The Irvine Division of the Academic Senate of the University of California
is pleased to present an evening of Distinguished Faculty Lectures

WEDNESDAY, OCTOBER 17, 2007
7:00 p.m.
UCI University Club

SENSING THE EARTH'S MAGNETIC FIELD:
HOW DO BIRDS DO IT?

Thorsten Ritz
Professor of Physics and Astronomy
2007-2008 Recipient of the Distinguished Assistant Professor Award for Research

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MOSQUITO-BORNE DISEASE IN THE 21ST CENTURY,
COUNTING UP OR COUNTING DOWN

Anthony A. James
Professor of Microbiology and Molecular Genetics and
Molecular Biology and Biochemistry
2007-2008 Recipient of the Distinguished Faculty Award for Research

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In addition, the following Senate Awards will be announced:

Hung Fan
Professor of Molecular Biology and Biochemistry
2007-2008 Recipient of the Daniel G. Aldrich Jr. Distinguished University Service Award

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

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2007-2008 Distinguished Assistant Professor Award for Research

Thorsten Ritz
Professor of Physics and Astronomy

I was born and raised near Frankfurt, Germany. My father is German and my mother was Korean, hence, my accent and looks do not match. From early on, I was attracted by the fundamental and quantitative aspects of the sciences, in particular, by mathematics. After winning the state math competition in eighth grade, I taught myself calculus from textbooks. Finding this much harder than I cared for as a teenager, saved me from becoming a math geek and diverted my desire for learning to other subjects like languages and playing guitar. Although I found math and chemistry most interesting in high school, friends and teachers helped me to realize that physics at the university level would be a better match for my interests. They were right, and the first semesters at the Goethe University in Frankfurt were truly exciting. Concepts and approaches that I could barely grasp at the beginning of each semester had become familiar and clear by the end of them. After three semesters, I could look back on some of the highlights of physics, such as quantum mechanics and general relativity. However, I also started to become increasingly less interested in the problems addressed in physics. I wanted to understand the phenomena of life that I could see, hear, and sense around me, rather than the properties of a piece of matter in some extreme state. I studied first philosophy and then psychology on the side, and was very attracted by cognitive and social psychology.

Ultimately, I decided that I would be most at home in applying the physics approach to the complex challenges in the life sciences. My first foray to the U.S. was to the Center for Complex Systems Research at the University of Illinois at Urbana-Champaign for a five-month research experience. I ended up staying for my Ph.D. in the group of Klaus Schulten at the same university. I had heard Dr. Schulten present a talk in Germany on his idea that magnetoreception might be based on spin-selective chemical reactions, and I told him that I wanted to work on this topic. He felt, however, that the true challenges in this topic would be to design new experiments, and that there were more fruitful topics for a thesis within his theoretical biophysics group. Following his advice, I worked on a quantum physical description of photosynthetic processes for my Ph.D. thesis, my first truly interdisciplinary work.

Heeding my inner compass, rather than the advice of some senior scientists, I decided to use my postdoctoral time to find out whether the magnetic sense of animals was really based on chemical reactions. Funded by a generous fellowship from the Fetzer Institute, I switched from quantum calculations to working in behavioral biology labs: breeding, feeding, and testing fruit flies, salamanders and, finally, migratory birds. Meanwhile, I had also applied for, and been offered, a faculty position. The grass-roots interdisciplinary atmosphere at UC Irvine convinced me to join the Department of Physics and Astronomy in April 2005, just two months after the first test season with migratory birds.
My magnetoreception research now focuses on experiments aimed at identifying the sensor molecules underlying magnetoreception. While the hunt is not over yet, there is very promising progress towards solving the long-standing mystery of the physiological basis of magnetoreception. Curiously, the new information about the biophysical basis of magnetic sensing raises exactly the types of questions I thought I would leave behind forever when I turned from cognitive psychology: how is magnetic information represented in the brain, and how can we test hypotheses in behavioral and neurobiological experiments? Such experiments present the next frontier of magnetoreception research and are underway with international collaborators.

2007-2008 Distinguished Faculty Award for Research

Anthony A. James
Professor of Microbiology and Molecular Genetics and Molecular Biology and Biochemistry

I am from a large family (five brothers and four sisters), and can remember my mother, a librarian, taking us to the local branch to get books to read. In retrospect, I think she was very clever. Instead of buying toys, she could get something new for us every two weeks and it didn't cost a thing! My father, a mathematician, moved his family west to chase Sputnik in the booming space industry of the late fifties. Someone asked me as an eight-year old what I wanted to be, and I blurted out "scientist"! While my approaches were unsophisticated, I enjoyed seeing new things.

Science was put on hold as I grew up in the sixties in the greater Los Angeles area. There was a lot going on and I was caught up in the counter-culture music. However, my parents had imprinted on me going to college, and I accepted it as part of the natural course of things. While I did not particularly like studying, I did enjoy learning. I thought I'd follow my brother's footsteps to Long Beach State (as it was known then), but as an afterthought, I applied to the new UC down in the orange groves. To my surprise, I was accepted at UCI in 1969. My first class was at 8:00AM, my second at 4:00PM, with a whole day in between. Hello Laguna Beach! I was undeclared for two years as I tried to follow up on music and earning money. I realized after my second year that I was going to graduate eventually, and I'd better select a major. I remembered that I liked biology and that summer I took a work-study job washing bottles in a Drosophila genetics laboratory headed by Howard Schneiderman. During breaks and lunch on the first day, I asked the people in the lab what they were doing, and got a nice surprise. If you ask most scientists about their work, they get excited and tell you. The next day they told me that I was no longer washing dishes, I was working with them! I am by nature a non-deterministic-type person. I don't believe in fate and I believe everyone has a free will, but here I was working in genetics, the most deterministic science of them all! I did my undergraduate and graduate theses projects with Peter Bryant on a mutation that I discovered that summer. Drosophila genetics provided a firm foundation for what was to come later.

I went to Boston in 1979 as a postdoctoral fellow to work with Richard Kolodner, a UCI alumnus, at the Harvard Medical School. The tools of molecular biology were just being applied to many different organisms and I was witness to the birth of molecular genetics in the fruit fly, yeast and other organisms. I worked first with *Escherichia coli* to determine if there was a pathway for genetic recombination analogous to that which was determined for replication. Eager to look at whole animals instead of plates, I then studied circadian rhythm genes with Michael Rosbash at Brandeis University.

The Department of Tropical Public Health, Harvard School of Public Health, recruited me to a MacArthur Foundation-funded effort to bring the tools of molecular biology and immunology to bear on vector-borne diseases. I could do anything I wanted with vectors as long as I was a "catalyst for change". Two things intrigued me about the genetics of mosquitoes and the pathogens they transmit. First, although there are many blood-borne viruses and protozoan and metazoan parasites, specific mosquito species do not transmit all of these pathogens. For example, *Anopheles* mosquitoes transmit human malaria parasites, and members of the family Culicinae transmit viruses. This strong host-pathogen association has a genetic basis. Second, it is possible to select within a species a pathogen-resistant population from one that ordinarily transmits. Crosses can be made with the refractory and susceptible strains to answer questions addressing dominance-recessive relationships, how many genes are involved and where the genes map. These observations led me and others to consider how a single dominant allele of a gene conferring resistance could be increased in frequency in mosquito populations so that pathogen transmission would be blocked. However, I recognized that working with endogenously-derived refractory genes was going to be difficult, so I proposed that novel, engineered genes could be used instead. An engineered gene would consist of mosquito-derived control DNA sequences that regulate when in development, where in the insect and how much of the product is made, and an expressed effector portion that disables the parasite. All we had to do now was make these genes, put them into mosquitoes, get the mosquito out there where they can do some good, and hopefully reduce disease and death. I have been working on this ever since! I came back to UCI in 1989 as an assistant professor in MBB and in 2004 was made a split appointment with Microbiology and Molecular Genetics. It seems entirely appropriate that I am associated with two Departments in two Schools as our work bridges major gaps in basic and applied science.

2007-2008 Daniel G. Aldrich Jr. Distinguished University Service Award

Hung Fan
Professor of Molecular Biology and Biochemistry

I was born in Beijing, China in 1947, and my family moved to West Lafayette, Indiana in 1949 where my father (a physicist who had trained in the US in the 1930's) took a faculty position at Purdue University. After graduation from high school, I majored in physics at Purdue, but worked in biology labs as a student. After graduation in 1967, I entered the graduate program in biology at MIT where I did my Ph.D. thesis on the molecular biology of mammalian cells (graduating in 1971).

While I was completing my Ph.D. thesis, another professor in the department (David Baltimore) discovered the enzyme reverse transcriptase in a class of cancer viruses now called retroviruses – he ultimately one the Nobel prize for this discovery. I was in the first wave of his postdoctoral fellows working on retroviruses, and I have worked on these viruses ever since.

I took my first independent position at the Salk Institute in San Diego, where I was a faculty member in the Tumor Virology Laboratory. I conducted research on murine leukemia virus (MuLV), a well-studied retrovirus that causes leukemia in mice. We carried out molecular biology experiments, including some of the early molecular cloning of retroviruses. While in San Diego, I met my partner Michael Feldman.

In 1981 I joined the Department of Molecular Biology and Biochemistry at UCI, recruited by then-chair Krishna Tewari and senior virologist the late Ed Wagner. During the subsequent years, I have continued my research on retroviruses, including MuLV, HIV, simian immunodeficiency virus, human T-cell leukemia virus (HTLV), use of retroviruses as gene therapy tools, and most recently jaagsiekte sheep retrovirus (the cause of a transmissible lung cancer in sheep). In 1986, I was appointed director of the Cancer Research Institute (CRI), an ORU focused on basic cancer research. This led to related activities including directorship of a National Cancer Institute-supported training program in cancer biology, leadership of the cancer biology track of the joint graduate program in Molecular Biology, Genetics and Biochemistry, and organization of over 35 national and international scientific meetings and workshops. In 1990, the UCI Cancer Program was established to coordinate basic, clinical and epidemiologic cancer research on campus, with myself and Frank Meyskens as co-directors. We successfully competed for a National Cancer Institute cancer center support grant in 1994, and in 1997 we received designation as an NCI comprehensive cancer center – the highest designation achievable, and one of only 39 nationwide. We are now called the Chao Family Comprehensive Cancer Center.

During my career at UCI, I have been involved in university service at several levels. I have served as a member and chair of the University-wide AIDS Task Force (UARP), member and chair of the UC Cancer Research Coordinating Committee (CRCC), and member of the University Council on Planning and Budget (UCPB). I have served on and chaired the UCI Committee on Planning and Budget, the institutional animal care and use committee (IACUC) and most recently the Council on Academic Personnel (CAP). For the school of Biological Sciences, I served as acting dean (1989-1990), and as chair of the school facilities committee.

I would like to thank Nita Driscoll, the CRI administrator for essential and outstanding support for over twenty years, Krishna Tewari for mentoring early in my UCI career, Frank Meyskens for a terrific working relationship in direction of the Cancer Center, and Michael Feldman for his love and support.

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