ILLINOIS
Cell & Developmental Biology
SCHOOL OF MOLECULAR & CELLULAR BIOLOGY
SPRING 2018

UIUC ALUMNI RETURN FOR CAREER DEVELOPMENT SEMINAR SERIES ORGANIZED BY GRADUATE STUDENTS

CDB graduate students wanted to open a discussion about career opportunities, particularly outside of academia. They formed a group that included students and postdocs in the summer of 2017, and to date, the group has hosted three alumni with very different and fascinating career paths.

Dr. Marshall Brennan (PhD Chemistry, '15) the Associate Editor of Nature Chemistry kicked off the inaugural session with a presentation on what it takes to be an editor. Dr. Brennan also spent time with graduate students by reviewing their resumes and writing samples from the perspective of an editorial position.

In the second session, Dr. Chad Stiening (BS Biology, '99), an entrepreneur and CEO of Kypha (St. Louis-based clinical diagnostic company) spoke to the students about the skills and characteristics, beyond a degree in science, needed for entrepreneurial enterprises. He shared the mantra, "Failure is success," and conveyed that as an entrepreneur, one should be ready to take risks and have perseverance for the end goal. His thoughts were relevant not only for budding scientist-entrepreneurs but to everyone in the graduate school.

The committee recently welcomed Dr. Melissa Junttila (BS Microbiology, '99) who is currently a Senior Scientist at Genentech, a biotechnology corporation researching and developing pharmaceuticals. Dr Junttila presented her recent research and answered questions about her career path. She also held mock interviews with students and postdocs to help them train better for industry related careers. Melissa believes that "in today's world you can do good research, irrespective of the place/institute where you are located."

Dr. Brennan, second from right

Dr. Chad Stiening, second from right

Dr. Melissa Junttila, third from left

NEAL KITCHEN, PHD 2009:

TAKING, AND MAKING, OPPORTUNITIES OUTSIDE OF ACADEMIA

When Neal Kitchen joined the department of cell and developmental biology in 2002, his plan was to get a PhD and then find a job with a company that would pay for an MBA program. But just as he neared graduation, the financial crisis of 2007-2008 took the wind out of the job market.

"There were a lot of companies that simply weren't hiring much," he said, "so I started looking again at other potential options for doing postdoctoral research on Type-1 diabetes."

Type-1 diabetes was Neal's initial impetus for pursuing biology. After a good friend developed Type-1 at an early age, Neal became interested in understanding the pathology of this disease though his graduate work ended up taking a different path.

With few industry prospects in a tepid economy, Neal started looking for postdoc opportunities and found an interesting research opportunity at Pfizer working with an eminent immunologist out of University of California San Francisco, Jeff Bluestone.

"I was to be on Pfizer's industry-based team and collaborate with Bluestone's lab to do some research on Type 1 diabetes, looking at how epigenetic markers are impacting the autoimmune response," he said. It was also an attractive option because it would be located near his parents where he grew up in St. Louis.

After an interview and positive feedback about his candidacy, the project with Bluestone's lab was delayed. At the time, Pfizer had just merged with another pharmaceutical giant, Wyeth, and the company decided to see how the merger would play out with the plan that Neal would start at the beginning of the next year.

As it turned out, the Pfizer facility in St. Louis closed and the postdoctoral option fell through.

Neal said he was treading water, but remained positive and started going to job fairs where he met representatives from several companies that were beginning to hire again. There he learned of several R&D positions but eventually chose to take a job with Thermo Fisher Scientific in a technical support role.

"Technical support was actually a really ideal position for me…" he said, "… the way that they had it set up allowed you to learn about a lot of different departments within the industry setting, and that was really valuable for me to quickly understand what does marketing do, what does quality control do, what the R&D scientists were doing -- and I really got exposed to all of those."

The technical support role launched other opportunities, and within a year Neal became a product manager over the immunology division. He was also able to realize another goal when Thermo Fisher paid for an MBA program at Rockford University.

Neal said the success and opportunities available at Thermo Fisher were exciting, but then another opportunity popped up. His sister, Annette Rubin, had founded a company called Belli SkinCare, creating non-toxic cosmetics for pregnant women. The company was quite successful and she sold it in 2011. She then took on a new

opportunity as a managing partner for Hydropeptide LLC, an anti-aging skin care company.

Neal remembers when he first heard of this new company. "I said 'Hydro WHAT' and she said 'peptide' and I kind of teasingly asked her, 'What did you think a peptide was,' and she didn't know exactly what my research had been," he said. "I spent the last good portion of my adult life studying signaling and peptides and how other proteins signal to the cell, and of course when she found that out she got excited to know that I had some relevance within her space."

One thing led to another, and Neal ended up taking an advisory role with Hydropeptide while still at Thermo Fisher Scientific. "It was both busy and fun enough that [my sister and I] started conversing about what kept holding me back from coming out there full time. That was probably one of the biggest decisions I've made," he said.

Neal took the opportunity to move to Seattle in 2014 and work with his sister even though it was a little more risky than staying at Thermo Fisher. His first official title was Vice President of Strategy Development, a role with the R&D side. He is now the Chief Operating Officer.

Though his new position does not necessarily coincide with his PhD research, he does feel like he has the opportunity to use his foundation in science and epigenetics with the complementing degree in business to bring research to the forefront of the skin care industry both from the marketing perspective and the technology perspective.

"I get to wear a lot of hats," said Neal, "but I think the part that's been the most fulfilling is the opportunity to go out and talk to people about skincare and what we can do to impact our skin in a real way. Everyone tends to think of fine line wrinkles, age spots, dull skin, and I talk to them about the fact that the changes we see are on the cellular level."

Of his experience in the department of cell and developmental biology, then called cell and structural biology, Neal says, it was a great program, "one where I felt in every moment that I had the opportunity to continue to grow," he says.

His message to current students: "The academia route is such a powerful one, and it certainly is applicable for a lot of graduate students, but it's not the only career path."

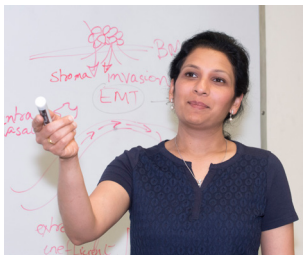
One of the things Neal has loved about his unique career path is that he has taken on what would not be considered traditional roles for a PhD.

Twelve years ago, Kitchen did not foresee himself saying, "'Hey I'm going to be in the beauty industry someday…' that would've been a little bit laughable in that sense, yet I feel very much like I'm fulfilling a lot of the things that made me passionate about science in the beginning. I get to be part of that in industry today."

By Steph Adams

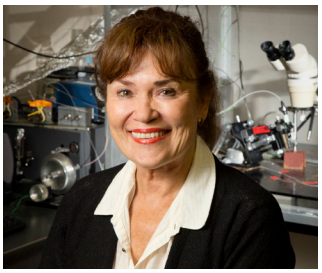
FACULTY ACHIEVEMENTS 2017

Dr. Supriya Prasanth received the Lynn M. Martin Award for Distinguished Women Teachers by the College of LAS



Dr. Prasanth's primary teaching responsibility has been the creation and delivery of MCB 400 Cancer Cell Biology, one of the most popular undergraduate elective courses. She is consistently ranked as excellent by her students each semester. Dr. Prasanth is known for the clarity of her lectures and for being lively, enthusiastic, and engaging, even during a 1.5 hour session. In addition to her classroom teaching, Dr. Prasanth has been an outstanding mentor to students engaged in undergraduate research.

NSF awards Illinois $3 million for interdisciplinary graduate student training



Professor Martha Gillette will lead the program to form new insight on the brain and expand participation in the field of brain science. Sixty graduate students from across campus will participate in the five-year National Science Foundation (NSF) Research Traineeship. Students will come from several departments across campus, including neuroscience, cell and developmental biology, molecular and integrative physiology, chemistry, psychology, chemical and biomolecular engineering, bioengineering, and electrical and computer engineering.The project's primary goal is to provide students with an immersive research experience that blends techniques from multiple disciplines to better understand the many aspects of the human body's most complex organ.

TEAM PLAYERS: HUSBAND AND WIFE DELVE INTO CELLULAR MYSTERIES

By Doug Peterson

Within a month after Prasanth and Supriya were married in India in December of 2000, they flew to New York City, landing in a city blanketed with heavy snow. It was the first time either one of them had ever seen snow.

They began a new life as postdoctoral researchers at Cold Spring Harbor Laboratory in New York. And today, as University of Illinois CDB professors, they continue to work side by side — literally. Their respective labs are next to each other in the Chemical and Life Sciences Building, where they probe the mysteries of DNA replication and gene expression.

Supriya and Prasanth grew up on opposite ends of India, for she lived in Delhi in the north while he grew up in Kerala in the south. They met when she attended a short program sponsored by the Indian government at the lab where he was a graduate student.

"We've been collaborating since 2001," says Supriya, referring to the year they began at Cold Spring Harbor. There, Supriya did her postdoc under Bruce Stillman, a father figure in the field of DNA replication, while Prasanth worked with David Spector, who has done groundbreaking research on the inner workings of a cell nucleus.

The Prasanths' collaboration continued when they came to Illinois in 2007, with Supriya bringing her biochemistry expertise to the table, while Prasanth contributes his training as a cell biologist. It's not unusual for husbands and wives to be recruited to the same institution, but it isn't often that they work so closely together—and on the very same floor.

"In this new age of science, you cannot survive with only one technical discipline," Prasanth says. "It has to be integrated," and that means combining their strengths.

"The way our collaboration works is our two labs have their own individual projects, but the students function as a single unit," adds Supriya. "The students all work together, helping each other out, and we run joint lab meetings."

Supriya's lab explores how cells coordinate the process of DNA replication, while Prasanth has been investigating the role of long non-coding RNA in gene expression control. Supriya's lab had its first big breakthrough in 2010 when they identified the ORC-associated protein, or ORCA/LRWD1.

These proteins stabilize Origin Recognition Complex (ORC) proteins on chromatin and help initiate DNA replication and aid in chromatin organization.

However, Supriya's lab has found that ORC and ORCA proteins have a role beyond just initiating DNA replication; they regulate many different aspects of the cell cycle. For instance, ORC plays a role in the process of DNA replication itself, as well as plays critical roles in centromere and centrosome biology and cell division. What's more, her lab found that ORCA proteins play a fundamental role in heterochromatin organization, compacting the DNA. And most recently, they discovered that both ORC and ORCA bind to telomeres, which protect the ends of chromosomes, preventing DNA damage.

"One of my graduate students discovered that the enrichment of ORC and ORCA is happening at very specific types of telomeres," Supriya says—a finding that may have cancer implications.

In normal cells, telomeres shorten over time, which limits the lifespan of cells and prevents them from becoming cancerous. But in some cancers—less than 15 percent—the cells manage to achieve immortality by continually lengthening the telomeres. One way cancer cells do this is through a mechanism called alternative lengthening of telomeres, or ALT.

"So what exactly are ORC and ORCA doing at ALT telomeres?" Supriya asks. "Do they have a role in DNA repair? That is something we are actively pursuing at this time."

Prasanth's lab has been assisting Supriya's team with the telomere research, but he says his wife's lab has been similarly helping his team with their work on long non-coding RNA.

In 2010, Prasanth's lab published a paper showing the involvement of a cancer-associated long noncoding RNA known as MALAT1 in regulating the activity of a subset of oncogenic SR family of pre-mRNA splicing factors in human cells.

Later in 2016, his laboratory demonstrated that when MALAT1 is overexpressed in breast cells, the cells form tumors, and when MALAT1 is depleted in breast cells, the cells lose the properties necessary to produce tumors.

"MALAT1 is also present in normal cells, operating under normal conditions, so maybe cancer cells are exploiting this to their own benefit," he says. "That's why cancer cells are addicted to high levels of MALAT1."

A normal cell has about 2000 to 3,000 copies of MALAT1 in its nucleus, but a cancer cell shows a two to threefold increase in the copy number of MALAT1, "and that completely changes the dynamics," he says. With so many copies at work, MALAT1 influences the activity of more SR proteins in the cell than normal, and the SR proteins, in turn, splice pre-mRNAs of genes that have the potential to cause cancer.

"It's like a puzzle," Prasanth says. "MALAT1 interacts with the SR protein here, and you have the splicing of oncogenic pre-mRNAs there. We're now trying to identify those oncogenic genes whose pre-mRNA splicing is regulated through MALAT1 and SR proteins."

According to Supriya, there is considerable intellectual collaboration between their respective labs, but they also supply skills and knowledge that the other needs. For instance, Supriya uses her expertise in the cell cycle to assist Prasanth's work on the role of long non-coding RNAs in cell cycle progression.

Because Prasanth's and Supriya's labs work together so closely, it's inevitable that scientific discussions continue over their kitchen table back at home. They have a 10-year-old son, and Prasanth says, "Let me put it this way. Our son knows all about MALAT1 and ORCA. But sometimes we have to make a deliberate decision not to be talking science all the time and talk about soccer instead."

ALUMNI NEWS 2017

Dan Allison (**PhD**, 2000) – Started new job as associate research fellow at Pfizer.

Chase Bolt (**PhD**, 2016) – Postdoctoral fellow in Duboule Laboratory, Switzerland, received F32 postdoctoral fellowship.

Thomas Crump (**PhD**, 2000) – Started new job as biotechnology analyst, First National Capital, LLC.

Tom Cycyota (**BS, Biology**, 1982), CEO of AlloSource – Recipient of the 2017 Jeanne C. Mowe Distinguished Service Award from the American Association of Tissue Banks

Ebru Erbay (**PhD**, 2004) – Moved from Bilkent University to Cedars Sinai Medical Center, Los Angeles, as Associate Professor in the departments of Medicine and Biomedical Sciences.

Yejing Ge (**PhD**, 2012) – Postdoctoral fellow in Fuchs Laboratory at the Rockefeller University, received the Irene Diamond Fund/AFAR Postdoctoral Transition Awards in Aging, and the American Association for Cancer Research NextGen Star Award.

Tingxia Guo (**PhD**, 2007) – Promoted to senior process development scientist at Orchard Therapeutics Ltd.

Simi Hurst (**PhD**, 2001) – Promoted to senior director, Clinical & Educational Strategy, Medscape.

Harini Iyer (**PhD**, 2017) – Postdoctoral fellow in Talbot Laboratory at Stanford School of Medicine, received the Stanford Dean's Fellowship.

Nimish Khanna (**PhD**, 2014) – Started new job as a synthetic biologist at Asimov in Boston, MA.

Ambika Nadkarni (**PhD**, 2016) – Postdoctoral fellow in Heald Laboratory at UC-Berkeley, received an American Heart Association Postdoctoral Fellowship.

Jacqueline Payton (**MD/PhD**, 2004/2002) – Assistant Professor of pathology and immunology at Washington University School of Medicine and medical director of the Molecular Diagnostics Laboratory at Barnes-Jewish Hospital, received Distinguished Investigator Award at Washington University.

Xinying Zong (**PhD**, 2017) – Postdoctoral fellow in Feng Laboratory at St. Jude Children's Research Hospital, received the Academic Programs Special Postdoctoral Fellowship.

FACULTY AWARDS 2017

Andrew Belmont received a renewal R01 award from NIH/National Institute of General Medical Sciences, titled "Chromatin Domain Structure and Function".

Martha Gillette as the lead principal investigator secured a 5-year interdisciplinary graduate student training program from the National Science Foundation, titled "Training the Next Generation of Researchers in Engineering and Deciphering of Miniature Brain Machinery".

Xin Li received a new R01 award from NIH/National Eye Institute, titled "Temporal patterning of neural progenitors to generate neural diversity".

K. Prasanth received an Arnold O. Beckman Award from the Research Board of UIUC, titled "Determine the role of MALAT1 lncRNA in hypoxia response".

K. Prasanth (with Andrew Belmont) received an early-concept grant for exploratory research (EAGER) award from the NSF, titled "Developing TSA-RNA-seq for Subcellular Transcriptomics".

Supriya Prasanth received the 2017 Faculty Research Excellence Award, School of Molecular and Cellular Biology, UIUC.

Rachel Smith-Bolton was named an I. C. Gunsalus Scholar in the College of Liberal Arts and Sciences.

Lisa Stubbs received a new R01 award from NIH/National Institute of Mental Health, titled "Mechanism of AUTS2-liked neurodevelopmental disorders".

Dr. Craig Mizzen, Associate Professor of Cell and Developmental Biology, passed away at his home on January 5, 2018, after a long and heroic battle with cancer. He was 61.

Craig received his PhD from the University of Toronto. He spent several years as a postdoctoral trainee, lab manager, and senior research associate in the laboratory of Dr. C. David Allis, a pioneer of the histone code. An exceptionally talented biochemist, Craig tackled fundamental questions in epigenetic regulation. He joined the Department of Cell and Developmental Biology at the University of Illinois Urbana-Champaign in 2002 as an assistant professor, and established a successful research program studying the roles and mechanisms of histone modifications in the regulation of chromatin structure and gene expression. Craig's deep passion for science, especially for the beauty of biochemical approaches, and his broad knowledge base earned him respect and admiration from his colleagues, students, and collaborators.

An eternal optimist, Craig always believed the next big scientific discovery was right around the corner in his lab. He faced his illness with the same conviction and scientific approach, and beat the odds of his prognosis by overcoming cancer time and again until the last battle, all while maintaining his research program, teaching, and training graduate students. Craig was also the loving husband to Dr. Lyne Levesque and doting father to their three young children. His memory will be cherished by his family, colleagues, students, and friends.

2017 DEPARTMENTAL AWARDS

Graduate Students

Oyetunji A Tungoon Memorial Award for Outstanding Research Achievements:
Keaton Schuster
Advisor: Dr. Rachel Smith-Bolton

CDB Platform Presentation Award:
Kook Son
Advisor: Dr. Jie Chen

Chester & Nadine Houston Graduate Fellowship:
Yo-Chuen Lin
Advisor: Dr. Supriya Prasanth

Outstanding Teaching Assistant Award:
Ruiqi Liao
Advisor: Dr. Craig Mizzen

Undergraduate Students

Roderick MacLeod Awards for Academic Excellence:
Nicole Blum
Advisor: Dr. Mary Schuler
Amish Khan
Advisor: Dr. Jay Mittenthal

Outstanding Undergraduate Research Achievement Award:
Vamsikrishna Naidu
Advisor: Dr. Xin Li

Undergraduate Research Achievement Awards:
Nicole Blum
Advisor: Dr. Mary Schuler
Katrina Dovalovsky
Advisor: Dr. Supriya Prasanth
Allison Hollatz
Advisor: Dr. Mary Schuler
Amish Khan
Advisor: Dr. Jay Mittenthal
Kurt Reynolds
Advisor: Dr. Lisa Stubbs
Benjamin Wang
Advisor: Dr. Rachel Smith-Bolton

GRADUATE STUDENT AND POSTDOC NEWS 2017

Nayab Abidi (Advisor: Dr. Rachel Smith-Bolton) received a travel award from Gordon Research Conference, Tissue Repair and Regeneration, June 2017. She was also selected to give a talk at this conference.

Nayab Abidi (Advisor: Dr. Rachel Smith-Bolton) chosen to participate in the highly competitive year-long Genetics Peer Review Training Program run by the Genetics Society of America in conjunction with the journal Genetics.

Dr. Amanda Brock (Smith-Bolton lab) selected to give a Hilde Mangold Postdoctoral Symposium talk at the Society for Developmental Biology Annual meeting.

Li-Hsin Chang awarded PhD, August 2017 (Advisor: Dr. Lisa Stubbs)
Thesis title: "Deep vertebrate roots for mammalian krab zinc-finger transcription factors"
Current position: Postdoctoral Researcher, Centre national de la recherche scientifique.

Dr. Yu Chen (Belmont lab) started her position as a Postdoc Fellow in Tjian-Darzacq Lab, HHMI/University of California, Berkeley.

Harini Iyer awarded PhD, August 2017 (Advisor: Dr. Phillip Newmark)
Thesis title: "Characterization of germ cell development in free-living and parasitic flatworms"
Current position: Postdoctoral Research Fellow, Stanford School of Medicine.

Rajashekar Iyer (Advisor: Dr. Martha Gillette) selected to give a talk at the Society for Neuroscience Annual Meeting, November 2017.

Mahdieh Jadaliha (Advisor: Dr. K. Prasanth) received a Graduate College Dissertation Completion Fellowship.

Anika Jain awarded PhD, May 2017 (Advisor: Dr. Martha Gillette)
Thesis title: "Filopodia Borne Along Tips and Shafts of Neuronal Dendrites Comprise Two Distinct Populations"

James Kemp awarded PhD, May 2017 (Advisor: Dr. William Brieher)
Thesis title: "A study on the modulation of alpha-actinin and filamentous actin"
Current position: Postdoctoral Researcher, The University of North Carolina at Chapel Hill.

Dongwook Kim (Advisor: Dr. Jie Chen) received a travel award from the American Society of Biochemistry & Molecular Biology Annual Meeting, April 2017.

Ruiqi Liao awarded PhD, May 2017 (Advisor: Dr. Craig Mizzen)
Thesis title: "Regulation and function of interphase histone H1 phosphorylation in pluripotent cell differentiation"
Current position: Postdoctoral Researcher, University of Wisconsin-Madison.

Yo-Chuen Lin (Advisor: Dr. Supriya Prasanth) received a travel award from the Cold Spring Harbor Laboratory Meeting, Eukaryotic DNA Replication & Genome Maintenance, September 2017.

Keaton Schuster (Advisor: Dr. Rachel Smith-Bolton) received a travel award from the Society for Developmental Biology Annual Meeting, July 2017.

Dr. Deepak Singh (K. Prasanth lab) started his position as a Postdoctoral Fellow in the lab of Julio A. Aguirre-Ghiso at the Icahn School of Medicine at Mount Sinai.

Nilmani Singh (Advisor: Dr. Jie Chen) selected to give a talk at the American Society of Biochemistry & Molecular Biology Annual Meeting, April 2017.

Yuan Tian (Advisor: Dr. Rachel Smith-Bolton) received a travel award from the Gordon Research Conference, Tissue Repair and Regeneration, June 2017.

Yating Wang awarded PhD, August 2017 (Advisor: Dr. Supriya Prasanth)
Thesis title: "Role of WD domain-containing proteins in cell cycle progression"
Current position: Postdoctoral Fellow, New York Langone Medical Center.

Xinying Zong awarded PhD, May 2017 (Advisor: Dr. K. Prasanth)
Thesis title: "Discovery and analysis of long noncoding RNAs in gene expression control and cell cycle progression"
Current position: Postdoctoral Researcher, St. Jude Children's Research Hospital, Department of Immunology.