Department of Biochemistry

2005/2006 Annual Report

PURDUE UNIVERSITY

Department Head Message

Greetings from the Department of Biochemistry! Another exciting year is summarized within these pages and we hope that you will enjoy browsing the contents to learn more about our activities and progress. One major change in our department is the addition of three new faculty members: Jim Clemens, Fred Gimble and Xiaoqi Liu. This brings us to a total of seven new faculty members since 2002. These talented individuals have had a positive impact within the department. There has been an increase in the number of collaborative research projects, additional graduate students and postdocs have filled their labs, and faculty discussions are not constrained by "the way we used to do it." The energy, enthusiasm and optimism of these new faculty members is evident and I sense an enhanced intellectual atmosphere spreading throughout the department. I am especially pleased that this enthusiasm extends to teaching and mentoring our students. The new faculty have welcomed undergraduates into their laboratories and provide thoughtful comments regarding the curriculum. They are genuinely concerned about education and enhancing students' careers. Our students are energized by these changes as well. Membership in the undergraduate Biochemistry Club has increased and the graduate students are initiating new social and professional activities.

Despite these positive trends it is a challenging time to establish an academic career. Currently, less than 10% of proposals are funded at NSF and the success rate is not much better at the NIH. Competition is keen and demands on faculty time are extensive. While I remain confident in our ability to compete for research dollars, persistence and determination are more important than ever. During these times we especially appreciate gifts from alumni and friends that enhance our programs and increase our flexibility. Thank you for support!

Jim Forney
Department Head

Inside This Issue

About the Cover

Clear evidence of flowering plants is present in the fossil record of the lower Cretaceous (140 million years b.p.), and equivocal evidence suggests their existence 60 million years earlier, around the same time that conifers and ginkgos arose. In contrast, fossil evidence for the ferns and lycophytes, which includes the genus *Selaginella* is found in strata dated to approximately 350 million years ago. Indeed, it is the fossil remnants of these species that comprises coal, a fact that led to the coining of the term "Carboniferous Era" to describe the Pennsylvanian and Mississippian periods during which these species were the dominant plant genera. *Selaginella moellendorffii* (pictured on the cover) has a number of characteristics that make it attractive as a new model system in plant biology, and as mentioned above, it is representative of the oldest lineage of vascular plants. Clint Chapple's lab has begun research on *Selaginella* by focusing on phenylpropanoid biosynthesis, since the pathway shows interesting similarities and differences compared to what is found in flowering plants. By following up on these results, Dr. Chapple hopes to obtain new tools with which to manipulate lignin biosynthesis in plants.

Faculty News

New Faculty

Jim Clemens joined the department in September 2005 as an Assistant Professor. He grew up in Indianapolis where his father worked as a neuroendocrinologist at Eli Lilly. Jim began his research career in the laboratory of Dr. Jack E. Dixon while pursuing his undergraduate degree at Purdue. Upon graduation in 1990, he enrolled in Purdue's Biochemistry graduate program to continue research on protein tyrosine phosphatases with Dr. Dixon. Shortly thereafter, Dr. Dixon moved his laboratory to the University of Michigan. Jim remained at Purdue to complete his M.S. in Biochemistry while his wife finished her B.S. in Engineering and then he joined Dr. Dixon for his Ph.D. research at the University of Michigan. In 1999, he moved to the University of California, Los Angeles and joined the laboratory of Dr. S. Lawrence Zipursky for his postdoctoral work to apply genetic approaches to his studies of nervous system development. Now, Jim combines biochemistry and molecular genetics to study how proteins control connection specificity between nerve cells during development.

After arriving in West Lafayette, Jim and his wife, Kristina, celebrated the birth of their first child, Erika. Prior to Erika's arrival, Jim and Kristina enjoyed dining out, concerts, "relaxing" in Las Vegas, and attending renaissance festivals in full costume. They now enjoy quiet evenings at home with Erika and their two cats, Sam and Athena.

Frederick Gimble joined the department in August 2005 as an Associate Professor. He is originally from Washington, D.C. He attended Tufts University where he received his B.S. degree in 1980 and remained in the Boston area to pursue his doctorate with Robert Sauer in the Department of Biology at MIT. Fred subsequently worked as a Damon Runyon Cancer Research postdoctoral fellow in the laboratory of Jeremy Thorner at the University of California, Berkeley where he studied the phenomena of intein homing in yeast. After working briefly as a postdoctoral fellow with Dr. Florante Quiocho at the Baylor College of Medicine, Fred became an Assistant Professor in 1993 at the newly established Institute of Biosciences and Technology (IBT), which is a component of the Texas A&M University System. He became an Associate Professor in 2000. During his tenure at IBT, his laboratory performed biochemical and structural studies of homing endonucleases to elucidate their interaction with DNA and their reaction mechanism.

Fred moved to Purdue with his wife, Amy Davidson, who is an Associate Professor in the Department of Chemistry, and their son, Nathan. At Purdue, the major focus of Fred's research group will be protein engineering of homing endonucleases by directed evolution and rational design methods. The novel reagents created by this research will have potential therapeutic applications in gene targeting protocols. In his free time, Fred enjoys outdoor activities including hiking and canoeing.

Xiaoqi Liu joined the department in April 2006 as an Assistant Professor. He received his B.S. in Chemistry at Beijing University in 1991 and M.S. in Biophysics at Academia Sinica in 1994. He continued his studies in Biochemistry at Washington State University under the supervision of Dr. Michael Smerdon in the field of DNA damage and repair in chromatin and received his Ph.D. in 1999. Xiaoqi's thesis work analyzed the mutual effects of nucleosome formation and transcription factor binding on DNA damage and repair using a 5S rDNA model system. Xiaoqi did his postdoctoral research at Harvard University with Dr. Raymond Erikson in the field of signal transduction. Specifically, he has been working on Polo-like kinase 1, a key enzyme required for mitosis.

Xiaoqi will continue to focus on the roles of Polo-like kinase 1 and its interaction with proteins during cell cycle progression. In his spare time, Xiaoqi enjoys fishing, playing tennis, and reading. Formerly a big fan of the Washington State football team, Xiaoqi will be cheering for Purdue at Ross-Ade this fall.

Faculty News

Outstanding Teacher and Counselor Awards

Two faculty members were recognized at the 2006 College of Agriculture Spring Awards Reception. **Clint Chapple** was the department's nominee for the Richard L. Kohls Outstanding Undergraduate Teacher Award. The Undergraduate Teacher Award recognizes professors who excel in teaching and inspiring students. **Mark Hermodson** received the departmental nomination for the Outstanding Undergraduate Counselor Award for providing leadership to undergraduates.

Clint Chapple

Mark Hermodson

National Science Foundation Research Grant

A $1 million National Science Foundation - Major Research Instrumentation grant awarded to **Clint Chapple** (Biochemistry), David Salt, David Rhodes (both in Horticulture) and Barry Wanner (Biological Sciences) has established the Purdue University Metabolic Profiling Facility, housed jointly in the Department of Horticulture and Discovery Park's Bindley Bioscience Center. The grant included over $300,000 in support from Purdue University. The funds have been used to purchase two state-of-the-art instruments for gas chromatography - mass spectrometry and two for liquid chromatography - mass spectrometry. The instruments will be used to profile changes in metabolism that result from environmental, biotechnological and pharmaceutical perturbations in a wide variety of organisms.

Bindley Bioscience Center

Mark Hall

2005 Cancer Center Scientific Retreat

Each fall the Cancer Center holds a scientific retreat, which provides a forum for scientific exchange and the opportunity to explore shared scientific interests. Among this year's speakers were two Biochemistry Assistant Professors. **Mark Hall** presented a talk on "Cell cycle regulation by the anaphase-promoting complex" and **Andy Tao** spoke on "Targeted proteomics based on dendrimers and mass spectrometry."

Andy Tao

Research Award

Andy Tao received an American Society for Mass Spectrometry Research Award, sponsored by ThermoFinnigan, for the year 2006. His project was entitled, "Identification of the drug targets based on dendrimer nanoprobes and mass spectrometry." The award, along with a check and an engraved plaque, was presented at the ASMS conference in Seattle, Washington.

Faculty News

In The "Spotlight"

Steve Broyles along with one of his former students, **Jaewook Oh**, was recognized in the "Spotlight" section of the *Journal of Virology* (October 2005) for their publication, "Host cell nuclear proteins are recruited to cytoplasmic vaccinia virus replication complexes." The journal editors select articles of significant interest from current issues and feature them in the spotlight section. In their publication, Broyles and Oh explain that multiple host nuclear proteins co-localize with viral replication complexes in the cytoplasm of the infected cell. These findings indicate that vaccinia virus has ready access to nuclear proteins, hinting at the origin for some essential functions not identified among viral gene products.

Steve Broyles

Jaewook Oh

Featured Research Article

The Annual Report of the Advanced Photon Source at Argonne National Laboratory featured an article entitled, "How a viral RNA self-splices." The article highlighted research by **Barbara Golden**, **Hajeong Kim** (PULSe Student in the Golden Lab), and **Elaine Chase** (Research Associate) that utilized the facilities at Argonne.

Hajeong Kim

Elaine Chase

Barbara Golden

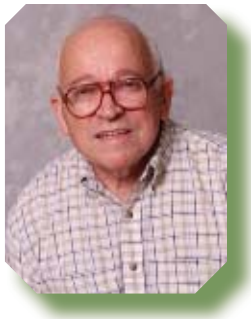
Top NIH Grantee Recognized

An NIH study placed **Henry Weiner** above the 95th percentile of the distribution of (extramural) NIH grants over the last 25 years. A team of health economists at Columbia University examined the careers of top NIH grantees and hypothesized that prominent researchers positively influence the research productivity of the colleagues around them. The team is in the process of quantifying the results, which will provide a more complete assessment of the returns to public investment in biomedical research.

Henry Weiner

Classes in Mexico Lead to Japan

David Krogmann traveled to Mexico City in February to continue teaching his annual course, "How to Write a Scientific Paper in English" at the Universidad Nacional Autónoma de México. Upon his return, Dr. Krogmann was invited by a former visiting scientist (1986), Dr. Yosusi Yamamoto of the Graduate School of Natural Science at Okayama University in Japan, to visit his lab and university during the fall of 2006. Dr. Krogmann will give a presentation on cyanobacteria and present his English manuscript writing short course. Dr. Krogmann reflects that until the 16th century scholars wrote in Latin and now, after five centuries of nationalism and polyglot publication, English has emerged as the universal language of science.



David Krogmann

Awards and Recognitions

Administrative/Professional Staff Honors

Kristi Trimble

Cathy Rooze

The College of Agriculture annually recognizes staff for excellent performance and achievement. This year's recipients were **Cathy Rooze** (Business Assistant) and **Kristi Trimble** (Administrative Assistant). Cathy has been at the University since 1993 and with the department since 1998. Kristi has been with Purdue since 1981 and with the department since 2003.

Service Appreciation

Jo Crain, Editorial Assistant (20 years); **Ruth Falwell**, Laboratory Assistant (20 years); **Joanne Cusumano**, Laboratory Manager (20 years) and **Elaine Chase**, Research Associate (15 years) were recognized for their years of service to Purdue. Their hard work and dedication is greatly appreciated.

Jo Crain

Joanne Cusumano

Ruth Falwell

Elaine Chase

Re-elected Third Term for Division of Chemical Education, Inc.

Anna Wilson, Coordinator of Teaching Laboratories in the department since 1975, was re-elected for a 3rd term as Treasurer for DivCHED (Division of Chemical Education, Incorporated), which is one of 33 technical divisions within the American Chemical Society (ACS). Its members come from the entire educational spectrum (pre-secondary, secondary, two- and four-year colleges, universities, research institutions) and include those from industry who are concerned about the education and professional training of future chemists and other molecular scientists. Anna also continues to serve as Treasurer/Secretary for the Biotechnology Secretariat, an association of ACS Divisions.

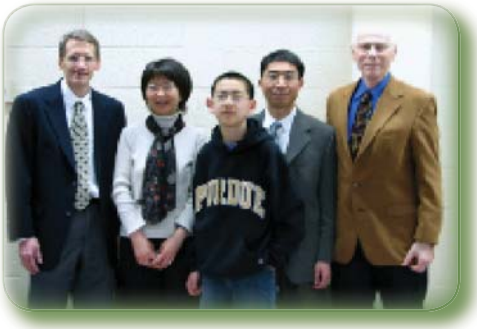
Awards and Recognitions

Distinguished Agricultural Alumni

Kun-Liang Guan of the Department of Biochemistry, University of Michigan was one of nine recipients honored with the 2006 Distinguished Agricultural Alumni Award.

The Distinguished Agricultural Alumni Award is designed to identify and recognize mid-career Purdue Agriculture graduates who have made significant contributions to their profession and communities. The nominees represent the full spectrum of the food, agriculture and natural resource system.

A native of the Republic of China, Guan's career in biochemistry began in 1983 when he came to Purdue through a program called the Chinese and U.S. Biochemistry Examination for Admissions. While at Purdue he honed his research skills, pioneering molecular biology expertise in Henry Weiner's research group. After receiving his Ph.D. and completing postdoctoral work, Guan joined the University of Michigan faculty in 1992, where he currently holds a named professorship.



During his visit, Professor Guan presented a seminar entitled, "Regulation of cell growth and cell size by the TSC-mTOR."

Bernard Axelrod Lectureship

Dr. Carol W. Greider from the Department of Molecular Biology and Genetics and the Department of Oncology at Johns Hopkins University School of Medicine presented this year's lecture, "Telomerase and the consequences of telomere dysfunction." Dr. Greider's career has focused on the function and analysis of telomerase, which she first discovered during her graduate work with Dr. Elizabeth Blackburn. Dr. Greider has served as Director of the Department of Molecular Biology and Genetics at Johns Hopkins University since 2003. She has received numerous honors including the Gairdner Foundation Award, the Rosenstiel Award and election to the National Academy of Sciences in 2003.

The Axelrod Lectureship was established by colleagues and friends of Dr. Bernard Axelrod for his many contributions to the field of biochemistry and its community of scientists. Dr. Axelrod served as head of the department from 1964 to 1975. During that time, he hired 12 faculty members, created a vibrant intellectual atmosphere and was instrumental in elevating the reputation of basic biochemical research at Purdue.

Carol Greider and Jim Forney

Seminar Series

The department hosted its second seminar series, which featured many guest speakers including those invited to give the Axelrod and Distinguished Agricultural Alumni Lectureships.

External Speakers

Brenda Andrews
Department of Medical Genetics
and Microbiology
University of Toronto

"Integrated Genomics: Identification of Kinase Targets by Systematic Analysis of Gene Over-expression Phenotypes"

David Gilley
Department of Medical
and Molecular Genetics
Indiana University School of Medicine

"Direct Crosstalk Between Telomere Maintenance and DNA Repair"

Carol Greider
Department of Molecular Biology
and Genetics
Johns Hopkins University

(see Bernard Axelrod Lectureship article)

Kun-Liang Guan
Life Sciences Institute
University of Michigan

(see Distinguished Agricultural Alumni Award article)

Michael Sturek
Department of Cellular and
Integrative Physiology
Indiana University School of Medicine

"*Pathophysiology of the Ossabaw Swine Model of the Metabolic Syndrome (pre-diabetes): Potential Biochemical Mechanisms"*

Gregg Howe
Department of Biochemistry
and Molecular Biology
Michigan State University

"Role of the Jasmonate Signaling Pathway in Systemic Induced Resistance to Herbivores"

Tom Hurley
Department of Biochemistry
and Molecular Biology
Indiana University School of Medicine

"Initiation of Glycogen Synthesis by Glycogenin: An Enzyme, Substrate and Product All in One"

Mark Parthun
Department of Molecular
and Cellular Biology
Ohio State University

"*Histone Post-Translation Modifications and the Assembly of Chromatin Structure"*

Zhong-Yin Zhang
Department of Biochemistry
and Molecular Biology
Indiana University School of Medicine

"Small Molecule Probes for Protein Tyrosine Phosphatases"

Steve White
Department of Structural Biology
St. Jude Children's Research Hospital

"Targeting Bacterial Fatty Acid Synthesis and Folate Synthesis for the Development of Novel Antibiotics"

Thomas Wang
Phytonutrients Laboratory
USDA

"Phytochemicals and Cancer Prevention: Deciphering Molecular Signatures and Mechanisms"

Seminar Series

Purdue Speakers

Jean Chmielewski
Department of Chemistry

"Next Generation Therapeutic Targets: Protein-Protein Interactions"

Amy Davidson
Department of Chemistry

"Using EPR to Monitor Conformational Changes in an ABC Transporter"

James Forney
Department of Biochemistry

"Remodeling the Genome: Developmentally Regulated DNA Elimination in Paramecium"

Bob Geahlen
Department of Medicinal Chemistry and Medical Pharmacology

"Signaling through a Cytoplasmic Tyrosine Kinase: Calling in SYK"

Christine Hrycyna
Department of Chemistry

"The ABCs of Multidrug Resistance in Cancer"

Ann Kirchmaier
Department of Biochemistry

"PCNA and Chromatin in Saccharomyces cerevisiae"

Xiaoqi Liu
Department of Biochemistry

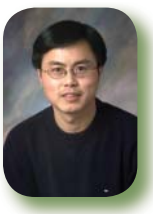
"Functional Studies of Polo-like Kinase 1 in Mammalian Cells"

Edmond Pajor
Department of Animal Sciences

"Farm Animal Welfare: The Interplay of Values, Policy and Science"

Andy Tao
Department of Biochemistry

"Proteomics - Go Big or Go Small"



Cliff Weil
Department of Agronomy

"Jumping Under the Radar: DNA Hairpin Formation and Repair"

Henry Weiner
Department of Biochemistry

"A Life Time with Aldehyde Dehydrogenase and Mitochondrial Protein Import"

Dinesh Yernool
Department of Biological Sciences

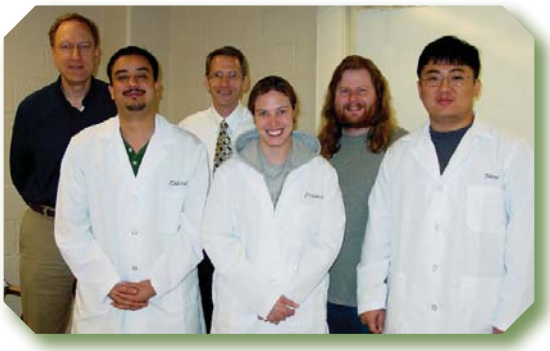
"X-ray Structure of a Glutamate Transporter in Two Conformations: Insight into Mechanism of Co-transport"

Graduate Student News

New Students

The department welcomed three new Ph.D. students in the fall of 2005. **Rakesh Joshi** received his M.S. from Northwestern Illinois University in Evanston in 2005; **Jessica Schoenherr** received her B.S. in 2005 from Grand Valley State University in Michigan; and **Zhen Yang** received his M.S. from Truman State University in Missouri in 2002.

Seham Alhadrami (not pictured) joined the department as an M.S. student. She comes to us from the United Arab Emirates where she received her B.S. in 2002.



(Front row) Rakesh Joshi, Jessica Schoenherr and Zhen Yang (Back row) Fred Gimble, Jim Forney and Jim Clemens

David W. Beach Travel Grant

Inspired by their son's enthusiasm for science, David and Doris Beach chose to share their good fortune by establishing a lectureship. The Beach endowment now also provides an annual travel grant to assist graduate students attending scientific meetings.

Bo Yang (Kirchmaier lab) received the $1,000 award that allowed him to attend the 2006 Yeast Genetics and Molecular Biology Meeting in Princeton, New Jersey. He presented a poster entitled, "Bypassing the catalytic activity of SIR2P for SIR protein dpreading in *S. cerevisiae*."

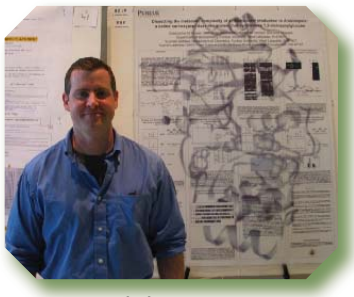
Taking Care of Business

Juan Martinez (Rossie lab) was granted admission to the Applied Principles Management Program at Purdue University. This program is jointly sponsored by the Krannert School of Management and the College of Science and offers over 50 in-class hours of instruction designed to meet the increasing desire of graduate-level engineers and scientists to develop expertise in the area of business. Juan considers his participation in this program an opportunity to enhance his career in the pharmaceutical or biotechnology industry.

Phytochemical Society of North America

Jing-Ke Weng

Chris Fraser presented a talk on "Dissecting the metabolic complexity of sinapate ester production in Arabidopsis: A serine carboxypeptidase-like protein that synthesizes 1, 2-disinapoylglucose" at the 2005 Phytochemical Society of North America Meeting in La Jolla, California. **Jing-Ke Weng** presented a poster entitled, "The lycophyte *Selaginella moellendorffii*: An emerging plant model for studying comparative genomics and the evolution of phenylpropanoid metabolism" for which he won the meeting's best student poster award. Both are students in Professor Chapple's lab.



Chris Fraser

Graduate Student News

A.K. Balls Award

Jim Henderson (Ogas lab) and **Bruce Knutson** (Broyles lab) were co-recipients of the 2006 A.K. Balls Award.

The A.K. Balls award is given annually to an outstanding graduate student who exhibits unusual potential for significant contributions to biochemical research and who is approaching completion of their pre-doctoral program.

Jim entered the Plant Biology Program in August 2001 and received numerous awards during his career: a 2001 Lynn Assistantship, a 2003-2005 NSF IGERT Fellowship, the 2004 Andrews Environmental Grant, a 2004 National Collegiate Inventor and Innovators Alliance E-team Grant (funded by The Lemelson Foundation), the 2005 Bisland Dissertation Fellowship and the 2005 Graduate School Incentive Grant. Jim's research focused on characterization of CHD proteins in Arabidopsis.

Jim Forney and Jim Henderson

Bruce entered the Biochemistry and Molecular Biology (BMB) program in August 2002 and has completed two research projects. He identified two host cell transcription factors that are used by the poxvirus to regulate its gene expression. One is the central factor in activating genes and the other has a repressive effect on expression of a subset of viral genes to alter their timing of expression. Bruce will be first author on both research manuscripts. The first, "Vaccinia intermediate and late promoter elements are targeted by the TATA binding protein" is scheduled for publication in the July 2006 issue of the *Journal of Virology*. In June 2006, Bruce presented a poster on his research at the XVIth International Poxvirus Research Conference sponsored by FASEB in Indian Wells, California.

Bruce Knutson and Jim Forney

Hickory Stick Award

Steve Bremmer (Charbonneau lab) was the 2006 Hickory Stick Award recipient. Steve entered the Biochemistry Ph.D. program in August 2003 and has been a teaching assistant for General Biochemistry, Analytical Biochemistry, and Medical Biochemistry. In addition to his subject knowledge, Steve's generosity, skill, attitude and ability to communicate and inspire confidence were reflected in students' comments.

The Hickory Stick award is given annually for outstanding performance by a graduate teaching assistant who is recognized for the qualities which are essential for future success in teaching and research.

Jim Forney and Steve Bremmer

Going the Extra Mile

Doug Mersman traveled to Memphis, TN to give a talk on chromatin remodelling at The Union University. (Nov. 2005)

Hemalatha Jayachandran and Ayesha Elias traveled to Chicago, IL to present a poster at the Chicago Signal Transduction Symposium at Northwestern University-Chicago Campus. (May 2006)

Younghoon Oh traveled to Indian Wells, CA to present a poster at the FASEB Summer Research Conference on Yeast Chromosome Structure, Replication, and Segregation. (June 2006)

Graduate Student News

Degrees Awarded - Summer/Fall 2005

Christine Adhiambo
BCHM, Ph.D.
(LeBowitz/Forney)

"Role of Cytoplasmic Dynein-2 in Leishmania mexicana"

Timothy Holzer
BCHM, Ph.D.
(LeBowitz/Forney)

"Molecular and Genomic Analysis of mRNA Stability in Leishmania mexicana"

Taichi Endo
BMB, M.S.
(Kirchmaier)

"Role of PCNA in Silencing"

Christiaan Meadows
BCHM, Ph.D.
(Weith)

"Effects of Secondary Structure Stability on Oligonucleotide Electrophoretic Mobility"

Jennifer Trinkle-Pereira
BCHM, M.S.
(Forney)

"Expression, Purification, and Analysis of EF2 and EFR1 Protein in Tetrahymena thermophila"

Degrees Awarded - Spring 2006

Eunyoung Choi
BMB, M.S.
(Charbonneau)

"Potential Role of Budding Yeast Cdc14 in Regulating Sumoylation and Spindle Pole Body Function"

Taksina Sinlapadech
PBP, Ph.D.
(Chapple)

"Genetic and Biochemical Analyses of Glycosyltransferases Involved in Arabidopsis Sinapate Ester Metabolism"

James Henderson
PBP, Ph.D
(Ogas)

"Characterization of the CHD Proteins in Arabidopsis"

Chia-Ling Wu
BMB, M.S.
(Briggs)

"Characterization of Set1, a Specific Histone H3 Lysine 4 Methyltransferase in S. cerevisiae"

Undergraduate Student News

December 2005 Graduates

Stephanie Mowery, Yoshiaki Hagiwara and Megan O'Shaughnessey

2006 Spring Awards

Each year the department honors one outstanding biochemistry undergraduate student from each class at the Spring Awards banquet. The criteria used to identify outstanding students are GPA and course difficulty, extracurricular activities, leadership in the department, and research experience. This year the department honored **Janet Broughton** (freshman), **Jacob Adler** (sophomore), **Kyle Mohler** (junior) and **Theresa Baltz** (senior).

Front row: Janet Broughton and Theresa Baltz
Back row: Jacob Adler and Kyle Mohler

May 2006 Graduates

Theresa Baltz

Amar Bhatt

Amanda Burns

Keith Convery

Holly Courtney

Melanie Ivancic

Damon Jones

Tina Klinge

Julie Lindsey

Kyle Roth

Jessica Sutton

Not pictured: *Floyd Dukes and Andy Tancos*

Undergraduate Student News

Edwin T. Mertz Memorial Scholarship

Jacob Adler, Haubstadt, Indiana and **Kyle Mohler**, Lebanon, Indiana are the 2006-2007 recipients of the Edwin T. Mertz Memorial Scholarship, which provides $1,500 toward tuition. Biochemistry undergraduate students apply for the award by completing an application and writing an essay describing their reasons and goals for studying biochemistry.

Kyle Mohler

Jacob plans to attend veterinary college or medical school after graduation. He enjoys his studies and the faculty in the College of Agriculture and is thankful that Purdue offers a curriculum in biochemistry that fits his needs. Kyle plans to pursue a career in agricultural plant research. He explains his recent fascination is with the modification of plants through genetics.

Jacob Adler

Dr. Edwin T. Mertz was a Professor of Biochemistry at Purdue from 1946-1976. He was recognized globally for his co-discovery of high-lysine corn. He received honorary degrees from Purdue and the University of Montana. In 1975, he was elected to the National Academy of Sciences. Dr. Ronald E. Chance, who had a distinguished career at Eli Lilly and Company, is the founding donor of the Edwin T. Mertz Memorial Scholarship.

BCHM Club in Action

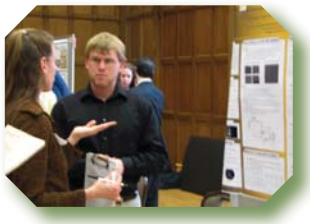
Spring Fest continues to be a great way to inform the community about biochemistry. This year the Biochemistry Club led hands-on demonstrations of how soap breaks the surface tension of water, how van der Waals bonds contribute to weak interactions between molecules, and how DNA can be precipitated from solution. Poster displays helped explain the biochemical and scientific principles involved.

On November 17, the Biochemistry Club hosted a workshop for Girl Scouts from the Lafayette Sycamore Council. Twenty-five girls and nine parents made Reebops from marshmallows to demonstrate simple genetic concepts and the power of DNA and alleles. They also precipitated and spooled DNA from a solution of herring sperm DNA in saline solution, looked at the DNA with a microscope and were instructed on how to make a polymer called GAK. Anna Wilson, Jeanette Britton, and Christy Johnson, along with scout parents and the Girl Scout Council, provided the scouts with an enjoyable scientific experience.

Undergraduate Student News

Spring Research and Poster Symposium

Five undergraduate students, **Melanie Ivancic**, **Tommy Kreke**, **Siqi Lui**, **Julie Chaney** and **Courtney Chambers**, participated in the 2006 Undergraduate Research and Poster Symposium on April 11. This event is sponsored by the Colleges of Sciences and Agriculture. Tommy Kreke won first place in Life Science Application and Design for a collaborative poster, "Effect of media and buffer on the recovery of bacteria in a CCR kit experiment." Melanie Ivancic received the College of Agriculture Student's Award for her poster, "Developing a phosphoproteomic strategy for the identification of target substrates of a Ser/Thr kinase in *Streptococcus agalactiae*." Faculty members **Mark Hermodson** and **Mark Hall**, along with **Kevin Donohue** (BCHM undergrad and Ag Ambassador) participated as judges in this year's symposium.

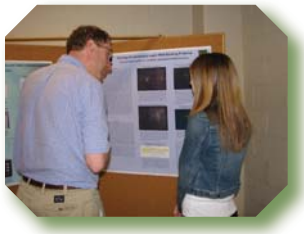


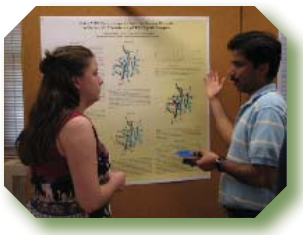
Tommy Kreke
(mentor, Michael Ladisch)

Melanie Ivancic and Mark Hall
(mentor, Andy Tao)

BCHM 490 Poster Presentation

Students fulfilled the department's capstone requirement and reported on the results of their research projects at a poster session on April 24. Through the capstone experience, students are challenged to integrate their knowledge, technical and social skills to identify and solve a problem relevant to issues encountered by professionals in their chosen discipline. **Theresa Baltz**, **Amar Bhatt**, **Amanda Burns**, **Joshua Clark**, **Keith Convery**, **Holly Courtney**, **Floyd Dukes**, **Melanie Ivancic**, **Damon Jones**, **Tina Klinge**, **Julie Lindsey**, **Jessica Sutton**, **Kyle Roth** and **Andy Tancos** answered questions from faculty and graduate students concerning their projects.





Ag Ambassadors Volunteer

Sarah Batta and **Kevin Donohue**, both Biochemistry sophomores, serve the College as Ag Ambassadors. Purdue Ag Ambassadors are student hosts who excel at academics, are outgoing and enjoy meeting new people. They represent the College of Agriculture at information and career fairs and lead campus tours for parents, visitors and prospective students. The Ambassadors travel around the state spreading their enthusiasm for Purdue by giving presentations about careers and college life. In recent years, they've hosted visiting dignitaries, such as Senator Richard Lugar and the Purdue astronaut alumni.

Sarah Batta

Kevin Donohue

Undergraduate Student News

Undergraduate Scholarships Awarded

Purdue Academic Success Award

Theresa Baltz
Janet Broughton
Julie Chaney
Brenton Goodman
Le Ann Hall
Damon Jones
Kara Levell
Lauren Mersinger
Christina Velasquez

Scholarship Award of Excellence

Andrew Bandy
Janet Broughton
Le Ann Hall
Adam Henry
Kara Levell
Lauren Mersinger
Nicole Mock
Matthew Nidlinger
Brandy Paul
Nicole Sigurdson
Emily Sturm
Christina Velasquez
Anna Verseman

Sophomore Scholarship

Jacob Adler
Sarah Batta
Brenton Goodman
Andrew Riebe
Scott Secrist
Anthony Snyder

Junior Scholarship

Kyle Mohler

Senior Scholarship

Theresa Baltz
Damon Jones

Leonard B. Clore Scholarship

Anthony Snyder

Floyd and Nellie Elliott Scholarship

Brenton Goodman

Agricultural Research Fund Scholarship

Julie Chaney
Kevin Donohue
Yoshiaki Hagiwara
Michael Kalwat
Megan O'Shaughnessey

Fred M. Fraser Memorial Agriculture Scholarship

Noah Shields

Marquardt Alumni Scholarship

Matthew Nidlinger
Andrew Riebe

Edwin T. Mertz Memorial Scholarship

Jacob Adler
Kyle Mohler

Milligan Agricultural Scholarship

Brenton Goodman

Purdue University Merit Scholarship for Agriculture

Janet Broughton
Christina Velasquez

O. B. Riggs Memorial Scholarship

Kevin Donohue

Patrick C. Matchette Scholarship

Megan West

Lewis Runkle Scholarship

Michael Hanlon

Straszheim Awards in Agriculture

Christina Velasquez

Charles Florian Sopcak Memorial Scholarship

John Kronberg

Pearl W. Smith Scholarship

Rebeccah Fontaine

Purdue General Scholarship for POA

Rebeccah Fontaine

Undergraduate Student News

Undergraduate Scholarships Awarded (cont'd)

Rex Hall Memorial Scholarship

Jacob Adler
Sarah Batta
Brenton Goodman
Kyle Mohler
Andrew Riebe
Scott Secrist
Anthony Snyder

IAA Foundation

Le Ann Hall

Valedictorian Scholarship

Le Ann Hall
Adam Henry
Kara Levell

Ray T. Kelsey Alumni Scholarship

Sara Izdepski

Geneva Nugent Alumni Scholarship

Grace Kang

Marsh Alumni Scholarship

John Kronberg

Lee B. Florea Student Aid Fund

Nicole Mock

William E. Morris Scholarship

Nicole Mock
Emily Sturm

E.S. and Edith L. Retter Scholarship

Hyun Moon

Olive K. Smith Scholarship

John Kronberg

Coca Cola Scholarship

Anna Verseman

Mauri Williamson Scholarships for Excellence in Agriculture

Amanda Burns

Dora Kyger Bryant Alumni Scholarship

Andrew Bandy
Brenton Goodman

Alva R. Bryant Alumni Scholarship

Andrew Bandy
Brenton Goodman

Harvey W. Wiley Scholarship

Sarah Batta

Pfendler Memorial Ag Scholarship

Sarah Batta

IPIA Exchange Program Scholarship

Sarah Batta

Study Abroad Scholarship

Shannon Borneman
Noah Shields

Indiana Resident Top Scholar Award

Janet Broughton
Brenton Goodman
Christina Velasquez

President's Leadership Class Scholarship

Adam Henry

Pearl W. Smith Scholarship

Kimberly Kennedy
John Naylor

Undergrad Research Poster Symposium

Thomas Kreke

Community Outreach

Summer Outreach

In June 2005, approximately 190 students ages 8 to 13 with an interest in science arrived on campus to visit the College of Agriculture for the Summer in Motion Program. The students attended four Agriculture classes including a Biochemistry class led by **Anna Wilson**, Coordinator of Teaching Laboratories. The students performed a hands-on experiment with DNA and discussed applications of DNA analytical methods. Assisting Anna and the students with the experiments were graduate students, **Steve Bremmer**, **Ying Wang**, **Eunyoung Choi**, **Jui-Hui (Rae) Chen** and Basic Medical Sciences postdoc **Wen-Horng Wang**.

Summer in "Motion"

In July 2005, Anna hosted a booth at the National Farm Bureau convention in Indianapolis where she included a hands-on experiment similar to the ones used at the Summer in Motion Program. Farm Bureau estimated the thirty-five exhibitors (including nine from Purdue College of Agriculture) drew approximately 400 attendees, many of which were elementary educators looking for information and experiments to use in their classrooms.

Science and Engineering Fairs

Purdue University was host to the 2006 Lafayette Regional Science and Engineering Fair on March 3 and 4. Area school children (grades 5-6 and 11-12) prepared science projects for this event. The top projects in the junior and senior divisions had the opportunity to participate at the National and International Science Fairs. Three Biochemistry faculty members, **Sandra Rossie**, **Fred Gimble** and **Mark Hall** served as Blue Ribbon Panel Judges.

Clint Chapple and graduate student, **Jake Stout**, assisted Gracie Conard (Lafayette Christian School) with her project, "Are cigarette filters effective?" Gracie won second place to earn the College of Science Dean's Award and silver medal at the International Science and Engineering Fair competition. **Anna Wilson** helped two students (Katelynne Reilly and Molley Springer) and their science teacher (Melissa George) from Tecumseh Middle School prepare a project titled, "DNA bands" by providing work space, equipment, materials, and advice. Hannah Salmon from Jefferson High School was mentored by former graduate student, **Tim Holzer** (Forney lab), on her project entitled, "The analysis of regulated *Leishmania* genes: The first step, PCR." Hannah received the silver medal award in the Medicine and Health Sciences category.

Seven Biochemistry undergraduates, **Brandy Paul**, **Andrew Bandy**, **Benjamin Rains**, **Kevin Donohue**, **Kyle Mohler**, **Bella Siangonya** and **Le Ann Hall** participated as judges at the 2006 Hoosier Science and Engineering Fair at DePauw University in Greencastle, Indiana on April 1. The fair showcased the top middle and high school Regional Science Fair winners from across Indiana.

Faculty members **Harry Charbonneau**, **Barbara Golden**, **Ann Kirchmaier**, **Victor Rodwell**, **Sandra Rossie** and **Anna Wilson** (Coordinator of Teaching Laboratories) participated as judges at the Intel International Science and Engineering Fair held at the Indianapolis Convention Center in May. The Intel ISEF is the world's largest international science and engineering competition for high school students. It provides an opportunity for the world's best young scientists to come together to share ideas, showcase the latest in scientific research and compete for more than $3 million in scholarships and awards. There were 1,400 young scientists and inventors entered in this year's competition.

Left to right: Sandra Rossie, Harry Charbonneau, Ann Kirchmaier, Victor Rodwell, Barbara Golden and Anna Wilson

Alumni Update

1950's

Donald A. Burns - Ph.D. 1958 (**Herbert Parker**) is retired from Los Alamos National Laboratory but still dabbles in science, teaching workshops in Near-Infrared Spectroscopy at FACSS and authoring the "Handbook of Near Infrared Analysis" (3rd edition now in preparation) and is a member of the ACS Speaker Circuit.

1970's

Joseph C. Schmit - Ph.D. 1971 (**Howard Zalkin**) is Associate Professor and Chairperson in the Department of Biochemistry and Molecular Biology at Southern Illinois University School of Medicine. He obtained a B.S. degree in Chemistry from North Dakota State University and a Ph.D. degree in Biochemistry in 1971 from Purdue University. He spent two years as an NIH postdoctoral fellow and three years as a research associate at the University of California, San Diego prior to joining the faculty of Southern Illinois University at Carbondale.

Franklin G. Berger - Ph.D. 1974 (**Klaus Herrmann**) is George H. Bunch, Sr. Professor in the Department of Biological Sciences at the University of South Carolina. He presently serves as Director of the Center for Colon Cancer Research.

Daniel Walker - Ph.D. 1979 (**Bernard Axelrod**) is Chief Executive Officer for Alphapointe Association for the Blind in Kansas City, a non profit corporation providing employment and rehabilitation for blind individuals. The association has annual revenues in excess of $20 million with products manufactured by blind employees.

1980's

Willis E. Brown - Ph.D. 1981 (**Victor Rodwell**) has resided in Madison, Wisconsin for the past ten years. He was an instructor at Harvard when he became interested in ecological restoration (an attempt to return ecosystems to what they were before the time of European settlement). He received his Masters from The University of Wisconsin-Madison in 1999 where he studied restoration in land resources at the Institute for Environmental Studies. In 2001, he and his partner formed Michler and Brown, LLC. Their work centers on prairie and oak savanna restoration (removing non-native plants and prescribing burns). They provide service to the University of Wisconsin-Madison, Nature Conservancy, Wisconsin Department of Natural Resources, Madison Audubon Society, U.S. Fish and Wildlife Service and private landowners.

Bradley T. Sheares - Ph.D. 1982 (**Donald Carlson**) is president of the U.S. Human Health Division, Merck & Company, Incorporated. He has sales and marketing responsibility for the company's medicines that treat chronic diseases and illnesses. In 1978, Brad had a summer research experience at Merck and then left to pursue an advanced degree. After earning a doctorate in Biochemistry at Purdue and pursuing post-doctoral cancer research at MIT, Brad returned to Merck in 1987 as a research fellow at the Merck Institute for Therapeutic Research. He later moved to the U.S. sales and marketing organization in 1990. Since then, he has held positions in business development, sales, and marketing at Merck's U.S. human health division. Brad was highlighted in the February 6th issue of Fortune Magazine as one of corporate America's next generation of leaders.

Robert (Bob) Deschenes - Ph.D. 1984 (**Jack Dixon**) is currently Head of the Biochemistry Department at the Medical College of Wisconsin. Robert obtained his B.S. from St. Michaels College, an M.S. in Biochemistry from Tufts University, and his doctorate degree in Biochemistry from Purdue University. During his post-doctoral training in the Molecular Biology department at Princeton University, he initiated studies on the posttranslational regulation of Ras oncogene proteins in the model organism yeast, *Saccharomyces cerevisiae*. Prior to joining the Medical College of Wisconsin, Dr. Deschenes was the Vice Chair of the Department of Biochemistry at the University of Iowa and director of the Genetics Ph.D. program. Dr. Deschenes joined the Department of Biochemistry at the Medical College in 2004. His research group studies eukaryotic signal transduction pathways involved in cancer and cell stress.

Michael Beach - Ph.D. 1987 (**Victor Rodwell**) is Associate Director for Healthy Water in the Division of Parasitic Diseases at the Centers for Disease Control and Prevention 1 (CDC) in Atlanta, GA. In April 2006, Dr. Beach returned to Purdue as a guest lecturer in Karl Brandt's interdisciplinary freshman Honors class. He addressed

Alumni Update

malaria and the developed world's responsibility toward solving Third World disease problems. He also spoke to the Biochemistry Club on "How to submit your updates, career paths and training opportunities at CDC".

Tuajuanda Jordan-Starck - Ph.D. 1989 (**Victor Rodwell**) was living in New Orleans when Katrina hit. She and her children temporarily relocated to Maryland with her parents. She has accepted a position as Howard Hughes Medical Institute's senior program officer in charge of science education.

1990's

Guo-Ping Zhao - Ph.D. 1990 (**Ronald Somerville**) currently holds many positions in China: Executive Director of the Chinese National Human Genome Center at Shanghai; Vice President and Director of the Shanghai BioChip Co. Ltd., National Engineering Center for BioChip at Shanghai; Professor and Chairman of the Academic Committee, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences; Professor and Director of the Department of Microbiology and Microbial Engineering, School of Life Sciences, Fudan University. As one of three principle scientists, he was responsible for the Human Genome Project at CAS during 1998-2001. Starting in the area of positional cloning of human disease genes, he later focused on microbial genomics research, mainly bacteria. Presently, he is working on new genomic projects such as the evolution of the SARS coronavirus, the genomic study of *Schistosoma japonicum*, and the human HapMap project.

Eumorphia Remboutsika - Ph.D. 1994 (**Gunter Kohlhaw**) is employed at the Stem Cell Biology Laboratory in Athens, Greece.

Richard Scott Rosenthal - Ph.D. 1995 (**Victor Rodwell**) is employed at the Amgen Production Facility in Colorado after relocating from the Amgen facility in Puerto Rico, University of Puerto Rico Medical Center. Scott is working with the Purification Process Development Group on viral clearance studies for two of their late-stage products, one which has indications for anemia and the other for osteoporosis. He will also be leading the commercial process development efforts for a new therapeutic protein for the potential treatment of lupus or various oncology indications.

2000's

John Humphreys - Ph.D. 2002 (**Clint Chapple**) is presently employed at UT Southwestern in Dallas, Texas and is the proud father of an 8 pound baby boy named Mark Morris Humphreys. John's paper, co-authored with **Matt Hemm** (Ph.D. 2003), in the *Proceedings of the National Academy of Sciences USA*, "New routes for lignin biosynthesis defined by biochemical characterization of recombinant ferulate 5-hydroxylase, a multifunctional cytochrome P450-dependent monooxygenase," has now been cited in the literature over 100 times.

Emily Arth-Walkey - B.S. 2004 - is attending the Indiana University School of Medicine - Lafayette (at the Purdue campus). She will complete her final two years at the Indianapolis campus.

Abby Patterson - B.S. 2004 - is presently working as a Professional Research Assistant in the S/M Cardiovascular Pulmonary Research Department at the University of Colorado Health Science Center.

Lisa Richey - B.S. 2004 - is employed by Monsanto as a research assistant. She works with corn in the areas of development and breeding.

Megan M. O'Shaughnessey - B.S. 2005 - moved to Middleton, Wisconsin after accepting a position with Monsanto, working in their soybean research/development center at the Agracetus campus. Megan will be starting a Master's program at the University of Wisconsin in fall of 2007 while working for Monsanto.

We want to hear from our alumni. Please take a moment to tell us what is going on in your life....

Comments, suggestions and updates can be sent to **bbarlow@purdue.edu**. Include your name, address, email address, degree, major and year of graduation. You can also update by using our website (**www.biochem.purdue.edu**)

Publications

2005

Mukhopadhyay, A., L. Ni, C.-S. Yang and **H. Weiner**. Bacterial signal peptide recognizes HeLa cell mitochondrial import receptors and functions as a mitochondrial leader sequence. *Cell. Mol. Life Sci.* 62: 1890-1899.

Larson, H.N., **H. Weiner** and T.D. Hurley. Disruption of the coenzyme binding site and dimer interface revealed in the crystal structure of mitochondrial aldehyde dehydrogenase "Asian" variant. *J. Biol. Chem.* 280: 30550-30556.

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Wang, W., M. Tanurdzic, M. Luo, N. Sisneros, H.R. Kim, J.-K. Weng, D. Kudrna, C. Mueller, K. Arumuganathan, J. Carlson, **C. Chapple**, C. de Pamphilis, D. Mandoli, J. Tomkins, R.A. Wing and J.A. Banks. Construction of a bacterial artificial chromosome library from the spikemoss *Selaginella moellendorffii*: A resource for vascular plant comparative genomics. *BMC Plant Biology* 5: 10.

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Matsuda, A. and **J.D. Forney**. Analysis of *Paramecium tetraurelia* A-51 surface antigen gene mutants reveals positive-feedback mechanisms for maintenance of expression and temperature-induced activation. *Eukaryotic Cell* 4: 1613-1619.

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Weiner, H. Enzymes: Classification, Kinetics, and Control. Textbook of Biochemistry with Clinical Correlations, 6th edition, T. M. Devlin ed., John Wiley and Sons Ltd. 10: 365-412.

2006

Kirchmaier, A.L. and J. Rine. Cell cycle requirements in assembling silent chromatin in *Saccharomyces cerevisiae*. *Mol. Cell. Biol.* 26: 852-862.

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Grants

Scott Briggs, National Institutes of Health, $1,325,951, 1/01/06 through 12/31/10, “The Role of Set1-Mediated Methylation in Chromatin Function.”

Scott Briggs, National Institutes of Health (Co-PI), $45,140, 7/01/05-12/31/06, “Training in Drug and Carcinogen-DNA Interactions.”

Scott Briggs, Sidney Kimmel Foundation for Cancer Research, $200,000, 7/01/04 through 6/30/06, “Functional Characterization of the Multiple Myeloma Set Domain Protein (MMSET).”

Scott Briggs, PU/IU Collaborative Biomedical Research (Co-PI), $25,000, 1/01/05 through 12/31/05, “Functional Analysis of a Novel Set Domain Protein in Histone Methylation, Gene Expression, and Oncogenesis.”

Steve Broyles, National Institutes of Health - Discovery Park, $116,341, 9/30/02 through 8/31/07, “Micromechanical Sensors for Virus Detection.”

Clint Chapple, National Science Foundation, $50,000, 4/01/05 through 3/31/08, “Functional Analysis of Phenylpropanoid Cytochrome P450-Dependent Monooxygenases.”

Clint Chapple, National Science Foundation, $1,054,380, 9/01/04 through 8/31/07, “Acquisition of Metabolic Profiling Instrumentation at Purdue University.”

Clint Chapple, Department of Energy, $360,000, 4/01/03 through 3/31/06, “Secondary Metabolism in Arabidopsis.”

Harry Charbonneau, National Institutes of Health, $1,219,741, 9/30/99 through 9/30/05, “Function and Regulation of the CDC14 Protein Phosphatase.”

James Clemens, Purdue Alumni Association, $1,000, 1/05/06 through 6/30/06, “Identification of the Molecular Mechanisms Underlying *Drosophila* Neural Connection Specificity.”

James Forney, National Institutes of Health, $1,408,925, 9/01/00 through 5/31/06, “Regulation of Flagellum and PFR Elaboration in *Leishmania*.”

Frederick Gimble, National Science Foundation, $203,700, 8/01/05 through 7/31/07, “Engineering Site-Specific DNA Endonucleases With Novel Properties.”

Frederick Gimble, National Institutes of Health, $675,019, 9/01/05 through 8/31/08, “Engineering DNA Endonuclease Reagents for Gene Targeting.”

Barbara Golden, National Aeronautics and Space Administration, $424,250, 9/01/01 through 11/30/05, “Engineering a Ribozyme for Diffraction Properties.”

Mark Hall, American Heart Association, $214,500, 7/01/05 through 6/30/08, “Role of 14-3-3 Proteins in Regulation of the Anaphase-Promoting Complex.”

Mark Hall, American Cancer Society-Cancer Center, $20,000, 12/01/04 through 11/30/05, “American Cancer Society Institutional Research Grant.”

Mark Hermodson, U.S. Department of Agriculture, $508,245, 2/01/01 through 12/31/05, “Biochemistry of Soybean Protein and Oil II.”

Mark Hermodson, IU School of Medicine (Co-PI), $108,018, 7/01/05 through 6/30/06, “Indiana University of Medicine in Lafayette.”

Mark Hermodson, The Protein Society, $596,379, 1/01/98 through 12/31/07, “Protein Science.”

Mark Hermodson, U.S. Department of Agriculture, $28,750, 10/01/04 through 9/30/05, “Task Order for FY 04-05.”

Joe Ogas, BASF Plant Science LLC, $5,939, 6/20/05 through 9/14/05, “Seed Development Studies in Soybean Grown in the Field to Identify Genes Capable of Increasing Seed Oil Production.”

Joe Ogas, National Institutes of Health, $1,261,428, 4/01/00 through 3/31/06, “Analysis of Role of CHD Proteins in *Arabidopsis thaliana*.”

Joe Ogas, Lemelson Foundation/NCIIA, $17,700, 8/01/04 through 1/31/06, “Pickle Technology.”

Sandra Rossie, National Institutes of Health, $1,563,277, 6/01/02 through 5/31/07, “Role and Regulation of Protein Phosphatase 5 in Brain.”

W. Andy Tao, Purdue Alumni Association, $1,000, 1/05/06 through 6/30/06, “Identification of Drug Targets Based on Dendrimer Nanoprobes and Mass Spectrometry.”

W. Andy Tao, Lilly Endowment Discovery Park, $30,000, 12/01/04 through 12/31/07, “Building on the Success of Discovery Park, Securing Preeminence for Purdue University/OSC Seed Grant.”

W. Andy Tao, Lilly Endowment Discovery Park (Co-PI), $10,000, 1/01/06 through 3/31/07, “Building on the success of Discovery Park Securing Preeminence for Purdue University/Nanoporous Silicon Based Sensors and Sensor Arrays for Detection of Volatile Organic Compounds in Air.”

Henry Weiner, National Institutes of Health, $1,413,743, 6/15/04 through 5/31/08, “Enzymology/Molecular Biology of Aldehyde Dehydrogenase.”

Donors

Thank you to everyone who made gifts to the Department of Biochemistry. We appreciate your loyal support. These gifts allow us to continue bringing in internationally recognized scholars to campus for seminars and informal interaction with faculty and students. The gifts continue to be the sole source of funds for activities critical to the development of the intellectual community within the department. Every effort has been made to ensure that the information listed here is accurate. Please let us know of any changes or additions. We would appreciate hearing from you if there are any omissions or changes to be made.

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