Pitt Psychiatry
Annual Research Day

June 12, 2025 | 8:15am – 4:00pm
Soldiers & Sailors Memorial Hall | University of Pittsburgh Oakland Campus

Program Schedule

Start	End	Description
8:15 AM	9:35 AM	Poster Session I
9:35 AM	*9:55 AM*	*Transition to Poster Session II*
9:55 AM	11:15 PM	Poster Session II
11:15 AM	*11:40 PM*	*Transition to Lunch and Roundtables*
11:40 PM	12:40 PM	Lunch and Roundtables
12:40 PM	*1:10 PM*	*Transition to Auditorium for Afternoon Presentations*
1:10 PM	2:00 PM	Speed Dat(a)ing
2:00 PM	2:30 PM	Fast Pitch Psychiatry
2:30 PM	*2:50 PM*	*Break (light refreshments will be available)*
2:50 PM	3:40 PM	Psychiatry 2025: Where Are We Now? Where Are We Headed?
3:40 PM	4:00 PM	Awards Ceremony

Poster Session I: 8:15am-9:35am

Poster Session II: 9:50am-11:15am

ID #	Location	Session	Last Name	First Nme	Degree(s)	Title
1	Gettysburg Room	I	Adedokun	Jacqueline	BS	Maternal Cognition, Mental Health and Maladaptive Behaviors in Adults with Down Syndrom
2	Gettysburg Room	I	Akintola	Tomiwa	BS	Disparities in Recruitment and Engagement by Race and Parent Sex in Psychiatric Research on Early Risk for Childhood ADHD
3	Gettysburg Room	I	Allen	Erastus	BA, MBA	Enhancing 2P Calcium Imaging via Multi-Feature Spatiotemporal Analysis
4	Gettysburg Room	I	An	Su bin	BS	Impact of Stressful Family Life Events on Perceived Stress of Young People at Clinical High-Risk for Psychosis: Protective Role of Caregiver Relationship
5	Gettysburg Room	I	Annas	Ellen	BS	Sex Hormone Regulation of Prefrontal Cortex Parvalbumin Interneuron Physiology
6	Gettysburg Room	I	Antezana	Ligia	PhD	Characterizing Patterns and Correlates of Nonsuicidal Self-Injury in Autistic Adults
7	Gettysburg Room	I	Arion	Dominique	PhD	Shared transcriptional features of layer 3 pyramidal neurons projecting to the monkey dorsolateral prefrontal cortex
8	Gettysburg Room	I	Arora	Manan	MBBS	Elevated left ventrolateral prefrontal cortical(vlPFC) activity to reward expectancy(RE) is associated with higher mania/hypomania risk: a replication study in 3 independent young adult samples
9	Gettysburg Room	I	Arruda Da Costa E Silva	Sophia	BS	Differential Afferent and Efferent Connectivity Between Caudal and Rostral mPFC
10	Gettysburg Room	I	Asaoka	Yui	PhD	Effects of Ketogenic Diet on Reward Circuitry in Bipolar Disorder: A Preliminary Investigation
11	Gettysburg Room	I	Balogun	Wasiu	PhD	Plasma p-tau217 for early detection of brain amyloid pathology in community-dwelling older adults without cognitive impairment: evidence from three community-based studies
12	Gettysburg Room	I	Bamfo	Alexis	BS	Does It Matter How People Think About Suicide?
13	Gettysburg Room	I	Barko	Kelly	BS, MS	Sex Differences Detected in the Proteome of MDD Subjects
14	Gettysburg Room	I	Bauer Negrini	Guilherme	PhD	Longitudinal progression and harmonization of tau-PET tracers
15	Gettysburg Room	I	Bear	Shlomo		circRNA Derived from Extracellular Vesicles as Potential Biomarkers for Schizophrenia
16	Gettysburg Room	I	Beatty	Abigail	BSE	Contributions of neuronal oscillations and cortical SNR to developmental changes in inhibitory control from adolescence into adulthood
17	Gettysburg Room	I	Bellaver	Bruna	PhD	Head-to-head trajectories of MK6240, Flortaucipir, and plasma p-tau217 as a function of amyloid-β
18	Gettysburg Room	I	Bennett	Charles	PhD	Interactive Voice Response (IVR) Monitoring as an Adjunct to Outpatient Assessment of Suicidal Thoughts and Behaviors
19	Gettysburg Room	I	Berchulski	Mariah	BS	Simultaneous superficial and deep layer calcium imaging in midline cortex with preserved local cytoarchitecture
20	Gettysburg Room	I	Biver	Lizzie		Apathy and Neuroinflammation: A Dopamine-Independent Pathway
21	Gettysburg Room	I	Boito	Gina	BS	The Impact of Selective Serotonin Reuptake Inhibitors on Episodic Memory
22	Gettysburg Room	I	Brammell	Sarah	BS	Mental Health and Service Use Among Cisgender and Sexual and/or Gender Minority Autistic Young Adults
23	Gettysburg Room	I	Brantly	Nathan		Elucidating the roles of motor function and cognitive switching in locomotor switching after stroke
24	Gettysburg Room	I	Brockway	Dakota	PhD	Neuropeptide Modulation of Prefrontal Cortex Circuitry: Insights into VIP Signaling in Alcohol Use Disorder
25	Gettysburg Room	I	Brodnick	Zachary	BS	Dopamine availability and real-time baseline mood symptoms in depressed youth.
26	Gettysburg Room	I	BS	Aswathy	PhD	The Ketogenic Diet Alters Dopaminergic Activity in the Ventral Tegmental Area in a Mouse Model of Bipolar Disorder
27	Gettysburg Room	I	Budinich	Reece	BS	Xylazine Reduces Prefrontal Cortex Inhibition and Prevents Oxycodone Place Preference
28	Hallway A	I	Bustos-Robles	Lucía		Tolerability of a Single Dose of Buprenorphine, Naltrexone, or Placebo in Major Depressive Disorder: Insights from the RAISE Study
29	Hallway A	I	Buzanis	Sophia	BA	Developing a Brief Clinical Pathway for Trauma-Focused Management of Individuals with Trauma Histories Admitted to the Medical Hospital
30	Hallway A	I	Campbell	Beth	BA	Parsing the heterogeneity of multidimensional determinants of suicide risk in depressed older adults: focus on cognition, personality, and social risk factors

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Poster Session II: 9:50am-11:15am

ID #	Location	Session	Last Name	First Nme	Degree(s)	Title
31	Hallway A	I	Campion	Jacques-Yves	MD	Predicting Worry-Related Mental States using Regional Brain Activity with Long Short-Term Memory (LSTM) Recurrent Deep Neural Networks
32	Hallway A	I	Chae	Christopher	BS	Linking Neural Sensitivity to Social Rejection and Acceptance to Daily Depressive Symptoms
33	Hallway A	I	Chaichian	Omeed	BS	Transcranial Focused Ultrasound Neuromodulation in Psychiatry: Main Characteristics, Current Evidence, and Future Directions
34	Hallway A	I	Chamberlain	Britt		Medial orbitofrontal cortex representation of active avoidance and refinement over learning
35	Hallway A	I	Chapa	Danielle	PhD	Exercise Does Not Regulate Affect: An Ecological Momentary Assessment Study of Maladaptive Exercise in Women with Eating Disorders
36	Hallway A	I	Chen	Chang-Le (Charles)	MSc	Periventricular Diffusivity Reflects APOE4-modulated Amyloid Accumulation and Cognitive Impairment in Alzheimer's Continuum
37	Hallway A	I	Cheng	Cynthia	BS	Rapid Eye Movement (REM) Sleep Characteristics in Individuals with First-Episode Psychosis and Healthy Controls
38	Hallway A	I	Choity	Lamia	BS	Elevated p-Tau217 Disrupts Age-Related Resilience to Cognitive Decline in Older Adults
39	Hallway A	I	Christian	Caroline	PhD	Multivariate Trajectory Modeling of Eating Disorder Symptoms across the Perinatal Period
40	Hallway A	I	Chung	Daniel Wonjae	MD, PhD	Computational Modeling of Stimulus-locked and Persistent Gamma Oscillation Regimes Reveals Differential Vulnerability to Schizophrenia-Associated Synaptic Perturbations
41	Hallway A	I	Cole	Becca	BA	Oxycodone dependence alters Mu and Delta opioid receptor regulation of prefrontal cortex inhibitory transmission in a cell type-specific manner
42	Hallway A	I	Conaty	Kayla	BA	Perceived Hearing Loss is Associated with Processing Speed and Executive Functioning Deficits in Older Adults with Treatment-Resistant Late-Life Depression
43	Hallway A	I	Costa	Ana Paula	PhD	Peripheral Biomarkers of Lipid Dysregulation and Inflammation in Anxiety-Related Risk for Alzheimer's Disease and Related Dementias
44	Hallway A	I	Crawford	Amaya		**WITHDRAWN -** Trait Anhedonia Dampens Expectancy Effects While Anxiety Amplifies Reinforcement Induced Mood Responses in Depression
45	Hallway B	I	Crummy	Elizabeth	PhD	Investigating the Neural Substrates of Active Avoidance in the Bed Nucleus of the Stria Terminalis
46	Hallway B	I	D'Aiuto	Leonardo	PhD	Non-canonical Functions of Tau
47	Hallway B	I	Daniel	Joshua	BA	GET ActivE: Testing of a Behavioral Activation App for youth
48	Hallway B	I	Das	Aanika		The Relationship Between Traumatic Life Events and Mood Lability in Adolescents
49	Hallway B	I	Dauginikas	Emalee	MSc	An Explorative Analysis of Sibling's Impact on an Individual's Emotion Regulation
50	Hallway B	I	Deam	Megan	MA	Five-Year Trajectories of Psychotic-Like Experiences: The Influence of Negative Life Events on Screen Use
51	Hallway B	I	Des Ruisseau	Gabrielle	BS	**WITHDRAWN -** Circadian dysregulation and mood outcomes in young people at risk for bipolar disorder
52	Hallway B	I	DeSerio	Jillian	BS	More Than Mom Brain: A Qualitative Exploration of the Experiences of ADHD and Motherhood in Pittsburgh
53	Hallway B	I	Dewhurst	Hannah	BS	The Female Advantage in Verbal Memory Across Learning and Recall of the California Verbal Learning Test
54	Hallway B	I	Dickens	Jacinta	PhD	**WITHDRAWN** - Trajectories of insomnia and loneliness across a 12-week intergenerational dialog-driven intervention
55	Hallway B	I	DiDomenico	Dominique	BS	Trauma Exposure and Related Context Processing Disruptions
56	Hallway B	I	Ding	Xiaoshan (Victoria)		Pilot study to assess alterations in cortical and thalamic excitatory inputs to parvalbumin-expressing interneurons in prefrontal and primary visual cortices of schizophrenia
57	Hallway B	I	Dong	Yiwen	ScM	The association between amyloid and physical activity in a racially diverse cohort of older adults
58	Hallway B	I	Dowling	Kevin	BA	Patterns of Differential Gene Expression and Co-Expression in Layer 3 Pyramidal Neurons Across 3 Regions of the Human Cortical Visuospatial Working Memory Network in Schizophrenia
59	Hallway B	I	Dubovecky	Haley	BS	Personality Determinants of Loneliness Trajectories in Older Adults: Results from a 12-Week Intergenerational Dialog-Driven Intervention

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Poster Session II: 9:50am-11:15am

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60	Hallway B	I	Edery	Israel	BA	Circadian and homeostatic trends in mood and alertness across a 36-hour ultradian protocol in adolescents
61	Hallway B	I	Edmunds	Lylah	MS	How Do Black Moms Racially Socialize Girls vs. Boys?
62	Hallway B	I	Edvardsson	Hollis	MPH, CCRC	Differences in Cannabis Use Motivations Among Sexual and Gender Diverse Individuals Compared to Heterosexual and Cisgender Individuals and Their Associations with Self-Reported Cannabis Use and Problems
63	Hallway B	I	Eken	Hatice Nur	MD	Associations Between Obsessive-Compulsive Personality Disorder Traits and Symptom Dimensions in Obsessive-Compulsive Disorder: A Cross-Sectional Study
64	Hallway B	I	Eldeeb	Safaa	PhD	Variability in suicidal thoughts and behavior among autistic adolescents and adults: Subgroup identification, predictive features, and group differences
65	Hallway B	I	Ellis	Jaime	BS	Borderline personality features and suicidality in children: Examining associations in a high-risk sample
66	Hallway B	I	English	Gabrielle	BS	Social Rejection Enhances Frontal Pole Activity in Adolescents with Musculoskeletal Pain: A Potential Link between the Neural Responses to Social Threat and Physical Pain
67	Hallway B	I	Enwright, III	John	PhD	Transcriptional profiles of somatostatin and parvalbumin interneuron subtypes in the human dorsolateral prefrontal cortex: Implications for schizophrenia
68	Hallway B	I	Estrada	Yadira	BS, MSW	Two Fronts of Trauma: The Differential Effects of Intimate Partner Violence and Community Violence on PTSD in Rural Mexico
69	Hallway B	I	Fabian	Carly	BS	Mechanisms driving binge drinking: alcohol-induced alterations in PFC basket cell function and mGlu5 receptor signaling
70	Hallway B	I	Farinas	Marissa	MS	Plasma vs. serum: which is better for proteomic blood biomarker analysis? Evaluation of the novel NULISA platform
71	Hallway C	I	Feldman	Julia	PhD	The relation between paternal emotion regulation and inconsistent parenting is dependent on maternal emotion regulation
72	Hallway C	I	Felix	Cynthia	MD, MPH	Usefulness of MoCA in detecting preclinical AD
73	Hallway C	I	Fiske	Meghan	BS	Context Processing and the Implications for Mania Risk
74	Hallway C	I	Forbes	Camryn	BS	VGLUT2 knockdown in the VTA reduces acquisition of alcohol self-administration in a sex-specific manner
75	Hallway C	I	Fowler	Lauren	BS	Auditory and Motor Timing Dysfunction in First Episode Psychosis Indexed by Rhythmic Finger Tapping
76	Hallway C	I	Gallagher	Hannah	BS	Small Effects, Large Impact: An Illustration from National Mental Health Data
77	Hallway C	I	Gamwo	Isaac		**WITHDRAWN** - Is Age Really Just a Number? Effect of Age on Responsiveness of Young Adults with ADHD to a Smartphone Intervention
78	Hallway C	I	Gelber	Ashley	BS	Stress and Perceived Support in Parents of Children with and without Autism Spectrum Disorder
79	Hallway C	I	Ghafari	Kimia	BSc	Cell-Type-Specific Synaptic Proteomics in Postmortem Human Cortex via Proximity Labeling and Single-Cell Transcriptomic Integration
80	Hallway C	I	Glinsky	Michaela	BA	Associations between borderline personality disorder, self-other boundaries, and suicide risk in romantic relationships
81	Hallway C	I	Gogola	Alexandra	MS	Implementation of NIA-AA Multilevel Tau Staging for Predicting Tau Accumulation and Cognitive Decline in Non-Demented Individuals
82	Hallway C	I	Grace	Jennifer	MS	Father engagement in obstetrical care: Black fathers' perspective
83	Hallway C	I	Grad-Freilich	Melanie	BS	The role of childhood abuse and neglect on brain function during emotional interference: Implications for depression in adolescence
84	Hallway C	I	Grady	Alek	BS	Integrated functional proteomics nominate key phosphoprotein-regulatory nodes essential for synaptic function in Schizophrenia
85	Hallway C	I	Griffith	Julianne	PhD	Anticipatory and consummatory anhedonia in adolescent girls: Associations with daily-life positive affect."
86	Hallway C	I	Griffith	Rebecca	PhD	Longitudinal associations between shared and unique components of executive function and externalizing subdimensions: Findings from the ABCD Study
87	Hallway C	I	Grizzanti	John	PhD	Differential effects of Type II Diabetes Mellitus on plasma biomarkers in an Alzheimer's disease cohort: a large memory clinic study
88	Hall of Valor	I	Gu *(with Vivian Zhang)*	Jeremy	BS	NIH Toolbox Cognition Battery: Associations with plasma and imaging AD biomarkers in older adults without dementia

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Poster Session II: 9:50am-11:15am

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89	Hall of Valor	I	Hafenbreidel	Madalyn	PhD	Examining mechanisms of multiple memory encoding of cocaine- and fear-associated memories
90	Hall of Valor	I	Hall	Andrea	MD	Simplifying the risk discussion of antidepressant use in pregnancy, a prototype web-based learning module
91	Hall of Valor	I	Harris	Nicholas	MD, PhD	**WITHDRAWN** - Positive child experiences may mitigate associations between early life adversity and neural stress reactivity in the central visceral circuit
92	Hall of Valor	I	Harvie	V. Blair	BS	Breakfast skipping among children: associations with body mass index, food insecurity, and cognitive function
93	Hall of Valor	I	Ho	Kirsten	BS	Depressive Symptoms and Global Cognitive Functioning in Adults with Down Syndrome
94	Hall of Valor	I	Horan	Nicole	BS	The Barrier Has A Bedtime: Circadian Control of the Blood Brain Barrier in the Nucleus Accumbens
95	Hall of Valor	I	Horter	Chloe	BS	Exploring Dopamine Availability and Smartphone Derived GPS Patterns in Young People with Depression
96	Hall of Valor	I	Hudson	Emma	MA	Greater Stress Response Network (SRN) Connectivity is Associated with Higher Worry in Men and Women in Late Life
97	Hall of Valor	I	Ilina	Karolina	BS	A Social Support Online Intervention for Sexual and Gender Minority Youth to Increase Help-seeking for Anxiety and/or Depression: Pilot Randomized Controlled Trial
98	Hall of Valor	I	Izydorczak	Alexandra	PhD	Development of an Immunoprecipitation Mass Spectrometry method for Tau Peptides in Plasma for Alzheimer's Disease Diagnosis
99	Hall of Valor	I	Janecek	Michael	BA	Elevated dopamine signaling in the NAc of Shank3B-/- pups during maternal interaction.
100	Hall of Valor	I	Janssen	Sabine	BS	Descrying phasic and tonic REM sleep, from healthy control's EEG oscillatory activity, with no significant cognitive correlations
101	Hall of Valor	I	Jo	Alex	BS	Perceived Barriers and Facilitators to an Integrated Treatment for Insomnia and PTSD Symptoms in Women: a Qualitative Analysis
102	Hall of Valor	I	Johnston	Amanda	BS, BA	Public assistance as a risk factor for brain sequelae of chronic trauma
103	Hall of Valor	I	Joshi	Ila Abhijeet		μ-Opioid Modulation of Expectancy-Mood Dynamics During Acute Antidepressant Placebo Effects
104	Hall of Valor	I	Jouppi	Riley	MS	Exploring descriptives and correlates of distress associated with loss of control eating across the perinatal period
105	Hall of Valor	I	Joyce	Karla	MSW, LCSW	Benefits of Comprehensive Clinical Internship Programs
106	Hall of Valor	I	Julien	Megan	BHA	Changes in Anhedonia and Depression with a Single Ketamine Infusion in Youth with Depression
107	Hall of Valor	I	Kaminsky	Mariya	PhD	Ketogenic Diet as Potential Treatment for Bipolar Disorder
108	Hall of Valor	I	Kass	Judah		Parental Acceptance and Rejection: Examining Its Impact on Sexual and Gender Minority Youth Depression Severity
109	Hall of Valor	I	Kastner	Megan (Memphis)	BS	Mental Health Trends and Demographic Insights in STEAM Peer Support
110	Hall of Valor	I	Kavanagh	Jack	M.Phil	Investigating Auditory Segmentation Deficits in the Cingulate Motor Area of First Episode Psychosis
111	Hall of Valor	I	Keller	Lauren	BS	Melanopsin-Driven Light Responsivity and Reward Motivation in Young People at Risk for Mania
112	Hall of Valor	I	Kharade	Ameya		Predicting age using resting state connectomes with deep curriculum based learning
113	Hall of Valor	I	Kinkel-Ram	Shruti	MA	An Intersectional Examination of Weight and Gender Identity-Based Minority Stress on Depression Symptoms among Gender Minority Youth
114	Hall of Valor		Ko	Mei-Chuan (Holden)	PhD	Does a highly G protein-biased mu opioid receptor agonist have an improved therapeutic profile?
115	Gettysburg Room	II	Koganti	Sannidhi	BSA	Moderating Effects of Working Memory Capacity and Internalizing Symptoms on the Relationship Between Age and Emotional Interference Resistance
116	Gettysburg Room	II	Krishna	Maya	BS	Do Reasons for Living Buffer Suicide Risk Equally? A Race-Moderated Analysis
117	Gettysburg Room	II	Ku	Shih-Hsuan (Tiffany)	MS	Exploring the Role of OMGp Signaling in Dendritic Development
118	Gettysburg Room	II	Laifer	Lauren	MA	Associations between chronicity and severity of preconception stress exposure and maternal HPA-axis reactivity during pregnancy
119	Gettysburg Room	II	Langer	Beatrice	BS	Development of a Social Trust Paradigm to Measure Strategic Coaxing

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Poster Session II: 9:50am-11:15am

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120	Gettysburg Room	II	Lee	You-Rim	PhD	Potential of dried plasma spot: a comparative study of plasma biomarker quantification using NULISA
121	Gettysburg Room	II	Leon-Romero	Alejandro	BA	Leveraging the Functionality of RShiny and REDCap to Optimize Study Operations in Clinical Trial Research
122	Gettysburg Room	II	Lewis	Madison	BS	AI-based Region-of-Interest Selection for Schizophrenia
123	Gettysburg Room	II	Lukasewicz Ferreira	Pamela	PhD	Head-to-head association of plasma p-tau217 with MK6240, Flortaucipir, PI2620, and RO948 tau PET tracers
124	Gettysburg Room	II	Luo	Weiquan		Evaluation of image processing methods on biological relationships with tau burden for multisite cross-sectional and longitudinal studies of 18F-Flortaucipir PET
125	Gettysburg Room	II	Lussier	Firoza	MS	Longitudinal multicenter head-to-head harmonization of tau-PET tracers
126	Gettysburg Room	II	Mabry	Samuel	PhD	The Combined Roles of Vesicular Release and Dopamine Reverse Transport on the Psychostimulant Properties of Amphetamine
127	Gettysburg Room	II	Magee	Kelsey	PhD	Patterns of stability and change in pregnancy-to-postpartum depressive symptoms among first-time mothers
128	Gettysburg Room	II	Maier	Matthew	BS	Cortical Layer-Specific Alterations in Schizophrenia: Evidence for Inflammation and Elevated ZFP36
129	Gettysburg Room	II	Manna	Lillian	BS	Can We Distinguish Types of Suicidal Behavior? Examining the Role of Impulsivity, Physical Aggression, and Emotion Regulation
130	Gettysburg Room	II	Mannion	Katherine	BS	Feasibility of actigraphy and sleep diary collection in preschool-aged children with behavioral and sleep difficulties
131	Gettysburg Room	II	Marowski	Megan	BS	Stress and Conflict in Borderline Personality Disorder: The Protective Role of Agreeableness
132	Gettysburg Room	II	Mayorga	Lynnea	BA	Preliminary analysis on the role of physiological stress reactivity in mediating the relationship between puberty and anxiety symptoms
133	Gettysburg Room	II	McCarty	Erin		The relationship between Subjective Cognitive Decline and Objective Cognitive Performance in older adults with Treatment-Resistant Late-life Depression: Role of Depression Severity as a Mediator
134	Gettysburg Room	II	McCathern	Ali	MD	Restructuring psychotherapy didactic for medical student psychiatry clerkship
135	Gettysburg Room	II	McDonald	Nastasia	PhD	Oops!: Error-Related Negativity as a Neural Correlate of Chronic Health Stress in Adolescents Enriched for Depression Risk
136	Gettysburg Room	II	McDonald	Nicholas	BS	Closed-Loop Respiration-Timed Optogenetic Stimulation in Mice using Real-Time Forecasting
137	Gettysburg Room	II	McKeon	Shane	PhD	Intrinsic neural timescales decrease through adolescence into adulthood supporting cognitive development
138	Gettysburg Room	II	Mehalko	Jordan	MSCP	Adolescent Feedback on a Suite of Mobile Suicide Prevention Tools: Integrated Care to Help at Risk Teens (iCHART)
139	Gettysburg Room	II	Melchitzky	Darlene	MS	The Arrangement of Synapses in Layer 3 of Human Prefrontal Cortex
140	Gettysburg Room	II	Miller	Nora	BS	Discrimination of threat vs. non-threat stimuli is differentially regulated by rostral and caudal medial prefrontal cortex
141	Gettysburg Room	II	Mirchandaney	Riya	BA	Circadian preference, but not circadian phase, associates with state and trait levels of impulsivity in adolescents
142	Hallway A	II	Mizuno	Akiko	PhD	Using Natural Language Processing to Identify Reflections on Late-Life Loneliness After an Intergenerational Dialogue-Driven Intervention
143	Hallway A	II	Monto	Abdul Razak	PhD	Comparative evaluation of Blood Collection Tubes on Targeted Proteomic Profiles of Alzheimer’s Disease Plasma Biomarkers
144	Hallway A	II	Mossazghi	Nahom	BS, MS	The neural basis of cognitive deficits in adults with sickle cell disease: a task-based fMRI study
145	Hallway A	II	Mroué	Rayan	MD	Different Patterns of Propagation of Tau Tangle Pathology in Typical Alzheimer's Disease Determine Clinical Sub-Phenotypes
146	Hallway A	II	Myers	Teneisha	MS	Pharmacokinetic profiling of ∆9-THC metabolism and its association with cognitive impairment and modulation by stress
147	Hallway A	II	Nafash	Michel	BS	Analytical Validation of BD-tau Advantage Plus Kit with Clinical Corroboration in a Pilot Traumatic Brain Injury Cohort.
148	Hallway A	II	Niggemyer	Michael	BS	The Role of Puberty on Neural Activity to Reward Feedback in Early Adolescence
149	Hallway A	II	Nizam	Nawshad Binta		Cross-Species Mapping of Human and Mouse Medial Prefrontal Cortex Using Spatial Transcriptomics

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Poster Session II: 9:50am-11:15am

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150	Hallway A	II	Nooraeen	Sara	MD	Neural Responses to Social Rejection in Adolescents with Musculoskeletal Pain: Preliminary Findings of Altered Processing of Social Threat
151	Hallway A	II	Novacich	Isabel	BS	Cognitive Function and Depression in Adolescents Under Chronic Stress
152	Hallway A	II	O'Rourke	Ella	BS	Independent validation of regional Biochemical Markers of Neuropil Contraction in Early-Onset Schizophrenia Identified by 7T ^{31}P MRS
153	Hallway A	II	Ojha	Amar	BA	Developmental trajectories of prefrontal – nucleus accumbens subcircuits support cognitive and affective control across adolescence
154	Hallway A	II	Ouyang	Bowei	PhD	Brain Age Estimation Using Deep Learning on High-Resolution MRI
155	Hallway A	II	Pan	Yiyan		Women have Greater Tortuosity of Internal Carotid Artery Compared to Men
156	Hallway A	II	Pangburn	Mary		Periventricular White Matter Diffusivity as a Mediator Between Metabolic Syndrome Components and Cognitive Impairment
157	Hallway A	II	Papale	Andrew	PhD	Age and Sex Differences in Exploration and Related Representations in Ventral Prefrontal Cortex and Hippocampus from Adolescence to Adulthood
158	Hallway A	II	Parr	Ashley Clare	PhD	Substance use trajectories relate to variation in impulsivity, inhibitory control, and tissue iron indices of dopamine neurobiology during the transition from adolescence to adulthood
159	Hallway B	II	Pearcy	Leigh	PhD	Longitudinal changes in white matter hypointensities in recurrent late-life depression
160	Hallway B	II	Perez	Megan	BS	Gene Splicing Differences in Psychosis in the Striatum
161	Hallway B	II	Petersen	Kaitlyn	PhD	Adolescent circadian rhythm disruption leads to increased risk-taking and transcriptional changes in adulthood
162	Hallway B	II	Petrie	Daniel	PhD	Developmental trajectories of reward, goal-directed, and habitual brain circuits are differentially linked to alcohol use
163	Hallway B	II	Pierson	Jamie	PhD	Evaluation of Compulsive and Anxiety-Like Behaviors in a Heterozygous Global Slitrk5 Knockout Mouse Model
164	Hallway B	II	Ponce	Jacob	BS	Psychological Resilience as a Moderator of Cognitive Reserve: An Integrative Neuroimaging Study
165	Hallway B	II	Povala	Guilherme	PhD	Harmonization of Flortaucipir, MK6240, PI2620 and RO948 with the Uni scale
166	Hallway B	II	Raeder	Robert	MSc, MA	Pre-Supplementary Motor Area Activity During Reward Expectancy Linked to Mania/Hypomania Risk
167	Hallway B	II	Raminfard	Samira	PhD	Diffusion-Derived Subcortical Microstructural Changes Associated with Clozapine Response in Treatment-Resistant Schizophrenia
168	Hallway B	II	Rapp	Ellie	BA	The Association Between Lifetime Suicide Risk and Cognitive Function Among Older Adults with Treatment Resistant Depression
169	Hallway B	II	Regal	Abigale	BS	The Impact of Depressive Symptoms and Disorders on Breastfeeding Intent and Duration
170	Hallway B	II	Ren	Yuxin	BS	Scanner effects in longitudinal tau-PET imaging studies of Alzheimer's Disease
171	Hallway B	II	Renuka Sanotra	Monika	PhD	Combining p-tau217 with Other Blood Biomarkers to Enhance Prediction of Cognitive Decline: A Large Memory Clinic Cohort Study
172	Hallway B	II	Rhorer	Hayley	BA	Differential Auditory Segmentation Potentials in First-Episode Psychosis: Active vs Passive Attention
173	Hallway B	II	Roberts	Anna		Altered resting state hippocampal connectivity associated with amyloid and tau in older adults without dementia from a population-based cohort study
174	Hallway B	II	Rose	Morgan	BS	Collaborating to create a "Roadmap to ETUDES": Human-centered design informs study materials to engage families in suicide prevention research
175	Hallway B	II	Ruppert	Emma	MD	Harmonizing visual reads of tau PET tracers - HEAD cohort
176	Hallway B	II	Russell	Emily	BS	Contextual Influences on Emotion Socialization: An Examination of the Current Framework and Future Directions
177	Hallway B	II	Saha	Pampa	PhD	Association of plasma GFAP with tau PET in cognitively unimpaired Aβ-negative subjects
178	Hallway B	II	Sanchez Montenegro	Catalina	BA	Maternal Depression and Dyadic Neural Synchrony: The Moderating Role of Maternal Positive Affect

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Poster Session II: 9:50am-11:15am

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179	Hallway B	II	Saunders	August	BA	Exploring the Intersection of Emotion Dysregulation and Intervention Use in Autistic Children
180	Hallway B	II	Scarpatto Rodrigues	Matheus	PhD	Effects of AD modifiable risk factors to tau-pet tracer uptake and its association with cognition in early Braak stages
181	Hallway B	II	Schmitt	Tylar	BA	A Scoping Review of Cultural Adaptation Frameworks for Digital Mental Health and Substance Use Interventions
182	Hallway B	II	Scop Medeiros	Marina	MD	Comparison of MK-6240 and Flortaucipir tau PET for the biological staging of Alzheimer disease
183	Hallway B	II	Scott	Madeline	PhD	Age dependent changes in 24 hour gene expression rhythms across cells of the human dorsolateral prefrontal cortex
184	Hallway B	II	Scullin	Keeley	BS	Distinct Clinical and Neuroimaging Profiles by Amyloid Status in Mild Cognitive Impairment
185	Hallway C	II	Seah	Stanley	PhD	Day-to-Day Sleep Quality Moderates the Link between Social Stress and Suicidal Ideation among High-Risk Sexual and Gender Diverse Young Adults
186	Hallway C	II	Seebold	Dylan	BS	Melody and Rhythmicity Perception Deficits in First-Episode Psychosis
187	Hallway C	II	Sehrawat	Anuradha	PhD	Equivalence of plasma and serum for clinical measurement of p-tau217: comparative analyses of four blood-based assays
188	Hallway C	II	Shellhause	Karoline	BS	Neuromodulatory effects of bright light on threat and reward network metabolism in depressed adults
189	Hallway C	II	Shelton	Micah	MS	Dissecting Cortical Layer and Sex-Specific Transcriptional Differences within the Subgenual Anterior Cingulate Cortex in Major Depressive Disorder
190	Hallway C	II	Shih	Yi-Chun	MS	Early Postnatal Dysfunction of ACC PV Interneurons in Shank3B-/- Mice
191	Hallway C	II	Silva da Rocha	Andreia	PhD	Head-to-head comparison of MK6240 and Flortaucipir PET tracers for in vivo Braak staging
192	Hallway C	II	Silva do Amaral	Livia	MSc	Comparison of Topographical Patterns of Abnormalities of the Tau PET Tracers [18F]Flortaucipir, [18F]MK6240, [18F]PI2620, and [18F]RO948
193	Hallway C	II	Silva Oliveira, Jr.	Markley	PhD	Tau-phosphorylation and Oligodendrocyte Dysfunction in Alzheimer's Disease
194	Hallway C	II	Singer	Juli	MS	Clinical Utility of Plasma Biomarkers in Alzheimer's Disease (CliPAD)
195	Hallway C	II	Singh	Maya	MSc	**WITHDRAWN:** Predicting Postpartum Depression: A Data-Driven Approach to Early Risk Screening
196	Hallway C	II	Sinrich	Jacob		Brain Age in Autism: identifying factors associated with accelerated aging
197	Hallway C	II	Snider	Isabella	BS	High Fidelity Wraparound's Positive Effects on Daily Functioning, Living Satisfaction, and Caregiver Strain
198	Hallway C	II	Snyder	Ian	BS	Neuromodulation of Antidepressant Placebo Effects: A TBS Study
199	Hallway C	II	Soares	Carolina	PhD	Profiling Amyloid-Negative, Tau-Positive Individuals with Two Tau PET Tracers – The HEAD study
200	Hallway C	II	Son	Haeun	BS	Parvalbumin interneuron diversity in mouse visual and prefrontal cortices
201	Hallway C	II	Springer	Shale	BS	Altered protein expression and phosphorylation in higher-order thalamic nuclei in Obsessive-Compulsive Disorder
202	Hall of Valor	II	Stein	Dylan		Toddler Behavior and Preschool ADHD Outcomes among Children at High and Low Familial Risk of ADHD
203	Hall of Valor	II	Stewart	Holly	BS	Participant performance factors and improvement in depressive symptoms following real-time fMRI amygdala neurofeedback training
204	Hall of Valor	II	Stowe	Taylor Ashley	PhD	Diurnal Rhythms Underlying Cholinergic Interneurons May Mediate Reward-Related Behaviors
205	Hall of Valor	II	Su	Derica	BA	Brain Network Activity in Autistic and Non-Autistic Adults Thinking About Preferred Interests
206	Hall of Valor	II	Syta	Juliette	BS	Belief-updating computations underlying repetitive negative thinking in late life
207	Hall of Valor	II	Taglioni	Laura	BA	Trust, But Take: Individual Differences in Reward Sensitivity Influence Strategic Exploitation during a Social Exchange Game
208	Hall of Valor	II	Taraban	Lindsay	PhD	Maternal Parenting-Related Confidence is Associated with Neural Co-Regulation among Mother-Infant Dyads
209	Hall of Valor	II	Teixeira Leffa	Douglas	MD, PhD	ADHD Genetic Risk and Cognitive Decline in Older Adults: Findings from the Alzheimer's Disease Sequencing Project

Poster Session I: 8:15am-9:35am

Poster Session II: 9:50am-11:15am

ID #	Location	Session	Last Name	First Nme	Degree(s)	Title
210	Hall of Valor	II	Theis	Nicholas	MS	Brain Energy States are Diagnostically Distinct & Capture Neural Dynamics Better than Regional Activation and Connectivity
211	Hall of Valor	II	Thomas	Jacky	BS	Navigating Sexual Orientation Diversity: Investigating the Impact of Mental Health on Academic Success Amongst New College Students
212	Hall of Valor	II	Tomlinson	Claire	PhD	Meta-Analysis on the Effectiveness of mHealth Interventions for Mental Health: A 10-Year Update
213	Hall of Valor	II	Vaughan	Dylan	BS	Melanin-concentrating hormone reduces learned helplessness in male mice and modulates layer 2/3 medial prefrontal cortex neuron properties
214	Hall of Valor	II	Verma	Piya		Adolescent specific effects of cumulative lifetime stress on affective impulsivity
215	Hall of Valor	II	Verone	Kate		Predicting Biological Age from Brain MRI with Deep Learning
216	Hall of Valor	II	Wang	Linghai		A Computational Approach to Examining Performance Perception
217	Hall of Valor	II	Wang	Melanie	BS	Emotional Brain Responses during Light Exposure in Adults with Depression
218	Hall of Valor	II	Weaver	Shantele	BS, MSCP	**WITHDRAWN** Optimizing Suicide Prevention Strategies for Pediatric Primary Care Through End-User Feedback
219	Hall of Valor	II	Westbrook	Ceci	MD, PhD	Identifying Brain Signatures of Worry Among Adolescents And Adults: A Multivariate Pattern Analysis Approach
220	Hall of Valor	II	Wilson	Michelle	BS	The MomMA program: A novel behavioral intervention for ADHD in pregnancy
221	Hall of Valor	II	Win	Emma	MSW	Detecting and managing fraudulent participation in a clinical trial
222	Hall of Valor	II	Wong	Meghan	MS	Bereavement Overload and its Association with Psychological Distress among Physicians-in-Training at UPMC
223	Hall of Valor	II	Wright	Destiny	BS	Developmental Trajectories of Hippocampal Glutamate & GABA
224	Hall of Valor	II	Yau	Stephanie		Nanoscale probing of synaptic architecture in human prefrontal cortex with expansion microscopy
225	Hall of Valor	II	Yeoum	Joshua	BS	Comparing Circadian Preference and Self-Reported Sleep Quality in Retired Night Shift Workers and Retired Day Workers
226	Hall of Valor	II	Yi	Sophia		Auditory processing deficits of dual-rule complex MMN in first episode psychosis
227	Hall of Valor	II	Yoblinski	Andrew	BS	Behavioral Effects of a Novel Antidepressant in a Mouse Model of Depression
228	Hall of Valor	II	Zeng	Xuemei	PhD	Unveiling Tau Pathogenesis in Alzheimer's Disease: A Label-Free Mass Spectrometry Study of Autopsy-Confirmed Brain Tissues

Presenter Name/Degree(s): Sannidhi Koganti, BSA
Current Position: Research Specialist

Primary Mentor in Psychiatry: Cecile D. Ladouceur, PhD

Title: **Moderating effects of working memory capacity and internalizing symptoms on the relationship between age and emotional interference resistance**

Author(s): ***Koganti S, Jones NP, Kumnick K, Versace A, and Ladouceur CD***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Emotional interference resistance, an emotion regulation subprocess, improves with age throughout adolescence to adulthood. Higher working memory capacity (WMC) is linked to stronger distraction resistance, while elevated internalizing symptoms (INT) are associated with greater vulnerability. The extent to which WMC and INT moderate age-related improvements in emotional interference resistance remains unclear.

Methods: Participants (n = 148, ages 10-25, 59% female) from the RESIST Study completed a Visual Working Memory task and Emotional Delay Working Memory (EDWM) task. Baseline INT was measured using the Youth/Adult Self-Report and Child Behavior Checklist. Linear mixed-effects models tested whether WMC (***M*** = 2.48, ***SD*** = 0.99) and INT (***M*** = 14.04, ***SD*** = 9.83) moderated the relationship between age and EDWM accuracy. Simple slopes analyses probed interactions at mean, +1 ***SD*** (high), and -1 ***SD*** (low) of each moderator.

Results: A significant interaction between age and WMC (***p*** = 0.029) showed that age predicted higher EDWM accuracy at low WMC (***p*** < 0.001), but not at mean or high WMC. A second interaction between age and INT (***p*** = 0.048) revealed stronger age—accuracy associations at mean (***p*** < .001) and high (***p*** < .001) INT, but not low INT (***p*** = 0.170), suggesting that age is a stronger predictor of accuracy at higher INT levels. A 3-way interaction (***p*** = 0.029) indicated that age predicted better accuracy at high INT when WMC was low (***p*** < 0.001), but not high (***p*** = 0.81).

Conclusion: Findings show that age-related improvements in emotional interference resistance are influenced by individual differences in working memory capacity and internalizing symptoms. Specifically, age effects on accuracy are reduced among participants with high WMC and low INT. Future longitudinal work will test whether higher WMC may buffer against heightened emotional interference linked to internalizing symptoms during adolescence and young adulthood.

Presenter Name/Degree(s): Maya Krishna, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Alexandre Y. Dombrovski, MD

Title: **Do reasons for living buffer suicide risk equally? A race-moderated analysis**
Author(s): ***Krishna M, Taglioni L, Tsypes A, Dombrovski AY, and Allen TA***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Suicide rates have increased dramatically for persons of color (POC) in the past decade. While many studies have investigated suicide risk factors, far fewer have examined protective factors, particularly in POC populations. Deterrents – known as reasons for living (RFL) – are associated with a lower likelihood of suicide attempts; however, little is known about whether their protective effects vary by racial group.

Methods: Four hundred fifty individuals with borderline personality disorder completed the RFL inventory at enrollment into a longitudinal study of suicide. Suicide attempt history was collected at baseline and annual follow-ups. We used zero-inflated Poisson regressions to examine whether total RFL scores predicted lifetime and prospective suicide attempts and whether these relationships were moderated by POC status.

Results: Higher RFL scores were associated with fewer lifetime attempts (β ***= –.26, SE = .04, p < .001***) and a lower overall likelihood of having made a lifetime suicide attempt (β ***= 0.41, SE = .13, p < .001***), consistent with a protective effect. POC status did not moderate these associations. Prospectively, higher RFL scores were associated with a decreased likelihood of suicide attempts (β ***= .94, SE = .15, p < .001***), but POC status did not moderate this relationship. RFL scores were not associated with the number of prospective attempts.

Conclusion: Our results suggest that higher RFL scores are associated with a decreased likelihood of both lifetime and prospective suicide attempts, with consistent protective effects across racial groups. These findings underscore the importance of strengthening RFL as a universal protective factor in suicide prevention efforts. Critically, POC status did not moderate our findings, which may have been a function of needing to aggregate across distinct racial groups to maximize power. This highlights the need for larger samples that can better disentangle culturally specific influences on suicidal behavior.

Presenter Name/Degree(s): Shih-Hsuan Ku, MS
Current Position: Research Assistant

Primary Mentor in Psychiatry: Melanie Grubisha MD, PhD

Title: **Exploring the role of OMGp signaling in dendritic development**

Author(s): ***Ku SH[1], Erickson S[1], Chowdari K[1], Homanics G[2], Sweet R[1] and Grubisha M[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Anesthesiology & Perioperative Medicine, University of Pittsburgh School of Medicine

Introduction: Dendritic arborization is essential for determining receptive fields in pyramidal cells. We previously identified oligodendrocyte myelin glycoprotein (OMGp) as a regulator of dendritic architecture, highlighting its potential role in adolescent dendritic remodeling. Gain of function of an OMGp-driven pathway leads to dendritic regression during late development. However, the role of OMGp in maintaining normal dendritic architecture across adolescence remains unknown.

Methods: We first utilized oligodendrocyte-neuronal co-cultures in which OMGp was knocked down using siRNA and neuronal architecture was quantified via Sholl analysis. We next generated a mouse model with the OMGp allele flanked by LoxP sites to enable Cre-mediated recombination for OMGp knockdown. To validate the model, we crossed floxed OMGp mice with EIIa-Cre mice, which express Cre recombinase ubiquitously in early embryos, producing germline deletions. Quantitative PCR (qPCR) was used to assess OMGp knockdown efficiency.

Results: Knockdown of OMGp in co-culture induced dendritic lengthening compared to scrambled siRNA control. In our mouse model, qPCR revealed a significant reduction in OMGp expression in Cre-positive mice ($M = 0.0111$, $SD = 0.0081$, $n = 6$) compared to Cre-negative controls ($M = 0.0458$, $SD = 0.0085$, $n = 7$), $t(11) = -7.56$, $p = 1.11 \times 10^{-5}$. Notably, LoxP sites alone did not alter baseline OMGp expression, avoiding complications seen in previous attempts at generating conditional OMGp knockout animals.

Conclusion: Knockdown of OMGp in culture induces dendritic lengthening, supporting the notion that OMGp serves to negatively regulate dendritic growth later in development and contributes to counterbalancing growth signals across adolescence and adulthood, resulting in apparent stability. We have successfully generated and validated a conditional OMGp knockout mouse model that enables temporally controlled deletion of OMGp. This model will be valuable for investigating the role of OMGp in dendritic development during adolescence and its functional consequences on circuit formation in vivo.

Presenter Name/Degree(s): Lauren M. Laifer, MA
Current Position: Doctoral Clinical Psychology Intern

Primary Mentor in Psychiatry: Alison Hipwell, PhD, PsyD

Title: **Associations between chronicity and severity of preconception stress exposure and maternal HPA-axis reactivity during pregnancy**

Author(s): ***Laifer LM[1], Keenan K[2], and Hipwell AE[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychiatry and Behavioral Neuroscience, University of Chicago

Introduction: Research highlights prenatal stress as an important risk factor for maternal and offspring outcomes, with maternal hypothalamic-pituitary-adrenal (HPA) axis dysregulation likely playing a central role. Although chronic exposure to adversity across the lifespan contributes to altered stress regulation, limited prospective research has investigated how preconception stress predicts maternal prenatal HPA-axis reactivity. The present study addresses this critical gap by examining how stress exposure type, severity, and consistency across development relates to prenatal stress reactivity.

Methods: Participants are enrolled in the longitudinal Pittsburgh Girls Study (PGS). As part of the PGS, caregivers had reported on frequency and severity of a range of stressors when participants were 7-17 years. Developmental trajectories were modeled to capture severity and consistency across subsistence, safety, and caregiving domains. A sub-sample of PGS participants (N = 338, mean age=25.58 years, 70% African American) were enrolled in a pregnancy-focused study in which HPA-axis reactivity during pregnancy was measured via salivary cortisol levels collected before, during, and after (20-, 40- and 50-minutes) a standardized social-evaluative stress test.

Results: Controlling for gestational weeks and time of day, subsistence stress consistency across development was significantly associated with total cortisol output (p=.003) during the prenatal stress test. In contrast, stress severity and safety and caregiving consistency were not significantly associated with total cortisol output.

Conclusion: Findings suggest that preconception subsistence-related stress may be uniquely associated with prenatal HPA-axis reactivity and highlight the potential relevance of preventive interventions targeting this stress domain across childhood and adolescence to promote maternal and offspring wellbeing.

Presenter Name/Degree(s): Beatrice Langer, BS
Current Position: Research Programmer

Primary Mentor in Psychiatry: Alexandre Dombrovski, MD and Timothy Allen, PhD

Title: **Development of a social trust paradigm to measure strategic coaxing**

Author(s): ***Langer B[1], Taglioni L[1], Hallquist MH[2], Schreiber AM[3], Dombrovski AY[1], and Allen TA[1]***

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology and Neuroscience, University of North Carolina at Chapel Hill; [3]College of Medicine, University of Kentucky

Introduction: Two-player economic exchange games – including the multi-round social trust game – are often used to study the dynamics of interpersonal decision-making, including how players learn from feedback, ascribe mental states to others, and attempt to shape the behavior of co-players. However, classic variants of the trust game do not provide an explicit, quantitative measure of participants' attempts to influence their co-player, a phenomenon we define as strategic coaxing. Here, we develop and validate a modified social trust game that overcomes this limitation by manipulating the standard order of trial events to provide an objective, quantitative measure of strategic coaxing.

Methods: We recruited 253 individuals to play an online variant of the iterative trust game. Participants, playing as trustees, interacted with three computerized investors across two blocks (game modes). Investor policies varied based on their rate of reciprocation. In secrecy mode, participants pre-committed to keeping or returning an investor's endowment prior to being informed of their choice (providing an index of baseline prosociality); in exchange mode, participants made their decision after learning of the investor's action. Critically, on trials in which the investor kept, participants indicated what they would have done had they shared (allowing them to send a no-cost social signal to the co-player). We defined strategic coaxing as the difference in return rates in exchange vs. secrecy mode on trials in which the investor kept.

Results: We used multilevel modeling to investigate how design variables (investor reciprocation rate, investor decision, and game mode) influenced participant choices. Participants were more likely to return the endowment when playing with more reciprocal investors ($OR = 1.27$, $p < .001$), and less likely to return when playing with non-reciprocating investors ($OR = .89$, $p < .001$). There was strong evidence for strategic coaxing on the task: participants were more likely to signal a desire to return on trials in which the investor kept in the exchange mode than in the secrecy mode ($OR = 3.58$, $p < .001$). This effect also increased as the interaction progressed, consistent with learning.

Conclusion: Our modifications to the classic iterative trust game yield a novel, behavioral measure of strategic coaxing in an ecologically-valid setting. In future studies, this manipulation will allow us to connect strategic coaxing to individual differences in personality and psychopathology, potentially providing unique insights into the social-cognitive deficits present in clinical populations.

Presenter Name/Degree(s): You-Rim Lee, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Thomas K. Karikari, PhD

Title: **Potential of dried plasma spot: a comparative study of plasma biomarker quantification using NULISA**

Author(s): ***Lee YR[1], Zeng X[1], Gu J[1], Farinas MF[1], Kofler J[2], Tudorascu DL[1], Shaaban CE[3], Lingler J[3], Pascoal TA[4], Klunk WE[3], Villemagne VL[5], Berman SB[2], Sweet RA[2], Snitz BE[2], Ikonomovic MD[6], Kamboh MI[3], Lopez OI[2], Cohen AD[3], and Karikari TK[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Pittsburgh School of Medicine; [3]University of Pittsburgh Alzheimer's Disease Research Center (ADRC); [4]Departments of Psychiatry and Neurology, University of Pittsburgh School of Medicine; [5]The University of Pittsburgh; [6]UPMC

Introduction: Efforts to diagnose Alzheimer's disease (AD) through blood tests have identified promising biomarkers. However, traditional plasma collection via venipuncture requires a medical professional and cold-chain transport, limiting its use in remote or home-based testing. Dried plasma spots (DPS) allow self-sampling and easier storage/transport but yield limited plasma. The Nucleic Acid-Linked Immuno-Sandwich Assay (NULISA) quantifies biomarkers from small plasma. This study compares DPS and traditional plasma using NULISA to evaluate DPS's potential for AD biomarkers.

Methods: Venous bloods were collected from 85 participants. DPS samples were created by applying blood to Telimmune Duo Plasma Prep Cards. Traditional plasma samples were collected through centrifugation. Alamar sample diluent was used to extract proteins from DPS. NULISAseq CNS Panel was performed on an Argo HT. The reproducibility of assays was evaluated using a Sample Control run in triplicate across runs. Spearman correlation assessed the concordance between DPS and traditional plasma samples.

Results: The NULISAseq CNS panel quantified 127 targets with high reproducibility, showing median intra- and inter-plate coefficients of variation <10%. In DPS samples, 104 targets (82%) were detected above the limit of detection in >50% of samples, compared to 123 (97%) in plasma. Median sample detectability was 82.7% for DPS and 96.1% for plasma. Among the 9 classical AD biomarkers, 6 biomarkers showed high detectability (71% to 99%), while 3 biomarkers had low detectability (29% to 35%). DPS and plasma samples showed moderate correlations for these biomarkers ($r = 0.197–0.616$). Across the panel, the median correlation was 0.369, with NEFH (0.831), CHIT1 (0.829), and IL5 (0.783) showing the highest values.

Conclusion: Our results support the potential of DPS for remote and home-based testing, enabled by technologies like NULISA that quantify biomarkers from low plasma volumes. Further optimization of DPS methods is needed to improve concordance with classical plasma samples.

Presenter Name/Degree(s): Alejandro Leon-Romero, BA
Current Position: Data Coordinator & Analyst

Primary Mentor in Psychiatry: Katalin Szanto, PhD and Sarah Stahl, PhD

Title: **Leveraging the functionality of RShiny and REDCap to optimize study operations in clinical trial research**

Author(s): ***Leon-Romero A, Campbell B, Wong MT, Szanto K, and Stahl ST***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Well-written software is the backbone of data-driven science including clinical research. Incorporating best software development practices with effective data management is essential for ensuring data quality and integrity which is vital for the success of clinical trials. Data collection practices must be complemented by a thorough data management system that ensures data completeness, accuracy, and consistency. This study describes the use of the R programming package, Shiny, in unison with the database platform REDCap, to create a web-based application to uphold and maintain proper data management principles in a clinical trial incorporating clinical, self-report, ecological momentary assessment, health coaching, and actigraphy data protocols.

Methods: We built a web application using RShiny to pull data from REDCap in real time. Applying user-feedback, we established an automated way to 1) implement tests to validate our study data against discrepancies; 2) generate CONSORT diagrams; 3) schedule and track participant visits; and 4) generate data visualization for research presentation.

Results: The RShiny web app utilizes REDCap as a single source of truth for our study's data. By establishing a user-friendly way for research staff to view and interact with individual and summarized participant data, our web app has organized study operations, including participant visits, equipment tracking, and has ensured that all research staff have access to real-time information. This app has also aided research staff in preparing updated information for yearly NIMH recruitment and progress reports.

Conclusion: These operational improvements contributed to improving the fidelity of clinical trial components, data integrity, and data comprehension among our research team.

Presenter Name/Degree(s): Madison Lewis, BS
Current Position: Graduate Student Researcher

Primary Mentor in Psychiatry: Konasale Prasad, MD

Title: **AI-based region-of-interest selection for schizophrenia**

Author(s): ***Lewis M[1], Theis N[2], Sundar H[3], Ouyang B[2], and Prasad K[1,2]***
Affiliation(s): [1]Department of Bioengineering, University of Pittsburgh Swanson School of Engineering; [2]Department of Psychiatry, University of Pittsburgh School of Medicine; [3]Department of Biomedical Engineering, College of Engineering, Carnegie Mellon University

Introduction: Selecting regions-of-interest (ROI) of clinical and pathophysiological importance is challenging but a critical step for developing targeted novel treatments. Artificial intelligence (AI)-based models can potentially help by using data-driven approaches guided by case-control prediction rather than associations. We used a deep learning graph convolutional network (GCN) model to predict the case-control status and map disorder-specific brain regions using MRI-derived dynamic functional connectomes (dFCs) from a sample of adolescent-onset schizophrenia (AOS).

Methods: In a balanced AOS and control sample, we used windows of resting-state functional MRI data defined by abrupt changes in network architecture (changepoints) to temporally partition the timeseries. Then several dFCs were built using the partitioned timeseries data per subject yielding enough networks for GCN training. The GCN model architecture was used successfully previously. Salient regions and edges were extracted from the best GCN model using Class Activation Mapping (CAM) and Integrated Gradients (IG), respectively, to identify features that significantly contributed to the prediction.

Results: The changepoint-informed windowing produced 617 dFCs (303 AOS, 314 control). GCN accurately predicted (average accuracy 80%; sensitivity 83%, specificity 77%) across 5-fold cross-validation; the best GCN model had 85% accuracy (sensitivity/specificity 84%/85%). These findings were validated on an independent sample with better accuracy. CAM identified early visual and inferior parietal cortex regions for AOS and superior parietal cortex regions for controls. IG identified salient connections for AOS between anterior cingulate regions, early to primary visual cortexes, and commissural connections between anterior cingulate regions. The controls had salient connections from anterior cingulate to dorsolateral prefrontal cortex.

Conclusion: Using dFCs within GCN models is a promising approach (which shows greater accuracy than clinician inter-rater reliability) with an added advantage of providing neurobiological basis by identifying salient features relevant for the classification. After further replication, salient features can be used to identify neuromodulation treatment targets.

Presenter Name/Degree(s): Pamela C Lukasewicz Ferreira, PhD
Current Position: Research Assistant Professor

Title: **Head-to-head association of plasma p-tau217 with MK6240, Flortaucipir, PI2620, and RO948 tau PET tracers**

Author(s): *Ferreira PCL[1], Bellaver B[1], Povala G[1], Bauer-Negrini G[1], Lussier F[1], Ruppert E[1], Soares C[1], Rocha A[1], Amaral L[1], Cehula J[1], Medeiros M[1], Masdeu JC[2], Tudorascu DL[1], Karikari T[1], Soleimani-Meigooni DN[3], Fortea J[4], Lowe VJ[5], Oh H[6], Pascual B[2], Gordon BA[7], Rosa-Neto P[8], Baker SL[9], and Pascoal TA[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurology, Houston Methodist Research Institute; [3]Department of Neurology, University of California - San Francisco;[4]Department of Neurology, Hospital de la Santa Creu i Sant Pau; [5]Department of Radiology, Mayo Clinic; [6]Department of Psychiatry and Human Behavior, Brown University; [7]Department of Radiology, Washington University in St. Louis; [8]McGill University Research Centre for Studies in Aging, McGill University; [9]Lawrence Berkeley National Laboratory*

Introduction: Tau phosphorylation and aggregation are hallmark features of Alzheimer's disease pathology (AD). Previous studies have shown that plasma phosphorylated tau (p-tau) at threonine 217 can detect AD-related tau tangle pathology. However, the head-to-head association between p-tau217 and different tau PET tracers remains unexplored. Here, we conducted a head-to-head comparison of the association between plasma p-tau217 and four distinct tau PET tracers [MK6240, Flortaucipir (FTP), PI2620, RO948].

Methods: We studied 338 individuals across the AD continuum from the HEAD study [190 cognitively unimpaired (CU), 148 with cognitively impaired] with available FTP, MK6240, and plasma p-tau217 measures. A subset of 64 individuals also had PI2620 and RO948. The strength of the association was determined using t-value maps from regression models, and the extent was measured by the percentage of significant voxels(t-value>3.2). R-square metric was used to determine how much of the variance in tau PET tracer estimates was explained by plasma p-tau217.

Results: We found that in CU, both the extent and magnitude of the association with plasma p-tau217 were higher for MK6240 compared to FTP. Plasma p-tau217 explained a greater proportion of the variance in MK6240 than in FTP. In CI, the extent and magnitude of the association were similar for MK6240 and FTP. Additionally, plasma p-tau217 explained a similar proportion of the variance in MK6240 and FTP. Using the subset of individuals who had all tau tracers, MK6240 showed a slightly higher extent of association with p-tau217, followed by FTP, PI2620, and RO948. The magnitude of association was stronger for MK6240, followed by PI2620, RO948, and FTP. Plasma p-tau217 explained a greater proportion of the variance in MK6240, followed by FTP, RO948, and PI2620.

Conclusion: In summary, our results indicate that the four tau PET tracers exhibit robust associations with plasma p-tau217 in similar topographical regions.

Presenter Name/Degree(s): Weiquan Luo
Current Position: Graduate Student Researcher

Primary Mentor in Psychiatry: Howard J. Aizenstein, MD, PhD

Title: **Evaluation of image processing methods on biological relationships with tau burden for multisite cross-sectional and longitudinal studies of ^{18}F-Flortaucipir PET**

Author(s): Luo W[1], Laymon CM[1], Baker S[2], Cohen AD[1], Villemagne VL[1], Lopresti BJ[1], Aizenstein HJ[1], Tudorascu DL[1], and Minhas DS[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Molecular Biophysics and Integrated Bioimaging, Lawrence Berkeley National Laboratory

Introduction: Gaussian smoothing to a common resolution is regularly employed to harmonize PET imaging in multi-site studies. However, spatial smoothing of PET can increase spill-over contamination between neighboring regions. Partial volume correction (PVC) has been applied to correct for such contamination. Despite being common practices, the impact of smoothing and PVC on cross-sectional and longitudinal tau PET outcomes is unclear. This study evaluated the impact of image-processing methods on estimated scanner (batch) effects and biological relationships with tau burden in cross-sectional and longitudinal analyses of multi-site ^{18}F-Flortaucipir (FTP) PET data.

Methods: Native-resolution FTP images (RAW) from 488 ADNI participants with longitudinal imaging were included in analyses. Image-processing methods evaluated were smoothing of PET images to an effective resolution of 8mm (SMO), application of a tau-specific PVC method (Baker et al, 2017) to native-resolution PET (RAW+PVC), and application of PVC to smoothed PET (SMO+PVC).
SUVR outcomes were extracted for all methods from Braak regions. Mean normalized additive and multiplicative scanner effects were assessed for outcomes using ComBat/LongComBat frameworks. Multivariate and mixed-effect models were used in cross-sectional and longitudinal analyses, respectively, to evaluate age, sex, and cognitive status as predictors of Braak SUVR.

Results: Smoothing did not consistently reduce estimated scanner effects. However, PVC of native-resolution data consistently reduced estimated additive scanner effects across all Braak regions, relative to RAW. Smoothing attenuated age and sex relationships with Braak 1 SUVR cross-sectionally and longitudinally. Sex was only significant longitudinally with PVC outcomes. PVC also increased the significance of age and cognitive status effects, both cross-sectionally and longitudinally, in earlier Braak regions compared to RAW and SMO.

Conclusion: Smoothing multi-site FTP PET data to a common resolution does not consistently reduce estimated scanner effects and attenuates the significance of age and sex. Tau-specific PVC consistently reduces additive scanner effects and enhances observed biological effects in early Braak regions.

Presenter Name/Degree(s): Firoza Z. Lussier, MS
Current Position: Research Program Administrator

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Longitudinal multicenter head-to-head harmonization of tau-PET tracers**

Author(s): *Lussier FZ[1], Povala G[1], Bauer-Negrini G[1], Ferreira PL[1], Bellaver B[1], Silva do Amaral L[1], Singer J[1], Masdeu J[2], Karikari TK[1], Tudorascu DL[1], Soleimani-Meigooni D[3], Oh H[4], Fortea J[5], Lowe V[6], Pascual P[2], Gordon BA[7], Rosa-Neto P8, Baker S[9], and Pascoal TA[1]*
Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Houston Methodist Research Institute, Department of Neurology; [3]University of California San Francisco, Memory and Aging Center; [4]Brown University, Department of Psychiatry and Human Behavior; [5]Hospital de la Santa Creu i Sant Pau, Sant Pau Memory Unit, Department of Neurology; [6]Mayo Clinic, Department of Radiology; [7]Washington University in St. Louis, Department of Radiology; [8]Translational Neuroimaging Laboratory, McGill University Research Centre for Studies in Aging, Douglas Research Institute; [9]Lawrence Berkeley National Laboratory*

Introduction: The HEAD study aims to generate a critical, longitudinal head-to-head dataset of MK-6240, Flortaucipir, RO948, and PI-2620 tau-PET to harmonize tau-PET tracers' outcomes and develop tools to generalize findings across research studies and clinical trials. Here, we provide an update on the progression of the HEAD study.

Methods: The HEAD study enrolls individuals between 18-28/50-90 years and classified as Young/CU/MCI/Dementia across nine performance sites. HEAD protocols involve clinical assessment utilizing the NACC Uniform Data Set, blood collection for banking of plasma/serum/buffy coat/whole blood, and MRI acquisition based on ADNI4. All participants undergo amyloid-β-PET with PiB/NAV4694/Florbetaben/Flutemetamol, and head-to-head tau-PET with at least two tracers, including MK-6240 (90-110), Flortaucipir (80-100), PI-2620 (45-75), and RO948 (70-90). PET data is reconstructed and processed uniformly similarly to ADNI4. LONI provides centralized databasing and NCRAD provides the blood sample biorepository. All study procedures are repeated at 18 months.

Results: Over 28 months, N=731 (72.1±6.8 years, 54% female) participants were enrolled, exceeding our proposed enrollment by 18%, with 40% of the cohort being cognitively impaired and 26% being from underrepresented groups (race/ethnicity/rurality). Advancements in data collection has generated N=629 (86%) complete initial timepoints, with 1,588 total acquired head-to-head tau-PET scans (mean acquisition window=34.9 days). Overall, 39% of the cohort are APOEε4 carriers, and amyloid-β positivity is 22/66/84% across CU/MCI/Dementia, respectively. Importantly, plasma biomarkers have been measured in N=407 cross-sectional samples (Aβ42/40 ratio/NfL/GFAP/PTau217) for use in hypothesis testing, and Braak stage classification is performed for all tau-PET. Thus far, 115 participants have also returned for 18-month longitudinal data collection.

Conclusion: The HEAD study cohort represents a critical effort in the optimization of AD imaging biomarkers. While data collection is ongoing, preliminary results are being actively generated from multiple research groups. Findings from the HEAD cohort will provide crucial guidance on use of tau-PET tracers in research and clinical trials.

Presenter Name/Degree(s): Samuel J. Mabry, PhD
Current Position: Postdoctoral Fellow

Primary Mentor in Psychiatry: Zachary Freyberg, MD, PhD

Title: **The combined roles of vesicular release and dopamine reverse transport on the psychostimulant properties of amphetamine**

Author(s): ***Mabry S, Yang T, Yang Z, Samuels K, Gurumurugan A, Sarkissian S, Bacci S, and Freyberg Z***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Amphetamine (AMPH), a psychostimulant commonly prescribed for treatment of neuropsychiatric disorders, also has high abuse liability. Both abuse and psychostimulant properties of AMPH are primarily associated with its ability to increase dopamine (DA) neurotransmission. It is understood that DA efflux, sometimes referred to as DA reverse transport, is critical for AMPH-induced behavioral effects. This phenomenon occurs when the DA transporter (DAT), through a channel-like intermediate, transports DA out of the cytosol into the synapse. Recent evidence showed that phosphorylation of DAT and subsequent interactions with SNARE proteins like syntaxin 1 are critical for DAT-mediated reverse transport of DA. Importantly, when AMPH is uptaken by DAT, it causes appreciable DA neuron depolarization. This depolarization can initiate vesicular DA release, offering AMPH a potential secondary mechanism for increasing DA neurotransmission beyond DA efflux.

Methods: Using the tractable Drosophila melanogaster model, we probed the behavioral effects of AMPH along with genetic and pharmacological approaches to block vesicular release and DA efflux. We additionally used DA GRAB and CyDAP, genetically encoded green fluorescent DA biosensors, to measure DA release and cytosolic DA levels, respectively, in ex vivo fly brain preparations in response to AMPH.

Results: We propose a mechanism where AMPH-induced depolarization is critical for the psychostimulant properties of the drug. Blocking either vesicular release via tetanus toxin (TeNT) expression in DA neurons or blocking DA efflux via a casein kinase II (CK2) inhibitor significantly reduced AMPH's psychomotor effects. Furthermore, both TeNT expression and CK2 inhibition blocked AMPH-induced DA release in an ex vivo Drosophila brain preparation. Importantly, CK2 inhibition also enhanced cytosolic DA levels in response to AMPH.

Conclusion: We propose a two-part mechanism for AMPH-induced DA release. The initial rapid phase of DA release in response to AMPH is caused by DAT-mediated depolarization due to uptake of AMPH, which enhances vesicular DA release. Subsequent DA reuptake raises cytoplasmic DA levels, priming cells for a prolonged phase of DAT-mediated efflux which raises synaptic DA to drive the prolonged psychostimulant effects of AMPH. Elucidating molecular mechanisms of AMPH actions offers the promise of more effective treatments with less addictive potential.

Presenter Name/Degree(s): Kelsey E. Magee, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Alison Hipwell, PhD, ClinPsyD; Michele Levine, PhD

Title: Patterns of stability and change in pregnancy-to-postpartum depressive symptoms among first-time mothers

Author(s): ***Magee KE[1], Hipwell AE[1], Musci R[2], Brennan PA[3], Akbaryan A[4], Avalos LA[5], Bush N[6], Cobbs JR[7], Levine MD[1], Northrup TF[8], Roubinov D[9], Santos H[10], Stepp SD[1], and Zhao H[2]***
Affiliation(s): ***[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Johns Hopkins University; [3]Emory University; [4]Hassenfield Children's Hospital at NYU Langone; [5]Kaiser Permanente; [6]University of California, San Francisco; [7]Medical University of South Carolina; [8]University of Texas Health Science Center at Houston; [9]University of North Carolina, Chapel Hill; [10]University of Miami***

Introduction: Research shows a reduction in depressive symptoms from pregnancy to postpartum; however, there may be variability in the magnitude of change in depressive symptom severity among individuals that has not been well characterized. Thus, we examined stability and change in depressive symptoms within the prenatal and postpartum periods and across the transition from pregnancy to postpartum in relation to age and pregnancy health (e.g., gestational hypertension, diabetes).

Methods: Participants (***N***=6,891; ***Mean*** age=29.9 years; 65% White, 18% Black, 3% multiple race) enrolled in the NIH Environmental Influences on Child Health Outcomes Program completed the Edinburgh Postnatal Depression Scale at three timepoints during pregnancy and three timepoints through 21-months postpartum; pregnancy health conditions were abstracted from medical records.

Results: Latent class analysis yielded three class models of depressive symptoms within pregnancy (Class1: 14.9%, clinical-"mild;" Class 2: 55.2%, non-clinical-low; Class 3: 29.9%, non-clinical-very low) and postpartum (Class 1: 10.9%, clinical-mild; Class 2: 49.9%, non-clinical-low; Class 3: 39.2%, non-clinical-very low), with stable symptoms over time within each period (***mean*** slopes ***p***>.05). Latent transition analyses indicated that individuals with mild depressive symptoms during pregnancy had a 62% chance of continuing to experience mild depressive symptoms postpartum. Younger individuals and those with gestational diabetes were more likely to experience mild depressive symptoms than non-clinical symptoms (OR=1.52, 95%CI=1.04-2.21).

Conclusion: Most individuals experienced relatively low levels of depressive symptoms, with similar classes during pregnancy and postpartum. However, a subgroup with persistent, mild depressive symptoms who may benefit from peripartum mental health screening and interventions was identified.

Presenter Name/Degree(s): Matthew J. Maier, BS
Current Position: CNUP Predoctoral Fellow

Primary Mentor in Psychiatry: Marianne L. Seney, PhD
(required field unless you are a member of the Department of Psychiatry faculty)

Title: **Cortical layer-specific alterations in schizophrenia: Evidence for inflammation and elevated ZFP36**

Author(s): Maier MJ[1], Shelton MA[1], Jenkins AK[1], Yin RF[2], Tseng GC[2,3,4], Lewis DA[1,5], McClung CA[1], and Seney ML[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Biostatistics, University of Pittsburgh School of Public Health; [3]Department of Human Genetics, University of Pittsburgh School of Public Health; [4]Department of Computational and Systems Biology, University of Pittsburgh School of Medicine; [5]Department of Neuroscience, University of Pittsburgh Kenneth P. Dietrich School of Arts & Sciences

Introduction: Schizophrenia is associated with region- and layer-specific abnormalities in cortical gene expression. The subgenual anterior cingulate cortex (sgACC) is a key region implicated in mood regulation and schizophrenia, but its layer-specific molecular changes remain poorly understood. Prior studies have examined laminar-specific cell populations in the dorsolateral prefrontal cortex (DLPFC); in contrast, our study directly investigates intact cortical layers of the sgACC to reveal layer-specific transcriptional alterations in schizophrenia.

Methods: Postmortem sgACC samples from individuals with schizophrenia (n=36) and matched non-psychiatric controls(n=40) were obtained via the Allegheny County Medical Examiner's Office. Layers 3 and 5 were microdissected and processed for bulk RNA sequencing to quantify gene expression. Differential expression (DE) analysis identified genes with altered expression in schizophrenia in each layer, with $p<0.05$ and log2fold change $>|0.26|$ considered statistically significant. Threshold-free rank–rank hypergeometric overlap (RRHO) analysis was used to examine shared or distinct transcriptional changes across layers. Metascape analysis was performed to identify significantly affected biological pathways.

Results: Layers 3 and 5 in the sgACC showed distinct but partially overlapping gene expression changes in schizophrenia. Specifically, there were 192 DE genes in layer 3 and 191 DE genes in layer 5, with RRHO analysis showing concordant alterations. Notably, layer 5 exhibited a strong upregulation of ZFP36, a gene encoding a zinc-finger protein that regulates inflammatory mRNA stability. Enrichment analyses indicated that inflammatory and cytokine signaling pathways were activated, with these immune-related changes being more pronounced in layer 5 than in layer 3.

Conclusion: Deep cortical layer 5 of the sgACC displayed prominent inflammation-associated transcriptional dysregulation in schizophrenia, highlighted by the marked increase of ZFP36. These findings provide novel insight into layer-specific molecular pathology in the sgACC, extending beyond prior laminar studies in the DLPFC and underscoring the importance of inflammatory pathways in the pathophysiology of schizophrenia.

Presenter Name/Degree(s): Lillian L. Manna, BS
Current Position: Research Project Assistant

Primary Mentor in Psychiatry: Lori Scott, PhD

Title: **Can we distinguish types of suicidal behavior? Examining the role of impulsivity, physical aggression, and emotion regulation**

Author(s): *Manna LL[1], Antezana L[1], Brown SL[2], and Scott LN[1]*
Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; Department of Psychology, Florida State University*

Introduction: Examination of individual clinically relevant characteristics among individuals with actual suicide attempts, only aborted suicide attempts, and no suicide attempts may help identify risk factors, or a lack of protective factors, which may be key to preventing suicide attempts. We aimed to investigate whether those with actual and aborted suicide attempts differ in impulsivity, emotion dysregulation, and physical aggression.

Methods: Participants were 135 diagnostically diverse young adults who experienced suicidal thoughts and/or behaviors in the past four months. One-way ANOVAs with Tukey's post-hoc tests were used to assess for group differences on the Short UPPS-P Impulsive Behavior scale, Difficulties in Emotion Regulation Scale, Emotion Regulation Questionnaire, and the NIH Toolbox Physical Aggression scale.

Results: Between-group differences were found for impulsivity and physical aggression. Individuals with actual attempts had significantly higher overall impulsivity compared to individuals with only aborted attempts based on the SUPPS-P total score ($t(69) = 2.37$, $p = .021$). Physical aggression was significantly higher for individuals with actual attempts ($M = 52.6$) vs. individuals with no attempts ($M = 48.2$; $p = .045$). No significant group differences in emotion dysregulation measures (DERS and ERQ) were seen.

Conclusion: Impulsivity and physical aggression appear to be factors that not only distinguish individuals with actual attempts from individuals without attempts but also distinguish individuals with different types of suicidal behavior. It will be important for clinicians to measure impulsivity and physical aggression when assessing risk for suicidal behavior. Moreover, among individuals with a history of only aborted attempts, increases in impulsivity and physical aggression may signal increased risk for actual attempts, though longitudinal research is needed to better understand these relationships.

Presenter Name/Degree(s): Katherine Mannion, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Heather Joseph, DO

Title: Feasibility of actigraphy and sleep diary collection in preschool-aged children with behavioral and sleep difficulties

Author(s): ***Mannion KA[1], Levenson JC[1], Kipp HL[1], Williamson AA[2], Conlon RPK[1], and Joseph HM[1]***
Affiliation(s): ***[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Oregon, Ballmer Institute for Children's Behavioral Health***

Introduction: Sleep problems are common among individuals with ADHD, starting in early childhood. Accurate measurement of sleep problems is crucial for developing effective interventions to improve sleep and behavior outcomes. Sleep diaries and actigraphy are common methods for collecting sleep data, and while both are considered feasible for non-clinical, school-age populations, few studies have explored their feasibility in preschoolers with behavioral and sleep difficulties.

Methods: 30 caregiver-child dyads enrolled in the Optimizing Attention and Sleep Intervention Study. Children (3-5 years) had at least 4 caregiver-reported ADHD symptoms (ADHD-RS-P) and caregiver-reported "moderate" or "serious" problematic sleep (Item 27, BCSQ). Caregivers were sent an 11-day, text-based sleep diary, while children simultaneously wore an actigraphy watch. Feasibility was assessed via rate of prompt completion for sleep diary, and protocol compliance (10 nights), minimum number of nights for scoring ($\geq$5 nights), and watch removal frequency for actigraphy.

Results: Of the 22 total sleep diary prompts (11 morning, 11 evening), participants completed an average of 16 (72.73%). Excluding non-responders (n=2), participants completed an average of 18 (81.82%) prompts. Results from paired sample t-test show significant average difference ($t=4.76$, $p<.001$) between morning and evening prompt completion, with morning completion ($M=9.34$, $SD=3.19$) exceeding evening completion ($M=7.45$, $SD=3.42$).

Of 30 participants, 76.67% (n=23) wore the watch for at least 5 nights, the minimum for scoring. Over half (60%, n=18) wore the watch for all 10 nights. Reasons for <10 nights included child intolerance (n=4), caregiver forgetfulness (n=4), and device non-return (n=2). Actigraphy data cleaning is ongoing; watch removal statistics will be reported at time of presentation.

Conclusion: Findings indicate sleep diary collection and actigraphy are feasible for preschoolers with behavioral and sleep difficulties. Lower evening prompt completion suggests adjusting text schedules for caregivers may be beneficial. Additional strategies should be examined to enhance caregiver compliance with both modalities.

Presenter Name/Degree(s): Megan Marowski, BS
Current Position: Research Assistant

Primary Mentor in Psychiatry: Timothy Allen, PhD

Title: **Stress and conflict in borderline personality disorder: The protective role of agreeableness**

Author(s): ***Marowski MC[1], Taglioni L[1], Wright AG[2], Dombrovski AY[1], and Allen TA[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology, University of Michigan

Introduction: Interpersonal conflict is a hallmark feature of many personality disorders, particularly borderline personality disorder (BPD). Clinical theories have long associated BPD with heightened emotional dysregulation in response to acute stress, which may trigger or exacerbate conflict in close relationships. Empirical studies support this view, showing that individuals with BPD experience more frequent stressors and exhibit greater emotional reactivity than those without the disorder. However, less is known about whether stress directly leads to interpersonal conflict in daily life. In the present 21-day ecological momentary assessment study, we examine whether elevated stress in individuals with BPD predicts interpersonal conflict. We further test whether agreeableness—a dispositional tendency toward cooperation and compassion—moderates this relationship by attenuating the impact of stress on conflict.

Methods: We included 152 participants with borderline personality disorder and 52 healthy controls. Participants completed the NEO-IPIP-120 Personality Inventory and ecological momentary assessments 7 times per day for 21 days. We used multilevel structural equation modeling to examine within-person associations between daily perceived stress and interpersonal conflict. At the between-person level, we examined cross-level moderation of this dynamic by the Big Five personality traits.

Results: At the within-person level, daily perceived stress was significantly associated with conflict reported at the end of the day ($\beta = 0.14$, $\boldsymbol{p} < 0.001$). At the between-person level, agreeableness was associated with a weaker coupling between within-person stress and conflict ($\beta = -0.46$, $\boldsymbol{p} = 0.012$), consistent with a protective effect.

Conclusion: These findings provide empirical support for theories linking stress reactivity to interpersonal dysfunction in BPD. Additionally, high agreeableness appears to disrupt the link between stress and interpersonal conflict, which is consistent with personality theories linking agreeableness to increased cooperation. Our results suggest that individuals high in agreeableness are skilled at navigating stress and preventing it from spilling over into the interpersonal domain. Future efforts to promote agreeableness in BPD may represent one useful pathway by which to protect against interpersonal dysfunction.

Presenter Name/Degree(s): Lynnea K. Mayorga, BA
Current Position: Research Project Assistant

Primary Mentor in Psychiatry: Cecile D. Ladouceur, PhD

Title: **Preliminary analysis on the role of physiological stress reactivity in mediating the relationship between puberty and anxiety symptoms**

Author(s): Mayorga LK[1], Bylsma LM[1], Henry T[2], and Ladouceur CD[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Virginia, School of Data Science

Introduction: Existing literature emphasizes puberty as a sensitive period of development in the context of adolescent mental health. Early pubertal timing has been linked to increased risk of anxiety, but the neurobiological mechanisms remain unclear. The present study aims to address this gap by examining how puberty influences adolescent experience of physiological stress reactivity and the extent to which this influences anxiety symptoms. We also explore how this pathway differs between male and female adolescents.

Methods: 35 adolescents ages 10-13 (30 female) participated in a study on puberty and brain development of anxious youth. Participants completed self-reports of the Pubertal Development Scale and Screen for Child Anxiety Related Disorders. Additionally, adolescents' cardiac activity was measured during the Trier Social Stress Task (TSST). The difference in interbeat interval (IBI) and high frequency heart rate variability during speech and math tasks, compared to baseline, were used to measure stress reactivity. Age was included as a covariate.

Results: Stress reactivity did not significantly mediate the relationship between pubertal status and anxiety symptoms. Change in IBI during the math portion of the TSST significantly increased with more advanced gonadarcheal development (b=2.331, SE=1.115, p=.045). This effect was stronger in male compared to female youth (b=-2.492, SE=1.155, p=.039).

Conclusion: Preliminary findings did not support our hypothesis that puberty is linked to anxiety through physiological stress reactivity. Due to the small sample available, there may not have been sufficient power to detect a mediating effect. Nonetheless, we found that male youth more advanced in gonadarche exhibited change in IBI during the math test. While more research is necessary to further understand pubertal influences on anxiety during adolescence, preliminary evidence suggests sex differences in how puberty may shape physiological stress responses. Future work will test these hypotheses in a larger sample and explore potential risk and protective factors.

Presenter Name/Degree(s): Erin McCarty
Current Position: Undergraduate Research Assistant

Primary Mentor in Psychiatry: Swathi Gujral, PhD

Title: **The relationship between subjective cognitive decline and objective cognitive performance in older adults with treatment-resistant late-life depression: Role of depression severity as a mediator**

Author(s): *McCarty E, Gujral S, Conaty K, Schweitzer N, Rapp E, Voineskos AN, Lavretsky H, Shimony J, and Butters MA*
Affiliation(s): *Department of Neuroscience, University of Pittsburgh; Department of Psychiatry, University of Pittsburgh School of Medicine; Western Psychiatric Hospital, University of Pittsburgh Medical Center; Department of Bioengineering, University of Pittsburgh; Center for Additions and Mental Health, University of Toronto, Canada; University of California, Los Angeles, Department of Psychiatry and Biobehavioral Sciences; Washington University School of Medicine Department of Psychiatry*

Introduction: We examined how SCD relates to cognitive performance in a large cohort of older adults with Treatment-Resistant Late Life Depression (TRLLD) as well as the extent to which depression severity statistically mediates this association.

Methods: We recruited 354 adults aged 60+ years diagnosed with TRLLD across four sites within the United States and Canada. All participants completed a comprehensive neuropsychological battery: the Repeatable Battery of Neuropsychological Status (RBANS) and the Delis-Kaplan Executive Function System (D-KEFS). All participants completed the Everyday Cognition Scale (eCog-12), which measures SCD across multiple cognitive domains over the past ten years. Of these, 229 participants had study partners who also completed the eCog-12. Linear regression models were used for primary statistical analyses, regressing age-adjusted standardized test scores for each cognitive domain onto participant and study partner mean eCog-12 scores. All models were adjusted for sex, race, and education. Depression severity was assessed with the Montgomery-Asberg Depression Rating Scale. Mediation between depression severity and other factors was examined using Causal Mediation Analysis.

Results: Participant and study partner-reported SCD was associated with worse global OCP and specifically for learning and executive function. Participant-reported SCD was additionally associated with worse OCP for attention, delayed memory, and language. Higher levels of participant- and study partner-reported SCD were associated with greater depression severity. Greater depressive symptom severity was associated with worse OCP for attention and executive function. Depression severity did not statistically mediate the association between participant-or study partner-reported SCD and OCP in any cognitive domain.

Conclusion: All SCD-OCP associations remained robust to adjustment for depression severity, suggesting depression severity does not explain the links between SCD and OCP among those with TRLLD. Though SCD and depression severity are linked, they are not interchangeable in the context of understanding cognitive decline in geriatric psychiatric populations.

Presenter Name/Degree(s): Alexis McCathern, MD
Current Position: Child and Adolescent Psychiatry Fellow

Primary Mentor in Psychiatry: Ryan Peterson, MD

Title: **Restructuring psychotherapy didactic for medical student psychiatry clerkship**

Author(s): ***McCathern A and Peterson R***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Medical school curriculum typically includes psychotherapy as a learning topic, most often taught within the psychiatry clerkship. Teaching psychotherapy in a didactic format poses considerable challenges. Traditional models of psychotherapy education involve weekly supervision. This model does not easily translate to medical student clerkship curriculum format. This project aimed to develop an improved didactic guide that can be delivered in a single session to teach core psychotherapy concepts, aligning with clerkship learning objectives and incorporating adult learning principles. The objectives of this project were to improve medical students' attitudes, knowledge, comfort, and skills related to psychotherapy concepts and with providing brief psychotherapy interventions at the bedside across all patient-care settings.

Methods: Initial psychotherapy didactic facilitator and student guides were analyzed in accordance with concepts commonly tested on NBME shelf exams and overall clerkship objectives. Psychotherapy didactic was re-written with adult learning principles in mind, using largely case-based format and role-play opportunities to maximize active learning and student participation. Pre- and post-surveys were developed to inquire attitudes, comfort, knowledge, and skills towards psychotherapy concepts. Pre-survey was administered one week prior to didactic session. Post-survey was administered within 24 hours after didactic session. Data collection occurred over a 14-month period.

Results: 123 and 98 medical student responses were included in pre-survey and post-survey data, respectively. Results show a statistically significant improvement of medical students' attitudes, comfort, knowledge, and skills regarding specific psychotherapy concepts across all 5 self-rated measures ($p<0.01$ across all 5 domains).

Conclusion: By restructuring a pre-existing psychotherapy didactic to align with adult learning principles using interactive and case-based formats, medical students report improved attitudes and greater comfort, knowledge, and skills towards practicing therapeutic approaches with patients. Skills learned through this improved curriculum will serve students well on clinical exams and in future encounters with patients, regardless of their chosen specialties.

Presenter Name/Degree(s): Nastasia McDonald, BS
Current Position: Research Project Assistant

Primary Mentor in Psychiatry: Mary L. Woody, PhD

Title: **Oops!: Error-related negativity as a neural correlate of chronic health stress in adolescents enriched for depression risk**

Author(s): McDonald N[1], Freeman A[1], Wears A[2], Keller L[1], Akwayena E[1], Price RB[1,3], Silk JS[3,1], Slavich G[4], and Woody ML[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]School of Social Work and School of Public Health, University of Pittsburgh; [3]Department of Psychology, University of Pittsburgh; [4]Cousins Center for Psychoneuroimmunology and Department of Psychiatry and Biobehavioral Sciences, University of California

Introduction: Greater exposure to stress during childhood is associated with enhanced error-related negativity (ERN), an event-related potential derived from EEG that is linked to increased risk for youth depression and anxiety. However, few studies have specifically examined the impact of chronic health-related stress, despite evidence that health-related stress is a common contributor to the development of adolescent depression and anxiety. As such, the present research aimed to explore the relationship between chronic health stress and the ERN during early adolescence.

Methods: Participants included 93 adolescents (aged 13-15; all assigned female at birth) recruited from a larger longitudinal study of depression risk. Adolescents' lifetime history of psychiatric disorders was assessed using the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS) and stress exposure - including health-related stressors - was measured using the Stress and Adversity Inventory for Adolescents (STRAIN). To assess ERN, participants completed a Flankers Task while EEG was recorded to capture neural response to errors and correct responses.

Results: Fifty-nine percent of adolescents reported experiencing at least one chronic health stressor. Compared to those without chronic health stress, adolescents with chronic health stress exhibited a significantly enhanced (i.e., more negative) ERN, suggesting greater neural sensitivity to errors. These teens also reported greater overall life stress, more chronic difficulties, and were more likely to meet diagnostic criteria for generalized anxiety disorder. However, in contrast to chronic health stress, neither overall life stress nor a history of anxiety disorders significantly predicted ERN magnitude.

Conclusion: Findings suggest that chronic health stress during childhood is uniquely associated with an enhanced ERN in adolescents at high risk for future depression. Future research should examine how health-related stress interacts with neurobiological markers of error monitoring, such as the ERN, to better understand developmental pathways linking physical health outcomes with long-term psychological outcomes.

Presenter Name/Degree(s): Nicholas McDonald, BS
Current Position: Research Assistant

Primary Mentor in Psychiatry: Joseph Stukenske, MD, PhD

***Title*:** **Closed-loop respiration-timed optogenetic stimulation in mice using real-time forecasting**

Author(s): McDonald N[1] and Stujenske JM[1,2]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Translational Neuroscience Program, University of Pittsburgh

Introduction: Prior studies from both mice and humans demonstrate that neural activity, including in the prefrontal cortex, is entrained by respiration-coupled oscillations. Manipulations timed to the inspiratory or expiratory cycle have been shown to have differential effects on anxiety in humans and fear extinction in mice. To investigate respiration-timing as a potential therapeutic approach for enhancing the effect of brain stimulation for treating psychiatric disease in humans, we developed a closed-loop system for real-time monitoring and forecasting of respiratory cycles in mice to enable inhalation- or exhalation-specific optogenetic stimulation.

Methods: Respirations are non-invasively tracked in head-fixed mice using a thermal camera to capture nostril temperature. We trained a DeepLabCut model to mark the perimeter of both nostrils location in real time, permitting capturing temperature in moving regions of interest (ROI).Peaks in the time-series data, corresponding to the start of inspiration were used to estimate the respiratory period, and a periodic autoregressive (AR) model predicted the next three inhalation/exhalation cycles.

Results: We demonstrate the high reliability of our autoregressive model to predict respiratory phase using ***in silico*** simulations using previously recorded videos, in comparison to human consensus labels. We also describe our preliminary efforts to apply this model ***in vivo*** in awake, behaving mice.

Conclusion: Our approach enables real-time, respiratory phase-specific stimulation based on predictive respiratory periods. It provides a valuable tool for studying respiration-linked neural activity and behavior in psychiatric models, allowing for precise neural activation during inhalations or exhalations.

Presenter Name/Degree(s): Shane McKeon, PhD
Current Position: Postdoctoral Scholar

Primary Mentor in Psychiatry: Beatriz Luna, PhD

Title: **Intrinsic neural timescales decrease through adolescence into adulthood supporting cognitive development**

Author(s): McKeon SD[1,2,3], Petrie DJ[3], Sydnor VJ[3], Calabro FJ[1,2,3], Foran W[3], and Luna B[2,3]
Affiliation(s): [1]Department of Bioengineering, University of Pittsburgh; [2]The Center for the Neural Basis of Cognition, University of Pittsburgh; [3]Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Adolescence is critical developmental period during which cognitive control improves as brain systems undergo neurobiological refinement. A key mechanism supporting stable cognitive control is efficient information processing, likely facilitated by increasing myelination in the prefrontal cortex (PFC). Myelination of excitatory pyramidal cells and inhibitory PV interneurons enhances excitatory/inhibitory (E/I) dynamics, increasing processing speed. These dynamics are reflected in intrinsic neural timescales (INTs), which quantify temporal windows of information integration and can be measured via EEG using the autocorrelation window (ACW).

Methods: INTs have been shown to shorten across adolescence in animal studies and human ECOG meta-analyses, suggesting developmental refinement of temporal processing. However, the neural basis of these changes, their cognitive relevance, and longitudinal trajectories remain unclear. We analyzed EEG and 7T MRI data from a large longitudinal cohort (N=164, ages 10–32, 286 sessions), with EEG collected during both rest and a memory-guided saccade task. Intracortical myelination was estimated using R1 values derived from MP2RAGE scans. INTs were assessed by the time lag when the EEG autocorrelation function dropped to 50% of its maximum (ACW-50).

Results: Results showed longer ACWs during task than rest, reflecting increased cognitive demands. ACWs decreased with age, especially in frontal regions, and this developmental pattern was replicated in a separate adolescent sEEG cohort. Notably, adolescents with adult-like shorter ACWs in frontal/parietal regions had better working memory performance. In contrast, excessively short ACWs in adults predicted worse performance, suggesting an optimal timescale for cognition. Deeper-layer myelination (layers 5/6) was associated with shorter ACWs, supporting the role of myelination in tuning temporal processing.

Conclusion: Together, these findings suggest that maturation of INTs, supported by deep-layer intracortical myelination, underlies improved executive function through adolescence and reflects a fundamental mechanism of neurodevelopment.

Presenter Name/Degree(s): Jordan Mehalko, MSCP
Current Position: Research Associate

Primary Mentor in Psychiatry: David Brent, MD

Title: **Adolescent feedback on a suite of mobile suicide prevention tools: Integrated care to help at risk teens (iCHART)**

Author(s): *Mehalko J[1], George-Milford B[1], Davis M,[2] Schwartz KTG[2], Dysart G[2], Alexander E[2], Reagan S[2], Joyce K[2], Radovic A[2], Bigley K[2], Goldstein T[1], Vaughn-Coaxum R[1], Biernesser C[1], and Stepp S[1]*
Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Children's Hospital of Philadelphia*

Introduction: Suicide is the second leading cause of death for adolescents. To better support primary care for adolescents experiencing suicidality, the iCHART intervention was developed. iCHART is a suite of digital tools designed to support teens' mental health through an enhanced mental health (EMH) screener, a smartphone safety planning app called BRITE, and an automated text messaging intervention to motivate safety plan use and treatment engagement called Text2Connect (T2C). Our study aims to gather feedback on adolescent's experiences with iCHART to inform further refinements to the intervention and its delivery.

Methods: Ten participants aged 12-17 were selected from the iCHART intervention study. Approximately 2 months after receiving the iCHART intervention, participants shared their experiences using iCHART during a semi-structured interview. A rapid qualitative analysis was performed, which used templated summaries of audio recordings.

Results: Participants predominantly liked iCHART and found it helpful. Participants felt that the onboarding length was appropriate, the coping plan created was relevant, and going step-by-step with the onboarder was beneficial. After onboarding, teens felt prepared to use BRITE independently and found BRITE simple and easy to use. The main barriers to using BRITE were being busy, forgetting, and technology issues. Teens had various suggestions to increase engagement, including more personalization and gamifying the app. 90% of the participants completed the EMH screener during onboarding; however, most did not discuss the results with their caregiver/provider or did not remember doing so. T2C served as a reminder to some teens to engage with BRITE. More than half of participants conveyed uncertainty about receiving or had confusion surrounding the T2C notifications.

Conclusion: The iCHART intervention, especially the BRITE app, has been acceptable for adolescents. Future recommendations include highlighting the importance of discussing the EMH screener with a caregiver and/or treatment provider and emphasizing consistent usage of BRITE.

Presenter Name/Degree(s): Darlene S. Melchitzky, MS
Current Position: Research Principal

***Primary Mentor in Psychiatry*:** Jill Glausier, PhD

Title: **The arrangement of synapses in layer 3 of human prefrontal cortex**

Author(s): ***Melchitzky D[1], Lewis, D[1,2] and Glausier J[1]***
Affiliation(s): [1]Department of Psychiatry, University Pittsburgh School of Medicine; [2]Department of Neuroscience, University of Pittsburgh

Introduction: The prefrontal cortex (PFC) is a multimodal cortical area that is involved in higher-ordered cognitive functions like working memory. Individuals with schizophrenia show reduced activation of PFC circuitry during working memory tasks. Animal studies of sensory cortices suggest that functionally-related synapses often are arranged in anatomical clusters. However, studies of the synaptic organization of multimodal cortices in the human brain are few.

Methods: Tissue containing Brodmann's Area 46 from one human brain was prepared for volume electron microscopy. Using Forced Ion Beam-Scanning Electron Microscopy (FIB-SEM) technology, a 2mm x 2mm sample of cortical layer 3 was milled and imaged. A volume of 1,098.3 μm^3 (dimensions of 18445 x 15070 x 3945 nm) was analyzed using Amira software for Type 1 or Type 2 synapses based on ultrastructural morphology.

Results: To date, 310 synaptic units displaying Type 1 synapses and 75 synaptic units displaying Type 2 synapses have been identified. Dendritic spines were the most common postsynaptic target of Type 1 synapses (78%), whereas Type 2 synapses preferably contacted dendritic shafts (66%). Use of the FIB-SEM technology, which allows examination of the tissue in 3D, revealed synapses that would not have been identified using more traditional methods. For example, dendritic spines receiving both a Type 1 and Type 2 synapse, called a triad, were readily visible in the current analysis, but are difficult to visualize with more standard methods.

Conclusion: The use of FIB-SEM technology to examine post-mortem human PFC tissue allows for unparalleled analysis of synaptic structure and organization. This analysis will help to elucidate the synaptic organization of this area, providing insight into the cortical circuitry necessary for higher-ordered cognitive processes affected in schizophrenia.

Presenter Name/Degree(s): Nora Miller, BS
Current Position: Graduate Student

Primary Mentor in Psychiatry: Joseph Stujenske, MD, PhD

Title: **Discrimination of threat vs. non-threat stimuli is differentially regulated by rostral and caudal medial prefrontal cortex**

Author(s): Miller N[1], McDonald N[2], and Stujenske JM[2,3]
Affiliation(s): [1]Center for Neuroscience, University of Pittsburgh; [2]Department of Psychiatry, University of Pittsburgh School of Medicine; [3]Translational Neuroscience Program, University of Pittsburgh

Introduction: Fear overgeneralization is an excessive defensive response to objectively safe stimuli present across multiple anxiety- and trauma-related psychiatric disorders. The medial prefrontal cortex has been implicated in both preventing fear overgeneralization and promoting defensive responses, but how these complementary functions are organized within the mPFC has remained uncertain. Here, we investigated whether there is functional variation of the mouse dorsal mPFC, the prelimbic cortex (PL), across its rostrocaudal axis using optogenetic silencing during recall of discriminative fear associations.

Methods: Adult male and female C57BL6/J mice were bilaterally injected with an adeno-associated virus expressing stgtACR2, a soma-targeted inhibitory opsin, or control virus in the rostral or caudal PL, followed by fiber optic implantation for light delivery. After viral expression, mice were trained over 3 days on a differential fear conditioning task with tones of two different frequencies (2 or 8 kHz, pseudorandomized between mice), in which a CS+ tone (30s) co-terminated with a foot shock (0.6 mA) while a CS- tone was unpaired. The day after training, mice were re-exposed to the CS+ and CS- in a new context with laser stimulation during half of cue presentations (pseudorandomly interleaved). Fear responses were assessed by freezing, which was automatically detected based on motion energy in acquired video.

Results: In the absence of light stimulation, mice exhibited differential responses, with higher freezing to the CS+ than the CS-. Inhibition of rostral PL resulted in increased freezing responses during the CS-, without changes to responses during the CS+, while inhibition of caudal PL resulted in decreased freezing responses to the CS+ without effects during the CS-.

Conclusion: Our results provide a means of reconciling seemingly contradictory data, suggesting the PL both promotes and suppresses defensive responses via complementary rostrocaudally organized circuits.

Presenter Name/Degree(s): Riya Mirchandaney, BA
Current Position: Graduate Student in Clinical-Health Psychology

Primary Mentor in Psychiatry: Brant Hasler, PhD

Title: **Circadian preference, but not circadian phase, associates with state and trait levels of impulsivity in adolescents**

Author(s): Mirchandaney R[1], Buysse DJ[2], Clark DB[2], Siegle GJ[2], Guo K[2], Wallace MJ[2], Oryshkewych NS[2], and Hasler BP[2]
Affiliation(s): [1]University of Pittsburgh, Department of Psychology; [2]Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Adolescents with evening preference are at risk for substance use problems. This may be partially explained by a connection between later sleep/circadian timing and greater impulsivity (a well-established contributor to substance use), which has been demonstrated with self-report measures of circadian timing in adults, but not adolescents. Here we tested whether (1) biological circadian timing associates with trait-level multi-dimensional impulsivity and (2) sleep/circadian timing is proximally associated with state-level impulsivity on a day-to-day basis.

Methods: 210 adolescents (60.5% female; ***M*** age = 17.4 years) completed self-report measures of trait impulsivity (UPPS-P) and circadian preference (Composite Scale of Morningness), and laboratory assessments of circadian phase (salivary dim light melatonin onset). During the week-long ambulatory protocol, participants wore wrist actigraphs (sleep midpoint and duration) and completed bedtime diaries assessing state impulsivity (UPPS-P). For between-person analyses, we ran linear regression models predicting trait and mean state impulsivity by circadian preference and phase. For within-person analyses, we ran mixed models predicting impulsivity by prior night sleep midpoint (with and without circadian phase as a moderator) and duration.

Results: Evening preference was associated with greater trait negative urgency (β= -.035, p=.003), as well as greater lack of perseverance at both trait (β= -.04, p=.003) and state (β=-.028, p=.02) levels. Circadian phase was not associated with impulsivity. Within-person results were insignificant, although there was a trend-level interaction between sleep midpoint and circadian phase on next-day negative urgency (β= .056, p=.07).

Conclusion: Extending prior findings in adults, adolescents with evening preference reported greater impulsivity across subdimensions—they were more likely to quit difficult tasks and act impulsively when experiencing negative emotions. Surprisingly, biologically-based circadian phase did not associate with impulsivity, although there was suggestive evidence that sleep and circadian timing may interact to predict greater impulsivity. Circadian preference measures may inadvertently capture impulsivity-related constructs.

Presenter Name/Degree(s): Akiko Mizuno, PhD
Current Position: Research Instructor

Title: **Using natural language processing to identify reflections on late-life loneliness after an intergenerational dialogue-driven intervention**

Author(s): Mizuno A[1], Puthiaraju G[1], Wang L[2], Aizenstein H[1,2], and Stahl S[1,3]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Bioengineering, University of Pittsburgh; [3]Clinical and Translational Science Institute, University of Pittsburgh

Introduction: Loneliness negatively affects health and well-being in late life. Intergenerational dialogue – or conversations between people of different age groups - offer a promising approach to reducing loneliness, but scientific evidence remains limited, and mechanisms are not well understood. A key challenge in assessing efficacy in loneliness interventions is capturing changes in perceived loneliness—a deeply subjective experience shaped by the perceived gap between desired and actual social connection. Traditional questionnaires may not fully capture these nuanced shifts. We aimed to identify themes in older adults' reflections on an intergenerational intervention using natural language processing (NLP).

Methods: We analyzed data from 24 lonely older adults (65+) who completed a 12-week intergenerational video call intervention. Post-program interviews were summarized using the LLaMA-3 model via the Ollama API. Using zero-shot learning, the model generated four structured outputs per interview: (1) summary of program impact in their own words, (2) sentiment, (3) key themes or topics, and (4) perceived changes in social, emotional, and cognitive domains. We then applied BERTopic, an unsupervised topic modeling framework combining HDBSCAN clustering and class-based TF-IDF representations, to extract recurring themes across participants.

Results: Sentiment analysis showed that most participants' responses (96%) were classified as positive. These responses were categorized into eight themes highlighting the intergenerational program's impact on enhancing social and emotional well-being. Common themes included ***meaningful connections/relationship***, ***intellectual engagement***, and ***self-discovery***. Notably, three out of eight themes reflected late-life developmental growth, including ***valuable mentorship***, ***intergenerational connection***, and ***positive interactions through knowledge sharing***.

Conclusion: We demonstrated the utility of NLP for evaluating subjective outcomes in psychosocial interventions. By combining large language model–based summarization with unsupervised topic modeling, we extracted meaningful themes from participants' reflections that extend beyond traditional self-report measures. The study highlights NLP's potential for nuanced evaluation of interventions targeting complex constructs like loneliness.

Presenter Name/Degree(s): Abdul Razak Monto, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Thomas K. Karikari, PhD

Title: Comparative evaluation of blood collection tubes on targeted proteomic profiles of Alzheimer's disease plasma biomarkers

Author(s): ***Monto AR, Zeng X, Farinas MF, Gu J, Choity L, Wilckens K, and Karikari TK***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Alzheimer's disease (AD) diagnosis can be enhanced by blood-based biomarkers (BBMs). BBMs integration into real-world settings, where access to specialized equipment's may present substantial challenge in terms of specimen quality. Our previous research indicated that the BD™ P100 (BD-P100) blood collection tube stabilizes classical AD BBMs. Multiplexed immunoassay (NULISAseq CNS) panel was employed here-in to compare plasma samples collected using BD-P100 and traditional EDTA tubes (EDTA). The objective was to assess the influence of tube types on biomarker profiles.

Methods: Venous blood collected from participants in the Pittsburgh Alzheimer's Pathways Sleep Study (ALPS) during two visits using EDTA and BD-P100. Plasma samples were obtained by centrifuging at 2000g for 10 minutes, aliquoted and stored. NULISAseq CNS Panel conducted on Argo HT, utilizing NULISA Protein Quantification (NPQ) values for biomarker quantification. The reproducibility of the assay was assessed by conducting a Sample Control (SC) run in triplicate across multiple trials. The concordance between various plasma samples was evaluated using Spearman's correlation.

Results: The study comprised 116 plasma samples from 49 participants (mean age 70.5 ± 4.1 years, 57% female, 90% non-Hispanic White). NULISAseq measured 127 biomarkers, with median intra- and inter-plate variation coefficients of 5.7% and 7.7%. Both sample types exhibited high detectability, with medians of 94% (IQR: 2%) for EDTA and 96% (IQR: 3%) for BD-P100. Most biomarkers exhibited a robust association between sample types, with a median Spearman coefficient (ρ) of 0.833 (IQR: 0.178). Classical AD biomarkers (tau isoforms and Aβ peptides) exhibited strong agreement (ρ = 0.540 to 0.942). Most biomarkers exhibited comparable NPQ levels across both samples, with 86 biomarkers falling within a 10% variance. HBA1 was markedly elevated in BD-P100.

Conclusion: Plasma obtained using BD-P100 and EDTA have comparable biomarker profiles. Additional study is required to ascertain whether BD-P100 extends the stability of these biomarkers.

Presenter Name/Degree(s): Nahom Mossazghi, BS, MS
Current Position: PhD Candidate

Primary Mentor in Psychiatry: Helmet Karim, PhD

Title: **The neural basis of cognitive deficits in adults with sickle cell disease: a task-based fMRI study**

Author(s): ***Mossazghi N[2], Karim H[2], and Wood S[1]***
Affiliation(s): ***[1]Department of Biomedical Engineering, Carnegie Mellon University; [2]Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Sickle Cell Disease (SCD) is a genetic blood disorder caused by a mutation in the beta-globin gene, impairing oxygen delivery and neurovascular function. This dysfunction leads to severe neurological complications, including strokes, silent cerebral infarcts, and progressive cognitive decline. Cognitive flexibility, a critical component of executive function that enables individuals to adapt to changing tasks and environments, is notably impaired in SCD. Prior work suggests that the frontoparietal network, particularly the prefrontal cortex, supports cognitive flexibility, yet how SCD disrupts these circuits remains unclear. To our knowledge, we are the first to use task-based fMRI to examine this disruption. In this study, we used the Digit Symbol Substitution Task (DSST), a standard measure of cognitive flexibility, during fMRI to characterize brain activation patterns. We hypothesize that SCD leads to decreased activation compared to controls and widespread effective connectivity indicating impaired neural circuitry of cognitive flexibility.

Methods: Participants [6 controls, aged 25.8 ± 2.68; 6 SCD patients, aged 34 ± 7.09] completed demographic, pain, and psychological assessments prior to scanning. In our customized DSST paradigm, a reference table pairs digits with symbols. Participants view a digit-symbol prompt and press distinct keys to indicate whether the pair is congruent (matches the reference table) or incongruent (does not match), thereby engaging cognitive flexibility through varied digit-symbol combinations. Functional and structural images were acquired using a Siemens 3T MRI scanner. fMRI data were preprocessed with fMRIPrep (motion correction, normalization, smoothing). GLM analyses modeled BOLD responses for each condition, followed by Granger Causality analysis to measure magnitude of effective connectivity.

Results: Adult patients with SCD showed slightly lower DSST accuracy compared to controls (92.35% ± 3.13 vs. 96.3% ± 5.38) and longer response times (1.66 ± 0.57 s vs. 1.50 ± 0.70 s). GLM analyses of the Congruent > Incongruent contrast revealed decreased activation in patients with SCD, particularly during incongruent trials. Among controls, incongruent trials elicited significant activation in the visual-parietal network, including the occipital lobe and parietal cortex, whereas patients exhibited limited activation in these regions. Finally, measures of effective connectivity indicated broader network engagement in patients with SCD compared to controls.

Conclusion: Our preliminary analysis revealed that patients with SCD exhibit slower processing times on average compared to controls, aligning with existing literature. fMRI results indicate that patients with SCD engage distinct neural circuits relative to controls. Reduced activation during incongruent tasks in the SCD group suggests inefficient recruitment of task-relevant brain networks. Additionally, effective connectivity findings point to a compensatory mechanism supporting task performance. This is the first study to employ task-based fMRI to examine circuitlevel differences in adults with SCD. Our preliminary findings support our hypothesis, demonstrating both reduced activation and broader recruitment of cognitive control regions in patients with SCD compared to controls. We plan to continue participant recruitment to increase our sample size and determine whether these trends persist and whether more pronounced behavioral deficits and altered neural activation patterns emerge.

Presenter Name/Degree(s): Rayan Mroué, MD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Tharick Pascoal, MD, PhD

Title: **Different patterns of propagation of tau tangle pathology in typical Alzheimer's disease determine clinical sub-phenotypes**

Author(s): *Mroué R[1], Povala G[1], Bellaver B[1], Ferreira P[1], Bauer-Negrini G[1], Lussier F[1], Amaral L[1], Scop-Madeiros M[1], Ruppert E[1], Silva da Rocha A[1], Scarpatto-Rodrigues M[1], Silva Oliveira M[1], Soares C[1], Masdeu J[2], Soleimani-Meigooni D[3], Fortea J[4], Lowe V[5], Oh H[6], Pascual B[2], Gordon B[7], Rosa-Neto P[8], Baker S[9], and Pascoal T[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh, School of Medicine; [2]Department of Neurology, Houston Methodist Research Institute; [3]University of California San Francisco, San Francisco; [4]Department of Neurology, Hospital de la Santa Creu i Sant Pau; [5]Department of Radiology, Mayo Clinic; [6]Department of Psychiatry and Human Behavior, Brown University; [7]Department of Radiology, Washington University in St. Louis; [8]Translational Neuroimaging Laboratory, McGill University Research Centre for Studies in Aging, Douglas Research Institute; [9]Lawrence Berkeley National Laboratory*

Introduction: One of the hallmarks of Alzheimer's disease (AD) is the progressive spread of tau pathology. However, heterogeneity in the spatial patterns of tau deposition at the individual level may contribute to distinct clinical presentations.

Methods: We investigated 106 tau PET positive individuals (16% cognitively unimpaired, 84% amnestic cognitively impaired) from the HEAD study using head-to-head Flortaucipir and MK6240 tau PET. For each tracer, we extracted the SUVR values from seven major brain networks: Limbic, Visual (Vis), Default Mode (Default), Dorsal Attention (DorsAttn), Frontoparietal, Somatomotor (SomMot) and Salience Ventral Attention (SalVentAttn) and the Entorhinal cortex. Pathways were identified by ranking regions from highest to lowest SUVR, with the region displaying the highest SUVR value being defined as the peak region. Individuals in late stages of tau deposition displaying distinct pathways were compared. Image averages and voxel-wise group comparisons using tau negative individuals as the reference were generated for each pathway and tau PET tracer. Cognitive differences were assessed using ANOVA for MoCA score and domain-specific composite scores for Memory, Attention and Visuospatial skills.

Results: In all individuals and tracers, tau in the Entorhinal cortex progressed to the Limbic network, supporting a common starting point for tau propagation. Beyond these initial stages, tau propagation followed three main distinct pathways following either the Vis, Default or DorsAttn networks. Voxel-wise comparison between individuals across these three pathways captured clear and similar differences in tau PET uptake as measured with Flortaucipir and MK6240. Although MoCA and Memory scores were similar across groups, individuals in the Vis network showed significantly lower Attention scores than those in the Default and DorsAttn networks, and lower Visuospatial scores than the Default group.

Conclusion: Our results indicate a model in which, although tau progresses hierarchically, its deposition peaks mainly follow specific networks, which drive tau deposition and, consequently, the clinical manifestations of AD.

Presenter Name/Degree(s): Teneisha Myers, MS
Current Position: Graduate Student Researcher - CNUP

Primary Mentor in Psychiatry: Mary M. Torregrossa, PhD

Title: **Pharmacokinetic profiling of Δ9-THC metabolism and its association with cognitive impairment and modulation by stress**

Author(s): ***Myers T and Torregrossa M***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Cannabis is the most widely used illicit substance in the country. Its use is only increasing alongside the recent push for its legalization and decriminalization, as well as the growing use for medicinal purposes. With this, many individuals have altered their perception regarding the safety of cannabis use. While cannabis can have positive effects in some individuals, there are potential negative consequences including dependence, psychosis, and cognitive impairments. The top reported reasoning for using cannabis is to alleviate stress, however, whether cannabis differentially induces positive or negative effects under conditions of stress has not been well studied. Developing a deeper understanding here will allow for better individualized decisions to be made on the medicinal use of cannabis. The current study investigates whether stress affects performance on a working memory task, and if Δ9-THC (THC), the primary psychoactive component in cannabis, can exacerbate or ameliorate the effects of stress. An additional aim is to determine if plasma THC concentrations are associated with cognitive performance.

Methods: 24 adult male and female Sprague Dawley rats performed a three choice, delay-match-to-sample working memory task. Rats assigned to the stress group were exposed to 45 minutes of restraint stress prior to injection of either vehicle, 0.5,1, or 3 mg/kg THC. Blood samples were collected 5, 25, 60, and 120 minutes after administration.

Results: A repeated-measures ANOVA revealed an effect of delay in the males ($\boldsymbol{p} < 0.0001$) and females ($\boldsymbol{p} < 0.0001$) on working memory performance, with no effect of stress or THC. However, 3 mg/kg THC disrupted task responsivity, leading to a subset of rats exhibiting non-responsiveness. Non-responders showed elevated THC plasma levels 5 minutes post 3mg/kg THC administration relative to responders ($\boldsymbol{p} < 0.0001$). Additionally, non-responders showed greater THC metabolite levels.

Conclusion: Overall, plasma concentrations of THC and its metabolites may predict levels of sensitivity to THC.

Presenter Name/Degree(s): Michel N. Nafash, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Thomas K. Karikari, PhD

Title: **Analytical validation of BD-tau advantage plus kit with clinical corroboration in a pilot traumatic brain injury cohort**

Author(s): Nafash MN[1], Svirsky S[9], Zeng X[1], Chen Y[1], Gogola A[8], Kofler J[7], Tudorascu DL[1], Shaaban CE[6], Lingler J[5], Pascoal TA[1], Klunk WE[1], Villemagne VL[1], Berman SB[2], Sweet RA[1], Ikonomovic MD[2], Snitz BE[2], Kamboh MI[4], Cohen AD[1], Lopez OL[3], Okonkwo DO[2], Puccio AM[2], and Karikari TK[1]

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurological Surgery, University of Pittsburgh; [3]Department of Neurology, University of Pittsburgh; [4]Department of Genetics, University of Pittsburgh; [5]Department of Nursing, University of Pittsburgh; [6]Department of Epidemiology, University of Pittsburgh; [7]Department of Pathology, University of Pittsburgh; [8]Department of Radiology, University of Pittsburgh; [9]Department of Critical Care Medicine, University of Pittsburgh

Introduction: BD-tau has emerged as a promising biomarker in predicting neurodegeneration in Alzheimer's Disease and brain injury. This study aims at analytically and clinically validating the not fully validated Quanterix® BD-tau Advantage PLUS commercial kit as a blood-based BD-tau assay for clinical research.

Methods: Using the Quanterix® Simoa HD-X analyzer, we evaluated the assay's robustness, precision, dilution linearity, spike recovery, specificity, and LLOQ. We also compared BD-tau levels in 48 plasma/serum pairs from Pitt-ADRC to determine the matrix effect. Finally, we used a Pittsburgh traumatic brain injury (TBI) cohort with plasma (n = 64) and CSF (n = 20) samples to evaluate its clinical performance in TBI settings.

Results: Repeated measurements of 3 plasma samples across 20 analytical runs indicated maximum intra-plate and inter-plate CVs at ~7.24%. A median drift of 8.00% (decrease) was observed from the start to the end of a full plate run. Robust linearity was observed between 4 to 16-fold dilutions. Spike recovery experiments showed recoveries within 86-96% for all tested spike levels. Sample stability tests showed a slight increasing trend with increasing freeze/thaw cycles. BD-tau Adv Plus produced drastically lower signals in samples spiked with peripheral-tau compared to BD-tau in both plasma and buffer, indicating strong specificity. Strong positive correlations were observed between plasma and serum in the Pitt-ADRC cohort ($r = 0.8392$; $p<0.0001$), as well as between plasma and CSF (n= 20 pairs, $r=0.6150$, $p=0.0039$) in the TBI cohort. Lastly, BD-tau effectively distinguished severe-acute TBI from chronic-mixed TBI and control groups. In severe TBI patients, significant correlations were observed between BD-tau and classical AD/TBI biomarkers such as, p-tau217 (plasma: $r=0.5761$, $p=0.0005$; CSF: $r=0.9667$, $p=0.0002$), NfL (plasma: $r=0.8910$, $p=0.0001$), and GFAP (plasma: $r=0.5424$, $p=0.0011$).

Conclusion: The BD-tau Advantage PLUS kit produced robust BD-tau-specific readings that were proven reliable in detecting TBI and distinguishing injury severity.

Presenter Name/Degree(s): Michael Niggemyer, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Cecile D. Ladouceur, PhD

Title: The role of puberty on neural activity to reward feedback in early adolescence
Author(s): ***Niggemyer M, Westbrook C, Bylsma, LM, and Ladouceur CD***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Alterations in neural response to reward contribute to depression, and developmental neuroscience research indicate changes in neural response to reward in early adolescence. However, the role of age relative to pubertal maturation on neural response to reward remain unclear. The goal of this study was to examine to what extent age and puberty influence a known EEG marker of reward feedback, the Reward Positivity (RewP), and relationships with depressive symptoms, and positive emotionality.

Methods: Participants included 79 adolescents (10–13-year-old; 47 girls) varying in pubertal status who performed a reward feedback guessing task (the Doors task). Pubertal maturation was assessed using sex-specific standardized composite measures based on Tanner staging and scores from the Pubertal Development Scale. Basal levels of circulating pubertal hormones were measured using immunoassays from three samples collected weekly upon awakening across a three-week period. The MFQ child report was used to assess depression symptoms and EATQ and SPSRQ were used to assess positive emotionality. Hypotheses were pre-registered here: https://osf.io/zpruj.

Results: RewP amplitude was not related to age, pubertal status, pubertal timing, pubertal hormones, or depressive symptoms. However, there was a moderating effect of impulsive trait on RewP-pubertal timing association, ($b = -2.63$, $p < 0.05$), such that greater RewP amplitude was linked to earlier pubertal timing (more advanced in puberty than same-age peers) in youth who were more impulsive.

Conclusion: Although there were no significant associations between RewP amplitude and age; pubertal status, timing, or hormones; and depression, findings suggest that sensitivity to reward feedback may be heightened in impulsive early adolescents who mature in puberty earlier than their peers. These results may help inform our understanding of pubertal timing in reward feedback sensitivity and impulsive behavior.

Presenter Name/Degree(s): Nawshad Binta Nizam, PhD
Current Position: Graduate Research Assistant

Primary Mentor in Psychiatry: Joseph Stujenske, MD, PhD

Title: **Cross-species mapping of human and mouse medial prefrontal cortex using spatial transcriptomics**

Author(s): Nizam NB[1], Karim H[2], and Stujenske J[2]
Affiliation(s): [1]Department of Bioengineering, University of Pittsburgh Swanson School of Engineering; [2]Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Our understanding of the human brain has greatly benefited from experiments in mice. The medial prefrontal cortex (mPFC) plays a key role in cognitive functions such as decision-making, working memory, and social behavior. Thus, understanding the functional organization of mPFC has been an active area of ongoing research in mice, yet our understanding of the anatomic homology between rodents and human mPFC is limited. Homologous structures are suggested by cytohistological similarities but have yet to be validated based on genetic expression. In this analysis, we develop a putative framework for human-mouse homology mapping using transcriptomic expression of homologous genes.

Methods: In this study, we used publicly available spatial transcriptomics datasets (Allen Brain Institute) for the whole mouse brain and regions of the human brain, each containing millions of cells. We then extracted expression matrices of homologous genes for the mPFC—focusing on A25, A32, and anterior cingulate cortex (ACC) in humans and ACC, IL, and PL in mice. Next, we applied canonical correlation analysis (CCA) to compare each human mPFC subregion with mouse mPFC cells, identifying significant correspondences and mapping the mouse cells based on their CCA weights to assess their spatial distribution.

Results: From the CCA comparing each human mPFC subregion with the mouse mPFC, we observed a modal distribution for overlap, such that some clusters were almost entirely overlapping while most were regionally specific. Surprisingly, these regionally specific clusters did not exhibit obvious spatial separation within the mouse brain. Nevertheless, our preliminary results suggest that there may exist spatially organized gradients for these regionally specific cells.

Conclusion: Our study shows that combining spatial gene expression data with computational methods helps connect mouse and human mPFC at the cellular level. Our current results suggest that mouse mPFC, while broadly homologous to human mPFC, has intermingled cell types with expression patterns similar to specific brain structures.

Presenter Name/Degree(s): Sara Nooraeen, MD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Mary L. Phillips, MD

Title: **Neural responses to social rejection in adolescents with musculoskeletal pain: Preliminary findings of altered processing of social threat**

Author(s): *Nooraeen S[1], English G[1], Bertocci MA[1], Taylor M[1], Stiffler R[1], Wagle S[1], Anonick R[1], Caputo S[1], Roberts L[1], *Oppenheimer C[2], and *Phillips ML[1]*
**Joint senior PIs*
Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]RTI International*

Introduction: Suicide, theorized to be driven by the desire to escape unbearable pain, is a leading cause of death in adolescents. While social threat—defined as a threat to social relationships/status—impacts mental health, its role in adolescents' pain experiences remains underexplored. This preliminary analysis examines the relationship between musculoskeletal pain (measured by affective and intensity pain scores) and neural activation in affective pain-related brain regions during a social rejection task. Cognitive control networks are also considered for their role in modulating pain responses.

Methods: Seventeen adolescents (M_{age} = 16.61, 64.71% female) from the Pittsburgh area with musculoskeletal pain underwent an MRI scan while completing a social rejection task in a mock online chatroom (CHAT). A regression model in SPM12 assessed the relationship between reported pain and neural activation during Rejection vs. Acceptance trials, controlling for sex and age. SPM threshold p=0.005.

Results: Whole brain analysis revealed that greater affective pain scores were associated with reduced neural activation in the right frontal pole (BA10) (k=20, t=5.13, p<.001) and right insula (k=20, t=4.44, p<.001) during social rejection (vs. acceptance). Pain intensity was negatively correlated with activation in the right dorsolateral PFC (k=20, t=5.18, p<.005) and ventral anterior cingulate (k=20, t=4.34, p<.005) during rejection.

Conclusion: The negative relationships between affective pain and intensity of pain and salience and central executive network activity indicate that adolescents with greater affective pain and pain intensity recruit regulation and salience networks to a lower extent during social rejection. These findings suggest that higher pain intensity and affective pain are associated with decreased perceptual salience and diminished regulation response during social rejection, respectively. While the causal nature of these relationships should be further explored, our findings are consistent with adolescents' altered processing of social rejection in contexts of greater pain intensity and affective pain.

Presenter Name/Degree(s): Isabel Novacich, BS
Current Position: Research Project Assistant

Primary Mentor in Psychiatry: Nadine Melhem, PhD

Title: **Cognitive function and depression in adolescents under chronic stress**
Author(s): ***Novacich I, Jia-Richards M, Goodfriend E, and Melhem N***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Adolescent depression is an increasing public health concern. The onset of depression during adolescence is closely linked to chronic and acute stressors. Cognitive theories of depression suggest that maladaptive cognitive processes, triggered by stress, lead to depression. Since adolescence is a critical period of neurocognitive development, deficits in cognitive function following exposure to a stressor may be crucial in the development and trajectory of depression symptoms. However, there has been limited research capturing cognitive processes throughout the unfolding of a major stressor in adolescents. This study examines the association between cognitive function and depression in youth who are experiencing parental cancer diagnosis.

Methods: Participants included 125 youth (ages 10-21) with a parent recently diagnosed with cancer and 225 controls without recent serious illness or death in the family. Assessments were conducted at intake (mean = 5.69 months post-diagnosis). Participants completed four tasks from the Cambridge Neuropsychological Test Automated Battery (CANTAB): the Motor Screening Task (MOT) for motor control, One Touch Stockings (OTS) for spatial planning, the Stop Signal Task (SST) for response inhibition, and Spatial Working Memory (SWM) for working memory and spatial manipulation. Depression symptoms were measured using the Beck Depression Inventory (BDI). Linear regression modeling examined group differences in depression symptoms related to cognitive performance.

Results: Poorer spatial working memory (SWM) was associated with higher depression symptoms ($\beta = 0.390$, SE = 0.166, $p = 0.021$) in the cancer group compared to controls. Better performance on spatial planning (OTS) was linked to lower depression symptoms in the cancer group but the result did not reach statistical significance ($\beta = -1.009$, SE = 0.570, $p = 0.0795$).

Conclusion: These results suggest that stress affects the relationship between cognitive processes and depression in adolescents. Specifically, cognitive performance in spatial planning and working memory influences depression symptoms under stress, emphasizing the potential for targeted cognitive interventions in youth facing chronic stress.

Presenter Name/Degree(s): Ella O'Rourke, BS
Current Position: Undergraduate Student

Primary Mentor in Psychiatry: Konasale Prasad, MD

Title: **Independent validation of regional biochemical markers of neuropil contraction in early-onset schizophrenia identified by 7T ^{31}P MRS**

Author(s): O'Rourke E[1], Stanley JA[2], and Prasad KM[3,4,5]
Affiliation(s): [1]Ken Deitrich School of Arts and Sciences, University of Pittsburgh; [2]Wayne State University School of Medicine; [3]Department of Psychiatry, University of Pittsburgh School of Medicine; [4]Department of Bioengineering, Swanson School of Engineering, University of Pittsburgh; [5]VA Pittsburgh Healthcare System

Introduction: Excessive synaptic pruning has been associated with pathophysiology of schizophrenia. Phosphorus magnetic resonance spectroscopy (^{31}P MRS) has emerged as the best available tool to obtain in vivo proxy measure of synaptic growth and pruning by reliably assessing membrane phospholipid (MPL) precursors (phosphomonoesters, PME) and breakdown products (phosphodiesters, PDE). ^{31}P MRS at 7 Tesla can separate the components of PME and PDE, thus identifying specific biochemical pathways involved in synaptic growth and pruning. Further, external validation of in vivo ^{31}P MRS metabolites has not been reported. This study investigated the correlation of ^{31}P MRS metabolites with neurite density (ND) data that indexes hindered diffusion due to complex geometry of the neuropil, derived from neurite orientation dispersion and density imaging (NODDI) modeling of diffusion imaging.

Methods: Ultra-high field 7T ^{31}P MRS and diffusion imaging data were obtained on 14 individuals with early onset schizophrenia (EOS), and 28 healthy controls. MPL metabolites and ND data were extracted from the hippocampus and prefrontal cortex (PFC). Case-control comparisons and correlation of these metrics were conducted.

Results: Among EOS, elevated levels of PDE (p=0.01), but not PME were observed in the PFC and hippocampus compared to controls. The PDE components, glycerophosphocholine (GPC) was significantly elevated in the PFC (p=0.004) and hippocampus (p=0.006) among EOS but not the PME components, namely phosphoethanolamine (PE) and phosphocholine (PC) in either region.

Conclusion: This preliminary study shows that reliable assessment of individual components of MPL is possible and case-control differences can be identified that suggest neuropil contraction (elevated synaptic pruning) in the PFC and hippocampus of EOS persons that may involve GPC but not GPE pathway but no alterations in neuropil growth (synapse formation). This may identify enzymes and cofactors in the GPC pathway that contribute to elevated synaptic pruning. Correlation with ND provide independent validation for these findings.

Presenter Name/Degree(s): Amar Ojha, BA
Current Position: Graduate Student Researcher

Primary Mentor in Psychiatry: Beatriz Luna, PhD

Title: **Developmental trajectories of prefrontal – nucleus accumbens subcircuits support cognitive and affective control across adolescence**

Author(s): Ojha A[1,2], Petrie DJ[2,3], Parr AC[2,3], Sydnor VJ[2,3], Foran W[3], Calabro FJ[3,4], and Luna B[1,2,3]
Affiliation(s): [1]Center for Neuroscience, University of Pittsburgh; [2]Center for Neural Basis of Cognition, University of Pittsburgh; [3]Department of Psychiatry, University of Pittsburgh School of Medicine; [4]Department of Bioengineering, University of Pittsburgh

Introduction: Adolescent peaks in motivated behaviors (e.g., exploration, risk-taking) involve changes in affective and cognitive neurodevelopment. Though mediated by fronto-striatal circuitry (e.g., prefrontal cortex, PFC; nucleus accumbens, NAcc), specific mechanisms remain elusive. NAcc core and shell support distinct processes, are linked with specific dopaminergic dynamics, and exhibit unique connectivity patterns. We hypothesize ventral affective subregions to exhibit more protracted maturation than dorsal cognitive subregions, mediated by dopamine.

Methods: We analyzed longitudinal 7T fMRI data from 176 10-32-year-old participants (274 total visits) to characterize age-related PFC-NAcc RSFC changes and associations with affective and cognitive variability. We obtained fMRI-based striatal tissue iron measures using the T2* signal.

Results: dlPFC – NAcc core RSFC peaked around age 21 ($\boldsymbol{F}$ = 7.17, $\boldsymbol{p}$ = .0004), and supported affective control (fewer internalizing, aggressive, and avoidant personality behaviors; $\boldsymbol{p}$s < .05), and cognitive control (better anti-saccade accuracy; $\boldsymbol{p}$ < .05). sgACC – NAcc shell RSFC decreased until age 24 ($\boldsymbol{F}$ = 7.07, $\boldsymbol{p}$ = .002) and was related to affective salience processing (substance use, somatic problems, prosocial behaviors; $\boldsymbol{p}$s < .05), and with worse working memory ($\boldsymbol{p}$ < .05). dlPFC – NAcc core and sgACC – NAcc shell RSFC were inversely related through adolescence (β = 0.01, $\boldsymbol{p}$ = 0.001), suggesting coordinated maturation. Next, we will investigate amygdala contributions and striatal tissue iron changes, reflecting dopamine availability, to circuitry development.

Conclusion: Coordinated changes during adolescence in PFC-NAcc pathways facilitate improvements in affective and cognitive control. Affective salience processing, mediated by sgACC – NAcc shell, weakens with development as top-down regulation, mediated by dlPFC – NAcc core, more predominantly drives NAcc responsivity. Characterizing developmentally timed trade-offs in anatomically specific subcircuits advances our understanding of neural trajectories supporting affective and cognitive maturation to support adaptive behaviors and identifies potential targets for intervention in those at psychiatric risk.

Presenter Name/Degree: Bowei Ouyang, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Konasale M Prasad, PhD

Title: **Brain age estimation using deep learning on high-resolution MRI**

Author(s): ***Ouyang, B[1], Theis, N[1], Verone, K[2], and Prasad KM[1,2,3]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Pittsburgh Swanson School of Engineering; [3]VA Pittsburgh Healthcare System

Introduction: Brain age prediction from neuroimaging serves as a biomarker for neurodegeneration and cognitive health. This study develops a 3D convolutional neural network model using ultra-high field (7T) MRI to enhance brain age estimation with improved structural specificity. The higher field strength offers superior tissue contrast and anatomical detail compared to conventional 3T scanners, potentially revealing subtle age-related changes previously undetectable.

Methods: Whole-brain T_1-weighted images were acquired using the MP2RAGE sequence on a 7T scanner. Preprocessed images were resampled to 256×256×256 dimensions using cubic spline interpolation via scipy.ndimage.zoom. The 3D CNN architecture featured three processing stages: local structural feature detection with initial 16 channels, regional pattern integration expanding to 32-64 mid-level features, and global brain age characteristic analysis culminating in 128 high-level features. The model incorporated batch normalization and regularization techniques for clinical robustness. Validation followed Cole et al. (2018) methodology using mean absolute error (MAE) and correlation with chronological age. The model was trained exclusively on healthy control data.

Results: The optimized model achieved brain age prediction with MAE around 4 years in testing, with ongoing fine-tuning expected to improve performance below 3 years. Saliency maps identified informative voxels for age prediction, which were projected onto FreeSurfer segmentations and the Glasser atlas to interpret subcortical, white matter, and cortical grey matter contributions. Applied to patient groups, the model revealed disease-specific brain age gaps, with particularly significant differences observed in subcortical structures and frontotemporal regions.

Conclusion: This 7T MRI-based brain age prediction model demonstrates high accuracy with anatomically interpretable results through saliency mapping. The region-specific aging patterns offer potential biomarkers for neurological and psychiatric disorders. Future work will focus on investigating longitudinal changes and validating these biomarkers across diverse clinical populations.

Presenter Name/Degree(s): Yiyan Pan
Current Position: Graduate Student Researcher

Primary Mentor in Psychiatry: Carmen Andreescu, MD and Helmet Karim, PhD

Title: **Women have greater tortuosity of internal carotid artery compared to men**
Author(s): ***Pan Y[1], Andreescu C[2], Ibrahim T[1,2], and Karim H[1,2]***
Affiliation(s): ***[1]Department of Bioengineering, University of Pittsburgh School of Engineering; [2]Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Anxiety disorders affect nearly 1 in 5 adults in the US with higher prevalence among women. Anxiety itself is a larger conceptual framework with different phenotypes (worry, somatic anxiety, rumination), each of which is characterized by distinct neural and behavioral correlates. Anxiety can cause chronic activation of stress circuitry, resulting in a constant state of action preparation in anticipation of uncertain threat. This constant activation can lead to physiological changes including elevated blood pressure and accelerated atherosclerosis, which can cause structural changes in brain vasculature like internal carotid artery (ICA). Given the effect of anxiety on the stress circuitry and the higher prevalence of anxiety disorders in women, we hypothesize that individuals with higher levels of worry, rumination, and anxiety will have heightened ICA tortuosity and women may have greater ICA tortuosity compare to men.

Methods: We collect time-of-flight (TOF) 7T magnetic resonance images from 127 participants age 50 and older with varying degrees of anxiety severity. We segmented the Circle of Willis using eICAB deep learning pipeline. We then conducted manual correction on segmentation and calculated tortuosity for each segmented vessel using our previously developed pipeline. This pipeline fits a B-spline on the skeleton of the vessel and calculates different curvature-based tortuosity measurements (e.g. total curvature) on this fitted spline. We evaluated correlations between TOF ICA tortuosity and measures of anxiety phenotypes (rumination, anxiety, and worry), age, sex, as well as depression and sleep. We conducted a linear regression with TOF ICA tortuosity with each of these variables in a single regression analysis.

Results: We found that women had greater TOF ICA tortuosity compared to men ($B=0.016$ (0.003), $ß=0.48$, $t=5.2$, $p<0.005$). Tortuosity did not correlate with measures of anxiety phenotypes.

Conclusion: Our result confirms that women exhibit greater ICA tortuosity compare to man, indicating potential sex-based differences in brain vascular anatomy and susceptibility to vascular remodeling. The lack of correlation between ICA tortuosity with anxiety phenotypes including global anxiety, worry, and rumination suggests that even chronic anxiety may increase vascular burden and generally influence vascular structures, ICA tortuosity itself is not a direct biomarker of anxiety phenotypes.

Presenter Name/Degree(s): Mary Pangburn
Current Position: Undergraduate Researcher

Primary Mentor in Psychiatry: Howard J. Aizenstein, MD, PhD

Title: **Periventricular white matter diffusivity as a mediator between metabolic syndrome components and cognitive impairment**

Author(s): ***Pangburn M[1,2], Son SJ[3], Chen CL[1,4], Schweitzer N[4], Hong CH[3], Roh HW[3], Cho YH[3], Park B[5], Kim NR[5], Choi JW[6], Seo SW[7], So Moon SY[7], Choi SH[7], Mizuno A[1], Yang S[1,4], Aizenstein HJ[1,4], and Wu M[1]***

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology and Neuroscience, Boston College; [3]Department of Psychiatry, Ajou University School of Medicine; [4]Department of Bioengineering, University of Pittsburgh; [5]Department of Biomedical Informatics, Ajou University School of Medicine; [6]Department of Radiology, Ajou University School of Medicine; [7]Department of Neurology, Ajou University School of Medicine

Introduction: Diffusion tensor imaging (DTI) techniques has allowed the study of metabolic abnormalities and their effects on the brain. Metabolic syndrome (MetS) factors can adversely affect the integrity of white matter (WM) in the human brain. Diffusion tensor imaging along the perivascular space (DTI-ALPS) has been used to assess perivascular fluid movement, demonstrating altered glymphatic-related integrity in type 2 diabetes mellitus. However, the role of DTI-derived markers in the relationship among MetS, WM, and cognition remains unclear. This study investigates the mediating role of DTI-derived markers between these measures, and estimates periventricular diffusivity (PVeD), capturing apparent diffusivity linked to perivascular fluid dynamics in the periventricular area.

Methods: We collected single-shell DTI data from 443 older participants in a multi-site multi-modal database. DTI data was preprocessed and reconstructed to diffusion tensors in MNI space. Fractional anisotropy (FA) and mean diffusivity (MD) maps were generated and sampled using a cerebral white matter (WM) mask, and the DTI-ALPS index was calculated. We estimated periventricular diffusivity (PVeD) by sampling the transverse tensor ratio (TTR). Given the multi-site dataset, the ComBat harmonization was applied. MetS was estimated by factor analysis based on residuals from metabolic risk indicators. Mediation analyses evaluated the role of DTI-derived markers in mediating the relationship between MetS and cognitive outcomes.

Results: The estimated MetS was positively associated with metabolic risk factors, and negatively correlated with DTI-ALPS and PVeD ($p < 0.001$). PVeD significantly mediated the indirect path between MetS and dementia symptom severity ($p = 0.008$) and cognitive outcomes ($p = 0.007$), while DTI-ALPS showed marginal mediation effects ($p = 0.076$, $p = 0.065$).

Conclusion: PVeD and DTI-ALPS provide stronger mediation effects than traditional DTI markers, showing potential in investigating metabolic-related neural changes. These findings suggest that DTI-derived markers of perivascular fluid dynamics could provide additional information beyond WM integrity.

Presenter Name/Degree(s): Andrew E. Papale, PhD
Current Position: UPMC Staff Scientist

Primary Mentor in Psychiatry: Alexandre Y. Dombrovski, MD

Title: **Age and sex differences in exploration and related representations in ventral prefrontal cortex and hippocampus from adolescence to adulthood**

Author(s): ***Papale AE[1], Westbrook C[1], Hallquist MN[2], and Dombrovski AY[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology and Neuroscience, University of North Carolina at Chapel Hill

Introduction: The dilemma between exploiting known good options and exploring potentially better alternatives is fundamental to decision-making, and it has been argued that adolescents display increased rates of exploration. However, developmental neural studies of this phenomenon are lacking. Furthermore, given different trajectories of behavioral development in women versus men, sex differences are important to understand. Connectivity between ventral prefrontal cortex (vPFC) and hippocampus is known to change with age and is related to exploration. For this study, we examined exploration behavior and associated functional connectivity of vPFC-hippocampus in two samples ranging in age from adolescence through adulthood, and how these effects differed by sex.

Methods: We included N=72 participants aged 14-30 (N=37 female) in Study 1, and 189 participants aged 18-62 (N=150 female) in Study 2. Participants completed the clock task in an fMRI scanner, where they chose a response time (RT) to stop a stimulus rotating around a clock face to obtain probabilistic rewards. Behavior was modeled with a reinforcement learning (RL) model. RT swings provided a reliable estimate of exploration. BOLD data (vPFC – grouped into 3 resting state networks – and hippocampus) were deconvolved to remove the HRF and extracted and resampled around trial onset.

Results: Male participants explored more than female participants, but total earnings did not differ. Connectivity between vPFC and hippocampus decreased with age and was lower in women. Results replicated out-of-sample.

Conclusion: Female participants use different, but equally successful, strategies during reward-learning on the clock task. Neural mechanisms of exploration diverge between males and females, likely in pre-adolescence.

Presenter Name/Degree(s): Ashley Clare Parr, PhD
Current Position: Assistant Professor

Title: **Substance use trajectories relate to variation in impulsivity, inhibitory control, and tissue iron indices of dopamine neurobiology during the transition from adolescence to adulthood**

Author(s): Parr AC[1,2], Ojha A[2,3], Petrie DJ[1], Calabro FJ[1,4], Tervo-Clemmens B[5], Foran W[1], Fitzgerald D[1], Tapert S[6], Nooner K[7], Thompson W[8], Goldston D[9], DeBellis M[9], Clark D[1], and Luna B[1]

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Center for the Neural Basis of Cognition (CNBC), Carnegie Mellon University; [3]Center for Neuroscience, University of Pittsburgh; [4]Department of Bioengineering, University of Pittsburgh;[5]Department of Psychiatry and Behavioral Sciences, University of Minnesota; [6]Department of Psychiatry, University of California; [7]Department of Psychology, University of North Carolina Wilmington; [8]Oxley College of Health and Natural Sciences, University of Tulsa; [9]Department of Psychiatry and Behavioral Sciences, Duke University

Introduction: Changes in dopamine (DA) have been implicated in animal models and adult studies of substance use; however, DA has not been linked to the ***development*** of substance use behavior ***in vivo*** in humans. We have shown that maturation of striatal tissue iron, reflecting DA availability, contributes to developmental changes in risk-taking and response inhibition in normative adolescence, two known risk markers for substance use. We characterized the role of impulsivity, response inhibition, and striatal neurophysiology in patterns of substance use from adolescence to adulthood.

Methods: The National Consortium on Alcohol and NeuroDevelopment in Adolescence (NCANDA) study combines neuroimaging with substance use assessments in a large, multisite, longitudinal cohort (N=831, 5 sites, 423F, baseline age=12-22yo, 1-9 visits, N sessions=6268). UPPS-P assessed impulsivity, the anti-saccade task measured response inhibition, and MR-based indices of striatal tissue iron obtained via time averaged and normalized T2*-weighted images (nT2*w) provided an index of DA availability. Between-person variation in substance use was quantified and within-person trajectories were delineated using Growth Mixture Models. General additive mixed models examined non-linear changes and associations between substance use and impulsivity, response inhibition, and nT2*w.

Results: At the between-person level, ***high*** impulsivity (***F***=24.82, ***p***<.001), ***low*** response inhibition (***F***=5.44, ***p***=.004), and ***low*** nT2*w (***F***=4.57, ***p***=.01) were associated with increased substance use. Growth Mixture Models revealed 4 distinct substance use trajectories: ***low*** (persistently low use; 30% of participants), ***youth peak*** (peak in adolescence/young adulthood; 26%), and two ***escalating*** groups, ***early*** (early increases followed by stabilization; 17%) and ***late*** (linear increases from late adolescence into adulthood; 26%). Youth peak trajectories were characterized by relatively ***high*** impulsivity (***F***=14.17, ***p***<.001) and ***low*** nT2*w (***F***=3.08, ***p***=.02), particularly early in adolescence.

Conclusion: We provide ***in vivo*** evidence linking differences substance use trajectories to DA, impulsivity, and response inhibition, suggesting that biological systems still undergoing normative development may contribute to adolescent substance use.

Presenter Name/Degree(s): Leigh Pearcy, PhD
Current Position: Postdoctoral Scholar

Primary Mentor in Psychiatry: Helmet Karim, PhD and Carmen Andreescu, MD

Title: **Longitudinal changes in white matter hypointensities in recurrent late-life depression**

Author(s): Pearcy LB[1], Costa AP[1], Butters MA[1], Krafty R[6], Boyd BD[3], Banihashemi L[1,2], Szymkowicz SM[3], Landman BA[7,8], Ajilore O[5], Taylor WD[3,4], Andreescu C[1], and Karim HT[1,2]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Bioengineering, University of Pittsburgh; [3]Center for Cognitive Medicine, Department of Psychiatry and Behavioral Science, Vanderbilt University Medical Center; [4]Geriatric Research, Education, and Clinical Center, Veterans Affairs Tennessee Valley Health System; [5]Department of Psychiatry, University of Illinois-Chicago; [6]Department of Biostatistics and Bioinformatics, Emory University; [7]Departments of Computer Science, Electrical Engineering, and Biomedical Engineering, Vanderbilt University; [8]Department of Radiology and Radiological Sciences, Vanderbilt University Medical Center

Introduction: White matter hypointensities (WMhs) on T1 are highly correlated with white matter hyperintensities (WMHs) on T2 FLAIR. Both lesions mark cerebrovascular disease and are associated with late-life depression (LLD). Increased baseline WMH volumes are associated with LLD recurrence risk. However, literature is sparse regarding the longitudinal accumulation of WMh/WMH and its association with LLD recurrence in older adults.

Methods: We investigated the relationship between WMh and LLD recurrence using data from a 2-year multi-site study. Imaging data were collected every 8 months from 216 participants, 151 with remitted LLD and 65 age-matched controls. We identified individuals who experienced depression recurrence to define groups for analysis. We used T1-weighted images to segment WMh volumes in Freesurfer and analyzed the change in WMh volume using mixed-effect regression models. Predictors included time, group, and their interaction to evaluate differences in volume trajectories between groups based on recurrence. We adjusted for intracranial volume (ICV), age, sex, race, education, site, and cerebrovascular disease burden. We additionally analyzed whether the change in WMh volume per participant was affected by age, ICV, and WMh volume at baseline to determine the effect of baseline lesion volume on progression.

Results: LLD participants with early relapse had greater baseline WMh volumes than non-depressed participants, confirming the results of previous findings. We found no evidence that the accumulation of WMh over two years differed across groups. Further, higher baseline WMh was associated with slower accumulation of WMh over time.

Conclusion: Our results confirm that greater WMh volume is associated with early relapse after depression remission in late life, but the progression of WMh did not differ between groups. WMhs did not accumulate faster in LLD participants who experienced recurrence. Lifespan studies, including midlife and late-life cohorts, are warranted to identify inflection points contributing to greater baseline WMH/WMh measures in LLD.

Presenter Name/Degree(s): Megan Perez, BS
Current Position: Graduate Student Researcher

Primary Mentor in Psychiatry: Kyle Ketchesin, PhD and Colleen McClung, PhD

Title: **Gene splicing differences in psychosis in the striatum**

Author(s): ***Perez MS[1,2], Yin RF[3], Dowling KF[1], Zong W[3], Scott MR[1], Seney ML[1], Hildebrand MA[1], Shankar VG[1], Glausier JR[1], Lewis DA[1], Tseng GC[3], Ketchesin KD[1], and McClung CA[1]***
Affiliation(s): [1]Translational Neuroscience Program (TNP), Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Human Genetics, School of Public Health, University of Pittsburgh; [3]Department of Biostatistics, University of Pittsburgh

Introduction: Psychosis is a highly disruptive and often debilitating symptom found in disorders such as schizophrenia and bipolar disorder. Prior studies have heavily implicated the striatum in psychosis. Furthermore, previous studies have reported a dysregulation of alternative gene splicing in psychosis. Alternative splicing is a major factor in transcriptional diversity and little research has been done regarding the intersection of psychosis and splicing in the striatum. Here, we begin to elucidate differential splicing (DS) in the striatum.

Methods: RNA-seq was performed on nucleus accumbens (NAc), caudate, and putamen samples from subjects with psychosis (n=36) or matched unaffected subjects (n=36). For identification and visualization of local splice variation we used LeafCutter and LeafViz, respectively. DIGGER was used to analyze how domain-domain interactions impact protein-protein interactions and Metascape was used for pathway enrichment.

Results: Across the three regions, we identified 705 named, unique genes that were DS. In the NAc, these genes were related to cellular organization and transport. In the caudate, there was enrichment in immune and cellular organization pathways. In the putamen, cilia-, mitochondria-, and cellular organization-related pathways were DS. Furthermore, there were many genes implicated in psychosis that featured splicing predicted to lead to a change in protein-protein interactions, such as ***NRXN1***, ***NRXN2***, and ***CACNA1C***.

Conclusion: We found a notable number of genes with DS across psychosis and unaffected subjects in all substriatal regions. These genes were associated with numerous pathways, including cellular organization, immune, and mitochondria. Additionally, we identified prominent genes known to be alternatively spliced and associated with psychosis in our analysis. Often, the splicing event caused a predicted loss or gain of a particular domain that altered protein-protein interactions. Future studies regarding differential transcript usage, splice factors, day/night differences, and sex differences will help us understand striatal DS and its potential functional consequences in psychosis.

Presenter Name/Degree(s): Kaitlyn Petersen, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Colleen McClung, PhD

Title: **Adolescent circadian rhythm disruption leads to increased risk-taking and transcriptional changes in adulthood**

Author(s): ***Petersen KA, Depoy LM, Vadnie CA, Scott MR, Zong W, Yin R, Matthaei RC, Jaurez Anaya F, Kampe CI, Tseng GC, and McClung CA***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Circadian rhythm disturbances have long been associated with the development of psychiatric disorders, including mood and substance use disorders. Adolescence is a particularly vulnerable time for the onset of psychiatric disorders and for circadian rhythm and sleep disruptions. Preclinical studies have found that circadian rhythm disruption (CRD) impacts the brain and behavior, but this research is largely focused on disruptions that occur during adulthood. The goal of this study was to determine the long-term effects of adolescent CRD.

Methods: We exposed mice to four 12 h shifts in the light/dark cycle over the course of adolescence (P28-P37). Mice were sacrificed across 4 times of day in adulthood, approximately 4 weeks following the last shift. Behavioral testing was then performed to assess reward and risk-taking. To identify possible mechanisms by which CRD during adolescence affects behavior later in life, we also measured gene expression in brain regions relevant to circadian rhythms, mood and reward, the SCN, PFC and NAc, respectively.

Results: We first identified that adolescent CRD alters behavior later in life, namely increasing reward and risk-taking. We measured differential expression (DE) between control and adolescent CRD mice at ZT6 in male and female mice and found that the transcripts affected by CRD were largely distinct across sex and brain region. The SCN was particularly affected, with more the most DE transcripts identified at $q<0.05$. These transcripts were largely involved in circadian rhythms, adipogenesis, and intracellular signaling. Downstream of the SCN we also observed significant changes in the PFC of males at ZT0. Transcripts with altered gene expression were associated with neuronal activity, translation, and the extracellular matrix.

Conclusion: Overall, these studies suggested that adolescent CRD in mice is sufficient to persistently increase risk-taking behavior and alter gene expression long-term.

Presenter Name/Degree(s): Daniel J. Petrie, PhD
Current Position: Postdoctoral Fellow

Primary Mentor in Psychiatry: Beatriz Luna, PhD

Title: **Developmental trajectories of reward, goal-directed, and habitual brain circuits are differentially linked to alcohol use**

Author(s): ***Petrie DJ, Parr AC, Calabro F, Foran W, and Luna B***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Reward-driven, goal-directed, and habitual behaviors are supported by distinct corticostriatal circuits involving the nucleus accumbens (NAcc), caudate, and putamen, respectively, and have been implicated in the initiation and maintenance of alcohol use. Despite these findings, the relationship between the maturation of these circuits and alcohol use during development remains unclear.

Methods: The National Consortium on Alcohol and Neurodevelopment in Adolescence - Adulthood (NCANDA-A) study integrates neuroimaging with substance use assessments in a longitudinal cohort (n = 822, ages 12–21 at baseline, 1-9 visits per participant). Whole-brain networks for the NAcc, caudate, and putamen were generated. Generalized additive models examined associations between corticostriatal functional connectivity (FC) and past-year alcohol use, as well as age-varying effects of FC and alcohol use.

Results: Higher cingulo-opercular network (CON) putamen FC was linked to more drinking days ($b = 3.05$, $p = 0.002$), while higher CON-caudate and CON-NAcc FC were associated with fewer drinking days (CON-caudate: $b = -2.21$, $p = 0.04$; CON-NAcc: $b = -1.40$, $p = 0.04$). Individual differences in CON-putamen FC were associated with variation in alcohol use particularly following age 19.54 years ($F = 8.36$, $p < 0.001$), with higher FC linked to more drinking days. An opposite pattern emerged for CON-NAcc and CON-caudate FC around ages 19.71 and 21.63, respectively, where higher FC was associated with fewer drinking days (CON-NAcc: $F = 4.42$, $p = 0.006$; CON-caudate: $F = 3.14$, $p = 0.04$).

Conclusion: These findings provide novel evidence that corticostriatal FC shapes age-related alcohol use. Higher CON-putamen FC may increase risk via reward and motor pathways, while higher CON-caudate FC may protect against use through cognitive control. Our findings have significant implications for understanding age-related drinking patterns by identifying specific connectivity profiles that increase risk for alcohol use**.**

Presenter Name/Degree(s): Jamie Pierson, PhD
Current Position: Research Principal Senior

Primary Mentor in Psychiatry: Susanne Ahmari, MD, PhD

Title: **Evaluation of compulsive and anxiety-like behaviors in a heterozygous global *Slitrk5* knockout mouse model**

Author(s): ***Pierson J and Ahmari S***
Affiliation(s): ***Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Obsessive-compulsive disorder (OCD) is a debilitating psychiatric condition characterized by intrusive thoughts and repetitive behaviors. While OCD is known to be heritable, the specific genetic mechanisms underlying its development remain poorly understood. Recent studies have identified genetic variants or reduced expression of the ***Slitrk5*** gene as potential contributors to OCD pathophysiology. ***Slitrk5*** is a neuron-specific transmembrane protein involved in the formation and maintenance of corticostriatal synapses, which are central to habit formation, behavioral inhibition, and other traits disrupted in OCD, and disruption in these circuits have been implicated in OCD etiology. In mice, complete knockout of ***Slitrk5*** results in OCD-relevant phenotypes such as excessive grooming and increased anxiety-like behaviors. However, the effects of heterozygous loss, which more closely parallels the partial gene disruptions seen in human populations, are unknown.

Methods: In the present study, we assessed whether heterozygous global ***Slitrk5*** knockout mice exhibit behavioral phenotypes consistent with compulsive or anxiety-related behaviors. We employed a battery of validated behavioral assays including grooming assessments and anxiety tests: exploration of a novel open field, elevated zero maze, and light-dark box testing.

Results: We found no significant differences in grooming behavior, general locomotion, or anxiety-like behavior in the elevated zero maze and open field tests compared to wildtype littermate controls. However, ***Slitrk5*** heterozygous knockout mice spent more time in the dark segment of the light-dark test ($p=0.019$), suggesting a subtle anxiety-related phenotype.

Conclusion: Our findings suggest that while partial loss of ***Slitrk5*** may contribute to anxiety-related behaviors, the heterozygous global knockout does not produce robust compulsive phenotypes and does not serve as an ideal model for OCD-like behavior. This study establishes an effective pipeline for testing further transgenic mouse models targeting candidate genes in OCD, which will improve the translational relevance of future preclinical research.

Presenter Name/Degree(s): Jacob Ponce, BS
Current Position: Clinical Research Coordinator

Primary Mentor in Psychiatry: Andrea Weinstein, PhD

Title: **Psychological resilience as a moderator of cognitive reserve: An integrative neuroimaging study**

Author(s): ***Ponce J [1,3], Snitz B[3,2], and Weinstein A[1,2]***
Affiliation(s): [1]Alzheimer's Disease Research Center; [2]Department of Psychiatry, University of Pittsburgh School of Medicine; [3]Department of Pathology, Division of Neuropathology, University of Pittsburgh

Introduction: The brain's capacity to compensate for neuropathological damage has been linked to factors such as education and cognitive stimulation. However, the role of psychological resilience—encompassing emotional, social, and stress-related traits or states—remains underexplored in this context. This study addressed three questions in aging: Do psychological resilience factors (1) relate to cognitive function, (2) relate to neuropathology, (3) moderate the relationship between neuropathology and cognitive function?

Methods: Participants included 232 older adults without dementia from the MYHAT (Monongahela–Youghiogheny Healthy Aging Team) Neuroimaging Study (N=110) and the HeartSCORE 500 Study (N=122). Participants were categorized as cognitively unimpaired or with mild cognitive impairment (MCI) based on Clinical Dementia Rating scale (CDR). Resilience factors were measured with the NIH Toolbox Emotion Battery. Neuroimaging biomarkers included cortical thickness and amyloid and tau burden via PET. Cognitive performance was measured by neuropsychological testing. Linear regression models adjusted for age, sex, education, race and cohort, and included biomarker x resilience factor interaction models.

Results: Psychological resilience was not related to cortical thickness, amyloid, or tau. Cortical thickness was associated with better processing speed, executive function, verbal fluency, and memory (p's $< .05$). In adjusted regression models, psychological resilience factors (Instrumental Support, Life Satisfaction, Positive Affect) were associated with better cognitive performance. For example, Instrumental Support related to better verbal fluency ($B = -1.54$, $p = .023$), and Life Satisfaction related to better executive function ($B = -23.68$, $p < .001$). Significant interactions emerged for cortical thickness × resilience factors (e.g., Instrumental Support, Life Satisfaction), such that participants with greater life satisfaction and cortical thickness had better executive function performance (p's $< .001$).

Conclusion: We found that psychological resilience factors were associated with better cognitive performance, but not cortical thickness, amyloid, or tau. Significant interactions were found indicating that greater psychological resilience may moderate the effects of neuropathology on cognition.

Presenter Name/Degree(s): Guilherme Povala, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Harmonization of Flortaucipir, MK6240, PI2620 and RO948 with the Uniτ scale**

Author(s): *Povala G[1], Bauer-Negrini G[1], Bellaver B[1], Amaral L[1], Lussier FZ[1], Ferreira P[1], Tudorascu D[1], Finn Q[2], Masdeu J[2], Soleimani-Meigooni D[3], Fortea J[4], Lowe V[5], Oh H[6], Pascual B[2], Gordon BA[7], Rosa-Neto P[8], Baker S[9], and Pascoal TA[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Houston Methodist Research Institute, Department of Neurology; [3]University of California San Francisco, Memory and Aging Center; [4]Hospital de la Santa Creu i Sant Pau, Sant Pau Memory Unit, Department of Neurology; [5]Mayo Clinic, Department of Radiology; [6]Brown University, Department of Psychiatry and Human Behavior; [7]Washington University in St. Louis, Department of Radiology; [8]Translational Neuroimaging Laboratory, McGill University Research Centre for Studies in Aging, Douglas Research Institute; [9]Lawrence Berkeley National Laboratory*

Introduction: Precise cross-tracer harmonization of tau PET imaging is essential for comparing tau burden across different tracers and studies. Here, we evaluated the performance of the universal tau PET scale (Uniτ) in harmonizing Flortaucipir, MK6240, PI2620, and RO948 tau PET images.

Methods: We assessed 485 individuals scanned head-to-head with Flortaucipir and MK6240, and a subset of 90 individuals with additional PI2620 and RO948. We generated tau PET SUVRs using the inferior cerebellar gray matter as reference. We estimated Uniτ parameters on a training set (n = 200) by fitting a smoothed hyperbolic tangent equation to the Meta-Temporal ROI anchored in the mean SUVR of young participants and the 90th percentile from cognitively impaired individuals. We compared tau positivity on the Uniτ scale with classifications from SUVRs (mean + 3 SD from Youngs). We applied the same equation to all brain voxels to generate Uniτ 3D images. We extracted mean Uniτ values for key ROIs and correlated them with ROI-based Uniτ values to evaluate voxel-wise estimates.

Results: Using tracer-specific parameters, Uniτ harmonized Flortaucipir, MK6240, PI2620, and RO948 to the same scale, aligning values near the identity line, confirming its applicability across tau PET tracers. For Flortaucipir, Uniτ positivity matched original SUVR classifications (ground truth), with only one mismatch for MK6240. Applying the Uniτ transformation to all brain voxels effectively harmonized 3D images to a common scale, reducing visual variabilities. ROI-based estimates and those extracted from the 3D Uniτ images were identical.

Conclusion: Our results indicate that tau PET tracers can be harmonized to a common scale using a large head-to-head dataset. The Uniτ scale can harmonize entire 3D tau PET images, with no need to use pre-established ROIs, which would constrain the analysis to a few brain regions. Uniτ is freely accessible (www.unitau.app) for ROI and 3D tau PET harmonization.

Presenter Name/Degree(s): Robert Raeder, MSc, MA
Current Position: Research Coordinator

Primary Mentor in Psychiatry: Mary L Phillips, MD, MD (Cantab)

Title: **Pre-supplementary motor area activity during reward expectancy linked to mania/hypomania risk**

Author(s): ***Raeder R, Arora M, Bertocci M, Chase H, Skeba A, Bebko G, Aslam H, Graur S, Benjamin O, Wang Y, Stiffler R, and Phillips M***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Elevated impulsivity is a core feature of mania/hypomania in bipolar disorder (BD), contributing to many debilitating outcomes. This study investigated the neural correlates of impulsivity facets—measured by the Behavioral Activation System (BAS) and Urgency, Premeditation, Perseverance, and Sensation Seeking–Positive Urgency (UPPS-P) scales—during the reward expectancy (RE) phase of a reward task to assess their relevance as markers of mania/hypomania risk. Relationships of significant neural clusters to left ventrolateral prefrontal cortex (L-vlPFC) activity during RE, a known neural marker of mania/hypomania risk, were examined to assess unique versus overlapping variance.

Methods: Whole-brain regressions were conducted for each BAS and UPPS-P facet in a transdiagnostic sample (N=143), controlling for age, sex, and IQ. Significant clusters were identified using voxel-wise family-wise error correction with a Bonferroni-adjusted threshold (p_{FWE}=0.006; 0.05/8). Across independent samples (discovery, n=142; replication, N=241), Poisson regression models tested associations between significant neural clusters and mania/hypomania risk, assessed via MOODS-SR lifetime mania domains. Mediation analyses assessed impulsivity facets as an intermediary. Likelihood ratio tests assessed whether significant neural clusters and L-vlPFC activity contributed unique or overlapping variance to mania/hypomania risk.

Results: Two significant neural clusters emerged in the discovery sample: a positive association between BAS Fun Seeking and pre-supplementary motor area (pre-SMA) activation (p_{FWE}=0.003, k=167), and a positive association between UPPS-P Sensation Seeking and right ventrolateral prefrontal cortex (R-vlPFC) activation (p_{FWE}=0.001, k=194); however, only the pre-SMA finding replicated. Greater pre-SMA activation was associated with Fun Seeking (discovery: β=2.729, p<0.001; replication: β=0.624, p=0.035), as well as MOODS-SR lifetime mania scores (discovery: β=0.538, p<0.001; replication: β=0.089, p=0.007), primarily driven by its association with the energy subdomain (discovery: β=0.507, p=0.009; replication: β=0.170, p=0.030). This relationship was mediated by Fun Seeking (discovery: ACME=3.228, p<0.001; replication: ACME=0.288, p=0.029). Likelihood ratio tests indicated that pre-SMA and L-vlPFC activity each contributed unique variance to mania/hypomania scores in the discovery sample (χ^2=91.64 and 43.84, both p<0.001), with pre-SMA accounting for unique variance in the replication sample as well (χ^2=9.40, p=0.002).

Conclusion: Pre-SMA activation during RE is a replicable, impulsivity-related neural correlate of mania/hypomania risk, operating independently of L-vlPFC activity and mediated by Fun Seeking. Findings support both regions as distinct neurobiological targets for early identification and intervention in BD.

Presenter Name/Degree(s): Samira Raminfard, PhD
Current Position: Postdoctoral Scholar

Primary Mentor in Psychiatry: Deepak K. Sarpal, MD

Title: **Diffusion-derived subcortical microstructural changes associated with clozapine response in treatment-resistant schizophrenia**

Author(s): Raminfard S[*], OverbeyT[*], Versace A, Jones N, Blazer A, Snover W, Pupi M, Kahn C, Chengappa RKN, and Sarpal DK[#]
Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine
**Shared first authorship [#]Corresponding Author*

Introduction: Schizophrenia is a chronic psychiatric disorder. Up to 35% of individuals with schizophrenia do not respond to first-line antipsychotic drugs and meet broad criteria for treatment-resistant schizophrenia (TRS). Clozapine (CLZ) has demonstrated superior efficacy for psychosis in people with TRS. However, CLZ's mechanism of action remains unclear. As of yet, microstructural alterations in cortical and subcortical regions remain underexplored. Thus, in this study, we examined microstructural changes in these regions using multi-shell diffusion-weighted imaging, exploring their relationship with changes in the clinical symptoms of schizophrenia following CLZ administration.

Methods: Twenty-nine TRS and sixty-five healthy controls underwent 3T multi-shell diffusion imaging. Longitudinal data were collected for 19 TRS at baseline and after 12 weeks of CLZ. Data were preprocessed using MRtrix. Neurite density index (NDI) and orientation dispersion index (ODI) mean kurtosis (MK) and radial kurtosis (RK) were extracted. Microstructural changes in frontal and basal ganglia regions were assessed. Along tract measures were also calculated using TractSeg. Clinical symptoms were measured with the Brief Psychiatric Rating Scale (BPRS) at multiple time points. Correlations between symptoms and microstructural changes were examined using a general linear model ($p < 0.05$).

Results: Association between changes in MK and total BPRS score was noted in the left ventral caudate ($R2=0.42$ $p = 0.46$ FDR corrected), the left globus pallidus ($R2=0.40$ $p = 0.46$ FDR corrected) and the left dorsolateral putamen ($R2=0.41$ $p = 0.46$ FDR corrected). Additionally, we examined white matter alterations along tracts and identified the predominant striatal endpoints that correlated with BPRS scores within the left striato-premotor tract. However, those endpoints did not remain significant after FDR correlation.

Conclusion: These results highlight the dimension of CLZ's impact on brain structure, suggesting that improvements in schizophrenia symptoms may be supported by microstructural changes within the basal ganglia.

Presenter Name/Degree(s): Ellie Rapp, BA
Current Position: Research Project Assistant

Primary Mentor in Psychiatry: Swathi Gujral, PhD

Title: **The association between lifetime suicide risk and cognitive function among older adults with treatment resistant depression**

Author(s): ***Rapp E[1], Gujral S[1], Diaz J[1], Szanto K[1], Conaty K[1], Mulsant B[2], Voineskos A[2], Lavretsky H[3], Shimony J[4], and Butters MA[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Centre for Addiction and Mental Health, Department of Psychiatry, University of Toronto; [3]Department of Psychiatry and Biobehavioral Sciences, University of California; [4]Department of Psychiatry, Washington University School of Medicine

Introduction: Older adults with treatment resistant late-life depression (TRLLD) have a high prevalence of cognitive impairment persisting after depression remission, increasing cognitive decline/dementia risk. Suicidal ideation (SI) and behavior are linked to impairment beyond effects of TRLLD. In community-dwelling older adults with TRLLD, we examined the association among lifetime suicidality (worst SI, attempts), a diagnosis of Mild Cognitive Impairment (MCI) or Dementia, and cognitive performance in domains affected by neurodegenerative processes.

Methods: 255 adults with TRLLD >60 years were recruited within the US/Canada. RBANS and D'KEFS addressed cognition while the WRAT-4 Reading subtest estimated premorbid IQ. The BSSI retrospectively assessed the worst lifetime SI. The CSSRS was used to assess past suicide attempts. Logistic and linear regression models were used to examine the effect of lifetime suicidality on cognitive status and cognitive performance, respectively. All models were adjusted for demographics, premorbid IQ, physical illness burden, and TRLLD severity.

Results: Of 255 participants, 124 (49%) had a cognitive diagnosis (MCI: 120; dementia: 4l); 119 (47%) had lifetime SI; and 32 (13%) had 1+ past suicide attempt. Lifetime SI was not related to cognitive diagnosis (ps>0.70) but it was associated with worse memory performance (B=0.84; p=0.024) but not to worse executive functioning (p=0.13) or slower processing speed (p=0.75). Higher TRLLD severity was associated with worse executive functioning (B=-0.12; p=0.047) and slower processing speed (B=1.14, p=0.003), but not memory performance (B=-0.02, p=0.403). A past suicide attempt was not related to cognitive diagnosis or cognitive performance for any cognitive domain (ps>0.10).

Conclusion: Suicidality and cognitive impairment in late-life depression are complexly related and possibly bidirectional. Our findings suggest, for older adult community members with TRD, lifetime SI does not increase risk of cognitive disorder (i.e., MCI), but relates to worse memory functioning, beyond the effects of TRLLD severity, medical burden, premorbid IQ, and demographics.

Presenter Name/Degree(s): Abigale Regal, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Michele Levine, PhD

Title: **The impact of depressive symptoms and disorders on breastfeeding intent and duration**

Author(s): ***Regal AL, Call CC, and Levine MD***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Psychological distress during the perinatal period (i.e., pregnancy and postpartum) negatively contributes to breastfeeding outcomes, including decreased breastfeeding duration. Individuals with pre-pregnancy BMI ≥25 are at increased risk for perinatal mood disorders and poor breastfeeding outcomes, but relationships between mood and breastfeeding are understudied in this population. We aimed to explore relationships between depressive disorders/symptoms and breastfeeding intent/duration among pregnant individuals with pre-pregnancy BMI ≥25.

Methods: Pregnant individuals (N=257) with pre-pregnancy BMI ≥25 completed assessments of current and past depressive disorders (Structured Clinical Interview for DSM-IV (SCID-IV)) and depressive symptoms (Center for Epidemiological Studies Depression Scale) at T0 (early pregnancy) and T6 (6-months postpartum). Breastfeeding intent was self-reported at T3 (mid-pregnancy) and breastfeeding duration at T6.

Results: In our sample, 47.9% of individuals had a lifetime depressive disorder at T0, and 18.7% experienced a depressive disorder between T0 and T6. At T0, 7.8% of individuals had a current depressive disorder, and 5.4% at T6. No depressive disorder variables significantly predicted breastfeeding intent or duration. Those with higher T0 CES-D scores were significantly less likely to intend to breastfeed (***p***=.026) and had shorter breastfeeding durations (***p***<.001). Higher T6 CES-D scores also significantly related to shorter breastfeeding durations ***(p***<.024**).** However, after controlling for covariates, CES-D scores were no longer significantly related to breastfeeding intent/duration. Instead, lower education level and not being in a relationship were linked to poorer breastfeeding outcomes.

Conclusion: Among individuals with pre-pregnancy BMI ≥25, current or past depressive disorders were unrelated to breastfeeding intent/duration, although low rates of current depressive disorders may have driven this null finding. Depressive symptoms may contribute to poorer breastfeeding outcomes in this population, however other factors such as education level and relationship status may play a larger role. Further investigation of breastfeeding risk and protective factors is needed in this population.

Presenter Name/Degree(s): Yuxin Ren, BS
Current Position: PhD student

Primary Mentor in Psychiatry: Dana L. Tudorascu, PhD

Title: **Scanner effects in longitudinal tau-PET imaging studies of Alzheimer's Disease**

Author(s): ***Ren Y***
Affiliation(s): ***Department of Biostatistics and Health Data Science, University of Pittsburgh School of Public Health***

Introduction: Multisite observational neuroimaging studies of Alzheimer's Disease (AD) have become increasingly popular in the last decade due to their large number of participants. However, these studies collect neuroimaging data on multiple types of scanners which could introduce technical variability that could affect downstream analyses leading to erroneous conclusions. In this work we evaluated the impact of Combat harmonization on Positron Emission Tomography (PET) tau tracer brain outcomes (Braak areas) in Alzheimer's Disease Neuroimaging Initiative (ADNI) study.

Methods: We used 2,416 participants (aged 55–89) from five diagnostic groups: AD, Cognitively Normal (CN), Early/Late Mild Cognitive Impairment (EMCI/LMCI), and Subjective Memory Complaints (SMC) as well as an age-sex matched subset. Mixed models were used for each Braak area outcome before and after applying Combat harmonization. Standardized effect sizes for harmonized versus non-harmonized group differences were computed and compared to those from meta-analyses to assess heterogeneity across sites. In a secondary analysis we matched subjects from AD and CN groups by age and sex and compared effect sizes before and after harmonization.

Results: The estimated group effect sizes from mixed models were not different between harmonized versus non-harmonized data and the results were consistent with meta-analysis. However, the matching analysis showed some discrepancies before and after harmonization (i.e. sex was not significantly associated with tau PET before harmonization for Braak VI but it was significant after Combat harmonization).

Conclusion: In this investigation, Combat harmonization did not show any differences in the estimated differences across groups for any Braak areas for the large sample. However, our analysis suggests that a smaller, better controlled subsample of multisite data may show different results before and after harmonization, thus requiring further investigation of subsampled matched studies from multisite studies.

Presenter Name/Degree(s): Monika Renuka Sanotra, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Thomas K, Karikari, PhD

Title: **Combining p-tau217 with other blood biomarkers to enhance prediction of cognitive decline: A large memory clinic cohort study**

Author(s): ***Renuka Sanotra M[1], Zeng X[2], Deek RA[1], Gu JM[2], Farinas MF[2], Nafash MN[1], Choity L[2], Lafferty TK[2], Bedison A[1], Mercurio RB[3], Matan C[2], Kofler JK[1,2,4], Tudorascu DL[1], Shaaban CE[1,3], Lingler JH[3], Pascoal TA[1,2], Klunk WE[1,3], Villemagne VL[1], Berman SB[2], Sweet R[2,5,6], Snitz BE[1,2,3], Ikonomovic MD[2,4,6], Cohen AD[1,2,3], Kamboh MI[1,3], Lopez OL[1,2,3] and Karikari TK[1,7,8,9,10,11,12,13]***

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Pittsburgh School of Medicine; [3]University of Pittsburgh Alzheimer's Disease Research Center (ADRC); [4]UPMC; [5]Department of Psychiatry and Neurology, University of Pittsburgh; [6]VA Pittsburgh Healthcare System; [7]University of Gothenburg; [8]Institute of Neuroscience and Physiology, Department of Psychiatry and Neurochemistry, The Sahlgrenska Academy at University of Gothenburg; [9]Institute of Neuroscience and Physiology, Department of Psychiatry and Neurochemistry, The Sahlgrenska Academy at University of Gothenburg; [10]Department of Psychiatry and Neurochemistry, Institute of Neuroscience and Physiology, The Sahlgrenska Academy, University of Gothenburg; [11]Institute of Neuroscience and Physiology, Department of Psychiatry and Neurochemistry, The Sahlgrenska Academy at University of Gothenburg; [12]NIHR Biomedical Research Centre for Mental Health & Biomedical Research Unit for Dementia at South London & Maudsley NHS Foundation; [13]Institute of Neuroscience and Physiology, University of Gothenburg

Introduction: Plasma p-tau217 has emerged as one of the most promising biomarkers for Alzheimer's disease (AD). However, it remains largely unexplored whether integrating p-tau217 with other emerging AD blood biomarkers (BBMs) will enhance its clinical performance. This research aims to address this question by analyzing a large memory clinic cohort with over three decades of longitudinal follow-up.

Methods: This study utilized participants enrolled at the University of Pittsburgh Alzheimer's Disease Research Center who underwent baseline blood collection and longitudinal Clinical Dementia Rating-Sum of Boxes (CDR-SB) based cognitive functional assessments over 30 years. A sub-cohort with 11C-PiB amyloid PET was used to determine the cut-off for p-tau217 (0.5471 pg/ml). Plasma levels of p-tau217, p-tau181, BD-tau, GFAP, and NfL were measured using the SIMOA assay.

Results: We included 4382 participants (57.0% female; 85.8% self-identified non-Hispanic White), aged 71.9 ± 9.8 years, with 2127 being non-demented (CDR≤0.5) at baseline. High p-tau217 levels were associated with a significantly faster cognitive decline, with a hazard ratio (HR) of 3.16 (CI: 2.82 – 3.53) and a median survival time of 4.0 years compared to 10.0 years for those with low p-tau217. Elevated GFAP was associated with the greatest hazards when combined with high p-tau217, HR 1.61 (1.41 – 1.84; $p < 0.0001$), followed by 1.46 (1.28 – 1.66; $p < 0.0001$) for NfL, 1.31 (1.14 – 1.50; $p = 0.0002$) for p-tau181, and 1.29 (1.13 – 1.48; $p = 0.0002$) by BD-tau. Among individuals with low p-tau217 levels, elevated NfL was associated with the greatest hazards, HR 3.53 (2.64 – 4.72; $p < 0.0001$), followed by 1.77 (1.32 – 2.39; $p < 0.0001$) for GFAP and 1.33 (1.01 – 1.77; $p = 0.029$) for p-tau181.

Conclusion: Our study underscores the synergetic joint effect between p-tau217 and other BBMs, and that integrating p-tau217 with these BBMs can enhance tailored clinical management strategies of AD.

Presenter Name/Degree(s): Hayley Rhorer, BA
Current Position: Research Specialist
Primary Mentor in Psychiatry: Brian A. Coffman, PhD

Title: **Differential auditory segmentation potentials in first-episode psychosis: Active vs passive attention**

Author(s): ***Rhorer H, Kavanagh J, Seebold D, Fowler L, Salisbury DF, and Coffman BA***
Affiliation(s): ***Clinical Neurophysiology Research Laboratory, Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Auditory segmentation potentials (ASPs) are event-related potentials (ERPs) that have been shown to generate in response to segmented groups of auditory stimuli as a pattern is established. Past neurophysiological research indicates that schizophrenia patients experience deficits in auditory processing; our lab previously demonstrated deficits in ASPs in first-episode psychosis (FEP). This current study aims to replicate and expand upon these findings by investigating EEG recordings of ASPs in response to segmented acoustic precepts during both active and passive attention.

Methods: Eight FEP (within 2 years of first contact regarding psychotic symptoms) and 10 age-matched controls (HC) either ignored or attended to tone groups while watching a silent nature video. Stimuli consists of 300 groups of ascending-pitch triplets (75 dB, 50 ms pips, 5 ms rise/fall times, SOA = 333ms), with occasional deviations in tone pattern. Groups were separated by 1000 ms ITI. Sustained potentials were measured from frontocentral ERPs filtered between 0.5-2 Hz, from 200ms to 900ms after onset of the first tone.

Results: ASP amplitudes in HCs were significantly larger during the active condition than the passive condition ($p < 0.05$), compared to FEP amplitudes, which were not significantly different across both conditions (ANOVA: $F_{1,16} = 3.7$; $p = 0.07$). Although not significant, in HCs ASP amplitudes during the active condition were larger and amplitudes during the ignore condition were smaller (Cohen's $d = 0.55$).

Conclusion: These preliminary results indicate that people experiencing first-episode psychosis may exhibit a reduced ability to establish/modulate pattern recognition to segmented acoustic stimuli, which might suggest that crucial higher-order cognitive mechanisms for auditory segmentation and processing are affected early in psychosis. This diminished differentiation observed in ASPs in FEPs between the active and passive emphasizes the importance of further research to explore the mechanisms driving these deficits and to assess their potential utility as early diagnostic indicators.

Presenter Name/Degree(s): Anna Roberts
***Current Position*:** Research Assistant

Primary Mentor in Psychiatry: Helmet T. Karim, PhD

Title: **Altered resting state hippocampal connectivity associated with amyloid and tau in older adults without dementia from a population-based cohort study**

Author(s): Roberts A[1], Andreescu C[1], Cohen A[1], Villemagne V[1], Nadkarni N[2], Minhas D[3], Laymon C[3], Lopresti B[3], Ganguli M[1,2,4], Snitz B[1,2], and Karim HT[1,5]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurology, University of Pittsburgh; [3]Department of Radiology, University of Pittsburgh; [4]Department of Epidemiology, University of Pittsburgh; [5]Department of Bioengineering, University of Pittsburgh

Introduction: Default mode network (DMN) regions, including the hippocampus, are among the first to accumulate amyloid-beta and tau pathology in Alzheimer's disease (AD) and have displayed connectivity changes prior to the emergence of cognitive dysfunction.

Methods: A subsample of cognitively healthy older adults from a population-based study of mild cognitive impairment and dementia risk in a low socioeconomic population underwent PET scans with PiB and AV1451 imaging and MRI with resting state and functional imaging. We evaluated non-linear associations between hippocampal DMN connectivity with amyloid-beta and tau in cross-sectional analyses.

Results: The left and right anterior hippocampal to DMN connectivity showed a negative quadratic association with amyloid, showing that within network connectivity increased with mildly elevated amyloid and then decreased with even greater levels of amyloid. We found that inter-network connectivity of the hippocampus increased with greater amyloid and tau. Greater intra and inter-DMN connectivity was associated with greater cognitive function especially memory and attention, consistent with compensatory processes.

Conclusion: Results supports a model for preclinical DMN connectivity changes where intranetwork connectivity increases with amyloid then decreases with the emergence of tau pathology, preceding clinically relevant cognitive dysfunction. In this model, internetwork connectivity increases with tau pathology then decreases with the appearance of cognitive symptoms – in this way functional connectivity may potentially offset the impact of early amyloid and tau accumulation and transitionally spare cognitive function.

Presenter Name/Degree(s): Morgan Rose, BS
Current Position: Research Associate

Primary Mentor in Psychiatry: Candice Biernesser, PhD, LCSW

Title: **Collaborating to create a "Roadmap to ETUDES": Human-centered design informs study materials to engage families in suicide prevention research**

Author(s): ***Rose M[1], George-Milford B[1], Monteverde C[1], and Radovic A[2]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]UPMC Children's Hospital of Pittsburgh, Department of Pediatrics, University of Pittsburgh School of Medicine

Introduction: Families of adolescents struggling with depression and suicidality are already overburdened, as are the providers treating them. Studies must be engaging and interactive to stay on their radar. Human-centered design (HCD) can increase acceptability of products by involving end-users in the design process by centering their perspectives as experts of their own experiences. The ETUDES (Enhancing Treatment and Utilization for Depression and Emergent Suicidality) Center funded by the NIMH develops technology interventions to help facilitate youth behavioral health treatment in primary care. However, with too much time between consent and study baseline, researchers were noticing high drop off rates. In an ETUDES Engagement Group (EEG) stakeholder feedback session, referring providers requested materials to offer families to help with pitching the study.

Methods: ETUDES Staff collaborated with UPMC Children's Center for Adolescent and Young Adult Health Youth Research Advisory Board (YRAB) to draft study materials on Canva that would be acceptable to families, convey pertinent information for referring providers to give out, and engage families in the waiting period between consent and baseline. ETUDES investigators offered feedback at committee meetings to suggest content changes. The YRAB commented on clarity of information, appearance, and usability.

Results: A "Roadmap to ETUDES" recruitment flyer was drafted and iterated on with the YRAB and ETUDES investigators. This acceptable version was then adapted into several different roadmaps outlining the different interventions and arms of the study. YRAB feedback focused on perfecting the balance between inclusion of the necessary information and visual appeal. Study staff will circulate the roadmap to participants at timepoints throughout the study to reduce attrition and maintain interest. Referring providers will give out the flyer to families interested in participating.

Conclusion: ETUDES staff will monitor acceptability and utility of the "Roadmap to ETUDES" as it is integrated into study procedures and revise as needed.

Presenter Name/Degree(s): Emma Ruppert, MD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Harmonizing visual reads of tau PET tracers - HEAD cohort**

Author(s): *Ruppert E[1], Medeiros MS[1], Vermeiren M[2], Povala G[1], Rocha A[1], Soares C[1], Ferreira PL[1], Amaral L[1], Bauer-Negrin G[1], Lussier F[1], Oliveira Jr M[1], Rodrigues MS[1], Mroue R[1], Bellaver B[1], Ossenkoppele Rik[2], van de Giessen E[2]. Masdeu J[3], Tudorascu DL[1], Soleimani-Meigooni D[4], Fortea J[5], Lowe V[6], Oh H[7], Pascual B[3], Gordon BA[8], Rosa-Neto P[9], Baker S[10], and Pascoal T[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Radiology and Nuclear Medicine, Alzheimer Center Amsterdam;[3]Department of Neurology, Houston Methodist Research Institute;[4]Department of Neurology, University of California - San Francisco; [5]Department of Neurology, Hospital de la Santa Creu i Sant Pau; [6]Department of Radiology, Mayo Clinic; [7]Department of Psychiatry and Human Behavior, Brown University; [8]Department of Radiology, Washington University in St. Louis; [9]McGill University Research Centre for Studies in Aging, McGill University;[10]Lawrence Berkeley National Laboratory*

Introduction: Alzheimer's disease(AD) research currently uses a biomarker-based framework. These biomarkers allow for the identification of abnormal proteins, beta-amyloid and tau, depositing in the brain. With the increasing use of tau-PET in research, it is essential to develop visual reads that allow for these images to be interpreted in clinical settings. This study aims to compare the performance of existing visual reading methods for [^{18}F]Flortaucipir(FTP) and [^{18}F]MK-6240(MK) and provide preliminary data toward a unified visual reading approach for all tau-PET tracers using a head-to-head dataset.

Methods: To evaluate previously published visual reading methods, two blinded raters conducted FTP and MK visual reads on 340 participants from the HEAD study. A unified visual reading method was developed and tested on 101 participants, using a composite of adjusted Braak regions to determine 3 stages of severity while harmonizing between tracers.

Results: Inter-rater agreement using previous methods showed high Cohen's kappa values (0.71-0.77) for the low and high tau burden categories for both tracers. However, agreement was substantially lower in the non-AD-like category**,** leading to overall agreement rates of 0.55 for FTP and 0.69 for MK. In contrast, the method developed improved inter-rater agreement across all categories and introduced a moderate tau burden group, leading to higher overall agreement rates of 0.81 for FTP and 0.87 for MK. For inter-tracer agreement, previous methods resulted in discordant visual reads for FTP and MK in 24.7-34.4% of cases. The developed method reduced disagreement to 11.9-15.8%, demonstrating improved consistency across different tracers.

Conclusion: Previously published visual reading methods produced varying classifications depending on the tracer used. The method proposed here improved inter-rater and inter-tracer visual read agreements by developing a unified approach easy to be used. Importantly, this clinician-friendly method has the potential for widespread adoption, offering a single harmonized visual reading technique for all tau-PET tracers.

Presenter Name/Degree(s): Emily C. Russell, BS
Current Position: Research Assistant

Primary Mentor in Psychiatry: Salome Vanwoerden, PhD

Title: **Contextual influences on emotion socialization: An examination of the current framework and future directions**

Author(s): ***Russell E, Vanwoerden S, Byrd A, and Stepp S***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Emotion socialization (ES) is a complex, dynamic process between parents and children with important implications for child development and socioemotional functioning. Previous research has largely ignored the impacts of contextual influences on ES, such as socioeconomic status (SES), race, and child sex, with a dominant focus on White and Western, educated, industrial, rich, democratic (WEIRD) samples.

Methods: This study investigated how contextual influences (SES, race, sex) impact maternal ES behaviors. Participants included 76 mothers ($\boldsymbol{M}_{age}$ = 33.2 years, ***SD*** = 4.83, 64% White, 40% receiving public assistance) and their preschool-aged children ($\boldsymbol{M}_{age}$ = 42.48 months; ***SD*** = 3.78; 56% male), drawn from a randomized control trial of Dialectical Behavioral Therapy (DBT). Mothers self-reported their ES behaviors, and dyads participated in two interaction tasks (Free-Play Task & Frustration Task) coded continuously for maternal ES behaviors.

Results: Racial differences emerged in supportive ES during the Free-Play Task with White mothers being coded as engaging in higher supportive behaviors than Black mothers. Differences also emerged regarding non-supportive ES, though only in the self-report measure, with Black mothers reporting higher non-supportive behaviors than White mothers.

Conclusion: This study considers cultural influences on ES behaviors in a racially and economically diverse sample. Findings are discussed within the context of discrimination, inherent biases, and methodological flaws. Given that ES may function differently across families, research should aim to re-evaluate and culturally adapt current conceptualizations and assessments of ES. Ultimately, addressing these gaps in theory and methodology is essential to informing more equitable, culturally responsive interventions that promote adaptive ES practices in all families.

Presenter Name/Degree(s): Pampa Saha, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Tharick Pascoal, MD, PhD

Title: **Association of plasma GFAP with tau PET in cognitively unimpaired Aβ-negative subjects**

Author(s): *Saha P[1], Bellaver B[1], Povala G[1], Lukasewicz Ferreira P[1], Bauer-Negrini G[1], Silva L[1], Lussier F[1], Scarpatto Rodrigues M[1], Silva Oliveira M[1], Rocha A1, Felix C[1], Rupert E [1], Scopp Medeiros M[1], Soares C[1], Masdeu J[2], Tudorascu D[1], Soleimani-Meigooni D[4], Fortea J[5], Lowe V[6], Oh H[7], Pascual B[2], Gordon B[8], Rosa-Neto P[9], Baker S[3], and Pascoal T[1]*
Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurology, Houston Methodist Research Institute; [3]Lawrence Berkeley National Laboratory; [4]Memory and Aging Center, University of California San Francisco; [5]Sant Pau Memory Unit- Department of Neurology, Hospital de la Santa Creu i Sant Pau; [6]Department of Radiology, Mayo Clinic; [7]Department of Psychiatry and Human Behavior, Brown University; [8]Department of Radiology, Washington University in St. Louis; [9]Translational Neuroimaging Laboratory, McGill University Research Centre for Studies in Aging and Douglas Research Institute*

Introduction: We recently showed that plasma GFAP, a marker for astrocyte reactivity, influences tau PET pathology in cognitively unimpaired Aβ-positive individuals. However, the link between GFAP and tau PET in individuals without detectable Aβ pathology was underexplored. Here, we aim to investigate the association between plasma GFAP and tau PET in cognitively unimpaired Aβ PET-negative individuals.

Methods: We studied 133 cognitively unimpaired (CU) Aβ PET-negative participants from the HEAD cohort with plasma GFAP and p-tau217, as well as tau PET flortaucipir and MK6240. Aβ positivity was determined by Aβ PET visual reading or Centiloid 12. Voxel-wise linear regression models tested the association of plasma GFAP and p-tau217 with tau PET. GFAP levels were further stratified into quartiles. SUVR in the entorhinal cortex was compared using ANOVA across GFAP quartiles.

Results: Voxel-wise analysis showed that plasma GFAP levels (but not plasma p-tau217 levels) were associated with tau PET in the medial temporal (e.g., amygdala, entorhinal cortex, hippocampus) and posterior cingulate cortices, predominantly for the tracer flortaucipir (Figure 1A, B, C, D). The association between plasma p-tau217 and tau PET was weak in our sample. These results were similar when Aβ positivity was defined based on Centiloid 12. Furthermore, the association between plasma GFAP and tau PET in the ROI entorhinal region was significant for flortaucipir but not for MK6240 [flortaucipir: β=0.22966, p=0.0081; MK6240: β=0.1296, p=0.1387]. Flortaucipir SUVR was slightly increased in the GFAP 4th quartile compared to the 1st quartile [flortaucipir: p=0.04; MK6240: p=0.38].

Conclusion: We found an association between GFAP levels and tau PET uptake in individuals not expected to exhibit high levels of tau tangle-related tracer uptake. If these preliminary results hold, further studies could be designed to elucidate the underpinning of this association, which could represent low levels of tau pathology, astrogliosis, or other factors.

Presenter Name/Degree(s): Catalina Sanchez Montenegro, BA
Current Position: Research Specialist

Primary Mentor in Psychiatry: Judith Morgan, PhD

Title: **Maternal depression and dyadic neural synchrony: The moderating role of maternal positive affect**

Author(s): ***Sanchez Montenegro C[1], Taraban L[1], Santosa H[3], Huppert T[2], Forbes E[1], and Morgan J[1]***
Affiliation(s): ***[1]Department of Psychiatry University of Pittsburgh School of Medicine; [2]University of Pittsburgh, Department of Engineering; [3]University of Pittsburgh, Department of Radiology***

Introduction: Parent-child neural synchrony refers to the coordinated brain activity -simultaneous activation of the same or different brain regions- between a parent and their child during a joint experience. Mother-child neural synchrony is associated with healthy development of child emotion regulation, which develops rapidly during the toddler years. Given the known associations of depression with altered brain function in affective systems, this study aims to examine if maternal depression may also be associated with disruptions in mother-child neural synchrony. We hypothesized that maternal depression would be associated to lower mother-child neural synchrony.

Methods: We examined neural synchrony in 91 mother-toddler dyads (M age=26.6 months, SD=10 months; 52% female) using functional near-infrared spectroscopy (fNIRS) during a 3-minute face-to-face (FTF) play interaction in the lab, designed to mimic natural play. The fNIRS caps' sources and detectors were set up to measure the prefrontal cortex and the temporoparietal junction. Mothers completed the Center for Epidemiologic Studies Depression Scale (CES-D) to assess current depressive symptoms. A fixed effects model using NIRS AnalyzIR was conducted to evaluate the association between CES-D and neural concordance across mother-child brain channels during the FTF task, controlling for child age.

Results: As hypothesized, there was a significant main effect of depressive symptoms on mother-child neural synchrony between the child's left TPJ (S2-D2) and the mother's right TPJ (S10-D15) ***(t = -2.45, p = 0.016,***) and between the child's left TPJ (S2-D3) and the mother's right PFC (S9-D14) ***(t = -2.48, p = 0.015).***

Conclusion: These findings suggest that maternal depression may disrupt neural concordance in brain regions involved in emotion regulation and social processing. Further work will focus on exploring potential factors that may buffer the impact of depression on mother-child neural synchrony. Findings reinforce the importance of addressing maternal depression to understand the nuances of parent-child interactions.

Presenter Name/Degree(s): August Saunders, BA
Current Position: Research Coordinator

Primary Mentor in Psychiatry: Jessie B. Northrup, PhD

Title: **Exploring the intersection of emotion dysregulation and intervention use in autistic children**

Author(s): ***Saunders A, Mazefsky C, and Northrup J***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Participation in early intervention (EI) is associated with improved outcomes for autistic children (Berg, et. al., 2024). Although emotion dysregulation (ED) is a common challenge in this population, it is rarely a primary target in EI.

Methods: Using data from a large (n = 853) online sample of parents of autistic children, the present study aims to describe therapy participation and history within the sample and to examine bivariate associations between therapy history and emotion dysregulation (ED).

Results: Speech therapy was the most common intervention, with occupational therapy and behavioral therapy as second and third most common. A number of associations were found between therapy utilization (never, currently, and past-only) and ED.

Conclusion: The results of the present analysis indicate that ED may impact/be impacted by one's ability to participate in therapy, even when controlling for other factors known to contribute to ED. While we cannot determine causality in these relationships, our findings can be used to further understand the associations between ED and therapy history. Future research is needed to understand the nature of these associations.

Presenter Name/Degree(s): Matheus Scarpatto Rodrigues, PhD
Current Position: Postdoctoral Researcher

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Effects of AD modifiable risk factors to tau-pet tracer uptake and its association with cognition in early Braak stages**

Author(s): *Rodrigues, MS[1], Bellaver, B[1], Povala, G[1], Bauer-Negrini, G[1], Lussier, F[1], Amaral, L[1], Ferreira, PL [1], Oliveira Junior, MS[1], Rocha, A[1], Saha, P[1], Medeiros, MS[1], Soares, C[1], Ruppert, E[1], Mroue, R[1], Masdeu, J[2], Tudorascu, DL[1], Soleimani-Meigooni, D[4], Fortea, J[5], Lowe, l[6], Oh, H[7], Pascual, B[2], Gordon, BA[8], Rosa-Neto, P[9], Baker, S[3], and Pascoal, TA[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Houston Methodist Research Institute, Department of Neurology; MS[3]Lawrence Berkeley National Laboratory; [4]University of California San Francisco, Memory and Aging Center; [5]Hospital de la Santa Creu i Sant Pau, Sant Pau Memory Unit, Department of Neurology; [6]Mayo Clinic, Department of Radiology; [7]Brown University, Department of Psychiatry and Human Behavior; [8]Washington University in St. Louis, Department of Radiology; [9]Translational Neuroimaging Laboratory, McGill University Research Centre for Studies in Aging, Douglas Research Institute.*

Introduction: Many risk factors can contribute to the occurrence of Alzheimer`s Disease (AD). However, little is known about the impact of dementia risk factors to the uptake of tau-PET tracers. Therefore, in this work we aim to investigate the influence of dementia risk factors on ^{18}F-Flortaucipir (FTP) and ^{18}F-MK6240 (MK) tau-PET tracers' uptake.

Methods: We accessed 436 individuals across the aging and AD spectrum (251 amyloid negative and 185 amyloid positive) from the HEAD study, with available Aβ-PET, FTP, MK, and clinical assessments. Linear regression models corrected for age, sex, clinical diagnosis, and study site tested the association of factors with tau-PET tracers in the medial temporal lobe (MTL). A tau-PET × risk factor term was added to test the influence of risk factors to the association of tau with cognition.

Results: Dementia risk factor exert different impact on tau-PET tracers' uptake in the MTL, according to amyloid-β pathology, with high BMI being positively associated with the uptake of both FTP and MK in amyloid-β negative individuals, whereas in amyloid-β positive individuals high BMI were negatively associated with the uptake of both tau-PET tracers in the MTL. Using MMSE scores as the outcome, we found that amyloid-β negative individuals with high BMI showed poorer cognition related to both MK and FTP in the MTL, while those with vision or hearing loss were affected by MK only. Amyloid-β positive individuals with hypercholesterolemia and hypertension showed worse cognition associated with both MK and FTP in the MTL.

Conclusion: In this preliminary analysis, we show that the effects of dementia risk factors vary according to amyloid-β pathology. These prevalent factors in the elderly also changed the association between tau-PET and cognition, underscoring the need for further studies to better understand their role in modulating this relationship.

Presenter Name/Degree(s): Tylar Schmitt, BA
Current Position: Research Coordinator

Primary Mentor in Psychiatry: César Escobar-Viera, MD, PhD
(required field unless you are a member of the Department of Psychiatry faculty)

Title: **A Scoping Review of Cultural Adaptation Frameworks for Digital Mental Health and Substance Use Interventions**

Author(s): *Schmitt TN[1], Porta G[1], Alcaraz KI[3], Buro AW[4], Costas-Muñiz R[5], Fields S[6], Heron K[7], Hollis-Hansen K[8], Kusters IS[9], Lo B[10]; Njie-Carr VPS[11], Panza E[12], Pedreira P[13], Sall KE[14], Serpas D[15], Suppok R[2], Tarfa A[16], Wippold G[7], Yi J[18], and Escobar-Viera C[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Health Sciences, University of Pittsburgh; [3]Johns Hopkins University; [4]University of New Mexico Health Sciences Center; [5]Memorial Sloan Kettering Cancer Center; [6]Texas A&M University; [7]Old Dominion University; [8]UT Southwestern Medical Center; [9]University of Houston-Clear Lake; [10]University of Guelph; [11]University of Maryland-Baltimore School of Nursing; [12]Brown Alpert Medical School/The Miriam Hospital; [13]Duke University Medical Center; [14]Alpert Medical School of Brown University; [15]University of South Florida; [16]Yale University; [17]University of South Carolina; [18]Fred Hutchinson Cancer Center*

Introduction: Cultural adaptations for digital mental health (DMH) interventions are necessary to ensure reach, relevance, appropriateness, and engagement among people from historically marginalized groups, but few frameworks exist to guide such adaptations. As part of a larger scoping review, we characterized the cultural adaptation frameworks used and identified for which groups adaptations were made among DMH interventions.

Methods: We conducted a systematic search of studies published between 2007-2024 using five academic databases. Articles were included if peer-reviewed, in English language, reported the cultural adaptation of an existing, efficacious DMH intervention for delivery in racial, ethnic, or LGBTQ+ minorities, or rural and resource-poor settings. At least two co-authors independently extracted data from included articles using an a priori developed web-based extraction form. Inter-rater reliability was high, and conflicts were resolved with adjudication if necessary.

Results: Of the 61 articles included, 26 were feasibility and acceptability studies, 25 efficacy/effectiveness, and 10 intervention development. Most frequently, study outcomes included depression/anxiety (n=15), smoking/tobacco cessation (n=10), alcohol/substance use (n=8), psychological distress (n=5), insomnia/sleep problems (n=3), and PTSD (n=3). Twenty-six articles reported adaptations made for people of marginalized race or ethnicity; 8 resource-poor settings; 7 LGBTQ+ people; 6 a new country, region, or language; 5 refugee populations; 2 more than one group; and 1 people living in non-urban areas. Thirty articles explicitly mentioned one guiding cultural adaptation framework. Of those that did, three used ADAPT-ITT and three used Community-Based Participatory Research.

Conclusion: Our findings suggest that many cultural adaptations of DMH interventions lack standardization in reporting their procedures and methods, making it hard to determine what processes lead to effective adaptation. Thus, there is a need for a more systematized, evidence-based approach to culturally adapting digital behavioral interventions for marginalized people.

Presenter Name/Degree(s): Marina Scop Medeiros, MD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Comparison of MK-6240 and Flortaucipir tau PET for the biological staging of Alzheimer disease**

Author(s): Scop Medeiros M[1], Ferreira PL[1], Ruppert E[1], Povala G[1], Amaral L[1], Rocha A[1], Bauer-Negrini G[1], Bellaver B[1], Zalzale H[1], Soares C[1], Rodrigues MS[1], Lussier F[1], Bloomquist M[1], Oliveira M[1], Mroue R[1], Leffa D[1], Saha P[1], Felix C[1], Tudorascu DL[1], Masdeu J[2], Soleimani-Meigooni D[4], Fortea J[5], Lowe V[6], Oh H[7], Pascual B[2], Gordon BA[8], Rosa-Neto P[9], Baker S[3], and Pascoal TA[1]

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Houston Methodist Neurological and Research Institutes; [3]University of California - San Francisco; [4]Hospital of Sant Pau in Barcelona; [5]Mayo Clinic Molecular Imaging Resource; [6]Department of Psychiatry, Brown University; [7]Washington University; [8]McGill University; [9]Cognitive Neurology, Brain Institute of Rio Grande do Sul;[10]Lawrence Berkeley National Lab

Introduction: The Alzheimer's Association workgroup criteria (AA-2024) suggest four biological stages based on PET imaging. Recognizing that the application of this framework may vary depending on the tau PET tracer used, we aim to compare clinical-biological staging using two different tau PET tracers.

Methods: We stratified 182 Aβ+ participants from the HEAD study with [^{18}F]MK-6240 and Flortaucipir tau-PET. Four clinical stages (normal, transitional, MCI, and dementia) were defined based on the AA-2024 criteria. Three different stage-2 constructs were tested in separated analyses for subjective cognitive decline (SCD), subtle objective cognitive deficit (SOCD), and mild behavioral impairment (MBI). For biological staging, SUVR regional abnormalities were defined based on tracer-specific thresholds, testing three different methods (Youden index, CU Aβ- mean +2SD, Young mean +2.5SD) and three regions of interest schemes: (i)proposed by AA-2024, (ii)Braak stages, (iii)or single anatomical regions. Cohen's weighted-kappa (K) statistic measured clinical-biological and between-tracer agreements.

Results: Clinical stages showed a progressively increased prevalence of Aβ+ and entorhinal tau PET pathology from cognitively normal (CN) to SOCD, MCI, and dementia. MBI and SCD transitional groups showed no increased Aβ+ or tau pathology compared to CN. For this reason, only SOCD was considered part of stage 2 for further analyses. All tested biological staging methods had similar agreement with clinical stages using MK-6240 and). All strategies showed reasonable between-tracer concordance (K>0.60), with AA-2024 and single-region strategies showing the best agreements (72-73%) and Braak-staging showing the worse (65-67%).

Conclusion: Our results support that AA-2024 biological and clinical stages show reasonable concordance using either Flortaucipir or MK-6240, although this can vary based on methods used in the analyses. The MBI and SCD transition groups showed more similar pathological burden to clinical stage 1 than to the SOCD transitional stage 2.

Presenter Name/Degree(s): Madeline R. Scott, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Colleen McClung, PhD

Title: **Age dependent changes in 24 hour gene expression rhythms across cells of the human dorsolateral prefrontal cortex**

Author(s): Scott MR[1], Yang H[2], Clarence T[2], PsychAD Consortium[3], Lee D[2], Fullard JF[2], Hoffman GE[2], Girdhar K[2], Roussos P[2], and McClung CA[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Icahn School of Medicine at Mount Sinai; [3]PsychAD Consortium

Introduction: Circadian rhythms, or 24 hour (h) physiological and behavioral cycles, deteriorate with aging. At the molecular level, gene expression rhythms also drastically change with age, suggesting this may be an important feature of late adulthood, though how these changes are influenced by individual cell types of the prefrontal cortex is unknown.

Methods: In this study, we performed a joint rhythmicity analysis on single nucleus RNA-sequencing (snRNA-seq) data from the dorsolateral prefrontal cortex (DLPFC) of 192 subjects with no diagnosed psychiatric or neurological illness, and compared 24 h gene expression rhythms in Adulthood (21-60 years old (yo); n=116) and Late adulthood ($\geq$ 61 yo; n=76) age groups within 26 cell type subclasses.

Results: 45 significantly rhythmic genes (FDR<0.05) were observed in 9 subclasses of the Adulthood group, with most of these genes being components of the circadian molecular clock. Conversely, Versican (VCAN) was the only significant rhythmic gene observed in Late adulthood. For a deeper analysis, we loosened our significance threshold (p<0.01) and observed more rhythmic genes in Adulthood than in Late Adulthood, and strikingly few genes (2+/-2.1 median rhythmic genes) that were rhythmic in both age groups within each subclass, indicating that the identity of transcripts with rhythmic gene expression differs between Adulthood and Late adulthood. Furthermore, while the expected circadian clock rhythmicity signature was observed in Adulthood neuronal subclasses, this signal was lost in Late adulthood.

Conclusion: Overall, our findings suggest that an intact, rhythmic molecular clock, which is known to be important for regulating sleep-wake patterns, cognitive function, and cellular metabolism, is a fundamental component of the transcriptomic landscape in the adult DLPFC. However, in Late adulthood, gene expression rhythmicity is vastly changed, suggesting cell type specific circadian reprogramming is an important mechanism to consider when investigating the biology underlying both healthy and disease-associated aging.

Presenter Name/Degree(s): Keeley Scullin, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Ariel Gildengers, MD and Andrea Weinstein, PhD

Title: **Distinct clinical and neuroimaging profiles by amyloid status in mild cognitive impairment**

Author(s): Scullin K[1], Ibrahim TS[2], Zeng X[1], Aizenstein HJ[1], Alkhateeb SK[2], Anderson SJ[3], Chu C[2], Diaz JL[1], Emanuel JE[1], Karikari TK[1], Li J[1], Lopez OL[4], Lopresti BJ[2], Royse SK[2], Sajewski AN[2], Santini T[2], Weinstein AM[1], Wu M[1], Butters MA[1] and Gildengers A[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Radiology, University of Pittsburgh School of Medicine; [3]University of Pittsburgh Graduate School of Public Health, Department of Biostatistics; [4]Department of Neurology, University of Pittsburgh School of Medicine

Introduction: Mild Cognitive Impairment (MCI) is a high risk state for developing dementias such as Alzheimer's Disease (AD) and vascular dementia. Identifying individuals most at risk for dementia is critical for early detection and intervention. Amyloid-beta (Aβ) accumulation, detectable via PET imaging, is a hallmark pathological sign of AD that can be detected preclinically. However, PET access is limited, so it is important to examine whether there are clinical and neurobiological indicators to suggest AD neuropathology in a high-risk group for developing dementia. This project examines clinical differences between individuals with MCI by amyloid status (Aβ+ versus Aβ-).

Methods: 75 individuals with MCI enrolled in a clinical trial studying the effectiveness of lithium to prevent cognitive decline and had completed baseline [11C] Pittsburgh Compound-B (PiB) PET imaging. Aβ load and status (positive/negative) were determined, and participants were grouped as Aβ+ (n=21) or Aβ- (n=54). Groups were compared on demographics, cognitive performance, and neuroimaging markers using chi-square tests and ANOVA. Imaging analyses were corrected for age, sex, and intracranial volume.

Results: Aβ+ participants were older (75.69 vs. 70.69 years, p=0.04), more often APOE4 carriers (61.9% vs. 27.8%, p=0.005), and more likely to have amnestic MCI (100% vs. 70.4%, p=0.014) compared to Aβ- participants. Aβ- participants had greater anticholinergic burden (p=0.046) and more depressive symptoms (p=0.024). Cognitively, Aβ- individuals performed better on verbal memory (p=<0.02), visuospatial memory (p=0.011), and general cognition (p=.005) tests, as well as on a performance-based measure of daily functioning (p=.002). Structurally, Aβ- participants had larger entorhinal cortex volumes (p=0.043) and trends for greater volume in regions of the temporal lobe including the hippocampus and amygdala (p<.08). Finally, Aβ- participants showed greater white matter hyperintensity burden (p=0.047) as compared to Aβ+ participants.

Conclusion: Amyloid status in MCI distinct cognitive, clinical, and neuroimaging profiles, suggesting AD vs. vascular pathologies.

Presenter Name/Degree(s): Stanley Seah, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Erika Forbes, PhD

Title: **Day-to-day sleep quality moderates the link between social stress and suicidal ideation among high-risk sexual and gender diverse young adults**

Author(s): ***Seah THS[1], Hart K[1], Horter CM[1], Lenniger CJ[1], Owodunni O[1], Franzen PL[1], Silk JS[2], and Forbes EE[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology, University of Pittsburgh

Introduction: Sexual and gender diverse (SGD) young adults face heightened risk for suicide. This disparity may be attributed to social stress associated with marginalization and exacerbated by the developmental vulnerabilities of young adulthood. Poor sleep, which is commonly reported by SGD youth, may amplify emotional reactivity to social stress and increase risk for suicide. In a high-risk sample of predominantly SGD young adults, we examined the interaction between day-to-day sleep quality and social stress on the occurrence of SI across six months of ecological momentary assessment (EMA).

Methods: Participants (n=96; 28% cis-heterosexual; 63% White; 95% non-Hispanic; Mean age=24 years, range: 18-30 years) were recruited from the community. As part of eligibility criteria, participants had lifetime suicidal behavior(s) and recurrent SI, including in the past six months. Participants completed weekly EMA bursts (3x/day for 7 days), once/month, for six months (compliance rate: 68%). Each day, participants reported past-night sleep quality, emotional reactions to social stress, and occurrence of SI (yes/no) in the past 24-h. Multilevel logistic regressions were used to model the relationship between variables across time.

Results: Daily sleep quality interacted with emotional reactivity to social stress to predict the occurrence of SI, β=-15.76, $\boldsymbol{p}$=.007. Specifically, on days where participants experienced worse sleep quality, greater negative emotional reactivity to social stress was associated with a higher likelihood of SI occurrence. Conversely, on days where sleep quality was better, negative emotional reactivity to social stress was associated with a lower likelihood of SI occurrence.

Conclusion: Findings suggest that sleep health influences SI risk by modulating emotional reactivity to negative social experiences. This is particularly relevant to SGD individuals, as they tend to encounter social challenges related to marginalization. Sleep quality may thus serve as a modifiable and proximal target for intervention to reduce suicide risk in SGD populations.

Presenter Name/Degree(s): Dylan Seebold, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Brian Coffman, PhD

Title: **Melody and rhythmicity perception deficits in first-episode psychosis**

Author(s): ***Seebold D, Fowler L, Kavanagh J, Rhorer H, Salisbury DF, and Coffman BA***
Affiliation(s): ***Clinical Neurophysiology Research Laboratory, Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Schizophrenia and other psychotic disorders have been linked to deficits in auditory change detection, particularly for pitch, timing, and complex grouping. Additionally, complex melodic and rhythmic impairments, assessed via the Montreal Battery of Evaluation Amusia (MBEA), is shown in chronic schizophrenia. Dysfunctional auditory and motor timing associated with prosodic aspects of speech production and interpretation may be related to impairments in social functioning/cognition. However, when these melodic-rhythmic deficits first occur, and whether they occur before, after, or concurrently with impairments in social cognition, has not been thoroughly studied. In this study we assess primary aspects of auditory perception (pitch, melody, and rhythmicity) in individuals within one-year of their first episode of psychosis (FEP) and associations with social cognition.

Methods: Auditory perception and musicality were assessed using the MBEA in 15 healthy controls (HC) and 10 (FEP). The MBEA assesses 6 areas of musical ability (scale, contour, interval, rhythm, metric, and music memory) across 3 categories (Melody, Temporality, and Memory). Group differences were assessed with t-tests. Further comparison to social cognition was assessed using the MATRICS Consensus Cognitive Battery (MCCB) and correlations done via Pearson's Correlation Coefficient.

Results: MBEA scores were generally reduced in FEP compared to HC, with the largest difference observed within the rhythm subtest ($p = 0.02$). FEP showed a significant impairment in social cognition ($p = 0.01$) compared to HC. A positive correlation was identified between MBEA Temporality total score (rhythm and meter) with MCCB Social Cognition t-score ($r = 0.64$).

Conclusion: Deficits in rhythm processing in FEP identified here highlight auditory-motor integration impairments in psychosis. Understanding rhythm processing deficits in psychosis may provide avenues for treatment of social dysfunction and other symptoms of these costly disorders.

Presenter Name/Degree(s): Anuradha Sehrawat, PhD
Current Position: Research Scientist

Primary Mentor in Psychiatry: Thomas K. Karikari, PhD

Title: **Equivalence of plasma and serum for clinical measurement of p-tau217: comparative analyses of four blood-based assays**

Author(s): Sehrawat A[1] , Chen Y[1,2], Albert AL[1], Farinas M[1], Lopez OL[1,3], Zeng X[1], Cohen AD[1], and Karikari TK[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Chemistry, University of Pittsburgh; [3]Department of Neurology, School of Medicine, University of Pittsburgh

Introduction: Phosphorylated tau (p-tau) 217 has emerged as a promising blood biomarker for Alzheimer's disease (AD). However, most p-tau217 assays have been validated solely in ethylenediaminetetraacetic acid (EDTA) plasma, leaving the clinical applicability of serum p-tau217 largely unexplored despite serum being the preferred matrix in many clinical laboratories. To address this gap, we compared p-tau217 concentrations and diagnostic performance of p-tau217 in matched plasma and serum samples using four research-use-only assays, including three from commercial sources i.e., Lumipulse, ALZpath, NULISA, and one from University of Pittsburgh.

Methods: Paired plasma and serum samples were processed from the same venipuncture collection and assessed with the four p-tau217 assays following manufacturer-recommended procedures in two research cohorts (N=84).

Results: Plasma and serum p-tau217 levels varied across assays; the ALZpath, Pittsburgh, and NULISA methods showed significantly lower p-tau217 levels in serum compared with plasma ($p<0.0001$), while Lumipulse showed higher or non-significant differences in serum. Yet, strong correlations (rho >0.8) were observed between plasma and serum p-tau217 pairs. Both plasma and serum p-tau217 demonstrated strong classification accuracies to differentiate clinical AD from normal controls, with high area under the curve (AUC) values (up to 0.963) for all methods. The exception was the Pittsburgh assay, where plasma p-tau217 had superior AUC than serum p-tau217 (plasma: 0.912, serum: 0.844), the rest of the assays had equivalent accuracies in both matrices.

Conclusion: Serum p-tau217 performs equivalently as plasma p-tau217 for most assays. Serum can therefore be used in place of plasma for p-tau217 assessment for research and clinical purposes.

Presenter Name/Degree(s): Karoline Shellhause, BS
Current Position: Research Specialist

***Primary Mentor in Psychiatry*:** Adriane Soehner, PhD

Title: **Neuromodulatory effects of bright light on threat and reward network metabolism in depressed adults**

Author(s): Shellhause K, Chase H, Wang M, Keller L, Sollie C, Rocklein K, and Soehner A
Affiliation(s): Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Light Therapy (LT) is a promising non-pharmacological treatment for depression, however, the mechanisms supporting its therapeutic benefits remain unclear. Preclinical models indicate that light modulates mood through melanopsin-containing of retinal ganglion cells (mRGCs). mRGCs are maximally sensitive to blue light and minimally sensitive to red light, and directly convey light signals from the retina to brain structures involved in threat and reward processing. Using within-scanner light exposures, we examined the degree to which melanopsin-engaging blue (vs. red light and darkness) light modulated regional metabolism within brain regions supporting threat and reward processing in adults with depressive symptoms.

Methods: A total of 30 young adults ages 18 to 30yr (24.90 ± 3.13 yr; 18 Female) with elevated depressive symptoms (Patient Health Questionnaire-9 > 5) completed 1 week of a stable sleep schedule followed by an MRI assessment. During the MRI protocol, participants underwent pseudo-continuous arterial spin labeling to assess cerebral blood flow (CBF) during dark, blue, and red light exposures lasting approx. 5 minutes; the order of red and blue light was counterbalanced. A mixed effects model evaluated CBF differences in threat (amygdala, insula, ventromedial prefrontal cortex [vmPFC]) and reward (ventral striatum[VS], medial prefrontal cortex[mPFC]) network regions of interest, adjusting for age, sex, and depression severity.

Results: Light condition impacted the VS ($F=3.66$, $p=0.033$), mPFC ($F=4.00$, $p=0.025$), and insula ($F=4.73$, $p=0.013$). Activation was greater in red light versus dark in the VS ($p=0.030$), mPFC ($p=0.025$), and insula ($p=0.010$). There were no significant differences between dark and blue light, or red and blue light, contrary to our predictions.

Conclusion: There may be differences in brain activation of threat and reward areas based on light condition exposure. Activation of threat and reward circuits may be significantly impacted by red light when compared to dark conditions.

Presenter Name/Degree(s): Micah Shelton, MS
Current Position: Research Lab Supervisor

Primary Mentor in Psychiatry: Marianne Seney, PhD

Title: Dissecting cortical layer and sex-specific transcriptional differences within the subgenual anterior cingulate cortex in major depressive disorder

Author(s): ***Shelton MA[1], Jenkins AK[1], Yin RF[2], Tseng GC[2], McClung CA[1], and Seney ML[1]***
Affiliation(s): ***[1]Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Biostatistics, University of Pittsburgh***

Introduction: Major depressive disorder (MDD) is a major source of global disease burden. While prior evidence suggests the molecular signature of MDD is sex specific, little is understood about how patterns of gene expression differ between cortical layers of men and women with MDD.

Methods: To test this, we performed large-scale gene expression analysis within layer 3 (L3) and layer 5 (L5) of the subgenual anterior cingulate cortex (sgACC) in a cohort of human subjects with MDD and in sex and age-matched unaffected comparisons subjects (N=30 males, 10 females/group). 12μm thick sections from the fresh frozen right hemisphere were Nissl stained to aid in identifying cortical layers. We then used laser-capture microdissection to collect L3 and L5 separately for RNA isolation and subsequent bulk RNA-sequencing. Differential expression (DE) analysis identified genes altered by disease; genes with $p<0.05$ and absolute $\log_2$fold change>0.26 considered DE. We used alluvial plots, threshold-free rank-rank hypergeometric overlap (RRHO), and pathway analysis to compare overlap in DE transcripts across layers and sex.

Results: In both layers, DE transcripts were distinct between the sexes. In L3 there were 524 DE genes by MDD in males and 1742 DE genes in females. In L5, there were 293 DE genes in males and 1631 DE in females. Most genes upregulated or downregulated in females were unchanged in males and vice versa. RRHO added to this, demonstrating the overall transcriptional profile of MDD was opposite in males and females but strongly concordant across layers. Gene ontology indicated that the pathways represented by DE transcripts were largely unique between males and females with MDD. More interestingly, several pathways upregulated in males were strongly downregulated in females, including pathways associated with gliogenesis and carbohydrate metabolism.

Conclusion: The transcriptional signatures of MDD across sgACC cortical layers largely vary based on sex, underscoring the need for sex-specific therapies.

Presenter Name/Degree(s): Yi-Chun Shih, MS
Current Position: PhD Student

Primary Mentor in Psychiatry: Rui T. Peixoto, PhD

Title: **Early postnatal dysfunction of ACC PV interneurons in Shank3B$^{-/-}$ mice**

Author(s): ***Shih YC[1,2], Nelson L[1,*], Janeček M[1,2,*], Matarazzo M[1], D'Agostino A[1], and Peixoto RT[1,2]***

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Center for Neuroscience at the University of Pittsburgh

Introduction: Anterior cingulate cortex (ACC), a key part of prefrontal cortex, dysfunction is implicated in the cognitive and social deficits in individuals associated with autism spectrum disorder (ASD). Abnormal changes in GABAergic Parvalbumin (PV) expressing interneurons (PVIN) have been widely observed in transcriptomic and postmortem histological studies of individuals with ASD. Similarly, many mouse models carrying ASD-linked mutations exhibit disrupted PVIN function suggesting that deficits in PVIN-dependent inhibitory mechanisms are potential pathophysiological feature of ASD. However, the developmental trajectory of pyramidal neurons (PYR) and PVIN in ACC circuit maturation under these conditions remains poorly understood.

Methods: We examined glutamatergic synaptic connectivity and intrinsic excitability in layer 2/3 PYR and PVIN in the ACC of male mice harboring a deletion in SHANK3 (Shank3B$^{-/-}$), a well-established genetic cause of autism, in both postnatal development and adulthood by slice electrophysiology recordings and ***in vivo*** two-photon calcium imaging.

Results: We found that PVIN in Shank3B$^{-/-}$ mice exhibit reduced excitability and ***in vivo*** hypoactivity as early as postnatal day 15 (P15), despite receiving normal glutamatergic input. This early hypoexcitability is accompanied by decreased feedforward inhibition from the mediodorsal thalamus and a reduction in hyperpolarization-activated (I_h) currents. In contrast, PYR display normal excitability and synaptic input at this stage, but already exhibit reduced I_h currents, indicating early HCN channel dysfunction across both cell types. By adulthood, both PVIN and PYR undergo marked phenotypic changes, characterized by reduced glutamatergic synaptic input and divergent shifts in excitability.

Conclusion: These findings reveal a distinct sequence of early PVIN dysfunction followed by cell type–specific circuit reorganization within ACC layer 2/3, and identify HCN channelopathy and impaired PVIN-mediated inhibition as early pathogenic features of SHANK3-associated neurodevelopmental disorders.

Presenter Name/Degree(s): Andreia Silva da Rocha, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Tharick A. Pascoal, PhD

Title: **Head-to-head comparison of MK6240 and Flortaucipir PET tracers for in vivo Braak staging**

Author(s): *Rocha A[1], Bellaver B[1], Ruppert E[1], Madeiros MS[1], Soares C[1], Ferreira PCL[1], Povala G[1], Amaral L[1], Bauer-Negrini G[1], Lussier FZ[1], Rodrigues MS[1], Masdeu JC[2], Tudorascu DL[1], Soleimani-Meigooni DN[3], Fortea J[4], Lowe VJ[5], Oh H[6], Pascual B[2], Gordon BA[7], Rosa-Neto P[8], Baker SL[9], and Pascoal TA[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurology, Houston Methodist Research Institute; [3]Department of Neurology, University of California - San Francisco; [4]Department of Neurology, Hospital de la Santa Creu i Sant Pau; [5]Department of Radiology, Mayo Clinic – Rochester; [6]Department of Psychiatry and Human Behavior, Brown University; [7]Department of Radiology, Washington University in St. Louis; [8]McGill University Research Centre for Studies in Aging, McGill University; [9]Lawrence Berkeley National Laboratory*

Introduction: Braak staging is a widely used framework for classifying Alzheimer's disease (AD) tau pathology progression. Originally derived from post-mortem histopathological examinations, over the past decade, the Braak scheme has been increasingly applied to in vivo imaging studies using various tau PET tracers. However, compatibility and consistency of Braak staging across different tracers have not yet been confirmed, particularly given tracer-specific differences in binding sensitivity and specificity. This study aims to compare and test harmonization procedures for Braak staging with the two most extensively used tau PET tracers: Flortaucipir and MK6240.

Methods: We assessed 437 participants (245 cognitively unimpaired (CU), 192 cognitively impaired; mean age 68.5 ± 8.6 years) with head-to-head MK6240 and Flortaucipir scans, alongside MRI, Aβ-PET, and clinical evaluations. Several cutoff methods and region-of-interest (ROI) optimizations were tested. Braak stage concordance was examined both within tracers (intra-tracer; sequential Braak pattern adherence) and between tracers (inter-tracer; staging match) using seven (0–VI) and simplified four-sage groupings (0, I–II, III–IV, V–VI).

Results: Intra-tracer seven-stage Braak concordance ranged from 63% to 94%, with Gaussian mixture modeling yielding highest concordance (MK6240: 94%; Flortaucipir: 89%). Inter-tracer concordance ranged from 56% to 76%, with the highest agreement (76%) achieved using CU Aβ–mean + 2SD cutoffs and optimizing the Braak II ROI to reduce off-target spill-off. The simplified four-stage approach enhanced intra-tracer concordance (MK6240: 94%, Flortaucipir: 89%) and inter-tracer agreement (86.5%). Most discrepancies between tracers occurred in Braak stages II–IV.

Conclusion: Our preliminary results demonstrate substantial discrepancies in Braak staging between Flortaucipir and MK6240 tracers, with up to 44% of cases classified differently depending on the chosen ROIs and cutoffs. Adjusting these parameters can partially reduce differences within and between tracers, highlighting the importance of harmonizing methods for consistent tau PET staging.

Presenter Name/Degree(s): Livia Silva do Amaral, MSc
Current Position: Data Manager

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Comparison of topographical patterns of abnormalities of the tau PET tracers [^{18}F]Flortaucipir, [^{18}F]MK6240, [^{18}F]PI2620, and [^{18}F]RO948**

Author(s): *Amaral L[1], Povala G[1], Bauer-Negrini G[1], Ruppert E[1], Bellaver B[1], Lussier FZ[1], Ferreira PL[1], Masdeu JC[2], Tudorascu DL[1], Soleimani-Meigooni DN[3], Fortea J[4], Lowe VJ[5], Oh H[6], Pascual B[2], Gordon BA[7], Rosa-Neto P[8], Baker SL[9], and Pascoal TA[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurology, Houston Methodist Research Institute; [3]Department of Neurology, University of California - San Francisco; [4]Department of Neurology, Hospital de la Santa Creu i Sant Pau; [5]Department of Radiology, Mayo Clinic - Rochester; [6]Department of Psychiatry and Human Behavior, Brown University; [7]Department of Radiology, Washington University in St. Louis; [8]McGill University Research Centre for Studies in Aging, McGill University; [9]Lawrence Berkeley National Laboratory*

Introduction: Multiple tau PET tracers have been shown to accurately capture tau tangle deposition in the human brain. However, single-tracer studies have demonstrated different uptake patterns across the AD spectrum. This study uses head-to-head acquired tau PET tracers (the HEAD study) to compare the topographical spread of tau pathology across the four most widely used tau PET tracers.

Methods: We studied 66 individuals (30 CU (10% A+) and 36 CI (33% A+)) with [^{18}F]Flortaucipir, [^{18}F]MK6240, [^{18}F]PI2620, and [^{18}F]RO948 tau PET tracers. PET SUVR was calculated using the inferior cerebellar grey matter as the reference region at 8mm FWHM. PET topographical spread was assessed using the percentage of abnormal voxels (PAV) above the mean + 2.5 SD of CU amyloid-negative individuals. ROC AUCs were used to compare the performance of SUVR and PAV in the meta-temporal ROI for identifying the presence of cognitive impairment (CU versus CI).

Results: PAV demonstrated a slightly higher AUC than SUVR in identifying cognitive impairment across all four tau PET tracers. PAV progressively increased from CU to MCI and dementia, partially following Braak stage patterns across the four tracers. Probabilistic 3D maps indicated that MCI subjects exhibited the highest concentrations of tau abnormality (20-40%), mostly confined to the entorhinal cortex and laterally. Individuals with dementia showed a higher concentration of tau PET abnormalities in the parietal and temporal lobes, with very similar patterns across tracers.

Conclusion: In this preliminary analysis, we found that tau PET topographical spread (measured with PAV) was associated with cognitive impairment. [^{18}F]MK6240 exhibited the most consistent regional abnormality patterns in individuals in early disease stages within Braak I-II regions. All four PET tracers showed substantial tau abnormality regional spread in individuals with dementia, with the highest concentrations in the temporoparietal regions.

Presenter Name/Degree(s): Markley Silva Oliveira Junior, PhD
Current Position: Postdoctoral Research Associate

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Tau-phosphorylation and oligodendrocyte dysfunction in Alzheimer's disease**

Author(s): ***Silva Oliveira Junior M[1], Bellaver B[1], Ha SK[1], Saha P[1], Scarpatto Rodrigues M[1], Silva Rocha A[1], Scop Medeiros M[1], Lussier FZ[1], Ferreira PCL[1], Povala G[1], Negrini G[1], Amaral L[1], Soares C[1], Felix C[1], Mroue R[1], Silva AC[1], and Pascoal TA[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurobiology, University of Pittsburgh

Introduction: Demyelination is a key feature of Alzheimer's disease (AD) and varies across Braak stages, but the role and distribution of oligodendrocytes remain unclear. While preclinical studies suggest that demyelination follows oligodendrocyte-tau pathology, this is not well characterized in AD. Here, we examined myelin, oligodendrocyte distribution, and tau pathology in the white matter across Braak stages in an AD brain.

Methods: Brain tissue from a male AD patient with cerebral amyloid angipathy, deceased 8 years post-diagnosis, was analyzed. Neuropathological assessment showed moderate cerebral amyloid angiopathy with no signs of Lewy body disease, cortical microinfarcts, or other neurodegenerative conditions. Formalin-fixed, paraffin-embedded sections were examined in regions corresponding to Braak stages: entorhinal cortex and hippocampus (I–II), anterior cingulate cortex (III–IV), and inferior parietal cortex (V–VI). Luxol Fast Blue (LFB) staining assessed myelin content (signal intensity/μm^2 and % demyelination), AT8 accessed qualitative overall tau-phosphorylation and number of plaques in the white matter. Immunofluorescence for MBP, CC1-APC, and pTau217 was used to identify specific tau-phosphorylation and quantify mature myelinating oligodendrocytes (MMOs); analyses were performed using ImageJ-FIJI (v2.9).

Results: White matter demyelination was more severe in early Braak stages (I–II), with increased myelin preservation, yet with high percentage of demyelinated areas in Braak III–IV and V–VI, as shown by LFB and MBP staining (Figure 1K–M). Quantification confirmed reduced myelin content and greater demyelinated area in early stages. AT8 staining confirmed a Braak VI tau pathology (Figure 2A-2C). With an increase in AT8+ plaques across Braak stages (Figure 2D-2G). Distribution of MMOs analysis revealed a progressive increase in non-functional MMOs ($CC1^+/MBP^-$) across Braak stages (Figure 2N). Some surviving MMOs showed intracellular inclusions of tau-phosphorylation ($CC1^+/pTau217^+/MBP^-$; Figure 2O) highlighting that some non-functional MMOs present tau-accumulation in AD.

Conclusion: Early Braak stages (I–II) in AD show greater demyelination, with lower LFB and MBP levels and lower number of MMOs. While later Braak stages show more preserved MMOs, those exhibit tau pathology and lack MBP expression, suggesting impaired function. This preliminary analysis reveals a distinct tau-related pattern in AD that also impact oligodendrocytes. Further investigation with additional cases will be performed to confirm our findings.

Presenter Name/Degree(s): Juli C. Singer, MS
Current Position: Research Operations Coordinator

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Clinical utility of plasma biomarkers in Alzheimer's disease (CliPAD)**

Author(s): ***Singer JC, Lussier FZ, Ganatra S, Gingrich T, Scop Medeiros M, Lukasewicz Ferreira P, and Pascoal TA***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Understanding the clinical validity of blood-based biomarkers for amyloid-beta (Aβ) and phosphorylated tau (p-tau) requires real-world evaluation to support their use in detecting Alzheimer's disease (AD). This study provides a blueprint for clinical validation by generating prospective evidence on the diagnostic impact, accuracy, and integration of these biomarkers into routine care. It also compares p-tau assays to assess their alignment with established diagnostic methods.

Methods: CliPAD is an observational study enrolling up to 200 participants (ages 40–90) referred through UPMC clinics. Eligible individuals have objective cognitive impairment suspected to be due to AD. Study visits at the UPMC Montefiore CTRC include blood sampling and cognitive testing, with questionnaires (NPI-Q, AD8, FAS) completed by a study partner. Blood is analyzed in CLIA-certified labs, and results are shared with referring clinicians to inform on the presence of Aβ pathology. Post-assay medical care is tracked to evaluate impacts on clinical management. Optional follow-ups occur at 12, 24, and 36 months.

Results: Seventy-eight referrals were received from 14 clinicians within UPMC Neurology and Geriatric Medicine, with 50 participants enrolled (71.3±11.2 years, MoCA = 18.4±6.33). Clinicians suspected AD in 29 participants, with 21 showing high likelihood of amyloid pathology, 6 low, and 2 inconclusive results. Amyloid PET scans, performed in 22% of participants, demonstrated 100% concordance with assay results. Of 15 participants initially classified as non-AD, 6 showed concordance, 6 discordance with high amyloid likelihood, and 3 inconclusive results. Currently, 14% of eligible participants are receiving anti-amyloid therapy (6 Leqembi, 1 Kisunla), all identified at referral, while another 14% are awaiting treatment pending PET scan results.

Conclusion: Early findings support the clinical utility of blood-based biomarkers for AD, showing strong concordance with PET imaging and real-world diagnostic impact. Ongoing data will refine integration into routine care.

Presenter Name/Degree(s): Maya Singh, MSc
Current Position: Medical Student

Primary Mentor in Psychiatry: Priya Gopalan, MD

Title: **Predicting postpartum depression: A data-driven approach to early risk screening**

Author(s): ***Singh M[1], Rodriguez S[2], Jakubowski K[3], Spada M[3], Gopalan P[3], and Krishnamurti T[2]***
Affiliation(s): ***[1]University of Pittsburgh School of Medicine; [2]University of Pittsburgh Department of General Internal Medicine; [3]Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Postpartum depression (PPD) affects approximately 1 in 7 birthing individuals, yet no validated tools exist to proactively identify those at highest risk. This study evaluated the feasibility of using routinely collected electronic health record (EHR) data to identify psychosocial and structural risk factors for PPD and inform early screening approaches.

Methods: We conducted a retrospective cohort study of 2,017 individuals who delivered at two hospitals in Northwest Pennsylvania. As part of routine care, nurses screened patients at delivery for depressive symptoms (PHQ-2/PHQ-9), psychiatric history, substance use, trauma, intimate partner violence, and social support. Behavioral health consults were offered to patients with a history of psychiatric illness, psychiatric medication use, or prenatal depressive symptoms, and to those reporting two or more risk factors. The primary outcome was a postpartum PHQ-9 score ≥10, indicating moderate depression, documented within one year after delivery.

Results: Among the 1,395 individuals with financial identification numbers (FINs), 575 had at least one postpartum PHQ-9 score and were included in the analytic sample; 510 (88%) had structured data on social determinants of health (SDOH), including housing, food, and financial insecurity. Seventeen percent (n=95) screened positive for probable PPD. Among those with PPD, 49.5% had Medicaid, 49.5% had commercial insurance, and 1% were self-pay. In adjusted analyses, higher prenatal PHQ-9 scores (OR = 1.13, $p < .001$) and Medicaid insurance (OR = 1.94, $p = .03$) were associated with greater odds of PPD. Being offered and accepting a behavioral health consult was associated with higher, though not statistically significant, odds of PPD (OR = 2.90), likely reflecting appropriate referral of high-risk individuals.

Conclusion: Findings suggest that prenatal depressive symptoms and insurance type may serve as early indicators of PPD risk. Leveraging EHR data for early identification could support more targeted interventions during the perinatal period.

Presenter Name/Degree(s): Jacob Sinrich
Current Position: Undergraduate Research Assistant

Primary Mentor in Psychiatry: Helmet Karim, PhD

Title: **Brain age in autism: Identifying factors associated with accelerated aging**

Author(s): ***Sinrich J[1], Mazefsky CA[1], Eack SM[2], and Karim HT[1,3]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Social Work; [3]Department of Bioengineering, University of Pittsburgh

Introduction: Autism is associated with psychiatric comorbidities and functional challenges across domains such as employment and independent living. These various factors may be associated with gray matter volume (GMV) and accelerated aging. We evaluated associations between brain age, a marker that uses GMV to predict age, and we explored how brain age was related to group differences (Autism vs. non-Autistic controls) as well as multiple factors including psychiatric morbidity (BPRS), general and social cognitive function, medication use, and IQ.

Methods: We analyzed data from 170 participants (n=140 Autistic). We estimated brain age using a single structural T1-weighted MRI with the BrainAgeR algorithm. Neurocognitive function was assessed using the MATRICS Consensus Cognitive Battery. Functional and social cognition outcomes were measured with standardized performance based and interview rated tools. Regression analyses examined associations between brain age and demographic, cognitive, psychiatric and treatment variables.

Results: We found that the model accurately predicted brain age (MAE=5.1 years, r=0.48, p=0.001). We found that brain age did not associate with group, sex, education, employment status, or independent living status. but showed no relationship with general or social cognition scores. We additionally found no association between brain age and IQ or cognitive function. We also found no association with BPRS or medication use except those who were on anxiety medications had greater brain age compared to those who did not.

Conclusion: While brain age was not associated with Autism or cognitive function, we did find that it was associated with anxiety medication. This may serve as a proxy for individuals with more severe anxiety (i.e., these are treatment-seeking individuals) and that this may reflect that anxiety is associated with brain age, which we have found in older adults. It may be important to understand the longitudinal effects of brain aging in Autism to better understand these associations.

Presenter Name/Degree(s): Isabella Snider, BS
Current Position: Research Coordinator

Primary Mentor in Psychiatry: Kenneth Nash, MD

Title: **High fidelity wraparound's positive effects on daily functioning, living satisfaction, and caregiver strain**

Author(s): Snider I[1,2], Pratt A[1,2], Segreti AM[1,2], Danny AD[1,2], Rogers L[1,2], Owens, C[1,2], Payne MW[1,2], and Nash K[1,2]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Youth and Family Training Institute

Introduction: The Youth and Family Training Institute (YFTI) provides training, coaching, credentialing, fidelity, and outcomes monitoring of the High Fidelity Wraparound (HFW) process across Pennsylvania. HFW is a team-based process that develops and implements individualized plans for youth with complex behavioral health needs and their families. In 2021, the Pennsylvania Department of Human Services was awarded the Pennsylvania Cooperative Agreements for the Expansion and Sustainability of the Statewide System of Care grant by the office of Substance Abuse and Mental Health Services Administration (SAMHSA). YFTI was selected to conduct the evaluation required by SAMHSA. Three HFW agencies from Blair and Delaware counties were included as provider partners in the grant evaluation process.

Methods: YFTI assessed 40 youth ranging in age from 7-21 and their primary caregiver since 2021. Data from the National Outcomes Measures (NOMs) sections of Daily Functioning, Overall Mental Health and Living Satisfaction, and from the Caregiver Strain Questionnaire (CGSQ) are reported here.

Results: Daily Functioning results show that 59.1% of youth reported a positive score at their most recent assessment compared to 40.9% at intake. Youth also reported an overall positive improvement in Living Satisfaction at 13.3% as well as a 27.8% positive improvement for Overall Mental Health. CGSQ results show a decrease in high levels of stress and strain and a corresponding increase in low levels of stress and strain for caregivers (4% decrease in high Objective Strain; 12% decrease in high and 28% increase in low Subjective Internalized Strain).

Conclusion: Data indicates a positive effect of the HFW process on the daily functioning and overall mental health of youth and their satisfaction of their living conditions while also decreasing stress and strain for caregivers.

Presenter Name/Degree(s): Ian Snyder, BS
Current Position: Systems Analyst II

Primary Mentor in Psychiatry: Marta Peciña, MD, PhD

Title: **Neuromodulation of antidepressant placebo effects: A TBS study**

Author(s): *Snyder I[1], Handoko K[1], Neppach A[1], Badhan G[1], Karim HT[1,2], Price R[1], Ferrarelli F[1], Dombrovski AY[1], and Peciña M[1]*
Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Bioengineering, University of Pittsburgh*

Introduction: The ventromedial prefrontal cortex (vmPFC)- ventral striatum (VS) circuit has been consistently implicated in the formation of placebo effects, yet the causal contribution of this circuit to the formation of antidepressant placebo effects has not been demonstrated. We use dorsomedial prefrontal cortex (dmPFC) stimulation to enhance the representation of antidepressant expectancies in the vmPFC-VS circuit and ultimately cause mood improvement.

Methods: 103 unmedicated individuals with depressive symptoms ages 18-53 years, were assigned to receive three within-subject counterbalanced forms of TBS targeting the dmPFC—intermittent (iTBS) expected to potentiate the vmPFC, continuous TBS (cTBS) expected to de-potentiate the vmPFC, or sham TBS (sTBS). Each TBS session was followed by a scanning session where participants completed the Antidepressant Placebo fMRI Task, which features two putative components of the placebo effect: expectancies of antidepressant infusions and their reinforcement with sham neurofeedback during the recording of trial-by-trial expectancy and mood ratings.

Results: The administration of one session of intermittent TBS (iTBS), compared to cTBS, was associated with increased BOLD responses during expectancy processing in the dmPFC and downstream effects in the bilateral orbitofrontal cortex, ventromedial prefrontal cortex, the subgenual anterior cingulate cortex and ventral striatum, compared to the control condition. cTBS, compared to both iTBS and sTBS enhanced neurosensitivity to the antidepressant infusion cue of the placebo task condition with respect to expectancy rating, resulting in higher overall expectancies in response to the task modulators. Interestingly, this positive association from cTBS had no meaningful effect on predicting mood ratings. When expectancies were positive, greater DMN activation was more likely to translate to higher mood ratings but was significantly enhanced following iTBS compared to both cTBS and sTBS.

Conclusion: TBS shows a promising ability to induce changes in neural activation that meaningfully interacts with the formation of antidepressant placebo effects to modulate mood outcomes.

Presenter Name/Degree(s): Carolina Soares, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD

Title: **Profiling amyloid-negative, tau-Positive individuals with two tau PET tracers – The HEAD study**

Author(s): *Soares C[1], Ruppert E[1], Ferreira PL[1], S. Medeiros M[1], Rocha A[1], Scarpatto Rodrigues M[1], Oliveira Jr M[1], Bellaver B[1], Povala G[1], Amaral L[1], Lussier F[1], Karikari TK[1], Masdeu J[2], Tudorascu DL[1], Soleimani-Meigooni D[3], Fortea J[4], Lowe V[5], Oh H[6], Pascual B[2], Gordon BA[7], Rosa-Neto P[8], Baker S[9], and Pascoal TA[1]*

Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neurology, Houston Methodist Research Institute; [3]Memory and Aging Center, University of California San Francisco; [4]Sant Pau Memory Unit, Department of Neurology, Hospital de la Santa Creu i Sant Pau; [5]Department of Radiology, Mayo Clinic; [6]Department of Psychiatry and Human Behavior, Brown University; [7]Department of Radiology, Washington University in St. Louis; [8]McGill University Research Centre for Studies in Aging; [9]Lawrence Berkeley National Laboratory*

Introduction: Little is known about individuals outside the Alzheimer's disease (AD) spectrum, such as those with amyloid-negative (A-), tau-positive (T+) positron emission tomography (PET) scans. While tau-PET imaging has been used to study this group, differences between tau tracers can impact identification. This study aimed to investigate A-/T+ individuals using two tau-PET tracers in the HEAD cohort.

Methods: We studied 433 individuals from the HEAD cohort (244 cognitively unimpaired,(CU), 138 mild cognitive impairment(MCI), and 51 with dementia).Participants underwent clinical assessments, MRI, A-PET, both MK-6240 and Flortaucipir scans, and a subset had plasma biomarkers (n=332). A-PET positivity was defined as Centiloid>24. Tau-positivity was determined by MK-6240 and Flortaucipir SUVR values exceeding the mean + 1.5SD in at least one Braak region anchored in CU A- individuals followed by visual confirmation in A-/T+ cases. Biomarker concordance was assessed across A/T groups. Plasma GFAP, p-tau217, NFL levels, and Centiloids were compared across A/T groups using adjusted linear regressions.

Results: We found a total of 109 (25.1%) cases classified as A-/T+ defined by at least one tau tracer (67 ± 8.5 years, 63% females, 76 CU, 27 MCI, 6 with dementia). Detection of A-/T+ cases varied by tracer: MK-6240 (n=41,10%), Flortaucipir (n=53,13%). Among A-/T+ individuals, MK-6240 identified 28 CU, 10 MCI, and 3 dementia cases, while Flortaucipir identified 32 CU, 18 MCI, and 3 dementia cases. Concordance between MK-6240 and Flortaucipir in A-/T+ cases was low (n=29,41%). A-/T+ individuals showed lower levels of plasma p-tau217 than A-/T-: MK-6240: $P<0.001$; Flortaucipir: $P=0.002$. Levels of other plasma biomarkers evaluated were not different between groups.

Conclusion: Individuals A-/T+ exhibited varying tau tracer detection rates and lower plasma p-tau217 levels compared to controls, suggesting that plasma p-tau217 could be a useful tool for identifying this group. These findings emphasize the need for studies to account for tracer variability.

Presenter Name/Degree(s): Haeun Son, BS
Current Position: Research Associate

Primary Mentor in Psychiatry: Guillermo Gonzalez Burgos, PhD

Title: **Parvalbumin interneuron diversity in mouse visual and prefrontal cortices**

Author(s): Son H[1], Miyamae T[1], Nishihata Y[1,2], Krimer OL[1], Howard D[3], Xu N[3], Tripathy S[3], and Gonzalez-Burgos G[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychiatry, Nara Medical Univeristy; [3]Department of Psychiatry, University of Toronto

Introduction: Parvalbumin-positive interneurons (PVIs) are a major class of interneurons which control pyramidal neuron activity via perisomatic inhibition across all areas of the mammalian neocortex. PVIs show transcriptional alterations in schizophrenia and other disorders that affect the prefrontal cortex (PFC) and other cortical areas, such as the visual cortex (VC). However, it remains unclear whether PVIs exhibit region-specific physiological properties, particularly between VC and PFC. Here, we compared the properties of mouse VC and PFC PVIs, using patch clamp electrophysiology and investigated the feasibility of applying patch-seq in acute slices, to obtain correlates between physiological and transcriptome differences.

Methods: We performed whole-cell patch-clamp recordings in acute brain slices obtained from the PFC and VC of male and female mice aged P21-P64. In a subset of experiments, we used the corking methods to obtain nucleus samples from recorded PVIs and assess the feasibility of patch-seq analysis.

Results: All PVIs in PFC and VC exhibited Fast Spiking (FS) physiological properties and were divided into two FS phenotypes based on their first spike latency at rheobase: delayed FS (dFS; latency >70 ms) and continuous FS (cFS; <70 ms). Most PVIs from VC were dFS (61/82), and five membrane properties differed significantly between dFS and cFS cells, with cFS being more excitable. In PFC, PVIs were divided similarly but with more equal proportions of dFS (35/82) and cFS (47/82) cells, and the membrane properties of dFS and cFS PVIs from PFC did not differ substantially. One possibility is that, in the PFC, PVI properties are more heterogeneous in ways not captured by the first spike delay alone. We further explored this applying dimensionality reduction with UMAP. In VC, dFS and cFS cells were spatially segregated in the UMAP space, and membrane properties varied systematically with spike delay in the UMAP space. In contrast, in PVIs from PFC, membrane properties were distributed in the UMAP space following complex gradients unrelated to spike delay, consistent with greater heterogeneity. Preliminary patch-seq studies demonstrated our capacity for generating high-quality data, correctly identifying excitatory and inhibitory neurons, and predicting the identity of 95% of the PVIs.

Conclusions: These findings demonstrate region-specific differences in PVI physiology between the PFC and VC, which may contribute to the differential vulnerability of cortical areas to disease-related alterations, such as those observed in schizophrenia.

Presenter Name/Degree(s): Shale Springer, BS
Current Position: PhD Candidate

Primary Mentor in Psychiatry: Susanne Ahmari, MD, PhD

Title: **Altered protein expression and phosphorylation in higher-order thalamic nuclei in obsessive-compulsive disorder**

Author(s): Springer SA[1,2], MacDonald ML[2,3], Klei L[2], Devlin B[2], Glausier JR[2], Lewis DA[1,2], and Ahmari SE[1,2]
Affiliation(s): [1]Center for Neuroscience; [2]Department of Psychiatry, University of Pittsburgh School of Medicine; [3]Health Science Mass Spectrometry Core

Introduction: Obsessive-compulsive disorder (OCD) is associated with alterations in cortical, striatal and thalamic brain regions. Synaptic RNA transcripts are differentially expressed in the cortex and striatum, but protein expression and phosphorylation have not been assessed in post-mortem brain tissue in OCD. Thalamic alterations in OCD are also particularly poorly understood.

Methods: Protein and phosphopeptide expression in four thalamic nuclei were quantified using untargeted mass spectrometry techniques. Differential expression and phosphorylation were analyzed using linear regression, co-expression network analyses and kinase-substrate enrichment analysis (KSEA).

Results: Blood microparticle proteins were upregulated and mitochondrial protein modules downregulated across thalamic nuclei in OCD subjects. Synaptic and neuronal proteins were differentially phosphorylated. KSEA and network analyses identified reduced activity of AGC family kinases and elevated activity of TGF-beta receptor family kinases in OCD.

Conclusion: Inflammation and oxidative metabolism pathways previously associated with OCD were differentially expressed in the thalamus. Synaptic proteins were differentially phosphorylated. Using phosphoproteomic analyses we identified regulatory pathways that may co-regulate these systemic and synaptic alterations.

Presenter Name/Degree(s): Dylan E. Stein
Current Position: Student Researcher

Primary Mentor in Psychiatry: Heather Joseph, DO

Title: **Toddler behavior and preschool ADHD outcomes among children at high and low familial risk of ADHD**

Author(s): ***Stein DE[1], Joseph HM[1], and Mark EG[2]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Pittsburgh School of Medicine

Introduction: Research indicates that early childhood behavior may distinguish children at high and low familial risk of ADHD, but little is known about the relationship between toddler behavior and later childhood ADHD diagnosis. The present study aims to test a novel coding system quantifying ADHD-related behaviors in toddlerhood and assess its predictive value for ADHD in preschool.

Methods: Subjects included 39 toddlers with a median age of 19.28 months who were split into groups based on low and high familial risk of ADHD. Two trained coders evaluated recordings of toddlers watching visual and audio tasks for duration of Affect (Positive & Negative), Inattention, and Hyperactivity (Fidget, Squirm, and Purposeless Limb Movement/PLM). For a subsample of 26 participants, preschool age data on ADHD symptoms was available from parental report (ADHD-RS-P) and clinical interviews (KSADS). Statistical methods included descriptive statistics and ***t***-test comparisons of toddlers at high/low familial risk of ADHD, as well as children with and without ADHD in preschool (defined as scores ≥93rd percentile for the ADHD-RS-P, and ≥6 symptoms on the KSADS).

Results: Forty-nine percent (***n***=19) were at low and 51% (***n***=20) at high familial risk of ADHD. Of coded toddler behaviors, only mean duration of Affect significantly differed between familial ADHD risk groups, with greater Negative Affect in the ADHD group (***t***=-2.78, ***p***=.005). Bivariate correlations indicated significant positive association between ADHD-RS-P scores in preschool and Toddler PLM (***r***= 0.55, ***p***=.004). There were no statistically significant differences in mean code durations in toddlerhood based on suggested ADHD-RS-P or KSADS thresholds.

Conclusion: Although negative affect in toddlerhood was linked to higher familial risk of ADHD, toddler behavior did not significantly differ based on preschool ADHD status. Further longitudinal research in a larger sample is needed to clarify the relationship between toddler behavior and preschool ADHD symptoms.

Presenter Name/Degree(s): Holly Stewart, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Kymberly Young, PhD

Title: **Participant performance factors and improvement in depressive symptoms following real-time fMRI amygdala neurofeedback training**

Author(s): *Stewart H, Riley E, Leiker E, Compère L, Barb S, and Young K*
Affiliation(s): *Department of Psychiatry, University of Pittsburgh School of Medicine*

Introduction: We have developed real time fMRI (rt-fMRI) neurofeedback training, which increases amygdala activation using positive autobiographical memory recall, to reduce depressive symptoms. To improve the efficacy of this intervention, we assessed potential factors associated with improvements in depressive symptoms.

Methods: 80 participants completed two rt-fMRI training sessions and self-report measures on their perceived experience following each scan. After intervention, participants were followed up for 12 weeks using the Beck Depression Inventory-II (BDI-II). Change from baseline in BDI scores was used to evaluate depressive symptom improvement. The relationship between BDI score change and perceived experiences reported during post-scan surveys was examined.

Results: Participants' BDI scores decreased by an average of 16.9 (12.7*SD*) points, and amygdala activity increased by 0.34% (0.03*SD*). We entered the following variables into a regression model with BDI change as the dependent variable: perceived control over brain activity, effectiveness of efforts at task, frustration during neurofeedback task, motivation to successfully complete task, desire to feel positive emotions, and desire to feel intense emotions of any kind. For BDI scores, the overall model was significant ($F(13,63)=2.13$, $p=0.025$) and explained 30% of the variance. For post-scan measures, BDI change was significantly correlated with motivation to successfully complete the NF task ($t(63) = -2.777$, $p=0.007$) as well as the desire to feel intense, positive emotions ($t(63)=2.91$, $p=0.007$), and the desire to feel intense emotions of any kind was marginally significant ($t(63) = -1.88$, $p=0.65$).

Conclusion: In using post-scan data to examine the impact of individualized experiences on BDI score change, the motivation to successfully complete the NF task, the desire to feel intense positive emotions, and the desire to feel intense emotions of any kind were significant. These findings ultimately inform future interventions so that these variables may be modified to increase neurofeedback training effects on reducing individual depressive symptoms.

Presenter Name/Degree(s): Taylor Ashley Stowe, PhD
Current Position: Postdoctoral Scholar

Primary Mentor in Psychiatry: Colleen McClung, PhD

Title: **Diurnal rhythms underlying cholinergic interneurons may mediate reward-related behaviors**

Author(s): ***Stowe TA, Joffe ME, Huang YH, and McClung CA***
Affiliation(s): ***Department of Psychiatry, TNP, University of Pittsburgh School of Medicine***

Introduction: Circadian rhythms have a significant impact on psychiatric and substance use disorders (SUDs). There is a bidirectional relationship between circadian rhythms and SUDs as those with disrupted rhythms are more vulnerable to drug-taking and drug-exposure can disrupt circadian rhythms, Notably, drug-taking patterns can vary throughout the day, indicating that individuals may be more susceptible to drug use at certain times of day. Overall, it is crucial to determine the mechanisms that underlie rhythms in reward-related behaviors, like drug-taking, to better understand vulnerability to developing SUDs. The nucleus accumbens (NAc) plays a key role in reward-related behaviors and contains cholinergic interneurons. Despite making up a small amount of the NAc, CINs are essential in mediating dopamine dynamics and reward-related behaviors. Our lab has shown that there are rhythms in the NAc, but little to no research has examined the potential rhythms in CINs and the CIN system.

Methods: We expanded on our previous data by measuring activity via ***ex vivo*** electrophysiology in the NAc over the 24 hr cycle in CINs. We also utilized pharmacological methods to determine the mechanisms contributing to diurnal rhythms in CIN activity. Additionally, mice were exposed to chronic nicotine via drinking water to determine the effects on diurnal rhythms in CINs.

Results: Our data show that CIN activity is higher during the dark cycle, particularly in male mice. In contrast, females show little to no rhythms in CIN activity. Additionally, we have found that chronic nicotine in males decreases CIN activity in the light cycle while having little to no effects on females. Our preliminary data also suggests that nicotinic receptors do not contribute to differences in CIN activity in females.

Conclusion: Given the essential role CINs play in motivated behaviors, the rhythmic activity in these cells may influence drug-taking behaviors and play a role in vulnerability to developing SUDs. We aim to determine whether these rhythms exist in CIN activity in ***in vivo*** methods and how circadian rhythms in CINs play a role in drug-taking behaviors in a model of IV nicotine self-administration. Overall, these novel findings collectively bring us closer to characterizing the role of circadian rhythms in the neural mechanisms that drive reward-related behaviors associated with SUDs.

Presenter Name/Degree(s): Derica J. Su, BA
Current Position: Research Specialist

Primary Mentor in Psychiatry: Carla A. Mazefsky, PhD

Title: **Brain network activity in autistic and non-autistic adults thinking about preferred interests**

Author(s): Su DJ[1], Johnston AL[1], Gotham KO[2], Mazefsky CA[1], and Siegle GJ[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology, Rowan University

Introduction: Preferred interests are common, intense, and idiosyncratic among autistic people, and may help with emotion regulation. Among general samples, savoring positive topics increases positive affect. We do not know how thinking about preferred interests compares to savoring, neurally. Autistic and non-autistic adults may have different levels of brain network activity when thinking about interests and savoring positive topics. We aimed to: 1) contrast brain activity in autistic and non-autistic adults thinking about preferred interests and savoring, and 2) examine correlations between brain activity and emotion dysregulation.

Methods: Participants (n=100) included 74 autistic and 26 non-autistic adults (mean age=32.59, range=18-58 years). All completed a 5-minute cognitive and emotional task during functional MRI assessment. Participants thought about personally relevant positive topics (savor) and preferred interests (interest) for ten seconds each over two blocks. Participants also completed the Emotion Dysregulation Inventory (EDI-SR). We compared activity in 12 meta-analytically (Neurosynth) derived brain networks (task, social, sensation, self, salience, pain, motor, memory, interoceptive, executive, emotion, default, attention, arousal) for each condition. We examined group differences in means and distributions, and correlations between network activity and EDI-SR Dysphoria and Reactivity indices across groups.

Results: We saw no significant differences between groups during interest, savor, and rest conditions. We found greater variability in distribution among the autistic group during interest minus rest and savor minus rest conditions. Across groups, we found significant negative correlations between several networks and Dysphoria and Reactivity indices for interest minus rest and interest minus savor conditions.

Conclusion: Autistic and non-autistic adults showed no significant differences in brain networks implicated in perception, emotion, and cognition when thinking about preferred interests and positive topics. Across groups, those more emotionally reactive or dysphoric engaged less with their preferred interests neurologically. Future studies should contrast neuroimaging and behavioral data to inform understanding of preferred interests.

Presenter Name/Degree(s): Juliette Syta, BS
Current Position: Student Research Assistant

Primary Mentor in Psychiatry: Andrew R. Gerlach, PhD

Title: **Belief-updating computations underlying repetitive negative thinking in late life**

Author(s): ***Syta J, Andreescu C, and Gerlach AR***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Worry and rumination, two commonly co-occurring forms of repetitive negative thinking (RNT) encountered as core symptoms of late life anxiety and depression, are difficult to treat and increase the risk of relapse for remitted depressive and anxiety disorders, especially in late life. We propose that dysfunctional belief-updating is a fundamental cognitive mechanism underlying RNT. Employing a Bayesian model of belief-updating, we hypothesize that 1) RNT will not be associated with associated with overall performance on a belief-updating task, 2) worry will be associated with low prior weight, and 3) rumination will be associated with low update strength.

Methods: We recruited 54 older participants (age ≥50) dimensionally for RNT to perform a novel belief-updating task. Worry was assessed with the Penn State Worry Questionnaire and rumination with the Response Style Questionnaire rumination subscale. We quantified performance with Kullback-Leibler divergence from the Bayesian model; prior weight was collected explicitly; and update strength was calculated by fitting a parameterized Bayes model. Associations with RNT were tested with linear regression.

Results: Participants generally performed in line with the Bayesian model of belief-updating (mean deviation < 15%). Neither worry nor rumination were associated with task performance ($\beta = -0.07, 0.02; p = 0.62, 0.87$). As hypothesized, worry was associated with low prior weight ($\beta = -0.19, p = 0.04$), but rumination was not ($\beta = 0.00, p = 0.96$). Rumination was associated with low update strength ($\beta = -0.28, p = 0.05$), but worry was not ($\beta = -0.02, p = 0.91$).

Conclusion: In this preliminary study, we have shown that our task reliably captures the intended belief-updating behavior. Further, worry and rumination are not associated with performance but show unique deficits in belief-updating: low prior weight for worry and low update strength for rumination. These findings form the basis for future work that will more thoroughly characterize aberrant belief-updating in RNT, informing specific therapeutic targets for these symptoms.

Presenter Name/Degree(s): Laura Taglioni, BA
Current Position: Research Specialist

Primary Mentor in Psychiatry: Timothy Allen, PhD and Alexandre Dombrovski, MD

Title: **Trust, but take: Individual differences in reward sensitivity influence strategic exploitation during a social exchange game**

Author(s): ***Taglioni L[1], Langer B[1], Hallquist MH[2], Schreiber AM[3], Dombrovski AY[1], and Allen TA[1]***
Affiliation(s): ***[1]Department of Psychiatry, University of Pittsburgh School of Medicine;*** *[2]Department of Psychology and Neuroscience*, ***University of North Carolina at Chapel Hill;*** ***[3]College of Medicine, University of Kentucky***

Introduction: In interpersonal interactions, individuals are often faced with a fundamental dilemma: whether to sacrifice their own goals to cooperate with others or prioritize personal gain by exploiting a counterpart. Iterative two-player economic exchange games, such as the trust game, offer a valuable framework for examining how people navigate these choices and how personality traits shape their behavior. One trait frequently studied in such social dilemmas is extraversion, broadly reflecting a tendency toward positive affect. Structural models of personality suggest that extraversion comprises two lower-order facets: agentic extraversion, which is associated with reward sensitivity and assertiveness, and affiliative extraversion, which reflects sociability and warmth. In the present study, we use a modified version of the trust game to investigate how these facets of extraversion relate to exploitative behavior in social exchanges. We hypothesized that exploitative behavior would be positively associated with agentic, but not affiliative, extraversion, reflecting a prioritization of personal gain over cooperation.

Methods: We recruited 300 adults online via Prolific. In the trust game, participants played as trustees with computerized investors. On each trial, investors either kept or shared a monetary endowment. If investors shared, trustees could either keep it all or return half. The game was played in two modes: secrecy (participants made responses before knowing the investor's decision) and exchange (participants responded after seeing the investor's decision). Exploitation was operationalized as keeping the endowment. Extraversion and its facets were assessed using the Big Five Aspects Scale (BFAS).

Results: We used multilevel modeling to predict participant returns from game mode (exchange vs. secrecy), investor decision (share vs. keep), and extraversion scores. Participants returned more when the investor kept relative to when the investor shared in exchange mode ($\beta = 1.30$, $\boldsymbol{p} < .001$), consistent with exploitation. Agentic extraversion specifically predicted greater exploitation ($\beta = .18$, $\boldsymbol{p} < .001$), whereas affiliative extraversion showed no significant effect.

Conclusion: Exploitation was demonstrated by participants returning less when investors shared relative to when investors kept, specifically in exchange mode. This pattern is indicative of strategic exploitation driven by the possibility of certain, immediate gains. Individual differences in agentic extraversion amplified this behavior, consistent with individuals higher in agentic extraversion strategically prioritizing personal rewards, particularly when a reward is guaranteed. Our findings clarify how extraversion influences decisions in social exchanges, highlighting the role of agentic extraversion in promoting self-interested strategies during interpersonal interactions.

Presenter Name/Degree(s): Lindsay Taraban, PhD
Current Position: Postdoctoral Scholar

Primary Mentor in Psychiatry: Judith Morgan, PhD

Title: **Maternal parenting-related confidence is associated with neural co-regulation among mother-infant dyads**

Author(s): Taraban L[1], Huppert T[2], Santosa H[3], Aloisio C[4], Hipwell AE[1], and Morgan JK[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Electrical and Computer Engineering, University of Pittsburgh; [3]Department of Radiology, University of Pittsburgh; [4]University of Pittsburgh Medical Center

Introduction: During co-regulation, infants and their caregivers coordinate behavioral, affective, and physiological signals, which over time support the child's ability to self-regulate. More recently, mother-infant co-regulation has been found to relate in real time to coordinated neural activation in regions that drive emotional expression and regulation. Maternal risk factors, such as high stress, may disrupt neural co-regulation. Although not explored in prior research, maternal ***strengths***—such as higher parenting-related confidence—may conversely relate to higher levels of neural co-regulation, as mothers who are confident in their parenting may be more present and attuned to their baby's signals. We focused on the prefrontal cortex (PFC) and temporoparietal junction (TPJ), based on their importance for emotional regulation and understanding.

Methods: Sixty-three mothers and their 3-month-old infants [mean age (SD) = 3.4(.51) months; 38% female] participated. ***Neural co-regulation*** was measured during 3 minutes of face-to-face play using Near-Infrared Spectroscopy (NIRSport2 system), a safe, painless, and non-restrictive method for assessing real-time neural function. To measure ***Parenting Confidence,*** mothers used a 7-point scale to complete the 11-item Competency Subscale from the Barkin Index of Maternal Functioning. Data analysis was performed in MatLab using the AnalyzIR toolbox.

Results: Overall, mothers experienced high parenting-related confidence [mean(SD) = 55.87(7.59)/66]. Greater maternal confidence was associated with stronger coupling of maternal right and left lateral PFC and left TPJ with infant right lateral PFC (3 associations; t = 3.36, p-corrected = .007; t = 3.11, p-corrected = .015; t = 3.46, p-corrected = .006).

Conclusion: Greater maternal confidence in parenting was associated with stronger synchronous activation of maternal brain regions implicated in emotion regulation (lateral PFC) and mentalization (TPJ) with infant areas related to emotion regulation (lateral PFC). Clinically, increasing mothers' parenting-related confidence may have a positive effect on mother-infant co-regulation and support the development of babies' early emotional self-regulation.

Presenter Name/Degree(s): Douglas Teixeira Leffa, MD, PhD
Current Position: Psychiatry Resident

Primary Mentor in Psychiatry: Tharick A. Pascoal, MD, PhD and Brooke Molina, PhD

Title: **ADHD genetic risk and cognitive decline in older adults: Findings from the Alzheimer's disease sequencing project**

Author(s): Teixeira Leffa D[1], Amaral L[1], Lussier F[1], Bellaver B[1], Povala G[1], Lukasewicz Ferreira P[1], Negrini G[1], Augusto Rohde L[2], Molina B[1], Archer D[3], and Pascoal TA[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Universidade Federal do Rio Grande do Sul; [3]Vanderbilt University Medical Center

Introduction: Emerging evidence suggests that attention-deficit/hyperactivity disorder (ADHD) is associated with an increased risk for mild cognitive impairment (MCI) and dementia due to Alzheimer's disease (AD). We tested whether the genetic risk for ADHD, estimated with polygenic risk scores (ADHD-PRS), predicts progression to MCI or AD in a large sample of cognitively unimpaired (CU) older adults across five cohorts from the AD Sequencing Project.

Methods: ADHD-PRS were calculated in 1,970 CU individuals without a clinical diagnosis of ADHD (mean age 71.9 years, 65.9% female). Participants were followed for up to 10 years with clinical and cognitive assessments, including memory, executive function, and language. Cox proportional hazard models were used to test the association between ADHD-PRS and progression to MCI or AD. Linear mixed models evaluated associations with cognitive trajectories.

Results: Higher ADHD-PRS was associated with an increased risk of developing MCI or AD (HR=1.25, 95% CI=1.07-1.45, p-value=0.004). Results remained significant after adjusting for education. Higher ADHD-PRS was associated to lower memory, executive function and language. A significant interaction between ADHD-PRS and time indicated steeper declines in executive function and language in participants with lower ADHD-PRS.

Conclusion: Results suggest that CU older adults with higher ADHD-PRS are at a greater risk of progressing to MCI or AD and show lower cognitive performance. Surprisingly, greater declined in executive function and language were seen in individuals with lower ADHD-PRS, suggesting a floor effect. These findings align with epidemiological studies linking ADHD to dementia risk, emphasizing the need for further research into underlying mechanisms.

Presenter Name/Degree(s): Nicholas Theis, MS
Current Position: Research Principal

Primary Mentor in Psychiatry: Konasale M. Prasad, MD

Title: **Brain energy states are diagnostically distinct & capture neural dynamics better than regional activation and connectivity**

Author(s): ***Theis N[1], Bahuguna J[2], Rubin J[3], Banerjee S[4], Iyengar S[4], and Prasad K[1,5]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Laboratoire de Neurosciences Cognitive et Adaptive, University of Strasbourg; [3]Department of Mathematics, University of Pittsburgh; [4]Department of Statistics, University of Pittsburgh; [5]University of Pittsburgh Swanson School of Engineering

Introduction: Schizophrenia, and adolescent-onset schizophrenia (AOS) are uncommon, under-studied, and associated with severe cognitive impairments and outcomes. Neuroimaging has shown altered regional activations (first-order effects) and functional connectivity (second-order effects) in schizophrenia and AOS compared to controls. The pairwise maximum entropy model (MEM) integrates first- and second-order factors into a single quantity called energy, which is inversely related to probability of occurrence of brain activity patterns. We profile brain energy states in these diseases using the MEM.

Methods: For AOS, we take a combinatorial approach to study multiple brain-wide MEMs of task-associated components; hundreds of independent MEMs for various sub-systems are fit to 7 Tesla functional MRI scans. Acquisitions were collected from 23 AOS individuals and 53 healthy controls while performing the Penn Conditional Exclusion Test (PCET) for executive function, which is known to be impaired in AOS. We also examine schizophrenia and psychosis-spectrum disorders using data from the UK Biobank.

Results: Accuracy of PCET performance was significantly reduced among AOS compared to controls. A majority of the MEMs had significant negative correlation between PCET scores and the total energy attained over the fMRI. Across all models, the AOS group was associated with significantly more frequent occurrence of states of higher energy, assessed with a mixed effects model. An example MEM instance was investigated further using energy landscapes, which visualize high and low energy states on a low-dimensional plane, and trajectory analysis, which quantify the evolution of brain states throughout this landscape. In the schizophrenia/psychosis-spectrum disorder sample we found evidence of altered brain energy state patterns compared to controls.

Conclusion: We found support for patient-control differences in the energy profiles in all groups. Severity of psychopathology was correlated positively with energy in the AOS sample. The MEM's integrated representation of energy in task-associated systems can help characterize pathophysiology of psychosis, cognitive impairments, and psychopathology.

Presenter Name/Degree(s): Jacky Thomas, BS
Current Position: Research Specialist

Primary Mentor in Psychiatry: Brian Thoma, PhD

Title: Navigating sexual orientation diversity: Investigating the impact of mental health on academic success amongst new college students

Author(s): ***Thomas J,[1] Miller L,[2] Binning K,[2] and Thoma BC[1]***
Affiliation(s): ***[1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology, University of Pittsburgh***

Introduction: Health is closely tied to academic outcomes, with mental well-being consistently linked to GPA. Sexual minority students—those identifying as lesbian, gay, bisexual, or otherwise non-heterosexual—report disproportionately high rates of mental health challenges. However, limited research has explored how these disparities impact academic success in college. This study examines whether sexual minority students arrive at college with lower self-reported health and whether these health differences predict later GPA.

Methods: Incoming students at the University of Pittsburgh (N = 4,474) completed a matriculation survey between 2019 and 2021. Key variables included sexual orientation, mental and physical health, and cumulative GPA from Fall 2022. Sexual orientation was recoded as heterosexual (0) or sexual minority (1); 848 students identified as sexual minority. Mental and physical health were measured on a five-point scale (1 = Poor to 5 = Excellent). Regression analyses assessed how health and sexual orientation interacted to predict GPA.

Results: Sexual minority students reported significantly lower mental and physical health upon entry. Among heterosexual students, mental health showed minimal predictive value for GPA. In contrast, mental health was a strong predictor of GPA for sexual minority students: low mental health correlated with lower GPAs, while excellent mental health was associated with academic outperformance. All students experienced a GPA decline from Fall 2020 to Fall 2021, likely due to the COVID-19 pandemic, but the interaction between sexual orientation and health remained significant.

Conclusion: These findings highlight the academic vulnerability of sexual minority students in the face of health disparities. While mental health appears less influential for heterosexual students, it significantly affects GPA among sexual minority peers. This underscores the importance of targeted health support and further research into resilience and intersecting identities.

Presenter Name/Degree(s): Claire Tomlinson, PhD
Current Position: Postdoctoral Associate

Primary Mentor in Psychiatry: Oliver Lindhiem, PhD

Title: **Meta-analysis on the effectiveness of mHealth interventions for mental health: A 10-year update**

Author(s): ***Tomlinson CS[1], McGhee EK[2], Gallagher HD[2], Angus A[2], and Lindhiem O[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Pittsburgh Medical Center

Introduction: Mental health disorders impose a significant global burden, with a persistent gap between treatment needs and available services. Despite advancements in evidence-based treatments, access remains limited due to a shortage of trained professionals. Mobile health (mHealth) interventions have emerged as scalable, accessible solutions, leveraging smartphone technology to deliver mental health support. These interventions range from standalone apps to hybrid models integrating clinician support. While mHealth interventions offer promise, their effectiveness remains debated, with prior meta-analyses reporting mixed findings. Small to moderate effect sizes have been observed, though outcomes vary depending on methodological rigor and comparison group intensity.

Methods: The current meta-analysis updates a prior 2015 meta-analysis by analyzing the findings of 74 eligible randomized controlled trials, including 60 new studies published between 2014 and 2024, evaluating mHealth interventions in clinical populations. We coded for symptom or concern targeted by an intervention, study design, population targeted (i.e., adults or children), and type of mobile intervention offered (text-messaging or smartphone application). Effect sizes were calculated using Comprehensive Meta-Analysis (CMA) software, employing random-effects models to account for heterogeneity. Publication bias was assessed through funnel plots.

Results: Results revealed a moderate overall effect size, Hedges' g = .56, with stronger effects observed in studies examining the additive benefit of mHealth to in-person sessions, those using waitlist controls, and interventions targeting anxiety and depression. After adjusting for publication bias, the effect size was more modest, though significant at .40.

Conclusion: These findings are consistent with existing literature suggesting small to moderate effects for mHealth interventions and support their use as a valuable supplement to traditional mental health care. This meta-analysis provides updated insights into the effectiveness of mobile mental health interventions, offering implications for clinical practice and future research.

Presenter Name/Degree(s): Dylan Vaughan, BS
Current Position: Graduate Student Researcher

Primary Mentor in Psychiatry: Yanhua Huang, Ph.D.

Title: **Melanin-concentrating hormone reduces learned helplessness in male mice and modulates layer 2/3 medial prefrontal cortex neuron properties**

Author(s): Vaughan DT[1,2,3], Barnhardt TR[1], and Huang YH [1,2]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Center for Neuroscience at the University of Pittsburgh; [3]Center for the Neural Basis of Cognition

Introduction: Posttraumatic stress disorder (PTSD) induces sleep changes that positively correlate with symptom severity. Rapid eye movement sleep (REMS) can improve PTSD symptoms and promote resilience, though the mechanisms are unclear. The medial prefrontal cortex (mPFC) is commonly dysregulated in PTSD, with certain features recapitulated in a mouse model of learned helplessness. Here, we focused on melanin-concentrating hormone (MCH), a neuropeptide predominantly released during REMS and implicated in cellular plasticity, and tested whether MCH acts on the mPFC microcircuit and reduces learned helplessness.

Methods: Exp 1: Male mice (n = 33) were run through a learned helplessness paradigm including the conditioning and testing phases to be characterized as helpless or resilient via k-means clustering (k=2). Following the first testing session, mice were given intranasal (IN) MCH, IN saline, i.p. TC-MCH-7c (MCHR1 antagonist) or i.p. saline. Mice were retested the following day to determine changes in helplessness. Exp 2. Acute brain slices were taken from male and female mice. Slices were incubated in ACSF, MCH, or TC-MCH-7c for 30 minutes. Electrophysiological recordings were done in layer 2/3 mPFC pyramidal neurons, parvalbumin (PV) interneurons, vasoactive peptide (VIP) interneurons, and somatostatin (SST) interneurons to assess changes in membrane and synaptic properties.

Results: Exp 1: IN MCH reduced helplessness ($n=8$, $p<0.01$, paired t-test) in male mice. Exp 2: MCH incubation increased the excitability of pyramidal neurons ($p<0.01$), VIP interneurons ($p<0.0001$), and PV interneurons($p<0.001$), but not SST interneurons ($p=0.6197$; One-way ANOVAs, n=10–12 cells per group, 2 – 4 cells per animal). Further, MCH increased the frequency ($p<0.0001$) and amplitude ($p=0.0001$, one-way ANOVAs, 8 – 12 cells per group, 2 – 4 cells per animal) of spontaneous inhibitory currents onto pyramidal neurons.

Conclusion: IN MCH reduces PTSD-like phenotypes in male mice and alters the electrophysiological properties of the mPFC microcircuit.

Presenter Name/Degree(s): Piya Verma
Current Position: Research Assistant

Primary Mentor in Psychiatry: Beatriz Luna, PhD

Title: **Adolescent specific effects of cumulative lifetime stress on affective impulsivity**

Author(s): ***Verma P[1], Petrie DJ[1], Foran W[1], Ojha A[2,3], Dionisos VO[4], Martinez A[1], Famalette A[1], Calabro FJ[1,5] and Luna, B[1,2,3]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Center for Neuroscience, University of Pittsburgh; [3]Center for Neural Basis of Cognition, University of Pittsburgh; [4]Department of Psychology; [5]Department of Bioengineering, University of Pittsburgh

Introduction: Adolescence is characterized by heightened reward sensitivity, which contributes to developmentally necessary exploration of novel environments, but may also result in increased impulsive behavior. This may cause adolescents to perceive certain actions to have rewarding outcomes without regarding negative consequences, which has been associated with an increased risk for psychiatric disorders. Stressful exposures including childhood trauma have been consistently linked to increased affect-related impulsivity (e.g., negative and positive urgency). Fewer studies have explored the developmental lens detailing this association when transitioning from adolescence into adulthood. To assess how and when domain-specific stressors are related to elevations in impulsivity, we collected measures of lifetime stress and impulsivity using the Stress and Adversity Inventory (STRAIN) and the Impulsive Behavior Scale (UPPS-P).

Methods: In a healthy sample of 163 participants (ages 10 to 33; 53% female), linear regression models were used to investigate associations among total scores and domain-specific subscales of each measure of impulsivity, including testing for age interactions.

Results: Cumulative lifetime stress was positively associated with impulsivity (β=0.004, p=0.002), with significant age interactions indicating that the association was stronger in adolescents than in adults (β=-0.006, p=0.019); post-hoc analyses suggest that relationship was not significant after age 21. Further post-hoc analyses reveal that stress-related increases in adolescent impulsivity were specific to negative and positive urgency but were not associated with sensation seeking. Finally, these associations were driven most strongly by stress perception of physical danger.

Conclusion: The adolescent-specific effects of lifetime stress on impulsivity gives further insight to the timing of susceptibility in developing psychiatric disorders related to emotion regulation. This association is supported by previous work demonstrating when executive functioning reaches adult-like maturity, suggesting that maturation of emotional regulation systems may serve to buffer against the effects of cumulative stress perception on impulsivity in adolescents.

Presenter Name/Degree(s): Kate Verone
Current Position: Undergraduate Researcher

Primary Mentor in Psychiatry: Konasale M. Prasad, MD

Title: **Predicting biological age from brain MRI with deep learning**

Author(s): ***Verone K[1], Ouyang B[2], Theis N[2], and Prasad KM[1,2,3]***
Affiliation(s): [1]University of Pittsburgh Swanson School of Engineering; [2]Department of Psychiatry, University of Pittsburgh School of Medicine; [3]VA Pittsburgh Healthcare System

Introduction: Chronological age merely quantifies the number of years a person has lived, whereas biological age offers a more nuanced understanding of an individual's aging process, based on various biomarkers. The discrepancy between chronological and biological age can serve as a valuable indicator for assessing disease risk. Although numerous methods exist to estimate biological age, this study employs a 3D Convolutional Neural Network (CNN) to evaluate biological age through T1-weighted MRI images.

Methods: T1-weighted MRI images were inputted to a 3D CNN with three layers. The model incorporated a hierarchical neural network structure, which was selected after testing both hierarchical and pyramid architectures. The kernel size and stride were carefully optimized to achieve the best performance, while also considering the computational time. To evaluate the model's performance, the Mean Absolute Error (MAE) values were used as a metric for assessing the goodness of fit.

Results: In this study, the MAE results consistently ranged between 4.5 and 4.7 during training. Testing and development are ongoing, with the objective of reducing the MAE to below 3 years. Shrinking the input size (for instance 256-cubed versus 128-cubed voxels) did not impact the performance of the brain age estimate. The model demonstrated invariance to architectural changes, with the performance remaining consistent whether a hierarchical or pyramid structure was used.

Conclusion: This study demonstrates the model's ability to predict biological age from brain T1-weighted MRI images with a margin of error of less than five years. It also confirms that designing computationally efficient models does not compromise performance. Ongoing work is focusing on enhancing model accuracy by further reducing the MAE, incorporating multimodal data, including genetic and biochemical markers, expanding to larger cohorts, and exploring specific clinical applications.

Presenter Name/Degree(s): Linghai Wang
Current Position: Graduate Student Researcher

Primary Mentor in Psychiatry: Howard Aizenstein, MD, PhD

Title: **A computational approach to examining performance perception**

Author(s): ***Wang L[1], Mizuno A[3],Das V[2], Edvardsson H[3], Lamb S[1], Hoenstine A[3], Aizenstein H[3], Eckstrand K[3], and Pedersen S[3]***
Affiliation(s): [1]Department of Bioengineering, University of Pittsburgh; [2]Department of Computer Science, University of Pittsburgh; [3]Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: People often try to make sense of their own successes and failures. Although internal factors such as effort and skill contribute to outcomes, external advantages, such as access to resources or favorable structural conditions, also play a significant role in shaping success. Individuals may not fully recognize these influences, especially when advantages are subtle or structural. This limited awareness can hinder empathy and understanding in unequal social contexts. We developed a novel computer task designed to implicitly access awareness of performance under varying advantage conditions and to examine its relationship with individuals' social experiences.

Methods: We analyzed data from 58 young adults (mean age=25.0 ± 3.1 years; 41.4% identified as White, 27.6% as Black or African American, 31.0% as other responses; 36.2% LGBTQIA+, 62.1% self-identified as women, 29.3% men, 8.6% nonbinary/gender queer) who completed our new task and questionnaires on lived experience. The task is a Pacman-like game where participants control a virtual avatar to collect coins against three computerized AI. We implemented two levels of advantage (advantaged and disadvantaged) in two modalities (speed and coin distribution) in separate game rounds which were randomized across participants. We calculated participants' accuracy in recognizing wins or losses and used a random forest model to identify predictors of accuracy.

Results: The random forest model achieved an average F1 score of 0.80 (.73 precision and 0.86 recall) across cross-validation folds. Participants' lived experiences (e.g., perceived social support measured) were the strongest predictors of accuracy, outperforming demographic variables. Only income approached the importance level of the lived experiences variables; all other demographic characteristics ranked lower.

Conclusion: Lived experience played a central role in shaping individuals' perception of performance across advantage conditions. While the current sample limits conclusions about specific contributing factors, findings highlight the relative influence of subjective experiences over demographic characteristics.

Presenter Name/Degree(s): Melanie Wang, BS
Current Position: Research Assistant

Primary Mentor in Psychiatry: Adriane Soehner, PhD

Title: **Emotional brain responses during light exposure in adults with depression**

Author(s): ***Wang M[1], Chase H[1], Keller L[1], Sollie C[1], Shellhause K[1], Caswell A[1], Chan S[1], Roecklein K[2], and Soehner A[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]University of Pittsburgh, Department of Psychology

Introduction: Depression is associated with impairments in threat and reward-related neural circuits. Previous studies indicate that bright light therapy can reduce impairment in these circuits, but the underlying mechanism is unclear. Data from rodent models suggest that light modulates emotional brain function through melanopsin-expressing retinal ganglion cells. Melanopsin is maximally sensitive to blue light, and least sensitive to red light. Among depressed young adults, we examined whether melanopsin-engaging blue light acutely stabilizes threat and reward circuitry more than red light and explored whether melanopsin-driven light responsivity modulates these brain responses. Understanding the role of melanopsin may inform non-invasive and accessible treatments for depression.

Methods: A total of 22 adults ages 19 to 30yr (25±3 yr; 15 Female) with elevated depressive symptoms (Patient Health Questionnaire-9 > 5) completed 1 week of a stable sleep schedule followed by an MRI assessment. Participants completed an auditory reward fMRI task during blue and red light (control) conditions, in counterbalanced order. Melanopsin responsivity was assessed via the post-illumination pupil response paradigm. An analysis of variance model evaluated differences in brain responses to wins vs losses in threat (amygdala, insula, ventromedial prefrontal cortex) and reward (ventral striatum, medial prefrontal cortex) network regions of interest, adjusting for age, sex, and depression severity.

Results: For the blue versus red light conditions, there was no significant difference in activation among reward or threat-related regions of interest (all p-values > 0.05). Degree of melanopsin responsivity was also not significantly correlated with differences in regional brain responses to red vs blue light (all p-values > 0.05).

Conclusion: While our findings did not show significant effects of blue light on reward or threat-related brain activity, nor associations with melanopsin responsivity, these results may be attributable to the limited sample size. As the study progresses, a larger cohort may help clarify whether melanopsin influences emotional brain circuitry.

Presenter Name/Degree(s): Shantele Weaver, BS, MSCP
Current Position: Research Project Coordinator

Primary Mentor in Psychiatry: David Brent, MD

Title: **Optimizing suicide prevention strategies for pediatric primary care through end-user feedback**

Author(s): *Weaver S[1], George-Milford B[1], Radovic A[1], Biernesser C[1], Huttle A[2], Brent D[1], and Stepp S[1]*
Affiliation(s): *[1]Department of Psychiatry, University of Pittsburgh School of Medicine*

Introduction: : Pediatric primary care (PPC) settings are critical for identifying and treating suicidal youth. We aim to optimize iCHART, a technology-based intervention to address suicidal risk for feasibility, acceptability, and scalability for youth at risk for suicide across less-resourced PPC settings through qualitative and usability feedback.

Methods: A total of N=74 individuals (23 teens ages 12-17, 30 parents, 21 providers) from 9 practices in urban, suburban, and rural geographic areas of the United States and members of the Pediatric Research in Office Settings (PROS) Network of the American Academy of Pediatrics (AAP) were interviewed about current practices and comfort in using iCHART in the PPC setting. Rapid qualitative analysis techniques were used to inform intervention modifications.

Results: Parents expressed comfort discussing their teen's mental health (MH) concerns with PPC providers and believed they would be satisfied with iCHART referral for their teen. Teen feedback highlighted parent-child relationship quality on teen's comfort discussing MH concerns with PPC providers and parent(s). Some parents and teens expressed data privacy concerns. PPC providers found the iCHART intervention to be acceptable and feasible for their practice.

Conclusion: Feedback from provider interviews contributed to changes to the iCHART dashboard, including a more streamlined process for onboarding patients to the intervention, allowing patients to respond to questions for developing the safety plan and interact with coping skills videos and links at their own pace with minimal interruption to patient visit flow. Several resources were developed for parents with teens who have been offered the study app, including a webpage, in which the primary focus is a "Frequently Asked Questions" (FAQ) tool designed to address concerns and questions that emerged from parent responses when viewing the iCHART components.

Presenter Name/Degree(s): Ceci Westbrook, MD, PhD
Current Position: Postdoctoral Scholar

Primary Mentor in Psychiatry: Cecile D. Ladouceur, PhD

Title: **Identifying brain signatures of worry among adolescents and adults: A multivariate pattern analysis approach**

Author(s): ***Westbrook C[1], Kolobaric A[1,2,3,4], Karim HT[1,5], Andreescu C[1], and Ladouceur CD[1,7]***

Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Obstetrics, Gynecology and Reproductive Sciences, University of Pittsburgh; [3]Department of Computational and Systems Biology, University of Pittsburgh; [4]Magee-Womens Research Institute; [5]Department of Bioengineering, University of Pittsburgh; [6]National Institute of Mental Health; [7]Department of Psychology, University of Pittsburgh

Introduction: Worry has been linked to alterations in brain activity, however, the degree to which these alterations vary as a function of age and symptomatology is unknown. Here, we use multivariate pattern analysis (MVPA) to investigate individual variance in brain activity during worry in a cross-sectional sample of adolescents and adults varying in worry symptoms.

Methods: 72 participants ages 12-31 completed an fMRI task in which they worried about self-identified worry or neutral topics for approximately 30s, followed on half of blocks by a 30s reappraisal block. Brain activity was averaged across k=268 brain regions from the Shen atlas. They also completed self-reports assessing worry (PSWQ), anxiety (SCARED), and depression (MFQ). A random-forest model was trained on estimated parameters from worry vs. neutral blocks using leave-one-subject-out cross-validation with a nested 3-fold random search procedure for hyperparameter tuning. Age and self-report scores were correlated with model accuracy for each subject fold and feature importance for each parcel.

Results: The overall cross-validated model had accuracy = 66.5%, balanced accuracy = 62.4%, sensitivity = 80%, and specificity = 44%. Accuracy was greater for higher within-scanner worry ratings (B = 0.30, $\boldsymbol{p} < .001$). Accuracy significantly correlated with age ($\boldsymbol{r} = 0.28$, $\boldsymbol{p} < .02$) but did not relate to symptomatology. Feature importance decreased as a function of increasing age for all networks except the visual network, with significant negative correlations in ventral striatum, dorsal anterior and posterior cingulate cortex, lateral temporal cortex, brain stem and cerebellum.

Conclusion: Our model was less successful at classifying worry in adolescents than adults, and brain networks supporting worry involved a wider network of brain regions than in adults. This suggests that brain mechanisms of worry are more variable in adolescents. Interventions targeting neurodevelopmental mechanisms of worry may thus require more individual tailoring in adolescents than in adults.

Presenter Name/Degree(s): Michelle Wilson, BS
Current Position: Research Project Coordinator

Primary Mentor in Psychiatry: Heather Joseph, DO

Title: **The MomMA program: A novel behavioral intervention for ADHD in pregnancy**

Author(s): ***Wilson MA[1], Chronis-Tuscano A[2], Kipp HL[1], Lorenzo, N[3], and Joseph HM[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychology, University of Maryland; [3]Department of Psychology, American University

Introduction: Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder in childhood, and for most, it continues to cause impairments into adulthood. ADHD is characterized by inattention, hyperactivity, and impulsivity, as well as difficulties with emotion regulation and executive function. In the perinatal period, ADHD has been associated with reduced perinatal vitamin use, increased parenting distress, higher risk for anxiety and depression, and altered mother-to-baby attachment.

Methods: To address these challenges in perinatal individuals with ADHD, the Moms Managing ADHD (MomMA) intervention was developed. This intervention was adapted from an existing behavioral intervention for parents of children with ADHD. After collecting feedback via focus groups with new and expectant parents with ADHD and perinatal behavioral health therapists, intervention content was adapted to address the identified challenges that new and expectant mothers with ADHD face, while considering the unique challenges of the perinatal period, such as limited time/energy, unpredictable schedules, and increased responsibilities.

Results: A brief, 6-session telehealth intervention was developed that incorporates elements of cognitive-behavioral therapy and organizational skills training with the goal of improving parent and child wellbeing in the perinatal period. To increase fidelity, materials including presentation slides with therapist notes, a therapist manual, and in-session planning and home practice worksheets were provided to therapists delivering the intervention. The study is currently enrolling pregnant individuals with ADHD to participate in an iterative case series to further refine the intervention.

Conclusion: To our knowledge, this is the first intervention for ADHD specifically designed for the perinatal period. Future work will aim to assess intervention effectiveness and implementation factors, as well as to adapt the intervention for peer-led and/or group options.

Presenter Name/Degree(s): Emma Win, MSW
Current Position: Research Associate Sr.

Primary Mentor in Psychiatry: Candice L. Biernesser, PhD

Title: **Detecting and managing fraudulent participation in a clinical trial**
Author(s): ***Win E, Biernesser C, Rose M, Sullivan J, and Goldstein T***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: With the increase in online recruitment used in research studies, documented issues related to fraudulent participation have emerged in the literature. Fraudulent participation is defined as individuals or software tools (e.g., bots) who intentionally produce inaccurate information toward the goal of meeting eligibility criteria for a study. Past work on fraudulent participation outline methods useful for cross sectional and survey research. However, there is a lack of information related to detecting and managing fraudulent participation in clinical trials studying adolescent mental health.

Methods: Within the context of a fully remote clinical trial that is recruiting through social media-based advertising, we have incorporated procedures to identify and respond to potential fraud at the time of screening, consent, and after enrollment. Strategies for detecting and managing fraud in this study were balanced with the need to maintain safety protocols for suicidal youth in the study.

Results: 219 people were identified as fraudulent at the time of screening, the majority of which were anticipated to be bots rather than human. One individual was identified as fraudulent at the time of consent. An additional six participants were identified as fraudulent following enrollment.

Conclusion: These methods can be used to develop a protocolized approach for detecting and managing potential fraudulent participation in clinical trials studying adolescent mental health. There are ethical considerations of removing versus maintaining fraudulent participants in the study with recent suicidality. Further research is indicated.

Presenter Name/Degree(s): Meghan Wong, MS
Current Position: Data Coordinator & Analyst

Primary Mentor in Psychiatry: Katalin Szanto, MD and Sarah T. Stahl, PhD

Title: **Bereavement overload and its association with psychological distress among physicians-in-training at UPMC**

Author(s): ***Wong MT[1], Khani AL[1], Patel K[1], Ferguson K[2], and Stahl ST[1]***
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Psychiatry and Behavioral Sciences, Stanford University

Introduction: Patient death is a common experience among medical trainees and may increase the likelihood of "bereavement overload." Bereavement overload occurs when an individual experiences multiple losses in quick succession without having adequate time to process and heal from each loss. Our study examined the association between bereavement overload and psychological distress among physicians-in-training at UPMC.

Methods: Our sample comprised of 113 physicians-in-training at UPMC who completed an online survey about grief and loss in 2021; 87% were residents and 13% were fellows. Psychological distress was measured as a composite score of the PHQ-2 and GAD-2, with higher scores indicating greater psychological distress. Bereavement overload was measured using a novel psychometric instrument developed by KF and STS (ICC score = 0.927). We employed a multivariable level model to examine the effects of bereavement overload and level of medical training (resident vs. fellow) on psychological distress while controlling for satisfaction with life and sleep quality.

Results: Bereavement overload was significantly associated with elevated levels of psychological distress. However, level of medical training moderated this association. Bereavement overload was more strongly associated with psychological distress among fellows. Bereavement overload was not associated with psychological distress among residents.

Conclusion: Bereavement overload is associated with greater symptom burden of depression and anxiety among fellows, but not residents. It is possible that fellows may have more exposure to patient death and therefore higher levels of bereavement overload. That said, it is vital to continue offering grief support training in medical education. Grief training curricula in medical school may mitigate symptoms of psychological distress exacerbated by bereavement overload experienced during the later stages of training for physicians.

Presenter Name/Degree(s): Destiny Wright, BS
Current Position: Graduate Student

Primary Mentor in Psychiatry: Beatriz Luna, PhD

Title: **Developmental trajectories of hippocampal glutamate & GABA**

Author(s): ***Wright DS[1], Ravindranath O[1], Calabro FJ[2,3], Foran W[3], and Luna B[3]***
Affiliation(s): [1]Department of Psychology, University of Pittsburgh; [2]Department of Biomedical Engineering, University of Pittsburgh; [3]Department of Psychiatry, University of Pittsburgh School of Medicine

Introduction: Adolescence is a transitional period marked by increased independence, exploration of novel environments, and the pursuit of long-term goals. To support this transition, the brain undergoes protracted maturation of regions relevant to higher-order cognition, such as the hippocampus (HPC) and prefrontal cortex (PFC). Notably, both of these regions undergo maturation mechanistically aligned to a critical period of plasticity. Recent evidence indicates PFC neuroplasticity as excitation-inhibition (E/I) balance increases into adulthood. While there is evidence for HPC structural and functional changes, neuroplastic mechanisms, including E/I balance, remains unclear. Here, we aim to characterize developmental trajectories of E/I balance in the HPC across subregions. We hypothesized that like PFC, (H1) HPC Glu will decrease with no changes in GABA and (H2) Glu/GABA balance will increase, stabilizing in adulthood.

Methods: 7T Magnetic Resonance Spectroscopic imaging (MRSI) was used to quantify HPC Glu/GABA balance in a longitudinal sample of 116 10-32-year-olds (20.24 ± 5.13) with up to three visits per participant (~18mo intervals; total visits = 153 after quality control). At each visit, we acquired an oblique MRSI slice (24x24 voxels; 1.0x0.9x0.9mm) using a J-refocused spectroscopic imaging sequence (TE/TR=35/1500ms) on a Siemens 7T scanner. Generalized additive models (GAMs) were used to model relationships between MRSI measures and age while controlling for sex and hemisphere.

Results: We found age-related decreases in HPC Glu across anterior, body, and posterior HPC ($p < 0.001$), with no changes in GABA. Additionally, we found age-related increases in HPC Glu/GABA balance ($p<0.001$) across subregions.

Conclusion: Our study indicates that E/I balance in the HPC increases into adulthood, primarily driven by age-related decreases in Glu, which may reflect adolescent pruning of excitatory synapses. Overall, the findings from this study will provide insight into hippocampal plasticity by elucidating how subcortical E/I balance emerges as adolescents transition into adulthood.

Presenter Name/Degree(s): Stephanie Yau
Current Position: Undergraduate Student Researcher

Primary Mentor in Psychiatry: Daniel Wonjae Chung, MD, PhD

Title: **Nanoscale probing of synaptic architecture in human prefrontal cortex with expansion microscopy**

Author(s): Yau S[1], Zhao Y[2], Lewis DA[1], and Chung DW[1]
Affiliation(s): [1]Translational Neuroscience Program, Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Biological Sciences, Carnegie Mellon University

Introduction: Schizophrenia (SZ) is associated with alterations in excitatory neurotransmission in the prefrontal cortex (PFC), where the efficiency of signaling depends, in part, on the nanoscale organization of synaptic proteins. Presynaptic vesicle release regulators (e.g., Rab3-interacting molecule [RIM]) and AMPA receptors (AMPARs) form nanoclusters (NCs) that align trans-synaptically, and the clustering and alignment of these proteins are thought to facilitate efficient neurotransmission. Expansion microscopy (ExM), which physically enlarges biological tissue, enables nanoscale-resolution imaging with standard confocal microscopy. Here, we tested the feasibility of ExM to visualize and quantify synaptic protein NCs in human PFC and to determine whether this method could reliably detect biologically meaningful differences relevant to SZ.

Methods: Human PFC sections from subjects with SZ and unaffected comparison (UC) subjects were processed using a protocol resulting in ~6.2-fold isotropic expansion. Expanded tissues were immunostained for RIM and Pan-GluA and imaged using spinning-disk confocal microscopy with a 40X objective and an additional 2.8X SORA magnification.

Results: The expansion factor and aspect ratio index showed no significant differences between five pairs of SZ and UC subjects with varying postmortem intervals, pH levels, and storage durations. Across over 1,500 synapses sampled from UC subjects, the number, length, and volume of RIM and AMPAR NCs were consistent with previously reported mouse data. Finally, a greater number of AMPAR NCs were observed in superficial compared to deep cortical layers in UC subjects, consistent with known laminar differences in excitatory synaptic strength.

Conclusion: These findings demonstrate that ExM yields stable, isotropically expanded human brain tissue regardless of diagnosis or postmortem conditions. This method also provided reliable quantification of NC number and size in human PFC sections and was sensitive enough to detect biologically meaningful differences. Thus, ExM may offer a novel strategy to identify synaptic nanoarchitecture alterations underlying PFC circuitry dysfunction in SZ.

Presenter Name/Degree(s): Joshua Yeoum, BS
Current Position: Volunteer Researcher

***Primary Mentor in Psychiatry*:** H. Matthew Lehrer, PhD

Title: **Comparing circadian preference and self-reported sleep quality in retired night shift workers and retired day workers**

Author(s): Yeoum J[1], Conaty K[1], McCarty E[2], Rennick-Zuefle K[3], Buysse DJ[1], and Lehrer HM[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Neuroscience, University of Pittsburgh; [3]Department of Biological Sciences, University of Pittsburgh

Introduction: Compared to day workers, night shift workers are more likely to report poor sleep. Night shift work may be associated with a greater preference for eveningness, which has been associated with poorer sleep quality. However, the extent to which circadian preference and poor sleep quality persist into retirement for former night shift workers is not well-known. The purpose of this study was to determine whether prior exposure to night shift work is associated with circadian preference and self-reported sleep quality in retirement.

Methods: Participants (N = 154, 55% females, 86% non-Hispanic White, mean age = 68.44 years [standard deviation = 5.44 years]) were 70 retired night shift workers (RNSW) and 84 retired day workers (RDW). Participants self-reported their circadian preference, sleep quality, and daytime sleepiness via the Circadian Type Questionnaire (CTQ), Smith Morningness/Eveningness Scale (Smith), Pittsburgh Sleep Quality Index (PSQI), and Epworth Sleepiness Scale (ESS). Linear regression models were used to compare CTQ subscales (rigidity, vigor, and morningness), Smith, ESS, and PSQI between RNSW and RDW. Models were adjusted for sex, age, race, years of education, depressive symptoms (CES-D), and physical health (RAND-12).

Results: Compared to RDW, RNSW reported higher PSQI scores ($\beta_{standardized}$ = .238, $\boldsymbol{p}$ = .005), indicating poorer sleep quality. RNSW also demonstrated a marginally significant preference for evening chronotype based on the CTQ morningness subscale ($\beta_{standardized}$ = -.177, $\boldsymbol{p}$ = .061). No significant group differences were found for scores on CTQ rigidity and vigor, Smith, and ESS.

Conclusion: RNSW demonstrated significantly poorer sleep quality compared to RDW, as indicated by higher PSQI scores. Despite being retired, night shift workers showed a marginal trend towards eveningness, which is consistent with sleep patterns of current shift workers: working during the night and sleeping during the day. Future research should further investigate whether this relationship – RNSW tending toward an evening chronotype – is causal.

Presenter Name/Degree(s): Sophia Yi
Current Position: Undergraduate Student

Primary Mentor in Psychiatry: Francisco López Caballero, PhD

Title: **Auditory processing deficits of dual-rule complex MMN in first episode psychosis**

Author(s): *Yi S, Seebold D, Rhorer H, Fowler L, Kavanagh J, Salisbury DF, Coffman BA, and López Caballero F*
Affiliation(s): *Clinical Neurophysiology Research Laboratory, Department of Psychiatry, University of Pittsburgh School of Medicine*

Introduction: Mismatch Negativity (MMN) is a pre-attentive brainwave measure elicited by a deviance in predicted stimuli, utilized as an indicator for cortical dysfunction in schizophrenia (SZ). In the auditory domain, we can distinguish between simple MMN (sMMN), elicited by tones breaking the regularity in one parameter (e.g. pitch), and complex MMN (cMMN), where more than one rule is simultaneously broken. This additivity of deviance in cMMN involves more complex circuitry, but it is unclear if this cMMN is reduced in first episode psychosis.

Methods: We recorded cMMN utilizing EEG and MEG employing a dual-rule task in 24 first episode psychosis patients (FEP) and 50 healthy controls (HC). Two binaural 50ms-length tones were used. Tone A were left-ear biased (80 dB left ear, 65 dB right ear) 1kHz tones and Tone B were right-ear biased (65 dB left ear, 80 dB right ear) 1.2 kHz tones. Tones were alternatively presented in an A-B succession with a Stimulus Onset Asynchrony (SOA) of 330ms. Deviant tones were a repetition of the A tone in place of an expected B tone, with 85.6% A,B standard pairs and 14.3% A,A deviant pairs.

Results: The results at the EEG sensor level (FCz) revealed that the dual-rule cMMN is sensitive to FEP deficits. We found a significant decrease in the MMN amplitude (130-230ms) of FEP relative to HC groups ($t_{(72)}$=1.99, p=0.04). However, source-level MEG recordings in auditory cortex (A1) did not show such sensitivity (left: $t_{(72)}$=1.99, p=0.52; right: $t_{(72)}$=1.99, p=0.48).

Conclusion: Our EEG results suggest that the auditory processing of more complex rules is impaired in FEP. Conversely, our A1 MEG results indicate such impairment may not be of A1 origin. Frontal contributions may explain our EEG results. Our future planned EEG-source solutions will elucidate whether frontal lobes are responsible for the scalp-recorded deficits in FEP.

Presenter Name/Degree(s): Andrew R. Yoblinski, BS
Current Position: Graduate Student (CNUP)

Primary Mentor in Psychiatry: Marianne L. Seney, PhD

Title: **Behavioral effects of a novel antidepressant in a mouse model of depression**
Author(s): ***Yoblinski AR, Horan NL, and Seney ML***
Affiliation(s): ***Department of Psychiatry, University of Pittsburgh School of Medicine***

Introduction: Major Depressive Disorder (MDD) is an increasing global health burden, yet as many has two-thirds of patients do not fully respond to current antidepressant drugs, most of which target neurotransmitter systems like serotonin and norepinephrine. Despite this and decades of research, few novel therapeutics have been developed. To address this critical need, we have tested a novel antidepressant small molecule, SP624, in a mouse model of depression. SP624 is a sirtuin 6 activator for which the primary mechanism of action is altering transcription through histone deacetylation chromatin remodeling.

Methods: Here, we have tested the behavioral effects of SP624 using the Unpredictable Chronic Mild Stress (UCMS) model to induce affective behavioral changes in mice. Male and female mice (n=7/sex/group) were subjected to UCMS and received concurrent daily injections of SP624, then assessed for alterations on 10 discrete behavioral/physiological assessments.

Results: We find that UCMS robustly induces affective and physiological alterations in male and female mice (ANOVA main effect stress: ***p<.001). Administration of SP624 has opposite effects on male and female animals UCMS-induced weight changes and nesting quality (ANOVA sex x drug interaction: *p<.05). We also observe a trending effect of SP624 that may ameliorate open field anxiety in female but not male mice (ANOVA sex x drug interaction: #p<.1).

Conclusion: Overall, our preliminary results suggest that SP624 may be beneficial in the context of stress, with important sex differences in its effects on behavior/physiology. Our future work will include fully powering (0.9) our behavior studies to detect meaningful differences by increasing to n=16/sex/group. Additional analyses will include assessment of peripheral cytokine level in plasma using ELISA, and profiling transcriptional changes in stress-responsive brain regions including prefrontal cortex, hippocampus, basolateral amygdala, and nucleus accumbens using RNA sequencing.

Presenter Name/Degree(s): Xuemei Zeng, PhD
Current Position: Research Scientist

Primary Mentor in Psychiatry: Thomas K. Karikari, PhD

Title: **Unveiling tau pathogenesis in Alzheimer's disease: A label-free mass spectrometry study of autopsy-confirmed brain tissues**

Author(s): Zeng X[1], Chen Y[2], Sehrawat A[1], Abrahamson EE[3,4], Kofler J[5], Paljug WR[3,4], Ikonomovic MD[1,3,4], and Karikari TK[1]
Affiliation(s): [1]Department of Psychiatry, University of Pittsburgh School of Medicine; [2]Department of Chemistry, University of Pittsburgh; [3]Department of Neurology, School of Medicine, University of Pittsburgh; [4]Geriatric Research Education and Clinical Center, VA Pittsburgh HS;[5]Department of Pathology, School of Medicine, University of Pittsburgh

Introduction: Neurofibrillary tangles (NFTs) and amyloid-β (Aβ) plaques are key pathological features of Alzheimer's disease (AD). Clinical progression of AD correlates more closely with the extent of NFTs than amyloid plaque burden. However, the molecular mechanisms leading to NFT formation remain unclear. Mass spectrometry (MS)-based proteomic analysis of brain regions at different stages of NFT burden holds the potential to unveil the molecular mechanisms underlying tau pathogenesis, uncover novel diagnostic/prognostic biomarkers, and identify therapeutic targets.

Methods: Post-mortem frozen inferior temporal and middle frontal cortex were collected from 27 cases with varying Braak NFT stages. Brain extracts were prepared by sequential extraction with lysis buffers of different solubility strengths (TBS, Na2CO3, and Urea), then trypsin-digested and analyzed using label-free nano-flow liquid chromatography-tandem MS with data-independent acquisition (DIA). Peaks Studio 12 was used for peptide/protein identification and quantification through direct database search against the Human Swiss-Prot database. Linear mixed models were employed to identify proteins with NFT Braak stage-dependent differential abundance and solubility changes.

Results: A total of 109,772 peptides from 5,746 protein groups were identified from the combined analysis of 54 brain tissue samples across 27 cases. Differential proteomic analysis revealed 81 proteins with significant NFT Braak stage-dependent abundances. Among the top significant proteins were MDK, MAPT (tau), SMOC1, BBOX1, HSPB1, COL6A3, PSPH, and SQSTM1. Additionally, 220 proteins exhibited Braak-stage dependent solubility changes, with tau, spliceosome proteins, endosomal trafficking proteins, and the calcium signaling protein among the top significant. Interestingly, several Armadillo family proteins showed significantly increased solubility from low Braak to mid Braak stages, but then decreased solubility from mid Braak to high Braak stages, suggesting these proteins may play a dynamic role during the progression of AD. Examination of the abundance of tau peptides in IT and MF cortex from cases across Braak stages and solubility fractions indicated potential hot spots of tau breakage reside in its microtubule binding region between amino acids 243-369. In addition, we found that many mitochondrial inner membrane proteins displayed a negative correlation with tau. In contrast, mitochondrial matrix proteins showed a positive correlation with tau, suggesting that tau pathology might differentially affect various mitochondrial compartments.

Conclusion: Our unbiased proteomic analysis of brain tissues from autopsy-confirmed cases revealed potential molecular mechanisms leading to tau pathogenesis.