

UNIVERSITY OF MINNESOTA

College of Pharmacy

**Driven to Discover**<sup>SM</sup>

## Department of Medicinal Chemistry 2011 Annual Report



717 Delaware Street Southeast  
Minneapolis, Minnesota 55414

308 Harvard Street Southeast  
Minneapolis, Minnesota 55455

# Department of Medicinal Chemistry

## 2011 Annual Report

<b>Contents</b>	Letter from the Department Head .....	1
	Mission Statement.....	2
	Teaching and Service .....	2
	Leadership Transition at the University .....	3
	Institute for Therapeutics Discovery and Development .....	3
	Faculty Recognition .....	3
	Editorial Activities.....	4
	Research Activities.....	4
	Symposia .....	5
	Seminars .....	5
	Student Recognition .....	6
	Commencement.....	7
	MIKI Meeting 2011 .....	7
	New and Departing Members.....	7
	Faculty .....	8
	Adjunct Faculty .....	9
	Research Staff .....	9
	Administrative Staff .....	10
	Graduate Students .....	10
	Postdocs and Fellows .....	11
	Undergraduate Research Assistants and Summer Scholars.....	12
	Ways to Give.....	12
	Research Grants .....	13
	Publications .....	14

**Letter  
from the  
Department  
Head**

2011 was another successful year for the Department. Below I am sharing some of the highlights with you.

Professor Carrie Haskell-Luevano, who assumed the Philip S. Portoghese Endowed Chair in Neuroscience, arrived in the summer together with her husband Jorge and their three daughters, Stephanie, Jessie, and Jamie. As Floridians they are slowly learning how to deal with snow.

This year we organized a symposium to recognize Professor Philip Portoghese's fifty years of excellence in teaching, research and service to the Department, the College, the University, and the scientific community. It also marked his eightieth birthday. Guest lecturers were F. Ivy Carroll from RTI International, Alexandros Makriyannis from Northeastern University, Lawrence J. Marnett from Vanderbilt University, and alumnus Christopher R. McCurdy from the University of Mississippi.

After forty years of service as the Editor-in-Chief of the *Journal of Medicinal Chemistry*, Dr. Portoghese stepped down at the end of 2011. As many of you already know, I will be one of two new Co-Editors-in-Chief of the journal. Professor Portoghese will now devote full time to research after just having received another five-year NIH grant.

Members of our faculty again received special recognitions last year. Teaching awards in the professional program went to Professors David Ferguson, Patrick Hanna, Robert Fecik, Elizabeth Amin, and Rory Remmel. Dr. Elizabeth Amin received the 2011 American Chemical Society HP Outstanding Junior Faculty Award and the University of Missouri Distinguished Alumni Award. Professor Natalia Tretyakova was promoted from Associate Professor to full Professor this year. She will serve as a charter member of the NIH's Cancer Etiology Study Section from 2011 to 2017. Professor Robert Vince was inducted into the Minnesota Science and Technology Hall of Fame.

Several of our graduate students received fellowships and special recognition and we are very proud of these students and the hard work and dedication for which they were recognized.

This year, Edward C. Taylor, the A. Barton Hepburn Professor of Chemistry Emeritus from Princeton University, presented the Ole Gisvold Lecture. His talk was entitled *From butterfly wing pigments to cancer – the discovery of the new antitumor agent drug Alimta*.

We currently have forty-nine graduate students in the Department, including some students from the Departments of Chemistry and Biochemistry, as well as forty-nine research associates and postdocs. Eight first-year graduate students joined our program in the fall.

The Institute for Therapeutics Discovery and Development (ITDD) has a new director of pharmacology, Dr. Henry Wong. His primary role will be to provide preclinical pharmacology support to the ITDD's NCI-funded Chemical Diversity Center and serve as scientific coordinator on its projects.

While we are welcoming new members to the Department, others left. Sara Wajee, a valued staff member followed her husband to a new job in New York City. We also said good-bye to Andrea Knickerbocker, who assisted my research group and me for ten years in an exemplary manner as an administrative assistant. She has retired and has moved back to Kansas.

I hope you share our pride in the Department's accomplishments of 2011.

Gunda I. Georg, Professor and Department Head  
Department of Medicinal Chemistry



## Mission Statement

The mission of the Department of Medicinal Chemistry is to educate and train scientists of the highest caliber, to provide future pharmacy practitioners with the basis for understanding the relationships between molecular structure and drug action, and to achieve and perpetuate excellence in medicinal chemistry through chemical and biological research for the improvement of human health.

## Teaching and Service

Medicinal Chemistry faculty members taught numerous professional and graduate courses in 2011 and were recognized throughout the year for quality teaching and dedication to students. Each professional pharmacy program class votes to honor their professors for outstanding teaching; the following members of our faculty received teaching awards in 2011.

- First Year students chose **David Ferguson** for Professor of the Fall Semester and Professor of the Year honors, **Patrick Hanna** was awarded Professor of the Spring Semester;
- Second Year students selected **Robert Fecik** as Professor of the Fall and Spring Semesters, **Elizabeth Amin** earned Professor of the Year; and
- Third Year students honored **Rory Rimmel** as their Professor of of the Fall Semester and Professor of the Year.

Faculty also gave of their time to numerous committees, representing service to the Department, the University, the College of Pharmacy, national and professional organizations, and government agencies. Additionally, faculty served as reviewers for professional journals and as grant reviewers for governmental panels.

## Graduate Courses

- Principles of Biomolecular Simulation (MEDC 5185)
- The New Drug Development Process (MEDC 5200)
- Research and Development Process of Pharmaceutical Products (MEDC 5202)
- Introduction to Drug Design (MEDC 5245)
- Advanced Methods in Quantitative Drug Analysis (MEDC 5494)
- Vistas in Medicinal Chemistry Research (MEDC 5495)
- General Principles of Medicinal Chemistry (MEDC 5700)
- General Principles of Medicinal Chemistry (MEDC 5710)
- Medicinal Chemistry Seminar (MEDC 8100)
- Chemistry of Nucleic Acids (MEDC 8413)
- Chemical Aspects of Drug Metabolism and Bioactivation (MEDC 8600)
- Advanced Concepts in Drug Design (MEDC 8700)
- Design of Peptidomimetics (MEDC 8760)
- Medicinal Chemistry Laboratory Techniques (MEDC 8800)
- Research in Medicinal Chemistry (MEDC 8900)

## Professional Courses

- Medical Microbiology and Immunizations (PHAR 6141)
- Biochemistry of Medicinals I (PHAR 6151)
- Biochemistry of Medicinals II (PHAR 6152)
- Medicinal Agents I (PHAR 6154)



*Assistant Professor Elizabeth Amin, Professors David Ferguson & Rory Rimmel, all recipients of 2011 "Professor of the Year" honors from PharmD students.*

## Professional Courses (continued)

- Medicinal Agents II (PHAR 6155)
- Medicinal Agents III (PHAR 6156)
- Human Nutrition and Drug Therapy (PHAR 6157)
- Recombinant DNA-Derived Drugs (PHAR 6158)
- Pharmaceutical Immunology and Biotechnology (PHAR 6159)
- PharmD IV Seminar (PHAR 6182)
- PharmD IV Paper (PHAR 6183)
- Drugs of Abuse (PHAR 6248)
- Pharmacology I (PHCL 5101)
- Pharmacology II (PHCL 5102)

## Leadership Transition at the University

In 2011, the University welcomed a new president, **Eric Kaler**. Dr. Kaler received his Ph.D. from the University of Minnesota in 1982. He has been a faculty member at the University of Washington and the University of Delaware, where he also served as Dean of the College of Engineering. In 2007, he was appointed provost and vice president for Brookhaven National Laboratory affairs at Stony Brook University in New York. President Kaler is committed to reinforcing the University's role as Minnesota's only research university and strengthening its ties to the community.

## Institute for Therapeutics Discovery and Development

Throughout 2011, the Institute for Therapeutics Discovery and Development (ITDD) continued its research in the area of drug discovery and development, and provided services to the scientific community of the University of Minnesota and beyond.

Over the course of the year, ITDD researchers participated in twenty-eight external and internal scientific programs and projects, including thirteen funded by the NIH and four collaborative projects with the Mayo Clinic. Eleven peer-reviewed scientific papers were published and six presentations were made at national meetings by ITDD researchers. In addition, eight patent applications and invention disclosures were submitted.

Development continued on Minnelide™, the promising anti-cancer agent designed by Institute researchers in collaboration with other University departments. The pre-clinical development stage is largely finished and the drug candidate is expected to go to clinical trial in 2012.

ITDD also continued its activities as a designated Center for Chemical Diversity within the NCI Chemical Biology Consortium. The goal of the Center is to perform translational research in medicinal chemistry for the NCI.

## Faculty Recognition

Assistant Professor **Elizabeth Amin** received a University of Missouri Distinguished Alumni Award and the American Chemical Society HP Outstanding Junior Faculty Award for 2011.

Associate Professor **Robert Fecik** received a \$25,000 AHC Seed Grant for his study *Mechanism of action of RITA, a small molecule for MLL leukemias*.

Professor **David Ferguson** was featured in the August 21 *Pioneer Press* story "Minnesota law takes on synthetic drugs – and their look-alikes." He was also quoted in a *Star Tribune* article on September 8 entitled "Users play chemical roulette."



Professor Robert Fecik, ITDD Associate Director Vadim Gurvich, Professor Natalia Tretyakova, left; Medicinal Chem. Chair / ITDD Director Gunda Georg with new University of Minnesota President Eric Kaler, right.





## Faculty Recognition (continued)

Professor **Gunda Georg** was profiled in the summer issue of University of Minnesota Foundation's *Legacy* magazine.

ITDD Director **Gunda Georg** and Associate Director Dr. **Vadim Gurvich** with Department of Pharmaceutics Associate Professor Jayanth Panyam received a \$247,267 NCI grant for their project *Polymeric nanoparticles for tumor targeted delivery of tylocrebrine*.

ITDD Associate Director **Vadim Gurvich** is also Associate Director of the National Institute for Pharmaceutical Technology and Education (NIPTE), which has been awarded a grant worth up to \$35 million over the next five years to improve drug manufacturing standards.

Two department members were awarded Engebretson Drug Design and Development grants: Professor **Rory Remmel** for his *Meropenem prodrugs for treatment of tuberculosis* project, and ITDD Lead and Probe Discovery Director Dr. **Michael Walters** for his *Enhancers of dihydrolipoamide dehydrogenase stability and function*.

Professor **Tom Shier** received a Grant-in-Aid of Research, Artistry and Scholarship for his project *Toll-like receptor 7 agonists for treatment of solid tumors*. Other investigators include Professor **David Ferguson** and Dr. John Ohlfest from the Medical School.

After eleven years with the Department, Dr. **Natalia Tretyakova** was promoted from Associate Professor to full Professor this year. In addition, she will be a charter member of the NIH's Cancer Etiology Study Section from 2011 to 2017.

In November, the Minnesota High Tech Association and the Science Museum of Minnesota inducted Professor **Robert Vince** into the Minnesota Science and Technology Hall of Fame at the Twelfth Annual Tekne Awards.

## Editorial Activities

**T**he *Journal of Medicinal Chemistry* will be headed by new Editors-in-Chief for the first time in forty years, as Professor **Philip S. Portoghese** stepped down at the end of 2011. Professor **Gunda Georg** is one of two new Co-Editors-in-Chief, with Dr. Shaomeng Wang, Professor of Internal Medicine and Pharmacology at the University of Michigan Comprehensive Cancer Center. Professors **Yusuf J. Abul-Hajj** and **Steven S. Hecht** serve as senior editors of the journal, which is the most-cited journal in Medicinal Chemistry and ranked as the top primary research journal in impact in its category. Professors **Courtney C. Aldrich** and **Carrie Haskell-Luevano** are on the journal's editorial advisory board.

Professor **W. Thomas Shier** is the Editor of *Toxins Review*.

Professor **Carston R. Wagner** is Associate Editor of *Molecular Pharmaceutics*.

## Research Activities

**D**epartment of Medicinal Chemistry faculty produced eighty-seven publications in more than fifty journals in 2011.

In addition, the Department was represented at numerous conferences through oral and poster presentations.



First year grad students: Skye Doering, Jonathan Tan, David Huang, Kimberly Maize, John Widen, Adam Zarth, Arnold Groehler, and Aniekan Okon.

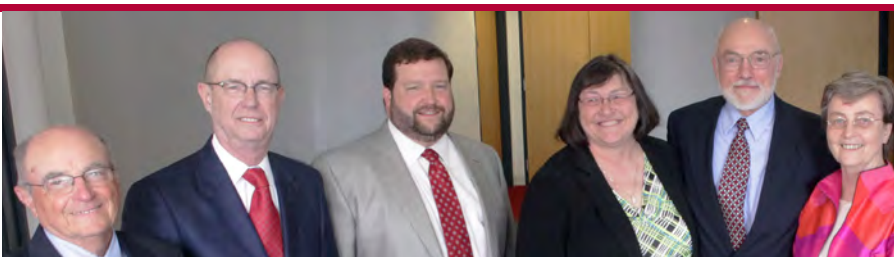
**Symposia** The 2011 Ole Gisvold Lecture was presented by Dr. Edward C. Taylor, the A. Barton Hepburn Professor of Chemistry Emeritus from Princeton University. His November 8 talk was entitled *From butterfly wing pigments to cancer – the discovery of the new antitumor agent drug Alimta*.

Professor Philip Portoghese's fifty years of excellence in teaching, research, and service to the Department, the College of Pharmacy, the University, and the scientific community were celebrated by a June symposium, which also marked his eightieth birthday. Several distinguished guests honored Dr. Portoghese with presentations, including F. Ivy Carroll from RTI International, Alexandros Makriyannis from Northeastern University, Lawrence J. Marnett from Vanderbilt University, and alumnus Christopher R. McCurdy from the University of Mississippi.

**Seminars** Many seminars were offered in 2011 by the Department of Medicinal Chemistry (MC), the Chemical Biology Initiative (CBI), and the Institute for Therapeutics Discovery and Development (ITDD).

- Dr. Michael N. Liebmann, President/Managing Director, Strategic Medicine, Incorporated. *Systems biology, systemics, and systematics in drug design*, January 21 (CBI/ITDD).
- Dr. Ronald T. Raines, Henry Lardy Professor, Department of Biochemistry, University of Wisconsin, Madison. *Electronic effects on protein structure*, February 7 (CBI).
- Dr. Richard C. Brundage, Professor, Department of Experimental and Clinical Pharmacology, University of Minnesota. *Center for forecasting drug response – the role of pharmacometrics*, February 11 (ITDD).
- Dr. Kevin Burgess, Rachal Professor, Department of Chemistry, Texas A & M University. *Secondary structure, minimalist, universal hot spot, and proteo-mimics: An evolutionary story*, March 7 (CBI).
- Dr. Lisa L. Shafer, Principal Scientist and Research Manager, Medtronic, Inc. *Potential for brain targeted passive immunotherapy for Alzheimer's disease*, March 11 (ITDD).
- Dr. Miqin Zhang, Professor, Department of Materials Science and Engineering, University of Washington. *Nanotheranostics for cancer imaging and targeted therapy*, April 18 (CBI).
- Dr. William H. Frey, Professor, Alzheimer's Research Center, Regions Hospital. *Intranasal stem cell treatment of Parkinson's disease in a rat model*, May 6 (ITDD).
- Dr. Walter C. Low, Professor, and Jason B. Nikas, Postdoc, Department of Neurosurgery, University of Minnesota. *Prognostic biomarkers for ovarian cancer*, May 20 (ITDD).
- Dr. Gerhard Höfle, Professor, Helmholtz Center for Infection Research, Braunschweig, Germany. *Development of epothilone and tubulin inhibitors as anticancer agents*, May 27 (ITDD).
- Dr. Armin Buschauer, Institute of Pharmacy, University of Regensburg, Germany. *Modulation of ABC transporters at the blood brain barrier and in multidrug resistance*, September 20 (MC).
- Dr. Indraneel Ghosh, Weed Distinguished Chair and Associate Professor, Department of Chemistry and Biochemistry, University of Arizona. *When it takes three to tango: Ternary design paradigms for sensors and inhibitors*, September 26 (CBI).

At the Portoghese Symposium: guest lecturers F. Ivy Carroll, Lawrence J. Marnett, and Christopher R. McCurdy; Dean Marilyn Speedie, Professors Phil Portoghese and Gunda Georg.



## Seminars (continued)

- Dr. **Michael K. Lee**, Professor, Department of Neuroscience, University of Minnesota. *Neurodegeneration in mouse models of Alzheimer's and Parkinson's disease: Implications for therapies*, October 7 (ITDD).
- Dr. **Adnan A. Elfarra**, Professor of Toxicology, School of Veterinary Medicine, University of Wisconsin, Madison. *FMOs: Characterization and potential roles in metabolism and toxicity of haloalkane cysteine S-conjugates and L-methionine*, October 11 (MC).
- Dr. **Muhammad N. Yousaf**, Associate Professor, Department of Chemistry, York University, Toronto. *Rewiring cell surfaces: From fundamental studies of cell behavior to applications in tissue engineering*, October 24 (CBI).
- Dr. **David Spiegel**, Assistant Professor, Department of Chemistry and Pharmacology, Yale University. *Using small molecules to engineer and explore human immunity*, October 25 (MC).
- Dr. **Jin Quan Yu**, Professor, Department of Chemistry, The Scripps Research Institute. *C-H activation: A shortcut to drug molecules from chemical feedstock*, November 1 (MC).
- Dr. **Christina D. Smolke**, Assistant Professor, Department of Bioengineering, Stanford University. *Synthetic RNA controllers for programming cell fate and function*, November 21 (CBI).
- Dr. **Efie Kokkoli**, Associate Professor, Department of Chemical Engineering and Materials Science, University of Minnesota. *Functionalized nanoparticles for targeted delivery of therapeutics*, December 2 (ITDD).

## Student Recognition

**S**tudents in the Department of Medicinal Chemistry are a hard working, talented group. We are especially proud of the following students who were recognized for their accomplishments in 2011.

The American Chemical Society awarded travel grants to two Medicinal Chemistry graduate students to attend the August ACS meeting in Denver. Graduate student **Kwon Ho (John) Hong**, Georg lab, received a travel grant from the Medicinal Chemistry (MEDI) Division. His poster, *Na,K-ATPase  $\alpha 4$  as a target for male contraception*, was presented twice; during the regularly scheduled poster session and again to represent the MEDI Division during the SciMix Poster session. Tretyakova group graduate student **Susith Wickramaratne's** travel was sponsored by the Division of Chemical Toxicology, which also awarded him second place for the best poster, *Synthesis and biological evaluation of site-specific DNA lesions of 1,3-butadiene*.

**David Hermanson**, Xing lab, received a University of Minnesota doctoral dissertation fellowship, awarded to outstanding Ph.D. candidates to support their final year of research.

Doctoral students **Jill Kyzer** from the Georg group and **Maggie Olson** and **Nick Struntz** from the Harki group were appointed to the NIH Chemistry-Biology Interface Training grant.

Both 2011 Bighley Fellowships were awarded to Medicinal Chemistry graduate students; **Maggie Olson** from the Harki lab and **Xia Zhang** in the Amin lab received fellowships.

A \$52,000 American Heart Association predoctoral fellowship was awarded to graduate student **Dan Wang**, whom Dr. Harki will mentor on her study *Elucidating the cellular targets of parthenolide – A promising anti-atherosclerosis natural product*.

Med Chem grad students Kwon Ho Hong (Georg Lab), Maggie Olson and Dan Wang (Harki Lab), Susith Wickramaratne (Tretyakova Lab), and Xia Zhang (Amin Lab).





- Commencement**
- M.S.** Xun Ming..... M.S., May ..... Advisor: Tretyakova  
*DNA-protein cross-linking by CIS-1,1,2,2-diamminedichloroplatinum (II) (Cisplatin) formation of 8-OXO-dG and oxazolone lesions with p53 derived DNA sequences following photooxidation in the presence of riboflavin*
- Ph.D.** Satish Patil (Chemistry)..... Ph.D., January..... Advisor: Georg  
*Preclinical development of a novel triptolide prodrug for cancer treatment*
- Sonia Das ..... Ph.D., October..... Advisor: Xing  
*Development of effective anti-cancer agents targeting drug-resistant malignancies*
- Ajay Yekkirala (Pharmacology) ..... Ph.D., October..... Advisor: Portoghese  
*Elucidating the role of opioid receptor heteromers as targets for analgesic drug design*
- Hajime Seki (Chemistry)..... Ph.D., December 2011..... Advisor: Georg  
*Cyclic enamines: Methodology development, total synthesis, and library construction*

### MIKI Meeting 2011

Held annually since 1963, the MIKI “meeting in miniature” is the oldest and most successful regional meeting in medicinal chemistry. Rotating meetings are organized by graduate students in the departments of Medicinal Chemistry at the Universities of Minnesota, Iowa, Kansas, and Illinois at Chicago.

The 49th Annual MIKI meeting was hosted by the University of Kansas and featured Professor **Dennis C. Liotta** from the Department of Chemistry, Emory University as the keynote speaker.

### New and Departing Members

In the summer of 2011, Dr. **Carrie Haskell-Luevano** joined the Department as the Philip S. Portoghese Endowed Chair in Chemical Neuroscience. Professor Haskell-Luevano grew up in California, and obtained a B.S. degree in Chemistry from the University of California, Fresno. She earned her Ph.D. in chemistry from the University of Arizona under the mentorship of Professors Victor J. Hruby, Mac E. Hadley and Dr. Tomi K. Sawyer. Dr. Haskell-Luevano was a postdoc in the Ira Gantz and Tadataka “Tachi” Yamada labs at the University of Michigan and Roger Cone’s lab at the Vollum Institute, Oregon Health Sciences University in Portland. She joined the University of Florida faculty in the department of medicinal chemistry in 1998 and rose through the ranks to full professor in 2008. Research in the Haskell-Luevano laboratory focuses around the “Melanocortin Pathway” that includes endogenous agonists, antagonists, G-protein coupled receptors, and auxiliary proteins involved in the regulation of the ligands and receptors in the brain.

Dr. **Henry Wong** joined the Institute for Therapeutics Discovery and Development as Director of Pharmacology on November 15, replacing Dr. **Juan Leal**, who left the Institute to join Regeneron Pharma. Dr. Wong’s primary role will be to provide preclinical pharmacology support to the ITDD’s NCI-funded Chemical Diversity Center and serve as scientific coordinator on its projects. He previously has been involved in all aspects of the development of both small molecules and targeted biologics from target identification, assay development, screening, proof of concept, mechanism of action, lead optimization, efficacy, and biomarker development.

After ten years with Dr. Georg, administrator **Andrea Knickerbocker** retired from the University of Minnesota at the end of the year, returning to Kansas. Andrea began working



Grad students Amy Doan and Maggie Olson with Assistant Professor Dan Harki at MIKI, left; Professor Carrie Haskell-Luevano’s lab: Dr. Anamika Singh, Dr. Srinivasa Tala, Dr. Huisuo Huang, Dr. Carrie Haskell-Luevano, and Yunyang Wang, right.



## New and Departing Members (continued)

with the Georg group in Kansas and was instrumental in organizing the group's move to the University of Minnesota.

Sara Wajeeh left the ITDD business office in June, moving to New York with her husband and sons. Sara's friendliness, knowledge, and resourcefulness made her a valuable part of ITDD's administrative staff after the move to Minnesota.

## Faculty

Gunda I. Georg ..... Department Head & Professor; Director, Institute for Therapeutics Discovery & Development (ITDD); Robert Vince Endowed Chair & McKnight Chair

Rodney L. Johnson ..... Associate Department Head & Distinguished Professor

David Ferguson ..... Director of Graduate Studies & Professor

Yusuf J. Abul-Hajj ..... Professor

Elizabeth A. Amin ..... Assistant Professor

Peter I. Dosa ..... Research Assistant Professor; Associate Program Director, ITDD

Earl W. Dunham ..... Associate Professor

Robert A. Fecik ..... Associate Professor

Barry C. Finzel ..... Professor

Vadim J. Gurvich ..... Research Assistant Professor; Associate Director, ITDD; Director, ITDD Chemical Process Development

Patrick E. Hanna ..... Morse-Alumni Distinguished Teaching Professor

Daniel A. Harki ..... Assistant Professor

Carrie Haskell-Luevano ..... Professor; Philip Portoghese Endowed Chair; Institute for Translational Neuroscience (ITN) Scholar

Derek J. Hook ..... Research Professor; Director, ITDD High Throughput Screening

Juan Leal ..... Director, ITDD Pharmacology & Biomarkers

Herbert T. Nagasawa ..... Professor Emeritus

Philip S. Portoghese ..... Distinguished Professor

Rory P. Remmel ..... Distinguished Teaching Professor

W. Thomas Shier ..... Professor

Marilyn K. Speedie ..... Dean, College of Pharmacy; Professor

E. John Staba ..... Professor Emeritus

Natalia Y. Tretyakova ..... Professor

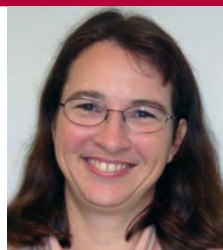
Robert Vince ..... Professor; Director, Center for Drug Design (CDD)

Carston R. Wagner ..... Professor; Endowed Chair in Medicinal Chemistry

Michael A. Walters ..... Research Associate Professor; Director, ITDD Lead & Probe Discovery

Henry Wong ..... Associate Program Director, ITDD Pharmacology & Biomarkers

Chengguo Xing ..... Associate Professor

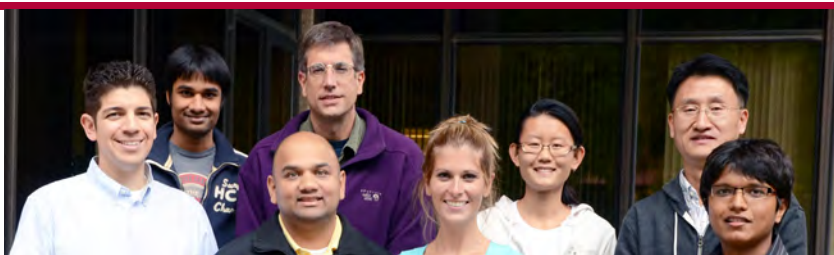


*New Med Chem Professor Carrie Haskell-Luevano, new ITDD Director of Pharmacology, Dr. Henry Wong, left; former ITDD administrative staff Andrea Knickerbocker and Sara Wajeeh, right.*



<b>Adjunct Faculty</b>	Courtney C. Aldrich .....	Research Associate Professor, CDD
	Mark D. Distefano .....	Distinguished McKnight University Professor, Department of Chemistry
	Stephen S. Hecht .....	Professor, Wallin Chair in Cancer Prevention
	Thomas R. Hoye .....	Merck Professor, Department of Chemistry
	Krzysztof W. Pankiewicz .....	Research Professor; Associate Director, CDD
	Lisa A. Peterson .....	Professor, Environmental Health Sciences

<b>Research Staff</b>	Eyup Akgun .....	Research Associate, Portoghese Lab
	Ramappa Chakrasali .....	Research Associate, Georg Lab
	Ting-Lan Chiu .....	Research Associate, Amin Lab
	Adrian Fegan .....	Research Associate, Wagner Lab
	Rawle Francis .....	Research Associate, Georg Lab
	Subhashree Francis .....	Research Associate, Walters Lab
	Joe Hexum .....	Junior Scientist, Harki Lab
	Sudhakar Jakkraj .....	Research Associate, Georg Lab
	Sidath Kumarapperuma .....	Research Associate, Wagner Lab
	Jae Chul Lee .....	Research Associate, Wagner Lab
	Lev Lis .....	Research Associate, Gurvich Lab
	Mary Lunzer .....	Scientist, Portoghese Lab
	Brock Matter .....	Scientist, Tretyakova Lab
	Amy Miller .....	Assistant Scientist, Gurvich Lab
	Srilakshmi Neelam .....	Research Associate, Walters Lab
	Angela Perkins-Harki .....	Research Associate, Harki Lab
	Michael Powers .....	Scientist, Portoghese Lab
	Anamika Singh .....	Research Associate, Haskell-Luevano Lab
	Rondedrick Sinville .....	Research Associate, Hook Lab
	Mary Smart .....	Laboratory Manager, Gurvich Lab
	Jonathan Solberg .....	Assistant Scientist, Hook Lab
	Chris Stenland .....	Research Associate, Gurvich Lab
	Jessica Strasser .....	Assistant Scientist, Walters Lab
	Shameem Sultana Syeda .....	Research Associate, Georg Lab
	Srinivasa Tala .....	Research Associate, Haskell-Luevano Lab
	Defeng Tian .....	Research Associate, Hook Lab
	Timothy Ward .....	Research Associate, Georg Lab



Members of Professor Carston R. Wagner's lab group: Dr. Matthew Cuellar, Amit Gangar, Dr. Sidath Kumarapperuma, Dr. Rick Wagner, Kari Gabrielse, Shui Li, Dr. Jae Chul Lee, and Rachit Shah.

**Administrative Staff**

Caitlin Boley..... Principal Office & Administrative Specialist  
 Mary Crosson..... Associate Administrator, ITDD  
 Sandy Dewing..... Associate Administrator, Journal of Medicinal Chemistry  
 Briana Gray ..... Student Office Assistant  
 Andrea Knickerbocker ..... Assistant to the Department Head  
 Joyce Reha ..... Executive Secretary  
 Sarah Johnson Sexton ..... Executive Office & Administrative Specialist  
 Marilee Tuite ..... Executive Office & Administrative Specialist, Journal of Medicinal Chemistry  
 Sara Wajeeh ..... Executive Office & Administrative Specialist

**Graduate Students**

Timothy Andrews..... Advisor: Harki  
 Adam Benoit ..... Advisor: Ferguson  
 Nicholas Bleeker ..... Advisor: Xing  
 Ran Dai ..... Advisor: Finzel  
 Sonia Das..... Advisor: Xing  
 Trinh Doan..... Advisor: Georg  
 Skye Doering..... Advisor: Haskell-Luevano  
 Curtis Engelhart ..... Advisor: Aldrich  
 William Fiers..... Advisor: Fecik  
 Kari Gabrielse Schuett ..... Advisor: Wagner  
 Amit Gangar..... Advisor: Wagner  
 Bryant Gay..... Advisor: Georg  
 Arnold Groehler ..... Advisor: Tretyakova  
 David Hermanson ..... Advisor: Xing  
 Kwon Ho (John) Hong..... Advisor: Georg  
 David Huang ..... Advisor: Georg  
 Annapurna Kamineni ..... Advisor: Shier  
 Yong Wook Kim (Chem).... Advisor: Georg  
 Srikanth Kotapati..... Advisor: Tretyakova  
 Elbek Kurbanov ..... Advisor: Amin  
 Jillian Kyzer ..... Advisor: Georg  
 Rahul Lad ..... Advisor: Sturla  
 Shui Li ..... Advisor: Wagner  
 Wei Li (Chem) ..... Advisor: Georg  
 Yang Li ..... Advisor: Fecik  
 Li-Kai Liu..... Advisor: Finzel  
 Kimberly Maize ..... Advisor: Finzel



*Members of Assistant Professor Daniel Harki's Lab: Dr. Dan Harki, Dan Wang, Tim Andrews, Maggie Olson, John Widen, and Dr. Tianshun Hu.*



**Graduate  
Students**  
(continued)

Xun Ming..... Advisor: Tretyakova  
 Kathryn Nelson..... Advisor: Aldrich  
 Aniekan Okon..... Advisor: Wagner  
 Margaret Olson..... Advisor: Harki  
 Satish Patil (Chem)..... Advisor: Georg  
 Michael Peterson ..... Advisor: Fecik  
 Martin Phillips..... Advisor: Peterson  
 Adwait Ranade..... Advisor: Georg  
 Dewakar Sangaraju..... Advisor: Tretyakova  
 Hajime Seki (Chem)..... Advisor: Georg  
 Rachit Shah..... Advisor: Wagner  
 Jingjing Shen ..... Advisor: Wagner  
 Nicholas Struntz ..... Advisor: Harki  
 Jonathan Tan ..... Advisor: Tretyakova  
 Aaron Teitelbaum..... Advisor: Rimmel  
 Sreedhar Tummalapalli..... Advisor: Georg  
 Dan Wang..... Advisor: Harki  
 Yunyang Wang..... Advisor: Haskell-Luevano  
 Susith Wickramaratne (Chem) Advisor: Tretyakova  
 John Widen ..... Advisor: Harki  
 Ajay Yekkirala (Pharmacol) Advisor: Portoghese  
 Yiyun Yu (Chem)..... Advisor: Georg  
 Adam Zarth..... Advisor: Hecht  
 Xia Zhang ..... Advisor: Amin  
 Bo Zhou ..... Advisor: Xing

**Postdocs and  
Fellows**

Mohamed Abou-Karam ..... Shier  
 Dennis Brown ..... Fecik  
 Padma Chittepudi ..... Ferguson  
 Rebecca Cuellar ..... Georg  
 Matthew Cuellar ..... Wagner  
 Teresa De la Mora-Rey..... Finzel  
 Jignesh Doshi ..... Portoghese  
 Todd Geders..... Finzel  
 Aridoss Gopalakrishnam ... Xing  
 Tianshun Hu ..... Harki  
 Huisuo Huang..... Haskell-Luevano  
 Irfan Javed..... Portoghese



*Members of Associate Professor Chengguo (Chris) Xing's Lab: Dr. Ahmad Shaik, Sonia Das, David Hermanson, Dr. Chris Xing, Pablo Leitzman, Dr. Aridoss Gopalakrishnam, Dr. Jinling Zhang, and Bo Zhou.*

## Postdocs and Fellows (continued)

Delshanee Kotandeniya ..... Tretyakova  
 Sidath Kumarapperuma ..... Wagner  
 Morgan Le Naour ..... Portoghese  
 Krishnarao Lopinti ..... Johnson  
 Bhaskar Malayappan ..... Tretyakova  
 Matthew Metcalf ..... Portoghese  
 Roli Mishra ..... Johnson  
 Satyendra Mishra ..... Johnson  
 Amber Onorato ..... Fecik  
 Charles Schiaffo ..... Ferguson  
 Ahmad Ari Shaik ..... Xing  
 Marina Tanasova ..... Georg  
 Jeffrey Vanvoorst ..... Finzel

## Undergraduate Research Assistants and Summer Scholars

Robin Alonge ..... Amin Lab  
 Ryan Baumgartner ..... Wagner Lab  
*University of Minnesota Undergraduate Research Opportunities Program*  
 Amy Grant ..... Tretyakova Lab  
 Torie Grover ..... Harki Lab  
*University of Minnesota Undergraduate Research Opportunities Program*  
 Hayat Hassan ..... Xing Lab  
*University of Minnesota Undergraduate Research Opportunities Program*  
 Mitch Hoverman ..... Remmel Lab  
 Pablo Leitzman ..... Xing Lab  
 James Lloyd ..... Tretyakova Lab  
*University of Minnesota Undergraduate Research Opportunities Program*  
 Ezra Menon ..... Harki Lab  
*University of Minnesota Undergraduate Research Opportunities Program*  
 Joseph Molde ..... Wagner Lab  
*University of Minnesota Undergraduate Research Opportunities Program*  
 Dan Murphy ..... Tretyakova Lab  
 Amanda Reigel ..... Tretyakova Lab  
 Heedo Shin ..... Tretyakova Lab  
 B.J. Valente ..... Tretyakova Lab  
 Anthony Vetter ..... Amin Lab

## Ways to Give

Private support of our activities is important to maintain the quality of our program and the continuation of the mission of the department. Even small contributions add up over time and can have a significant impact.



Members of Professor Philip Portoghese's lab: Dr. Eyup Akgun, Dr. Irfan Javed, Dr. Matthew Metcalf, Dr. Phil Portoghese, Dr. Michael Powers, Ajay Yekkirala, and Morgan Le Naour.

## Ways to Give (continued)

Giving opportunities include:

- Medicinal Chemistry Alumni Graduate Student Fellowship
- MIKI Meeting Fund
- Ole Gisvold Fellowship in Medicinal Chemistry
- Philip S. Portoghese Fellowship in Medicinal Chemistry
- Philip S. Portoghese Lectures in Medicinal Chemistry
- Remmel and Zimmerman Fellowship in Drug Metabolism and Pharmacokinetics
- Robert Vince Graduate Student Fellowships
- Soine Lectures in Medicinal Chemistry
- Yusuf J. Abul-Hajj Fellowship in Medicinal Chemistry

Our Development Director Robert Busch will work with you and will answer any questions that you might have. He can be reached by e-mail, busch110@umn.edu, or phone, 1-866-437-0012.

## Research Grants

**A**wards to the Department of Medicinal Chemistry and Institute for Therapeutics Discovery and Development from the National Institutes of Health and other sources totaled \$4.98 million for fiscal year 2011.

Ongoing projects and grants newly funded in 2011 are listed below with their primary investigator.

- Administration of the National Institute for Pharmaceutical Technology and Education .....Vadim Gurvich
- An anticancer agent selective against drug resistant AML .....Chengguo Xing
- An NF- $\kappa$ B inhibitor as a post-carcinogen lung cancer chemopreventive agent .....Chengguo Xing
- Anthrax toxin lethal factor inhibition study .....Elizabeth Amin
- APOBEC transfection enhancer technology .....Daniel Harki
- Chemical Biology Consortium .....Gunda Georg
- Developing a post-carcinogen lung cancer chemopreventive .....Chengguo Xing
- Development and manufacturing of peptidoglycan for clinical use.....Vadim Gurvich
- Development of prodrugs of anti-apoptotic bile acids for protection against acute tissue injury.....Peter Dosa
- Development of small molecule inhibitors of the AAA ATPase p97 ...Gunda Georg
- Development of VUM4P1 as a novel approach to treatment of Parkinson's disease.....Vadim Gurvich
- Diazepam prodrugs for the treatment of seizure emergencies.....Gunda Georg
- DNA cross-linking by diepoxybutane .....Natalia Tretyakova
- Elucidating the mechanisms of AML cancer stem cell toxicity by parthenolide .....Daniel Harki
- Endogenous G-protein coupled receptor antagonists .....Carrie Haskell-Luevano
- Enhancers of dihydrolipoamide dehydrogenase stability and function .. Michael Walters
- High-throughput meso-scale discovery of new frataxin enhancers .....Derek Hook
- HTS of natural product extract libraries for apoptosis inducers.....Michael Walters
- Interdisciplinary Center for Male Contraceptive Research .....Gunda Georg



## Research Grants (continued)

- Kinase library screen .....Derek Hook
- Ligands that target opioid-chemokine and opioid-mGlu5 heteromers ..Philip Portoghese
- Magnetic/plasmonic nanoparticles for cancer diagnosis and therapy ....Carston R. Wagner
- Mechanism of action of RITA, a small molecule for MML leukemias .....Robert Fecik
- Mechanisms of ethnic/racial differences in lung cancer due to cigarette smoking .....Natalia Tretyakova
- Meropenem prodrugs for the treatment of tuberculosis.....Rory Rimmel
- Multivalent vaccine for opiate addiction .....Philip Portoghese
- Nanopore biosensor for measuring dynamics of membrane proteins....Chengguo Xing
- NExT-CBC project: Optimization and testing of CDK3 inhibitors .....Gunda Georg
- Nutrition-based treatment for Alzheimer's disease .....Chengguo Xing
- Pro-Leu-Gly-NH<sub>2</sub> and dopamine receptor modulation study.....Rod Johnson
- Reviewer education in state of the art pharmaceutical manufacturing technology .....Vadim Gurvich
- Selective nonpeptide opioid ligands.....Philip Portoghese
- Self-assembling immunotherapeutic nanorings.....Carston R. Wagner
- Sequence distribution of tobacco carcinogen-DNA adducts.....Natalia Tretyakova
- Structural basis of specificity in affinity-labeled polyketide synthase didomains .....Robert Fecik
- Targeting cancer stem cells with parthenolide-functionalized gold nanoparticles .....Daniel Harki

## Publications

1. Adams, T.B.; Gavin, C.L.; McGown, M.M.; Waddell, W.J.; Cohen, S.M.; Feron, V.J.; Marnett, L.J.; Munro, I.C.; **Portoghese, P.S.**; Rietjens, I.M.C.M.; Smith, R.L. The FEMA GRAS assessment of aliphatic and aromatic terpene hydrocarbons used as flavor ingredients. *Food Chem. Toxicol.*, 49(10), 2471-2494.
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Compiled, designed, and edited by Sarah Johnson Sexton, Department of Medicinal Chemistry.