Department Chairs

Left to right: Kung, Clark, Frye
Mark A. Frye, M.D. (Chair, Rochester, Minnesota)
Matthew M. Clark, Ph.D. (Chair of Research)
Simon Kung, M.D. (Vice Chair of Research)

Teresa A. Rummans, M.D., Chair (Jacksonville, Florida)

Cynthia M. Stonnington, M.D., Chair (Scottsdale, Arizona)

Kristin Vickers Douglas, Ph.D. (Co-Chair of Education)
Brian A. Palmer, M.D. (Co-Chair of Education)

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Welcome to the 2016 – 2017 Research Report of the Mayo Clinic Department of Psychiatry & Psychology

Thank you for your interest in our Department of Psychiatry and Psychology and learning more about our recent research accomplishments. Our Department plays an essential role in Mayo Clinic’s goal of inspiring hope and contributing to health and well-being by providing the best care to every patient through integrated clinical practice, education, and research. At Mayo Clinic’s three main campuses -- Rochester, Minnesota; Jacksonville, Florida; and Scottsdale, Arizona -- there are over 150 psychiatrists and psychologists, joined by over 200 allied health staff to meet the needs of the patient. Our flagship clinical programs include our Psychiatric Hospital, Mayo Clinic Depression Center, Pain Rehabilitation Program, Addiction Treatment Center, Child and Adolescent Programs, Neurocognitive Assessment and Treatment Programs, Behavioral Medicine Program, and Integrated Care Programs. We have recently started two innovative clinical services: a Transitions Program, for patients being discharged from our inpatient units into the community that require short term intensive outpatient treatment; and the John E. Herman House, a residential facility for patients with complex psychiatric illnesses that has a strong emphasis on individually tailored treatments, competitive employment, and community integration.

Our Department provides numerous educational programs including Graduate Medical Education Fellowships in Adult and in Child and Adolescent Psychiatry, Medical Psychology (Clinical Child Psychology, Clinical Health Psychology, and Clinical Neuropsychology), Geriatric Psychiatry, Psychosomatic Medicine, Sleep Medicine, and Addiction Psychiatry. Due to the expertise and range of these clinical and educational programs, our Department of Psychiatry and Psychology was again ranked as one of the Top Ten Psychiatry Departments in the country by U.S. News and World Report in 2016-17. Many of our research projects focus on clinical interventions and our clinical programs guide and shape our research efforts, which in combination seek to provide the best care to every patient every day.

Precision Medicine is an emerging approach for disease treatment and prevention that takes into account individual variability in genes, environment and lifestyle for each person. Mayo Clinic has been awarded $142 million in funding over the next five years by the National Institutes of Health to serve as the National Precision Medicine Initiative Cohort Program Biobank. The biobank will hold a research repository of biologic samples, known as biospecimens. This program aims to advance precision medicine by enrolling 1 million or more U.S. participants to better understand individual differences that contribute to health and disease. This is an extraordinary opportunity for Mayo Clinic to participate in an important research initiative. Our Department, under Dr. Mark Frye’s leadership, has a large active biobank of individuals with bipolar disorder and refractory depression. Learning more about applying individualized medicine to patients with mood disorders is an exciting area of investigation in our Department, and there will be other applications of precision medicine to other psychiatric illnesses in the future.

The Department of Psychiatry and Psychology continues to highlight research teams in our annual 2016-17 Departmental Research Report. We want to highlight the value, importance, and productivity of research teams within our Department. These research teams can also be found across the Mayo Clinic sites which include Minnesota, Florida, and Arizona, and also involve the many hospitals that comprise the Mayo Clinic Health System. For example, the Neuropsychology, Aging, and Cognition Research Team has scientific investigators across all three campuses. Research teams within our Department include an array of health care professionals and focus on the evaluation and treatment of a range of mental health problems and their impact on patients and their families. The Mayo Clinic Depression Center Research Team, which includes psychiatrists, psychologists, nurses, and social workers, conducting clinically relevant research in treatment-resistant depression and bipolar disorder, is an example of a highly productive multidisciplinary

If you are interested in contacting any of the investigators highlighted in this report, please contact our Department at 507-266-5100.
clinical research team. Additionally, many investigators in our Department are engaged in research projects with other Departments or Centers of Excellence across our academic medical center. Our Department has investigators in The Mayo Clinic Comprehensive Cancer Center, The Bariatric Surgery Center of Excellence, and The Alzheimer’s Disease Research Center. Finally, we encourage the participation of research with other academic centers, collaborations, and multisite studies. The University of Minnesota, the Karolinska Institute in Sweden, and the National Network of Depression Centers are outstanding examples of collaborative multicenter research projects.

Meeting the needs of underserved populations and addressing health disparities is a priority of our Department’s clinical, educational, and research programs. To address the problem, our Department has numerous academic and research projects focused on meeting the needs of underserved populations, developing creative mental health treatment delivery systems, and tailoring interventions for specific underserved populations. Many people with mental health issues struggle to get needed medical, psychiatric and psychological care. Specific examples include:

Expanding access to cognitive behavioral therapy (CBT) for childhood anxiety disorders via smartphones. Funded by the National Institute of Mental Health. Principal Investigator: Dr. Stephen Whiteside.

Networks Among Tribal Organizations for Clean Air Policies. Funded by the National Cancer Institute. Principal Investigator: Dr. Christi Patten.

Healthy immigrant families: Working together to move more and eat well. Funded by the National Heart, Lung and Blood Institute. Co-investigators: Drs. Bridget Biggs, Matthew Clark, Eleshia Morrison, and Christi Patten.

Community intervention to reduce tobacco use among pregnant Alaska Native women. Funded by the National Cancer Institute. Principal Investigator: Dr. Christi Patten.

National Network of Depression Centers: Dr. Mark Frye.

Primary Care Initiatives: Coordinated Anxiety Learning and Management (CALM), Diabetes, Cardiovascular Disease, Depression, Comprehensive Pediatric and Adolescent Support Services Care Team (ComPASS), Early Management and Evidence-Based Recognition of Adolescents Living With Depression (EMERALD), and Depression Improvement Across Minnesota, Offering A New Direction (DIAMOND), Co-investigators: Drs. David Katzelnick and Mark Williams.

Low-cost, virtual reality system to increase access to exposure therapy for anxiety and obsessive compulsive disorders in children and adolescents. Funded by the National Institutes of Mental Health. Principal Investigator: Dr. Stephen Whiteside.
Mayo Clinic Depression Center

Depression is a significant public health problem, in this country and across the globe. Effective treatment can be challenging to identify for the individual and relapse is common after depression treatment. Therefore effective, individualized, long-lasting treatments are needed for depression. The main focus of the Mayo Clinic Depression Center is to conduct clinically relevant research in treatment-resistant depression and bipolar disorder in adults, adolescents, and children. Our current research projects aim to build on our comprehensive and multidisciplinary depression treatment programs. Mayo Clinic Depression Center is a Center of Excellence for the National Network of Depression Centers, a network of 21 leading clinical and academic Centers of Excellence in the U.S. working to transform the field of depressive illness and related mood disorders.

ADULT INVESTIGATORS


PEDIATRIC INVESTIGATORS

Paul E. Croarkin, D.O., M.S., John E. Huxsahl, M.D., Jarrod M. Leffler, Ph.D., L.P., and Jennifer L. Vande Voort, M.D.

AWARDS AND LEADERSHIP ROLES

Mark A Frye, MD. Board of Councilors, International Society for Bipolar Disorders.

Mark A. Frye, MD. Member, Scientific Advisory Board, Depression and Bipolar Support Alliance.


Susannah J. Tye, Ph.D., Co-Chair. Treatment Resistant Depression Task Force, National Network of Depression Centers.

Susannah J. Tye, Ph.D., Scientific Reviewer, Patient-Centered Outcomes Research Institute (PCORI) Treatment Resistant Depression Study Section.
GRANTS

Agency for Healthcare Research and Quality
Understanding the Bidirectional Relationship between Depression and Heart Failure. 06/01/2014 – 06/30/2016. PI: Bobo.

AssureRx Health

Brain and Behavior Research Foundation
Glutamate Neurotransmission in Depressed Adolescents at Risk for Bipolar Disorder. 07/01/2014 - 06/30/2017. PI: Croarkin.

Janssen Research and Development, LLC
A Double-Blind Randomized Placebo-Controlled Study to Evaluate the Efficacy and Safety of Intranasal Esketamine for the Rapid Reduction of Symptoms of Major Depressive Disorder Including Suicidal Ideation in Subjects at Imminent Risk for Suicide. 11/03/2014-11/02/2016. PI: Frye.

Mayo Clinic Children’s Research Center Pediatric Team Science Award

Mayo Clinic CCaTS-CBD Pilot Awards for Team Science
Preclinical Optimization of Repetitive Transcranial Magnetic Stimulation for Adolescent Depression. 01/01/2016-12/31/2016. PI: Croarkin.

Mayo Clinic Center for Individualized Medicine
Functional Effects of TCF7L2 X BMI Interactions on Wnt and Insulin Signaling in Patients with Bipolar Disorder and Healthy Controls. 07/01/2015–09/15/2017. PI: Tye.

Mayo Clinic Foundation

Mayo Clinic Foundation
A Pharmacokinetic/pharmacodynamic Genetic Variation Treatment Algorithm versus Treatment As Usual for Adolescent Management Of Depression. 03/16/2014-03/15/2017. PI: Vande Voort.

Mayo Clinic Foundation
Mayo Clinic Individualized Medicine Biobank for Bipolar Disorder. 01/01/2013-12/31/2017. PIs: Frye and Biernacka.

Mayo Clinic Foundation
16-week Open Randomized Comparative Effectiveness Trial of Lamotrigine vs. Fluxetine for Bipolar Depression: Pharmacogenomic and Biomarker Predictors of Response. 02/01/2015–01/31/2017. PI: Frye.

Mayo Clinic Foundation
Mayo Clinic Proteomic Informed Genomic/Epigenomic Study to Distinguish Mood Disorders. 05/01/2016–04/30/2017. PI: Frye.

Mayo Clinic – Karolinska Institute
Focal Inflammation and Dopamine Neurotransmission: Mechanisms and Markers of Deep Brain Stimulation Antidepressant Action. 01/01/2016-12/31/2016. PI: Tye.

Minnesota Partnership for Biotechnology
Harnessing Imaging and Genomics for Clinical Neuroscience of Psychiatry. 09/12/2012-09/30/2016. PI: Tye.

National Institute of Mental Health
Glutamate Probes in Adolescent Depression
K23 Mentored Patient-Oriented Research Career Development Award. 02/01/2014–01/31/2018. PI: Croarkin, Mentor: Frye.

National Network of Depression Centers
The BIO-K Study: A Single-Arm, Open-Label Biomarker Development Clinical Trial of Ketamine for Non-Psychotic Unipolar Major Depression and Bipolar I or II Depression. 11/1/2016-12/31/2017. PI: Bobo.

Neuronetics
A Randomized, Sham-Controlled Trial Evaluating the Safety and Effectiveness of NeuroStar Transcranial Magnetic Stimulation (TMS) Therapy in Depressed Adolescents. 10/15/2015-10/14/2019. PI: Croarkin.

TEVA Pharmaceutical

Xencor Inc.
Antidepressant Efficacy of anti-TNF biologic, XPro1595, in a Preclinical Model of Treatment-Resistant Depression. 09/30/2016-09/15/2017. PI: Tye.

KEY PUBLICATIONS


KEY PUBLICATIONS continued


The Mayo Clinic Neuromodulation Group in Rochester, Minnesota, focuses on research in Deep Brain Stimulation (DBS), Electroconvulsive Therapy (ECT), and Transcranial Magnetic Stimulation (TMS). Dr. Rasmussen continues work that refines contemporary ECT practice such as a study investigating the use of daily right unilateral ultrabrief pulse ECT to potentially shorten the treatment duration of ECT for depression, without sacrificing effectiveness or cognitive impairments. Ms. Johnson and Dr. Kung are tracking real-world clinical outcomes of ECT for depression, with special attention to perceived memory impairments. Drs. Croarkin, Lewis, and Vande Voort are leading a multi-site randomized double-blinded study of rTMS versus sham for the treatment of adolescent depression, which will be the largest study of rTMS in the adolescent population. Dr. Sampson has conducted open-label TMS studies in patients with depression and comorbid conditions such as Post-Traumatic Stress Disorder (PTSD), Borderline Personality Disorder, and chronic pain/fibromyalgia. Future rTMS studies will examine novel dosing strategies such as theta burst stimulation in adolescents and adults. In 2017, Drs. Lewis and Doruk will launch a transcranial direct current study examining state dependent effects in adolescents. Drs. Bobo and Frye are leading groundbreaking work with DBS focused on treatment-resistant obsessive-compulsive disorder, in collaboration with Neurology and Neurosurgery. Planning is underway for DBS depression studies. Dr. Tye leads novel preclinical work in brain stimulation. These examples of our neuromodulation research highlight the underlying goal: to expand our knowledge and treatment options for depression and other psychiatric illnesses, beyond conventional medications and psychotherapies.
GRANTS
Brain and Behavior Research Foundation, NARSAD Young Investigator Award. Glutamatergic Neurotransmission in Youth at Risk for Bipolar Disorder. 07/2014-07/2017. PI: Croarkin, Mentor: Frye.


Paul and Betty Woolfs Foundation: A Double-Blinded, Sham-Controlled Study Utilizing rTMS in Adolescents with Major Depressive Disorder. 07/2012 – 11/2017. PI: Croarkin.

A Randomized, Sham-Controlled Trial Evaluating the Safety and Effectiveness of NeuroStar Transcranial Magnetic Stimulation (TMS) Therapy in Depressed Adolescents. Funded by NeuroNetics. 2016-2019. PI: Croarkin.


KEY PUBLICATIONS


Croarkin PE, Rotenberg A. Pediatric Neuromodulation Comes of Age. J Child Adolesc Psychopharmacol. in press.


**LEADERSHIP ROLES**

Paul Croarkin, D.O. Board of Directors Member, Co-Chair of Annual Meeting, and Member at Large for the Clinical Transcranial Magnetic Stimulation Society, 2016-present.

Shirlene M. Sampson, M.D., Executive Committee Member, International Society for ECT and Neurostimulation, 2010 – present.
Wellness Coaching and Resiliency

Mayo Clinic has several new innovative approaches to improving the wellness of its employees and patients. The Dan Abraham Health Living Center is an on-site facility for employees that provide programs for aerobic fitness, healthy nutrition, weight management, wellness coaching and resiliency and over 14,000 employees are members. Mayo Clinic has also developed an evidence-based patient wellness center, The Health Living Program. For both the Employee Wellness Center and the Patient Health Living Program, Dr. Vickers Douglas is the Medical Director for the Mayo Clinic Wellness Coaching Program and Dr. Clark is the Domain Leader for Resiliency. Dr. Vickers Douglas helped create, design, and implement the Mayo Clinic Wellness Coaching Certification Program and trains health care providers from across the country in coaching communication and self-management education approaches for medical settings. Several research projects have been conducted and published and examples include a health coaching intervention for patients with Chronic Obstructive Pulmonary Disease (COPD), examining the outcomes from participating in a 12-week wellness coaching program, participation in a group-based healthy sleep program, and how stress impacts health behaviors over time in a cohort of employees.

INVESTIGATORS
Matthew M. Clark, Ph.D., L.P. and Kristin S. Vickers Douglas, Ph.D., L.P.
KEY PUBLICATIONS


PRESENTATIONS


The goal of this multidisciplinary research team is to improve the care of children and adolescents with anxiety disorders and obsessive compulsive disorder (OCD). Over the past two years we have demonstrated that although exposure-based cognitive behavior therapy is the most effective and efficient treatment for these disorders; this intervention is rarely available in real world clinical settings. To increase access to high quality evidence based cognitive behavioral treatment, our team has developed and tested a five-day intensive anxiety disorders treatment program available to children throughout the country. Our work to develop technological solutions to aid in the advancement of treatment for childhood anxiety disorders continues under four government agency grants to expand our iPhone application, Mayo Clinic Anxiety Coach, to include a therapist web-based portal, a web-based self-help application, virtual reality enhanced exposures, and an immersive video game for children with social phobia. In 2015 - 2016, presentations and workshops were given at the annual meetings of the Anxiety and Depression Association of America, and the Association of Behavioral and Cognitive Therapy.

GRANTS

**Agency for Healthcare Research and Quality:** Anxiety in Children. Literature Review. 2016-2017; Co-I: Whiteside.

**National Institute of Mental Health:** Expanding access to CBT for childhood anxiety disorders via smart phones. 2013-2016; PI: Whiteside.

**National Institute of Mental Health:** Pediatric Anxiety Intervention with an Entertaining Video Game. 2014-2016; Site-PI: Whiteside.

**National Institute of Mental Health:** Low-Cost, Virtual Reality System to Increase Access to Exposure Therapy for Anxiety and Obsessive Compulsive Disorders. 2016-2017; Site-PI: Whiteside.

KEY PUBLICATIONS


Sattler AF, Ale CM, Nguyen K, Gregg MS, Geske JR, Whiteside, SPH. Use of evidence-based assessments for childhood anxiety disorders within a regional medical system. *Psychological Services, in press.*

Whiteside SPH, Sattler A, Ale CM, Young B, Hillson Jensen A, Gregg MS, & Geske JR. The Use of Exposure Therapy for Child Anxiety Disorders in a Medical Center. Professional Psychology: Research and Practice, in press.

Whiteside SPH, Ale CM, Young B, Olsen MW, Biggs BK, Gregg MS, Geske JR, Homan K. The Length of Child Anxiety Treatment in a Regional Health System. Child Psychiatry and Human Development, in press.


Samuel C. Johnson Genomics Of Addiction Program

INVESTIGATORS
Joanna M. Biernacka, Ph.D., William V. Bobo, M.D., Doo-Sup Choi, Ph.D., Paul E. Croarkin, D.O., Mark A. Frye, M.D., Daniel K. Hall-Flavin, M.D., Ryan Hurt, M.D., Victor M. Karpyak, M.D., Ph.D., Keith D. Robertson, Ph.D., Terry D. Schneekloth, M.D., Marin Veldic, M.D., and Richard Weinshilboum, M.D.

The Samuel C. Johnson Genomics of Addiction Program was designed to bring a multidisciplinary, integrated group of clinicians and scientists together to work synergistically to better understand how biomarkers are associated with the onset and treatment of alcohol use disorders. In addition, this multidisciplinary research team has concentrated on developing individualized molecular strategies for alcoholism treatment, with the primary focus on studying the pharmacogenomics of anti-craving medications.

The S.C. Johnson research team was awarded a P20 Developmental Center Grant from the National Institute on Alcohol Abuse and Alcoholism to establish the Center for Individualized Treatment of Alcohol Dependence (CITA). The primary goal of the funded research was to develop infrastructure for an expanding research team dedicated to designing and launching systematic pharmacogenomic and imaging studies of pharmacological treatments for alcoholism, initially focused on the medication acamprosate, an FDA-approved medication for treating alcoholism. The grant has funded the creation of an expanded multidisciplinary team of investigators who work together to design and conduct preclinical and clinical studies to identify which alcohol-dependent patients are most likely to benefit from acamprosate.

With the successful implementation of the National Institutes of Health-supported P20 Center, Mayo Clinic S.C. Johnson investigators have published more than 100 peer-reviewed articles in major journals during the last three years in the fields of addiction, neuroscience, genetics, and psychiatry. With future support from the NIH and foundations this multidisciplinary research team plans to expand its studies to better understand the best individualized treatments for alcoholism.
GRANTS

ASPET David Lehr Research Award: Adenosine-Mediated Glutamate Signaling in Neuro-Glial Interaction and Alcoholism. 05/01/15 – 04/30/17. PI: Choi.

Inherited Variations In Drug Metabolizing Enzymes. This grant supports basic studies of the biochemistry, molecular biology and molecular pharmacogenetics of methyl conjugation. 07/01/96-03/31/20. PI: Weinshilboum.


National Institute of Drug Abuse: Varenicline and lorcaserin for smoking cessation and weight gain prevention. 7/15/15 – 6/30/19. PI: Hurr, Mentor: Choi


SC Johnson Foundation Grant. Developing a DNA Repository for Genomic Studies of Addiction. The purpose of this study is to establish a DNA resource to study potential variation in polymorphisms associated with vulnerability to addictions and variations in treatment response. 12/28/04-12/27/2016. PI: Karpyak.

Training Grant in Clinical Pharmacology. The goal of this program is to prepare qualified postdoctoral trainees for careers in clinical pharmacology research. 07/01/98-06/30/18. PI: Weinshilboum.

KEY PUBLICATIONS


NOVEL METHODS FOR UNDERSTANDING
Researchers in this team have established a large biobank for bipolar disorder, thus far collecting biological samples and clinical data from 2,000 individuals. This is a multisite endeavor, with Mayo Clinic in Rochester, Minnesota, serving as the primary project site. Other sites that are assisting in the recruitment of participants include Austin Medical Center–Mayo Health System (Austin, Minnesota), the Lindner Center of HOPE (Mason, Ohio), the University of Minnesota, Universidad de los Andes (Chile), and UANL - Universidad Autónoma de Nuevo León (Mexico). The infrastructure of this data-rich biobank has facilitated epidemiological and biomarker studies of disease risk, disease progression, comorbid illness, and treatment outcomes using state-of-the-art research technology. Using the Biobank resource, the research team has completed a series of studies investigating genetic variation that contributes to disease risk, in particular, focusing on subtypes of the illness defined by presence of specific illness characteristics or comorbidities, as well as genetic variation that influences how a patient responds to pharmacological treatment of bipolar depression. Other projects have utilized serum, plasma, and slow frozen cells extracted from the blood specimens to investigate a variety of biomarkers including protein expression, epigenetic variation, and measures of mitochondrial function. The Mayo Clinic Biobank for Bipolar Disorder is also collaborating with large international research consortia, including the Psychiatric Genomics Consortium (PGC) and the International Consortium for Lithium Genetics (ConLiGen). The identification of genetic risk factors associated with disease onset can potentially lead to early interventional treatment in at-risk patients. This early intervention is particularly important in bipolar disorder because the initiation of any treatment for bipolar disorder is often delayed by more than a decade from the time of onset. Additionally, identification of pharmacogenomic predictors of treatment response could provide increased selectivity to treatment recommendations, as well as help prevent such serious adverse events as antidepressant-induced mania.
GRANTS


KEY PUBLICATIONS


PROFESSIONAL INTERNATIONAL PRESENTATIONS


World Psychiatric Association’s XVI World Congress of Psychiatry September 14–18, 2014, Madrid Spain. Symposium Chair: Cardiovascular Disease and Obesity in Bipolar Disorder: Translational Research Focused on Epidemiology and Genetics, “Mayo Clinic Bipolar Biobank: Focus on Metabolic Disorders”.

NOVEL METHODS FOR UNDERSTANDING
The primary objectives of this research program are to better understand genetic variability as it relates to antidepressant response and to evaluate the use of pharmacokinetic/pharmacodynamic variation testing on treatment response/remission rates for participants seeking treatment at the Mayo Clinic Depression Center.

This program was originally supported by a grant from the National Institute of General Medical Sciences (NIGMS) as part of the NIH Pharmacogenomics Research Network (PGRN: 2005-2015) and over 800 Mayo Clinic patients with major depressive disorder (MDD) treated with citalopram or escitalopram were studied. A second arm of the study involved the use of a serotonin-norepinephrine reuptake inhibitor, duloxetine, in patients who did not respond when treated with escitalopram or citalopram. In addition, this program also organized an International SSRI Pharmacogenomics Consortium (ISPC) that included samples from approximately 1000 SSRI-treated MDD patients. In 2010, the RIKEN Institute in Japan conducted a genome-wide association study (GWAS) of an initial PGRN patient cohort of 521 patients and during the past year, RIKEN also performed a GWAS for the ISPC samples.

The PGRN team also received funding from the University of Minnesota–Mayo Clinic partnership to study iPS cell-derived neurons from MDD patients treated with SSRIs. Our team partnered with Timothy J. Nelson, M.D., Ph.D., at Mayo Clinic, with colleagues at the University of Minnesota and with the Salk Institute for Biological Studies in California to study iPS cell-derived neurons from a subset of patients who had participated in the PGRN SSRI study. Finally, a pharmacometabolomic study of escitalopram and citalopram response in the PGRN MDD patients has been completed that has identified novel biomarkers that provide insight into both variation in antidepressant therapy response and the pathophysiology of MDD.
The Mayo Clinic Depression Center is currently recruiting adults and adolescents who are experiencing a depressive episode to participate in a study that will evaluate the impact of the use of pharmacokinetic and pharmacodynamic variation testing on treatment response or remission. These participants are asked to provide a saliva sample at the beginning of the study and are then followed for a course of eight weeks of antidepressant therapy to monitor their depressive symptoms and any medication side effects. The study participants are randomized to either treatment as usual or pharmacogenomic guided treatment. At the end of the eight weeks, all study participants will receive the pharmacogenomic test results.

**GRANTS**

Agency for Healthcare Research and Quality. Understanding the Bidirectional Relationship Between Depression and Heart Failure. 01/01/2014 – 06/30/2016. PI: Bobo.

AssureRx. A Pharmacokinetic/Pharmacodynamic Genetic Variation Treatment Algorithm versus Treatment as Usual for Management of Depression. 07/01/2014 – 06/30/2016. PIs: Frye.


**KEY PUBLICATIONS**


The newly established Lesbian, Gay, Bisexual, Transgender, and Intersex (LGBTI) Research and Education Program is a multidisciplinary group housed in the Department of Psychiatry and Psychology that focuses on achieving the aim of fostering interdisciplinary, inclusivity, and diversity science and education that advances the health and well-being of sexual and gender minorities. Our group achieves this aim through the delivery of culturally proficient research and educational activities that target biopsychosocial mechanisms that reduce health disparities and inequities among gender and sexual diverse populations.

One of our current investigations focuses on building the research infrastructure for future LGBTI clinical research by examining the feasibility and acceptability of the collection of sexual orientation and gender identity questions on intake forms at multiple outpatient clinics. This study is the first step to assemble the needed infrastructure that will facilitate the identification of health disparities among gender and sexual diverse individuals receiving care at Mayo Clinic.

In collaboration with other departments, our group is also engaged in understanding the intersection between LGBTI-health and medical education. Currently, our group is examining the prevalence of LGBTI-inclusive curriculum across medical residencies in the United States and the role of LGBTI-related stigma on the implementation of the curriculum.

In addition to our clinical and educational research activities, our group regularly delivers LGBTI education in our medical school and provides curriculum guidance to other departments. Our group also works collectively with the Transgender and Intersex Specialty Care Clinic to achieve Mayo Clinic’s broader goal of inspiring hope and contributing to health and well-being by providing the best care to every patient through integrated clinical practice, education, and research. Through our investigations and delivery of education, we hope to improve the health and wellbeing of gender and sexual diverse populations.
GRANTS
Strategic Development of Sexual Orientation and Gender Identity (SOGI) Data Collection in a Clinical Setting. Funded by General Internal Medicine Award, Office of Health Disparities Research Award. 06/2015 - 12/2015. PI: Gonzalez

LGBTI curricula and attitudes among family medicine residencies: A U.S. probability sample. Funded by an internal grant from the Department of Family Medicine. 2015-16. PI: Rullo

KEY PUBLICATIONS


NATIONAL LEADERSHIP ROLES
Gonzalez, C.: Editorial Board Member, International Journal of Transgenderism

AWARDS
Dr. Rullo:

Dr. Gonzalez:
Distinguished Service for Diversity and Inclusion in Education Award – Department of Psychiatry and Psychology, Mayo Clinic, Rochester, MN. 6/2016.

PRESENTATIONS
INTERNATIONAL


NATIONAL


The Brain Rehabilitation Research Group is composed of a multidisciplinary team with members from the Departments of Nursing, Physical Medicine, Rehabilitation, Neurology, Social Services, and Psychiatry and Psychology. Our Center has been continuously funded by the National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR) as a Traumatic Brain Injury Model System (TBIMS) Center, contributing participants to the TBIMS national database (the largest non-proprietary longitudinal dataset of outcomes for individuals who receive inpatient rehabilitation after TBI, now with greater than 13,000 participants) and involved in collaborative analyses of this longitudinal clinical outcome cohort. Current site-specific research includes a community-based randomized pragmatic clinical trial in four upper Midwest states, testing a remotely provided coordinated care model designed to improve outcome after TBI. Internal collaborators for this study include the Center for Innovation and Center for Social Media. External collaborators include the Departments of Health in Minnesota and Iowa, Altru and Regional Health systems in the Dakotas. Additional collaborative research includes using a TBI cohort from the Rochester Epidemiology Project (REP) of individuals aged 30 years and older who met record-review TBI criteria between 1985 and 2000 and age- and sex-matched individuals without a TBI during this timeframe will be expanded. We will determine diagnoses of Alzheimer’s Disease and Related Disorders (ADRD) among the expanded cohort and will also determine whether TBI increases the risk of ADRD within the population. In addition, our team is involved with a collaborative study with ReAbility Online to assess the feasibility of their technology to provide a home-based tele-rehabilitation program to improve the motor, cognitive, and functional status of people who have had a stroke or other acquired brain disorders. Current collaborative research projects between Mayo Clinic’s TBIMS Center and other funded TBIMS centers (a total of 16 nationally) include study of internet use among individuals with TBI and an investigation of their resilience. Mayo’s Brain Rehabilitation Research group networks with academic institutions and agencies that do similar research including regional Departments of Health, Human Services, and Vocational Rehabilitation; the Brain Injury Alliances of Iowa, Minnesota and Wisconsin and surrounding states, and regional VA medical centers.
GRANTS


Department of Defense (DoD) office of the Congressionally Directed Medical Research Programs (CDMRP), Peer Reviewed Alzheimer’s Research Program (PRARP) Convergence Science Research Award. 9/15/15 – 9/14/2018. PI: Brown.


KEY PUBLICATIONS


The Pain Rehabilitation Center Programs at Mayo Clinic Rochester, Arizona, and Florida continue to evaluate functional outcomes from each of our programs. The adult programs are investigating tapering opioid medication use and program outcomes (Drs. Loukianova and Cunningham) as well as patient weight and bariatric surgery status related to program success (Drs. Townsend and Sperry). Drs. Gilliam, Morrison, and Sperry are examining aspects of pain catastrophizing affecting patient success along with patient perceptions of the program. Dr. Sletten is investigating other medical conditions commonly associated with chronic pain as well as the health care economics of pain rehabilitation programs. We are also examining outcomes of brief one or two day programs as well as trials of programming tailored to young adult populations (Drs. Morrison, Harbeck-Weber, Loukianova, Gilliam, and Sperry).

On the pediatric side, we continue to be interested in the short and long-term impact of our programs. Dr. Ale and colleagues are examining the success of our initial 1000 patients in the pediatric program. Drs. Harbeck-Weber, Sim, and Ale are examining factors such as self-monitoring, anxiety and disordered eating that impact the success of pediatric patients. Dr. Harbeck-Weber is also examining outcomes in our two day program and our young adult program pilots.

GRANTS

PRC research team members have been effective in obtaining internal grants, including “Physical activity and sleep patterns in adolescents who attend an intensive pain rehabilitation program” from the Center for Clinical and Translational Science Small Grants Program, as well as in interdisciplinary collaboration for small departmental grants such as “Effect of a Controlled Substance Prescribing Plan on Opioid Prescribing in a Large Primary Care Practice.”
KEY PUBLICATIONS


Gilliam WP, Craner JR, Morrison EJ, Sperry JA. The mediating effects of the different dimensions of pain catastrophizing on outcomes in an interdisciplinary pain rehabilitation program. The Clinical Journal of Pain, in press.


AWARDS AND PRESENTATIONS:

Our PRC allied health staff are recognized leaders on an international level, including Elizabeth Pestka, MS, APRN, CNS who was elected President-Elect of the International Society of Nurses in Genetics in 2016. Research team members from all disciplines of our team including anesthesiology, psychology, psychiatry, physical therapy, occupational therapy, nursing, and recreational therapy have been presenting PRC data at regional, national and international conferences. Recent International Presentations include:


The Psychosomatic Research Group investigates problems at the interface between medical and psychiatric illnesses, as well as assessment and treatment of psychological and behavioral factors in medical illness. Many of the investigators on this team work in the multidisciplinary Behavioral Medicine Program. Research areas of investigation include functional disorders in multiple medical specialties (e.g., behavioral spells, chronic dizziness, functional movement disorders, functional gastrointestinal tract disorders), somatic symptom disorders and illness anxiety, identification and treatment of psychological and behavioral factors in patients with cancer, psychiatric morbidity in medically ill patients, and predictors of disability and health care utilization. Our research collaborations, funding, and publications have an international reach.

INVESTIGATORS

Daniel A. Danczyk, M.D., Shawna L. Ehlers, Ph.D., L.P., Shirlene Sampson, M.D., M.S., and Jeffrey P. Staab, M.D. (Mayo Clinic Rochester)

Kari A. Martin, M.D. and Cynthia M. Stonnington, M.D. (Mayo Clinic Arizona)

GRANTS


Cancer and Palliative Care

INVESTIGATORS

Matthew M. Clark, Ph.D., L.P., Simon Kung, M.D., Maria I. Lapid, M.D., and Jarrett W. Richardson, M.D., (Mayo Clinic Rochester)

Teresa A. Rummans, M.D., Steven C. Ames, Ph.D., and Shehzad K. Niazi, M.D. (Mayo Clinic Florida)

The primary goal of the cancer and palliative care research team is to improve the quality of life for cancer patients and their caregivers by first assessing and treating psychiatric, psychological, and psychosociospiritual difficulties and then teaching skills for coping with cancer. This multidisciplinary research team spans the Jacksonville, Florida, and Rochester, Minnesota, Mayo Clinic campuses. The team is involved in several externally funded research projects that seek to identify the predictors of quality of life for cancer survivors or that evaluate tailored multidisciplinary interventions designed to improve the quality of life of cancer patients and their caregivers. Team members are also collaborating with Karolinska Institute for novel approaches to palliative care.
GRANTS


Impact of Massage Therapy on the Quality of Life of Hospice Patients. Multi-funded by Mayo Clinic Development, Mayo Clinic Values Council, CCaTS Stimulus Award. 2015-2017. PI: Lapid


KEY PUBLICATIONS


Posters and Presentations


Lapid M. Cancer Caregiver Quality of Life: Need for Targeted Intervention. MASCC/ISOO Annual Meeting on Supportive Care in Cancer, Copenhagen, Denmark. June 2015.


Lapid M. Psychiatric Comorbidities are Associated with Increased Cost of Care in Cancer Patients MASCC/ISOO Annual Meeting on Supportive Care in Cancer, Adelaide, Australia. June 2016.

Neuropsychology, Aging, and Cognition

ADULT INVESTIGATORS


Melanie C. Chandler, Ph.D., Tanis J. Ferman, Ph.D., John A. Lucas, Ph.D., Otto Pedraza, Ph.D., and Beth K. Rush, Ph.D. (Mayo Clinic Florida)

Yonas E. Geda, M.D., Kristin A. Kirlin, Ph.D., Dona E. Locke, Ph.D., David Osborne, Ph.D., Cynthia M. Stonnington, M.D., and Jennifer V. Wethe, Ph.D. (Mayo Clinic Arizona)

PEDIATRIC INVESTIGATORS

Tanya M. Brown, Ph.D., L.P., Andrea R. S. Huebner, Ph.D., L.P., and Michael J. Zaccariello, Ph.D., L.P. (Mayo Clinic Rochester)
Adult and Pediatric neuropsychologists at Mayo Clinic have a robust history of studying neurodevelopmental trajectories within the context of medical or neurological conditions, normal cognition, aging, dementia, as well as acquired brain injury. Growth shines through all Mayo Clinic sites as research programs evolve and become more diversified. Research continues to have a firm grounding in early detection of cognitive impairment and the study of cognitive phenotypes of neurodegenerative dementias, but innovative research has emerged across all Mayo Clinic sites over recent years (e.g., see HABIT) due to a variety of converging demands (i.e., clinical, science, social).

Neuropsychological research embraces an inter-disciplinary approach and a spirit of teamwork across the Mayo Clinic sites, particularly the larger campuses of Arizona, Florida, and Rochester. The neuropsychologists collaborate with physician colleagues or scientists at Mayo Clinic or with external scientists, and many neuropsychologists combine cutting-edge technologies such as neuroimaging with psychometrics to enhance outcomes and advance knowledge of neurologic conditions.

Mayo Clinic Arizona neuropsychologists have strong research programs focused on aging, mild cognitive impairment, dementia and epilepsy, as well as a unique and important line of research seeking to better characterize and treat those with psychogenic nonepileptic seizures and medically unexplained symptoms. Mayo Clinic Arizona also has an impressive sport concussion clinic with a growing programmatic research program focused on evaluation and management of mild brain injury, repetitive brain trauma, and methods to improve detection of concussion.

Research at the Mayo Clinic Florida campus, which has a strong focus on aging, Alzheimer’s disease, and normative research, is also pioneering techniques to enhance our field by developing computerized cognitive tasks. Mayo Clinic Florida is the center of Mayo Clinic’s HABIT program for mild cognitive impairment and Mayo’s cross-cultural neuropsychology research. Neuropsychology’s interest in Lewy body dementia, particularly in relation to imaging markers and pathologic mechanisms of Lewy body, is based in Mayo Clinic Florida. Mayo Clinic Florida neuropsychology is also involved in Parkinson’s disease and deep brain stimulation research. Moreover, the neuropsychology of and adjustment to motor neuron disease is based within Mayo Clinic Florida.

Highlights at Mayo Clinic Rochester include complex research paradigms focusing on neuroimaging correlates of the major variants of primary progressive aphasia and primary progressive apraxia of speech. Mayo Clinic Rochester has leaders studying the neuropsychology of aging, mild cognitive impairment, Alzheimer’s and dementia, liver disease, brain tumor, Parkinson’s disease and deep brain stimulation. Mayo Clinic Rochester also has a long history of studying outcomes of brain injury rehabilitation, primarily stroke and traumatic brain injury. Mayo Clinic Rochester has some emerging research areas concentrating on sport psychology, computerized cognitive assessment, prediction of beta-amyloid burden, and managing post concussive syndrome.

Our pediatric specialists are located at the Mayo Clinic Rochester campus and primarily study effective interventions for children and adolescents who have complex medical or neurological conditions or developmental disorders. They explore evidenced-based approaches to neuropsychological assessment and search for algorithms that reliably assess change across time. Populations of particular interest include epilepsy, Autism Spectrum Disorder, and traumatic brain injury. There has also been research seeking to better delineate the neurodevelopmental trajectory of children exposed to anesthesia.

Although there is common, and even overlapping, research interests among the many neuropsychologists within Mayo Clinic and the Health System, one will find rich diversity within each neuropsychologist’s research program.


Comparative Effectiveness of Behavioral Interventions to Prevent or Delay Dementia. Patient Centered Outcomes Research Initiative. 7/1/2014 - 10/31/2017. PI: Chandler.


European Union: Neuroepidemiology – Aging, Pre-Clinical Alzheimer’s Disease and Dementia. 01/11-01/20. PI: Geda.


Patient Centered Outcomes Research Institute (PCORI). Site Principal Investigator. Project Title: Comparative Effectiveness of Behavioral. Interventions to Prevent or Delay Dementia. 7/1/2014 – 6/30/2017. Co-I: Locke.


KEY PUBLICATIONS


Lorenzo-Betancor O; Ogaki K; Soto-Oortolaza AI; Labbe C; Walton RL; Strongosky AJ; van Gerpen JA; Uttij RJ; McLean PJ; Springer W; Siuda J; Opala G; Krygsowska-Wajs A; Barcikowsa M; Czyzewski K; McCarthy A; Lynch T; Puschmann A; Rektorova I; Sanotys K; Vilarino-Guell C; Farrer MJ; Ferman TJ; et al. DNAJC13 variant p.A152T in risk of α-synucleinopathies. Neurology. 2015, 85(19):1680-6.


Shepard MA, Silva A, Starling AJ, Hoerth MT, Locke DEC, Ziemba K, Chong CD, Schwedt TJ. Patients with psychogenic non-epileptic seizures have a more severe form of migraine than patients with epilepsy. *Seizure.* 2016, 34, 78-82.


Wershba R, Locke DEC, Lanyon R. Analysis of Minnesota Multiphasic Personality Inventory-2: Restructured Form response bias indicators as suppressors or moderators in a medical setting. *Psychological Assessment.* 2016, 27, 733-737.


The HABIT (Healthy Actions to Benefit Independence and Thinking™) Clinical Research Program

INVESTIGATORS


The HABIT Healthy Action to Benefit Independence and Thinking® clinical program is informed and supported by ongoing clinical research at all three Mayo Clinic campuses. Across the nation, individuals and families confronting mild cognitive impairment can access this 10-day wellness and memory training program that includes cognitive rehabilitation, cognitive stimulation training, support groups, wellness education, and yoga. Research on HABIT is aimed at improving patient-centered services for patients and families confronting mild cognitive impairment at risk of developing dementia. HABIT’s clinical, research, and education activities involve a team of neuropsychologists, certified yoga specialists, dementia education specialists, master’s level therapists, psychometrists, and trained cognitive rehabilitation specialists.

Our research into behavioral interventions in MCI has been continually funded since 2005. Of recent note, we concluded an NIH/NINR-funded project entitled A Multicenter Rehabilitation Intervention for Amnestic Mild Cognitive Impairment in 2014. This study demonstrated patient and care partner willingness to enroll and complete this intensive intervention program and provided effect size estimates on the impact of the HABIT program on the individual with MCI’s daily functioning and self-efficacy as well as care partner mood and burden. These preliminary findings helped our team successfully obtain our current Patient Centered Outcomes Research Institute (PCORI) project in 2015 entitled Comparative Effectiveness of Behavioral Interventions to Prevent or Delay Dementia. This 3-year grant will enable a 3-site Mayo Clinic study examining which outcomes of the HABIT program are most important to which patients, and which of the five components of the HABIT program most impact those outcomes. The HABIT team additionally procured the Ralph C. Wilson, Jr. Foundation Endowment in 2015. This will enable Mayo Clinic to ensure the HABIT program continues to work towards meeting patient goals for MCI treatment well into the future.

GRANTS/FUNDING

Patient Centered Outcomes Research Institute (PCORI). Comparative Effectiveness of Behavioral Interventions to Prevent or Delay Dementia. 07/01/2014 – 10/31/2017. PIs: Chandler, Fields, and Locke.


KEY PUBLICATIONS


PRESENTATIONS


Obesity and Eating Disorders

INVESTIGATORS

Gretchen Ames, Ph.D. (Mayo Clinic Florida)

This multidisciplinary research team is involved in several clinical projects and National Institutes of Health–funded clinical trials that examine the influence of psychological functioning and neurobiology on obesity and eating disorders and their treatment, conducted at the Rochester, Minnesota, and Jacksonville, Florida, sites of Mayo Clinic. Current adult investigations focus on primary care–based obesity treatment, medication management and intragastric balloon treatment of obesity, the effect of bariatric surgery versus calorie restriction on metabolism, the metabolome, and the microbiome in patients with type 2 diabetes and predictors of gastric band removal versus revision. Pediatric studies focus on understanding adolescents’ preferences for social support for development of a healthy lifestyle and the effect of training children and their parents in stress management and mindful eating based on body mass index and cardiovascular risk markers. Eating disorders research focuses on the use of functional magnetic resonance imaging to understand the neurological aspects of anorexia and bulimia nervosa. Additional studies examine the role of family functioning in adolescent eating disorders and explore whether athletes with eating disorders differ from non-athletes. The application of nonexercise activity thermogenesis to anorexia nervosa represents a novel method to understand and monitor weight regulation.

Through our investigations, we hope to improve long-term treatment outcomes for persons with eating disorders and obesity.

GRANTS


Orencia: A Multicenter, Randomized, Double-Blind, Placebo-Controlled Study Assessing the Occurrence of Major Adverse Cardiovascular Events (MACE) in Overweight and Obese Subjects With Cardiovascular Risk Factors Receiving Naltrexone SR/ Bupropion SR. 08/2012 – 08/2016. Co-I: Clark

Spatz FGIA, Inc: A randomized, controlled, multicenter study comparing the Spatz3 Adjustable Balloon System plus diet and exercise to diet and exercise alone. 8/1/2016 - 7/31/2017. Co-I: Grothe and Clark

KEY PUBLICATIONS


NATIONAL LEADERSHIP ROLES

Grothe KB, Editorial Board Member, *Bariatric Times*.

Clark MM, Editorial Board Member, *Eating Behaviors*.

Ames GE, Member, The Obesity Society Membership Committee.

Ames GE, Practice Samples Reviewer, American Board of Professional Psychology.
Mayo Clinic Department of Psychiatry & Psychology has historically been featured prominently in the field of sleep medicine. The late Peter J. Hauri, PhD, LP (professor emeritus, Mayo Clinic in Rochester) co-founded the American Sleep Disorders Association, authored the internationally renowned self-care book *No More Sleepless Nights*, and was widely considered to be the world’s authority on insomnia. Dr. Fredrickson is past president of the American Academy of Sleep Medicine (AASM). Drs. Auger, Fredrickson and Krahn continue this trend of national visibility and scholarship. Dr. Krahn served as joint editor of an influential sleep medicine textbook, *Sleep Medicine in Clinical Practice*, the second edition of which was recently published. Her research interests include narcolepsy, sleep disorders in women, and the interplay of psychiatric disorders and sleep. She previously has received funding from the Narcolepsy Network. Dr. Auger has served and/or chaired various AASM task forces, which have resulted in prominent publications and associated practice parameters. He was previously a member of the AASM Research Committee and of the American Sleep Medicine Foundation Executive Board. He chaired the AASM Circadian Rhythms Membership Section and has directed and participated in numerous sleep medicine sessions at national meetings. His primary research interests reside in the realm of circadian-based interventions for the treatment of sleep disorders.
GRANTS


Flamel Corporation: A double-blind, randomized, placebo controlled, two arm multi-centre clinical trial to assess the efficacy and safety of a once nightly formulation of Sodium Oxybate CR (FT218) for the treatment of Excessive Daytime Sleepiness and Cataplexy in patients with Narcolepsy: Randomized trial Evaluating the efficacy and Safety of a once nightly formulation of sodium oxybate: REST-ON Trial. 08/2016-08/2017 PI: Krahn


KEY PUBLICATIONS


Transplant Psychiatry

INVESTIGATORS

Daniel K. Hall-Flavin, M.D., Sheila G. Jowsey-Gregoire, M.D., Victor M. Karpyak, M.D., Ph.D., Larissa L. Loukianova, M.D., Ph.D., Eleshia J. Morrison, Ph.D., L.P., Teresa A. Rummans, M.D., Terry D. Schneekloth, M.D., and Nuria J. Thusius, M.D. (Mayo Clinic Rochester), Steven C. Ames, Ph.D., Tanis J. Ferman, Ph.D., Shehzad K. Niazi, M.D., and Adriana R. Vasquez, M.D. (Mayo Clinic Florida), and Cynthia M. Stonnington, M.D. (Mayo Clinic Arizona)

Transplant Center Psychiatry and Psychology research efforts have focused on pre-transplant assessment, treatment interventions, and post-transplant outcomes for solid organ and Bone Marrow Transplant (BMT) patients. Our Mayo Clinic 3-site research team is pursuing a series of three studies on the predictive value of the Psychosocial Assessment for Transplantation (PACT) scale in determining patients who will have poorer post-transplant outcomes because of psychiatric, substance use, and social problems. The first of the three studies was recently published and the next two are nearing completion. Drs. Jowsey-Gregoire, Niazi, and Schneekloth are collaborating with American and European colleagues on development of assessment standards for kidney and heart transplant candidates. Members of our research team continue a multi-center study of outcomes in alcoholic liver transplant candidates and have published findings on liver transplantation in alcoholic patients with ≤ 6 months abstinence, an area of increasing investigation and discussion in liver transplantation. Dr. Jowsey-Gregoire has taken a leadership role in the assessment of composite tissue (hand and face) transplant patients and the development of a multi-center database for hand transplant candidates supported by the Tarek E. Obaid Grant. She is also collaborating with researchers at the University of Alabama, Washington University, and the University of Minnesota on the NIDDK funded RELIVE study of long-term outcomes in kidney donors. Dr. Niazi has received support from Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery for a pilot project to electronically collect patient reported outcome measures in liver transplant patients. In 2016, Dr. Stonnington was the lead author on a study examining the therapeutic role of mindfulness based-therapy for transplant candidates. Drs. Niazi, Ferman and Vasquez are conducting a longitudinal study comparing cognitive function after liver transplantation in recipients over age 65 with younger recipients. Other research initiatives include outcomes in pancreas transplant for patients with psychiatric disorders, outcomes in elderly patients with psychiatric disorders undergoing liver transplantation, the role of health coaching and health literacy in transplantation, the impact of post-transplant smoking on alcohol relapse in liver transplantation, and liver transplant outcomes in patients with Bipolar Disorder.
GRANTS


W. Eugene and Sandra R. Davenport Fund for Organ Transplantation Research and The Center for Regenerative Medicine in Florida to study the impact of psychiatric comorbidities on functional and cognitive outcomes in elderly liver transplant recipients compared to younger recipients. 8/2014 – 12/2016. PI: Niazi.

KEY PUBLICATIONS


Integrated Behavioral Health Research

The primary care and behavioral health interface is a rich environment for research. This multidisciplinary team of investigators is from a variety of disciplines and specialties. They have been investigating the implementation of evidence-based quality improvement projects for several prevalent mental health conditions presenting in the primary care setting. There are ongoing investigations leveraging the availability of large clinical databases of patients enrolled in care coordination for adult depression Depression Improvement Across Minnesota Offering a New Direction (DIAMOND), adolescent depression Early Management and Evidence-Based Recognition of Adolescents Living with Depression (EMERALD), and a unique database on the implementation of cognitive behavioral therapy in primary care settings, individually and in group therapy.

Research is a crucial part of our integrated behavioral health mission to find the most effective and efficient ways to deliver behavioral health services to our population of patients in a time of significant shortages in access to mental health expertise. We challenge ourselves to gather data as we implement new programs to compare our outcomes with benchmarks and also to create ongoing data from which to generate new research questions on which patients do best in our programs and which patients may need increased attention.

In 2015 we completed work with a 3-year grant with the Center for Medicare and Medicaid studies as a part of a multisite implementation of a model of care coordination for patients co-morbid for Diabetes, Cardiovascular Disease, and Depression Care of Mental, Physical, and Substance Use Syndrome (COMPASS) with excellent outcomes and many lessons learned about the challenges of implementation across several states.

In 2016, we are involved in a Center for Medicare and Medicaid studies (CMS) grant to transform the delivery of primary care services across several states. This grant includes a plan to spread our model of integrated behavioral health to many new clinics with associated opportunities to research effective implementation and ways to improve the clinical outcomes of patients at lower cost. Within our Mayo Clinic Rochester practice, our group has also received support to explore the impact of care coordination on work for our large employee population and we are beginning to develop projects related to pain and the opioid epidemic with funding initially to discover the outcomes of controlled substance contracting on prescribing practices in primary care.

INVESTIGATORS
ACTIVE GRANTS


Effect of a Controlled Substance Prescribing Plan on Opioid Prescribing in a Large Primary Care Practice. Funded by Department of Psychiatry and Psychology small grants program. 07/2016 -06/2018. PI: William Leasure, Co-I: Williams.

KEY PUBLICATIONS


Katzelnick DJ, Williams MD. Large-Scale Dissemination of Collaborative Care and Implications for Psychiatry. Psychiatr Serv. 2015, 66:904-6.


LEADERSHIP ROLES/HONORS
Dr. Mark Williams, Member of American Psychiatric Association’s Council on Psychosomatic Medicine & Academy of Psychosomatic Medicine’s Joint Workgroup on Integrated Care Dissemination: Dissemination of Integrated Care in Adult Primary Care Settings: The Collaborative Care Model.

Dr. Mark Williams, Member of Collaborative Mental Health Care for the World Federation of Societies of Biological Psychiatry.

Dr. David Katzelnick, Secretary for Executive Committee National Network of Depression Centers.

INTERNATIONAL PRESENTATIONS

Glasgow, Scotland, COMPASS – Medicine and psychiatry joining forces to improve care delivery for the medically ill depressed patient. 23rd World Congress on Psychosomatic Medicine. Williams and Katzelnick, August 2015.

Copenhagen, Denmark –Integrating Behavioral Health and Primary Care - Experience at Mayo, Annual Meeting of Dansk Distriktspsykiatrisk Selskab. Williams, October 2015.

Jennifer L. Vande Voort, M.D.

Dr. Vande Voort is a child and adolescent psychiatrist whose research efforts focus on the treatment of mood disorders across the lifespan. Areas of interest have included the use of rTMS and pharmacogenomic testing in the child and adolescent population and the use of ketamine for treatment-resistant depression in the adult population.

Dr. Vande Voort is currently a primary investigator on a project that is evaluating the impact of pharmacogenomic testing on treatment response/remission rates and side effect burden for depressed adolescents who are seeking medication treatment. The overall goal of this study is to evaluate whether pharmacogenomic test results are associated with better treatment outcomes.

Prior to coming on staff at Mayo Clinic, Dr. Vande Voort completed a research fellowship at the National Institute of Mental Health where she focused on using novel therapeutics, mainly ketamine, in the treatment of depression. Her specific area of interest investigated the anti-suicidal response seen with the use of ketamine and how that was associated with improved sleep. She is currently working with Mayo Clinic collaborators to better understand how to optimize repeat administrations of ketamine to prolong its antidepressant effects.

GRANTS

Mayo Clinic Sponsorship Research Committee: Diagnostic Consistency and Services Delivered in a Sample of Children and Adolescents Diagnosed with Bipolar Disorder. 07/01/2011–08/31/2012. Co-PI: Vande Voort and Jensen.

KEY PUBLICATIONS


AWARDS AND LEADERSHIP ROLES

Weinshilboum Prize in Psychiatric Pharmacogenomics
Career Development Institute for Bipolar Disorder Awardee
Medical Director – Child and Adolescent Psychiatry Inpatient Unit
Yonas E. Geda, M.D., MSc

Dr. Geda is a Consultant in the Departments of Psychiatry & Psychology and Neurology at Mayo Clinic Arizona. He is Professor of Neurology and of Psychiatry. His research examines the impact of lifestyle factors and neuropsychiatric symptoms on brain aging and mild cognitive impairment. He has authored or co-authored over 100 peer-reviewed publications in major journals including in *Neurology*, *JAMA Neurology*, *JAMA Psychiatry*, and the *American Journal of Psychiatry*. He is the first author of a paper published by an international expert panel assembled by the Alzheimer’s Association. The paper proposed a cohesive neurobiological model for neuropsychiatric research in Alzheimer’s disease. Dr. Geda is a recipient of several awards including the Mayo Brothers Distinguished Fellowship Award, a Medal for Excellence in Research from the City of Marseille, France (2003), and from the City of La Ciotat, France, in 2016. He subsequently launched his career with a research scientist development grant (K01) from the National Institutes of Health and subsequently obtained several extramural and foundation grants to pursue his research.

**GRANTS**


European Union: Neuroepidemiology – Aging, Pre-Clinical Alzheimer’s Disease and Dementia. 01/11-01/20. PI: Geda.


**KEY PUBLICATIONS**


John A. Lucas, Ph.D.

Dr. Lucas is Professor of Psychology and Vice Chair of the Department of Psychiatry and Psychology at Mayo Clinic Florida. He is a clinical neuropsychologist whose research efforts have focused largely on the study of cognition along the spectrum from normal aging to mild cognitive impairment to dementia. He has served as co-investigator on numerous biomarker studies of risk and protective factors in Alzheimer’s disease, clinical trials in neurodegenerative disease, and studies of cognitive outcomes following surgical interventions for epilepsy and movement disorders. Dr. Lucas has served on the Clinical Core of the Mayo Clinic Alzheimer’s Disease Research Center (ADRC) since 1993 and is principal investigator of the Mayo ADRC Outreach, Recruitment, and Education Core. Since 1996, he has directed Mayo’s Older African American Normative Studies (MOAANS), an ongoing study of aging and cognition developed and maintained in partnership with the Jacksonville African American community. His current research activities include the collaborative development of a computerized cognitive screening tool for primary care practices, the continued study of disparities in dementia health literacy among African Americans, and ongoing work to improve the clinical utility of neuropsychological measures among ethnically diverse populations.

GRANTS


KEY PUBLICATIONS


Susannah J. Tye, Ph.D.

Dr. Tye is an Assistant Professor of Psychiatry, Psychology, and Pharmacology. She is Director of the Translational Neuroscience Laboratory in the Mayo Clinic Depression Center and is faculty in both the Department of Psychiatry and Psychology, and the Department of Molecular Pharmacology and Experimental Therapeutics at Mayo Clinic. She collaborates with numerous investigators in our Department and across the Institution to study the mechanisms mediating antidepressant treatment response and resistance. Using preclinical rodent models in parallel with clinical biomarker investigations, her research team is focused on understanding how stress, inflammation and metabolic dysfunction impair therapeutic efficacy. This research has established a foundation for development of novel treatment approaches and biomarker screens, with the overarching aim of developing individualized approaches for psychiatric patient care.

GRANTS

Mayo Clinic/Karolinska Institutet, Focal Inflammation and Dopamine Neurotransmission: Mechanisms and Markers of Deep Brain Stimulation Antidepressant Action. 1/16 – 6/17. Role: Co-PI.

Mayo Clinic Center for Individualized Medicine. Metabolomic Biomarkers of Lithium Response in Bipolar Disorder. 9/14 – 8/16. Role: PI.


Minnesota Partnership for Biotechnology and Medical Genomics Harnessing Imaging and Genomics for Clinical Neuroscience of Psychiatry. 9/12 – 9/16. Role: PI (Mayo Clinic site).

Teva Pharmaceuticals Armodafinil Modulation of Phasic and Tonic Dopamine Neurotransmission in a Preclinical Model of Treatment-Resistant Depression. 10/14 – 9/16. Role: PI.
KEY PUBLICATIONS


AWARDS, HONORS, AND OFFICES

Co-Chair, Treatment Resistant Depression Task Group for National Network of Depression Centers
American Society of Psychopharmacology Early Career Committee
Society of Biological Psychiatry Scientific Program Committee
Society of Biological Psychiatry Education Committee
International Society for Bipolar Disorders Scientific Program Committee
Society of Biological Psychiatry Travel Award (2014)
Career Development Institute for Psychiatry (2014)
NCDEU New Investigator Award (2013)
Dr. Patten is a licensed Clinical Psychologist, Professor of Psychology, Director of the Behavioral Health Research Program, and Director of the Community Engagement Program within the NIH-funded Center for Clinical and Translational Science at Mayo Clinic Rochester, MN. Her research focuses on developing novel, theory-based behavioral interventions for tobacco cessation with various populations including adolescents and smokers with psychiatric comorbidity, as well as the social network of smoker. She has a successful longstanding partnership with the Alaska Native community, and has conducted several intervention studies to reduce tobacco use among Alaska Native adolescents and pregnant women. Dr. Patten is a co-investigator on several other projects evaluating behavioral lifestyle interventions in various underserved populations. She recently served as Chair of the Risk, Prevention and Interventions in the Addictions (RPIA) and Interventions to Prevent and Treat Addictions (IPTA) NIH study sections. She has served on several expert panels related to cancer disparities and tobacco use. Dr. Patten serves as a mentor to numerous trainees and junior faculty in research.

GRANTS

National Cancer Institute: Community Outreach Program: Spirit of Eagles Communities Network Program. 09/2010 - 08/2017. PI: Patten.


AWARDS AND LEADERSHIP ROLES

Director, Community Engagement, Mayo NIH funded CTSA

Chair, NIH Risk, Prevention, and Interventions in the Addictions (RPIA) Study Section.

Chair, NIH Interventions to Prevent and Treat Addictions Study Section (IPTA) Study Section

Assistant Editor, Addiction
KEY PUBLICATIONS


Ahmed T. Ahmed, M.B., B.Ch.
Mark A. Frye, M.D. and Richard Weinshilboum, M.D., Mentors

Dr. Ahmed T. Ahmed is an international medical graduate from Egypt. He completed his radiology residency, and 5 years ago, he started a career in research when he joined Mayo Clinic. During his time here, his research focus has been on epidemiological, evidence based, and knowledge synthesis studies (systematic review and meta-analysis). In addition, Dr. Ahmed has completed a master’s degree in clinical and translational science coursework and is waiting for his thesis defense. Since started at Mayo Clinic, Dr. Ahmed has changed his vision and future goals. He has developed an interest in pharmacogenetic and pharmacogenomic-related psychiatric research, where he recently got appointed in the Mayo Clinic - NIH T32 Clinical Pharmacology Training Program. Currently, he is working on several projects, one of which is “The Right Antidepressant: Pilot Project”. Dr. Ahmed would like to pursue a career in psychiatric pharmacogenomic research and to be one of the main researchers in the field.

Jasmin Kohli, M.D.
Paul E. Croarkin, D.O., Mentor

Dr. Kohli, a recent medical graduate, has a longstanding interest in mental health challenges affecting children and adolescents. During medical school, she further developed her interest by focusing her clinical experiences on neurology and adolescent psychiatry. Here at Mayo Clinic, Dr. Kohli is involved in research on transcranial magnetic stimulation (TMS) for treatment of depression in adolescents. She is currently involved in the evaluation pharmacogenomic treatment algorithm versus treatment-as-usual for the Adolescent Management of Depression (AMOD) project. Additionally, Dr. Kohli is currently performing comparative data analysis on the correlation of magnetic resonance spectroscopy with sleep patterns in adolescent patients with depression.

Charles P. Lewis, M.D.
Paul E. Croarkin, D.O., Mentor

Dr. Lewis completed his psychiatry residency and child and adolescent psychiatry fellowship training at the Mayo School of Graduate Medical Education, where he worked on several projects related to biological markers of depression severity and suicidal risk in children and adolescents. He currently is enrolled in the Mayo Clinic Clinician-Investigator Training Program, a two-year clinical research fellowship. Dr. Lewis’s research interests include the neurobiological correlates of mood disorders and suicidal behavior and the development of biological markers for these conditions, particularly in child and adolescent populations. His recent work has involved the use of transcranial magnetic stimulation (TMS) neurophysiologic techniques and proton magnetic resonance spectroscopy (1H-MRS) to examine dysfunction of excitatory and inhibitory neurotransmitter systems in pediatric depression. He also is involved in research related to clinical brain stimulation techniques, including repetitive TMS and transcranial direct current stimulation (tDCS) in pediatric populations. Dr. Lewis has presented his work at meetings of the American College of Neuropsychopharmacology, the Society of Biological Psychiatry, and the American Academy of Child and Adolescent Psychiatry.
Akuh Adaji, M.B.B.S., Ph.D., PGY-4 Resident  
Mark D. Williams, M.D., Mentor

Dr. Adaji has an interest in integrated care models and the application of relevant technology to improve population health, patient and provider experience of care, and value based outcomes. He has upcoming presentations at national conferences on the topic of integrated care. His current research project focuses on the impact of an integrated care model on occupational outcomes for employees with depression. He is currently working on manuscripts examining the use of technology in mental health treatment.

Nicholas D. Allen, M.D., PGY-3 Resident  
Victor M. Karpyak, M.D., Ph.D., Mentor

Dr. Allen is working collaboratively with Dr. Karpyak and they are focusing on subjective and objective measures of impulsivity in outpatients undergoing dual diagnosis chemical dependency treatment. Impulsivity is a major component of addictive behavior contributing to the initiation and perpetuation of substance use disorders. They will ask patients at the Mayo Clinic Intensive Addictions Program to fill out self-report questionnaires about impulsivity, as well as undergo neurocognitive testing, that will objectively measure impulsivity. Their short-term goal will be to validate measures of impulsivity in this population and correlate them with addiction treatment outcomes and cravings scores. A longer-term goal is to tailor our patient’s treatment to improve impulsivity via psychotherapeutic and pharmacologic interventions.

Kristin L. Borreggine, D.O., PGY-3 Resident  
Susannah J. Tye, Ph.D., Mentor

Dr. Borreggine’s area of clinical focus is child and adolescent psychiatry. As a researcher, she is examining the novel mechanisms responsible for rapid acting ketamine response in treatment resistant depressed adults and children. She will be investigating biomarkers in ketamine non-responsive adults and children in collaboration with Kathryn Cullen, M.D. at the University of Minnesota. Other areas of research include trying to elucidate lithium’s mechanism of mood stabilization, specifically the role mTOR activation plays in treatment responsive and non-responsive bipolar disorder. In addition to the above mentioned projects, Dr. Borreggine and Mayo Clinic colleagues have quantified metabolomics markers associated with lithium response and non-response in rodent plasma and brain.
Ian C. Lamoureux, M.D., PGY-4 Resident  
*Teresa A. Rummans, M.D., Mentor*

Dr. Lamoureux’s area of clinical focus is forensic psychiatry. As a researcher, he has focused primarily on patient’s rights and treatment. His research topics include chemical dependency commitment, involuntary mental health holds, court-approved electroconvulsive therapy, restoration of medical decision-making capacity, and mentally ill persons who make false accusations of sexual assault. He is scheduled to present three of his studies at the 47th Annual Meeting of the American Academy of Psychiatry and the Law and has presented on the topic of decision-making capacity restoration at the 33rd Annual Meeting of the Midwest Chapter of the American Academy of Psychiatry and the Law. He was invited to present at Grand Rounds focusing on the nature and utilization of involuntary mental health holds to the Department of Internal Medicine. His manuscript regarding the use of civil commitment for chemically dependent persons has been submitted and is being reviewed for publication.

Kristen A. Schmidt, M.D., PGY-4 Resident  
*Doo-Sup Choi, Ph.D. and Kathryn M. Schak, M.D., Mentors*

Dr. Kristen Schmidt’s primary research interests concern the role that the endocrine system plays in the neurobiology of addiction and mood disorders. She recently completed a paper entitled the “Association of plasma orexin A and ethanol-drinking behaviors in pregnant rats” investigating hormonal factors involved in reduced alcohol consumption during gestation. This work was accepted for publication in the *Journal of Alcoholism & Drug Dependence* and will be presented at the annual meeting of the American Academy of Addiction Psychiatry. Additionally, she explored the relationship between mania and prolactin changes during weaning in a recently published case study, “Mixed mania associated with cessation of breastfeeding.”
Lisa M. Gudenkauf, Ph.D. – Clinical Health Psychology Fellow
Shawna L. Ehlers, Ph.D., L.P. and Matthew M. Clark, Ph.D., L.P., Mentors

Dr. Gudenkauf is a first year Clinical Psychology Fellow. She has research background in the study of group psychosocial interventions for breast cancer survivors, focusing on the impact of stress management interventions on positive psychological outcomes and resiliency factors. Dr. Gudenkauf’s current research interests include implementing and evaluating group psychosocial interventions for broader oncology populations in the clinical setting, and she will be involved in several projects within the Behavioral Medicine Program (BMP).

Allison A. Holgerson, Ph.D. – Clinical Health Psychology Fellow
Karen B. Grothe, Ph.D., L.P. and Matthew M. Clark, Ph.D., L.P., Mentors

Dr. Holgerson’s primary research interests are focused in the management and treatment of obesity. Her research background includes evaluating interventions for both childhood and adult obesity, binge eating disorder, and the promotion of healthy dietary behaviors and chronic disease prevention at the individual and community level. She is currently extending this background with multidisciplinary research teams focusing on the psychological factors of those seeking obesity treatment and predictors of success following bariatric surgery.

Kendra J. Homan, Ph.D. – Clinical Child Psychology Fellow
Leslie A. Sim, Ph.D, L.P., Mentor

Dr. Homan’s research agenda broadly addresses the identification and treatment of disordered eating and eating disorders in children and adolescents. A current focus of her research investigates improving detection and prevention of pediatric eating disorders in primary care with a particular emphasis on atypical eating disorder presentations. Dr. Homan is also currently examining the impact of disordered eating on outcomes among adolescents with chronic pain attending a pain rehabilitation program, weight suppression in patients with eating disorders, and the influence of non-body related social comparisons on disordered eating. Dr. Homan is also interested in cultural factors related to disordered eating and service use/delivery broadly.
Dr. Hord’s research in clinical anxiety disorders has included studies of measurement validation, complex data analysis, process modeling, as well as longitudinal investigations. Dr. Hord has a special interest in developing technological solutions for use with anxious youth. To accomplish this goal, one step is to objectively examine the strengths and weaknesses of the current mental health system. Additionally, conducting longitudinal research to evaluate changes in symptoms over time can likewise inform the innovative use of technology in the clinical setting. As such, she recently obtained a grant to gather data on the relative long-term benefits of anxiety treatment as measured by symptom level, functioning, and service utilization compared across different treatment approaches and settings within the Mayo Clinic Health System. Dr. Hord’s ultimate goal is to obtain external funding to develop novel uses of technology that will improve treatment outcomes and accessibility to treatment for children with anxiety disorders.

Dr. Lucchetti’s primary research interests are focused broadly on assessing neuropsychological and family functioning of children with special healthcare needs. She has previously investigated psychosocial characteristics of pediatric patients with health conditions such as cancer, functional gastrointestinal disorders, and autism spectrum disorder. She is currently involved with projects examining the relationship between executive function and somnolence over time in pediatric patients with traumatic brain injury, as well as neuropsychological correlates of epilepsy across the lifespan. She is also involved in a pilot study about critical flicker fusion and cognitive abilities in children.

Dr. Owens’ program of research includes investigating reading differences in primary progressive apraxia of speech and neurodegenerative language disorders. He currently is working on projects addressing the utility of word-reading tasks and other neuropsychological measures to differentiate subtypes of primary progressive apraxia of speech and primary progressive aphasia. Upcoming projects are planned to explore data-driven improvements in classification criteria of some primary progressive aphasia subtypes.

Dr. Tsai Owens is broadly interested in issues related to adjustment to and self-management of chronic medical conditions in youth and young adults. Her previous work has included the development of measures assessing barriers to medical regimen adherence experienced by youth with juvenile idiopathic arthritis and assessing readiness to transition from pediatric to adult healthcare among youth and young adults with chronic, pediatric-onset conditions. As a first-year Clinical Child Psychology Fellow, Dr. Tsai Owens is currently involved in a project assessing the clinical outcomes of the recently developed Pain Rehabilitation Center young adult program and is developing projects with her mentors to examine factors affecting young adults’ healthcare transition outcomes.
The Research Psychometrics Resource (RPR) provides psychological and cognitive testing for researchers throughout the institution. The RPR matches investigators across Mayo Clinic seeking validated psychometric questionnaires and testing in collaboration with a psychologist investigator who can assist in proper test selection, study design, and data interpretation. RPR psychometrists have expertise in the administration of psychological testing and have research training and backgrounds and they provide test procurement, scheduling, test-administration, quality control and certain data management services under the auspices of the Psychological Assessment Laboratory in the Department of Psychiatry and Psychology. Established in 2000, the RPR has facilitated collaborations between the Department of Psychiatry and Psychology and numerous other departments including Cardiology, Neurology, Anesthesiology, Radiation Oncology, Gynecology, Physical Medicine and Rehabilitation, Internal Medicine, and Surgery. Example protocols have included:

Characterization of Silent Cerebral Lesions in Patients Undergoing Left Heart Ablation for Ventricular Arrhythmia and Atrial Fibrillation. PI – Asirvatham.

A Longitudinal Study of Alterations in Cognitive Function and Brain Metabolites among Women Receiving Chemotherapy for Primary Breast Cancer. PI – Kholi.

Effects of Estrogen Replacement on Atherosclerosis Progression in Recently Menopausal Women: The Kronos Early Estrogen Prevention Study.

Neurodevelopment of Children Exposed to Anesthesia: A Population Based Assessment PI – Warner.
The primary role of the Departmental Research Team is to provide administrative and protocol support services for any Departmental faculty who has an interest in engaging in research. The scope of expertise includes administration of pre and post grant submission related activities, budget and protocol development, regulatory documentation and management, manuscript submission, and preparation for national and international scientific educational sessions, and clinical trials research as well as basic science research.

To support the Department’s growth of research activities related to clinical trials, Michelle Skime, Senior Clinical Research Coordinator, leads teams of well-trained associate and clinical research coordinators. On average, 10 dedicated clinical coordinators support over 80 active clinical research protocols throughout the Department including, but not limited to, the Pain Rehabilitation Program, Addiction Center, and Mood Clinic in both adult and adolescent populations. The team also includes Barb Hall, Protocol Specialist III, and Lori Solmonson, Research Secretary, who support the administrative function of the department’s research.

A second group, dedicated to Community Health Education Outreach, is the Behavioral Health Research Program led by Dr. Christi Patten. Christine Hughes is the Program Coordinator. Their research focuses on developing behavioral interventions for tobacco cessation and reducing cancer health disparities. Their current research targets Alaska Natives, Native Americans, pregnant women, smokers with psychiatric comorbidity and the social network of smokers.

In addition to clinical studies, a basic science laboratory led by Dr. Susannah J. Tye, Associate Consultant, focuses on supporting the molecular and small animal research protocols of neurologic translational research. Two research technicians and a wealth of research facilities are located on the second floor of the Generose Building alongside the inpatient and outpatient Psychiatry and Psychology Department. The laboratory is equipped for protein work (western blotting and ELISA), molecular biology (PCR, RT-PCR, SNP analysis, and gene expression), immunohistochemistry of tissues, cell culture and immortalization of cells, and also the processing of clinical samples. The animal research area is located at the downtown campus in the Stable Building. In the animal facilities we are looking at pharmacotherapies, deep brain stimulation and the combinations of the two, as well as analyzing multiple behavioral tests for efficacy of the treatments. These facilities are available to support clinicians engaged in translational neuroscience.