

@ Adams

The Director's Letter

The Adams Institute continued its strong growth in 2010 and 2011, as you will discover in the pages that follow. Our roster of faculty researchers has grown with the addition of two excellent new Chemistry faculty members, Young Zeng in Analytical Chemistry and Shenqiang Ren in Inorganic. Their research areas are an excellent fit with the activities of the Institute, and they have made a strong start in forming research groups and preparing their labs.

In addition, both of the newest faculty members in Pharmaceutical Chemistry, Tom Tolbert and Michael Wang, focus their research on biochemistry, and make excellent additions to the family of Institute researchers.

Our COBRE grant proposal has been funded by NIH. This \$11 million, 5-year grant establishes a thematic multidisciplinary center, The Center for Molecular Analysis of Disease Pathways, and will enhance the ability of investigators to compete independently for funding. The CoPIs for this proposal, Blake Peterson, Regents Distinguished Professor of Medicinal Chemistry, and Erik Lundquist, Professor of Molecular Biosciences, have joined the Adams team as well.

The Ralph Adams Alumni Symposium and Reunion in June of 2010 was a great success, with over 40 guests joining us for two days of activities. For a slide show of the reunion, visit http://adamsinstitute.ku.edu/news/buzz_photo.shtml.

Ted Kuwana was the sparkplug for this event, and during the following year, Ted was recognized for his contributions to Chemistry when he was named an ACS Fellow, and received the Analytical Division's Distinguished Service Award for 2011. For a photo slide show, visit <http://adamsinstitute.ku.edu/photos/kuwana/album/index.html>.

May I wish you all the best in 2012, and thank you for your continuing support of the Adams Institute.

Sue Lunte
Director

KU Chemistry Alumni Receive ACS Awards

Two alumni of the Chemistry Department have received awards from the Division of Analytical Chemistry of the American Chemical Society.



Ted Kuwana (Ph.D. 1959), Emeritus Distinguished Professor of Chemistry at KU, received the Award for Distinguished Service in the Advancement of Analytical Chemistry for 2011. This award is given annually to an individual who has substantially and uniquely enhanced the field of analytical chemistry. Dr. Kuwana was Buzz Adams' first graduate student, and has been instrumental in the founding of the Adams Institute.



Steve Soper (Ph.D. 1989), Senn Professor of Chemistry at Louisiana State University, received the Division's Award in Chemical Instrumentation. This award is given annually for advancing the field of analytical chemistry through developments in chemical instrumentation. Dr. Soper is the Director of the Center for BioModular Multi-Scale Systems at LSU and has received many awards and honors for his contributions to Analytical Chemistry. Congratulations to Drs. Kuwana and Soper for these richly deserved awards.



Adams Undergraduates Awarded Seo Research Scholarships

Four undergraduate researchers from Adams research groups were awarded the Seo Research Scholarships in the 2010 and 2011 academic years. The Seo Research Scholarship, made possible through generous contributions from Eddie Tatsuo Seo and Alice Yoshiko Seo and Research and Graduate Studies, provides scholarships of \$2,000 to undergraduates who demonstrate dedication to exemplary scholarship and research in Analytical Chemistry.

The Seo Scholars for 2010 were Todd Coffey from the Mike Johnson Group, and Emilie Mainz, a member of the Sue Lunte Research Group.



Todd was a fifth year senior Neurobiology major from Topeka who came to KU in 2005. He conducted research full time during the summer of 2010 on merged behavioral and neurochemical analysis using cyclic voltammetry. He has been accepted to graduate school at KU in Neuroscience.



Emilie, a Goddard junior majoring in Biochemistry, in 2010, worked on separation of dynorphin peptides using capillary electrophoresis. Her summer

included a trip to Cork, Ireland to conduct research on biofuel cells (see below).

The Seo Scholars for 2011 were Andrew Longanecker, a member of the Sue Lunte Research Group, and Morgan Maxon from the Heather Desaire Group.



Andrew is a senior Chemistry major who came to KU after receiving an Associate of Science degree from Fort Scott Community College in 2008. He is conducting research on creating new fabrication techniques for microchip development. He has recently been awarded the Undergraduate Research Award provided by the Honor's Program for his current research. Andrew plans on going to medical school after graduation in May of 2012.



Morgan, a Topeka senior majoring in Chemistry, was investigating protein separation and identification, as well as mass spectrometry (MS) on intact and proteolytically cleaved proteins and glycoproteins.

She has been an author on two publications, and plans to continue her education in graduate school following graduation.

Emilie Mainz Conducts Research in Ireland

Emilie Mainz, an Adams Institute undergraduate researcher in the Sue Lunte Group (pictured at left) visited Cork, Ireland last summer to conduct research on biofuel cells. This visit was funded by the From Atoms to Systems Undergraduate Research Network, FASTNET, sponsored by the Tyndall National Institute. Her research project focused on microfluidic biofuel cells. She worked with FASTNET researchers to make biofuel cells with enzymes to produce sustain-

able energy sources. These biofuel cells are incorporated with microfluidics, one of the major focuses of the Sue Lunte Group, and could power microelectronic devices in the future. Emilie's Principal Investigator was Dr. Gregoire Herzog.

In addition to her work, Emilie took time to do some sightseeing in Ireland. For additional information, follow this link to Emilie's blog. <http://emilieisinireland.blogspot.com/>

REU Student Receives Poster Award



Christa Snyder, a Summer 2010 Research Experience for Under-

graduate (REU) student in the Sue Lunte Group, was selected as the winner of the 2011 Analytical Sciences Digital Library/Association for Lab Automation (ASDL-ALA) Young Scientist Poster Award.

This award is sponsored by the ALA and recognizes a student poster submitted to the ASDL e-Poster session pertaining to laboratory automation.

Derek Jensen Selected for K-INBRE Scholarship



Undergraduates affiliated with the Adams Institute continue to demonstrate leadership and excellence in research, and to win recognition for these qualities. In the latest example, Derek Jensen, a researcher in the Sue Lunte group, was among eight KU students selected to receive Kansas IDEA Network of Bio-

medical Research Excellence (K-INBRE) spring 2010 undergraduate scholarships.

"The scholarships will provide \$2,000 for the spring and (contingent of funding) \$4,000 for the summer. These funds can be used for any purpose that supports the recipient's participation in research.

Derek is a sophomore biochemistry major from Gardner, and is an Honors student at KU.

He will be conducting research to culture macrophage cells and optimize parameters for the production of peroxynitrite by these cells.

Desaire Group Members Earn 2010 NSF GK-12 Fellowships

Two doctoral candidates from the Heather Desaire Research Team participated in a National Science Foundation Graduate STEM (science, technology, engineering and mathematics) in K-12 Education program. Fellows in this program receive \$30,000 for 12 months plus tuition and travel expenses.



spending one day a week in his classroom as a scientist mentor helping him to develop student research.

Carrie Woodin is one of 9 new fellows for the 2010-2011 academic year. She received her bachelor's degree from the University of Illinois-Springfield. Carrie attended the GK-12 Summer Academy in June of 2011 with area teachers. At the completion of the Academy, teachers and students formed teams, and spent the next academic year working together.

Congratulations to Katie and Carrie for their achievements!



Katie Rebecchi, one of eight 2009 fellows, received her bachelor's degree from Northwest Missouri State University. Katie worked with Harry Purrington, a 7th grade Physical Science teacher at Arrowhead Middle School in Kansas City, Kansas,

Tom Linz Awarded AHA Predoctoral Fellowship



Tom Linz of the Sue Lunte group was awarded a predoctoral fellowship from the American Heart Association in 2011 for his work regarding the development of an analytical method for the determination of methylated arginines (MAs) in serum. The goal of Tom's project is to determine whether the concentrations of MAs in serum can be used as biomarkers to predict the progression of coronary ath-

erosclerosis in at-risk patients.

Once these methods are validated, they will be applied to the analysis of clinical samples provided by Adams lab alum, Roger Dreiling, MD. Dr. Dreiling is the Director of Interventional Cardiology at Lawrence Memorial Hospital and is aiding this project by providing clinically relevant blood samples from patients undergoing testing for coronary atherosclerosis.

Having current and former members of the Adams lab family work to interface analytical chemistry with clinical patient care to help advance disease diagnostics is a great tribute to Ralph Adams' legacy.

Institute Researchers win Awards in Sigma Xi Research Competition

The Sigma Xi Research Paper Competition provides an opportunity for both undergraduates and graduate students to improve their ability to communicate the importance of their research to the community. Sigma Xi, a scientific honor society, was established in 1886, and is dedicated to supporting science, technology, and engineering. The University of Kansas chapter, #004, was the fourth to be established in 1889.

Adams Institute students participated in both 2010 and 2011, and the following students received awards.



Anne Regel, a graduate student in the Susan Lunte group, placed first in the advanced graduate student category of the 2010 Sigma Xi Research Paper Competition held on April

24th, 2010. The title of her presentation was "Progress towards an on-animal separations based sensor for simultaneous monitoring of neurochemistry and behavior."

This research utilizes microchip electrophoresis in order to separate electroactive neurochemicals present in microdialysis samples from the brain and detect them electrochemically.



Rodi Torres-Gavosto, an undergraduate student in the Cindy Berrie research group, placed third in the undergraduate student category of the Sigma Xi research competition held on April 2nd, 2011. The title of his presentation was "Humidity and Pressure Dependence of Atomic Force Microscopy Based Patterning in Octadecyl Silane Self-Assembled Monolayers."

Sarah Wildgen Receives Self Fellowship



Sarah Wildgen, a doctoral student in the Bob Dunn research group, is one of eight recipients of KU's prestigious Madison and Lila Self Gradu-

ate Fellowship as she begins the 2011-2012 academic year. The Self Fellowship provides development opportunities for exceptional PhD students.

Sarah is currently developing novel biosensors for multiplexed detection of biological samples with a goal of improving diagnostic capabilities for various forms of cancer.

Wildgen received her B.S. in chemistry with a minor in mathematics (2009) from Drake University in Des Moines.

Farewell to our Graduates

2010

- Swetha Kaul, Craig Lunte Group, "Investigation of Carbamathione Pharmacokinetics and Pharmacodynamics by In Vivo Microdialysis and Capillary Electrophoresis."
- Courtney Kuhnline, Sue Lunte Group, currently postdoctoral researcher, University of Illinois, "The Development of Analytical Methods for Investigations of Dynorphin A 1-17 Metabolism in the Central Nervous System and Peripheral Tissues and Transport at the Blood Brain Barrier."
- Andrew Mayer, Craig Lunte Group, currently research scientist, KCAS Bioanalytical Research, Shawnee Mission, KS, "Local Dosing in a 3-Mercaptopropionic Acid Chemically-Induced Epileptic Seizure Model with Microdialysis Sampling."
- Melinda Toumi, Heather Desaire Group, currently postdoctoral researcher, KU-IAMI program, "Therapeutic protein and glycoprotein production, optimization, and analysis methods."

2011

- Jenny Fulks, Michael Johnson Group, "Dopamine Release and Uptake in Animal Models of Neurological Diseases"
- Grace Jepkorir, Mario Rivera Group, "Structural and Biochemical Investigations of the Mechanism of Heme Capture by the Hemophore HasAp from *Pseudomonas aeruginosa*"
- Andrea Ortiz, Michael Johnson Group, "Neurochemical Measurements in Rodents that Model Huntington's Disease and Oxidative Stress"
- Saroja Weeratunga, Mario Rivera Group, Current Position: Research Fellow, Hoffman Group, Griffith University, "Structural and Biochemical Characterization of Bacterioferritin B from *Pseudomonas aeruginosa* and Its Role in Bacterial Iron Homeostasis"

Congratulations to all of our graduates, and all the best in your future endeavors!

Our International Researcher



In 2011 the Institute welcomed another talented International Scholar, Simon Pfeiffer. Simon is a masters student in the Department of Chemistry at the University of Regensburg in

Regensburg Germany, where he earned his bachelors degree in the Frank Matysik Research Group. During his year in the US, Simon will be working in the Sue Lunte Group, conducting research on microchip electrophoresis and microdialysis.

Simon is from Schongau, a small town south of Munich in the foothills of the Alps. When he finishes his masters degree in 2013, he plans to enter a doctoral program in analytical chemistry. Please join us in welcoming Simon to KU!

Departmental Awards & Scholarships

A number of graduate students working in the Adams Institute received Departmental Awards and Scholarships in 2010 and 2011.

2010

- Rachel Lane, Frank B. Dains Award
- Saroja K. Weeratunga, J. K. Lee Award in Analytical Chemistry
- Matthew S. DeVore, Paul and Helen Gilles Award in Phys. Chem.
- Ted Keppel, Charles and Beatrice Kulier Scholarship
- Kevin Armendariz, Reynold T. Iwamoto Scholarship
- Megan K. Dorris, McCollum Research Scholarship
- Heath A. Huckabay, McCollum Research Scholarship
- Grace Jepkorir, Kuwana Graduate Scholarship
- Andrea Ortiz, Adrienne Hiscox Mitchell Scholarship

2011

- Rachel Saylor, Snyder Award
- Heath Huckabay, J.K. Lee Award in Analytical Chemistry
- Christina Edwards, Thomas A. Milne Scholarship
- Dulan Gunasekara, Charles and Beatrice Kulier Scholarship
- Rachael Lane, Reynold T. Iwamoto Scholarship
- Daniel Clark, Kuwana Graduate Scholarship
- Matt Devore, Takeru & Aya Higuchi Scholarship in Physical Chemistry

Past Visiting Researcher Wins Prestigious Award for Thesis



Wendell Karlos Tomazelli Coltro, a past visiting graduate researcher with the Sue Lunte Group, has won "The Best Chemistry Thesis of 2008 Award", offered by the Brazilian Government Agency CAPES. His work was chosen from among all theses finished in 2008 in Brazil.

The thesis, entitled "Contactless conductivity detection: A

new tool for monitoring biomolecular interactions" was based in part on experimental work done in the Sue Lunte Group lab at The University of Kansas. In addition to a diploma and a one year post-doctoral scholarship,

Dr. Coltro will also receive a medal at a ceremony in December 2010. His advisor, Emanuel Carrilho (Institute of Chemistry of São Carlos, University of São Paulo, Brazil,) was also awarded funds for participation in a meeting or conference of his choice.

Dr. Coltro was recently admitted to the faculty of University of Goias at Goiania, Brazil, where he is conducting research on microchip analysis systems.

Ralph Adams Alumni Symposium & Reunion a Roaring Success

Former graduate students, undergraduate students, and post-doctoral researchers from across the nation who worked in the Ralph Adams Research Group at The University of Kansas returned to the KU campus this summer for a Research Symposium and Reunion. The Adams Group alumni were joined by friends and family for three days of research presentations, campus and facility tours, and social events. The Buzz Adams Legacy Symposium and Reunion took place on June 11-13, 2010, and welcomed over 40 guests who shared their current research activities and memories of their time in the Adams Lab, and renewed old friendships.

The symposium took place on Saturday, June 12, and featured presentations by a number of Adams alumni. Presenters included:

Mike Johnson, Assistant Professor of Chemistry, The University of Kansas. "High temporal resolution analytical measurements in living systems"

Pete Kissinger, Professor of Chemistry, Purdue University.

"Personalized Medicine; Automated Serial Blood Sampling for Clinical Drug Trials, NICUs and ICUs; Exploring Dried Biofluid Samples with DESI Mass Spectrometry"

Richard McCreery, Professor of Chemistry, Senior Research Officer, National Institute for Nanotechnology, University of Alberta. "Nonvolatile Memory from the World's Thinnest Electrochemical Cell (containing a carbon electrode, what else?)"

Terry Miller, Ohio Eminent Scholar, Professor of Physical Chemistry, The Ohio State University. "Free Radicals from the 1960's into the 21st Century"

Margaret Rice, Professor, Departments of Neurosurgery & Physiology and Neuroscience, New York University. "Dopamine: Beyond the Synapse"

Mark Wightman, W.R. Kenan, Jr. Professor of Chemistry, University of North Carolina, Chapel Hill.

"Neurochemical responses to rewarding and aversive stimuli" Following the symposium, some of the attendees toured the offices and labs of the Adams Institute for Bioanalytical

Chemistry, while others chose to visit the scenic KU campus. After dinner, the group gathered at the home of Gini Adams for a reception to conclude the day's activities.

On Sunday morning, the participants took advantage of a final opportunity to reconnect with colleagues at a brunch in the historic Eldridge Hotel in down-

town Lawrence before heading off to catch their various flights home. The last Adams Reunion was held in 2001, so there was quite a bit to catch up on at this gathering. All enjoyed this opportunity to connect with old friends and make new ones, and parted with a promise to meet again at a future, not too distant date.



Jane McCreery visits with Ginny Adams.



Guests chat at the home of Ted and Jane Kuwana.



Seated: Albert Burgstahler, Sue Lunte. First row: Rick McCreery, Jane McCreery, Gus Manning, Barbara Rice, Margie Zimmerman, Ted Kuwana, Mark Wightman. Second row: K.V. Thirivikraman, Barbara Miller, John Zimmerman, Rena Kirkpatrick, Jane Kuwana. Third row: Paul Plotsky, Nancy Harmony, Bev Wilson, George Wilson, Terry Miller, Don Leedy. Fourth row: Marlin Harmony, Wes White, Pete Kissinger, Richard Hart, Craig Lunte, Ivan Mefford.

News in Brief

- Heather Desaire, Associate Professor of Chemistry and Adams Institute faculty member, has been awarded a proof-of-concept grant, one of 11 awarded to KU faculty. These grants are sponsored by KU's Institute for Advancing Medical Innovation (IAMI), a program funded by the Kauffman Foundation and KU Endowment. The goal of the program is to generate new and innovative drugs, medical devices, and drug-device combinations. The title of Dr. Desaire's proposal is "A Novel Platform for Producing Proteins".
- Tom Linz from the Sue Lunte Group received the Tony B. Academic Travel Award to present a poster on his research at Lab Automation 2011. Tom has spent the last two years developing a capillary electrophoresis-based method for the analysis of methylated arginines (MAs) in human plasma. Tom enjoyed presenting the recent advances in this project in beautiful southern California in January.

Welcome Our Newest Faculty Members

The Adams Institute welcomed its newest faculty members in 2011, Dr. Yong Zeng and Dr. Shengqiang Ren.



Dr. Zeng received his master's degree from Wuhan University, and his PhD from the University of Alberta. He comes to KU from a postdoctoral position with Richard Mathies at the University of California, Berkeley.

During his academic training and research in Analytical Chemistry, Dr. Zeng has been pursuing his interest in devel-

oping new micro and nanofluidic technologies to facilitate our understanding of complex biological systems and improve clinical diagnostics. His research group is currently focused on three main areas: (1) quantitative single cell analysis for cancer biology and clinical medicine; (2) high-throughput glycoproteomics and glycomics; and (3) nanomaterial enabled bioanalytical technologies.



Dr. Ren holds a PhD degree in Materials Science and Engineer-

ing from the University of Maryland, College Park where he worked under the direction of Professor Manfred Wuttig.

He most recently held a postdoctoral position with Dr. Silvija Gradecak at the Massachusetts Institute of Technology, Cambridge, MA.

Dr. Ren's research at KU will focus on designing novel nanostructured materials for renewable energy applications such as photovoltaic solar cells, photoelectrochemical cells, and multifunctional sensors, with the ultimate goal of defining the field of materials nanochemistry.

NIH Awards COBRE Grant to Sue Lunte



The National Institutes of Health (NIH) has informed Dr. Lunte that it will be funding her Centers of Biomedical Research Excellence (COBRE) proposal submitted in 2010. The name of the pro-

posed COBRE is the Center for Molecular Analysis of Disease Pathways (<http://cmadp.cobre.ku.edu/>), and should be up and running by July, 2012.

In addition to Sue Lunte, the Principal Investigator, the center administration includes Co-investigators Eric Lundquist, Professor, Department of Molecular Biosciences and Blake Peterson, Regents Distinguished Professor, Department of Medicinal Chemistry. Congratulations to all faculty and staff involved in writing this proposal.

Getting Acquainted



In this issue we will learn more about one of the junior faculty in the Adams Institute, Assistant Professor David Weis.

David grew up on the "North Coast" on the shores of Lake Erie outside of Cleveland, Ohio. After graduating from Rocky River High School, he attended Earlham College, where he majored in Chemistry and ran the college film series. Following graduation in 1993, David started graduate school at Indiana University, Bloomington doing research in vibrational spectroscopy of

inorganic aerosols in the laboratory of Prof. George Ewing. Following the completion of his Ph.D. in 1998, David accepted an appointment as a visiting professor at Middlebury College in Vermont, and two years later a tenure-track position at Skidmore College in Saratoga Springs, NY. During his time at Skidmore, he and his students established a successful line of research focusing on enzyme kinetics in acoustically levitated droplets of supercooled water.

This success led to a decision to leave Skidmore to pursue research on a larger scale. In 2004, David accepted an appointment as a research professor in the Prof. John Engen at the University of New Mexico where he learned biological mass spectrometry focused on protein structure and dynamics. In 2007, he joined the faculty at

the Department of Chemistry here at KU.

Prof. Weis's current research interests focus on issues related to protein flexibility. In one line of research, his lab is investigating intrinsically disordered proteins. These are proteins that, though functional, have limited or no well-defined structure. This research aims to understand the mechanisms by which such proteins interact to form stable complexes. In another line of research, Prof. Weis is collaborating with Prof. David Volkin and Prof. Russ Middaugh in the

Department of Pharmaceutical Chemistry to understand how to inhibit protein flexibility that is believed to lead to aggregation of biotherapeutic proteins.

Prof. Weis also coaches a team of 9-14 year old children who compete in the international FIRST Lego League, a program designed to build interest in science and engineering. Together Canan Aker, his wife of 16 years, they are raising two children, Helen and Theo. In his spare time, David enjoys cycling, hiking, and camping.

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