



Department of Experimental and Clinical Pharmacology

2020 Annual Report

**Department of Experimental and Clinical Pharmacology
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308 Harvard Street SE
Minneapolis, MN 55455**

pharmacy.umn.edu/ecp

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ABOUT

ECP MISSION

The mission of the Department of Experimental and Clinical Pharmacology (ECP) is to discover, disseminate, and apply new knowledge related to safe, effective, and economical medication use in patients. ECP will educate students of pharmacy, post-graduate trainees, and others for careers in pharmacy and health care with the ultimate goal of improving health. The ECP faculty and staff actively engage in teaching and conduct research pertaining to experimental and clinical pharmacology and patient outcomes to identify and promote the use of the best therapies. Together, ECP strives to advance the science of human pharmacology and therapeutics, while maintaining the highest standards of ethics in research and education.

DATA COLLECTION

Note that financial data is reported by fiscal year (2020: July 2019-June 2020). All other data uses the calendar year. These parameters continue to be the standard since 2019.

UNIVERSITY OF MINNESOTA MISSION

The University of Minnesota, founded in the belief that all people are enriched by understanding, is dedicated to the advancement of learning and the search for truth; to the sharing of this knowledge through education for a diverse community; and to the application of this knowledge to benefit the people of the state, the nation and the world. The University's threefold mission of research and discovery, teaching and learning, and outreach and public service is carried out on multiple campuses and throughout the state.

EQUAL OPPORTUNITY STATEMENT

The University of Minnesota shall provide equal access to and opportunity in its programs, facilities, and employment without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression.

Inquiries regarding compliance may be directed to the Director, Office of Equal Opportunity and Affirmative Action, University of Minnesota, 274 McNamara Alumni Center, 200 Oak Street S.E., Minneapolis, MN 55455, (612) 624-9547, eoaa@umn.edu. Website: www.eoaa.umn.edu.

This publication/material is available in alternative formats upon request. Please contact Lindsay Bork Nichols, Experimental and Clinical Pharmacology, phone number.

DISABILITY ACCESS STATEMENT

This publication/material is available in alternative formats upon request. Direct requests to Lindsay Bork Nichols, Experimental and Clinical Pharmacology, phone number.

LETTER FROM THE DEPARTMENT HEAD

Dear Colleagues and Friends,

In this 2020 annual report I take pride in sharing a few highlights for the Department of Experimental and Clinical Pharmacology (ECP). Navigating Covid-19 throughout most of 2020 proved to be challenging in many ways. Nonetheless, this report clearly demonstrates the resolve of our faculty, staff, and student's to persevere in accomplishing our research, education, and service mission.

The effort and commitment we've made to ECP over the last 12 years are reflected in the strong performance in several of our key research metrics, including:

- new sponsored awards increasing the annual total over \$3 million
- a 2% increase in faculty salary offset by sponsored projects over 2019
- 45% growth of peer-reviewed articles published by ECP faculty over 2019

These statistics, along with our consistent record of contributing to the teaching and service endeavors of our college, reflect the high caliber and dedication of our faculty, staff, and students. Since our 2019 report, we have endured several personnel changes. Specifically, Dr. John Rotschafer, who was for over 40 years a nationally recognized leader in the infectious disease field, as well as, Dr. Shellina Scheiner in the critical field of geriatric pharmacotherapy retired. In addition, early in 2020, Dr. Swayam Prabha left to pursue her continued work in the area of drug delivery of cancer chemotherapy agents at Temple University. Finally Carolyn Chase, who ably served as ECP's administrative manager for 4 years, also retired in 2020. We wish them all the very best and thank them for their years of service and dedication to the department.

At the same time, we welcomed Lindsay Bork Nichols as our new department administrator who has already made significant contributions since joining in April 2020, including assisting in the development of the biennial pharmacogenomics conference.

On September 10-11, over 350 students, clinicians, researchers, and exhibitors gathered virtually for the third biennial Precision Medicine Conference, titled "Pharmacogenomics: Implementation of Pharmacogenomics into Clinical Care." This conference is jointly hosted by ECP, the Institute of Personalized Medicine, and in cooperation with the Minnesota Precision Medicine Collaborative

As we continue to navigate ongoing COVID-19-related challenges, I take pride in sharing in this report what our faculty, students, and staff have accomplished to advance the science of our discipline and support a new generation of students from our ECP graduate program.

Finally, I wish to acknowledge and thank all alumni, donors, and friends of the department for their support and ongoing pride for the things we can still do for our community in the face of today's challenges.

With warm regards,

Robert J. Straka
Department Head

NEW FACULTY & PROMOTIONS



Dr. Betsy Hirsch, an ECP faculty member since June 2017, was promoted to Associate Professor with tenure in May 2020. Dr. Hirsch received her PharmD from Creighton University followed by a fellowship in Infectious Diseases Pharmacotherapy at University of Houston College of Pharmacy and St. Luke's Episcopal Hospital. Her current research focuses on the detection and treatment of multidrug-resistant (MDR) Gram-negative infections. The overall goal of the program is the translation of laboratory findings to improve the use of antimicrobials for patients with resistant bacterial infections. Expertise from the laboratory can be applied on a continuum, from the pre-clinical antimicrobial development phases to post-marketing evaluation of patient outcomes after clinical treatment.



Dr. Melanie Nicol, an ECP faculty member since August 2014, was promoted to Associate Professor with tenure in May 2020. Dr. Nicol received her PhD in Pharmaceutical Sciences from the University of North Carolina, Chapel Hill followed by a PharmD degree from Ohio Northern University. In addition, Dr. Nicol completed a North Carolina Collaborative Clinical Pharmacology NIH Postdoctoral Training Program offered jointly by the University of North Carolina, Chapel Hill and Duke University. Her current research focuses on identifying factors that influence the efficacy of antivirals (and other anti-infectives) in tissue compartments. Specifically, the Nicol lab is working to describe the penetration of drugs used to treat HIV and related infections into tissue compartments such as the genitals, brain, and lymph tissue.



Dr. Debra Skaar, an ECP faculty member since 2000, was promoted to Professor (annual renewable contract) in May 2020. Dr. Skaar received her PharmD from the University of Minnesota followed by a fellowship at St. Paul-Ramsey Medical Center (ASHP Critical Care). Her current research focuses on critical care, glycemic control in the critically ill, management of ICU anxiety, and agitation.

DEPARTMENT MEMBERS

FACULTY

Mahmoud Al-Kofahi
Assistant Professor

Angela K. Birnbaum, PhD, FAES
Professor; Director of Graduate Studies

Jeffrey Bishop, PharmD, MS, BCPP, FCCP
Associate Professor

Richard C. Brundage, PharmD, PhD, FISO, FCP
Professor

Scott A. Chapman, PharmD
Associate Professor

James C. Cloyd, PharmD, FCCP
Professor, Weaver Endowed Chair in
Orphan Drug Development

Lisa Coles, PhD
Research Assistant Professor

Jeannine M. Conway, PharmD
Associate Professor; Associate Dean
for Professional Education

Esam El-Fakahany, PhD
Professor; Associate Dean for
Faculty Affairs & Graduate Studies (ended Summer 2020)

Elizabeth Hirsch, PharmD
Associate Professor

R. Stephanie Huang, PhD
Associate Professor

Pamala A. Jacobson, PharmD, FCCP
Distinguished Professor

L'Aurette A. Johnson, PhD
Assistant Professor; Associate Director of Graduate
Studies

Reena Kartha, PhD
Research Assistant Professor

Mark N. Kirstein, PharmD
Associate Professor

Michael Kotlyar, PharmD
Associate Professor

Ilo E. Leppik, MD
Professor

Ling Li, PhD, DVM
Professor, VFW Endowed Chair in
Pharmacotherapy for the Elderly

Susan E. Marino, PhD
Associate Professor

Melanie R. Nicol, PharmD, PhD
Associate Professor

William S. Oetting, PhD
Professor

John C. Rotschafer, PharmD, FCCP
Professor (retired December 2020)

Shellina Scheiner, PharmD, BCGP
Assistant Professor

Leo J. Sioris, PharmD
Professor

Debra J. Skaar, PharmD, FCCM
Professor

Robert J. Straka, PharmD, FCCP
Professor; Department Head

Lynda Welage, PharmD
Professor; Dean

Beshay Zordoky, PhD
Assistant Professor

ADJUNCT FACULTY

Kyle Baron, PharmD, PhD

Assistant Professor

Andrew Behm, PharmD, CGP

Assistant Professor

Alexander Berg, PharmD, PhD, FCP

Associate Professor

Ashley Brown, PharmD

Assistant Professor

Samuel Callisto, PhD

Assistant Professor

Jason Chittenden, PhD

Assistant Professor

David Gregornik, PharmD

Associate Professor

John Gualtieri, PharmD

Assistant Professor

Serge Guzy, PhD

Professor

Jeanine Jarnes, PharmD

Assistant Professor

Nitin Kaila, PhD

Assistant Professor

Daniel E. Keyler, PharmD

Professor

Frank N. Konstantinides, MT, MS

Professor

George Konstantinides, PharmD

Assistant Professor

Edris Kosar, PharmD

Assistant Professor

Robert Kriel, MD

Research Professor

Smita Kshirsagar, PhD

Assistant Professor

Marie D. Kuker, RPh

Assistant Professor

Richard L. Lalonde, PharmD, FAAPS, FCP, FCCP

Professor

Stephen H. LeMaster, PharmD

Associate Professor

Ramaiah Muthyala, PhD

Associate Professor

David Parra, PharmD

Associate Professor

Pamela A. Pawloski, PharmD

Assistant Professor

Mark Robbins, PhD, JD

Associate Professor

Samuel Roiko, PhD

Assistant Professor

Ahmed H. Salem, PhD

Associate Professor

Kyriakie Sarafoglou, MD

Associate Professor

Robert J. Schumacher, PhD

Assistant Professor

Catherine Sherwin

Associate Professor

Kelly M. Sioris, PharmD

Assistant Professor

Catherine St. Hill, DVM, PhD

Associate Professor

John V. St. Peter, PharmD

Associate Professor

Sean Stewart, PharmD, BCACP, CLS

Associate professor

Mary A. Ullman, PharmD

Associate Professor

Brian Van Ness, PhD

Professor

Orly Vardeny, PharmD, BCPS, FHFSA

Associate Professor

STAFF

Christopher Barkley	Research Associate, Marino Research Program
Lindsay Bork Nichols, MBA	Administrative Manager, ECP Office
Sandra Bowers	Researcher, Birnbaum Research Program
Hunter Brigman	Researcher, Hirsch Research Program (departed December 2020)
Carolyn Chase, MS	Administrative Manager, ECP Office (retired April 2020)
Lindsey Collins	Junior Scientist, Nicol Research Program
Sheena Dufresne	Study Coordinator, Kotlyar Research Program
Lori Endsley	MTRF Administrator
Prosperity Eneh	Research Specialist, Nicol Research Program (departed May 2020)
James Fisher	Technical Director, CPAS Laboratory
Katherine Goffin	Administrative Specialist, ECP Office
Andrea Gram	Junior Scientist, Li Research Program
Marianne Grant	Lab Manager, Zordoky Research Program
Silvia M. Illamola	Research Associate, Birnbaum Research Program
Alyssa Johnson	Research Professional, Marino and Jacobson Research Programs
Austin Korlin-Downs	Researcher, Li Research Program (departed February 2020)
Adam M. Lee, PhD	Research Associate, Bishop Research Program
Erin McGonagle	Staff, Precision Medicine Grand Challenge
Usha Mishra, MS	Assistant Scientist, Center for Orphan Drug Research
Rachel Moniz	Researcher, Birnbaum Research Program
Becky Palapala	Finance & Communications Specialist, ECP Office
Siddhika Pareek	Research Specialist, Huang Research Program (departed April 2020)
Erica Stapic	Finance Entry, ECP Office (departed December 2020)
Sam Stensgard	Researcher, Birnbaum Research Program
Marcia Terluk	Researcher, Center for Orphan Drug Research
Susan Williford	Graduate Program Coordinator, ECP Office

NEW & CONTINUING GRADUATE STUDENTS

PhD PROGRAM

Ibrahim Abdelgawad, BS

Advisor: Beshay Zordoky, MSc, PhD

Charul Avachat, MS

Advisor: Angela Birnbaum, PhD

Cecilia (Cece) Barajas, BS

Advisor: Carolyn Fairbanks, PhD

Jessica Barry, BS

Advisor: Angela Birnbaum, PhD

Morgan Bixby, BS

Advisor: Elizabeth Hirsch, PharmD, RPh

Shen Cheng, MS

Advisor: Richard C. Brundage, PharmD, PhD

Yingbo Huang, MS

Advisor: R. Stephanie Huang, PhD

Mu'taz Jaber, PharmD

Advisor: Richard C. Brundage, PharmD, PhD

Angela Jeong, PharmD

Advisor: Ling Li, DVM, PhD

Ashwin Karanam, PharmD

Advisor: Angela Birnbaum, PhD

Sarah Kim, PharmD

Advisor: Jeanine Jarnes, PharmD

Alyssa Lantz, BS

Advisor: Melanie Nicol, PharmD, PhD

Xintian Lyu, BS

Advisor: Angela Birnbaum, PhD

David Margraf, PharmD, MS

Advisor: Scott Chapman, PharmD

Siddhee Anand Sahasrabudhe, MS

Advisor: Reena Kartha, PhD

Abhishek Sathe, MS

Advisor: Lisa Coles, PhD

Mei-Chi (Judy) Su, MS

Advisor: R. Stephanie Huang, PhD; Swayam Prabha, MBA, PhD; Angela Birnbaum, PhD

Boguang Sun, PharmD

Advisor: Robert J. Straka, PharmD, FCCP

Fan Wang, MS

Advisor: Melanie Nicol, PharmD, PhD

Ya-Feng (Jay) Wen, PharmD

Advisor: Robert J. Straka, PharmD, FCCP

Rui Zhong, BS

Advisor: Ling Li, DVM, PhD

MASTERS PROGRAM

Scott Luisi, BS

Advisor: Susan Marino, PhD

Joshua Mentzer, BS

Advisor: R. Stephanie Huang, PhD

Abdelrahman Saqr, BS

Advisor: Pamala Jacobson, PharmD

Takuto Takahashi, MD

Advisor: Mark Kirstein, PharmD

POSTDOCS & FELLOWS

Vasudeva Reddy Dodda

Advisor: Ramaiah Muthyala, PhD

Alex Ling, PhD

Advisor: R. Stephanie Huang, PhD

Jaehyeok Roh, PharmD

Advisor: Reena Kartha, PhD

Jena Sampreeti, PhD

Advisor: R. Stephanie Huang, PhD

Samuel Williams

Advisor: Jeff Bishop, PharmD, MS, BCPP, FCCP

RESEARCH

Led by our world-class faculty, research teams conduct groundbreaking and critical research in the Department of Experimental and Clinical Pharmacology. Faculty research programs focus on oncology, transplantation, infectious diseases, pharmacogenomics, geriatrics, critical care, neuroscience, cardiovascular diseases, pediatrics, and psychiatry, among other areas. ECP is home to the Lawrence C. Weaver Endowed Chair in Orphan Drug Development and the VFW Endowed Chair in Pharmacotherapy for the Elderly. In addition, ECP’s state-of-the-art, CLIA-certified Clinical Pharmacology Analytical Services Laboratory has provided an important research resource to both University researchers and external customers for more than fifteen years.

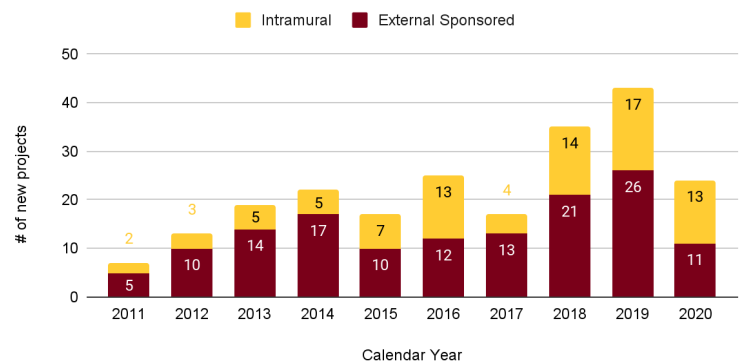
Our faculty routinely present important research at national and international conferences, lecture and collaborate across the country, serve as reviewers and editorial board members of international journals, hold leadership positions in national organizations, and serve on review committees for National Institutes of Health (NIH) and other granting agencies.

ANNUAL PERFORMANCE AND YEAR-TO-YEAR TRENDS

- Funding for research in ECP comes from both intramural and external sources:
 - New Grants Received: 24
 - Intramural: 13
 - External sponsored: 11
- Research endeavors result in various outputs, including:
 - Articles in peer-reviewed publications: 100
 - Books, chapters and other publications: 14

New Projects by Type

2011-2020

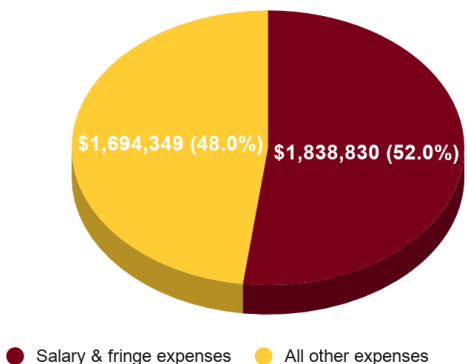


Financials of Sponsored Projects in FY2020

- Expenditures by category
 - Salary and Fringe \$1,694,349
 - Other Expenses \$1,838,830
 - Total \$3,533,179
- Percentage of department faculty salaries supported by sponsored projects: 22.8%
 - Continued 4-year trend of increasing salary offset percentage. +2% increase over last year.

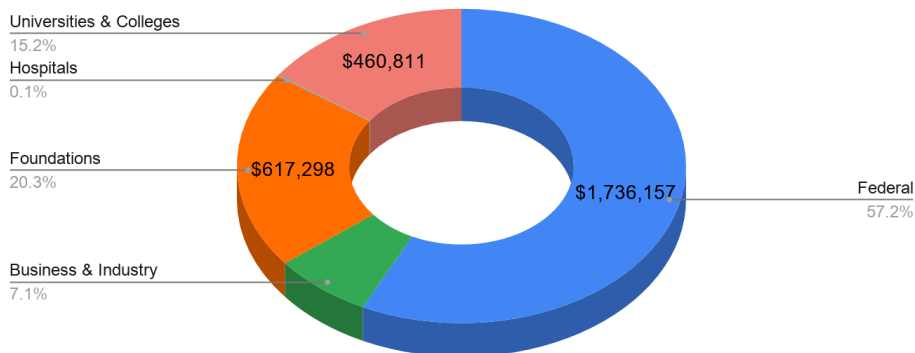
Percent of Expenditures by Category

\$3,533,179 total



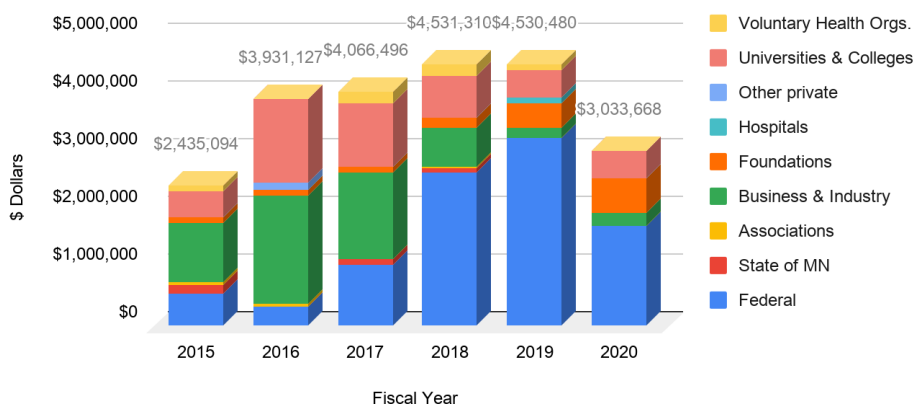
Sponsored Awards by Source (FY20)

Total: \$3,033,668



Sponsored Awards by Source

(FY15-FY20)



A RESEARCH RICH ENVIRONMENT

The College of Pharmacy is ranked 3rd among outstanding pharmacy education and research institutions in the world. It is located within one of the largest academic health centers in the U.S., with nationally recognized programs in public health, medicine, nursing, dentistry, and veterinary medicine. Major campus research facilities include a Clinical and Translational Science Institute, the Biomedical Genomics Center, and a comprehensive cancer center. In addition, there are numerous partnerships with affiliated healthcare systems that offer exceptional research and educational programs. The Twin Cities also have a large number of cutting-edge biomedical companies eager to collaborate with the academic community.

RESEARCH CENTERS WITHIN ECP

- Center for Orphan Drug Research (Dr. James Cloyd, Director)
- Institute for Personalized Medicine (Dr. Pamala Jacobson, Director)
- Center for Clinical and Cognitive Neuropharmacology (Dr. Susan Marino, Director)

LOCATIONS AND FACILITIES

ECP maintains a total of 25,889 square feet of office and laboratory space within four buildings on the East Bank of the University of Minnesota's Twin Cities campus:

- Weaver-Densford Hall 7,332 sf
- McGuire Translational Research Facility 7,696 sf
- Phillips Wangensteen Building 6,915 sf
- 717 Delaware Street SE 3,946 sf

NEW SPONSORED PROJECTS WITH ECP FACULTY

Faculty	Project Description	Sponsor
James Cloyd (PI), (Lisa Coles, CO-I)	Phase I Study of Midazolam Pharmacokinetics, Pharmacodynamics and Adverse Effect following Intramuscular Injection in Dogs using an Autoinjector	Mesagreen Pharmaceutical Company
James Cloyd (PI), Lisa Coles, (Co-I)	An Exploratory, Open-label Study of the Pharmacokinetics and Pharmacodynamics of Diazepam after Intranasal Administration of a Single Dose of Valtoco to Healthy Volunteers	Neurelis, Inc.
James Cloyd (PI), Lisa Coles, (Co-I)	Compatibility and Stability Testing of New Formulation Containing Ketamine and Levetiracetam for KESETT	University of Virginia
Reena Kartha (PI)	Translational Pharmacology Research Fellowship	Genzyme
Michael Kotlyar (Co-PI)	Feasibility of Using Wearable Technology for Just-in-Time Prediction of Smoking Lapses	NIH National Institute on Drug Abuse
Michael Kotlyar (Co-PI)	Cigarette Smoking as a Risk Factor for Greater Psychiatric Symptom Severity across Serious Mental Illnesses: A Secondary Analysis of Three Nationally-Representative NIH Data-sets	NIH National Institute on Drug Abuse
Ling Li (Co-I)	Macrophage inflammasome activation and the mechanism of lipolysis resistance in aged adipose	NIH National Institute on Aging
Ling Li (Co-I)	Generating Exogenic Hippocampal	NIH National Institute on Aging
Ling Li (Co-I)	Integrating Alzheimer's disease GWAS with proteomic and metabolomic QTL data	NIH National Institute on Aging
Ling Li (Co-I)	Deep Learning with Neuroimaging Genetic Data for Alzheimer's Disease"	NIH National Institute on Aging
Beshay Zordoky (PI)	Psychosocial Stress Exacerbates Doxorubicin-induced Cardiovascular Aging	NIH National Heart, Lung, and Blood Institute

NEW INTRAMURAL PROJECTS WITH ECP FACULTY

Faculty	Project Description	Sponsor
Mahmoud Al-Kofahi (PI), Lisa Coles (CO-I)	Intranasal Delivery of Cortisol Stress Dosing in Patients with Adrenal Insufficiency	The Pediatric Device Innovation Consortium (PDIC) , University of Minnesota
Jeffrey Bishop (Mentor)	Cardiovascular Disease Genetics and Medications and Brain structure in Psychosis	Melendy/Peters Fdn., University of Minnesota College of Pharmacy
Lisa Coles (Mentor)	Effect of Potential Antiepileptogenic Drugs on Inflammation and Oxidative Stress in Animal Models of Post-traumatic Epilepsy.	Melendy/Peters Fdn., University of Minnesota College of Pharmacy
Elizabeth Hirsch (Mentor)	Comparison of Resistance Mechanisms Against Fosfomycin in <i>Pseudomonas aeruginosa</i> and Enterobacterales	University of Minnesota Undergraduate Research Opportunities Program (UROP)
Elizabeth Hirsch (Mentor)	Investigating Broth Microdilution as a Reference Method for Fosfomycin Susceptibility Testing Against <i>Escherichia coli</i>	University of Minnesota Undergraduate Research Opportunities Program (UROP)
R. Stephanie Huang (CO-PI)	Repurposing Drugs to Treat Androgen Receptor Independent Prostate Cancer	University of Minnesota Office of Academic Clinical Affairs (OACA) Faculty Research Development grant
R. Stephanie Huang (PI)	BioSpa 8 Automated Incubator for Automated Live Cell Analysis	UMN Office of the Vice President for Research (OVPR)
R. Stephanie Huang (Mentor)	Evaluating the Sexual Dimorphism in Drug Response	CTSI APReP summer scholarship
Michael Kotlyar (CO-I)	Conversational Agents and Interventions in Health Care	Minnesota Robotics Institute (UMN)
Ling Li (PI)	Modeling and Reversing Alzheimer's Pathology via Human Brain Organoids	Faculty Research Development Grant Program, OACA, UMN
Robert J. Straka (PI)	Assessment of Anticoagulants and Antiplatelets Dosing Requirement in Hmong (A4) Study in Hmong	University of Minnesota, College of Pharmacy
Robert J. Straka (Advisor)	Reducing Health Disparities in Cardiovascular Diseases through Individualized Approaches	University of Minnesota Graduate Program (DDF Fellowship)
Beshay Zordoky (Mentor)	CYP1B1 as a Therapeutic Target in Cardio-Oncology	UMN Clinical and Translational Science Institute (CTSI) Pathways to Research Program (PReP)

ONGOING SPONSORED PROJECTS WITH ECP FACULTY

Faculty	Project Description	Sponsor
Angela Birnbaum (Co-I)	Phase 1a/1b Clinical Trials of Multivalent Opioid Vaccine Components	NIH National Institute on Drug Abuse
Angela Birnbaum (Co-I)	A Randomized Trial of Medical Cannabis in Patients with Advanced Cancers to Assess Impact on Opioid Use and Cancer-Related Symptoms: A Pilot and Feasibility Study	Randy Shaver Foundation
Angela K. Birnbaum (Co-I), Richard C. Brundage (Co-I)	Maternal Outcomes and Neurodevelopmental Effects of Antiepileptic Drugs	NIH National Institute of Neurological Disorders and Stroke
Angela K. Birnbaum (Co-PI), Susan E. Marino (Co-PI), Ilo E. Leppik (Co-I)	Pharmacokinetics and Cognitive Side Effects of Cannabidiol in Adult Epilepsy Patients	Epilepsy Foundation of America
Angela K. Birnbaum (PI)	Pharsight-University of Minnesota Pharmacometrics Collaboration	Pharsight Corporation
Angela K. Birnbaum (Co-I)	Vaccines for Prescription Opioid and Heroin Abuse	NIH National Institute on Drug Abuse
Jeffrey Bishop (PI), Adam Lee	Epigenetics of PTSD Treatment Response	NIH National Center for Complementary and Integrative Health
Jeffrey Bishop (Co-I)	An Informatics Framework for Discovery and Ascertainment of Drug-Supplement Interactions	NIH National Center for Complementary and Integrative Health
Jeffrey Bishop (PI)	Pediatric CPIC Rx Study	Vanderbilt University
Jeffrey Bishop (Mentor)	Comorbidity: Substance Use Disorders and Other Psychiatric Conditions	NIH National Institute on Drug Abuse
Jeffrey Bishop (Mentor)	Polygenic Risk for Cardiovascular Diseases, Cardiovascular Medication Burden and Cognitive Performance in Patients with Psychotic Disorders	American College of Clinical Pharmacy
Richard Brundage (PI)	Pharmacometrics Traineeship	Pfizer Pharmaceuticals, Inc.
Richard Brundage (PI)	Ph2a SQ HC infusion pump in congenital adrenal hyperplasia IND125,640	DHHS Food and Drug Administration

Richard Brundage (PI)	Population Pharmacokinetics: Methadone-Antiretroviral Interactions	Hennepin Healthcare Research Institute
James Cloyd (PI), Lisa Coles (Co-I)	Phase I Study of Midazolam Pharmacokinetics, Pharmacodynamics and Adverse Effect following Intramuscular Injection in Dogs	Mesagreen Pharmaceutical Company
James Cloyd (Co-I)	Prodrug + Converting Enzyme Formulation for Rapid Intranasal Delivery of Midazolam to Treat Seizure Emergencies	Sollievo Pharmaceuticals, Inc.
James Cloyd (Co-I), Lisa Coles (Co-I), Reena Kartha (Co-I)	Identifying Biological Signatures of N-acetylcysteine for Non-Suicidal Self-Injury in Adolescents	NIH National Center for Complementary and Integrative Health
James C. Cloyd (Co-I), Lisa Coles (Co-I)	Epilepsy Bioinformatics Study for Antiepileptogenic Therapy (EpiBioS4Rx),	NIH National Institute of Neurological Disorders and Stroke
James C. Cloyd (PI), Lisa Coles (Co-I)	Established Status Epilepticus Treatment Trial (ESETT)	NIH National Institute of Neurological Disorders and Stroke
James C. Cloyd (Co-PI), Lisa Coles (Co-PI), Richard C. Brundage (Consultant)	Established Status Epilepticus Treatment Trial (ESETT) Pharmacokinetic/Pharmacodynamic Study	NIH National Institute of Neurological Disorders and Stroke
James C. Cloyd (Co-PI), Reena Kartha (Co-I)	Lysosomal Disease Network	NIH National Institute of Neurological Disorders and Stroke
James C. Cloyd (PI), Reena Kartha (Co-PI)	Role of Oxidative Stress and Inflammation in Type 1 Gaucher Disease: Potential Use of Antioxidant/Anti-Inflammatory Medications	Pfizer, Inc.
Lisa Coles (PI)	The Role of Beta-Catenin in the Pathophysiology of Infantile Spasms	Tufts University
Lisa Coles (Co-I)	Hypoglycemia After Exercise in Type 1 Diabetes: Intranasal Naloxone as a Novel Therapy to Preserve Hypoglycemia Counterregulation	Juvenile Diabetes Research Fdn.
Esam El-Fakahany (Co-I)	University of Minnesota Clinical and Translational Science Institute (UMN CTSI)	NIH National Center for Advancing Translational Science
Elizabeth B. Hirsch (PI)	A Retrospective Multi-Center Study to Assess Patient Outcomes Following Treatment	Merck & Co.

	with Ceftolozane/Tazobactam (C/T)	
Elizabeth B. Hirsch (PI)	Outcomes of Immunocompromised Patients Treated with Ceftolozane/Tazobactam	Merck & Co.
R. Stephanie Huang (PI)	Drug Repurposing in Breast Cancer	NIH National Cancer Institute
R. Stephanie Huang (PI)	Genetic Mechanisms Underlying Sexual Dimorphism in Cancer and Response to Therapy	NIH National Cancer Institute
Pamala Jacobson (PI)	Gut Microbiota and Effect on Immune Suppressants in Transplantation	National Institute Allergy and Infectious Disease
Reena Kartha (PI), James Cloyd (Co-I)	Use of Antioxidant or Anti-inflammatory Medications to Mitigate Oxidative Stress and Inflammation in Type1 Gaucher Disease (GD1)	Pfizer, Inc.
Mark N. Kirstein (Co-I)	Novel targeted Chemo/Immunotherapy Approach for Localized and Metastatic CaP	NIH National Cancer Institute
Mark N. Kirstein (Co-I)	Development of Mutation Suppression Therapy in a Swine Model of NF1	Recombinetics, Inc.
Mark N. Kirstein (Co-I)	Cancer Center Support Grant	NIH National Cancer Institute
Mark N. Kirstein (Co-I)	Novel Targeted Chemo/Immunotherapy Approach for Localized and Metastatic CaP	NIH National Cancer Institute
Michael Kotlyar (PI)	Effect of Banning Menthol Flavorant on Cigarette and e-Cigarette Use	NIH National Institute on Drug Abuse
Michael Kotlyar (Co-I)	Bupropion for the Prevention of Postpartum Smoking Relapse	NIH National Institute on Drug Abuse
Michael Kotlyar (Co-I)	AI-DCL: Addressing Sociotechnical Challenges of Conversational Agents and Interventions in the Context of Elderly Care	The National Science Foundation
Ilo Leppik (PI)	A Randomized, Double-Blind, Placebo-Controlled Study of the Safety and Efficacy of Intranasal Midazolam (USL261) in the	PharmaNet, Inc.

	Outpatient Treatment of Subjects with Seizure Clusters	
Ilo Leppik (PI)	A Randomized, Double-Blind, Placebo-Controlled Study to Evaluate the Efficacy and Safety of Sage-547 Injection in the Treatment of Subjects with Super-refractory Status Epilepticus	Sage Therapeutics, Inc.
Ling Li (PI)	HDL Mimetic Peptide-Mediated Enhancement of Neurovascular Function to Mitigate Cerebral Amyloid Angiopathy and Alzheimer's Disease	NIH National Institute on Aging
Ling Li (PI)	Dysregulation of Protein Prenylation in the Pathogenesis of Alzheimer's Disease	NIH National Institute on Aging
Ling Li (PI)	Testing a Unique HDL Mimetic Peptide to Reverse ApoE4 Lipidation Deficiency and Alzheimer's Neuropathology	NIH National Institute on Aging
Ling Li (Co-I)	Generating Exogenic Hippocampa	National Institutes of Health (NIH)
Ling Li (Co-I)	Macrophage Inflammasome Activation and the Mechanism of Lipolysis Resistance in Aged Adipose	NIH National Institute on Aging
Susan Marino (PI), Angela Birnbaum (Co-I)	Comparison of the Cognitive and Motor Effects of Treatment Between an Immediate- and Extended-Release Tacrolimus (Envarsus® XR)-Based Immunosuppression Regimen in Kidney Transplant Recipients	Veloxis Pharmaceuticals
Melanie Nicol (PI)	Evaluating Antiretroviral Pharmacology in the Female Genital Tract to Optimize HIV Prevention	NIH National Institute of Allergy and Infectious Diseases
Melanie Nicol (PI)	Pharmacology of Antiretrovirals in Anatomical Brain Tissue among Persons with Chronic HIV Infection	NIH National Institute of Neurological Disorders and Stroke
Melanie Nicol (Co-I)	Midwest Integration of the National HIV Curriculum (MINHC)	University of Illinois--Chicago
Melanie Nicol (Co-I)	Improving Diagnostics and Neurocognitive Outcomes in HIV/AIDS-related Meningitis	NIH National Institute of Neurological Disorders and Stroke

Melanie Nicol (Co-I)	Encochleated Oral Amphotericin for Cryptococcal Meningitis Trial	National Institutes of Health (NIH)
Melanie Nicol (Co-I)	Role of CNS Co-infections in HIV Viral Reservoirs	National Institutes of Health (NIH)
Melanie Nicol (Co-I)	Cryptococcal Antigen Screening Plus Sertraline (C-ASSERT)	NIH National Institute of Allergy and Infectious Disease
Shellina Scheiner (Co-I)	Treatment of Acute Pain	US Department of Health and Human Services AHRQ
Debra Skaar (Co-I)	Efficacy of Self-Management of Sedative Therapy by Ventilated ICU Patients	Mayo Clinic Rochester
Beshay Zordoky (PI)	Combating Cellular Senescence to Prevent Anthracycline Cardiotoxicity	St. Baldrick's Foundation

ONGOING INTRAMURAL PROJECTS WITH ECP FACULTY

Faculty	Full Project Name	Sponsor
Scott Chapman (PI)	An Evaluation of Enoxaparin Dosing as a Risk factor for Venous Thromboembolic Events in Critically Ill Patients	University of Minnesota
James Cloyd (Co-I)	Development of a Prodrug/Enzyme Nasal Spray for Rapid Delivery of Diazepam for Treatment of Seizure Emergencies	CTSI Committee on Pharmaceutical Development
James Cloyd (PI), Reena Kartha (Co-PI), Ling Li (Co-I),	Shared Equipment Upgrade (the Synergy 2 Microplate Reader)	UMN College of Pharmacy
Lisa Coles (PI), James C. Cloyd (Co-PI),	Development and Application of MRI Methods to Quantify Brain Energy Impairment and Drug Responses in Neurodegenerative Disorders	UMN AHC Faculty Development Grants
Elizabeth Hirsch (Co-I)	Program to Improve Quality and Safety of Outpatient Parenteral Antibiotic Treatment (OPAT) at UMMC	UMN Medical School Academic Investment Clinical Program
Elizabeth Hirsch (Research Co-Advisor)	Detection of Bacterial Pathogens and β -lactamases in Cystic Fibrosis Patient Samples Using Chemical Probes and	CTSI TL1 Predoctoral Scholar Program

	Flow Cytometry as a Novel Diagnostic Technique	
Pamala Jacobson (PI), Jeffrey Bishop (Co-I), R. Stephanie Huang (Co-I)	Grand Challenge 3: Statewide Implementation of Pharmacogenomics	UMN Provost's Office
Pamala Jacobson (Co-I)	Treatment of Microbiome Dysbiosis after HCT with Activated Charcoal	UMN CTSI
Pamala Jacobson (PI)	Microbiome and Immunosuppressants in Hematopoietic Cell Transplantation	UMN Masonic Cancer Center Chainbreaker
Reena Kartha (PI)	Synergistic Chaperone Activity of N-acetylcysteine and Its Metabolite L-cysteine in Gaucher Disease	Center for Orphan Drug Research
Michael Kotlyar (Co-I)	Improving Health and Well-Being with Personalized, Pervasive Technology	UMN Provost's Office
Ling Li (Co-PI)	Selective Activation of Neural Circuits of the Limbic System Involved in Alzheimer's Disease	UMN Institute for Engineering in Medicine
Ling Li (Core User)	Viral Vector and Cloning Core (VVCC)	UMN OVPR Research Infrastructure Investment Program
Melanie Nicol (PI)	The Role of Inflammation in Antiretroviral Concentrations in Genital and Central Nervous System Compartments	UMN CTSI K-R01 Transition to Independence Grant
Debra Skaar (Co-PI), Pamala Jacobson (Co-I), Schellina Scheiner (Co-I)	Creating a 21 st Century Precision Medicine Intensive Care Unit (ICU)	UMN College of Pharmacy
Robert J. Straka (PI), Jeffrey Bishop (Co-I)	Advancing Health Through Tailored Solutions: A Community Based Approach Towards Advancing Personalized Medicine in Underserved Populations (VIP-H Study)	UMN Grand Challenge Exploratory Research Award, Provost's Office
Robert Straka (Co-I)	The Effect of Ginger on the Gut Microbiome	UMN Minnesota Cancer Clinical Trials Network and Masonic Cancer Center
Robert J. Straka (PI)	Differences in Predicted Warfarin Dose for Hmong vs East Asians Using Genotype-based Dosing Algorithm	UMN CTSI
Robert J. Straka (Co-I)	A Pilot Trial to Examine the Effect of Aspirin on the Gut Microbiome	UMN CTSI Exploratory Grants
Beshay Zordoky (PI)	Hypertension Exacerbates Doxorubicin-induced Vascular Aging	UMN CTSI K-R01 Transition to Independence Grant

PUBLICATIONS

JOURNAL ARTICLES BY ECP FACULTY

(Key: **ECP Faculty**, **ECP Graduate Students**, **Post-Docs and Staff**)

2020 Journal Articles

- Abdelgawad, I. Y.**, Sadak, K. T., Lone, D. W., Dabour, M. S., Niedernhofer, L. J., & **Zordoky, B. N.** (2020). Molecular mechanisms and cardiovascular implications of cancer therapy-induced senescence. *Pharmacology & therapeutics*, 107751. 10.1016/j.pharmthera.2020.107751
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- Al-Kofahi, M.**, Ahmed, M. A., **Jaber, M. M.**, Tran, T. N., Willis, B. A., Zimmerman, C. L., . . . **Brundage, R. C.**, . . . **Sarafoglou, K.** (2020). An integrated PK-PD model for cortisol and the 17-hydroxyprogesterone and androstenedione biomarkers in children with congenital adrenal hyperplasia. *British journal of clinical pharmacology*. 10.1111/bcp.14470
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- Al-Kofahi, M.**, **Jacobson, P.**, Boulware, D. R., Matas, A., Kandaswamy, R., **Jaber, M. M.**, . . . **Nicol, M. R.** (2020). Finding the Dose for Hydroxychloroquine Prophylaxis for COVID-19: The Desperate Search for Effectiveness. *CLINICAL PHARMACOLOGY & THERAPEUTICS*, 108(4), 766-769. 10.1002/cpt.1874
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- Barkley, C. M.**, Hu, Z., Fieberg, A. M., Eberly, L. E., **Birnbaum, A. K.**, **Leppik, I. E.**, & **Marino, S. E.** (2021). An association between resting state EEG parameters and the severity of topiramate-related cognitive impairment. *Epilepsy and Behavior*, 114. https://api.elsevier.com/content/abstract/scopus_id/85096999177 10.1016/j.yebeh.2020.107598
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- Begnaud, A., Yang, P., Robichaux, C., Rubin, N., Kratzke, R., Melzer, A., . . . **Jacobson, P.** (2020). Evidence That Established Lung Cancer Mortality Disparities in American Indians Are Not Due to Lung Cancer Genetic Testing and Targeted Therapy Disparities. *CLINICAL LUNG CANCER*, 21(3), E164-E168. 10.1016/j.clc.2019.10.012
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- Berti, A. D., & **Hirsch, E. B.** (2020). Tolerance to antibiotics affects response. *Science (New York, N.Y.)*, 367(6474), 141-142. 10.1126/science.aba0150
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- Birnbaum, A. K.**, Meador, K. J., **Karanam, A.**, Brown, C., May, R. C., Gerard, E. E., . . . Pennell, P. B. (2020). Antiepileptic Drug Exposure in Infants of Breastfeeding Mothers With Epilepsy. *JAMA NEUROLOGY*, 77(4), 441-450. 10.1001/jamaneurol.2019.4443
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- Blaes, A., Konety, S., & **Zordoky, B.** (2020). Response to Schoormans. *Journal of the National Cancer Institute*. 10.1093/jnci/djaa158
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- Illamola, S. M., Amaeze, O. U., Krepkova, L. V., Birnbaum, A. K., Karanam, A., Job, K. M., . . . Enioutina, E. Y. (2020). Use of Herbal Medicine by Pregnant Women: What Physicians Need to Know. *Frontiers in pharmacology*, 10, 1483. 10.3389/fphar.2019.01483
- Jaber, M. M., Al-Kofahi, M., Sarafoglou, K., & Brundage, R. C. (2020). Individualized Absorption Models in Population Pharmacokinetic Analyses. *CPT: pharmacometrics & systems pharmacology*, 9(6), 307-309. 10.1002/psp4.12513
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- Lizano, P., Lutz, O., Xu, Y., Rubin, L. H., Paskowitz, L., **Lee, A. M.**, . . . **Bishop, J. R.** (2020). Multivariate relationships between peripheral inflammatory marker subtypes and cognitive and brain structural measures in psychosis. *Molecular Psychiatry*. 10.1038/s41380-020-00914-0
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Sathe, A. G., Tuite, P., Chen, C., Ma, Y., Chen, W., Cloyd, J., . . . Coles, L. D. (2020). Pharmacokinetics, Safety, and Tolerability of Orally Administered Ursodeoxycholic Acid in Patients With Parkinson's Disease-A Pilot Study. *Journal of clinical pharmacology*, 60(6), 744-750. 10.1002/jcph.1575

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- Skipper, C. P., Pastick, K. A., Engen, N. W., Bangdiwala, A. S., Abassi, M., Lofgren, S. M., . . . **Nicol, M. R.**, . . . Boulware, D. R. (2020). Hydroxychloroquine in Nonhospitalized Adults With Early COVID-19. *Annals of Internal Medicine*, 173(8), 623-631. <http://dx.doi.org/10.7326/m20-4207> 10.7326/m20-4207
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- Swaminathan, S. K., Zhou, A. L., Ahlschwede, K. M., Curran, G. L., Lowe, V. J., **Li, L.**, & Kandimalla, K. K. (2020). High-Density Lipoprotein Mimetic Peptide 4F Efficiently Crosses the Blood-Brain Barrier and Modulates Amyloid- β Distribution between Brain and Plasma. *The Journal of pharmacology and experimental therapeutics*, 375(2), 308-316. 10.1124/jpet.120.265876
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- Takahashi, T.**, Luzum, J. A., **Nicol, M. R.**, & **Jacobson, P. A.** (2020). Pharmacogenomics of COVID-19 therapies. *NPJ genomic medicine*, 5, 35. 10.1038/s41525-020-00143-y
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- Zhang, L., Brown, S. J., Shan, Y., **Lee, A. M.**, Allen, J. D., Eum, S., . . . **Bishop, J. R.** (2020). CYP2D6 Genetic Polymorphisms and Risperidone Pharmacokinetics: A Systematic Review and Meta-analysis. *Pharmacotherapy*, 40(7), 632-647. 10.1002/phar.2434
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- Zhang, W., Lei, D., Keedy, S. K., Ivleva, E. I., Eum, S., Yao, L., . . . **Bishop, J. R.**, . . . Sweeney, J. A. (2020). Brain gray matter network organization in psychotic disorders. *Neuropsychopharmacology : official publication of the American College of Neuropsychopharmacology*, 45(4), 666-674. 10.1038/s41386-019-0586-2
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- Zhou, J., **Terluk, M. R.**, Basso, L., **Mishra, U. R.**, Orchard, P. J., **Cloyd, J. C.**, . . . **Kartha, R. V.** (2020). N-acetylcysteine Provides Cytoprotection in Murine Oligodendrocytes through Heme Oxygenase-1 Activity. *Biomedicine*, 8(8). 10.3390/biomedicine8080240

OTHER PUBLICATIONS BY ECP FACULTY

2020 Other Publications by ECP Faculty

Birnbaum, A. K., Meador, K. J., & Pennell, P. B. (2020). *Exposure of Infants Who Are Breastfed to Antiepileptic Drugs* Reply 12th ed., vol. 77, 1578-1578. JAMA NEUROLOGY. 10.1001/jamaneurol.2020.3033

Hermes, E. N., **Bishop, J. R.**, Okuneye, V. T., Tamminga, C. A., Keshavan, M. S., Pearlson, G. D., . . . Keedy, S. K. (2020). *No connectivity alterations for striatum, default mode, or salience network in association with self-reported antipsychotic medication dose in a large chronic patient group.* vol. 223, 359-360. Schizophrenia Research. 10.1016/j.schres.2020.06.017

Ramsey, L. B., Namerow, L. B., **Bishop, J. R.**, Hicks, J. K., Bousman, C., Croarkin, P. E., . . . Strawn, J. R. (2020). *Thoughtful Clinical Use of Pharmacogenetics in Child and Adolescent Psychopharmacology.* Journal of the American Academy of Child and Adolescent Psychiatry. 10.1016/j.jaac.2020.08.006

Brown, J. T., **Bishop, J. R.**, & Schneiderhan, M. E. (2020). *Using pharmacogenomics and therapeutic drug monitoring to guide drug selection and dosing in outpatient mental health comprehensive medication management.* 4th ed., vol. 10, 254-258. The mental Health Clinician. 10.9740/mhc.2020.07.254

Sarafoglou, K., **Jaber, M. M.**, **Al-Kofahi, M.**, & **Brundage, R. C.** (2020). *Hydrocortisone suspension formulations are not necessarily the same in the treatment of children with congenital adrenal hyperplasia.* 6th ed., vol. 183, L27-L28. European journal of endocrinology. 10.1530/EJE-20-0938

Zordoky, B. (2020). *Cardiovascular Vulnerability to COVID-19 in Cancer Survivors.* MDPI AG. <http://dx.doi.org/10.20944/preprints202004.0128.v1> 10.20944/preprints202004.0128.v1

Grant, M. K., **Abdelgawad, I. Y.**, Lewis, C. A., Seelig, D., & **Zordoky, B. N.** (2020). *Isoproterenol-induced Cardiac Dysfunction in Male and Female C57Bl/6 Mice.* Cold Spring Harbor Laboratory. <http://dx.doi.org/10.1101/2020.04.17.046417> 10.1101/2020.04.17.046417

TEACHING

The College of Pharmacy consistently ranks among the top three pharmacy schools in the country for the quality of its PharmD program. Faculty fill a variety of roles in the educational process, including course director, lecturer, discussant, seminar participant, and others. In addition to these classroom roles, faculty also serve as mentors and advisors to students, providing them with one-on-one training and counsel as they prepare for their careers.

In 2019, ECP faculty contributed significant, didactic education to PharmD classes. This instruction included teaching and directing the required pharmacotherapy series and the pharmaceutical care skills course sequence, as well as teaching elective courses. Instruction to pharmacy students also included experiential education in acute care, geriatric patient care, pediatric infectious disease, and clinical toxicology. The department also offers a research emphasis track for PharmD students which pairs students with an advisor(s) in the Clinical Pharmacology Research Emphasis program. In addition to coursework, students choose a research topic in experimental, translational, or clinical pharmacology for their PharmD paper project.

ECP faculty also teach graduate program classes. While these are primarily designed to support the department's own graduate students, the courses also include students in nursing, public health, geriatrics, and genetics, as well as graduate students in other College of Pharmacy programs.

TEACHING-RELATED METRICS IN ECP

- (unspecified) Students mentored by ECP faculty 4
- Undergraduate students mentored or advised by ECP faculty 8
- Graduate/Professional students mentored or advised by ECP faculty 60

Reported Student Credit Hours by Course Level

Course level	Credit hours	# of sections
1000	60	1
4000	-	-
5000	16	2
6000	3,469	45
7000	5,150	23
8000	130	64

SERVICE

ECP faculty discover opportunities for service both within and outside the University. The hours spent offering expertise and guidance are a way to give back to students, the community, and the field. In 2019, faculty members served on boards of directors or advisory councils of research organizations and others reviewed grant proposals and/or faculty promotion documents for institutions across the country. While much of the service performed by ECP faculty is performed on behalf of the department, college, and university in which they work, they also support their colleagues and their profession.

SERVICE-RELATED METRICS IN ECP

Service commitments to the discipline or profession	228
Service commitments to the university, college, or department	216
External and public service commitments	31
Professional memberships	66
Professional development activities	187
Licensures & certifications	33
Peer mentorship relationships	66

ECP GRADUATE PROGRAM

The ECP Graduate Program provides individualized, hands-on learning experiences to those who will become tomorrow's leaders in experimental and clinical pharmacology research and teaching.

The ECP Graduate Program is an innovative, interdisciplinary program that trains students to conduct research utilizing methodology from basic and clinical pharmacology perspectives. Designed specifically for students interested in clinical research, the goal of the program is to advance the science of human pharmacology and therapeutics to improve the safe, effective, and economical use of drugs by patients. Students study such topics as experimental pharmacotherapy, drug metabolism, infectious disease, pharmacometrics, neuropharmacology/neuroscience, and pharmacogenomics. Graduates are prepared for distinguished careers in clinical research.

ECP GRADUATE PROGRAM-RELATED METRICS

- PhD degrees completed 33
- MS degrees completed 5
- ECP program graduates 3
- Students in ECP graduate program 22

ECP DOCTORAL GRADUATES

Name	Advisor	Thesis Title
Abhishek Sathe, MS	Lisa Coles, PhD	Clinical Pharmacology of First- and Second-line Treatments of Convulsive Status Epilepticus
Ashwin Karanam, PharmD	Angela Birnbaum, PhD	Quantitative pharmacological approaches for characterizing lamotrigine pharmacokinetics in special populations of pregnancy, postpartum and breastfeeding infants to prospectively optimize dosing

ECP MASTERS GRADUATES

Name	Advisor	Thesis Title
Scott Luisi	Susan Marino, PhD	Topiramate Induced Alteration in Frontal Lobe eLORETA-ICA Resting State Network Activity is Associated with Baseline Semantic Fluency Performance

FELLOWSHIPS AND AWARDS FOR GRADUATE STUDENTS

Name	Fellowships/Awards
Ibrahim Abdelgawad	Best Poster Award Rho Chi Research Day College of Pharmacy
Charul Avachat	ECP Fellowship
Morgan Bixby	Coin Fellowship
Yingbo Huang	CTSI APreP Summer Scholar, 3M Science and Technology Fellowship, Best Abstract Award at American Association of Pharmaceutical Scientists (AAPS)
Mu'taz Jaber	2020 ACCP/ISoP SIG Student Award, ACCP Annual Meeting
Angela Jeong	Kwanjeong Educational Foundation Overseas Scholarship, Best Poster Award Rho Chi Research Day College of Pharmacy
Ashwin Karanam	Chair of ISoP Student Community
Sarah Kim	Frieda M. Kunze Fellowship, NIH Loan Repayment, <i>WORLDSymposium</i> Young Investigator Award, Rowell Fellowship, Lysosomal Disease Network Fellow
David Margraf	UMN Health Data Competition - Finalist MDH all payer claims database
Siddhee Sahasrabudhe	Rare Disease Scholar 2020 (RDCRN-NIH), James Cloyd Fellowship
Abhishek Sathe	2020 Rare Disease Day Research Award, University of Minnesota
Takuto Takahashi	Outstanding Hematology/Oncology Fellow and Resident Award, MSCO 2020 Spring Conference, FQUAD Fellow Prize, Dept of Pediatrics, UMN, Nesbit Fellowship Travel Award, Pediatric Hematology/Oncology, UMN
Ya-Feng Wen	University of Minnesota Doctoral Dissertation Fellowship, Straka Fellowship
Rui Zhong	College of Pharmacy 3 Minute Thesis Winner, University 3MT People's Choice and Second Place Winner, James Cloyd Fellowship

ECP RESEARCH EMPHASIS TRACK GRADUATES

ECP also provides professional students in the PharmD program an opportunity to specialize in research by participating in the ECP Research Emphasis Track.

Name	Advisor
Joseph Corbino	Melanie Nicol
Parker Johnson	James Cloyd
Steven Just	Pamala Jacobson
An Le	Melanie Nicol
Irene Lin	Ling Li and Karunya Kandimalla
Melanie Mahoney	Elizabeth Hirsch
Megan Olander Hundertmark	Jacob Brown
Elizabeth Smith	Elizabeth Hirsch
Boguang Sun	Robert Straka
Thang Tran	Richard Brundage

PUBLICATIONS BY GRADUATE STUDENTS & POST-DOCS

2020 Journal Articles

Ababneh M, **Jaber M**, Rababa A, Ababneh F. Seasonal influenza vaccination among older adults in Jordan: prevalence, knowledge, and attitudes. *Hum Vaccin Immunother.* 2020;00(00):1-5. doi: 10.1080/21645515.2020.1718438

Abdelgawad, Ibrahim Y, Sadak, Karim T, Lone, Diana W, Dabour, Mohamed S, Niedernhofer, Laura J, and **Zordoky, Beshay N** "Molecular Mechanisms and Cardiovascular Implications of Cancer Therapy-induced Senescence". *Pharmacology & Therapeutics*: 0163-7258, Page: 107751.

Al-Kofahi, M., Ahmed, M. A., & **Jaber, M. M.** (n.d.). *An integrated PK-PD model for cortisol and the 17-hydroxyprogesterone and androstenedione biomarkers in children with congenital adrenal hyperplasia.* 612–624. <https://doi.org/10.1111/bcp.14470>

Al-Kofahi, M., **Jacobson, P.**, Boulware, D. R., Matas, A., Kandaswamy, R., **Jaber, M. M.**, Rajasingham, R., Young, J. A. H., & **Nicol, M. R.** (2020). Finding the dose for hydroxychloroquine prophylaxis for COVID-19; the desperate search for effectiveness. *Clinical Pharmacology and Therapeutics*, 0(0), 6–9. <https://doi.org/10.1002/cpt.1874>

Al-Rayess, H., Fleissner, K., **Jaber, M.**, **Brundage, R. C.**, & **Sarafoglou, K.** (2020). Manipulation of Hydrocortisone Tablets Leads to Iatrogenic Cushing Syndrome in a 6-Year-Old Girl With CAH. *Journal of the Endocrine Society*, 4(8), 1–11. <https://doi.org/10.1210/jendso/bvaa091>

Chernick, D*.; **Zhong, R*** (*co-first author); **Li, L.** The Role of HDL and HDL Mimetic Peptides as Potential Therapeutics for Alzheimer's Disease. *Biomolecules* 2020, 10, 1276.

Grant, Marianne KO, Abdelgawad, Ibrahim Y, Lewis, Christine A, **Zordoky, Beshay N** (2020) "Sexual Dimorphism in Doxorubicin-induced Systemic Inflammation: Implications for Hepatic Cytochrome P450 Regulation" *International Journal of Molecular Sciences* 21 (4), 1279

Grant, Marianne KO, Abdelgawad, Ibrahim Y, Lewis, Christine A, Seelig, Davis, **Zordoky, Beshay N** (2020) "Lack of sexual dimorphism in a mouse model of isoproterenol-induced cardiac dysfunction" *PloS one*, 15(7), e0232507.

Holzer K, Culhane-Pera KA, **Straka RJ**, **Wen YF**, Lo M, Lee K, Xiong T, Peng K, **Bishop J**, Thyagarajan B, HA Zierhut. Hmong participants' reactions to return of individual and community pharmacogenetic research results: "A positive light for our community". *Journal of Community Genetics*, 2020.

Hough R, **Wen YF**, Huff JT, Kibert J, Finks SW. Hypertension; Chapter in *Pharmacotherapy Principles & Practice*, Sixth Edition by Marie A. Chisholm-Burns, Terry L. Schwinghammer, Barbara G. Wells, Patrick M. Malone, Jill M. Kolesar, Joseph T. DiPiro McGraw-Hill 2020.

Huang, Y., **Alexander, L.**, Pareek, S., **Huang, R. S.** (2020) Oncogene or tumor suppressor? -- Long Noncoding RNAs role in Patient's Prognosis Varies Depending on Disease Type. *Translational Research*, doi: 10.1016/j.trsl.2020.10.011

Huang, Y., Lu, Y., Vadlamudi, M., Zhao, S., Felmlee, M., Rahimian, R., & Guo, X. (2020). Intrapulmonary inoculation of multicellular spheroids to construct an orthotopic lung cancer xenograft model that mimics four clinical stages of non-small cell lung cancer. *Journal of Pharmacological and Toxicological Methods*, 106885.

Illamola SM, Amaeze OU, Krepkova LV, **Birnbaum AK**, **Karanam A**, Job KM, Bortnikova VV. Use of Herbal Medicine by Pregnant Women: What Physicians Need to Know. *Front Pharmacol.* 2020;10:1483. 2020 Jan 9. <https://doi.org/10.3389/fphar.2019.01483>

Jaber, M M, Al-Kofahi, M, Sarafoglou, K, and Brundage, R C, "Individualized absorption models in population pharmacokinetic analyses," *CPT Pharmacometrics Syst. Pharmacol.*, pp. 1–3, 2020, doi: 10.1002/psp4.12513.

Mustafa HJ, Wong HL, Al-Kofahi M, Schaefer M, Karanam A, Todd MM. Bupivacaine Pharmacokinetics and Breast Milk Excretion Following Liposomal Bupivacaine use in Cesarean Birth. *Obstetrics & Gynecology*. Accepted March 2020.

Ou L, Przybilla MJ, Ahlat O, Kim S, Overn P, Jarnes J, O'Sullivan GM, Whitley CB. A highly efficacious gene editing system corrects metabolic and neurological complications of Hurler syndrome. *Mol Ther*.

Pareek, S., Huang, Y., Nath, A., & Huang, R. S. (2020). The success story of drug repurposing in breast cancer. In *Drug Repurposing in Cancer Therapy* (pp. 173-190). Academic Press. Book Chapter.

Sarafoglou, K., Jaber, M. M., Al-Kofahi, M., & Brundage, R. C. (2020). Hydrocortisone suspension and hydrocortisone tablets are not bioequivalent in the treatment of children with congenital adrenal hyperplasia. *European Journal of Clinical Pharmacology*. <https://doi.org/10.1530/EJE-20-0938>

Sathe AG, Elm JJ, Cloyd JC, Chamberlain JM, Silbergleit R, Kapur J, Cock HR, Fountain NB, Shinnar S, Lowenstein DH, Conwit RA, Bleck TP, and Coles LD: Association of Patient Weight and Dose of Fosphenytoin, Levetiracetam and Valproic acid with Treatment Success in Status Epilepticus, *Epilepsia*, May 2020, 0 (0), 1-5.

Sathe AG, Mishra U, Cloyd JC, Elm JJ, Chamberlain JM, Silbergleit R, Kapur J, Cock HR, Fountain NB, Shinnar S, Lowenstein DH, Babcock L, and Coles LD: Exposure of Fosphenytoin, Levetiracetam and Valproic acid After High Dose Intravenous Administration in Children in Benzodiazepine-refractory Status Epilepticus, *Journal of Clinical Pharmacology* 2020, 0(0), 1-6.

Sathe AG, Tuite P, Chen C, Ma Y, Chen W, Cloyd J, Low WC, Steer CJ, Lee BY, Zhu XH and Coles LD: Pharmacokinetics, Safety and Tolerability of Orally Administered Ursodeoxycholic Acid in Patients with Parkinson Disease- A Pilot Study, *Journal of Clinical Pharmacology* 2020, 60 (6), 744-750.

Sun, B., Wen, Y. F., Culhane-Pera, K. A., Lo, M., Xiong, T., Lee, K., ... & Straka, R. J. (2020). Differences in predicted warfarin dosing requirements between Hmong and East Asians using genotype-based dosing algorithms. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*. 2020 Nov 17. doi: 10.1002/phar.2487

Takahashi T, Hobday, Patricia M., Pozos, Tamara C., Gordon, Peter M., *Journal of Pediatric Hematology/Oncology*, 2020 June, doi: 10.1097/MPH.0000000000001869. Online ahead of print.

Takahashi T, Jacobson, Pamala, Luzum, Jasmine, Nicol, Melanie, *npj Genomic Medicine*, 5, 35, 2020 August, <https://doi.org/10.1038/s41525-020-00143-y>

Takahashi T, Prensner, John, Robson, Caroline, Janeway, Katherine, Weigel, Brenda, *Pediatric Blood and Cancer*, 2020 August, doi: 10.1002/pbc.28636. Online ahead of print.

Takahashi T, Smith AR, Jacobson PA, Fisher J, Rubin NT, Kirstein MN "Antimicrobial Agent and Chemotherapy, 2020 September, DOI: 10.1128/AAC.00653-20. Online ahead of print

Wen YF, Culhane-Pera KA, Thyagarajan B, Bishop J, Zierhut H, Muaj Lo M, Xiong T, Peng K, Holzer K, Lee K, and Straka RJ. Differences in Allele Frequency between Minnesota Hmong and East Asian Population in Key Genetic Variants within Very Important Pharmacogenes (VIPs). *Pharmacotherapy* 2020;40(2):142-52. Epub 2019/12/31.

PRESENTATIONS BY GRADUATE STUDENTS & POSTDOCS

2020 Abstracts, Posters, and Presentations

Abdelgawad IY, Grant MKO, Lewis C, Largaespada D, Popescu F, and Zordoky BN. Doxorubicin Cardiotoxicity in Young Tumor-Bearing Mice. *The FASEB Journal*, 2020. 34(S1): p. 1-1

Abdelgawad IY, Grant MKO, Lewis C, Largaespada D, Popescu F, and Zordoky BN (2020). Characterizing Doxorubicin Cardiotoxicity in Young Tumor-Bearing Mice. Research Day, College of Pharmacy, University of Minnesota

Avachat, Charul, Characterization of lamotrigine dosing scenarios when co-prescribed with combined oral contraceptives" Poster at American Epilepsy Society annual meeting: December 2020

Cheng S., Flora D.R., Tracy T. S., Rettie A.E., **Brundage R.C.** American Conference of Pharmacometrics (ACOP) 11 (Virtual, 2020) Genotype-Dependent Changes in Warfarin Clearance upon Co-administration of an Inhibitor (fluconazole) and an inducer (rifampin): A Model-based Analysis.

Cheng S., Tracy T. S., **Brundage R. C.** University of Minnesota College of Pharmacy Annual Research Day (MN, 2020) Evaluation of the Impact of CYP2C9 Genetic Polymorphism on S Warfarin Drug-Drug Interactions using a Pharmacometric Approach

Grant, M. K., Seelig, D., **Abdelgawad, I.**, & **Zordoky, B.** (Corresponding Author) (2020). Absence of Sexual Dimorphism in Isoproterenol-induced Cardiac Dysfunction in C57BL/6 Mice (Suppl_1 ed., vol. 127). *Circulation Research*. https://doi.org/10.1161/res.127.suppl_1.411

Huang, Yingbo; Huang, R. Stephanie, Pan-cancer Analysis of Key Long-noncoding RNAs Related to Patient's Prognosis. *Virtual Pharmacy Education 2020, AACP, 07/13/2020*

Huang, Yingbo, Ling, Alexander, Pareek, Siddhika, **Huang, R. Stephanie**; Long Noncoding RNAs role in Patient's Prognosis Varies Depend on the Disease Types. Pharmacogenomics Conference 2020, UMN.

Huang, Yingbo; Zhongyue, Y; Zizhao, X; Yong, Z; Roshanak, R; Xin, G. Co-culturing Cancer and Fibroblast Cells into Multicellular Spheroids to Mimic Solid Tumor. *Virtual AAPS PharmSci 360 Conference, 2020*.

Huang, Yingbo; Zizhao, X; Zhongyue, Y; Yifan, L; Mallika, V; Shen, Z; Yong, Z; Melanie, F; Roshanak, R; Xin, G. Intrapulmonary Inoculation of Multicellular Tumor Spheroids to Construct an Orthotopic Lung Cancer Xenograft Model. *Virtual AAPS PharmSci 360 Conference, 2020*.

Jaber MM, "HydroC-Precision: An Integrated Hydrocortisone Dosing and Biomarker Platform for Treating Children with Congenital Adrenal Hyperplasia". ACCP/ISoP SIG Meeting. Oct 2, 2020

Jaber MM, Sarafoglou K, Al-Kofahi M, Brundage RC. "Application of a Deep Learning Algorithm as a Prescreening Tool to Assign Individualized Absorption Models in a Population Pharmacokinetic Analysis". International Society of Pharmacometrics 2020. American Conference of Pharmacometrics 11 (ACoP11). Denver, CO, Oct 2020.

Jaber MM, Sarafoglou K, Al-Kofahi M, Brundage RC. "HydroC-Precision: An Integrated Hydrocortisone Dosing and Biomarker Platform for Treating Children with Congenital Adrenal Hyperplasia". American College of Clinical Pharmacology 2020 Annual meeting, Sept 2020.

Jeong Angela, Role of protein prenylation in the pathogenesis of Alzheimer's Disease. University of Minnesota College of Pharmacy Rho Chi Research Day. Minneapolis, MN

Kim, Sarah. Platform presentation, *WORLDSymposium*, Orlando, FL, Feb 2020.

Nelson JM, **Wen YF**, Culhan-Pera KA, Lo M, Xiong T, Lee K, Peng K, Thyagarajan B, **Bishop J**, Zierhut H, **Straka RJ**. Pharmacogenomics as a guide to improve antidepressant drug selection and dosing in the Minnesota Hmong. October 24-27, 2020. American College of Clinical Pharmacy Annual Meeting, Virtual.

Prensner JR, **Takahashi T**, Robson CD, Tewari M, Iloeje U, Weigel BJ, Janeway KA, Use of the Gamma-Secretase Inhibitor Nirogacestat in Pediatric Desmoid Tumor: A Report of Four Cases. Poster session (presented virtually due to COVID-19 global pandemic), 2020 The American Society of Pediatric Hematology/Oncology Annual Conference

Sahasrabudhe SA, **Kartha RV**, Ng M, **Cloyd JC**, Orchard PJ, **Brundage RC**, **Coles LD** (2020) Population Pharmacokinetic Analysis of N-acetylcysteine in Pediatric Patients with Inherited Metabolic Disorders Undergoing Hematopoietic Stem Cell Transplant, Poster presented at ACoP11 (ISSN:2688-3953, 2020, Vol 2)

Sathe AG, **Coles LD**, Underwood E, Elm J, Silbergleit R, Chamberlain J, Kapur J, Cock H, Fountain N, Shinnar S, Lowenstein D, Conwit R, Bleck TP and **Cloyd JC**: Underdosing of Benzodiazepines in Patients with Status Epilepticus Enrolled in the Established Status Epilepticus Treatment Trial (ESETT) at Rare Disease Day in Minneapolis, MN in Feb 2020.

Sathe AG, Othman AA and Mohamed MEF: Pharmacokinetics of Cytochrome P450 probe substrates in healthy subjects and psoriasis patients- A model-based comparison to inform therapeutic proteins-drug interaction potential, American Society for Clinical Pharmacology and Therapeutics published in Clinical Pharmacology and Therapeutics 107, S38, March 2020.

Takahashi T, Arora M, Okoiev G, DeFor TE, Weisdorf DJ, MacMillan ML. "Pediatric Late-onset Acute and Chronic Graft-versus-host Disease: A single center cohort study 2007-201" Poster session, 2020 TCT | Transplantation & Cellular Therapy Meetings of ASTCT and CIBMTR, Orlando, FL

Takahashi, Takuto, Rachael Pearson, Qing Cao, **Pamala Jacobson**, Effects of Genetic Polymorphism on Pharmacokinetics of Cyclophosphamide in Conditioning Regimen for Adult Hematopoietic Cell Transplant Patients, 2020 Minnesota Society of Clinical Oncology conference, virtual conference.

Wan, Fang, Review: Hydroxychloroquine and Chloroquine for Treatment of SARS-CoV-2 (COVID-19) (Open Forum Infect Dis. 2020 Apr 15;7(4):ofaa130. doi: 10.1093/ofid/ofaa130. eCollection 2020 Apr.)

Wen YF, **Brundage R**, **Straka RJ**. The Impact of *SLC22A12* Genotype on Pharmacokinetics and Pharmacodynamics of Allopurinol in Hmong with Gout and/or Hyperuricemia. November 9-13, 2020. American Conference on Pharmacometrics 11, Virtual. Poster THU-070.

Wen YF, Gaedigk A, Boone E, Wang W, **Straka RJ**. Genetic variation of *CYP2D6* in US Hmong, an Underserved Community. October 26, 2020. Pharmacogenomics Research Network Conference, Virtual. Poster 52.

Wen YF, Sayre F, Nelson J, **Straka RJ**. Systematic review of genetic factors related to the selection and use of urate lowering therapy in patients with gout and/or hyperuricemia. (accepted at 2020 ASCPT Annual Conference, Houston, TX).

Rui Zhong, Dustin Chernick, David Hottman, **Ling Li**. "The HDL mimetic peptide 4F mitigates amyloid and associated neuroinflammation in a transgenic model of cerebral amyloid angiopathy and Alzheimer's disease". February 25, 2020. College of Pharmacy Research Day. Minneapolis, MN.

ECP RESEARCH SEMINAR (ECP 8100)

Both graduate students and postdoctoral associates present at the weekly research seminar.

Date - Spring 2020	Title	Presenter
January 22	Course Introduction and Orientation Research Emphasis Track	Mahmoud Al-Kofani , PhD, DDS, Assistant Professor ECP L'Aurelle Johnson , PhD, Assistant Professor ECP; Assoc. Director of Grad Studies Robert Straka , BSc, PharmD, FCCP, Professor and ECP Department Head
January 29	Doxorubicin induces Endothelial Cell Senescence	Ibrahim Abdelgawad , ECP PhD Student, Dr. Beshay Zordoky's Lab
February 5	Pharmacokinetics of Cannabidiol	Charul Avachat , MS, ECP PhD Student, Dr. Angela Birnbaum's Lab
February 12	Asymptomatic Bacteriuria: Why We Should Let It Be	Morgan Bixby , ECP MS Student, Dr. Elizabeth Hirsch's Lab
February 19	Modulating Neuroimmune Function to Mitigate Vascular and Cortical Amyloid Pathology in a Transgenic Mouse Model of AD	Rui Zhong , ECP PhD Student, Dr. Ling Li's Lab
February 26	Biological Signatures of N-acetylcysteine in Non-Suicidal Self-Injury: Design of a Clinical Study	Siddhee Anand Sahasrabudhe , MS, ECP PhD Student, Dr. Kartha's Lab
March 4	Pan-cancer Analysis of Key Long-noncoding RNAs Related to Patient's Overall Survival	Yingbo Huang , MS, ECP PhD Student, Dr. Stephanie Huang's Lab
March 18	The Application of Target Mediated Drug Disposition Model for Warfarin Pharmacokinetics	Shen Cheng , MS, ECP PhD Student, Dr. Richard Brundage Lab
March 25	Endosomal cargo sorting and VPS35 in Alzheimer's disease and related tauopathies: therapeutic implications	Domenico Praticò , MD, FCPP, Professor, Pharmacology, Immunology and Microbiology, Lewis Katz School of Medicine, Temple University
April 1	Faculty research presentations	Dr. James Cloyd and Dr. Robert Kriel
April 8	Role of inflammation in HIV prevention in Women	Alyssa Lantz , ECP PhD Student, Dr. Melanie Nicol's Lab
April 15	Glycoengineered MSCs as cell based therapeutics	Judy (Mei-Chi) Su , MS, ECP PhD Student, Dr. Swayam Prabha's Lab
April 22	Impact of Obesity on the Pharmacokinetics of Voriconazole in Children Undergoing Stem Cell Transplant	Takuto Takahashi , MD, ECP MS Student, Dr. Mark Kirstein Advisor
April 29	Using Imputed Drug Sensitivities to Predict Candidate Drugs in Advanced Prostate Cancer	Joshua Mentzer , ECP PhD Student, Dr. Stephanie Huang's Lab
May 6	Graduate student research updates	ECP Graduate Students

Date - Fall 2020	Title	Presenter
Sept. 9	Course Introduction and Orientation Research Emphasis Track	Mahmoud Al-Kofani , PhD, DDS, Assistant Professor ECP L'Aurelle Johnson , PhD, Assistant Professor ECP; Assoc. Director of Grad Studies Robert Straka , BSc, PharmD, FCCP, Professor and ECP Department Head
Sept. 16	Novel Variants within CYP2D6 in An Underserved Community Using Next-Generation Sequencing	Jay (Ya-Feng) Wen , PharmD, ECP Graduate Student, Dr. Robert Straka's Lab
Sept. 23	Faculty research presentations; COVID-19 research update	Melanie Nicol , PharmD, PhD; Mahmoud Al-Kofahi , DDS, PhD; Pamala Jacobson , PharmD, FCCP
Sept. 30	Safety Update	DEHS speakers: Jodi Ogilvie , PhD, and Nancy Rolstad , MS, RBP
October 7	Delivering Therapeutic Biologics into the CNS	Sarah Kim , PharmD, ECP Graduate Student, Dr. Jeanine Jarnes's Lab
October 21	Using Imputed Drug Sensitivities to Predict Candidate Drugs in Advanced Prostate Cancer	Josh Mentzer , ECP Graduate Student, Dr. Stephanie Huang's Lab
October 28 CANCELLED	Levetiracetam Pharmacokinetics in women of childbearing age	Charul Avachat , MS, ECP Graduate Student, Dr. Angela Birnbaum's Lab
November 4	Investigating inner colonies of <i>Pseudomonas aeruginosa</i> during susceptibility testing	Morgan Bixby , ECP Graduate Student, Dr. Elizabeth Hirsch's Lab
Nov. 11	Clinical use of antidepressants in pregnancy. Changes in drug disposition.	Silvia M. Illamola , PharmD, PhD, Research Associate
Nov. 18	Sex Differences in the Human Liver Transcriptome	Yingbo Huang , MS, ECP Graduate Student, Dr. Stephanie Huang's Lab
December 2	Post mortem tissue analysis to assess drug penetration in potential HIV reservoirs	Fan Wang , MS, ECP Graduate Student, Dr. Melanie Nicol's Lab
December 9	The Influence of the Microbiome on Antiretroviral Concentrations in the Female Genital Tract in HIV Positive Women	Alyssa Lantz , ECP Graduate Student, Dr. Melanie Nicol's Lab