Dear alumni, students, staff and faculty,

We have had another wonderful year in the Department of Biochemistry and the achievements of our students, staff and faculty, and some reminiscences from our alumni are documented on the following pages. Instead of providing a brief synopsis of these in my annual welcome statement, I instead would like to bring to your attention a unique program Purdue University announced this past spring that offers a rare opportunity to leverage philanthropic support of undergraduate scholarships, directly impacting current and future Purdue students. Those of you for whom we have email addresses (if we don’t have yours, please send it to us!) will have heard about this already, but for the many alumni for whom we only have postal addresses, this is my opportunity to tell you about this chance to give back to the Department of Biochemistry and our students.

The Indiana Challenge Match is a dollar-for-dollar matching program to establish endowed undergraduate scholarship funds. The interest generated from each endowment’s principal will be used to award scholarships to Indiana students in perpetuity; the scholarship can be created as a lump-sum, or paid out over 5 years (e.g., $2,500/year for 5 years, for a total gift of $12,500). An additional 10% bonus applies to gift commitments of $25,000.

A commitment of $12,500 to the Indiana Challenge Match will create an endowment of $25,000. The gift can be made as a lump-sum, or paid out over 5 years (e.g., $2,500/year for 5 years, for a total gift of $12,500). An additional 10% bonus applies to gift commitments of $25,000 or higher.

If you would be interested in taking advantage of this opportunity, I would be glad to talk through the guidelines in greater detail, and put you in contact with the College of Agriculture Development Office.

Please feel free to contact me (chapple@purdue.edu; 765-494-1607) if you have any questions.

Dr. Clint Chapple
Department Head

The fountain is 38 feet tall and has four vertical concrete parabolas pointing skyward. In the center, a water jet sprays upward through a steel cylinder standing 10’ 6” tall and 32” in diameter. The water from the fountain drains into a reservoir below the fountain.

Distinguished Professor of Chemistry, Graham Cooks, who served as the chair of the Art in the Classroom project, often refers to the fountain as “The World’s Largest Mass Spectrometer”. Cooks says, “There are resemblances, especially the four vertical elements – quadrupole rods - and the lights (for photoionization) and most spectacularly, the later stainless steel cylinder with water spraying upwards which is a pretty good replica of the electrospray ionization method. But all this is imaginary of course.”

Features

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In 1954 Axelrod joined the Department of Agricultural Chemistry at Purdue University. Here, his laboratory pursued a research program that focused on enzymatic phosphate transfer reactions, carbohydrate metabolism, and the properties of lipoxygenase isoenzymes in soybeans. During his tenure at Purdue, Axelrod was the major professor of over 30 graduate students. He also played a major role in planning and implementing a reorganization of the department he had joined. These efforts culminated in the establishment of a re-named Department of Biochemistry in the School of Agriculture. In 1964 he became the new department’s first Head. During the eleven years of his headship he was able to triple the size of the faculty, oversee a significant increase in research support from such agencies as the NSF and NIH, more than triple student enrollment in the department’s undergraduate program, and give the department national and international recognition. In 1972 he was appointed Adjunct Professor at the Indiana School of Medicine, Lafayette Center of Medical Education, where he developed and taught a highly acclaimed course in biochemistry for medical students. These efforts resulted in his receiving the Outstanding Teacher Award from the Indiana School of Medicine in 1982.

Axelrod retired in 1985, but continued to work in his laboratory and to publish papers for many more years. In 1984 and later, colleagues at Purdue and elsewhere, friends, and relatives contributed funds to establish an annual Bernard Axelrod Lectureship in Biochemistry that has since brought distinguished scientists from all over the world to the Purdue campus. Axelrod was a member of several professional societies and a Fellow of the American Association for the Advancement of Science. In 1960 and again in 1970 he was awarded a Senior Postdoctoral Fellowship by the National Science Foundation. In 1989 he was awarded an Honorary Doctorate by Purdue University.

Axelrod will be remembered for his love of science, his benevolent concern for his students, his colleagues and the institutions he was part of, and, maybe most of all, his indefatigable sense of humor. Knowing how dear he was to so many faculty and alumni, we decided that there was no better way to salute Barney Axelrod than to let the people he had an impact on tell their stories...

"On hearing of Barney’s passing I opened my desk drawer and pulled out one of my proudest possessions: a faded yellow button with ‘FOBA’ written in black block letters. I received it as part of a celebration of Barney’s ‘official’ retirement back when I was a graduate student at Purdue. The button commemorates Barney’s practice of sponsoring a ‘hospitality suite’ at the Federation meetings in the days when they convened in Atlantic City. I’m told that the password for gaining access to the liquid refreshment contained within this modern-day speakeasy was to tell the person answering the door that you were a ‘Friend of Barney Axelrod.’ Today, as a Department Head, I do my best to emulate Barney’s uncanny talent for recognizing and recruiting persons of intelligence, integrity, and humanity.”

–Pete Kennelly

"Barney loved the arts. He was a regular at Bach Chorale concerts and theater. He especially liked to listen to belle canto soprano voices. He and Sara took regular trips to Stratford, Ontario, to attend the annual Shakespeare festival there.”

–Mark Hermodson

"Barney hired a dozen or so people to become faculty at Purdue. I was the runt of that litter. Barney’s new department turned into one of the best in the U.S. Providing the core of the campus biochemists, strengthened by some prominent colleagues from the Departments of Biological Sciences and Chemistry who were close friends of Barney, the Purdue Biochemistry Graduate Program became the envy of many and under the leadership of Prof. Umbarger, a soulmate of Barney, ranked among the top 15 programs in the nation for many years. A sizable number of graduates went on to prominent positions in academia and industry, among them CUSBEA students from the laboratories of Michael Rossman, Ron Sommer, and others; JoAnn Suzich and Craig Garner to name just a few."

To give a bit of the flavor of my interactions with Barney, I will describe my first and my last visit with him. When I came for my job interview for Purdue, after the seminar, Barney took me to his home, where Sara had prepared a dinner that the three of us enjoyed on a small round table in their kitchen. Before the dessert, Barney asked “Do you want the job?”

He had shown me a clean room in the basement of the Biochemistry Building that was prominent for the center piece of a huge air conditioner that served the entire building and an equally clean small place for an attached office. Clean in this sense means, there was nothing in the rooms, maybe a few benches and a chair or two. He had however given me free access to the storeroom. I could order anything I needed to start my laboratory, nothing like a “start-up package.” When I asked for a helper, Barney agreed to pay for one technician as long as I did not have grant money. Ron Sommer gave me access to his pipettes and petri dishes, and most important, help with writing my first NIH grant. And this is how I started my career at Purdue, the only real job I ever had in my life.
The last time I saw Barney, I wheeled him around an old folks home across town. I tried to remind him of stories from the old days. He remembered many colleagues but not all. He knew me and emphasized that we were chemists; he had a disdain for all physicians, particularly for those who spoke of rehabilitation. When I left him, I was in a state of depression and cried the whole time on my flight back to Europe.

Between these two days lie many that formed me. Barney was a colleague who became a very good friend for me and my family. One of the best educated persons I ever knew with a fine feeling for sharp humorous remarks, never cutting anybody down, generating respect among his peers by example. He knew many of the early researchers who formed the new discipline of biochemistry. In his living room I got to know founders like Krebs from Krebs-Cycle fame. Barney’s grandfather was a carpenter for the count Leo Tolstoi; the best meaning of the word noble in nobility had obviously left traces in his grandson. In conversations between my wife Elke and me, Barney comes up frequently, we still miss him.”

~Klaus Herrmann

"I was the last faculty member Barney hired; he had built a very strong department with great young people. I benefited from this when I came to Purdue in 1973 as a new assistant professor. It was a much simpler time then, and the only thing I can remember was how great a place this was to teach and do research. Barney and I played squash together. He really loved to play the game and we would talk about everything under the sun, basically I had a wonderful relationship with my chair; today they would call this mentoring. Our work went well and a few years later after Barney retired he came to me and said we have got to clone and do the structures of these lipoxygenases. We got started on this and Barney and Sara were just wonderful to Claudia and me. The years from 1973-1991 were very special times when Barney, Howard Zalkin and K-H Kame were very special times when Barney, Howard Zalkin and K-H Kame had key roles in my development as a scientist. What a great 20 years it was at Purdue.”

~Jack Dixon

“In January 1965, I applied to Purdue for graduate school in biochemistry and scheduled a campus visit. I quickly heard back and had an April date set for a Saturday morning appointment with Barney, the ‘new’ department head. With Uncle Joe driving, my mom and dad and I set out from Silver Creek, New York (30 miles south of Buffalo) to travel as far west as anyone in my family had ever been.

There we were at 10 am outside the Biochemistry Building waiting for Barney and promptly at 10:30 he showed up wearing broken glasses taped together after a mishap on the squash courts. He apologized for being late, but said he was in a very competitive match with some guy named Quackenbush (editor’s note: Dr. Axelrod was referring to former department head Forrest Quackenbush). The building tour was great and my mother was given a personal tour of labs, the adjacent Biology Building and other parts of campus while the other three of us trailed along. Dinner was hosted by Barney and Sara at their home where the hospitality was unmatched and Sara and my mom traded recipes. At the end of dinner Barney turned to me and said, “Well Joe, your mom is convinced that this is the school for you” and my mom quickly followed by saying, “Be a good boy and this Barney will take care of you.” No truer words were ever spoken. Later that evening my dad said “These are very nice people, study hard and don’t disappoint them”.

Four years later, on June 8, 1969, my mom, dad and Uncle Joe attended commencement in Elliott Hall and we were hosted afterwards for dinner with Barney and Sara. When we were leaving dinner my mom turned to Barney and said, “Thanks for educating my son and I’m glad to see that you got your glasses fixed.” Thank you Barney and thank you Sara for making all our lives better.”

~Joe Villafranca

“In a very real sense, Barney Axelrod’s enduring legacy was the complete makeover of the department. In his first two years as Head, Barney brought six new faculty members into the department; Vic Rodwell as Associate Professor; Karl Brandt, Larry Butler, Gunter Kohlhaw, Hank Weiner, and Howard Zalkin as Assistant Professors. Enzymology and basic biochemical research became the department’s focus. Though the department’s name had been officially changed in 1953, Barney’s appointment initiated the evolution of the department from its heritage as an Agricultural Chemistry department (as carved on the lintel above the south entrance of the building) to a Biochemistry Department (as carved on the lintel above the east entrance).

Barney wanted every one of his new hires to succeed, and he wanted us to grow together. On a monthly basis (as I recall), he hosted informal evening get-togethers in the basement of his and Sara’s home on Hollowood Drive. Sara provided goodies to eat, and one of us would give an informal presentation about his research (past and/or future), with everyone else chiming in with questions or observations or suggestions. It was a very relaxed, congenial environment, and a great way to build camaraderie among these new kids on the block, and to integrate them with the senior members of the department. Barney hovered over us like a proud parent. Barney had an enduring love of knowledge (and his knowledge seemed encyclopedic). One of his favorite sayings (he certainly said it often enough) was, “That’s something every good biochemist should know.” All too often, it was something I did not know, so I’d have to go off and teach myself something new. How he goaded us to grow!

Barney also loved wordplays and puns. I know that more than once I found myself in a spiraling sequence of pun upon pun as he and I tried to top one another. It was part of Barney’s joy of life. I also discovered early on how my voice carries when, while sitting in a faculty meeting I’d whisper a pun to the person next to me, as an aside, on something that had been said, only to hear Barney from the other end of the table top my pun with one of his own.

He kept us loose.”

~Karl Brandt
Can you provide a brief explanation of the research that won you the McCoy award?

My lab focuses on understanding plant metabolic pathways: the network of reactions that plants use to convert the carbon dioxide they fix from the atmosphere into chemicals and polymers essential for their survival. When I started my lab, I wanted to do basic research, but I knew that it would be an added bonus if my work could someday have an application. So, I decided to work on the biochemical pathway that plants use to make substances that protect them from UV light, and reinforce their stems so that they can stand upright and resist decay. That same pathway has important consequences for everything from the pulp and paper industry, to livestock nutrition and in more recent times, to biofuel production.

That stem reinforcing compound is called lignin. One of the biggest differences between a piece of celery and a piece of wood is the presence of lignin in the wood. We all know that if we were to put a piece of celery and a stick in a compost heap, the celery will quickly decompose, but the stick will last for years. It is that same resistance to degradation that makes the presence of lignin problematic to the use of biomass for human purposes including biofuel production. What we have been able to do over the past twenty years is to isolate and characterize the genes and enzymes involved in lignin biosynthesis so that we can now control lignin content and composition in plants. The data we have obtained to date indicate that some of our strategies make it easier to degrade the other major cell wall constituents, so-called polysaccharides, into their component sugars so that they can then be converted to biofuel.

How does your research affect the population as a whole?

So far? Not at all. Most basic research takes decades to have an impact on society if it does so at all. In many cases, we cannot predict how research will eventually be applied, and the advances that change our lives often come about from the combined research of dozens of scientists, sometimes working in unrelated areas. What I can say is that our lignin modification strategies have been applied in the field and appear to effectively translate from the lab to the field. That’s very rewarding.

What was your reaction when finding out you won the award?

I was delighted and honored of course. There are many truly outstanding faculty at Purdue University, and to have been recognized by my peers as having done something of impact was humbling, not to mention the fact that one of my colleagues went to the trouble of putting together the nomination on my behalf. On top of that, Dr. Richard Buckius, Purdue’s vice president for research took the time out of his busy schedule to find me at a meeting to tell me that I had been selected. I think all of this paints a picture of the sort of colleagues I have at Purdue and the supportive culture we all work to maintain.

How has Purdue’s Department of Biochemistry shaped your scientific research?

I came to Purdue in 1993 and have always found our department to be a strong and collegial department. As a biochemistry department in an agricultural college, I’ve always found it to be an ideal setting for me to do research in plant biochemistry. Perhaps most importantly, the department has provided me with access to the excellent graduate students who have been the mainstay of my research program.

Who have been your biggest influences?

Professionally I would have to say my Ph.D. and post-doctoral mentors, Brian Ellis and Chris Somerville. I received outstanding training in their labs and learned how to “do” science. Here at Purdue, I learned how to be successful as a faculty member from Klaus Herrmann and Randy Woodson. Personally, my parents always said I could do anything I put my mind to (isn’t that what parents are supposed to say?), and my wife Janice and son Evan do their best to keep some balance in my life.

What are your plans for future research?

We’ve made some recent discoveries that are taking our research in the direction of the regulation of the metabolic pathways we’ve been studying for the past two decades. Fortunately for me, many of the junior faculty in the department are experts in this field, so once again, I find the Department of Biochemistry an ideal place for me to be!
Completing the Cycle: New Insight into Cell Division

It has been several decades now since the pioneering work of researchers like Tim Hunt, Paul Nurse, Lee Hartwell, and many others revealed the first molecular insights into how the division of a single parent cell into two identical daughter cells is regulated, a process that is fundamental to our fight against cancer and other human diseases. Using convenient genetic systems like budding yeast and developmental systems like sea urchin and frog eggs these investigators provided the first evidence that an enzyme that we now know as “Cyclin-dependent kinase” (Cdk) controlled the complex sequence of events required for a cell to make exact copies of its genome and distribute them faithfully to two daughter cells. Amazingly, they found that the activity of Cdk oscillated in a precise pattern during cell division cycles and that this rise and fall of its activity was critical for cell division to succeed. Drs. Hunt, Nurse, and Hartwell were jointly awarded the Nobel Prize in Physiology or Medicine in 2001 for this pioneering work that laid the foundation for our current understanding of how the cell division process is orchestrated. Their initial success stimulated intense interest in understanding the molecular mechanisms of this regulation in impressive detail.

Kinases act by attaching phosphate to specific sites on other proteins. The attachment of phosphate can activate, inactivate, or change physical properties of proteins, thereby controlling their functions. Another class of enzyme, called phosphatases, opposed the action of kinases by removing phosphate groups from proteins. It has become clear only recently that the completion of the cell division cycle and the start of a new one require both the termination of Cdk activity and the removal of the phosphate groups it attached to other proteins by phosphatases. Thus, cyclic activities of specific protein phosphatases are just as important for the proper completion of cell division as those of kinases. But research on phosphatase contributions to cell division has lagged far behind the extensive work on kinases. A collaborative research project led by Dr. Mark Hall and Dr. Harry Charbonneau of the Department of Biochemistry is now addressing this issue and has recently provided new insight into how cells use the Cdc14 family of phosphatases to control the challenging final steps in the cell division cycle, including the segregation of genome copies to the daughter cells and the physical separation of daughter cells from each other, a process called cytokinesis.

Cdc14 enzymes are known to be important for proper completion of cell division and were thought to possess the general ability to reverse Cdk-catalyzed phosphorylation events. “It has been suspected for some time that Cdk sites must be removed in a specific order to complete cell division normally,” says Hall. “The problem is, no one has been able to explain what determines that order.” The Hall and Charbonneau labs have now provided a plausible answer in their discovery that Cdc14 enzymes from species as distantly related as yeasts and humans all exhibit a striking preference for a subset of Cdk sites in which the phosphorylated amino acid is a serine. “Most kinases and phosphatases do not distinguish between two amino acids to which phosphates are commonly attached: serine and threonine,” explains Charbonneau. “For example, Cdk5 phosphorylates both with roughly equal efficiency. The Cdc14 family appears to be an unusual exception.” The results indicate that cells may evolve serine or threonine Cdk sites to make them either amenable or resistant to dephosphorylation by Cdc14. This, and additional features of Cdc14 specificity identified in this work, suggest that Cdk-catalyzed phosphorylation events may be regulated in an ordered way by Cdc14’s inherent specificity to ensure that the final steps in cell division are executed correctly.

The discovery of the dramatic and unusual Cdc14 specificity is yet another example of serendipity in science. The Hall lab was trying to establish a new assay for studying protein degradation. “Current graduate student Christine Bremmer and Dr. Steven Bremmer were collaborating on a project to predict novel Cdc14 substrates and the predictions examined so far have all been experimentally validated. These predictions have opened up new research directions aimed at understanding cytokinesis and the repair of DNA damage. “We think this is the tip of the iceberg with regard to Cdc14 function,” claims Hall. “The strict specificity should help us identify the important substrates in humans, something that has been a real obstacle in this field. We expect many exciting discoveries to come out of this in the future.”

Dr. Hana Hall and graduate student Michael Maleske
Photo by John Underwood/CEC

“It was the final piece of the puzzle after a lot of time and hard work.” Dr. Hana Hall

My interest in many areas of science is the result of several dedicated mentors that supported my curiosity throughout high school and college. While at Purdue I was honored with excellent teachers and my experiences were an outstanding stepping-stone to my interest in studying protein function. My work in the Charbonneau lab gave me a superb foundation in biochemistry and also gave me the opportunity to explore other areas of science through valuable collaborations with labs like the Hall lab. These collaborations introduced me to many techniques including protein mass spectrometry.
Taking a semester abroad was one of the best decisions I have made in college. Based at University College Dublin, I was able to see a bit of the world, experience different cultures, and learn about myself along the way. There is no sensation like the one when you begin a new trip. "Man, I can't believe I am in (insert awesome place). This is so beautiful. Who would have thought I would end up here?"

Inevitably, this is followed by, "Dear God, what am I doing...I don't know the language, I don't know where I am going, I'm by myself, I only have this backpack, and my flight home is on the other side of the country in four days..."

By far the most outstanding aspect of the trip was how the people of Mali, even amidst extreme poverty, were so welcoming, warm, and kind.

I travelled to Mali in West Africa for two weeks. It was one of the most influential and exciting experiences of my life! While in Mali, I spent time in the capital city, Bamako, and in a rural town called Bandiagara, where together with a group of University of Maryland medical students, I collected and analyzed mosquitos to examine the genetic diversity of the malaria parasite. The research was an opportunity to interact directly with the people of Mali, become exposed to a completely different culture and gain inspiration for continuing on my path to fighting tropical diseases. By far the most outstanding aspect of the trip was how the people of Mali, even amidst extreme poverty, were so welcoming, warm, and kind.

China was amazing! It was one of the best decisions I have ever made. I'm so thankful for the opportunity I had to travel and study in such a unique and interesting place! My professors and peers were fantastic and I made friends and peers were fantastic. Being immersed in a completely different culture, I learned to appreciate the differences of other cultures and to respect everyone's own way of life. I am grateful for the opportunity to learn and experience the world that I could have never fully grasped just sitting in a classroom.

I spent spring break traveling in Ireland with other College of Agriculture students. We visited farms and factories at well more typical tourist destinations. Although I have Irish heritage, I never realized how connected the Irish people felt to Americans. They were some of the friendliest people I have ever met. One of the best experiences of the trip was to participate in St. Patrick Day celebrations in Dublin. It was hectic but really showed how fun-loving the Irish people are.

I travelled to Ecuador with other Purdue Caedereas (pre-med) Club members to aid Ecuadorians with medical needs during spring break 2012. I learned to administer vaccinations, take vitals, and stitch wounds in the city's hospital. I observed surgeries and patient physicals. One day, we traveled to boys' and girls' orphanages. We donated toys, clothes, and spent time playing and getting to know the children. I am so grateful to have had this experience. Knowing that students from Purdue University made an impact on many people's lives in Ecuador makes me so proud to be a Boilermaker!
More Than a Job

What does it take to graduate successful students? First and foremost, it takes excellent students and the Department of Biochemistry has those in abundance. It also takes dedicated faculty like ours. But it takes more than that. It takes someone to be the face of the department to incoming students and their parents. It takes someone to listen to the stories of success and sometimes failure. It takes someone who goes that extra mile to put that student in touch with a potential employer, or enroll them in a course that opens their eyes to new possibilities. It takes someone who cares for students from the moment they enter our doors until the day that they walk across the stage in Elliott Hall of Music to receive their diplomas. For us, and for our students, that person is Sherry Pogranichniy.

Pogranichniy has been a prized resource of ours since 2007 when she joined the department as Undergraduate Program Coordinator. She came with a wealth of experience working with students, including a Master of Science degree in Agricultural Education and eight years of work in student services at Iowa State University. It did not take her long to exceed every expectation of her position and identify many new and improved ways to serve our students. Pogranichniy explains her role in the department as follows, “I see myself as a student advocate, so it’s important that they know they can trust me. They need to feel comfortable speaking to me about problems they might be having with a class or even their roommate. I can help them navigate the many resources available at Purdue to foster their success. Knowing each student individually also helps me match their interests and goals with opportunities that I learn about such as on-campus jobs, research experiences, scholarships and internships.”

Pogranichniy meets regularly with each student throughout their careers to assist with course selections and to keep them on their academic track, but she serves them in many other ways as well. The undergraduate curriculum was substantially revised in 2010 and Pogranichniy not only contributed substantially to this revision process, but lobbied with others for a course to help our students develop professional skills alongside their academic and technical toolkit. In response to these efforts, our revised curriculum includes a new 1-credit course, BCHM 39000 (Professional Development Seminar) and because of her extensive experience in this arena, Pogranichniy was selected to teach this course, which she did for the first time in the fall 2011 semester.

“In BCHM 39000, I bring in alumni and others who are working in different careers related to biochemistry. This gives students a chance to explore the many options they have following their undergraduate studies. The other focus for the class is preparing students for what comes next. We work on their resumes, personal statements, cover letters and interviewing skills. They also research companies they might like to work for or graduate/professional schools they might want to attend. I think the most helpful assignments are writing the personal statement and participating in a mock interview because those are things most students have never done before.”

Pogranichniy’s efforts to promote success for our students outside of the realm of the textbook extend well beyond BCHM 39000. She produces a weekly “Biochemistry Bulletin” that keeps students up to date on opportunities ranging from scholarships to internships to job openings for graduating students. One of her particular passions is study abroad. Not only does she regularly identify and promote opportunities for international study and research, she also does her own fieldwork. Since joining the Department of Biochemistry, Pogranichniy has co-led a spring break course in Italy, participated in a site visit to Ukraine for a planned Maymester course, and explored opportunities for biochemistry students in Ireland and France.

“I would even go so far as to call Sherry a friend in addition to an advisor, and I am sure that I do not speak for just myself in that regard.”

“More Than a Job”

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“I would even go so far as to call Sherry a friend in addition to an advisor, and I am sure that I do not speak for just myself in that regard.”
It’s what everyone was taught in their undergraduate biochemistry courses (until recently). Ribonucleic acid, or RNA, is a simple information carrier; a molecule that can transport the sequence encoded in DNA out of the nucleus and into the cytoplasm where it can program the cell to perform its functions within an organism. In recent years, however, the scientific world has been surprised to discover many diverse roles for RNA molecules. Most interestingly, RNAs can even perform biochemical reactions, a characteristic previously thought to be limited to protein molecules. Barbara Golden, Professor of Biochemistry, is a leader in the exploration of these unexpected functions.

Like proteins, RNAs can fold into complicated three-dimensional structures that let them perform tasks in the cell. In addition to functioning as chemical catalysts, a wide variety of RNAs have been found to function as chemical sensors called riboswitches, which toggle gene expression on and off. Catalytic RNAs, or ribozymes, are being discovered in a variety of organisms, including within the human genome. It is now becoming very clear that it is essential for us to develop a detailed understanding of these systems in order to understand the true breadth of importance of RNA molecules in biology. The Golden laboratory is tackling this challenge using X-ray crystallography and biochemical characterization of functional RNAs and ribozymes to paint a picture of how these molecules work.

“It is somewhat surprising that RNA can perform biochemical reactions because RNA, like its closely-related DNA counterpart, is chemically inert,” says Golden “This is an important property because if DNA could undergo chemical reactions, catastrophic mutations would result. In spite of this limitation, RNA has found a few key chemical strategies to achieve catalytic activity.”

To understand how a molecule such as RNA can become chemically reactive, the Golden lab uses X-ray crystallography to provide a detailed look at the three-dimensional structure of complex RNAs. Golden and her students first coax the molecules into forming tiny crystals which they then take to the Department of Energy’s Argonne National Laboratory. There, the intense X-rays from a synchrotron accelerator are fired through the crystals to create a constellation of spots called a diffraction pattern. “With these data in hand, we can calculate a map of the molecule and trace the path of the RNA as it twists and turns through space.”

A major focus of the Golden laboratory is a ribozyme from the human hepatitis delta virus. This ribozyme is capable of cleaving RNA molecules within cells and is a key part of the viral replication process. Through these studies, they have learned that the structure of the ribozyme transforms the chemical properties of one of its building blocks, a cytosine base, in the heart of the ribozyme. The novel chemical properties of this base promote the chemical reaction that results in RNA strand cleavage. Golden’s group has also found that the ribozyme harnesses a key metal ion from its cellular environment to initiate the RNA cleavage reaction.

In the future, it is likely that new, previously unidentified ribozymes will be found to use such catalytic strategies. These studies therefore lay the groundwork for understanding novel ribozymes unveiled as we dig deeper and deeper into data from genome sequencing projects.

“Our work will not cure cancer directly. We don’t know whether our work will contribute to the prevention of viral infections or the treatment of diseases. We are trying to understand how the molecules in our cells are able to do their job and to identify potential tools for molecular biology,” said Golden, “This very basic science lays the foundation upon which translational research is built.”
Biochemistry

Aliquots

Dr. Dan Tawfik from the Weizmann Institute of Science in Jerusalem, Israel presented the 2012 Bernard Axelrod Lectures.

Three biochemistry faculty members were promoted this year. Dr. Xiaojie Liu and Dr. Mark Hall were promoted to Associate Professor of Biochemistry and Dr. Barbara Golden was promoted to Professor of Biochemistry.

Dr. Anh Kirchmaier was named a 2012 University Faculty Scholar. She joins her colleagues Dr. Andy Tao and Dr. Scott Briggs who are also Faculty Scholars. The program recognizes outstanding faculty members across the University who are on an accelerated path of academic distinction.

For the past five years Professor Emeritus Klaus Herrmann has been working on hydrothermal carbonization (HTC), a procedure that mimics natural coal formation and in March 2012 he published his first paper on the subject. He was invited to present his results in the U.S. to various organizations including the Metropolitan Washington Council of Governments in Washington DC, as part of the Transatlantic Climate Bridge program.

Professor Barbara Golden was selected to serve as a member of the Macromolecular Structure and Function B Study Section, Center for Scientific Review with the National Institutes of Health of the Macromolecular Structure and Function B Study Section, Center for Scientific Review with the National Institutes of Health.

Shawn Liu (Liu lab) was awarded the 2012 Arnold K. Balls Award. This award is given annually to one of our graduate students who has demonstrated outstanding research potential, scholarliness and intellectual curiosity.

Four biochemistry staff members received a College of Agriculture Administrative/Professional Advancement for excellent performance. Sara Cloutier (Tran lab) moved from rank 3 to 4 while Jo Cusumano (Chapple lab), Jim Henderson (Undergraduate Teaching Labs Coordinator), and Sherry Honn (Account Assistant) all moved from rank 4 to 5.

Three biochemistry employees were recognized for their long-time service at Purdue. Kwok Kj (K.K.) Ho (Research Assistant in the Ogas lab) for 10 years; Sara Cloutier (Research Assistant in the Tran lab) for 10 years; and Kristi Trimble (Administrative Assistant in the Main Office) for 30 years.

For the third time in four years students from the Department of Biochemistry won three of the four Outstanding Student Awards for the College of Agriculture. Outstanding Senior Betheny Moore graduated in May with her B.S. and was admitted to Purdue’s Doctor of Veterinary Medicine program for the fall 2012. Gabe Rangel, who was the Outstanding Sophomore last year, is attending Indiana University School of Medicine. Brittany Kraft (B.S. 2010) is a DVM student in Purdue’s College of Veterinary Medicine, Megan West (B.S. 2008) is a Ph.D. student in Food Science at Purdue, and Nicole Sigurdson (B.S. 2009) is attending Michigan State University College of Law.

Seven alumni returned to the department to help with BCHM 39000 (Professional Development Seminar for Biochemistry (juniors) during the fall semester. Three were invited guest speakers: Michael Pape (Ph.D. 1989, Kim) is co-founder, CEO and CSO of NimbleGen, a biotechnology company with a novel drug discovery platform. Ken Bischoff (Ph.D. 1985, Rodwell) is a microbiologist at the USDA National Center for Agricultural Utilization Research in Peoria, Illinois. Leslie Lincoln Halterman (B.S. 1997) is an associate scientist in the applied science division of Roche NimbleGen in Madison, Wisconsin. Four recent B.S. graduates participated in the class by serving on an alumni panel about graduate and professional schools. Brent Goodman (B.S. 2008) is attending Indiana University School of Medicine. Brittany Kraft (B.S. 2010) is a DVM student in Purdue’s College of Veterinary Medicine, Megan West (B.S. 2008) is a Ph.D. student in Food Science at Purdue, and Nicole Sigurdson (B.S. 2009) is attending Michigan State University College of Law.

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Professor Barbara Golden was selected to serve as a member of the Macromolecular Structure and Function B Study Section, Center for Scientific Review with the National Institutes of Health for a 6-year term.

Graduate students Christie Eissler (Hall lab) and Kayla Harmeyer (Briggs lab) received Beach Travel Awards. Both attended 2012 FASEB summer research conferences in Snowmass Village, Colorado.

Graduate student Liang Xue (Tao lab) was the recipient of the 2012 Henry A. Moses Award for his first author publication, “Sensitiv kinase assay linked with phosphoproteomics for identifying direct kinase substrates” published in the Proceedings of the National Academy of Sciences USA.

Graduate student Faeze Saatchi (Tao lab) received the 2012 Hickory Stick Award for Outstanding Graduate Teaching Assistant for her work in BCHM 32200 (Analytical Biochemistry).

Dr. Hugo Bellen from Baylor College of Medicine presented the 2011 Beach Lectures.

Photo by John Underwood/CEC
University and College Scholarships

Lewis Runkle Scholarship
Alexis Zobel

Marquardt Farm Scholarship
Jessica Gabbard and Kayleigh Nyffeler

Scholarship Award of Excellence
Stephen Dilk, Emily Erickson, Adam Fessenden and Brittany Omlison

J. Kelly O’Neall & Margaret Ritchey O’Neall Memorial Scholarship
Connor Lewis, Daniel Martin, Moriah Massafaro, Elaine McCarthy, Leesa Rorstrom and Amanda Smith

Ernest & Eva Voliva Memorial Scholarship
Cadin Hector and Katherine Turpen

Food, Environmental and Life Sciences Scholarship
Patrick Mangan and Misha Remy

Rex Hall Memorial Scholarship
Kathryn Alleve, Elizabeth Baker, William Beyer, Lotti Brose, Betheny Moore, Kayleigh Nyffeler, Dahlia Shvets, Katherine Turpen, Kimberly Tyler, Michael Wenndt and Kirsten Young

Henry William & Matilda Marie Sailer Schroeder Memorial Scholarship
Monica Bomber, Patrick Mangan and Misha Remy

Departmental Scholarships

Edwin T. Mertz Memorial Scholarship
Kathryn Alleve, Emily Erickson, Moriah Massafaro, Erin Nicklow, Kimberly Tyler and Michael Wenndt

Patrick C. Matchette Scholarship
Elizabeth Bell

Ray W. Fuller Memorial Scholarship
Lotti Brose and Kayleigh Nyffeler

Scholarships Awarded in the Department of Biochemistry

Stacy Dahmen
Next Stop: Chemist, Australian Gold, Indianapolis, IN

Laura Henry
Next Stop: Ph.D. student, Horticulture, Purdue University

Dan Martin
Next Stop: M.S. student, Entomology, Purdue University

Elaine McCarthy
Next Stop: DVM student, Purdue University

Betheny Moore
Next Stop: DVM student, Purdue University

Zulaika Miswan
Next Stop: Returning to Malaysia to search for full time employment

B.S. Graduates

Stacy Dahmen
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Betheny Moore
Next Stop: DVM student, Purdue University

Zulaika Miswan
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John Nast
Next Stop: Technician III, Eli Lilly & Company, Indianapolis, IN

Chelsea Noffsinger
Next Stop: Technician, Animal Disease Diagnostic Lab, Purdue University

Allison Shockley
Next Stop: J.D. student, Maurer School of Law, Indiana University

Dahlia Shvets
Next Stop: Applying to nursing school

Kirsten Young
Next Stop: DVM student, Purdue University

Ph.D Graduates

Jessica Schoenherr
Next Stop: Visiting faculty, Grand Valley State University

Jingyao "Isabella" Zhang
Next Stop: Bioanalytical staff scientist, Convance, Madison, WI

Image: Photo by John Underwood/CEC

Graduates
Gene Butcher (B.S. 1957 and M.S. 1961) received his M.D. from Duke University in 1965. After finishing an Internal Medicine residency at Duke Hospital, he practiced at Western Reserve Care System (WRCS) in Youngstown, Ohio from 1965-1985. Gene left private practice to be the Senior Vice President for Medical & Academic Affairs for the WRCS until he retired in 2001. He was also an Associate Professor of Internal Medicine at Northeastern Ohio College of Medicine and served as Associate Clinical Dean for WRCS. Gene resides in Youngstown with his wife, Suzanne Butcher M.D., and he enjoys gardening, golfing and traveling to visit his three daughters and four grandchildren.

Steve Robert Simmons (B.S. 1968) concluded his 33-year career on the faculty in the Department of Agronomy and Plant Genetics at the University of Minnesota in 2009. He is now well into his new life of creative nonfiction writing, as well as coaching other writers in their various endeavors. Some of Steve’s personal essays can be found at his writings website: http://ste-vember.wordpress.com.

Ray Hammerschmidt (B.S. 1974) received his Ph.D. from the University of Kentucky. His faculty advisor was Dr. Joseph Kuc, a former faculty member of the biochemistry department at Purdue. Ray joined the faculty at Michigan State University in the Department of Plant Pathology in 1980. His research has focused on the biochemical nature of plant disease resistance and induced resistance. For the last 10 years Ray has been the director of the North Central Plant Diagnostic Network. This is a USDA funded consortium of land grant university plant diagnostic labs (including the lab at Purdue) that are engaged in helping to protect U.S. agriculture through disease and pest detection and diagnosis. He also serves as editor-in-chief of the Journal Physiological and Molecular Plant Pathology. Ray is a fellow of the American Phytopathological Society and a co-recipient of the 2010 USDA-NIFA Partnership Award for Innovative Program Models. After nearly 13 years as department chair, he is returning to full-time research and teaching. He and his wife, also a Purdue graduate, have two grown children and one grandchild.

William Lake (Ph.D. 1973, Whistler) did his postdocs at the University of Pennsylvania and Yale before accepting an assistant professor of biochemistry position (with a joint appointment in endocrinology) at Northwestern University Medical School in Chicago. In 1980 he moved from academia to industry, accepting a position with Baxter International Laboratories in Deerfield, Illinois where he worked for 15 years and held various positions. From 1987 to 1991 Bill was an adjunct professor of chemistry and biochemistry at California State University at Long Beach and was recognized as a distinguished alumnus of the School of Natural Science. During his research career Bill authored more than 30 research publications and was awarded four patents. After retiring from Baxter in 1993, he established a Mail Boxes Etc. store in Loma Linda, California until 2008 when he sold the business and retired. Bill and his wife Marien have two children and five grandchildren and live in Martinsburg, West Virginia. When they are not at home they are traveling around the country in their RV.

Mark Mamrack (B.S. 1972) received his Ph.D. in Pharmacology from Baylor College of Medicine in Houston, Texas in 1978 and did his postdoctoral work in the Biology Division of the Oak Ridge National Lab. In 1983, Mark became a faculty member in the Department of Biological Sciences at Wright State University outside Dayton Ohio. Recently, he became Associate Dean in the College of Science and Mathematics at Wright State.

Bryan Ohning (B.S. 1974) continued his education at Case Western Reserve and graduated in 1981 with a Ph.D. in biochemistry and the M.D. degree. Pediatric residency followed at Duke University Medical Center and then a clinical and research fellowship in Neonatal/Perinatal Medicine at the University of Cincinnati Children’s Hospital. Bryan stayed in the laboratory with an American Heart Association Scientist award and a faculty position at Cincinnati Children’s Hospital & Research Institute. During this time, the laboratory he was in partnered with Ross/Abbot Labs and patented an artificial surfactant product to be used in premature infants (Survanta®). In 1988, he took a faculty position at the Medical University of South Carolina in Charleston, and remained there for 12 years before moving to the Children’s Hospital of Greenville, South Carolina and the University of South Carolina where he is currently the Medical Director of the Neonatal Intensive Care Unit (NICU) and a Professor of Pediatrics. Bryan and his wife, a former pediatric cardiologist have four children, ages 15 through 20. One son has an undergraduate degree in biochemistry and is currently in medical school.

Gordon Ohning (B.S. 1977) continued his education at Case Western Reserve and graduated in 1984 with a Ph.D. in biochemistry and the M.D. degree. He is currently a gastroenterologist in Los Angeles, California.

Jeffrey Dean (Ph.D. 1986, Herrmann) was named the Associate Director of the Institute of Bioinformatics in July 2011, and in September was co-recipient of an Honor Award for Excellence from Secretary of Agriculture Thomas Vilsack for his involvement in the Conifer Translational Genomics Network (CTGN), a USDA CAP project. Most recently, he was named as an Administrative Fellow in the SEACAG Academic Leadership Development Program for next year.

In Memoriam

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Alumni Updates

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Barb Cohen (B.S. 1979) continues work with her company Arax Life Sciences, Inc. She has discovered a way to increase semen fertility with a biomarker-based approach. Gender bias in cattle—with improved fertility—is another offshot of her discovery. Barbara and her business partner, Ron Parkinson, MBA, have developed a simple test kit available through Arax.

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George Flentke and Susan Smith (both B.S. 1982) continue their work at the University of Wisconsin-Madison. A paper they published last year received the 2012 James G. Wilson Award from the Teratology Society for outstanding publication in Birth Defects Research. In October 2011, Sue provided expert testimony to the American Academy of Pediatrics panel, tasked with deciding if the science supports the routine Fetal Alcohol Spectrum Disorder (FASD) screening. The AAP panel recommended ‘yes’ and this is an important step in recognizing FASD as a significant public health problem. Sue recently completed a term as President of the FASD Study Group.

Glenn Kranower (Ph.D. 1980, Kim) celebrated his 30th year at the Medical College of Wisconsin (Milwaukee), where he performed postdoctoral work in methotrexate toxicity before settling in as a staff scientist in obesity and diabetes research and eventually moving into the realm of Translational Investigation. He directed the General Clinical Research Center (now the Clinical and Translational Science Institute) Core Laboratory since 1989 and currently assists young investigators in grant and scientific writing.

Michael Pape (Ph.D. 1989, Kim) continues his work as a venture capitalist at Orchard Ventures, formally Stynon Capital. As a cofounder of Nymyrum in Ann Arbor, Michigan, he serves as chief executive officer and chief scientific officer. Mike was named representative of the 2012 Distinguished Alumni Award for Entrepreneurship at the University of Chicago Booth School of Business which recognizes outstanding achievements of alumni living around the world.

M. Golnesh Javanbakht (B.S. 2012) received her M.D. from Indiana University School of Medicine in 2008 and completed her pediatric residency at Duke University Medical Center in 2011. She is currently working as a pediatrician in Oconomowoc, Wisconsin. Emily’s husband Jeff is currently working on his Ph.D. in theology at Marquette University. The couple welcomed their first child, a daughter Liesel, in May 2011.

Stephanie (Doun) Leimgruber (M.S. 2004, Rockwell) resigned her lab technician position at Cornell in December 2011 to take on a brief adventure in Fogelsville, Pennsylvania, where her husband John became a farm manager at the Glaser Inn. The two moved (along with dog Linus) to Charlottesville, Virginia, in May and Stephanie is working in the Department of Pharmacology at the University of Virginia studying leishmania and Alzheimer’s disease. They are enjoying the move and all of the restaurants, farms and markets that Charlottesville has to offer.

Douglas Andres (Ph.D. 1990, Dixon) joined the faculty at the University of Kentucky in 1993 and was appointed Chair of the Department of Molecular and Cellular Biochemistry in June 2012. His research group continues to investigate the role of Ras family GTPase signaling pathways in neurodegenerative and cardiovascular disease, and he was honored by a University Research Professorship for this work in 2012. He and his wife Christine (MBA, Kranewitt School of Business) have two children and reside in Lexington, Kentucky.

Wendy (Caldwell) Eisel (B.S. 1995) worked as a research technician at Purdue for two years after graduating. The first year, she worked in the Department of Food Science helping a beef processing plant develop a food safety plan, and the second year in the Botany and Plant Pathology department doing corn genetic engineering work. In 1997 her husband Kevin entered the army and they moved to Fort Hood, Texas. Wendy worked in a lab doing liver research trying to determine the cellular mechanism which allows the liver to regenerate. In 2000 the family moved to Indianapolis, Indiana, and she worked at IUPUI Medical Center in a diagnostic lab involving a genetic disorder called PIDM. Wendy relocated to Fort Campbell, Kentucky, in 2001 and worked at Vanderbilt University in an M.D.-Ph.D. research lab. Beginning in 2003, she stayed home to raise her two children, Rachel and Alister. Wendy returned to the workforce in August 2011 as a Laboratory Technologist with the Louisville Metro Health Department in the laboratory running diagnostic testing.

Anthony Schilmiller (B.S. 2000) completed his postdoctoral appointment and continues to work for Dr. Rob Last at Michigan State University as a Research Assistant Professor studying specialized metabolism in tomato trichomes.

Tara (Breen) Tracy (B.S. 2006) moved to Houston, Texas, in 2009 and has been working at the Human Genetics Center at the University of Texas. She is also working on her MBA in health administration at the University of Saint Thomas and is expected to graduate in May 2013. Tara and her husband Eric reside in Pearland, Texas, and they welcomed their first child, Brogan James, on June 26, 2012.

Cheng Wei (“Willis”) Chiang (B.S. 2010) continued to work at Covance in Madison, Wisconsin, as a Study Technician contributing to the development of drug products within Dose Formulation until recently. He is currently attending Purdue University Calumet and is applying to pharmacy programs for fall 2013.

Courtney Hinesley (B.S. 2010) entered the workforce as a chemist after graduating, but her passion was always with veterinary medicine, so she entered the program at Ross University in St. Kitts in fall 2011. She is the fundraising chair for her class and works as an anatomy I and II TA. She is involved in the surgery club, student emergency and critical care society, and SCUBA club. Courtney expects to finish her veterinary degree in December 2014. In December 2011, she got engaged to Purdue alumnus Mike Zander (M.S. 2011 Aerospace Engineering) and they plan to marry in the summer of 2014.

Anna Hurlock (B.S. 2011) finished her first year at Michigan State University and joined the lab of Dr. Christopher Benning studying lipid trafficking from the ER to the chloroplast.

Rakesh Joshi (Ph.D. 2011, Gimble) and his wife Puja moved from Biratnagar, Nepal, to London, Ontario, Canada, in April 2012. Rakesh began a postdoc appointment in the lab of Dr. Shawn Shun-Cheng Li in the Department of Biochemistry at the Schulich School of Medicine and Dentistry at the University of Western Ontario. The Li lab works on various signal transduction molecules and is cancer-biology related.

Erin Kischuk (B.S. 2010) joined the Purdue University Life Sciences graduate program in August 2011 and is now a member of Dr. Tim Ratliff’s lab working on a bladder cancer project.

Lifeng Yuan (B.S. 2011) finished his first year in the Ph.D. program at Duke University and recently joined the laboratory of Dr. Xiao-Fan Wang in the Department of Pharmacology and Cancer Biology.

Brian Zedalis (B.S. 2010) continued his education and completed an M.S. in Biotechnology/Biotechnology from Georgetown University in Washington, D.C. in the spring of 2011. He is currently working as a cell culture upstream manufacturing associate at MacroGenics Inc. (a biotech/pharmaceutical company located in Rockville, Maryland) that specializes in antibody-based therapeutics against various cancers and infectious diseases.

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Graduate student Tiffany Young

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Nicholas Bonowitz, Life Sciences Research Foundation, $12,000, 08/01/2009-07/31/2011, “BAAK-1 and autotransferrases as a means to manipulate lignin biosynthesis and optimize cellulose/bioethanol production,” postdoctoral fellowship for research in the laboratory of Clint Chapple.


Clint Chapple (Co-PI) Global Climate and Energy Project, Stanford University, $1,930,000, 03/01/2008-07/31/2012, “Assembly of a lignin modification toolbox.”


Harry Chardonneau and Mark Hall (Co-PI), Purdue University Center for Cancer Research, Innovative Center Research Pilot Projects Award, $30,000, 06/01/2010-04/30/2012, “Regulation of cell division by the Cdc14 phosphatase.”

James Forney (Co-PI), National Science Foundation, Research Experiences for Undergraduates (REU), $231,589, 01/15/2012-03/15/2015, “REU site: Molecular and biochemical analysis of proteins.”

James Forney (Co-PI), Howard Hughes Medical Institute, $1,500,000, 09/01/2010-08/31/2014, “Deviation from the standard: Integrating statistical analysis and experimental design into life science education.”

Barbara Golden, Case Western Reserve University/National Institutes of Health, $80,000, 04/01/2009-03/31/2013, “Characterizing RNA-metal binding by Raman spectroscopy.”

Barbara Golden, National Institutes of Health, $1,602,836, 01/01/2011-12/31/2015, “Coupling of structure and dynamics in RNA catalysis.”

Barbara Golden, National Institutes of Health, $126,256, 09/15/2012-09/14/2013, “Quantitative imaging for biochemistry.”

Mark Hall, National Science Foundation, $586,639, 06/01/2009-05/31/2012, “Regulation of the anaphase-promoting complex by pseudosubstrate inhibition.”

Anton Iluk, Purdue Realization and Entrepreneurship Postdoctoral Program (PREPP), $50,000, 07/01/2011-06/30/2012, “A Purdue University wide approach to catalyzing entrepreneurship,” postdoctoral fellowship for research in the laboratory of W. Andy Tao.

Ann Kirchmaier (Co-PI), Indiana School of Medicine - Indiana Clinical and Translational Sciences Institute, $10,000, 07/01/2010-06/30/2012, “Ultrasensitive detection and quantification platforms for microRNA-based screening, staging and classification of cancer.”

Ann Kirchmaier, Indiana School of Medicine - Indiana Clinical and Translational Sciences Institute Core Grants, $8,000, 01/01/2011-06/30/2012, “Bioinformatics for mapping genomic sites of 5-hydroxymethylcytosine, a novel CpG modification catalyzed by the MLL partner TET1 protein family.”

Ann Kirchmaier (Co-PI), Indiana School of Medicine - Indiana Clinical and Translational Sciences Institute, $10,000, 11/01/2009-04/30/2012, “Manipulating the fate of neural stem cells by regulating epigenetic processes.”


Ann Kirchmaier, Purdue University Center for Cancer Research, Innovative Cancer Research Pilot Projects Award, $30,000, 12/01/2010-11/30/2011, “Mapping genomic sites of 5-hydroxymethylcytosine, a novel CpG modification catalyzed by the MLL partner TET1 protein family.”

Ann Kirchmaier (Co-PI), W.M. Keck Foundation, $1,000,000, 03/01/2012-02/28/2015, “Live single cell epigenetic profiling and regulation at single molecule resolution.”


Xiaqiu Liu, National Science Foundation, $570,000, 03/01/2011-02/28/2014, “PK1 in DNA replication.”

Xiaqiu Liu, Showalter Trust, $15,000, 07/01/2011-06/30/2012, “PK1 in gemicidine resistance of pancreatic cancer.”

Xiaqiu Liu (Co-PI), National Institutes of Health, $1,332,084, 09/30/2011-04/30/2016, “Initiation and regulation of chronic autoimmune prostate inflammation.”

Joe Ogas, National Science Foundation, $300,000, 09/01/2009-08/31/2012, “Dissecting the relationship between a CHD3 chromatin remodeler and the repressive epigenetic mark H3K27me3 in Arabidopsis.”

Joe Ogas, National Science Foundation, Research Experience for Undergraduates (REU) Supplement, $12,000, 05/17/2010-08/31/2012, “Dissecting the relationship between a CHD3 chromatin remodeler and the repressive epigenetic mark H3K27me3 in Arabidopsis.”


W. Andy Tao, National Science Foundation, $541,593, 07/01/2007-08/30/2012, “CAREER: Soluble nanopolymers for targeted proteomics in vitro and in living cells.”

W. Andy Tao (Co-PI), National Institutes of Health, Department of Health and Human Sciences, $1,188,554, 09/01/2011-05/31/2015, “Identification of protein-metabolite interactome.”

W. Andy Tao (Co-PI), National Institute of Food and Agriculture, US Department of Health and Human Services, $970,300, 01/15/2010-01/14/2013, “The interaction of pathogenicity factors in the rice blast fungus Magnaporthe oryzae.”


W. Andy Tao (Co-PI), National Institutes of Health, National Institute of General Medical Sciences (NIGMS), $1,025,000, 07/01/2012-06/30/2015, “Chemical approaches for detecting S-nitrosothiols.”

W. Andy Tao, Burton D. Morgan Center & Ewing Marion Kauff- man Foundation-Entrepreneurship Leadership Academy, $5,000, 09/01/2010-08/31/2015, “A Purdue University wide approach to catalyzing entrepreneurship.”

W. Andy Tao (Co-PI), National Institutes of Health, Center for Research Resources, $537,489, 08/09/2010-05/31/2013, “Paper spray ionization mass spectrometry device for direct analysis of biofluid samples.”

W. Andy Tao, National Institute of General Medical Sciences, US Department of Health and Human Services, $1,596,250, 09/01/2010-08/31/2015, “New proteomic technologies for the analysis of tyrosine kinase signaling pathways.”


Dr. Patricia C. Allen
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