Biochemistry @ Iowa

Fall 2016

In this issue:

Message from the Chair

Roy J. Carver Chair and Head of Biochemistry

Dear Friends of Iowa Biochemistry,

Today got off to an upsetting start. I looked at Facebook and read some commentary from a friend who opined that there is a conspiracy between the CDC and big pharma to create hysteria about viruses. According to my friend, the hysteria will result in people getting vaccines that will injure them. Additional commenters asserted that the Zika virus is harmless.

My friend didn't seem to know that HIV infection in Southern Africa was driven, in part, by virus deniers, that measles outbreaks in the US have been occurring among unvaccinated children and adults, and that polio is recurring in parts of the world where authority figures have spread the word that polio is a CIA plot. Sadly, the author of retracted papers that purported to connect the MMR vaccine with autism has directed and released a movie, which is convincing well-intentioned people anew that there is a connection between vaccines and autism. Moreover, people are being taught to believe that medical science is fundamentally corrupt and that government agencies such as the CDC are evil.

Try as I might to cite peer-reviewed data to friends and to friends-of-friends on Facebook, the sense of the conversants was that people are entitled to their own opinions on whether viruses or vaccines are dangerous. Some people seemed to think that Zika, measles and HPV pose no health threat and that vaccines are poison. Others, like myself, are certain that Zika inhibits brain development, that measles still kills almost 100,000 people per year, and that HPV is strongly associated with cervical and other malignancies. If people disagree on these issues, the argument goes, shouldn't parents be able to decide whether to vaccinate or not?

While people are entitled to their own opinions, they are not entitled to their own facts.

Andrew Wakefield, the author of the retracted 1998 Lancet paper claiming a connection between the MMR vaccine and autism, was found to have violated multiple ethical rules and was stripped of his British medical license. Additional studies have failed to support the proposed connection between MMR and autism. The claims are baseless.

While one could propose a connection between autism and the rise of soccer as a sport in North America, the use of Roundup, or the decline in the use of manual typewriters, these phenomena are not mechanistically related. That said, people who dislike international football or pesticides, or who enjoyed an old fashioned carriage return might find such hypotheses appealing. Perseverance in the face of adversity can be a positive trait. However, perseverance in the face of negative data is dangerous because refusing vaccines endangers the public health.

Observers of British and US politics in the last year have noted that many of the people who would be most harmed by Brexit or a rollback of the Affordable Care Act have been rallied in support of such proposals by emotional and fact-free manipulation. It would be truly marvelous if we could have serious debates on important topics based on reliable data. This leads me to back to the importance of education. An educated public is the best defense against manipulation of our friends and neighbors. I thank every member of the University community for doing what we do. It is only by educating the public that we have a chance to know the difference between real dangers and manufactured hysteria.

Best,

Department of Biochemsitry

BIOCHEMISTRY FACULTY
Charles Brenner, Head
Lori Wallrath, Vice Chair
Dale Abel
Sheila Baker
John Dagle
Brandon Davies
Kris DeMali
Adrian Elcock
Ernesto Fuentes
Pamela Geyer
Catherine Musselman
Andrew Norris
David Price
Miles Pufall
Peter Rubenstein
Michael Schnieders
Debra Schwinn
Madeline Shea
Maria Spies
M. Ashley Spies
Eric Taylor
M. Todd Washington
Daniel Weeks
Ronald Weigel
Marc Wold

ADJUNCT FACULTY
Lokesh Gakhar
Subramanian Ramaswamy
Nancy Stellwagen
Joseph Walder
Meng Wu
Liping Yu

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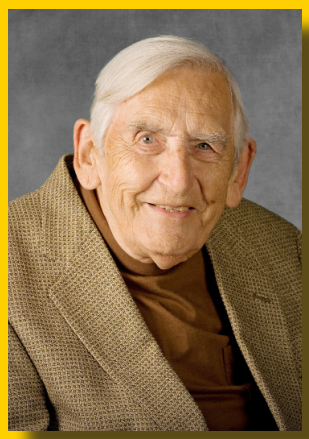
Arthur Arnone
Thomas Conway
John Donelson
Alice Fulton
Bryce Plapp
Arthur Spector
Earle Stellwagen
Charles Swenson

BIOCHEMISTRY STAFF
Matthew Benge
Briana Horwath
Judy Means
Maren Rogers
Paul Rogers
Rosemary Stratton

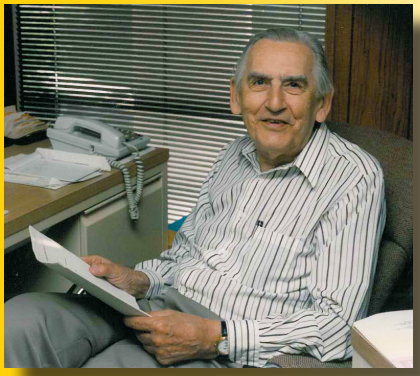
BIOCHEMISTRY STORES
Don Boehme
Lori Streb
Troy Struzynski

In Memoriam



On Sunday, July 31, 2016, Professor Emeritus **Rex Montgomery** passed away peacefully at Oaknoll Retirement Community at the age of 92 with family by his side. Rex was the longest serving member of the Department of Biochemistry, a great leader at the University of Iowa, an outstanding carbohydrate biochemist, a devoted father and grandfather, and a wonderful human being.

Rex was a 1946 PhD from the University of Birmingham. After a short stint at the University of Minnesota, Dr. Montgomery began as an Assistant Professor at the University of Iowa in 1955, and became a full professor in 1963. Dr. Montgomery also served as Associate Dean for Academic Affairs in the College of Medicine from 1974-1995 during which time he also held the positions of Associate Dean of Research in the College and interim Vice President of Research for the University.



His research and scholarly efforts had a major global impact. Two of his textbooks, described as influential and strikingly important, transformed biochemistry education. Dr. Montgomery is admired and appreciated for his remarkable impact as a teacher and mentor. Dr. Yuan Lee (1962 PhD), Professor of Biology at Johns Hopkins University, recalls a time in the laboratory when he thought he had finished his work for the day. However, Rex reminded him that "There is no such a day for a scientist!" because work in the lab is an endless endeavor in which a solution to any problem leads to a new questions. Dr. Lee still applies this mantra to his research philosophy today.

In 1974, Dr. Montgomery established the Physician Assistant Program at the University of Iowa and served as its director until 1976. In the years since, graduates of this program have gone on to help patients throughout the state, nation and globe.

L to R: Rex Montgomery, Thomas Conway and Charles Swenson.

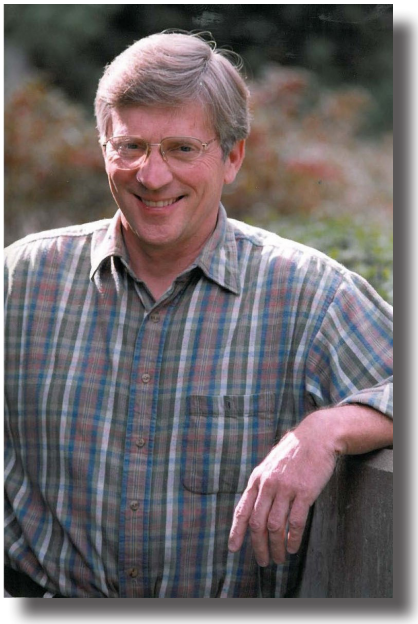
Dr. Montgomery transitioned to emeritus status in 2006 and continued to make an impact in the department and in the field of biochemistry. In addition to his scientific contributions, he and his friends, students and colleagues supported the Department of Biochemistry and many other units on campus with generous financial gifts. He will be greatly missed.

Dr. Montomery was remembered with a service at Trinity Episcopal Church on August 8, 2016.

Distinguished Mentor Award

John Donelson, Professor Emeritus and former Head of Biochemistry, was awarded the 2016 Carver College of Medicine Distinguished Mentor Award. Professor Donelson has an outstanding record of mentoring trainees, faculty and staff at all levels. By his example, and with his guidance and leadership, he has influenced the lives and careers of scientists and physicians at Iowa and beyond.

After obtaining a BS in Biophysics from Iowa State, he left his native state of Iowa and joined the Peace Corps. He taught math, chemistry and physics in Ghana, West Africa. There, he saw firsthand the havoc wrought by infectious diseases. This motivated him to return to the US, where he attended graduate school at Cornell University. He earned his PhD in Biochemistry in 1971 for work on exonucleolytic DNA sequence determination with DNA polymerase I. He was awarded a Helen Hay Whitney fellowship to further develop DNA sequencing and phage molecular biology in Cambridge, England with Nobel Laureate Fred Sanger. Indeed, work that John and other luminaries did with Sanger during this period contributed to Sanger's second Nobel Prize for dideoxy sequencing of DNA. Professor Donelson continued pioneering studies in molecular biology during a brief second postdoc at Stanford University with Professor David Hogness. He was then recruited to the Department of Biochemistry at the University of Iowa as an Assistant Professor in 1974. He brought back to Iowa his worldly experiences and cutting edge molecular techniques that fueled his research program on African trypanosomes for the next 37 years.



Among his 255 publications are landmark papers such as a 1974 *Cell* paper with Pieter Weinsick and David Hogness on chromosome mapping in fruit flies, his 1980 *Nature* paper reporting the sequence of the yeast 2 micron plasmid, and his groundbreaking contributions to the genomics of trypanosomes in three *Nature* and *Science* papers. Twenty years after first reading *Scientific American* articles in Africa, he wrote a 1985 review in the same journal on "How the African Trypanosome Changes Its Coat."

Professor Donelson served as a research mentor of 29 PhD students and 23 postdoctoral fellows. Bruce Citron, Director, Laboratory of Molecular Biology, Professor of Molecular Medicine, USF College of Medicine stated "He truly cared about his students and the graduate program and provided just the right amount of guidance – not too much and not too little." Kent Hill, Professor, Department of Microbiology, Immunology and Molecular Genetics, UCLA reported that Professor Donelson was "always available for discussion and continuously works to identify opportunities for enriching the training experience of the people in his lab or classroom." Dr. Shiyong Li, Associate Professor, Emory University School of Medicine, stated "Professor Donelson had a remarkable ability to phrase constructive criticism in a way that was encouraging, leaving me wanting to work harder and better". Nearly all of his trainees have gone on to prominent positions in academia and industry. Many are leaders in molecular parasitology and molecular biology, thereby carrying on his legacy.

L to R: Former postdoctoral fellow, Michael Lenardo; John Donelson; and former postdoctoral fellow, James Hartley.

At the time of his University of Iowa retirement in 2011, Dr. Louis Miller of the National Institutes of Allergy and Infectious Diseases wrote a commendation to Dr. Donelson stating, "you were always the leader in the world in molecular biology of Trypanosomes." In 2012, John surprised us by being offered and accepting an appointment as a visiting professor at the Federal University of Rio Grand do Norte in Brazil, where he teaches biochemistry and conducts genomic research on leishmania.

Dr. Donelson was honored at the Distinguished Mentor Award Celebration and Lecture on September 1, 2016. The program featured a lecture by Dr. Thomas Cech, Professor of Chemistry and Biochemistry at the University of Colorado Boulder and an HHMI Investigator, who grew up in Iowa City. Dr. Cech received the Nobel Prize in Chemistry in 1989 for his discovery of catalytic properties of RNA.

Faculty Honor

Charles Brenner recieved the **2016 ASBMB Award for Exemplary Contributions to Education**, given annually to a scientist who encourages effective teaching and learning of biochemistry and molecular biology. In her letter of nomination for Dr. Brenner, Former Dean Debra Schwinn wrote "Dr. Brenner is powerfully and constructively engaged locally and nationally in medical education. At his urging, the Carver College of Medicine made undergraduate biochemistry a formal premedical requirement and with his effective influence, there has been a substantial preservation of biochemistry in the first semester of our new integrated medical curriculum. Indeed, educational leaders here at Iowa appreciated his involvement in the national dialog on the need to reemphasize molecular science in the education of current and future medical students."

Dr. Brenner presented a plenary symposium lecture entitled "Biochemistry and molecular biology education in a transforming academy and a molecular world" at the ASBMB Annual meeting in San Diego, CA in April 2016.

Daniel Weeks was chosen by the Council on Teaching as one of this year's recipients of the **President and Provost Award for Teaching Excellence**. For the past 28 years Professor Weeks, an internationally known nucleic acid biochemist and developmental biologist, has demonstrated sustained contributions to teaching at the University of Iowa. His teaching has influenced thousands of undergraduates, graduates and medical students who have gone on to enjoy productive careers in academia, industry and policy. The President and Provost Award for Teaching Excellence represents the highest level of achievement in teaching given at the University of Iowa.

Dr. Weeks also recieved the **2015-2016 Graduate College Outstanding Faculty Mentor Award for Biological and Life Sciences**. In his nomination letter, Dr. Brenner wrote "Professor Weeks has served as Director of Graduate Studies for the Department of Biochemistry for over a decade. His devotion to each and every student makes our graduate program a huge success."

Marc Wold received the **2015-2016 Carver College of Medicine's Collegiate Teaching Award**. Professor Wold has passionately taught tens of thousands of students at all levels for more than 25 years at the University of Iowa. He is the Director of the Biochemistry undergraduate program.

Among current Biochemistry primary faculty, Dr. Wold joins Drs. **Peter Rubenstein**, **Adrian Elcock**, **Lori Wallrath**, **Daniel Weeks**, **Todd Washington**, **Kris DeMali**, and **Pamela Geyer** as recipients of the CCOM Collegiate Teaching Award. This is the 6th consecutive year a Biochemistry faculty member has received this award.

Peter Rubenstein recieved the **2016 Hancher-Finkbine Faculty Medallion**. Medallions are given in recognition of outstanding leadership, learning, and loyalty within the University of Iowa community. Dr. Rubenstein was nominated by the Carver College of Medicine for his commitment to education and medical curriculum development and for his dedicated service on the CCOM Executive Committee throughout his 39 years at the Univeristy of Iowa.

Pamela Geyer was elected **Fellow of the American Association for the Advancement of Science** (AAAS) for "distinguished contributions to the field of eukaryotic transcription, particularly founding discoveries of the insulator class of regulatory elements and mechanisms of tissue-specific gene expression." Dr. Geyer joins **Marc Wold**, **Charles Brenner**, **David Price**, and **Peter Rubenstein** among current primary faculty members who are AAAS Fellows.

S AND AWARDS

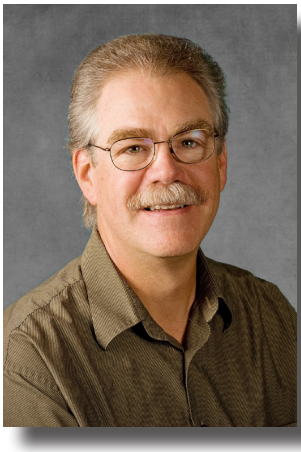
Miles Pufall received a **National Science Foundation CAREER Award** for his project entitled "Allosteric regulation of transcription factor DNA binding specificity, kinetics, and cellular activity." Under this 5-year grant, Dr. Pufall aims to provide a realistic picture of how transcription factors make the critical decision of where to bind DNA and regulate genes in the complex environment of the cell.

Sheila Baker and Amy Lee, Professor of Molecular Physiology & Biophysics, in collaboration with Arlene Drack, Associate Professor of Ophthalmology & Visual Sciences, have been awarded an **R21 from the National Eye Institute** entitled "Rescue of photoreceptor synapses". This multidisciplinary team will explore the regenerative capacity of photoreceptor synapses and develop a method for making novel retinal gene therapy vectors in an effort to create new treatments for blindness.

Brandon Davies was awarded a **new R01** entitled "Regulation of GPIHBP1-dependent and independent triglyceride clearance." Dr. Davies' aims to understand how the angiopoietin-like (ANGPTL) proteins, ANGPTL3 and ANGPTL4, modulate triglyceride clearance in the context of LPL-GPIHBP1 complexes and to identify the mechanism by which triglycerides can be cleared in the absence these complexes.

Dr. Davies also recieved an **FOEDRC Pilot & Feasiblity Grant** for his research project entitled "Skeletal Muscle Programming of Capillary Endothelial Cells," which aims to to identify how skeletal muscle cells program adjacent endothelial cells to deliver triglyceride-derived fatty acids to muscle.

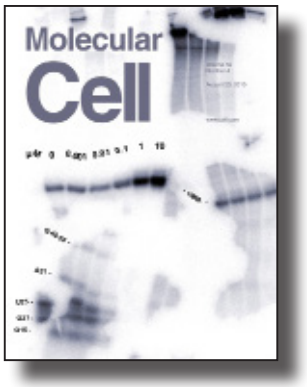
Eric Taylor recieved an **FOEDRC Pilot & Feasiblity Grant** for his research project entitled "A novel regulator of glutamine-driven gluconeogenesis," which aims to determine the biochemical activity of a recently discovered poorly annotated protein that is important for using the amino acid glutamine for gluconeogenesis, the mechanisms underlying its role in glutamine-driven gluconeogenesis, and how its function contributes to hyperglycemia during type-2 diabetes.



David Price and Donal Luse from the Cleveland Clinic, Lerner Research Institute, have been awarded a **new R01** entitled "Coordination of early events in RNA polymerase II elongation control." Drs. Price and Luse aim to examine how the RNA polymerase II elongation control machinery interfaces with chromatin structure.

Subramanian Ramaswamy, Adjunct Professor of Biochemistry, has received a **2015 University of Iowa Research Foundation Inventors Award**. In 2015, the UI Research Foundation and Dr. Subramanian, secured an option agreement with Spyryx Biosciences, Inc. for Dr. Subramanian's technology "PLUNC-A Secreted Protein of Respiratory Epithelia and Salivary Glands With Surfactant Activity."

Publication Highlights



David Price's laboratory was featured on the August 2015 cover of *Molecular Cell*. The article entitled "THZ1 Reveals Roles for Cdk7 in Co-transcriptional Capping and Pausing," shows how a Cdk7 inhibitor, THZ1, dramatically impacts CTD phosphorylation, co-transcriptional capping, pausing, and P-TEFb-dependent productive elongation by disrupting an ordered exchange of factors after initiation. These results provide mechanistic insights into the anti-proliferative and super-enhancer-selective effects of THZ1. MCB graduate student **Kyle Nilson** was first author of this work. The article was also featured in a preview written by Drs. Frédéric Coin and Jean-Marc Egly entitled "Revisiting the Function of CDK7 in Transcription by Virtue of a Recently Described TFIIH Kinase Inhibitor," and was recommended by the Faculty of 1000 prime.

Daniel Weeks's laboratory was featured on the June 2016 cover of *Biology Open*. The article entitled "Amyloids assemble as part of recognizable structures during oogenesis in Xenopus." Amyloids are traditionally associated with pathologic conditions like Alzheimer's and Huntington's diseases. However, there is a growing appreciation that amyloids assemble and disassemble as part of many biologically important activities. The Weeks laboratory found that amyloids were easily detectable in the cytosol and nucleus of Xenopus oocytes. Nuclear amyloids were part of structures involved in transcription by all three RNA polymerases and in RNA processing while cytosolic amyloids were observed with in yolk platelets and other yet to be identified structures. MSTP/MCB graduate student **Michael Hayes** was first author of this work.

Charles Brenner's laboratory, in collaboration with Drs. Randy Kardon and Mark Yorek, published a May 2016 *Scientific Reports* articled entitled "Nicotinamide Riboside Opposes Type 2 Diabetes and Neuropathy in Mice," which shows nicotinamide riboside lowers blood sugar, reduces fatty liver and prevents neuropathy in models of prediabetes and type 2 diabetes. Former Genetics graduate student **Samuel Trammell** was first author of this work.

Eric Taylor's laboratory published an article in an April 2016 issue of the *Journal of Biological Chemistry* entitled "A Method for Multiplexed Measurement of Mitochondrial Pyruvate Carrier Activity," which developed a 96-well assay that enables much greater throughput with substantially decreased mitochondrial sample requirements. They expect this assay will be useful for understanding the regulation of MPC activity under diverse physiological conditions in health and disease. Postdoctoral fellows **Lawrence Gray** and **Adam Rauckhorst** were co-first authors of this work.

Liping Yu, Adjunct Professor of Biochemistry, and collaborators co-authored a *Science* article entitled "An unprecedented mechanism of nucleotide methylation in organisms containing thyX." Their findings indicate a mechanism that is very different from thymidylate biosynthesis in humans, underscoring the potential as a novel antibiotic target.

Departmental Outreach

Maria Spies and Janice Robertson, Assistant Professor of Molecular Physiology and Biophysics, were co-organizers of the 4th Midwest Single Molecule Workshop held at the University of Iowa July 31-August 2, 2016. The workshop attracted single-molecule enthusiasts from the leading researchers in single-molecule biophysics to graduate student from all across the Midwest to share ideas, research, and resources. The event featured a keynote lecture by Jeff Gelles, the Aron and Imre Tauber Professor of Biochemistry and Molecular Pharmacology at Brandeis University.

4th Midwest Single Molecule Workshop attendees.

The Department of Biochemistry supports the **Arthur A. Spector** Award for Basic Biomedial Research presented during the annual Medical Student Research Day. **Armin Avdic**, a first year medical student in **Michael Schnieders** laboratory, recieved the 2016 award for his work entitled "Physics-Based Protein Optimizations Determine Missing Loops and Predict Structural Consequences of Missense Variants"

Postdoctoral Achievements

Lawrence Gray (Taylor laboratory) received the first place $750 travel award in the recent Pappajohn Biomedical Institute competition for best postdoctoral fellow paper of 2015. Dr. Gray's paper entitled "Hepatic Mitochondrial Pyruvate Carrier 1 Is Required for Efficient Regulation of Gluconeogenesis and Whole-Body Glucose Homeostasis" was published in the October 6th issue of *Cell Metabolism*. Dr. Gray's research demonstrates that disrupting mitochondrial pyruvate uptake in the liver attenuates high blood sugar in models of type 2 diabetes.

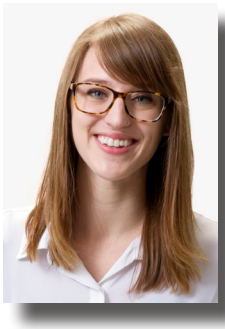
Colin Wu, a postdoc in Maria Spies' laboratory, began his independent career as Assistant Professor in the Department of Chemistry at Oakland University in Rochester, MI this fall.

Casey Andrews, a postdoc in the Elcock laboratory and a 2014 PhD with Adrian Elcock, began his independent career as Visiting Assistant Professor at Coastal Carolina University in Myrtle Beach, SC this fall.

Graduate Student News

Jennifer Bays (DeMali laboratory) was awarded an American Heart Association Predoctoral Fellowship for her project entitled "Links between E-cadherin-mediated force transmission and metabolism," which aims to understand how cells derive the energy they need to support cytoskeletal rearrangements.

Lacy Barton (Geyer laboratory, 2014 PhD) was awarded the 2015 Subramanian Award for best PhD thesis in the Department of Biochemistry. Lacy is currently a postdoctoral fellow in Ruth Lehmann's laboratory at New York University School of Medicine in New York, NY. She was recently awarded a Damon Runyon Cancer Research Foundation Fellowship for her project entitled "Mechanisms of directed cell migration in a complex in vivo environment." Damon Runyon fellowships are among the most prestigious postdoctoral awards and a high accolade for an early career scientist.



Sarah Hengel (Maria Spies laboratory) was first author on an *eLife* article entitled "Small-molecule inhibitors identify the RAD52-ssDNA interaction as critical for recovery from replication stress and for survival of BRCA2 deficient cells." In this study, Hengel et al. developed a high throughput biophysical method to search through a large collection of small molecules to find those that prevent RAD52 from binding to DNA. This identified a naturally occuring compound that competes with single-stranded DNA to bind to RAD52. The methods used by Hengel et al. provide the foundation for further searches for new anticancer drugs. Future studies that employ the small molecule probes identified so far will also help to determine exactly how RAD52 works in human cells and how it helps cancer cells to survive.

Recent Graduates

Elizabeth Boehm
(Washington Laboratory)
Postdoctoral fellow
with Johannes Walter
Harvard Medical School
Boston, MA

Shyamal Subramanyam
(Maria Spies Laboratory,
University of Illinois)
Postdoctoral fellow
with **Maria Spies**
University of Iowa
Iowa City, IA

Samuel Trammel
(Genetics Student,
Brenner Laboratory)
Postdoctoral fellow
with Matthew Gillium
University of Copenhagen
Copenhagen, Denmark

Zhen Xu
(Fuentes Laboratory)
Postdoctoral fellow
with **Ernesto Fuentes**
University of Iowa
Iowa City, IA

IDT & Smith-Gehring Graduate Fellowships

The IDT and Smith-Gehring Graduate Fellowships are awarded to three of the most meritorious second year Biochemistry graduate students based on academic and research achievements. The IDT Graduate Fellowships were established through a gift made by **Joseph Walder**, Adjunct Professor of Biochemistry. Dr. Walder started his independent research career as a faculty member in the Department in 1978 and launched Integrated DNA Technologies in 1987. The 2016 IDT Graduate Fellows are **Colleen Caldwell** and **Timothy Collingsworth**:

Ms. Colleen Caldwell performed extremely well in classes during her first year in the graduate program. Work she did during her rotations is likely to earn her a contribution to research papers from two labs. Ms. Caldwell graduated cum laude with a bachelor's degree in Biochemistry and Molecular Biology and a minor in Neuroscience from the Gustavus Adolphus College in St. Peter, MN in spring 2015. She had a brilliant undergraduate career and her application to our graduate program definitely stood out. In the laboratory of Dr. Maria Spies, she is working on a project focused on deciphering the molecular mechanism of human DNA helicase RTEL1 (regulator of telomere length). Defects in the RTEL1 helicase are associated with a broad spectrum of human diseases ranging from cancer to Crohn's. Ms. Caldwell plans to take a full advantage of Dr. Spies' lab expertise in DNA repair helicases and custom built single-molecule equipment to decipher the RTEL1 mechanism and to gain insights into its physiological roles outside of the telomeres. In collaboration with the X-ray crystallography core and Dr. M. Todd Washington's lab, Ms. Caldwell will also add a structural biology component to her work on RTEL1 in definition of the association between RTEL1 helicase and the PCNA processivity clamp that integrates RTEL1 activity into cellular processes that ensure accurate replication.

Mr. Timothy Collingsworth also had an exemplary first year in the graduate program. In addition, Mr. Collingsworth's overall positive attitude and enthusiasm stood out to us. Mr. Collingsworth, who grew up in Cedar Rapids, graduated with a bachelor's degree in Biochemistry and minors in Computer Science and Spanish from the University of Iowa in spring 2015. Mr. Collingsworth is training in the laboratory of Dr. Michael Schnieders and is working on a project in collaboration with Dr. Michael Welsh aimed to develop computational tools to combat cystic fibrosis (CF). CF is caused by mutations in the gene that encodes the cystic fibrosis transmembrane conductance regulator (CFTR) anion channel. In humans and pigs lacking CFTR, unchecked H+ secretion by the nongastric H+/K+ adenosine triphosphatase (ATP12A) acidifies airway surface liquid, while mice that lack CFTR express little ATP12A and secrete minimal H+. Thus, airway surface liquid in CF and non-CF mice have similar pH, suggesting that inhibiting ATP12A can reverse host defense abnormalities and treat CF in humans. The goal of Mr. Collingsworth's project is to use computer aided molecular design to create specific inhibitors of ATP12A function.

The Smith-Gehring Fellowship was established through a gift made in memory of Dr. **Elizabeth K. Smith**, a 1943 PhD in Biochemistry, and from the gift of Dr. **Lois Bigger Gehring**, a great friend of the Department of Biochemistry. The 2016 Smith-Gehring Graduate Fellow is **Hannah Miller**:

Ms. Hannah Miller performed extremely well in classes during her first year in the graduate program. Ms. Miller is the department's first Fast Track PhD student. The Fast Track program allows for high achieving University of Iowa undergraduate students to take PhD course work during their final undergraduate year. To qualify for this program Ms. Miller participated in an extensive amount of formal research in Dr. Todd Washington's lab and maintained an exemplary academic record. Ms. Miller stated, "I was interested in the Fast Track PhD program in Biochemistry because it is a unique opportunity to dive deeper into research at a young age. The program gives me the opportunity to join a lab with my first year, giving me a great start on my thesis project. I'm very excited to see how the program will challenge me and allow me to progress as a scientist." Ms. Miller has joined the laboratory of Dr. Kris DeMali. She is currently working on a project aimed at understanding how cells sense and transmit externally applied forces and dissecting how this process becomes dysregulated during tumorigenesis.

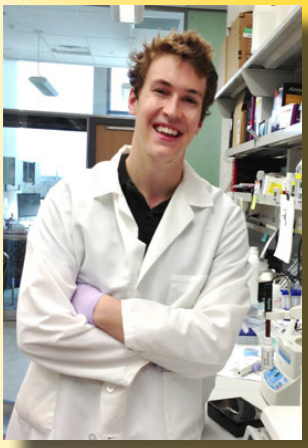
Undergraduate Programs

Seven Biochemistry Honors students presented research at the Twelfth Annual **Gene F. Lata** Undergraduate Research Symposium.

Hannah Miller (Washington laboratory) will continue in the Fast Track program towards a PhD in Biochemistry at the University of Iowa. **Jiadi An** (Elcock laboratory) will attend graduate school at San Diego State University. **Devon Moose** (Lear laboratory) will persue a masters degree in Molecular Physiology and Biophysics at the University of Iowa. **Jianlan Ren** (Elcock laboratory) plans on working in the chemistry or biochemistry industry for a few years before attending graduate school. **Alexander Wolff** (Weeks laboratory) plans to work in industry or academia while detemining what type of healthcare career to persue in the future. **Mohammed Ismail** (Maria Spies laboratory) plans to apply to medical schools after graduation.

2016 Lata Symposium Presenters: L to R: Jiadi An, Hannah Miller, Mohammed Ismail, Alexander Wolff, Hang Yin, Devon Moose, Jianlan Ren.

Undergraduate Student Spotlight



Nicholas McCarty

Nicholas McCarty (Abel laboratory) was named a 2016 Goldwater Scholar. The Barry Goldwater Scholarship and Excellence in Education Program was established by Congress in 1986 to honor Senator Barry Goldwater by awarding scholarships to college students who intend to pursue research careers in STEM related fields. Nicholas was also selected for a 2016 Phi Beta Kappa Society writing internship where he will will spend five months in Washington, D.C., writing for *The Key Reporter*, Phi Beta Kappa's news and alumni-relations publication. Nicholas is a fellow in the Latham Science Engagement Initiative, a program promoting communication between researchers and the public. He has worked with Professor E. Dale Abel for three years studying heart disease and diabetes; is completing minors in clinical and translational science, chemistry, and entrepreneurial management; and intends to pursue an MD/PhD after earning his bachelor's degree.

Mohammed Ismail (Maria Spies laboratory) has been awarded the 2016 Montgomery Biochemistry Scholar's Prize Award for his outstanding research accomplishments and excellent presentation at the Lata Symposium. **Emily Britt** (Davies laboratory), **Laura Fischer** (Wold laboratory), and **Angela Zhang** (Jacob Michaelson laboratory) were awarded 2016 Rex Montgomery Scholarship Awards for their outstanding academic record and commitment to research. Both awards made possible by a gift from the late **Rex Montgomery**.

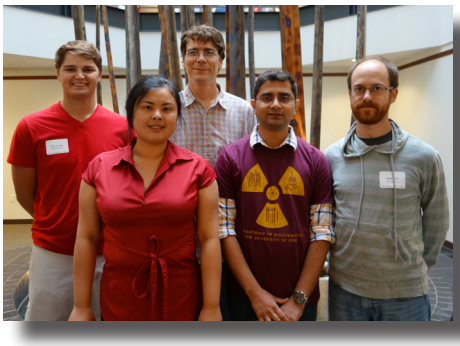
Alexander Wolff was presented with the H.G. Wittmann Scholar Award and **Hannah Miller** was presented with the H.G. Khorana Scholar Award at the 2016 Lata Symposium, recognizing their exceptional understanding of biochemistry and its value to society. Both awards made possible by a gift from **Alap Subramanian**.

Sarah Gardner (Baker laboratory), **Cara Larson** (Wallrath laboratory), **Nicholas McCarty** (Abel laboratory), and **Maria Nunez Hernandez** (Shea Laboratory) presented Scientific Outreach Projects at the Latham Science Engagement Initiative 1st Annual Project Engage Showcase held on Saturday, April 30, 2016, at the Iowa Memorial Union.

Aaron Aspinall, **Gabrielle Bui**, **Kaitlyn Daugherty**, **Titus Hou**, **Michael Kegel**, **Nicholas McCarty**, **Thuy Tien Nguyen**, **Ryan Shaw**, **Sarah Van Dorin**, **Alexander Wolff**, **Kasra Zarei**, and **Angela Zhang** were invited to join the Phi Beta Kappa Honor Society. The Phi Beta Kappa Society is the oldest and most prestigious undergraduate honors organization in the United States.

Retreat Highlights

The Department of Biochemistry held its 7th Annual Retreat on August 20, 2016, in the Coralville Public Library. The retreat featured 5 faculty talks and 34 poster presentations.



2016 Retreat poster winners: L to R: Rick Young, Lalita Oonthonpan, Will Hacker, Shyamal Subramanyam, and Mark Miller.

Lalita Oonthonpan (Taylor laboratory) won first place in the Graduate Student Poster Competition for her poster entitled "Elucidating structure-function relationship of the mitochondrial pyruvate carrier." **Will Hacker** (Elcock laboratory) took second place for his poster entitled "Modeling the E. coli nucleoid subject to experimental restraints." Third place went to **Mark Miller** (Elcock laboratory) for his poster entitled "Re-parameterization of protein force fields guided by osmotic coefficient measurements from molecular dynamics simulations" **Shyamal Subramanyam** (Postdoc, Maria Spies laboratory) won the Postdoctoral/ Medical Fellows and Research Staff Poster Competition with his poster entitled "Tyrosine phosphyorylation stimulates activity of human RAD51 recombinase through altered nucleoprotein filament dynamcs." **Rick Young** (Waldorf College, Wallrath laboratory) won the Undergraduate Poster Competition for his poster entitled "DNA damage associated with muscular dystrophy."

Sarah Hengel (Maria Spies laboratory) won the X-Scientist Theme Competition with her "Aqua Structure Girl" superpowers giving her the ability to shrink herself to the size of a water molecule, jump into protein solutions, and with her eyes shoot X-rays at the protein of interest for structural determination.

FUTURE in Biomedicine

[Fostering Undergraduate Talent - Uniting Research and Education]

2016 FUTURE program participants.

The 8th annual FUTURE in Biomedicine program, directed by **Madeline Shea**, brought 15 Faculty Fellows and students from primarily undergraduate institutions in Iowa to conduct research and pursue collaborations with UI faculty. Three Faculty Fellows worked with Biochemistry hosts: Melanie Hauser from Buena Vista University worked with **Miles Pufall**; Heriberto Hernandez from Grinnell College worked with **Mike Schnieders**; and Maria Dean from Coe College worked with **Sheila Baker.**

In addition, Sydney Wilderman from St. Mary-of-the-Woods College, the second recipient of the Gioannini Women-in-Science Summer Research Fellowship honoring former colleague **Theresa L. Gioannini**, studied with Jerrold Weiss, Professor of Internal Medicine & Microbiology.

BSURF [Biochemistry Summer Undergraduate Research Fellowship]

BSURF, directed by **Peter Rubenstein**, is an opportunity for undergraduate students outside the University of Iowa to gain hands-on experience in an active research laboratory under the direction of an established scientist. Four BSURF students conducted research in Biochemistry labs this summer and presented their research at the Summer Undergraduate Research Conference, sponsored by the Graduate College.

Maria Valdes from Waldorf College worked with **Charles Brenner**, Patrick Rooney from Wartburg College worked with **Ashley Spies**, Matthew Hayden from Simpson College worked with **Madeline Shea**, and Lotte van den Goor from Loyola University Chicago worked with **Ernesto Fuentes**.

Also joining in the BSURF activities were, Iowa Academy of Science Fellow, Rick Young from Waldorf College who worked with **Lori Wallrath**, and two students from Butler University, Diante Graffagnino and Brittany Stankavich, who were summer research interns with **Miles Pufall**'s NSF CAREER grant.

L to R: Rick Young, Brittany Stankavich, Patrick Rooney, Maria Valdes, Matthew Hayden, Lotte van den Goor, and Diante Graffagnino.

Alumni Accomplishments

Debbie Thurmond

Debbie C. Thurmond, a 1997 PhD with **Alan Goodridge**, has joined City of Hope as Professor and founding Chair of the Department of Molecular and Cellular Endocrinology within the institution's new Diabetes & Metabolism Research Institute. Thurmond will lead City of Hope's efforts to develop new diabetes treatments, focusing on potential therapies that can reverse or prevent the onset of the disease. Dr. Thurmond joins City of Hope from Indiana University, where she was a Professor of Pediatrics and Associate Director of the Basic Diabetes Research Group within the Herman B. Wells Center for Pediatric Research.

Bridget Coughlin, a 1999 PhD with **John Donelson**, was recently named CEO of the Shedd Aquarium. Dr. Coughlin is the fourth president in the Shedd's history and the second female head of a Museum Campus institution. Dr. Coughlin, was previously the Vice President of Strategic Partnerships and Programs and Adjunct Curator at the Denver Science Museum.

Bridget Coughlin

Linda Sealy, a 1980 PhD with **Roger Chalkley**, was the first recipient of the Vanderbilt University Joseph A. Johnson Jr. Distinguished Leadership Professor Award. Professor of Molecular Physiology and Biophysics and Director of the Vanderbilt Initiative to Maximize Student Development, Dr. Sealy played a significant role in identifying, recruiting and mentoring a large number of the 105 PhDs awarded to under-represented students in Vanderbilt's biomedical research programs.

Michael Vitalini, former postdoctoral fellow with **Lori Wallrath**, received tenure at St. Ambrose University in Davenport, IA. Dr. Vitalilini teaches biology, microbiology and genetics in addition to mentoring students on independent research projects.

Nathan Coussens, a 2007 PhD with **Subramanian Ramaswamy**, published a July 2016 *International Union of Crystallography Journal* article entitled "Structure of a heterogeneous, glycosylated, lipid-bound, *in vivo*-grown protein crystal at atomic resolution from the viviparous cockroach *Diploptera punctata*," which suggests that cockroach milk is among the most nutrient dense substances on the planet. Nathan first discovered these milk protein crystals while studying at the University of Iowa. His article was publicized in multiple news outlets such as the *Washington Post*, *CNN*, and *NPR*.

Iowa Biochemistry Apparel

Show your Biochem pride!

University of Iowa Department of Biochemistry screen-printed t-shirts are available for purchase in Adult S-XL.

Polos are available for purchase in Black with a gold hawk embroidered at the chest in Men's M-XXL and Women's S-L.

Please email *biochem@uiowa.edu* or call 1-877-846-8569 with any purchase inquiries or questions.

Alumni: Where are you now?

Share your latest comings and goings with us!

Email your news and accomplishments to *biochem@uiowa.edu*. Include your name, current position, address, degree, graduation year, & your UI mentor.

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The University of Iowa

UI Foundation

Biochemistry's representative at the University of Iowa Foundation, **Madelynn Krall**. Madelynn is an Iowa City native and an alumna of the University of Iowa.

Private support, which has always been important for the Department, is critical today as state and national funding become increasingly difficult to secure. With help from private supporters, we can provide scholarships to graduate students and postdocs; invest in new, state-of-the-art equipment; fund seminar series and lectureships; and attract and retain outstanding faculty members. These generous gifts are the lifeline for our advancement and have never been more important.

Madelynn is available as a resource for friends of the department who are considering an outright or estate gift to Biochemistry. Madelynn travels extensively, and would be happy to talk with alumni and friends of the department by phone (800-648-6973) or by email (madelynn-krall@uiowa.edu) about contributions to existing funds or initiatives, such as our campaign to endow graduate education.

Newsletter designed and prepared by Maren Rogers