UNIVERSITY of CALIFORNIA • IRVINE

The Irvine Division of the Academic Senate of the University of California is pleased to present its Distinguished Faculty Awards for 2012-2013

TUESDAY, DECEMBER 11, 2012 5:30 p.m. UCI University Club

James W. Hicks

Professor of Ecology and Evolutionary Biology Daniel G. Aldrich Jr. Distinguished University Service Award

Michael B. Dennin Professor of Physics and Astronomy Distinguished Mid-Career Faculty Award for Service

Robert M. Uriu Professor of Political Science Distinguished Faculty Award for Teaching

Marcello O. Fiocco Professor of Philosophy Distinguished Assistant Professor Award for Teaching

Zuzanna S. Siwy

Professor of Physics and Astronomy Distinguished Mid-Career Faculty Award for Research

Matthew D. Law

Professor of Chemistry and Chemical Engineering and Materials Science Distinguished Assistant Professor Award for Research

Michael R. Rose

Professor of Ecology and Evolutionary Biology The recipient of the Distinguished Faculty Award for Research will present a lecture:

HOW TO CONTROL AGING

~

Chancellor Michael V. Drake cordially invites you to a reception immediately following the lectures.

In Remembrance

Gilbert L. Geis 1981 – Distinguished Faculty Award for Research

Medhat A. Haroun

1997 – Distinguished Faculty Award for Teaching

R. Duncan Luce

1994 – Distinguished Faculty Award for Research 2003-2004 – Daniel G. Aldrich Jr. Distinguished University Service Award

F. Sherwood Rowland

1977 – Distinguished Faculty Award for Research

Daniel G. Aldrich Jr. Distinguished University Service Award

James W. Hicks Professor of Ecology and Evolutionary Biology

For most of my life I have been interested in how animals work. As a child, this interest was manifested in a small menagerie of spiders, snakes, lizards and a lone kangaroo rat (much to the chagrin of my parents). Following graduation from EI Dorado High School, in north Orange County, I stayed close to home in order to work in my father's small business (a dry cleaners in Fullerton, CA). In 1977, I obtained a B.S. in Biology from California State University at Fullerton. During my years at Fullerton, I was exposed to the fields of comparative physiology and natural history, and I soon made the decision to continue my education in graduate school. In 1977 I moved to Albuquerque, New Mexico, where I received an M.S. in Biology, followed by a Ph.D. in Physiology from the University of New Mexico School of Medicine in 1984. My graduate degree was augmented by postdoctoral fellowships in Germany (Max Planck Institute for Experimental Medicine) and the Physiological Research Laboratory, Scripps Institution of Oceanography, UCSD. In 1988, my first faculty position was in the Department of Physiology at Creighton University School of Medicine in Omaha, Nebraska, followed by my moved to the Department of Ecology and Evolutionary Biology here at UCI in 1992.

My research provides an evolutionary perspective into circulation and respiration and seeks to discover not only differences among organisms, but also the unifying principles shared by diverse organisms. My academic interests have resulted in providing me with many opportunities to communicate how animals' work, and how natural selection may have shaped animal form and function. Over the years I have consulted with the California Museum of Science and Industry, and have contributed to several TV productions, including "Circulation: the River of Life-Different Designs", which was awarded an Emmy in 1997, and more recently on the BBC productions "Life in Cold Blood" with Sir David Attenborough, and "Inside Nature's Giants" with Richard Dawkins. In 2006 I was ask to host a television pilot for Animal Planet/Discovery "Twisted Creatures" and from 2005-2007, I consulted on the Pixar/Disney Film, "Wall-E", where the film's producers sought my input on the long-term effect of living in space on human physiology.

I believe that one of the distinguishing characteristics of the University of California is the tradition of sharedgovernance and I consider it an honor to contribute in the responsibility of guiding the operation and management of the university. Occasionally shared-governance can seem burdensome, taking "precious" time away from scholarship. However, the collective contributions of many committees are absolutely essential to the research and teaching missions of the University, and I believe, it is the tradition of shared-governance that contributes to the greatness of the University of California.

Receiving the Daniel G. Aldrich Jr. Distinguished University Service Award is humbling. Over the past twenty years, I have had the opportunity to serve with and witness the valued contributions of many distinguished, thoughtful and creative colleagues. I have strived to make a positive and lasting contribution to this great University, and I deeply appreciate the recognition.

Distinguished Mid-Career Award for Service

Michael B. Dennin Professor of Physics and Astronomy

I started my academic career deciding between three different majors: history, mathematics, and physics. Some interesting turning points were learning the number of pages involved in a history senior thesis and being told by a mathematics professor that the proof I turned in was done the way a physicist would do it. In the end, I earned my A.B. in Physics from Princeton University. While at Princeton, I had the opportunity to work on the largest and smallest scales of the physical world. I was an undergraduate researcher with the experimental particle physics group (the smallest), and I did my senior thesis on inflationary models of the early universe (the largest). After graduating in 1988, I went on to graduate school at U. C. Santa Barbara with the intent to study quantum gravity (the smallest and largest combined). During my first year at Santa Barbara, I was seduced into the lab of Guenter Ahlers and David Cannell, where I became enamored with the physics of things that fit on a tabletop. I have been doing "tabletop" physics ever since. After finishing at Santa Barbara, I began my southern trek through the UC system and did a postdoc at UCLA in physical chemistry. There my interest turned to foams and other "complex" fluids. Finally, I joined the faculty at U. C. Irvine in January of 1997.

Here at UCI, my research focuses on asking the question: what, if any, new physical principles emerge in complex systems? What does this mean? Consider foam, such as shaving cream. Foam is composed entirely of two fluids: a gas (the bubbles in the foam) and a liquid (the walls between the bubbles). Reductionism tells us that the foam is a fluid (because its smallest parts are). Therefore, it should flow freely and conform to the shape of any container in which it is placed. However, shaving cream can clearly hold its shape outside of a container. This rigidity is the result of the organizational structure of the bubbles; they press against each other. A different arrangement of the gas and liquid would flow freely. The rigidity of foams is not a violation of the "fundamental" laws of microscopic physics, but presumably there are additional new laws of physics that are not based on the molecular level interactions that can be used to describe this behavior. To try to better understand such phenomenon, my research focuses on a range of experiments, from studies of foam to studies of proteins interacting with lipid membranes.

One of my passions has always been teaching – which has often taking the form of outreach to students of all ages (pre-school to retired engineers). These outreach efforts often involved connecting science and superheroes, which has led to a number of appearances on the History Channel. Even more recently, I have been very interested in the role of online education, both for the residential students at the University and as a tool for reaching a broader audience. This was one of many reasons that I became highly active in the Academic Senate, especially the Council on Educational Policy. I would like to thank the Senate for recognizing my efforts in this area, and the other service I have actively pursued for the University.

Distinguished Faculty Award for Teaching

Robert M. Uriu Professor of Political Science

When I first arrived at UCI in 1997 I had been teaching only graduate level classes at my former school, Columbia University. I noticed that the students here were on the passive side not only in discussions but also in their approach to learning. So I sat down with a group of students to talk about ways to make learning more interesting. Ever since then, I have been using interactive methods to get students more engaged in the learning process. These methods are time and energy consuming, but I have found that students come out with a much deeper understanding of the material.

For all of my lecture courses I have the students form into teams, and then prepare for and engage in in-class debates. Teams must get together to figure out what their position is, anticipate how they will be attacked and how to respond, and what the weak points of the other side are, etc. Just by thinking in this way, students automatically get one or two levels deeper in terms of their understanding of the material. I have made it a practice to hold long prep sessions with each of the teams, in which we go over what they are arguing, what they are missing, etc. Teams have taken these meetings very seriously, and so usually come well versed in the debate material. I have found that students are naturally competitive, and don't want to "lose" the debate. So I have been amazed at how much extra effort they put in to thinking about how to argue their case – not only going over the readings in minute detail, but doing outside research, arguing among themselves about how to respond, etc. I love seeing this because they are learning so much more just so they can get the debate "win."

My seminar classes are based on a series of "policy simulations" of real-time issues, in which students form into very small groups to represent either different government organizations or different governments. I also meet with each of these small groups outside of class before each simulation. This is of course time consuming but also rewarding, as these students are very advanced and really know their stuff, and so we are able to get into some highly sophisticated discussions.

Students seem to have fun with a learning process that requires that they are actively engaged. And in the process I think they learn more than they normally would. Students also clearly enjoy working together rather than studying in isolation. Many have developed deeper friendships (and I know of at least three marriages of students who were on the same team!) In all of my classes I encourage students to learn from each other, and to teach each other. I have found that this helps not only the less advanced students, but also the better students who are doing the "teaching." I obviously do not grade on a curve – my only goal is to encourage students to learn.

Finally, I would say that I just really enjoy teaching. I get a great deal of satisfaction in seeing my students learn, but even more when I see them developing an interest in learning more. I think students sense all this, and tend to appreciate it.

Marcello O. Fiocco Professor of Philosophy

My first encounter with the notion of a philosopher was as a boy, in a tall book. The philosophers were portrayed as men in togas, and so I thought philosophy was a thing of the past, like voyages of discovery and polar exploration. I knew otherwise by my freshman year, and took two introductory courses, yet was so put off, I did not even consider taking another one. I chose to major in languages and literature. By the end of my junior year, though, I realized that what had led me to literature—interests in existence and reality and meaning and representation—could be taken up more directly by studying philosophy.

As a senior, I changed majors, resolving to become a philosopher still without a clear idea of what philosophy was. The late start in a discipline that cannot be rushed left me playing catch-up for years. To find the time and means to do this led me from one end of this country to the other, and then across the world. I had a position in Sharjah, adjacent to Dubai, in the United Arab Emirates when I received the email offering me a position at UCI. That email was one of the great thrills of my life. So I would like to thank the Department that saw fit to send it to me and to the wonderful Chair, David Woodruff Smith, who wrote it.

By the time I came to Irvine, I knew what philosophy is. It is not any sort of subject matter, it is an activity. It is critical thinking and this is rooting out presuppositions and assumptions, examining their justification and determining their consequences; rejecting the assumptions that are untenable and figuring out what might replace them. Like any activity, the only way to learn it is by doing it. I was never explicitly taught this, and yet it was something I learned. From the beginning, I studied philosophy with the intention of teaching it, so I learned with an awareness that has provided the basis of my pedagogy. I remember what it was like to be bewildered and *how* I was confused and some of the mistakes I made. Keeping this in mind has helped me when trying to avoid or forestall certain impediments to understanding. I remember well the discouragement and discomfort of learning. Indeed, not only do I remember these things, I still experience them daily. I let my students in on all this, as I assure them that struggling and being discomfited is the way to becoming a more critical thinker.

One can engage philosophically with any subject matter that is suitably rich. There are many issues that interest me and so these are the things I focus on in my courses. I do not, however, think any of them are inherently interesting. But, as I often tell my students, they need have no specific interests in the topics of my courses to benefit from them. So philosophy, in itself, is not engrossing; nor do I think it fun, and I do not try to make it fun. I do, however, think critical thinking is crucially important to living a fulfilling life and that learning how to do it is always worthwhile—and a great privilege for those who have the luxury to do so. This is what I try to impress upon my students in my classes that are not necessarily interesting or fun.

Thinking critically is vitally important, in each of our lives and in our lives together. Yet learning how to do it is difficult and often unpleasant. Since philosophy is an activity, one needs to practice; since it is difficult, one does not usually want to. The one thing I try to do in all my classes is get my students to do more than listen. I ask questions and I call on them. I ask for (and sometimes demand) questions from my students and I call them out. I ask students to articulate points I have just explained and to explain points I have just articulated. I ask them why I am making some particular point and why I just made the point I just made (and sometimes ask them to tell me why I am asking so many questions). I do this to help them practice because I believe their happiness and well-being depend on it.

Distinguished Mid-Career Award for Research

Zuzanna S. Siwy Professor of Physics and Astronomy

I feel honored to be chosen by the Academic Senate and the UCI community for this award. Being recognized by my colleagues is a truly wonderful feeling.

I received my PhD degree from the Silesian University of Technology in Gliwice, Poland. It is the university that my Father attended and I decided to follow in his steps. However, instead of studying civil engineering like my Father did, I focused on physical chemistry that I felt would allow me to participate in research that is both application-driven as well as pursue more fundamental questions.

My research on single nanopores, therefore 'holes' whose diameter is 100,000 smaller than the thickness of a human hair, started already in Gliwice. Nanopores in biological cells are the basis of all physiological processes of a living organism including heart and nerve functions. My early research focused on fundamental physical and chemical processes that underlie very selective and efficient transport of ions and molecules through these tiny structures.

In the years 2000-2003 I was a fellow of the Alexander von Humboldt Foundation and the Foundation for Polish Science doing research at the Institute for Heavy Ions Research in Darmstadt, Germany. My research there included development of various nanotechnology tools for nanostructuring and characterizing materials and I became a co-inventor of three international patents.

My research on nanopores continued at the University of Florida in Gainesville where I applied nanopores as a basis for biosensors targeted at various proteins including biohazards such as ricin.

I joined the Department of Physics and Astronomy of UCI in July 2005. The highly interdisciplinary environment of UCI is what attracted me to the university. Since my arrival, I have collaborated with colleagues from other departments in the School of Physical Sciences as well as the School of Engineering. My research program has focused on using nanopores as building blocks in the preparation of ionic and chemical circuits for controlling the transport of ions and molecules in water solutions thus an environment in which biomolecules function in a living organism. There are many devices controlling transport of electrons but very few control transport of ions in a solution. The research performed in my group attempts to fill this gap. We have already built ionic diodes and transistors, now we are trying to combine these elements into circuits.

These efforts were recognized by the NSF Career award as well as the Presidential Early Career Award for Scientists and Engineers. In 2007-2009 I was a fellow of the Sloan Foundation. In 2009, I was also a recipient of the Bessel award from the Alexander von Humboldt Foundation.

Another direction of our research aims at developing new, more sensitive tools to detect viruses. The system that we prepared is sensitive not only to the virus size but also surface chemical properties and shape.

Since arriving at UCI I have been involved in outreach activities focused on organizing visits of middle and high school students to UC Irvine combined with research experience in nanotechnology. The visits were organized within the UCI School Partnership in Research and Information Technology (SPIRIT) as well as Laboratory Experiments and Activities in the Physical Sciences (LEAPS) programs. Since 2007, over 200 students from Santa Ana and Compton have visited our laboratory.

I am very grateful to the UCI community for the ongoing support and encouragement. It is a privilege to be a part of this vibrant campus.

Distinguished Assistant Professor Award for Research

Matthew D. Law Professor of Chemistry and Chemical Engineering and Materials Science

I was born and raised in (northern) California and spent four fantastic years experiencing weather and liberal idealism at Wesleyan University in Middletown, Connecticut, graduating with degrees in chemistry and government in 1999. This choice of double major sometimes raises eyebrows, but follows naturally from my long interest in environmental protection from both the science and policy sides. I was also periodically obsessed with astrophysics but ultimately decided it was not the most practical path for someone concerned about earthly things like fossil fuel use and biodiversity. I did a Ph.D. in chemistry with Peidong Yang at UC Berkeley from 2000 to 2005 with the goal of learning enough about electronic materials to invent new alternative energy technologies. For me, Berkeley was a great time to do science. My thesis was about the application of semiconductor nanowires in sensors, lasers, and solar cells; it was named as one of the five best chemistry theses worldwide that year by IUPAC, the international chemistry federation. I spent two postdoctoral years with Art Nozik at the National Renewable Energy Laboratory (NREL) in Golden, CO, to develop a new type of solar cell based on films of quantum dots (nanometer-sized spherical crystals). I joined the UCI Chemistry department in the summer of 2008 to start a group focused on the chemistry and physics of new materials for solar energy conversion.

The goal of my research is to devise practical ways to make electricity and chemical fuels from sunlight. To do this, my group creates new solar energy conversion and storage devices from nanoscale and thin film materials, integrating materials synthesis and basic physical studies with device fabrication, modeling, and optimization. Nanoscale materials are a major focus because of their potential to deliver breakthroughs in the efficiency, cost, and scalability of devices that produce electricity or chemical fuels from sunlight. For example, quantum dots can be deposited from solution in a fashion similar to newspaper printing, and they exhibit unique physical effects that may be harnessed to boost the efficiency of solar cells. My group is pursuing three long-term projects that tackle the "terawatt challenge" of alternative energy: (i) next-generation guantum dot solar cells, (ii) thin-film solar cells based on abundant and nontoxic elements, and (iii) devices that can decompose water into hydrogen gas for use as a green fuel. Each project combines the tools of chemistry, physics, and electrical engineering in an attempt to create optimized materials and devices with the potential to be rapidly manufactured on a large scale. I lead two multi-PI groups funded by the NSF and DOE and serve as a scientific thrust leader of a DOE Energy Frontier Research Center. I have been lucky to work with gifted students from many disciplines and collaborators spanning the Chemistry, Physics, Mathematics, and ChEMS Departments at UCI, as well as people at NREL, Los Alamos National Laboratory, and other institutions. A few of the questions that currently interest me include: How do electrons move in quantum dot films, and how can we fool them into moving much faster and farther than is now thought possible? Can dye-coated nanoscale powders be used to split water into its constituent gases? What causes the poor voltage performance of otherwise promising semiconductors like iron sulfide? Each of these questions links fundamental science with applications in the real world.

This award comes as an unexpected honor. I would like to thank the Academic Senate and the UCI faculty as well as the members of my research team, our collaborators, and my wife, Lori, for her constant support and encouragement.

Distinguished Faculty Award for Research

Michael R. Rose Professor of Ecology and Evolutionary Biology

I arrived at UCI on July 4, 1987, as a Canadian immigrant. I had been a relatively contented professor at Dalhousie University in Halifax, Nova Scotia, when UCI first contacted me about coming in 1983. I knew and liked two of UCI's then faculty, Rich Lenski and Tom Johnson, who played big roles in persuading me to come. In my first years on campus, I taught with Tom and collaborated on research with Rich. Indeed, life on the faculty of UCI for me has featured a plethora of wonderful colleagues, from the much-lauded Francisco Ayala to my mainstay partner in science, Laurence Mueller, now also my departmental Chair.

Coming to UCI 25 years ago was one of the two best decisions I have made in my scientific career. Not only did I benefit from its burgeoning faculty, I also found that it offered an ideal student body for my research, most notably the UCI School of Biological Sciences truly remarkable 199 undergraduate research students. Over the last quarter-century, thousands of these students have worked in my lab, handling millions of the fruit flies that are the foundation of my career as an experimental evolutionist. But I should also mention some of my amazing postdoctoral fellows and past doctoral students here at UCI, including Ted Hutchinson, Joseph Graves, Adam Chippindale, Armand Leroi, Ted Nusbaum, Hardip Passananti, Denise Deckert, Jay Phelan, Henrique Teotonio, Casandra Rauser, Molly Burke, and Parvin Shahrestani, as well as present graduate students Larry Cabral, Marta Santos, Jimmy Kezos, Mark Phillips, Grant Rutledge, and Marjan Koosha. They all wear the badge of honor that comes from surviving the rigors of our massive experiments and their unreasonably demanding advisor.

Our work here at UCI has built on two basic elements: the evolutionary theory of aging and the techniques of experimental evolution. I was introduced to the evolutionary theory of aging in the 1970s by my doctoral advisor, Brian Charlesworth, but we were able to improve on it here at UCI, particularly thanks to some heavy lifting in our collaborations with Larry Mueller. I had been an experimental evolutionist for ten years prior to coming to UCI, but together with Larry Mueller, Rich Lenski, Al Bennett, and others, we made UCI the world's leading campus for experimental evolution. Thus I now happily serve as Director of the University of California's systemwide Network for Experimental Research on Evolution, headquartered at UCI.

Finally, as a Canadian working in the United States I am not eligible for national academy membership in either country, so the awards I have received have come solely from UCI and from international organizations, making me especially grateful to the Senate for this award.