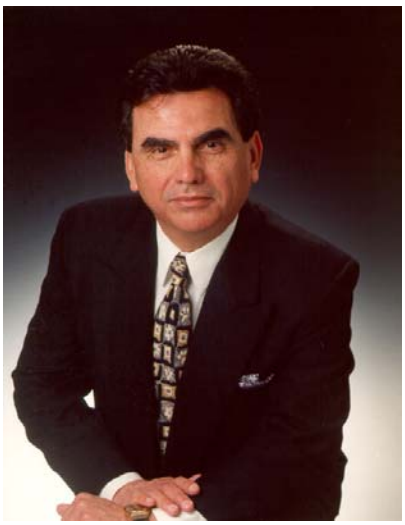
The Photon: Spotlight

On Alumnus Miguel Rios, Jr.

Discussing life after Physics at Maryland

The physics department was very interesting and stimulating. It had many fields of specialization, lots of faculty, lots of graduate students and lots of research going on. It was just humming.

by Maria Elena Alvarez



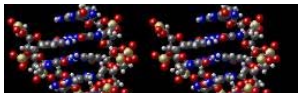
Miguel Rios, Jr., Ph.D., was elected Chairman of the Board of the National Center for Genome Resources at its bi-annual meeting Nov. 1, 2001.

It's been 30 years since Miguel Rios, Jr., completed a doctorate in Experimental Nuclear Physics at the University of Maryland. Those years have been of no small impact to his community and the nation at large.

His latest appointment as Chairman of the Board of the National Center for Genome Resources, NCGR, in Santa Fe, N.M. on the heels of being named Interim President/CEO is but another turn in his formidable career that spans science and business.

NCGR is a nonprofit bioinformatics and computational biology center. Its key scientific direction includes development in systems biology and novel methods for integrating software applications and databases.

The institute's software technologies include PathDB, to assist investigators in modeling and understanding biochemical pathways; ISYS, which integrates independent genomics tools, databases and Web sites; and XGI, an automated system to store, analyze, annotate and visualize large numbers of DNA sequences.



Rios has been on the board since it was founded seven years ago. More than 16 years ago, Rios left his

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On Biophysics

Veteran physicist is honored by colleagues as he brings a new type of physics to Maryland

by Sheldon Smith

Dr. Michael E. Fisher comes from a family of excellence. Several family members are prominent in science and technology.

Rutgers University hosted the 86th Statistical Mechanics Conference, Dec. 16-18 2001, which was held this year in honor of Professor Michael E. Fisher's 70th birthday. Fisher, of Maryland's Institute of Physical Science and Technology and Physics Department, was honored by 40 invited lecturers who came to the three-day event from across the country and around the world.

The first lecturer, Professor Daniel S. Fisher, professor of physics at Harvard University, was Fisher's eldest son. The second, Professor Matthew P.A. Fisher of the Institute of Theoretical Physics, University of California, Santa Barbara, was his youngest son.

Fisher's second son, Dr. Martin J. Fisher of ApproTEC, presented the Human Rights Session Lecture. ApproTEC is a nonprofit organization that develops and markets new technologies in Africa. The topic of his lecture was "Technology for Economic Growth and Job Creation in Africa."

The conference included a banquet on Dec. 16, and featured more than 70 contributed talks.

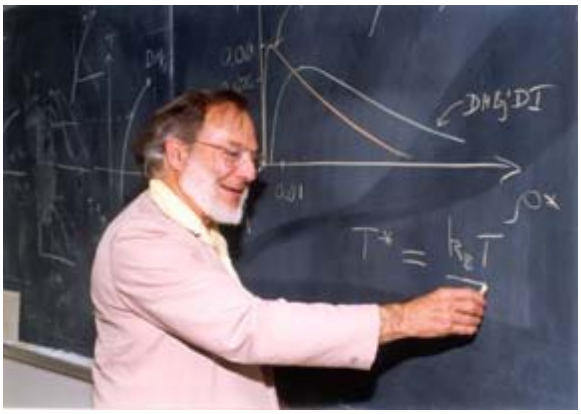
Biophysics employs modern physics to address biological problems.

Fisher has recently become involved in biophysics, where he hopes to bring theoretical physics principles and techniques to better describe how real

biological systems work. This semester he is teaching a new course entitled, "Basic Biophysics for Motion in Cells" ? the first biophysics course to be taught in the Department.

"Biophysics employs all aspects of physics to address biological problems," Fisher said. According to the online course description, the primary aim of the course is to give graduate students in the physical and chemical sciences an introduction to some aspects of modern molecular biophysics, which draws on concepts and ideas from physics, chemistry, engineering and, of course, biology.

How do muscles work? How do cells move? And how do they transport chemical "packages" internally? These are fundamental questions that drive Fisher's research.



Dr. Michael Fisher is one of the world's best known physicists. He has taught students in several locations around the world.

Molecular biophysics must be studied on a nanometer-scale (one nanometer is a millionth of a millimeter), at which one can observe many types of molecular motors that are concerned with motion in cells. "A cell is more complicated than the typical modern city," Fisher said. "It is supported by food delivery, waste disposal, fuel supplies, imports and exports, by a communication infrastructure, and by homeland security systems!"

Just as roads in cities, a network of tracks called microtubules facilitates transportation in cells. Molecular motors are made of proteins: one of the smallest is kinesin. "Kinesins are like small tractors. They consume Adenosine Tri Phosphate fuel molecules, pull loads and can move long distances ? much like big trucks on the highway," Fisher said.

Using as an example the cog railways found in the Alps, Fisher described the microtubules. "They are little tracks," he said. "If you can, imagine the two smooth tracks of a cog railway with a single ridged track in the center." Beneath the train's locomotive is a wheel that looks like a sprocket that grabs the ridges of the center track. "Molecular motors run along their tracks moving chemicals needed by the cell or bringing back the waste. The "cogs" on a microtubule are spaced by only 8.2 nanometers (8.2 nanometers is about a 3 millionth part of an inch) and the motor can take a 100 or more "steps" of this size in a second."

Fisher has been a Maryland faculty member since 1987.

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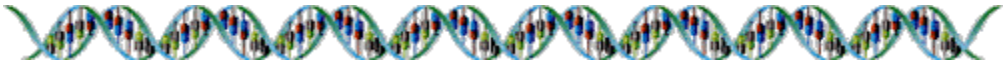
position at Sandia National Laboratories to launch his own company ORION International Technologies, Inc. based in Albuquerque. ORION is a defense contractor engaged in fundamental research; systems analysis, engineering, design, fabrication, test and evaluation and program planning and management. ORION currently provides engineering services; research and development support to the U.S. departments of Defense, Energy and Transportation and to Sandia National Laboratories. It also supports large Department of Defense prime contractors in areas such as directed-energy technologies, space technologies, information technologies, test and evaluation, countermeasures and counter-proliferation of nuclear weapons.

The company has more than 200 employees with operations at White Sands Missile Range, Albuquerque and Santa Fe, N.M., Puerto Rico, Colorado Springs, CO., and Arlington, VA. The success of ORION International Technologies recently led to the creation of a spin-off company, ORION Information Technologies (ORION IT).



Life in Maryland

The University of Maryland was a dramatic change of culture and climate for Rios and his young wife. "Upon arriving at Maryland my wife Maria Estela and I marveled at all the greenery in the landscape and the colonial brick architecture. There were no brick buildings in Southern California. It was clear we were in a very different region of the country. Graduate student housing was great and the university personnel treated me very well as a graduate student.

The physics department was very interesting and stimulating. It had many fields of specialization, lots of faculty, lots of graduate students and lots of research going on. It was just humming. I was fortunate in having a great thesis advisor in Jerry D. Marion. I also received excellent support from other faculty on my research team including professors Paul Hornyak, Frank Young, Marv Roush and Phil Connors," said Rios in a recent interview reflecting on his Maryland experience and the value of his degree in nuclear physics came to play in his life's work.

He obtained his first physics degree from the University of Southern California, followed by a Master's in Physics from California State University in Los Angeles. At CSU, he received a Distinguished Alumnus Award from the School of Letters and Science. After CSU he left for Maryland and graduated in 1971.

After Maryland Rios and his young family returned to California to complete three years of postdoctoral research in Nuclear Astrophysics at the California Institute of Technology. While at Caltech, he was co-author of several groundbreaking papers, including one with Dr. William Fowler, 1983 Nobel Laureate. He then accepted a position with Sandia National Laboratories in

Albuquerque, New Mexico, a place he would finally call home.

Upbringing & Early Influences

Rios was born into a genteel family in El Paso, a predominantly Mexican border community, in Texas. He learned arithmetic from his grandfather before he learned to speak English. He received a solid parochial school education where the nuns provided him with unlimited support in his studies. This education afforded him the ability to develop a keen scientific mind.

During the late 1950s when Rios was in high school the Russians launched Sputnik and the U.S. was actively engaged in a space race. "It was clear to me that people in science were going to be respected in our society and I was developing an interest in physics."

The rigors of applying mathematics to understanding the nature of interaction between energy and matter had great appeal to Rios and he was inspired by the elegance of physics.

"Physics has been instrumental in everything I have done professionally in the areas of science and technology," said Rios.

Leading a successful company and now in his new role at NCGR is a testament to his unique leadership skills. When asked to define his philosophy Rios is quick to respond that his goal has always been to create a vision that motivates people to grow to their highest potential. He applies a very practical approach in leading people by allowing them to succeed.

Today Rios has been married to Maria Estela over 35 years and they have three children, Miguel, III, 33, who works for the European Union-appointed government in Bosnia, Eva, 27, a graduate student at Universidad de Acala in Spain and Madgalena, 25, a cellular biologist in San Diego.

Advice to Physics Students

His advice to students is that physics is a very good field, that will provide graduates with a strong foundation in science that makes them versatile in technology development, academia, fundamental research and engineering. It has allowed Rios to be very versatile in working with multi-discipline teams.

In almost every aspect of life, Rios, has defied stereotypes and taken a road less traveled.

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