

# Indispensable News

# MinneCeutics

University of Minnesota

Fall 1999

Department of Pharmaceutics

#### Regular Faculty:

David J.W. Grant  
Yueh-Erh Rahman (Emeritus)  
Ronald J. Sawchuk  
Ronald A. Siegel  
Raj G. Suryanarayanan  
Timothy S. Wiedmann  
Cheryl L. Zimmerman

#### Associate and Adjunct Faculty:

Belinda W.Y. Cheung, University of Minnesota  
Walid M. Awni, Abbott Laboratories  
Keith K.H. Chan, GloboMax  
Lawrence E. Felice, Medtox Laboratories  
William H. Frey, II, Alzheimer's Institute at  
Regions Hospital  
Michael D. Karol, Abbott Laboratories

Henry H. Mantsch, National Research Council of  
Canada  
Eric Munson, University of Minnesota  
Aldo Rescigno, University of Parma, Italy  
Ray Skwierczynski, 3M Pharmaceuticals  
Lian Yu, Eli Lilly & Co.

## MESSAGE FROM THE DEPARTMENT HEAD

This is the first *MinneCeutics* newsletter in four years. You may be asking, where have we been and what have we been doing?

During 1996-1998 the College of Pharmacy reorganized and converted departments into divisions. Last year a second reorganization took place and departments were reestablished. Much work has been done during 1998-1999 to optimize the collegiate and departmental structures. Much credit is due to Professor Ronald J. Sawchuk, who was Department Head during the time of transition. With the Department of Pharmaceutics back, you can expect this newsletter every year.

The past few years were marked by the retirement of two distinguished faculty members, Professors Edward G. Rippie and Yueh-Erh (Jady) Rahman. In 1998 I joined the faculty after having spent 15 years at the University of California at San Francisco. (The weather was too boring there.) In addition, Professor Raj Suryanarayanan was promoted to Full Professor in 1999.

A major event impacting our Department is the establishment of the Drug Delivery Center (DDC), funded by the Graduate School. The DDC, under the direction of Professor David Grant, includes all present faculty members, along with members of the Chemistry, Biomedical Engineering, and Laboratory Medicine/Pathology departments. The DDC is expected to augment our Department's graduate teaching mission and research expertise in solid state pharmaceuticals, polymers, and biophysical mass transport, through the fostering of collaborations with members of other departments with complementary expertise.

We are presently recruiting a seventh, junior faculty member in the area of membrane transporters. This recruit, who will study drug transport from a molecular and cellular point of view, will complement our current strengths in

organ- and whole-body-based pharmacokinetics. We are also pursuing the possibility of adding an eighth position in our Department in the field of pharmacogenomics, hopefully in the next two years. With improved understanding of genetic mechanisms underlying cellular transport processes, and with the advent of the Human Genome, we can expect future therapies to be tuned to diverse individuals and populations, and this may represent a major paradigm shift in the process of drug development. We believe that pharmacogenomics is an area where our Department can and should establish a position of leadership.

This year we converted to the semester system, and this has forced a reorganization of course structures at both the professional and graduate level.

Looking down the road, the strategic challenges we face are those of a department that is growing in size and diversity of research. A common signal of success in research is the lack of sufficient space. The College of Pharmacy is already encountering this problem, and much effort is being made by Dean Marilyn Speedie to plan for future space needs. A second challenge is to properly match the size of our graduate program with the size of our research enterprise. Finally, the integration of pharmaceutical research into professional teaching remains an ongoing challenge.

I look forward to meeting you at the upcoming Minnesota Alumni breakfast in New Orleans!

Best regards,



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

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## FACULTY NEWS AND ACTIVITIES

**PROFESSOR DAVID J. W. GRANT** was presented the Pharmaceutical Manufacturers of America Foundation (PhRMA) Award for Excellence in Pharmaceutics on April 20, 1999 in New York City for his work on crystalline forms of drugs and physical chemical characterization of drug formulations.

The Swedish Royal Institute of Technology's Dept. of Chemical Engineering in Stockholm invited Dr. Grant to present "Influence of the Opposite Enantiomer in the Crystallization Solution on the Properties of Chiral Organic Crystals", "Prediction of the Solubilities of Organic Compounds", and "Influence of Water Activity in Mixed

Crystallization Solvents on the Hydration Phases of Some Organic Solids", November 17-19, 1998.

Dr. Grant also was invited to present: •"Particle Engineering in Pharmaceutical Technology", Faculty of Pharmacy, Uppsala University, Sweden, November 19, 1998. •"C.V. Raman's Legacy to the Pharmaceutical Sciences", 50th Indian Pharmaceutical Golden Jubilee Commemoration and the 17th Asian Congress of Pharmaceutical Sciences, Mumbai, India, December 11, 1998. •"Solid State Behavior of Cromolyn Sodium: New Insights", Midwest Organic Solid State Chemistry Meeting, Eli Lilly and Co., Indianapolis, IN, June 4, 1999. •"Polymorphism and Aspartame", GlaxoWellcome, Greenville, NC, June 14, 1999.

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We invite you to join us in catching up on news of fellow Minnesota graduates:

### MINNESOTA ALUMNI BREAKFAST MONDAY, NOVEMBER 15 7:00 - 8:00 a.m. New Orleans Riverside Hilton Hotel



AAPS Annual Meeting and Exposition  
November 14-18, 1999  
Ernest N. Morial Convention Center  
New Orleans, Louisiana

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**PROFESSOR RONALD J. SAWCHUK** served as Department Head for Pharmaceutics until July 1, 1999. He received notification that a manuscript co-authored by he, Zheng Yang, Richard Brundage and R.H. Barbhiya was selected for the 1999 AAPS Meritorious Manuscript Award to be presented at the New Orleans AAPS Annual Meeting in November. Entitled "Microdialysis Studies of the Distribution of Stavudine into the Central Nervous System in the Freely-Moving Rat", the manuscript was published in *Pharmaceutical Research* (14: 865-872, 1997).

During the last year Dr. Sawchuk established the AAPS Microdialysis Focus Group, which will plan programming in the area of microdialysis for future AAPS meetings. The group has an initial membership of 90.

Dr. Sawchuk was invited to present: •"Applications of Microdialysis in Pharmacokinetics: Brain, Blood, and Middle Ear Fluid," Bristol-Myers Squibb, Wallingford, CT, May 14, 1999. •"Blood Sample Pooling and the Determination of Mean Residence Times in High-Throughput Pharmacokinetic Screening," Parke-Davis, Ann Arbor, MI, May 21, 1999. •"Investigating Neuropharmacokinetics and Drug Delivery to the CNS using Microdialysis," 8th International Conference on *In Vivo* Methods: Monitoring Molecules in Neuroscience, Stony Brook NY, June 19-23, 1999. •"Use of Microdialysis in Pharmacokinetics" at the 8th Biomedical Simulation Resource Workshop on *Advanced Methods of Pharmaco-*

*kinetic and Pharmacodynamic System Analysis*, Marina del Rey, CA, June 25-26, 1999.

**PROFESSOR RONALD A. SIEGEL** joined the Department in September 1998 and assumed Department Head responsibilities in July 1999. Prior to joining the University of Minnesota, he was Professor and Vice Chair of the Department of Biopharmaceutical Sciences at the University of California at San Francisco. His primary research interest is polymeric drug delivery systems, and he has a grant from the National Science Foundation to investigate the feasibility of regularly pulsating implantable delivery systems for hormones.

Dr. Siegel has served as president of the Controlled Release Society, an international organization devoted to the controlled and targeted delivery of drugs. He serves on the editorial boards of *Journal of Controlled Release* and *Pharm Sci*, and is former editor of *Polymer Gels and Networks*. He is past winner of the CRS Young Investigator Award and the AAPS/Pfizer Young Investigator Research Grant Award. This past year Dr. Siegel was named Fellow of the American Institute for Medical and Biological Engineering. Dr. Siegel will be inducted as an AAPS Fellow at the Annual Meeting Awards Ceremony on November 14 in New Orleans.

This year Dr. Siegel gave invited lectures on his research at Johns Hopkins University, Colorado School of Mines,

NIH, and the Russian Academy of Sciences. He was also an invited speaker in Barga, Italy at the Gordon Research Conference on Nonlinear Dynamics and Oscillation in Chemistry.

**PROFESSOR RAJ G. SURYANARAYANAN** was promoted to Full Professor, and was elected to the Academy of Distinguished Teachers at the University of Minnesota. He is a member of the steering committee of the AAPS Preformulation Section Focus Group.

Dr. Suryanarayanan was invited to present a lecture titled "Nature of the Solid State" and a case study titled "Characterization of Solid Phase Transformations in Pharmaceutical Processing" at the 34th Annual Arden House Conference (Instrumentation and Process Control for Solid Dose Forms, Present and Future) in January 1999.

He also was invited to present: •"Issues and Challenges in Quantitative Powder X-ray Diffractometry" at Inhale Therapeutic Systems in San Carlos, CA in February 1999. •"Characterization of Phase Transitions During Freeze-Drying by *In Situ* X-ray Powder Diffractometry" at Merck in West Point, PA in March 1999. •"Introduction to Solid State" at Geneve Pharmaceuticals, Broomfield, CO. •"Examination of Phase Transformations During Freeze-Drying Using Low-Temperature X-ray Powder Diffraction" at the 48th Annual Denver X-ray Conference in Steamboat Springs, CO in August 1999.

**PROFESSOR TIMOTHY S. WIEDMANN** received a grant from NIH to study distribution and transport of lipids in mucin. He was invited to present a seminar entitled "Solubility and Micellar Solubilization of Drugs" at the World Pharm Conference in Philadelphia in 1998, and also invited to present "Solubilization in Drug Delivery" at the Symposium for Controlled Drug Release in Salt Lake City in 1999.

Dr. Wiedmann has been actively involved in faculty governance for the last two years. He helped rewrite the College of Pharmacy's constitution, and was a University senator during the revision of the tenure code. He is a current member of the Academic Health Center's Faculty Consultative Committee which advises AHC Senior Vice President Frank Cerra on issues of concern to the faculty.

**PROFESSOR CHERYL L. ZIMMERMAN** was invited speaker at the 29th Gordon Research Conference on Drug Metabolism, Holderness School, July 4-9, 1999, and presented a talk entitled "Pharmacokinetic Evaluation and Inhibition of Intestinal First-Pass Metabolism". She is taking a sabbatical year, from August 15, 1999 through August 15, 2000, to study intracellular retinoid transport in the laboratory of Dr. David E. Ong in the Biochemistry Department at Vanderbilt University.

Dr. Zimmerman became Chair-Elect of the Pharmacokinetics, Pharmacodynamics and Drug Metabolism Section of AAPS in 1999, and will be Chair of the Section in 2000. She served as Vice Chair in 1998.

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*"A lot of academics are academics because we were the kind of poor souls who actually liked going to school; we liked it so much that we never left. So we're often socially maladjusted creatures. 'Do not feed the professor; it may bite.'" —Tim Burke, Swarthmore professor*

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## DRUG DELIVERY CENTER

Faculty from the Department of Pharmaceutics, the Institute of Technology, and the Medical School are collaborating in the University's new Drug Delivery Center, which will integrate graduate education and research on drug delivery for the treatment of cardiovascular disease, cancer, infection, inflammation, and stroke.

The Drug Delivery Center consists of an interdisciplinary team of faculty from the Department of Pharmaceutics (College of Pharmacy), the Department of Laboratory Medicine & Pathology and the Biomedical Engineering Center (School of Medicine), and the Department of Chemistry (Institute of Technology). This team of educators and scientists is taking an interdisciplinary approach to educate graduate students in the controlled delivery of therapeutic agents. For this purpose, the Drug Delivery Center was awarded a competitive grant of \$100,000 spread over three years beginning on July 1, 1998. In October 1998 the Center was officially recognized by the Academic Health Center for its present and future contributions to drug delivery.

Since its inception, the Drug Delivery Center has co-sponsored an interdisciplinary seminar program with the Centers for Advanced Therapies and Molecular and Cellular Therapies. Faculty in the Drug Delivery Center have been submitting interdisciplinary research proposals, co-advising graduate students, and teaching graduate courses relevant to controlled drug delivery (Phm 8480). The Center is providing seed grants to encourage new research initiatives and is supporting graduate students in interdisciplinary research projects. The current research focus of the Center is the development of polymeric systems for the controlled delivery of nitric oxide donors, antiviral nucleosides, and peptides.

The Center is staffed by **Bonnie Jean Walker**, and is housed in the College of Pharmacy.



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

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## MESSAGE FROM THE DIRECTOR OF GRADUATE STUDIES

There are three main issues related to the graduate program that may be of interest. First, we have a web page for the graduate program. This is one of the more important initiatives that the program has undertaken in its efforts to improve recruitment of highly qualified students. I think they turned out quite well, but I think the faculty should have gone to Glamour Photo for better pictures.

Another big event at the U has been the conversion from quarters to semesters. It has added to the normal confusion encountered by students, but there is perhaps an educational benefit in being exposed to subject matter for a longer period of time (i.e., 14 or 15 weeks as opposed to the 10-week quarter). For me, I suppose it will take 5 years to stop saying 'quarter' and say 'semester'. For the alumni, rest assured your diplomas are still valid.

Finally we have adopted a major strategic change for our Department. We have always held that the graduate program is the cornerstone of the Department. This certainly will not change. However, the faculty have made a commitment to enhance the caliber of the research enterprise. One important aspect of implementing this strategy is to bring more postdoctoral fellows into the department. This increase will come at the expense of the number of graduate students. Nevertheless, it is our unanimous belief that by having postdoctoral fellows work side by side with graduate students, the educational experience of the students will be enhanced. While no rules are set forth, a reasonable target is for every three students there should be one postdoctoral fellow.

Before closing, I hope to see you all at the breakfast in New Orleans.



Timothy Scott Wiedmann, Ph.D.  
Associate Professor

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## GRADUATE STUDENT NEWS

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### NEW STUDENTS

The Department welcomed new students in 1998:

- Mr. Yuandong "Alex" Gu**, China Pharmaceutical University, Beijing (Advisor: Dr. Ronald Siegel)
- Ms. Ping Ji**, Beijing Medical University (Advisor: Dr. Ronald Sawchuk)
- Mr. Wei Liu**, Beijing Medical University and National Institute for the Control of Pharmaceutical and Biological Products (Advisor: Dr. Ronald Sawchuk)
- Mr. Zheng Lu**, Tianjin Medical University and Shenyang Pharmaceutical University (Advisor: Dr. David Grant)
- Ms. Swati Nagar**, Bombay College of Pharmacy (Advisor: Dr. Cheryl Zimmerman)
- Mr. Cletus Nunes**, University of Bombay (Advisor: Dr. Raj Suryanarayanan)
- Mr. Deliang Zhou**, Nankai University and Peking University, and City University of New York. Mr. Zhou was recipient of the 3M Fellowship for 1998-1999. (Advisor: Dr. David Grant)

The Department welcomed new students in 1999:

- Ms. Sharmistha Datta**, Jadavpur University, Calcutta
- Ms. Yan Song**, Xi'an Medical University, China, and North Dakota State University
- Mr. Agam Sheth**, University of Bombay, India
- Mr. Zhihong Li**, Beijing Medical University China and Creighton University
- Ms. Chitrlekha Telang**, Bombay College of Pharmacy. Ms. Telang is recipient of the Peters Graduate Fellowship for 1999-2000.

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### DEGREES AWARDED

- Rebanta Bandyopadhyay, Ph.D.**  
Thesis: "Influence of Crystal Properties on the Tableting Behavior of Lysine Derivatives" (Advisor: Dr. David Grant)
  - Raghu Cavatur, Ph.D.**  
Thesis: "Characterization of Phase Transitions During Pharmaceutical Processing" (Advisor: Dr. Raj Suryanarayanan)
  - Linna Chen, Ph.D.**  
Thesis: "Solid State Behavior of Cromolyn Sodium" (Advisor: Dr. David Grant)
  - Xueqing Chen, Ph.D.**  
Thesis: "Non-invasive Delivery of Nerve Growth Factor to the Central Nervous System Via the Olfactory Neural Pathway" (Advisors: Dr. Y.E. Rahman and Dr. W.H. Frey, II)
  - Han Jun, Ph.D.**  
Thesis: "Influence of Environmental Conditions on the Dehydration of Pharmaceutical Hydrates" (Advisor: Dr. Raj Suryanarayanan)
  - Luna Musib, Ph.D.**  
Thesis: "The Absorption Mechanism of Retinoic Acids in the Intestinal Epithelium" (Advisor: Dr. Cheryl Zimmerman)
  - Stephen Pham, Ph.D.**  
Thesis: "Respiratory Delivery of Poorly Water Soluble Drugs" (Advisor: Dr. Timothy Wiedmann)
  - Jie Jennifer Sheng, M.S.**  
Thesis: "Eprosartan Mesylate: Its Phases and Transitions" (Advisor: Dr. David Grant)
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**Steven Wick, Ph.D.**

Thesis: "The Visco-elastic Evaluation of Transdermal Adhesive Systems and the Influence of Excipients"  
(Advisor: Dr. Edward Rippe)

**Geoff G.Z. Zhang, Ph.D.**

Thesis: "Influences of Solvents on Properties, Structures, and Crystallization of Pharmaceuticals Solids" (Advisor: Dr. David Grant)

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**AWARDS**

**Raghu Cavatur** received the 1998 AAPS Outstanding Graduate Research Award in Pharmaceutical Technologies, sponsored by EM Industries, Inc., in San Francisco (Advisor: Dr. Raj Suryanarayanan). Their manuscript entitled "Characterization of Phase Transitions During Freeze-drying by *In Situ* X-ray Powder Diffractometry" appeared in the journal *Pharmaceutical Development and Technology* 3(4): 1998.

**Chong-Hui Gu** was invited to present a research paper entitled at the AAPS Graduate Symposium in Analysis and Quality Control in New Orleans this November. (Advisor: Dr. David Grant)

**Jun Han** received the 1998 AAPS Outstanding Graduate Research Award in Pharmaceutical Research, sponsored by EM Industries, Inc. in San Francisco (Advisor: Dr. Raj Suryanarayanan). Their manuscript entitled "Influence of Environmental Conditions on the Kinetics and Mechanism of Dehydration of Carbamazepine Dihydrate" appeared in the journal *Pharmaceutical Development and Technology* 3(4): 1998.

**Yue Huang** received the 1999 Best Poster Award at the AAPS Midwest Regional Meeting May 1999 in Chicago, IL for his poster entitled, "Antibiotic Pharmacokinetics in Chinchilla Middle Ear Using Microdialysis". (Advisor: Dr. Ronald Sawchuk)

**Yinghua Li** and **Suneel Rastogi** received the 1998 Proctor and Gamble Award for their doctoral dissertation research at the AAPS Meeting in San Francisco. (Advisor: Dr. Raj Suryanarayanan)

**Suneel Rastogi, M. Zakrzewski and Dr. Raj Suryanarayanan** received the Proctor and Gamble Award at the AAPS 13th Annual Meeting in San Francisco for a project entitled "Effect of temperature and water vapor pressure on the solid-state decomposition of aminophylline monohydrate." *Pharm. Sci.* 1: S-122 (1998).

**Suneel Rastogi** was selected as life member of Rho Chi National Pharmacy Honor Society. (Advisor: Dr. Raj Suryanarayanan)

**Suneel Rastogi** will receive the 1999 AAPS Outstanding Graduate Research Award in Pharmaceutical Technologies in New Orleans, sponsored by EM Industries, Inc. (Advisor: Dr. Raj Suryanarayanan)

**Rahul Surana**, a USP Fellowship recipient, is in London, U.K., working in the laboratory of Dr. N. Murli Vemuri on a 6-month project entitled "Solid-State Characterization by Inverse Gas Chromatography". (Advisor: Dr. Raj Suryanarayanan)

**Robbie Thorne** received the Best Poster in Drug Delivery Award, as well as Best Overall Poster, at the 6th Annual Biomedical Engineering Society 1999 Spring Poster Symposium at the University of Minnesota in May 1999. (Advisors: Dr. Y.E. Rahman and Dr. W.H. Frey, II)

**Robbie Thorne** received the Junior Investigator Award at the 6th International conference on Alzheimer's Disease and Related Disorders in Amsterdam in July 1998. (Advisor: Dr. Y.E. Rahman and Dr. W.H. Frey, II)

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**SUMMER INDUSTRY INTERNS AND TRAINEES**

**Zheng Wu** was a 1999 summer research intern at Parke-Davis. (Advisor: Dr. Cheryl Zimmerman)

**Zheng Lu** worked at Abbott Laboratories with project advisor Dr. Eric A. Schmitt on research entitled "Physical Stability of Amorphous Materials" during a summer 1999 internship. (Advisor: Dr. David Grant)

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**BIOANALYTIC AND PHARMACOKINETIC SERVICES**

For the past several years the Bioanalytic and Pharmacokinetic Services has provided a variety of services for pharmaceutical companies in the U.S., Canada and Europe. The primary focus involves the development and validation of custom bioanalytical methods in compliance with GLP Guidelines and the conduct of pharmacokinetic studies, data analysis and report preparation. Since 1998, BPS has included LC/MS/MS in its wide range of analytical techniques. Other expertise includes *in vivo* microdialysis using several animal models to study the drug distribution and delivery to various target tissues, preclinical pharmacokinetic studies, *in situ* drug absorption screens, and PK/PD modeling and data analysis. Dr. Belinda Cheung is Assistant Director of BPS.



Ronald J. Sawchuk, Ph.D.  
Professor and Director of BPS

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## ❧ OBITUARY ❧

Lillian Esmat Riad, Ph.D., passed away on April 7, 1999 in Cairo, Egypt. After completing her B.S. in pharmacy (with honors) at the University of Cairo, Dr. Riad was a USAID Peace Fellow while studying for her M.S. degree (1985) in the Department of Pharmaceutics, University of Minnesota. After completing her Ph.D. degree in 1989, Dr. Riad remained at the University of Minnesota for a post-doctoral fellowship. She returned to Cairo in 1991 and, at the time of her death, was Associate Professor in the Department of Pharmaceutics, College of Pharmacy, University of Cairo.

Dr. Riad was a dedicated researcher in the field of pharmaceutics, and contributed actively to the pharmaceutical sciences literature in the areas of drug analysis and pharmacokinetics. She was dedicated to undergraduate and graduate education, and was loved and highly respected by her academic colleagues. In addition to her position at the University of Cairo, Dr. Riad was a consultant to the pharmaceutical industry and to various regulatory agencies in Egypt.

Dr. Riad is survived by her husband, Hani, and son, Nadder, as well as her parents and her sisters, Nyra and Sally.

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## PROFESSIONAL STUDENT ACTIVITIES

Professional pharmacy students were active in research in the Department:

**Todd Burkhardt**, a Pharm.D. student at the University of Minnesota, was awarded a PhRMA Foundation Undergraduate Research Training Fellowship for 1999. Todd conducted research on a project entitled "Influence of the Water of Hydration on the Physico-Mechanical and Tableting Properties of a Model Pharmaceutical Hydrate".

**Reed Horning** worked in the lab of Dr. Cheryl Zimmerman on a project entitled "Blood Distribution and Protein Binding of Morphine in Mice Bearing the Human Transgene for Sickle Cell Disease" as part of his Pharm.D. paper. Reed is a Pharm.D. IV student at the University of Minnesota.

**Dorothy Doyle** received a Melendy Undergraduate Research Scholarship to work in Dr. Cheryl Zimmerman's laboratory on a bioequivalence project with a rabbit model. Dorothy is a Pharm.D. student at the University of Minnesota.

**James Michael Roemer**, a University of Minnesota Pharm.D. student, received a Melendy Undergraduate Research Scholarship in 1998 to work in the lab of Dr. Raj Suryanarayanan on a project entitled "Study of Solid-State Drug Excipient Interactions Using X-ray Powder Diffractometry".

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## VISITING STUDENTS AND SCHOLARS

**Ms. Erin Cavusgil** is a graduate student in Biomedical Engineering working in Dr. Ronald Siegel's laboratory. Ms. Cavusgil is developing a micromachined insulin delivery device.

**Mr. Anish Dhanarajan** is a graduate student in Biomedical Engineering working in Dr. Ronald Siegel's laboratory. Mr. Dhanarajan is developing analytical techniques to study the time-varying transport of hormones through pulsating hydrogels.

**Ms. Anastasia Foppoli**, a Ph.D. candidate at the University of Milan, Italy, is completing a portion of her degree in the laboratory of Dr. David Grant.

**Dr. Ping Guo**, a Postdoctoral Research Associate from West China University of Medical Sciences, Chengdu, worked in Dr. Ronald Sawchuk's lab on a project entitled "Analysis and Pharmacokinetics of Peptide V, and Potential Cell Binding Inhibitor in the Treatment of Stroke."

**Ms. Rachel Johns**, a biochemical engineering student at the University of Missouri-Rolla, received a Life Science Summer Undergraduate Research Fellowship to work in

Dr. Cheryl Zimmerman's lab to study the tissue stability of AZT-monophosphate prodrugs.

**Dr. Gauri P. Misra** is a Postdoctoral Research Associate working in Dr. Ronald Siegel's laboratory. His field of expertise is oscillating chemical reactions, and he is working on pulsating polymer hydrogels with application to episodic delivery of hormones.

**Ms. Isabel Pineros**, a Ph.D. candidate in pharmaceutical technology at the Universidad Complutense of Madrid, Spain, is working in the laboratory of Dr. Raj Suryanarayanan on a project to characterize the amorphous state of lysine clonixinate, an analgesic and anti-inflammatory drug.

**Sudha Vippagunta, Ph.D.**, is currently a postdoctoral associate with Dr. David Grant working on a project entitled "Solid-State Characterization of Hydrogels".

**Mr. Kiwamu Yuki**, a Visiting Scientist from Unitika, Ltd., Japan, worked in the laboratory of Dr. Ronald Siegel during 1998-1999. Mr. Yuki synthesized and measured swelling properties of glucose-sensitive hydrogels.

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## RECENT PUBLICATIONS

Brittain H.G. and Grant D.J.W. Effects of Polymorphism and Solid-State Solvation on Solubility and Dissolution Rate, in *Polymorphism in Pharmaceutical Solids*, Harry G. Brittain (ed.), Marcel Dekker, New York, NY, 1999, pp. 297-330.

Cavatur R.K. and Suryanarayanan R. Characterization of frozen aqueous solutions by low-temperature X-ray powder diffractometry. *Pharm. Res.* 15: 194-199 (1998).

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Han C. and Wiedmann T.S. Spectral properties and ion dissociation behavior or retinoids. I. Aqueous solutions. *Int. J. Pharm.* 172: 241-253 (1998).

Han C., Zimmerman C.L. and Wiedmann T.S. Spectral properties and ion dissociation behavior or retinoids. II. Bile salt solutions. *Int. J. Pharm.* 172: 229-240 (1998).

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Leroux J.-C. and Siegel R.A. Autonomous gel/enzyme reactor fueled by glucose — preliminary evidence for oscillations. *CHAOS* 9: 267-275 (1999).

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Naqwi A.A., Fandrey C.W., Bandyopadhyay R. and Grant, D.J.W. *In situ* sizing of powders and crystals using phase doppler measurement technique. *KONA Powder and Particle* 16: 143-151 (1998).

Rastogi S. and Suryanarayanan R. Characterization of delivery systems — X-ray powder diffractometry. In *The Encyclopedia of Controlled Drug Delivery* (E. Mathiowitz, ed.), Wiley & Sons, April 1999.

Siegel R.A. A Lesson from Secretory Granules. *Nature (New and Views)* 394: 427-429 (1998).

Wen Y., Rimmel R.P. and Zimmerman C.L. First-pass disposition of (-)-6-aminocarbocvir in rats. I. Prodrug activation may be limited by access to enzyme. *Drug Metab. Disp.* 27: 113-121 (1999).

Yang Z. and Sawchuk R.J. Investigation of distribution, transport, and uptake of anti-HIV drugs to the central nervous system. Invited review. *Advanced Drug Delivery Reviews* (in press) 1999.

Zell M.T., Padden B.E., Grant, D.J.W., Chapeau M.-C., Prakash I. and Munson E.J. Two-dimensional high-speed CP/MAS NMR spectroscopy of polymorphs. 1. Uniformly <sup>13</sup>C-labeled aspartame. *J. Am. Chem. Soc.* 121: 1372-1378 (1999).

Zhang G.G.Z. and Grant D.J.W. Incorporation of mechanism of guest molecules in crystals: solid solution or inclusion? *Int. J. Pharm.* 181: 61-70 (1999).

Zou X. and Siegel R.A. Modeling of oscillatory dynamics of a simple enzyme-diffusion system with hysteresis. The case of lumped permeabilities. *J. Chem. Phys.* 110: 2267-2279 (1999).

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Drug Delivery Research Center ..... (612) 624-4433  
*Journal of Pharmaceutical Sciences* ..... (612) 625-0926



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## ALUMNI NEWS

There was an overwhelming response to the website's alumni page. Here are just a few of the messages sent by Pharmaceutics graduates. Please take a look at the website, and feel free to send information about yourself to be included in the next newsletter, as well as any information about 'lost' colleagues ([www.pharmacy.umn.edu/resgrad/pceutics/pharmaceuticshome.html](http://www.pharmacy.umn.edu/resgrad/pceutics/pharmaceuticshome.html)).



I hope all is well at Minnesota, and best regards to my many friends there. —Morris D. Faiman [M.S., 1961, Ph.D., 1965]

Thank you for still writing me! I earned a few degrees in my life: R.N. from St. Mary's School of Nursing in Rochester, Minnesota, B.S. in Nursing from Villanova, B.S. in Pharmacy from the University of Minnesota, a Masters degree in counseling and guidance from Catholic University, and a M.S. degree in Pharmaceutics from the University of Minnesota. I am currently retired and am planning to move to Minneapolis. I lost my dear husband, Sidney, this year. We met while I was teaching at Ft. Berthold (North Dakota) Community College and married in 1979. I play the organ and piano for my neighbors, swim three times a week at the YMCA, read lots of books, participate in Mass most mornings, and teach Head Start.

—Barbara Ruth Wynkoop Fox [M.S., 1970]

I'm doing well despite being buried under piles of documents. I handle adverse events from an assortment of both investigational and marketed drugs.

—Carol A. Bainbridge, M.D., Ph.D. [1973]

I am a professor of physical pharmacy in the College of Pharmacy, Seoul National University, and currently serve as Director of the Research Institute of Pharmaceutical Sciences. I have also been serving as a member of the Korean Academy of Science and Technology, a vice president of the Korean Association of Pharmaceutics, and a vice president of the PDA Korean Chapter. In addition, I have been serving as an editorial advisory board member of several journals, including *Pharmaceutical Research*. I hope things are going well in the Pharmaceutics Department.

—Chong-Kook Kim [Ph.D., 1975]

Great to hear from you. I am Senior Manager, Pharmaceutics Department, Bracco Research USA. Also, I am webmaster/owner of PharmWorld.COM which you might want to add to your Web-site listing. I must be something of a computer geek and I blame it all on Sawchuk and Ken 25 years ago! How things have changed since then.

—Richard J. Hunt [Ph.D., 1976]

You have created an impressive web page for the College of Pharmacy/Department of Pharmaceutics! I've been at Pfizer Central Research for 17 years, and have held the positions of Research Scientist, Sr. Research Scientist, Sr. Research Investigator, Project Leader, and Manager. The areas in which I've worked are solids research and development, research pharmacy, clinical solid dosage, clinical manufacturing, technology transfer, and CSSA. Currently I'm managing strategic planning and resourcing, knowledge management, outsourcing, and recruitment.

—Mak S. Jawadekar [Ph.D., 1982]

Medinox is developing pharmaceuticals that neutralize a key mediator, nitric oxide (NO), which plays a fundamental role in numerous physiological and patho-physiological conditions, including inflammation, pain sensation and blood pressure regulation. *Science* magazine honored NO as the "molecule of the year" in 1992 and last year's Nobel Prize in Physiology and Medicine was awarded to three scientists for their works related to NO. The company has a collection of small molecules that can be administered via various routes to correct medical conditions associated with excessive NO. We recently started our first Phase I/II clinical trial for using NOX-100 to treat hypotension during hemodialysis. We are also developing clinical plans for several other disease areas such as allograft rejection, hemorrhagic shock, acute lung injury, ischemic stroke, IL-2 cancer therapy, and sepsis. More information can be obtained by visiting <http://www.medinox.com> if anyone is interested.

—Wei Liaw [Ph.D., 1984]

The alumni info is a smashing good idea, as my English father-in-law would say. My laboratory has developed a mouse model of atherogenesis with dose-controlled hyperlipidemia. This model has distinct advantages over more drastic genetic "knockout" models such as the ApoE- and LDL-receptor-knockout models. We are able to evaluate the therapeutic efficacy of different classes of antihyperlipidemic drugs. The model also is being used by several universities and corporations in this country and abroad to test new antihyperlipidemic agents as well as provide dose-modulated elevations in serum TG and cholesterol. In addition, my lab continues to investigate the potential for enhancing drug (especially therapeutic polypeptides) delivery through the oral mucosa using a number of unique approaches such as deliberate alteration of the secondary and tertiary structure of the macromolecules.

—Thomas P. Johnston [Ph.D., 1986]

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I am glad to hear from you. It is a good idea to provide a web page for alumni. You are welcome to include my information, and I am looking forward to hearing the school's news.

—Shelly Wu [M.S., 1983, Ph.D., 1986]

I am Acting Head, Industrial Pharmacy Department, Faculty of Pharmacy, Assiut University, Egypt. I would also like to announce that the ASSIUT UNIVERSITY'S SECOND PHARMACEUTICAL CONFERENCE will be held March 8-9, 2000 in the Assiut Faculty of Pharmacy, Assiut, Egypt.

—Sayed Khidr [Ph.D., 1987]

I am honored to accept your kind invitation to include my name in the alumni list on the Pharmaceutics website. I visited this website many times and I was happy to see the tremendous progress the department is making. I am always proud of being one of the graduates of this department. The most important thing that I learned during my stay under Dr. Sawchuk's keen supervision is to remain a student for the rest of my life.

—Hisham Abou-Auda [Ph.D., 1987]

I am a Research Specialist in Clinical Pharmacokinetics at 3M Pharmaceuticals. I am still working with Les Harrison in the clinical pharmacokinetics group, now more concentrated on PK than on management, since I left the team leader responsibilities that I had for two years. I am very happy that I had that opportunity since it helps me now to do my job better. I keep myself challenged, I am learning more on regulatory aspects, and have more supervisory responsibilities on PK than last year. On a personal note, Natalia is 8 years old and is in second grade. Monica starts kindergarten in September. Kids are the ones who remind us of how fast time goes.

—Inma Soria [Ph.D., 1992]

I hope things are going well with you and the department. I hope to stop by one of these days. My current job is that of Director of Formulation Development at CIMA Laboratories, Inc.

—Raj Khankari [Ph.D., 1993]

It is wonderful to hear from you. I visited the web site and it is very informative. You may have heard that I am moving to the Bristol-Myers Squibb Wallingford, Connecticut site.

—Srini Venkatesh [Ph.D., 1993]

Most of the 4.5 years that I've been working at Abbott has been in pharmaceuticals or preformulation. The job requires discovery team and development team interactions, and center project (research) responsibilities. The best things about this job are excellent co-workers, competent associate scientists, good equipment and low visibility.

—Devalina Law [Ph.D., 1994]

What a wonderful surprise to hear from you. Like hearing from home! In terms of updates, following the completion of my fellowship, I have been working with Agouron Pharmaceuticals for the past two years. And it has been a good two years. I have been involved with clinical studies in the Agouron oncology and antiviral divisions. At the end of the tally, there have been many, many more days of curious learning than those of frustration, and I see that as a good measure of progress. Besides San Diego agrees well with me.

—Yazdi K. Pithavala [Ph.D., 1995]

I work at Inhale Therapeutic Systems in California as an associate scientist. It is a fast-paced company, and I enjoy it a lot. I also had a second baby boy. It has been 3 years since I graduated from Minnesota, and I'll never forget it. Best wishes to all of you.

—Xiaohong Cai [M.S., 1996]

Everything is fine with me. I am working in the Department of Industrial Pharmacy at Purdue University, and my advisor is Dr. Stephen R. Byrn. I am very happy at Purdue.

—Xiaorong He [M.S., 1997]

I would be happy to be included in the published alumni list. I am at SmithKline Beecham Consumer Healthcare as a senior formulation scientist.

—Neelima Phadnis [Ph.D., 1997]

Since joining Glaxo Wellcome, Inc. in 1997 as a research investigator, Jim has made significant contributions to 7 discovery and development projects, and won the Rave Award (one of the most prestigious awards in the company) for outstanding contributions to the design and implementation of polymorph screen workstation. In addition, Jim serves as the research liaison for the oncology matrix team and oversees 8 cancer projects. His wife, Ruth, and boys Joshua and Caleb are all doing well and miss Minnesota.

—Jim Haijian Zhu [Ph.D., 1997]

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It is a pleasure to hear from you and our department. I am a staff chemist in the Pharmaceutical Research & Development section of Merck. My duties in the pharmaceutical chemistry preformulation group are physico-chemical characterization of novel drug candidates, and the support of formulation development for clinical trials as well as the market.

—Jitesh Tank [M.S., 1997]

Long time no see! I hope you are doing well. Spring is pretty in Connecticut. As for myself, I am doing very well. I just received a new associate and am currently responsible for two high-profile drug discovery programs. Life is very busy. Miss our department!

—Zheng Yang [Ph.D., 1997]

I have been working within the pharmaceutical industry for the past 16 years, and have been fortunate to participate in the successful development of multiple marketed pharmaceutical products within my career to date. My activities have included: establishing a paper-feasibility system to rapidly screen drug candidates across multiple routes of delivery; designing and implementing a pre-formulation characterization process for rapid formulation prototyping; leading formulation and process optimization activities through final product/process validation; leading cross-functional, international product development teams; designing and implementing computer-based productivity-enhancing systems within the laboratory; providing technical assessment and strategic direction to regulatory submissions (i.e., ANDA, NDA, Citizen Petitions, etc.); and participating in several product launch/commercialization teams. In addition, six years ago I was able to design and implement a proactive drug delivery system technology group focused on the development of novel drug delivery technologies. My current responsibilities include providing technical and strategic leadership to the global transdermal product development laboratory through my role as Laboratory Manager.

—Steven M. Wick [Ph.D., 1998]

"The lyf so short, the craft so long to lerne." —Chaucer

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