

# Indispensable News

# MinneCeutics

University of Minnesota

Fall 2002

Department of Pharmaceutics

## REGULAR FACULTY:

William F. Elmquist  
Carolyn A. Fairbanks  
David J.W. Grant  
Ronald J. Sawchuk  
Ronald A. Siegel  
Raj G. Suryanarayanan  
Timothy S. Wiedmann  
Cheryl L. Zimmerman

## ASSOCIATE AND ADJUNCT FACULTY:

Walid M. Awni, Abbott Laboratories  
Rene A. Braeckman, Pan Pacific Pharmaceuticals, Inc.  
Keith K.H. Chan, GloboMax LLC  
Belinda W.Y. Cheung, University of Minnesota  
William H. Frey, II, Alzheimer's Institute at Regions  
Hospital

Janet M. Dubinsky, University of Minnesota  
Michael D. Karol, Abbott Laboratories  
Aldo Rescigno, University of Parma, Italy  
Evgeniy Y. Shalaev, Pfizer Pharmaceuticals  
Ray Skwierczynski, 3M Pharmaceuticals  
Lian Yu, Eli Lilly and Company

## MESSAGE FROM THE DEPARTMENT HEAD

Some years are more eventful than others, and this year has been a big one!

The last time I communicated with you, our Department had six members. Now we have eight (a gain of 33%!). In January 2002, **Dr. Carolyn Fairbanks** joined us as Assistant Professor. Dr. Fairbanks is a neuropharmacologist (now a "neuropharmaceuticist") whose research is focused on understanding the mechanisms underlying chronic pain in order to facilitate the development of novel prodrugs for pain control. She comes to us with a Mentored Career Development (K01) Award and a Cutting Edge Basic Research Award (R21) from the National Institutes of Health to study the impact of genetic variability of glutamatergic/agnatinerbic systems on pain and drug addiction. Dr. Fairbanks has recently been awarded the American Pain Society's Early Career Scholars Award for the year 2003. The addition of Dr. Fairbanks to our faculty will allow our Department to contribute to the already strong neurosciences area of emphasis at the University of Minnesota.

In August 2002, **Dr. William Elmquist** joined our Department as Associate Professor. Dr. Elmquist was previously at the University of Nebraska, where he developed an internationally recognized research program focused on the transport of drugs across the blood-brain barrier, and the utilization of microdialysis to quantitate such transport. His NIH-funded research along these lines will be concentrated, in part, on the genetically determined regulation and expression of transporters, which is in line with the College of Pharmacy's pharmacogenomics initiative. Welcome, Carolyn and Bill!

Last June the 3rd International Symposium on Microdialysis in Drug Research and Development was hosted by the College of Pharmacy, and was organized by Ron Sawchuk and Bill Elmquist. This event brought internationally known scientists to our campus. An accompanying course was presented on basic and advanced aspects of *in vivo* microdialysis.

Last year I reported the ongoing construction of new laboratories, including a core molecular biology facility in Weaver-Densford Hall, and how everyone was squeezed together as a result. Construction is now complete, and David Grant's group

is now enjoying their new space and facilities. Also, next door to us is the new Molecular and Cell Biology building, which was completed in July. Carolyn Fairbanks's laboratory conducts their genetic and neuroanatomical studies in this new building.

This year the University of Minnesota was once again rated among the top three public research universities in the U.S., behind the University of California at Berkeley and the University of Michigan.

Looking for a new job? University President Mark Yudof has moved to the University of Texas, and a search for a new president is underway. Dr. Robert Bruininks, previously the Provost, is serving as Interim President.

We face two major challenges in the upcoming year. First, our professional pharmacy program is up for reaccreditation, and a self-study of the College of Pharmacy is being prepared, including descriptions and self-assessments of our research and graduate programs. We will be site-visited in March 2003. Second, expansion of the College of Pharmacy to the Duluth campus is underway. This expansion is to accommodate the pharmacist shortfall that is particularly acute in rural regions of Minnesota. Fifty professional pharmacy students will be admitted to the Duluth site this year. Much of the curriculum will be delivered by distance learning, with instructional support on the Duluth campus. As you can imagine, there are numerous logistical issues that must be dealt with in making this expansion as seamless as possible.

I will have more to tell you at the Alumni Breakfast!

Best regards,



Ronald A. Siegel, Sc.D.  
Professor and Head  
Department of Pharmaceutics

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## THE EDWARD G. RIPPKE FELLOWSHIP IN PHARMACEUTICS

The Edward G. Rippke Fellowship in Pharmaceutics was established in honor of his contributions to the field of pharmaceutics, with a goal of creating a permanent endowment that will provide a \$15,000 award to a promising Pharmaceutics graduate student.

Dr. Rippke was recognized by his peers as a leader in solid-state pharmaceutics. Well-known for his work in the physics of tablet compression, Dr. Rippke received the Ebert Prize in 1982 from the Academy of Pharmaceutical Sciences, APhA, an indication of the high esteem in which he was held by the pharmaceutical sciences community. He also received the Award for the Advancement of Industrial Pharmacy in 1985 from the IPT Section of APhA, and in 1986 received the Citation of Merit from his alma mater, the University of Wisconsin. He was instrumental in the establishment of the PT section of AAPS.

## THE RONALD J. SAWCHUK FELLOWSHIP IN PHARMACOKINETICS

The Ronald J. Sawchuk Fellowship in Pharmacokinetics was established in honor of his contributions in the field of pharmacokinetics to create a permanent endowment that will provide a fellowship for an outstanding graduate student working in the area of pharmacokinetics.

Dr. Sawchuk has been dedicated to the Department of Pharmaceutics at the University of Minnesota for over 30 years. He joined the Department when pharmacokinetics was still a relatively new discipline and was a driving force in building and solidifying the field within the graduate and professional programs. Throughout his years at Minnesota he served as department head and director of graduate studies. His many advisees have long enjoyed success in the pharmaceutical industry and in academia. His contribution to the undergraduate program is reflected by the Teacher of the Year Award he received in 1982, the Horace T. Morse—Amoco Foundation Award in 1986, and the Hallie Bruce Memorial Lecture Award in 1996. He was also recognized by his peers as a Fellow of AAPS in 1988 and of AAAS in 1990.

To learn more about how you can contribute to these important graduate fellowships and eligibility for matching funds, please contact:

**Laurel Mallon, Director of Development**  
College of Pharmacy, University of Minnesota  
308 Harvard Street S.E., Room 5-138 Weaver Densford Hall  
Minneapolis, MN 55455  
612-624-2490 or mallo001@umn.edu

We invite you to join us.

**MINNESOTA ALUMNI BREAKFAST**  
*MONDAY, November 11, 2002*  
*7:00 - 8:00 a.m.*  
**Sheraton Centre Toronto Hotel**



AAPS Annual Meeting and Exposition  
November 10-14, 2002  
Metro Toronto Convention Centre, Toronto, Ontario, Canada

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## DRUG DELIVERY CENTER

The Drug Delivery Center welcomed new members Dr. Carolyn Fairbanks and Dr. William Elmquist, who are new faculty in the Department of Pharmaceutics, while one of the founding members, Dr. Eric Munson, moved to the University of Kansas. I am pleased to announce the addition of Mr. Bill Hamann, who is providing secretarial and administrative support. As part of his duties, Bill coordinates the annual Open House and the Advanced Therapies Seminar series, as well as other related activities.

The Open House was held this year on October 3, beginning with a poster session by University of Minnesota faculty, postdocs and graduate students, and was followed by a seminar presentation titled "Targeted Drug Delivery: Some Ideas for the Future" by Dr. Vladimir P. Torchilin, Professor and Chair of the Department of Pharmaceutical Sciences at Northeastern University in Boston, Massachusetts. This lecture was part of a monthly series sponsored by the Academic Health Center's Advanced Therapies Initiative, the Drug Delivery Center, and the Center for Cellular and Molecular Therapies.

In addition to the Open House, the Drug Delivery Center sponsored two seminars by Dr. Charles Nicholson of New York University School of Medicine, and by Dr. Kenneth Morris of Purdue University, also as a part of the Advanced Therapies Initiative.

Present membership in the Drug Delivery Center comprises nineteen scientists representing five academic departments, and support is provided by thirteen companies.

On July 1, 2001, funding from the Graduate School expired and a no-cost extension was granted for an additional year until June 30, 2002. Although the University will not be providing additional funds, the Center has received \$10,500 from the local pharmaceutical industry and anonymous donors. To help us provide seed grants for promising research projects, we welcome donations from alumni and faculty.

The Drug Delivery Center continues to bring together disparate faculty and groups having a common interest in drug delivery. Goals for 2002-2003 will be to continue the highly successful joint seminar program, act on feedback from a questionnaire completed by Industrial Advisory Board members, provide modest seed grants as funding becomes available, and enhance research collaborations.



David J.W. Grant, D.Phil., D.Sc.  
*Professor and Director*

### **UNIVERSITY OF MINNESOTA MEMBERS**

- ◆ Pharmaceutics ◆ Biomedical Engineering ◆ Electrical and Computer Engineering
- ◆ Laboratory Medicine and Pathology ◆ Regions Hospital in St. Paul, Minnesota

### **INDUSTRIAL ADVISORY BOARD**

- ◆ Antares Pharma, Inc. ◆ Birchpoint Medical ◆ CIMA Laboratories, Brooklyn Park and Eden Prairie, Minnesota
  - ◆ Comedicus ◆ General Mills ◆ Hosokawa Bepex ◆ LecTec Corporation ◆ Medtronic ◆ 3M Pharmaceuticals
  - ◆ Minnesota Technologies, Inc., Academic Health Center, University of Minnesota ◆ TSI, Inc.
  - ◆ Upsher-Smith Laboratories, Inc. ◆ Amir Naqwi, Ph.D., Powerscope, Inc. ◆ David Madsen, Ph.D.
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**3<sup>rd</sup> International Symposium on  
Microdialysis in Drug Research and Development**  
— and —  
**Course on Basic and Advanced Aspects of *In Vivo* Microdialysis**

On June 18-22, 2002 the College of Pharmacy hosted the Course on Basic and Advanced Aspects of *In Vivo* Microdialysis and the 3<sup>rd</sup> International Symposium on Microdialysis in Drug Research and Development. Attendees from 13 countries were welcomed by Professor Ronald Sawchuk of the University of Minnesota and Professor William Elmquist of the University of Nebraska Medical Center.

The application of microdialysis is rapidly expanding in the field of pharmacokinetic and drug disposition studies. The 1<sup>st</sup> and 2<sup>nd</sup> International Symposia on Microdialysis in Drug Research and Development were held in The Netherlands in 1998, and in Sweden in 2000. The next Symposium will be held in Vienna, Austria in 2004.

This year's Symposium featured three days of presentations focused on Analytical and Methodological Aspects of Microdialysis, Clinical Microdialysis, Microdialysis in the Skin and Subcutis, Microdialysis in ADME Research, and Applications in Preclinical Drug Development. Participants presented their research in poster and podium sessions, and six travel grants were awarded by Leo Pharmaceuticals to assist student attendees.

Symposium presenters were: ♦ Christopher Bernards, University of Washington, USA ♦ Eva Benfeldt, University of Copenhagen, Denmark ♦ Michael Bowser, University of Minnesota, USA ♦ Ross Bullock, Virginia Commonwealth University, USA ♦ Geraldine Clough, University of Southampton, United Kingdom ♦ Sandrine Desrayaud, Novartis Pharma, AG, Switzerland ♦ Lotte Groth, Leo Pharmaceuticals, Denmark ♦ Malin Höistad, Karolinska Institutet, Sweden ♦ Christian Joukhadar, University of Vienna, Austria ♦ Phillip Jobe, University of Illinois, USA ♦ Peter Kissinger, Bioanalytical Systems, Inc., USA ♦ Michel Lemaire, Novartis Pharma, AG, Switzerland ♦ Markus Mueller, University of Vienna, Austria ♦ Kay Rittenhouse, Pfizer, USA ♦ Danny Shen, University of Washington, USA ♦ Jamie Scism, Lilly Corporation, USA ♦ Martin Schmelz, University of Erlangen, Germany ♦ Tung-Hu Tsai, National Research Institute of Chinese Medicine, Taiwan ♦ Fan Yuan, Duke University, USA.

During the Symposium, the Cutaneous Microdialysis Club held a workshop that included informal scientific presentations, discussions, and a prize for best poster. The workshop was sponsored by the Dermatological/Pharmacological Research Centre, Copenhagen, Denmark.

The Course addressed applications of microdialysis in drug research, with special attention given to the quantitative nature of pharmacokinetic studies. Lectures focused on basic principles in microdialysis, recovery issues, and special considerations for designing, performing and interpreting microdialysis studies. Comparisons between microdialysis and other *in vivo* techniques were discussed. This course was helpful to those with minimal experience with the technique and to more experienced researchers who intend to use microdialysis in quantitative studies. Course presenters included: ♦ Michael Bowser, University of Minnesota, USA ♦ Peter Bungay, National Institutes of Health, USA ♦ Belinda Cheung, University of Minnesota, USA ♦ Elizabeth de Lange, LACDR, The Netherlands ♦ William F. Elmquist, University of Nebraska Medical Center, USA ♦ Margareta Hammarlund-Udenaes, Uppsala University, Sweden.

Our website for this year's Course and Symposium will soon contain photos from the 2002 events, as well as preliminary information about the 2004 Symposium in Vienna. The website address is:

[www.pharmacy.umn.edu/resgrad/pceutics/ThirdIntSymp/index.html](http://www.pharmacy.umn.edu/resgrad/pceutics/ThirdIntSymp/index.html)

**COURSE AND SYMPOSIUM SPONSORS**

♦ Amgen ♦ Bioanalytical Systems, Inc. ♦ CMA/Microdialysis ♦ Immunex  
♦ Leo Pharmaceuticals ♦ Nordea ♦ Novartis ♦ Pfizer

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# 3<sup>rd</sup> INTERNATIONAL MICRODIALYSIS COURSE AND SYMPOSIUM





## SPRING 2002 GRADUATION



Zedong Dong, Zheng Wu, Tong Zhu, Zhuoying Joanna Peng



Prof. Zimmerman and Tong



Tong Zhu with her mother and husband



Zedong with wife, Ping Ji, and Prof. Grant



Lyn and Prof. Ron Sawchuk



'Z' and his wife



Joanna and friends

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## MESSAGE FROM THE DIRECTOR OF GRADUATE STUDIES

Dear Alumni, Students, Faculty, and Friends,

Graduate programs undergo periodic reviews every 5 to 10 years. Our program underwent such a review in 1998, which involved a self-study by the faculty, external evaluators, student and alumni input via questionnaires, documentation by administrators, and a formal review by the Graduate School. One purpose of the review was to identify weaknesses and suggest means of improving the quality of education. I thought you may be interested in what we have done since the 1998 review.

- Pharmaceutics faculty are members of the Center for Advanced Therapies, and head the Center for Drug Delivery at the University of Minnesota. This has broadened our Department's seminar offerings and has allowed us to invite more outside speakers.
- Three faculty who have high potential to attract NIH funding have been hired.
- Stipends for students have been significantly increased.
- The percentage of U.S. citizens/permanent residents in the program has risen to 15%.
- The Preliminary Written Exam, an important student milestone, is now written by collective groups of faculty in the main areas of (1) physical pharmacy, (2) pharmacokinetics and pharmacodynamics, and (3) molecular biology, biopharmaceutics, and cell biology. (No, the students still do not like it.)
- The old Department Head's office has been converted to a student library, and a copy machine is now available for student use in the laboratory.
- Graduate-level courses have been added in areas of drug delivery, drug stability, pharmacokinetics, and the drug development process.

I would like to thank all those alumni who participated in the 1998 graduate program review for providing their thoughtful and helpful comments about our graduate program. Clearly, you are in the best position to evaluate the quality of our work.

While we are pleased with our accomplishments, there is more to be done. We are presently seeking the cooperation of students to identify areas needing improvement, and are working with them to create an ever better, educationally enriching graduate program.

- Last year I talked about adding a prescreening tool on the web so that potential applicants could get a sense of their chances for admission. Such a tool is particularly important for international students who have difficulty meeting the application fee (\$75 US).
- Two years ago, we raised the minimum GRE requirement to 80% for the quantitative and analytical sections.
- Finally, web-based application forms are now available.

With these changes, the request for paper applications dropped from 350-500 per year to 267. However, the median GRE scores in our first-year graduate students still exceeded 90% in the quantitative and analytical sections. Thus, the total number of applicants has been reduced but the overall quality has increased.

If there is anything we need to be working on, let us know.



Timothy S. Wiedmann, Ph.D.  
*Associate Professor*  
*Director of Graduate Studies*

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## NEWS AND ACTIVITIES

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### ALUMNI

**Richard C. Brundage** [Ph.D., 1996] is Associate Professor and Director of Graduate Studies in the Department of Experimental and Clinical Pharmacology in the College of Pharmacy, University of Minnesota.

**Prajakti Atul Kothare** [Ph.D., 2001], is a senior PK/PD scientist in Global Pharmacokinetics/Pharmacodynamics and Trial Simulations at Eli Lilly and Company, Indianapolis, Indiana.

**Aparna Lakkaraju** [Ph.D., 2001] is a postdoctoral associate in the laboratory of Dr. Enrique Rodriguez-Boulan, Department of Ophthalmology at Cornell University Medical Center in New York City.

**Luna C. Musib** [Ph.D., 1999], is a senior pharmacokineticist in Global Pharmacokinetics/ Pharmacodynamics at Lilly Laboratories for Clinical Research in Indianapolis, Indiana.

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### GRADUATE DEGREES EARNED

#### **Zedong Dong, Ph.D.**

Thesis: Conformational Flexibility and Polymorphism of the Dipeptide Sweetener, Neotame (Advisor: Prof. David Grant). Zedong is employed at Genentech in South San Francisco, California.

#### **Joanna Zhuoying Peng, Ph.D.**

Thesis: The Influence of Drug Pre-Exposure on First-Pass Metabolism of Tacrine (Advisor: Prof. Ronald Sawchuk). Joanna is employed at Abbott Laboratories.

#### **Rahul Surana, Ph.D.**

Thesis: Influence of Thermal History and the Interaction with Plasticizers on the Properties of Some Amorphous Pharmaceuticals (Advisor: Prof. Raj Suryanarayanan). Rahul is employed at 3M Pharmaceuticals in St. Paul, Minnesota.

#### **Robert Gary Thorne, Ph.D.**

Thesis: The Nasal Pathway for Drug Delivery to the Central Nervous System: Studies with Protein Tracers and Therapeutics (Advisor: Prof. William Frey II). Robbie is has begun a postdoctoral fellowship at New York University Medical Center with Dr. Charles Nicholson in the Department of Physiology and Neuroscience.

#### **Zheng Wu, Ph.D.**

Thesis: Disposition of 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL) in Bile Duct-cannulated Rats: Stereoselective Metabolism and Tissue Distribution (Advisor: Prof. Cheryl Zimmerman). 'Z' is employed at Wyeth in Pearl River, New York.

#### **Tong Zhu, Ph.D.**

Thesis: Study of Middle Ear Distribution Kinetics of a Cephalosporin in Freely Moving Chinchillas Using

Microdialysis (Advisor: Prof. Ronald Sawchuk). Tong is employed at Abbott Laboratories in Chicago, Illinois.

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### NEW GRADUATE STUDENTS

The Department welcomed these new students in Fall 2002:

**Mr. Amardeep Singh Bhalla** came to Minnesota from the University Department of Chemical Technology (UDCT), Mumbai, India with a B.Tech. in pharmaceuticals and fine chemicals.

**Mr. Nagdeep Giri** earned a B.Pharm. degree from Osmania University in India, and attended the University of Nebraska at Omaha. He transferred to the University of Minnesota in August with his advisor, Dr. William Elmquist.

**Mr. John C. Roberts** earned a B.A. in Chemistry from Macalester College, and a Masters of Music from the University of Minnesota. Prior to joining the Pharmaceutics graduate program, John was a scientist in the laboratory of Prof. Carolyn Fairbanks.

**Mr. Naveed M. Shaik** earned a B.Pharm. degree from Osmania University in India, and attended the University of Nebraska at Omaha. He transferred to the University of Minnesota in August with his advisor, Dr. William Elmquist.

**Mr. Brian A. Willis** came to Minnesota with a B.S. in biochemistry and a B.A. in history from Rhodes College in Alabama. Prior to joining the Pharmaceutics graduate program, Brian was a formulations chemist at Southern Research Institute in Birmingham, Alabama.

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### GRADUATE STUDENT ACHIEVEMENTS

**Ms. Sharmistha Datta** was awarded a 2002-03 USP Fellowship for a project titled "Influence of Solvents on Polymorph Stability Relevant to Screening" that she will present at the USP Annual Meeting in May in Washington, D.C. She also received a Procter and Gamble PDD/PT Graduate Student Award and will present her work at the AAPS Annual Meeting and Exposition in Toronto, Ontario in November.

**Mr. Yuandong (Alex) Gu** is this year's recipient of the Novartis Award from Novartis Pharmaceuticals Corporation of East Hanover, New Jersey. Candidates for the award are nominated and selected by the Pharmaceutics faculty.

**Ms. Ping Ji** was awarded a Doctoral Dissertation Fellowship from the University of Minnesota Graduate School.

**Ms. Swati Nagar** was awarded a PPDM Eli Lilly Graduate Student Award and will present her work at the AAPS Annual Meeting and Exposition in Toronto, Ontario

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in November. She is also a finalist for "The Best Presentation by Graduate Students" at the 11<sup>th</sup> North American ISSX Meeting (International Society for the Study of Xenobiotics) in Orlando, Florida in October, where she will give a short oral presentation and a poster.

**Mr. Cletus Nunes** won a Procter and Gamble Graduate Student Award and will present his PDD/PT work at the AAPS Annual Meeting and Exposition in Toronto, Ontario in November.

**Mr. Agam Sheth** received the 2002 Enz Award from the Pharmacia Corporation in Kalamazoo, Michigan by Dr. Gregory Amidon, who also presented the first Departmental seminar of the year.

**Mr. Deliang Zhou** was awarded a 2002-03 USP Fellowship for a project titled "Influence of Molecular Mobility on the Crystallization of Amorphous Pharmaceuticals".

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#### SUMMER INDUSTRY INTERNS & TRAINEES

**Mr. Koustuv Chatterjee** worked at Pfizer Central Research in Groton, Connecticut with Dr. Evgenyi Y. Shalaev in Pharmaceutical Research and Development on solid-state acidity of pharmaceutical buffers in lyophilized solids, and on chemical reactivity of amorphous solids: inversion of sucrose in a lyophilized matrix.

**Mr. Yushi Feng** interned with Dr. Qun Lu at Pharmacia in Kalamazoo, Michigan on a study of thermally stimulated current as an analytical tool for solid state pharmaceuticals.

**Mr. Cory Hitzman** worked at 3M Pharmaceuticals in the Pharmaceutics Department with Dr. Cynthia Guy, Senior Product Development Chemist, on a project titled "Physical Characterization of Nasal Spray Emulsions."

**Mr. Sachin Lohani** interned at Pfizer Global Research and Development in Groton, Connecticut with Dr. Ravi M. Shanker and Alison K. Mutchler on a project titled "Initial Attempts on Estimation of Lattice Energy from Molecular Structure".

**Ms. Chitrlekha Telang** worked with Dr. Jun Han at Abbott Laboratories in Chicago, Illinois on a project involving the thermal characterization of hydrates.

**Mr. Deliang Zhou** interned with Dr. Eric A. Schmitt at Abbott Laboratories in Chicago, Illinois on a project dealing with molecular mobility and stability of amorphous pharmaceuticals.

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#### SCHOLARS

**Ms. Gwendolyn Athman**, a third-year Pharm.D. student in the College of Pharmacy, received a Melendy Research Scholarship last summer to join the research team of Dr. Carolyn Fairbanks learning the basic techniques of sensory

assessment and intrathecal injection in mice. She is now working on the second part of an ongoing collaboration Dr. Fairbanks has with Dr. Kathleen Sluka, University of Iowa, to identify the  $\alpha_2$  adrenergic receptor subtypes that may contribute to the analgesic effect of transeletrical nerve stimulation (TENS).

**Mr. Haiqing Dai** is a visiting scholar in Dr. Elmquist's laboratory. He is currently finishing his Ph.D. research on improving the targeted delivery of antitumor agents to the central nervous system, and will receive his degree from the University of Nebraska Medical Center. He has a wife, Jingyan, and child, David, who is in the fourth grade. Haiqing was a physician in China, and received a Master's degree from St. Jude Children's Research Hospital.

**Ms. Cory Goracke** works as a member of Dr. Fairbanks' drug abuse research team (supported by her R21 CEBRA grant) to identify the impact of genetic variability of decarboxylated arginine and its biosynthetic and degradative enzymes on pain and opioid addiction. Last year she worked extensively on pharmacodynamic studies of opioid analgesics in a murine model of cancer pain. Cory holds a Bachelor's degree from St. Benedict's College, and left a developing career in the high-tech industry to pursue her interest in basic neuroscientific research.

**Dr. Ramprakash Govindarajan** joined Prof. Suryanarayanan's group as a postdoctoral fellow. He earned a Ph.D. degree in 2002 from Mumbai University, India.

**Mr. Toshihito Hosokawa** is working in Prof. Grant's group as a research associate. He is a research scientist at Kyoto Hakko Kogyo in Osaka, Japan.

**Dr. Xiangmin Liao** joined Prof. Wiedmann's laboratory as a postdoctoral associate. Xiangmin Liao received his Ph.D. in Chemistry from Kansas State University.

**Ms. Laura Maertens** accepted a permanent position in Prof. Zimmerman's laboratory as a junior scientist, and is working on a research project studying the role of a genetic polymorphism in breast cancer response to tamoxifen. She worked in Prof. Zimmerman's laboratory while earning a B.S. in chemical engineering from the University of Minnesota.

**Ms. H. Oanh Nguyen** is laboratory manager for Dr. Fairbanks and has been a long-time collaborator. Throughout the duration of her University of Minnesota Bachelor's degree program in Genetics and Cell Biology, Oanh contributed substantially to the  $\alpha_{2c}$  adrenergic receptor analgesic studies led by Dr. Fairbanks. Oanh is now leading new protocol development in the molecular biology component of Dr. Fairbanks' research program. She is currently pursuing a master's degree in Pharmacology.

**Mr. Cletus Nunes** and **Dr. Ramprakash Govindarajan** traveled to the European Synchrotron Radiation Facility in Grenoble, France with **Prof. Raj Suryanarayanan** to carry out experimental work using high-intensity X-rays.

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**Dr. Valentina V. Vasilevskaya**, from the Nesmeyanov Institute of Organoelement Compounds, Russian Academy of Sciences in Moscow, Russia, spent a month in Prof. Siegel's laboratory working on a theory of titration and osmotic pressure in phase-separating polyelectrolyte solutions.

**Ms. Fenghua Xu** is a visiting scientist from the Chinese National Army Hospital in Beijing, China. She is working in Prof. Siegel's laboratory on enzyme-specific biodegradable microspheres.

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## FACULTY NEWS AND ACTIVITIES

**PROFESSOR WILLIAM F. ELMQUIST** is housed in the office formerly occupied by Professor Emeritus Edward Rippie, and reports that he sometimes feels a desire to hunt grouse and tell bad jokes. He will continue his research on the expression and regulation of drug transporters in the central nervous system, including novel drug delivery approaches to improve the distribution of drugs to the brain to treat AIDS and tumors.

Dr. Elmquist was invited to give a talk on "Novel *In Vivo* Models to Examine the Function of Drug Transporters in the CNS" by Allergan Research in Irvine, California in January.

The Department of Pharmaceutical Chemistry at the University of Kansas invited Dr. Elmquist in February to present "Drug Transporters and CNS Drug Delivery: Experience with AIDS and Cancer Therapy".

Dr. Elmquist was invited to present "The Use of Microdialysis to Study the Function of Membrane-Bound Drug Transport Proteins in the Central Nervous System" in the Carolyn Frye-Halloran Symposium, Microdialysis Catheters in Brain Tumors, at Massachusetts General Hospital, Harvard Medical School in Boston, Massachusetts in March.

Dr. Elmquist was invited to present "Principles of Microdialysis Sampling Technique" and "Determining Microdialysis Probe Recovery *In Vivo*" at the ACCP 2002 Spring Practice and Research Forum in Savannah, Georgia in April.

Dr. Elmquist was invited to present "Transport of Anti-tumor Agents in the Central Nervous System" in May at the 35<sup>th</sup> Annual Higuchi Research Seminar in Lawrence, Kansas.

At the Gordon Conference in June in Tilton, New Hampshire, Dr. Elmquist presented "Influence of Drug Transporters on the Delivery of Selected Anti-tumor Agents to the CNS, Barriers of the CNS".

Dr. Elmquist was invited to give a talk on "Using Intracerebral Microdialysis to Examine Drug Transport at the Blood-Brain Barrier" and "Transport at the Blood-Brain Barrier: A Role in Environmental Disease?" by the National Institute of Environmental Health in Research Triangle Park, North Carolina in September.

Cleveland Clinic Foundation invited Dr. Elmquist to present "The Role of Drug Efflux Transporters in Drug Delivery to the CNS" in Neurosurgical Grand Rounds, and "Novel Methods to Study Drug Efflux Transport Systems in the CNS" as a LRI Lecture in the Brain Tumor Institute in Cleveland, Ohio in October.

**PROFESSOR CAROLYN A. FAIRBANKS**, in collaboration with other investigators, will establish "A Self-sustaining Research Center: The Minnesota Project to Cure Pain" with funding from the University of Minnesota.

In 2002 she was appointed Trainer of the Neuroscience Training Grant in Drug Abuse Research (Dr. Virginia S. Seybold, P.I.). She holds graduate faculty appointments in Pharmaceutics and Pharmacology.

Dr. Fairbanks was a session organizer for the Winter Conference on Brain Research 2002 in January. Her panel (Fairbanks C.A., Carlton S., Zadina J.E. and Mogil J.S.) presented "New Kidz on the Block: Novel Neurotransmission in Pain and Analgesia". Panels are peer-reviewed competitively.

Dr. Fairbanks will receive the 2003 John C. Liebeskind Early Career Scholars Award at the American Pain Society's annual meeting in Chicago in March. This award is one of the two highest awards a new principal investigator can receive in the pain field.

**PROFESSOR DAVID J.W. GRANT** was named Fellow of the International Union of Pure and Applied Chemistry (IUPAC) in March.

Dr. Grant, along with Dr. Raj Suryanarayanan of Pharmaceutics and Dr. Theodore Labuza of Food Science and Nutrition at the University of Minnesota, received funding for "A Proposal from the U of MN to join the Purdue/Yukon/Puerto Rico Cooperative Center for Pharmaceutical Processing Research" (CPPR). This is part of the NSF Industry/University Cooperative Research Center Program.

Dr. Grant was invited to give a presentation on "Nucleation and Crystal Growth of Polymorphs Relevant to Screening", in the "AAPS Workshop on Chemical and Physical Form Selection of Drug Candidates: Principles, Considerations and Case Studies" following the Pharmaceutics and Drug Delivery Conference held in Crystal City, Arlington, Virginia in April.

Dr. Grant was invited to present "Why are Compounds Insoluble?" in January at Pharmacia in Kalamazoo, Michigan.

Dr. Grant presented "Molecular Basis of Polymorph Screening: Influence of Solvents and Impurities on Sulfamerazine Polymorphism" at the 35<sup>th</sup> Higuchi Research Seminar in Lawrence, Kansas in May.

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Dr. Grant co-authored three chapters on salt forms of drugs in the *Handbook of Pharmaceutical Salts: Properties, Selection, and Use*, International Union of Pure and Applied Chemistry (IUPAC Series on Medicinal Chemistry), pp. 9-81, (P.H. Stahl and C.G. Wermuth, eds.), Wiley-VCH, Weinheim, Germany, 2002.

GlaxoSmithKline in Greenville, North Carolina invited Dr. Grant to present "Nucleation and Crystal Growth of Polymorphs Relevant to Screening" in May.

Allergan in Irvine, California invited Dr. Grant to give six presentations in a short course in May.

Dr. Grant was invited to present "Theory and Origin of Polymorphism" at the June 2002 FDA Polymorph Symposium in Rockville, Maryland.

Barnett International Conference Group invited Dr. Grant to give two presentations as part of the Conference on Polymorphism and Crystallization held in Philadelphia, Pennsylvania in June.

**PROFESSOR RONALD J. SAWCHUK** received this year's Lawrence C. and Delores M. Weaver Medal for Distinguished Contributions to Pharmacy Education or Research in December. Recipients of the medal, established in 1996, are selected by College of Pharmacy faculty for their leadership in developing and maintaining the national recognition of their department or graduate program. The other recipients of this year's Weaver Medal were James Cloyd, Hugh Kabat and Philip Portoghese.

Dr. Sawchuk was appointed Guest Professor at Guilin Medical College, People's Republic of China in March, and gave a 10-hour course on biopharmaceutics and pharmacokinetics to third-year students. He gave a presentation on "Applications of Microdialysis in Studying Drug Delivery to Specific Targets".

He organized a symposium on "Microdialysis in Industrial Drug Development", presented at the annual AAPS Meeting and Exposition in Denver, Colorado last October.

Dr. Sawchuk was invited to present "Prediction of the Pharmacokinetics of Cefdinir in Children from the Results of Animal Studies" at the Omnicef® Clinical Advisory Meeting in Dallas, Texas in February.

He was also invited to present "Microdialysis: A Tool to Measure Brain Uptake?" at the June 2002 Gordon Research Conference on Barriers of the CNS in Tilton, New Hampshire.

Dr. Sawchuk is Chair-Elect of the Executive Council of the AAPS Pharmacokinetics, Pharmacodynamics and Drug Metabolism Section.

**PROFESSOR RONALD A. SIEGEL** agreed to serve a second three-year term as Department Head for Pharmaceutics at the University of Minnesota.

Dr. Siegel was co-organizer of the 7th Pacific Polymer Conference in December in Oaxaca, Mexico for a micro-symposium in honor of the late Professor Toyochi Tanaka. He presented a lecture titled "Rhythmically Pulsing Polymer Gels Based on Chemomechanical Instability: Fundamentals and Potential Application in Hormone Therapy".

He was invited to present "Mechanisms of Drug Delivery from Polymeric Materials" by the Department of Chemistry at the University of Missouri at Kansas City in April. He was also invited to present "Polyelectrolyte Gels in Drug Delivery" in May as part of the Structural Biology Colloquium at the University of Minnesota.

Dr. Siegel, along with Prof. Babak Ziaie of the Electrical and Computer Engineering Department at the University of Minnesota, received a one-year grant from the U.S. Army to develop an implantable glucose sensor that can be monitored by a hand-held, remote interrogating unit (much like the "tricorder" on Star Trek).

**PROFESSOR RAJ G. SURYANARAYANAN** was elected to Fellowship status in AAPS, and is Chair of the Preformulation Focus Group. He is Chair-Elect of the AACP Section of Teachers of Pharmaceutics.

Dr. Suryanarayanan presented a short course on "Solid State Characterization of Drugs, Curso Satellite del ICDD Workshop" in Ciudad Universitaria in Cordoba, Argentina in November. He also presented a lecture on "Powder X-ray Diffraction Applications in Pharmaceutical Compounds" at an ICDD Workshop on Advanced Methods in X-ray Powder Diffraction, coordinated by ACC-Ceproc.

Dr. Suryanarayanan organized a symposium titled "Material Science of Drugs—Issues Involved in Drug Candidate Selection" at the 53<sup>rd</sup> Indian Pharmaceutical Congress in New Delhi, India in December 2001. He presented a lecture titled "Selection and Characterization of the Appropriate Solid Form of the Drug Candidate."

Dr. Suryanarayanan was invited to present "Polymorphism in Anhydrous Theophylline - Implications on the Dissolution Rate of Theophylline Tablets" at Lupin Limited, Pune, India, and also at Ranbaxy Research Laboratories in Gurgaon, India in December.

Eurand in Vandalia, Ohio invited Dr. Suryanarayanan in January to present "Phase Transformations During Pharmaceutical Processing: Implications on Product Performance".

Dr. Suryanarayanan presented a lecture titled "Use of Powder X-ray Diffractometry to Monitor Phase Transitions During Processing" at a symposium on "Emerging Technologies: Regulatory Aspects and Detecting Solid-State Changes During Drug Development" at last October's AAPS 16<sup>th</sup> Annual Meeting in Denver, Colorado.

**PROFESSOR TIMOTHY S. WIEDMANN** was invited by the University of Cincinnati, Ohio in February to present "Aerosol Delivery for Cancer Chemoprevention".

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Dr. Wiedmann was invited to present "Respiratory Drug Delivery for the Chemoprevention of Lung Cancer" by the University of Minnesota's Graduate Program in Biomedical Engineering.

He was appointed to the University of Minnesota Senate Committee on Faculty Affairs. He also received a graduate faculty appointment in Biomedical Engineering at the University of Minnesota.

Dr. Wiedmann is Co-Principal Investigator on a National Cancer Institute contract titled "Efficacy Studies of Selected Chemopreventive Agents Administered by Aerosol in the Syrian Golden Hamster Lung Tumor Model".

He is also Co-Principal Investigator on a National Cancer Institute grant to study "Aerosol Delivery of Chemopreventive Agents".

Dr. Wiedmann contributed to a presentation given by Dr. L.W. Wattenberg on "Chemoprevention of Infiltrating Squamous Cell Carcinoma (SCC) of the Upper Respiratory Tract (URT) of the Syrian Golden Hamster by 5-Fluorouracil (5-FU) Delivered by Aerosol" at the AACR meeting in San Francisco, California.

Dr. Wiedmann also contributed to a presentation given by Dr. L.W. Wattenberg at the *Frontiers in Cancer Prevention Research* meeting in Boston, Massachusetts on "Utilization

of Chemotherapeutic Agents for Chemoprevention by Reduction of Toxicity with Tissue Site Targeting: Aerosol Administration of 5-Fluorouracil (5-FU) Inhibits Squamous Cell Carcinoma (SCC) of the Upper Respiratory Tract (URT) of the Hamster".

**PROFESSOR CHERYL L. ZIMMERMAN** was promoted to Full Professor of Pharmaceutics in 2002 at the University of Minnesota.

She was invited to present "The Influence of Chemical Structure on the Gastrointestinal Absorption of Retinoids" in December by the Food and Drug Administration's Center for Drug Evaluation and Research in Rockville, Maryland.

Dr. Zimmerman is a member of the AAPS Fellows Task Force and the AAPS Diversity Task Force for 2002. She is past Chair of the PPDM (Pharmacokinetics, Pharmacodynamics and Drug Metabolism Section).

Dr. Zimmerman is a co-investigator on an NIH grant to study "Metabolism of Tobacco-Specific Nitrosamines". Dr. Steven Hecht of the University of Minnesota Cancer Center is principal investigator.

Dr. Zimmerman is also a co-investigator on an NIH Program Project Grant in Nicotine Addiction (Project 4, "The Role of Nicotine Metabolism in Nicotine Addiction") with Drs. Sharon Murphy (Project P.I.) and T. Reich (Program P.I.).

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Since many regions in the U.S. have recently changed telephone area codes, it would be helpful to know your full address, phone, facsimile and e-mail as we update our database for future newsletter mailings.

And please feel free to include news about yourself!

## CAPITAL CAMPAIGN

Campaign Minnesota is in full swing with four major initiatives for the College of Pharmacy and a goal of \$6 million. With eight months remaining in the campaign, momentum is strong and the College has raised \$4.9 million.

The College's four major campaign initiatives include:

- \* *Ensuring Continued Scientific Excellence* by funding graduate fellowships such as the Edward G. Rippie and Ronald J. Sawchuk Fellowships, providing seed grants for promising research, and supporting renovation/construction of laboratory space.
- \* *Strengthening Pharmaceutical Leadership* by establishing a Center for Pharmaceutical Leadership in Minnesota that will serve as a resource hub for health care professionals around the world.
- \* *Supporting Access to Pharmacists* by increasing class size and expanding the College's program to the University of Minnesota's Duluth campus.
- \* *Expanding Expertise in Herbal and Natural Medicinals* by supporting the hiring of a full-time faculty member to shape a related program of study and to perform advocacy on behalf of this emerging area of drug therapy.

Gifts and pledges may be directed to any of the key initiatives listed above, and we welcome your participation in the campaign. If you have questions about making a gift or would like additional information about creating a new fund, please contact:

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