DEPARTMENT OF
EXPERIMENTAL AND CLINICAL PHARMACOLOGY

2013 Annual Report

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The University’s mission, carried out on multiple campuses and throughout the state, is threefold: research and discovery, teaching and learning, and outreach and public service. 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.

This publication is available in alternative formats upon request. Direct requests to Erin McGonagle, Department of Experimental and Clinical Pharmacology, mcgo0064@umn.edu, 612-624-7639.
DEAR COLLEAGUES AND FRIENDS,

Without a doubt, the quality of a department depends upon its members: their innovative and rigorous research work, their leadership and service within the profession, the passion and excellence they bring to training the next generation of thinkers and practitioners. I am proud to say that the Department of Experimental and Clinical Pharmacology (ECP) comprises many such renowned investigators and scholars.

ECP also thrives because its members possess a range of experience and expertise. The decades of scholarship of our professors, the fresh perspectives of our junior faculty, along with the proven excellence of our research and administrative staff, all contribute to our department’s standing as one of the top programs of its kind in the nation.

This past year has been one of expansive thinking and planning for ECP. Department members have seized opportunities to form new relationships with international peers from England to India to Singapore. (Given that funded research work is increasingly collaborative and studies can involve multiple sites and institutions, developing partnerships is an important ongoing objective.) New sponsored projects by faculty researchers were begun in areas as diverse as Alzheimer’s disease, cognitive responses to drugs, and tobacco dependence, to name but a few. Lastly, in order to build upon the existing expertise of our renowned faculty, the department launched national searches for two new faculty positions.

We also congratulate two ECP faculty members who were promoted in 2013: Debra J. Skaar from assistant professor to associate professor, and Pamala A. Jacobson from associate professor (tenured) to professor (tenured). Each received significant external recognition for sustained excellence in their fields: Dr. Skaar was awarded Fellowship in the American College of Critical Care Medicine, while Dr. Jacobson was awarded Fellowship in the American College of Clinical Pharmacy.

The mission of the Department of Experimental and Clinical Pharmacology is to discover, disseminate, and apply new knowledge related to safe, effective, and economical medication use in patients.

FROM THE DEPARTMENT HEAD
Teaching, within the professional program and of our graduate students, continues to be a significant part of ECP’s role within the College. The first year of a new curriculum was launched for the incoming class of Pharm.D. students in Fall 2013. Meanwhile, ECP faculty joined colleagues in other departments to design coursework for subsequent years. This substantial effort seeks to improve upon our current outstanding program, providing students a strong scientific foundation and preparing them for the collaborative, interdisciplinary work of tomorrow’s health care team.

Our distinguished graduate program, which trains future leaders of clinical and translational research within human pharmacology and therapeutics, gained new leadership this year in Dr. Angela Birnbaum and Dr. Marnie Peterson, named director and associate director of graduate studies, respectively. In 2013, ECP graduate students presented research abstracts at national conferences, had publications accepted in peer-reviewed journals, and won competitive fellowships to support their graduate research. Students also had the opportunity to meet with an array of guest speakers brought in by the department who shared their expertise on topics such as antiretroviral agents used in the treatment of HIV infection, warfarin pharmacogenetics in underrepresented populations, and pharmacokinetic/pharmacodynamic approaches to superbugs.

I am pleased to present you with this 2013 Annual Report. More of our department successes from the last year are cataloged in the pages that follow. I invite you to read through the diverse array of accomplishments that establish our department as a leading group of translational scientists in the discipline of experimental and clinical pharmacology.

Robert J. Straka, Pharm.D.
Professor and Department Head
FACULTY

Angela K. Birnbaum, Ph.D.  
Associate Professor; Director of Graduate Studies

Richard C. Brundage, Ph.D., Pharm.D.  
Professor

Scott A. Chapman, Pharm.D.  
Associate Professor

James C. Cloyd, Pharm.D.  
Professor; Weaver Endowed Chair in Orphan Drug Development

Jeannine M. Conway, Pharm.D.  
Assistant Professor; Director of Applied Learning

Esam El-Fakahany, Ph.D.  
Professor, Associate Dean for Research and Graduate Studies

Cynthia R. Gross, Ph.D.  
Professor

David R. Guay, Pharm.D.  
Professor Emeritus

Pamala A. Jacobson, Pharm.D.  
Professor

L’Aurelle A. Johnson, Ph.D.  
Assistant Professor

Mark N. Kirstein, Pharm.D.  
Associate Professor

Michael Kotlyar, Pharm.D.  
Associate Professor

Jatinder Lamba, Ph.D.  
Assistant Professor

Vishal Lamba, Ph.D.  
Assistant Professor

Ilo E. Leppik, M.D.  
Professor

Ling Li, Ph.D.  
Professor; VFW Endowed Chair in Geriatric Pharmacology

Henry J. Mann, Pharm.D.  
Professor Emeritus

Susan E. Marino, Ph.D.  
Assistant Professor

William S. Oetting, Ph.D.  
Professor

Marnie L. Peterson, Ph.D., Pharm.D.  
Associate Professor; Associate Director of Graduate Studies

John C. Rotschafer, Pharm.D.  
Professor

Shellina Scheiner, Pharm.D.  
Assistant Professor

Leo J. Sioris, Pharm.D.  
Professor

Debra J. Skaar, Pharm.D.  
Associate Professor

Robert J. Straka, Pharm.D.  
Professor; Department Head

ADJUNCT FACULTY

Michele Anderson, Ph.D.  
Research Assistant Professor

Mary Antonymsamy, Ph.D.  
Assistant Professor

Andrew Behm, Pharm.D., CGP  
Assistant Professor

Greg Beilman, M.D.  
Professor

Lisa Coles, Ph.D.  
Research Assistant Professor

Kristin Ergebretsen, Pharm.D.  
Associate Professor

Dean T. Filandrinos, Pharm.D.  
Assistant Professor

Mary E. Foss, Pharm.D.  
Assistant Professor

John F. Gualtieri, Pharm.D.  
Assistant Professor

Nitin Kaila, Ph.D.  
Assistant Professor

Reena Kartha, Ph.D.  
Research Assistant Professor

Daniel E. Keyler, Pharm.D.  
Professor

Frank N. Konstantinides, M.T., M.S.  
Professor

Robert Kriel, M.D.  
Research Professor

Smita Kshirsagar, Ph.D.  
Instructor

Marie D. Kuker, R.Ph.  
Assistant Professor

Stephen H. LeMaster, Pharm.D.  
Assistant Professor

Len Lichtblau, Ph.D.  
Associate Professor

Charles Muscoplat, Ph.D.  
Professor

Ramaiah Muthyala, Ph.D.  
Associate Professor

Patrick J. Parks, M.D., Ph.D.  
Associate Professor

David Parra, Pharm.D.  
Associate Professor

Pamela A. Pawloski, Pharm.D.  
Assistant Professor

Kelly M. Sioris, Pharm.D.  
Assistant Professor

Catherine I. Starner, Pharm.D.  
Assistant Professor

Catherine St. Hill, D.V.M., Ph.D.  
Associate Professor

John V. St. Peter, Pharm.D.  
Associate Professor

Jeanine Utz, Pharm.D.  
Assistant Professor

Chester B. Whitley, M.D., Ph.D.  
Professor

Rank and appointment as of 12/31/2013.
Research and Administrative Staff

Michele Anderson, Ph.D. ................................................................. Senior Research Associate, Peterson Lab
Laura Breshears, Ph.D. ................................................................. Research Associate, Peterson Lab
Marcia Brott .......................................................... Assistant Scientist, Oetting Lab
Rebecca Brown ................................................................. Study Coordinator, Jacobson Research Program
Carol Ann Dickinson ............................................................ Associate Administrator
Sheena Dufresne ................................................................. Program/Project Specialist
James Fisher ................................................................. Technical Director, CPAS Laboratory
Kathy Fox ................................................................. Study Coordinator, Birnbaum Lab
Laurie Baeker Hovde ............................................................ Coordinator, MTRF Laboratories
Dede Johnston ................................................................. Associate Administrator
Reena Kartha, Ph.D. ................................................................. Research Associate, Cloyd Lab
Frank N. Konstantinides, M.T., M.S. ............................ Director, CPAS Laboratory
Kyle LeBlanc ................................................................. Junior Scientist, Li Lab
Erin McGonnigle ................................................................. Executive Office & Administrative Specialist
Annie Mills ................................................................. Study Coordinator, Kotlyar Research Program
Usha Mishra ................................................................. Assistant Scientist, Center for Orphan Drug Research
John O. Rarick ................................................................. Study Coordinator, Birnbaum Lab
Maryanne Reilly-Spong, Ph.D. ............................................ Psychologist, Gross Research Program
Brent Williams ................................................................. Scientist, CPAS Laboratory

Continuing Graduate Students—Fall 2013

Mariam Ahmed, B.S. ................................................................. Advisor: Richard C. Brundage, Ph.D., Pharm.D.
Suresh Agarwal, M.S. ................................................................. Advisor: Richard C. Brundage, Ph.D., Pharm.D.;
Neha Bhise, B.Pharm. ................................................................. Advisor: James C. Cloyd, Pharm.D.
Caroline Churchill, B.S. ................................................................. Advisor: Carolyn Fairbanks, Ph.D.
Taraswi Mitra Ghosh, M.Sc. ................................................................. Advisor: Jatinder Lamba, Ph.D.
Aaron Gillman, B.S. ................................................................. Advisor: Marnie L. Peterson, Ph.D., Pharm.D.
Mary Holmay, R.N. ................................................................. Advisor: James C. Cloyd, Pharm.D.
David Hottman, B.S. ................................................................. Advisor: Ling Li, Ph.D.
Krista Johnson, B.S. ................................................................. Advisor: James C. Cloyd, Pharm.D.
Jia Kang, M.S. ................................................................. Advisor: Richard C. Brundage, Ph.D., Pharm.D.
Janice Lee, Pharm.D. ................................................................. Advisor: Angela K. Birnbaum, Ph.D.
Chay Ngee Lim, B.Sc. ................................................................. Advisor: Angela K. Birnbaum, Ph.D.
Malek Okour, B.S. ................................................................. Advisor: Richard C. Brundage, Ph.D., Pharm.D.
Youssef Roman, Pharm.D. ................................................................. Advisor: Robert J. Straka, Pharm.D.
Kinjal Sanghavi, B.Pharm. ................................................................. Advisor: Vishal Lamba, Ph.D.
Harrison Tam, B.S. ................................................................. Advisor: L’Aurelle A. Johnson, Ph.D.
Jie Zhou, M.S. ................................................................. Advisor: James C. Cloyd, Pharm.D.

New Graduate Students—Fall 2013

Ali Alhadab, Pharm.D. ................................................................. Advisor: Marnie L. Peterson, Ph.D., Pharm.D.
Cristina Peterson, B.S. ................................................................. Advisor: Carolyn Fairbanks, Ph.D.

New and Continuing Post-Docs, Fellows, and Residents

Laura Breshears, Ph.D. ................................................................. Advisor: Marnie L. Peterson, Ph.D., Pharm.D.
Lata Chauhan, Ph.D. ................................................................. Advisor: Jatinder Lamba, Ph.D.
Shaowu Cheng, Ph.D. ................................................................. Advisor: Ling Li, Ph.D.
Darcy Flora, Ph.D. ................................................................. Advisor: Richard C. Brundage, Ph.D., Pharm.D.
Patrick Sorgen, Ph.D. ................................................................. Advisor: James C. Cloyd, Pharm.D.
RESEARCH

Groundbreaking and critical research is conducted in the Department of Experimental and Clinical Pharmacology. Faculty research programs focus on oncology, transplantation, infectious diseases, genomics, geriatrics, critical care, neuroscience, cardiovascular diseases, pediatrics, integrative therapies and outcomes, and psychiatry. ECP is home to the Lawrence C. Weaver Endowed Chair in Orphan Drug Development and the VFW Endowed Chair in Geriatric Pharmacotherapy. 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 ten years.

Our 23 regular faculty members routinely present important research findings 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 National Institutes of Health and other granting agencies’ review committees.

In 2013:

- New grants received by ECP faculty = 19
- Peer-reviewed articles published by ECP faculty = 49
- Books and chapters published by ECP faculty = 7
- Department expenditures on sponsored projects (exclusive of salaries/fringe) = $1,512,919
- Department salaries/fringe offset by sponsored projects in 2013 = $2,037,071
- Percentage of ECP faculty salaries generated by sponsored projects in FY 2013 (July 1, 2012 to June 30, 2013) = 21.3%
Research Centers within ECP

- Center for Forecasting Drug Response
- Center for Orphan Drug Research (Dr. Jim Cloyd)
- Center for Clinical and Cognitive Neuropharmacology (Dr. Susan Marino)
- Center for Excellence in Critical Care (Dr. Greg Beilman)
- Pathway-Driven Pharmacogenomics University of Minnesota Alliance (Dr. Jatinder Lamba)

New Sponsored Projects by ECP Faculty in 2013

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Project Description</th>
<th>Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard C. Brundage</td>
<td>Testing the Penetration of Moxifloxacin into Chinchilla</td>
<td>Alcon Laboratories, Inc.</td>
</tr>
<tr>
<td>(Co-I)</td>
<td></td>
<td></td>
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<tr>
<td>Lisa Coles (Co-I)</td>
<td></td>
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</tr>
<tr>
<td>James C. Cloyd (Co-I),</td>
<td>Identifying New Therapies for Infantile Spasms</td>
<td>Cure Foundation/Department of Defense</td>
</tr>
<tr>
<td>Lisa Coles (Co-I)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>James C. Cloyd (PI)</td>
<td>Pharmacotherapy of Inherited Metabolic Disease Pharm.D. Fellowship</td>
<td>Genzyme Corporation</td>
</tr>
<tr>
<td>James C. Cloyd (PI),</td>
<td>Differential Pharmacological Effect of Ezogabine on Canine EEG</td>
<td>GlaxoSmithKline</td>
</tr>
<tr>
<td>Lisa Coles (Co-I)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>James C. Cloyd (PI)</td>
<td>Analysis of Intra-subject Variability in Plasma Topiramate Concentrations following Administration of Extended Release Topiramate</td>
<td>Upsher-Smith Laboratories, Inc.</td>
</tr>
</tbody>
</table>
### New Sponsored Projects by ECP Faculty in 2013, continued

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Project Description</th>
<th>Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esam E. El-Fakahany (Co-I)</td>
<td>Leveraging Best Practices in Mentoring from the Collective Experience of CNPCs</td>
<td>NIH National Institute on Minority Health and Health Disparities</td>
</tr>
<tr>
<td>Michael Kotlyar (PI)</td>
<td>GRAND 2012: Use of Medicinal Nicotine for Preventing Cue-Induced Craving and Withdrawal Symptoms</td>
<td>Pfizer, Inc.</td>
</tr>
<tr>
<td>Michael Kotlyar (PI)</td>
<td>Smoker Response to Banning of Menthol-Flavored Cigarettes</td>
<td>Clearway MN</td>
</tr>
<tr>
<td>Robert Kriel (PI), James C. Cloyd (Co-I), Lisa Coles (Co-I)</td>
<td>Two-Way Crossover Study of Oral and Intravenous Baclofen</td>
<td>Paralyzed Veterans of America</td>
</tr>
<tr>
<td>Vishal Lamba (Co-I)</td>
<td>Cannabinoid-Based Therapy and Approaches to Quantify Pain in Sickle Cell Disease</td>
<td>NIH National Heart, Lung, and Blood Institute</td>
</tr>
<tr>
<td>Ling Li (PI)</td>
<td>ApoJ/Clusterin Peptide as a Novel Therapeutic Agent for Alzheimer’s Disease</td>
<td>Alzheimer’s Drug Discovery Foundation</td>
</tr>
<tr>
<td>Ling Li (Co-I)</td>
<td>Training Grant: Functional Proteomics of Aging</td>
<td>NIH National Institute on Aging</td>
</tr>
<tr>
<td>Susan E. Marino (PI), Angela K. Birnbaum (Co-I), Pamala A. Jacobson (Co-I)</td>
<td>Cognitive and Motor Effects of Treatment with a Calcineurin Inhibitor (Tacrolimus) versus Belatacept in Kidney Transplant Patients</td>
<td>Bristol-Myers Squibb Company</td>
</tr>
</tbody>
</table>
### New Intramural Projects by ECP Faculty in 2013

<table>
<thead>
<tr>
<th>Faculty</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Jeannine Conway (PI)</td>
<td>Pharmacist and Nurse Clinical Decision-Making: An Initial Exploration of Shared Decision-Making Processes</td>
<td>U of M Grant-in-Aid of Research, Artistry and Scholarship</td>
</tr>
<tr>
<td>Jatinder K. Lamba (PI)</td>
<td>Pharmacogenomics of Ara-C in Pediatric Acute Myeloid Leukemia Patients</td>
<td>U of M Grant-in-Aid of Research, Artistry and Scholarship</td>
</tr>
<tr>
<td>Ling Li (PI)</td>
<td>Purchase of Tabletop Ultracentrifuge</td>
<td>U of M Grant-in-Aid of Research, Artistry and Scholarship</td>
</tr>
<tr>
<td>Ling Li (PI)</td>
<td>Therapeutic Potential of a Novel Neuroprotective Agent for Alzheimer’s Disease</td>
<td>Engebretson/Bighley Drug Design &amp; Development Grant</td>
</tr>
<tr>
<td>Marnie L. Peterson (PI)</td>
<td>Alpha Toxin: Role in Biofilm Formation by MRSA Wound Isolates and Therapeutic Target</td>
<td>U of M CTSI-Ed R-to-R Scholars Program Grant</td>
</tr>
</tbody>
</table>

### Ongoing Sponsored Projects by ECP Faculty in 2013

<table>
<thead>
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<tbody>
<tr>
<td>Angela K. Birnbaum (PI)</td>
<td>Maternal Outcomes and Neurodevelopmental Effects of Antiepileptic Drugs – Pharmacokinetics Laboratory Core</td>
<td>NIH National Institute of Neurological Disorders and Stroke</td>
</tr>
<tr>
<td>Angela K. Birnbaum (PI), Ilo E. Leppik (Co-I), Susan E. Marino (Co-I)</td>
<td>Clinical Impact of Unstable AED Levels in Elderly Nursing Home Epilepsy Patients</td>
<td>NIH National Institute on Aging</td>
</tr>
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</table>

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<thead>
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<tbody>
<tr>
<td>Angela K. Birnbaum (Co-I)</td>
<td>Multivalent Vaccine for Opiate Addiction</td>
<td>NIH National Institute on Drug Abuse</td>
</tr>
<tr>
<td>Angela K. Birnbaum (Co-I)</td>
<td>Preclinical Studies of a Heroin/Morphine Vaccine for Opiate Addiction</td>
<td>NIH National Institute on Drug Abuse</td>
</tr>
<tr>
<td>Angela K. Birnbaum (Co-PI), Jatinder Lamba (Co-PI)</td>
<td>Pharmacogenomics and Pharmacokinetics of Lamotrigine in Early Pregnancy</td>
<td>Epilepsy Foundation of America, Inc.</td>
</tr>
<tr>
<td>Angela K. Birnbaum (PI)</td>
<td>Pharsight–University of Minnesota Pharmacometrics Collaboration</td>
<td>Pharsight Corporation</td>
</tr>
<tr>
<td>Richard C. Brundage (PI)</td>
<td>Pharmacogenetics and Drug Interactions</td>
<td>NIH National Institute of General Medical Sciences</td>
</tr>
<tr>
<td>Richard C. Brundage (Co-I)</td>
<td>University of Minnesota Clinical and Translational Science Institute</td>
<td>NIH National Center for Research Resources</td>
</tr>
<tr>
<td>Richard C. Brundage (Co-I), Ilo E. Leppik (Co-I)</td>
<td>Genotype–Dependent Drug Interactions</td>
<td>NIH</td>
</tr>
<tr>
<td>Richard C. Brundage (PI)</td>
<td>Novartis Pharmacometrics Traineeship</td>
<td>Novartis Pharma AG</td>
</tr>
<tr>
<td>Richard C. Brundage (PI)</td>
<td>Pfizer Pharmacometrics Traineeship</td>
<td>Pfizer, Inc.</td>
</tr>
<tr>
<td>James C. Cloyd (PI)</td>
<td>Clinical Pharmacotherapy and Pharmacogenetics of Inherited Metabolic Diseases</td>
<td>Genzyme Corporation</td>
</tr>
<tr>
<td>James C. Cloyd (Co-I), Reena Kartha (Co-I)</td>
<td>Phase II Clinical Trial to Evaluate the Benefits of Post-Conditioning in STEMI</td>
<td>NIH National Heart, Lung, and Blood Institute</td>
</tr>
</tbody>
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### Ongoing Sponsored Projects by ECP Faculty in 2013, continued

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<tr>
<td>James C. Cloyd (Co-I), Lisa Coles (Co-I)</td>
<td>Neurophysiologically Based Responsive Pharmacotherapy for Epilepsy</td>
<td>NIH</td>
</tr>
<tr>
<td>James C. Cloyd (PI)</td>
<td>The Human Epilepsy Project</td>
<td>Epilepsy Study Consortium</td>
</tr>
<tr>
<td>James C. Cloyd (PI)</td>
<td>Lysosomal Disease Network</td>
<td>NIH National Institute of Neurological Disorders and Stroke</td>
</tr>
<tr>
<td>Jeannine M. Conway (PI)</td>
<td>A Pharmacy Coordinated Program to Enhance Medication Use in Chronic Cardiovascular Disease in a Rural Minnesota Community</td>
<td>MN Department of Health</td>
</tr>
<tr>
<td>Cynthia R. Gross (Co-I)</td>
<td>Studies of Organ Transplantation in Animals and Man</td>
<td>NIH National Institute of Diabetes and Digestive and Kidney Diseases</td>
</tr>
<tr>
<td>Pamala A. Jacobson (Co-I), Mark N. Kirstein (Co-I)</td>
<td>Cancer Center Support Grant</td>
<td>NIH National Cancer Institute</td>
</tr>
<tr>
<td>Pamala A. Jacobson (Co-I), William S. Oetting (Co-I)</td>
<td>Genomics of Kidney Transplantation</td>
<td>NIH National Institute of Allergy and Infectious Diseases</td>
</tr>
<tr>
<td>Mark N. Kirstein (PI)</td>
<td>Evaluation of Antitumor Efficacy for Imprime PGG + Monoclonal Antibody Combination in Pancreatic Tumor Mouse Model</td>
<td>Biothera</td>
</tr>
<tr>
<td>Mark N. Kirstein (PI)</td>
<td>Vitamin D₃ Effects on Musculoskeletal Symptoms with Use of Aromatase Inhibitors</td>
<td>Park Nicollet Institute</td>
</tr>
</tbody>
</table>

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### Ongoing Sponsored Projects by ECP Faculty in 2013, continued

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<td>Michael Kotlyar (PI)</td>
<td>Medicinal Nicotine for Preventing Stress-Induced Craving and Withdrawal Symptoms</td>
<td>NIH National Institute on Drug Abuse</td>
</tr>
<tr>
<td>Jatinder Lamba (PI)</td>
<td>Impact of Genetic Variation on Response to GO Therapy in COG-AML Clinical Trials</td>
<td>NIH National Cancer Institute</td>
</tr>
<tr>
<td>Jatinder Lamba (PI)</td>
<td>Pharmacogenetics of Ara-C Metabolic Pathway</td>
<td>NIH National Cancer Institute</td>
</tr>
<tr>
<td>Vishal Lamba (Co-I)</td>
<td>Genetic and Time-Frequency Aspects of Neural Phenotypes in Schizophrenia</td>
<td>US Department of Veterans Affairs</td>
</tr>
<tr>
<td>Ilo E. Leppik (PI), James C. Cloyd (Co-PI)</td>
<td>Canine Status Epilepticus: A Translational Platform for Human Therapeutics Trials</td>
<td>NIH National Institute of Neurological Disorders and Stroke</td>
</tr>
<tr>
<td>Ilo E. Leppik (PI)</td>
<td>A Randomized, Double-Blind, Placebo-Controlled Study of the Safety and Efficacy of Intranasal Midazolam (USL261) in the Outpatient Treatment of Subjects with Seizure Clusters</td>
<td>PharmaNet, Inc.</td>
</tr>
<tr>
<td>Ling Li (PI)</td>
<td>A Novel Role of ApoA-I in Alzheimer’s Disease</td>
<td>BrightFocus Foundation</td>
</tr>
<tr>
<td>Ling Li (PI)</td>
<td>Protective Mechanisms of Statins in Alzheimer’s Disease</td>
<td>NIH National Institute on Aging</td>
</tr>
<tr>
<td>Susan E. Marino (PI), Angela K. Birnbaum (Co-I), Ilo E. Leppik (Co-I)</td>
<td>Characterizing and Predicting Drug Effects on Cognition</td>
<td>NIH National Institute of Neurological Disorders and Stroke</td>
</tr>
</tbody>
</table>

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## Ongoing Sponsored Projects by ECP Faculty in 2013, continued

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<tr>
<td>Susan E. Marino (PI)</td>
<td>Professional Fighters Brain Health Study</td>
<td>The Cleveland Clinic</td>
</tr>
<tr>
<td>William S. Oetting (Co-I)</td>
<td>Twin Study of ADHD, CD and Substance Abuse</td>
<td>NIH National Institute on Drug Abuse</td>
</tr>
<tr>
<td>William S. Oetting (Co-I)</td>
<td>Statistical Model Building for High Dimensional Biomedical Data</td>
<td>NIH National Institute of General Medical Sciences</td>
</tr>
<tr>
<td>William S. Oetting (Co-I)</td>
<td>Substance Abuse &amp; Behavioral Disinhibition: Integrating Genes &amp; Environment</td>
<td>NIH National Institute on Drug Abuse</td>
</tr>
<tr>
<td>Marnie L. Peterson (Co-I), William S. Oetting (Co-I)</td>
<td>Immunological Factors and Risk of Vulvodynia</td>
<td>NIH National Institute of Child Health and Human Development</td>
</tr>
<tr>
<td>Marnie L. Peterson (PI)</td>
<td>Mucosal Models for Skin and Wound Infections</td>
<td>3M</td>
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<td>Marnie L. Peterson (PI)</td>
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<td>3M</td>
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<tr>
<td>Marnie L. Peterson (PI)</td>
<td>Biomarker Analysis of Non-Healing Wounds as a Function of Treatment</td>
<td>3M</td>
</tr>
<tr>
<td>Marnie L. Peterson (Co-I)</td>
<td>Cardiotoxicity of Streptococcal Pyrogenic Exotoxins</td>
<td>NIH National Institute of Allergy and Infectious Diseases</td>
</tr>
<tr>
<td>Marnie L. Peterson (PI)</td>
<td>Staphylococcal Superantigen Interactions with Vaginal Epithelium</td>
<td>NIH National Institute of Allergy and Infectious Diseases</td>
</tr>
<tr>
<td>Shellina R. Scheiner (Co-I)</td>
<td>Minnesota Area Geriatric Education Center</td>
<td>US Department of Health and Human Services HRSA</td>
</tr>
</tbody>
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### Ongoing Sponsored Projects by ECP Faculty in 2013, continued

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Project Description</th>
<th>Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debra J. Skaar (Co-I)</td>
<td>Testing the Feasibility of Patient-Controlled Sedation in Ventilated ICU Patients</td>
<td>NIH National Institute of Nursing</td>
</tr>
<tr>
<td>Jeanine Utz (PI)</td>
<td>Placebo Controlled Trial Evaluating Gabapentin for the Treatment of Small Fiber Neuropathic Pain in Patients with Fabry Disease</td>
<td>Genzyme Corporation</td>
</tr>
</tbody>
</table>

### Ongoing Intramural Projects by ECP Faculty in 2013

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Project Description</th>
<th>Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>James C. Cloyd (Co-PI)</td>
<td>Diazepam Prodrugs for the Treatment of Seizure Emergencies</td>
<td>AHC Faculty Development Grant</td>
</tr>
<tr>
<td>Reena Kartha (Co-I)</td>
<td>Determination of Endogenous Levels of Nitric Oxide and Hydrogen Sulfide in Patients with Obstructive Sleep Apnea</td>
<td>University of Minnesota Foundation</td>
</tr>
<tr>
<td>Mark N. Kirstein (Co-I)</td>
<td>Pilot Analysis of Unbound Sorafenib: Relevance to Efficacy and Toxicity in a Phase I Trial and to In-vitro Cytotoxicity</td>
<td>University of Minnesota Foundation</td>
</tr>
<tr>
<td>Jatinder Lamba (PI)</td>
<td>Generation of Genetically Diverse Liver Cultures from Skin-Derived iPS Libraries</td>
<td>University of Minnesota Foundation</td>
</tr>
<tr>
<td>Vishal Lamba (PI)</td>
<td>Use of HapMap Lymphoblastoid Cell Lines to Identify Pharmacogenetic Predictors of Mycophenolate Tox.</td>
<td>U of M Grant-in-Aid of Research, Artistry and Scholarship</td>
</tr>
<tr>
<td>Marnie L. Peterson (PI)</td>
<td>Development of a Biotherapeutic for Prophylaxis and Treatment of <em>S. aureus</em> Disease</td>
<td>Engebretson/Bighley Drug Design &amp; Development Grant</td>
</tr>
<tr>
<td>Robert J. Straka (PI)</td>
<td>Pharmacogenomic Markers of Lipid Response to Fenofibrate in a Hispanic Population</td>
<td>UMN Institute of Human Genetics</td>
</tr>
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Published Articles by ECP Faculty in 2013


Published Articles by ECP Faculty in 2013, continued


Published Articles by ECP Faculty in 2013, continued


Published Books and Chapters by ECP Faculty in 2013


TEACHING

The College of Pharmacy consistently ranks among the top three pharmacy schools in the nation. In 2013, ECP faculty provided 2,104.5 hours of didactic education to 167 pharmacy students per class year, as well as students in dentistry, nursing, public health, geriatrics, and genetics. Instruction to pharmacy students included experiential education in acute care, geriatric patient care, pediatric infectious disease, and clinical toxicology. It also included teaching and directing in the pharmacotherapy series and the pharmaceutical care skills course sequence, and teaching other elective courses. In addition, ECP members participated in journal clubs throughout the University in their areas of interest and with research collaborators.

In 2013, ECP faculty mentored:

- 15 students on special research projects funded under CTSI/CHE, Melendy Scholarships, or Undergraduate Research Opportunities Program
- 11 undergraduate students
- 14 professional students
- 13 graduate students in non-ECP programs
- 13 post-doctoral fellows or residents

In 2013, ECP faculty:

- offered clerkships or experiential instruction to 79 students
- served as advisors or readers on thesis projects to 107 pharmacy students

With more than two dozen faculty and a dedicated administrative and research staff, ECP trains professional, graduate, and post-graduate students of the highest caliber while advancing a widely respected research program.
Innovations in Teaching

Angela Birnbaum, Pamala Jacobson, and Marnie Peterson developed the new Research Emphasis for the pharmacy program, approved by the College Assembly in 2013. The first applicants were received in Fall 2013. Birnbaum and Peterson then worked with Carol Ann Dickinson and Catherine St. Hill to create “Introduction in Pharmacy Research” (PHAR 6206), which is required for the Research Emphasis.

Richard Brundage presented two workshops on population pharmacokinetics at Mayo Hospital in Rochester. He also gave several lectures via the web for the University of Manchester on the impact of LLOQ censoring in NONMEM, on correlations between dose and clearance in therapeutic drug monitoring settings, and on Mixture Modeling in NONMEM.

Jeannine Conway worked with residents and P4 students to develop an immunization refresher lab, a drug information lab, and an herbal product lab. She was also selected Fall 2013 Teacher of the Semester (Class of 2015, Twin Cities) and 2013 Teacher of the Graduating Class (Twin Cities).

Esam El-Fakahany was co-director of the College of Pharmacy’s Workshop Series on Writing Successful Fellowship Applications; he also moderated numerous workshops for graduate students and fellows on behalf of CTSI, the Center for Teaching and Learning, and the Graduate School.

Pamala Jacobson was awarded the 2013 Graduate and Professional Student Association Outstanding Advisor Award. The award, which is University-wide, recognizes advisors who go out of their way to create a positive learning environment. Jacobson was one of only five recipients; nominations come directly from students.

Pamala Jacobson delivered a ten-day course in pharmacogenomics to clinical pharmacists and interns at Singapore General Hospital and gave the keynote presentation at the 23rd Singapore Pharmacy Congress. Robert Straka presented on cardiovascular topics for the hospital course, and spoke at the Cardiovascular Research Institute of the Yoo Loo Lin School of Medicine at the National University of Singapore.

Marnie Peterson developed an international collaborative Ph.D. student research program with the University of Birmingham and the Queen Elizabeth Hospital Birmingham in the United Kingdom.

John Rotschafer was named Spring 2013 Teacher of the Semester (Class of 2014, Twin Cities). He also developed the antibiotics curriculum for the Dental School’s “Dental Pharmacology” course (DDS 6215).
In addition to their college teaching and research, many ECP faculty discover opportunities for service both within the University and with outside organizations and companies. The immeasurable hours they spend offering expertise and guidance are a way to give back to the community, peers and students, and the field.

Faculty cited service to 22 national committees in 2013, including NIH study section committees, abstract review committees, and program planning committees for national organizations. Faculty served on 35 University and AHC committees including the Faculty Senate, the Graduate Education Council, search committees, scientific advisory groups, and others. They also had a total of 81 service commitments to committees within the College of Pharmacy and 26 within ECP. Faculty members had appointments on boards of directors or professional advisory boards of research organizations; others had appointments on standards and education committees with health providers in Minnesota such as HealthPartners, Regions, and Fairview.

In 2013, faculty served on the editorial boards of the *Austin Journal of Endocrinology and Diabetes*, *BMC Nephrology*, *Epilepsia*, *Frontiers in Cellular and Infection Microbiology*, *Frontiers in Neurodegenerative Diseases*, *Frontiers in Pharmacogenetics and Pharmacogenomics*, *Human Mutation*, *International Scholarly Research Network – Pharmacology*, *Journal of Geriatrics and Palliative Care*, *Journal of Pharmacology and Drug Metabolism*, *Pharmacogenomics*, *Pharmacotherapy*, and *Scientific World Journal – Genetics*. In addition, they served as manuscript reviewers for 57 journals; as proposal reviewers for 11 funding bodies; and as reviewers of faculty promotion documents for institutions across the country and around the world.
Highlights in Service

Angela Birnbaum worked with Pharsight to host a special, three-day training workshop in Phoenix WinNonLin software for ECP, Medicinal Chemistry, and Pharmaceutics graduate students and post-docs, as well as eight participants from outside the University. Birnbaum was able to secure the University registrations for free or at cost. She is working with the company to plan a similar NLME workshop for 2014.

Jim Cloyd and members of the Center for Orphan Drug Research helped plan and facilitate the Rare Diseases Day at Nickelodeon Universe at Mall of America, where 150 kids with rare diseases and their families were able to enjoy the rides and activities for free while park staff made sure their unique accessibility and safety needs were met.

Jeannine Conway served as the pharmacist for Camp Oz, a summer camping experience organized by the Epilepsy Foundation of Minnesota for kids with seizures.

Cynthia Gross was a faculty participant in the 2013 Rein in Sarcoma Foundation Mini Medical School, held at the University of Minnesota. Within the day’s focus on sarcoma research that is ongoing at the U, she spoke on the topic of training therapy dogs.

William Oetting was named an Honorary Member of the Pan American Society for Pigment Cell Research, which bestowed the recognition “for his exceptional and lasting service.”

Marnie Peterson gave a lecture on research and drug discovery to students from Trinity School at River Ridge, a junior high and high school in Eagan.

Debra Skaar served as the faculty liaison to the University of Minnesota’s student chapter of AACP.
The ECP Graduate Program is an innovative, interdisciplinary program that trains students to conduct research encompassing methodology from basic and clinical pharmacology perspectives. It was designed specifically for students interested in clinical research with the goal 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, and pharmacogenomics. Graduates are prepared for distinguished careers in clinical research.

ECP celebrated the graduation of 3 students in 2013 (bringing the total number of program graduates to 37), and had a total of 19 new and continuing students in the program as of Fall 2013.

New Students—Fall 2013

The department admitted two new students in Fall 2013:

Ali Alhadab, Pharm.D.  Advisor: Marnie L. Peterson, Ph.D., Pharm.D.
Cristina Peterson, B.S.  Advisor: Carolyn Fairbanks, Ph.D.

New Ph.D. Candidates in 2013

These students became Ph.D. candidates by passing their oral preliminary exams:

Suresh Agarwal, M.S.
Neha Bhise, B.Pharm.
Aaron Gillman, B.S.
Harrison Tam, B.S.
**ECP Ph.D. Graduates in 2013**

<table>
<thead>
<tr>
<th>Graduate</th>
<th>Thesis Title</th>
<th>Advisor</th>
<th>Current Position</th>
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<tbody>
<tr>
<td>Gavin Bart, M.D., Ph.D.</td>
<td>Methadone population pharmacokinetics: Toward understanding the dose-response relationship in the treatment of opiate addition</td>
<td>Richard C. Brundage, Ph.D., Pharm.D.</td>
<td>Division Director of Addictive Medicine, Hennepin County Medical Center</td>
</tr>
<tr>
<td>Manoj Chiney, M.Pharm., Ph.D.</td>
<td>Effect of obesity on hepatic drug metabolism</td>
<td>L'Aurelle A. Johnson, Ph.D.</td>
<td>Research Investigator, Bristol-Myers Squibb</td>
</tr>
<tr>
<td>Jia Kang, M.S., Ph.D.</td>
<td>Pharmacometric analyses of drug exposure and response data</td>
<td>Richard C. Brundage, Ph.D., Pharm.D.</td>
<td>Research Scientist – Pharmacometrics, Metrum Research Group LLC</td>
</tr>
</tbody>
</table>

**Presentations by Graduate Students or Post-Docs in 2013**

**Agarwal S.** Model-based approach to designing efficient and informative trials. Presented at: Center for Orphan Drug Research Seminar, College of Pharmacy, University of Minnesota; 2013 Apr 4; Minneapolis, MN.

**Agarwal S.** Placebo response in medicine: minimize, maximize or personalize? Presented at: Center for Orphan Drug Research Seminar, College of Pharmacy, University of Minnesota; 2013 Dec 12; Minneapolis, MN.

**Ahmed M.** Application of deconvolution to the analysis of intranasal diazepam data. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Jan 30; Minneapolis, MN.

**Bhise N.** Development of resistance to nucleoside analogs. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Nov 6; Minneapolis, MN.

**Churchill C.** AAV gene therapy to the choroid plexus for chronic pain. Presented at: The Neurovascular Unit/Blood-Brain Barrier Mini-Symposium, University of Minnesota; 2013 Oct; Duluth, MN.

**Churchill C.** AAV- agmatine decarboxylase gene therapy and agmatine’s role in NMDA Receptor Signaling. Presented at: Pharmacokineuroimmunology Research-in-Progress Symposium, University of Minnesota; 2013 Oct; St. Paul, MN.

**Mitra Ghosh T.** Pharmacogenomic of chemotherapeutic agents-platinating agents and taxanes/taxol. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Sep 11; Minneapolis, MN.
Presentations by Graduate Students or Post-Docs in 2013, continued

Gillman A. Could inhibition of local inflammation aid in treatment of staphylococcus aureus-induced Toxic Shock Syndrome? Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Apr 17; Minneapolis, MN.

Hottman D. Impact of human cholesteryl ester transfer protein on cognitive function and neuropathology in a mouse model of Alzheimer’s disease. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Nov 13; Minneapolis, MN.

Johnson K. Medical countermeasures against chemical threats. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Oct 16; Minneapolis, MN.

Laramy J. Levetiracetam in pregnant women. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Feb 13; Minneapolis, MN.

Ngée Lim C. Quantitative approach to investigating effects of anti-epileptic drugs on cognition. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Nov 20; Minneapolis, MN.

Okour M. Introduction to population pharmacometrics. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Sep 18; Minneapolis, MN.

Roman Y. Role of genetics on hyperuricemia in Hmong. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Oct 23; Minneapolis, MN.

Sanghavi K. Pharmacogenomics of mycophenolic acid. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Feb 20; Minneapolis, MN.

Zhou J. N-acetylcysteine in childhood cerebral adrenoleukodystrophy: new insights into its pharmacology. Presented at: Department of Experimental and Clinical Pharmacology Weekly Seminar, College of Pharmacy, University of Minnesota; 2013 Mar 13; Minneapolis MN.

Zhou J. Improving pre-clinical research through rigorous study design and transparent reporting. Presented at: Center for Orphan Drug Research Seminar, College of Pharmacy, University of Minnesota; 2013 Oct 17; Minneapolis, MN.

Abstracts—Posters and Presentations by Graduate Students or Post-Docs in 2013


Abstracts—Posters and Presentations by Graduate Students or Post-Docs in 2013, continued


Mitra AK, Mitra Ghosh T, Feldberg TJ, Pounds S, Cao X, Lamba JK. SNPs in ribonucleotide reductase genes RRM1 and RRM2 are associated with mRNA expression and response to nucleoside analogs-based chemotherapy. Poster presented at: American Society for Clinical Pharmacology and Therapeutics Annual meeting; 2013 March 5-9; Indianapolis, IN.

Lamba JK, Feldberg TJ, Mitra Ghosh T, Bhise N, Fridley B. Genome-wide association analysis identified genetic markers associated with triptolide cellular sensitivity using HapMap LCLs as model system. Poster presented at: American Association for Cancer Research Annual Meeting; 2013 April 6-10; Washington, DC.

Chauhan L, Feldberg TJ, Mitra Ghosh T, Bhise N, Fridley B, Lamba JK. Genome-wide association analysis identified genetic markers associated with triptolide cellular sensitivity using HapMap LCLs as model system. Poster presented at: Rho Chi Research Symposium. University of Minnesota; 2013 April 4; Minneapolis, MN.


Okour M, Brundage R, Jacobson P. Correlations between biomarkers and therapeutic outcomes: application to mycophenolic acid and kidney transplantation. Poster presented at: CTSI Poster Session & Reception; 2013 October 1; Minneapolis, MN. [Winner, Best Poster – Advanced Research Program]

Roman Y, Xiong J, Culhane-Pera K, Straka R. Analysis of single nucleotides polymorphisms (SNPs) in Hmong population and hyperuricemia. Poster presented at: CTSI Poster Session & Reception; 2013 October 1; Minneapolis, MN.

Tam H, Subramanian M, Tracy T. Substrate dependent metabolism by cytochrome P450 2C9.1, 2, 3, 5, 8, 11, and 13 variants expressed in Supersomes™. Poster presented at: 18th International Conference on Cytochrome P450; 2013 June 18-22; Seattle, WA.

Published Articles by Graduate Students or Post-Docs in 2013


