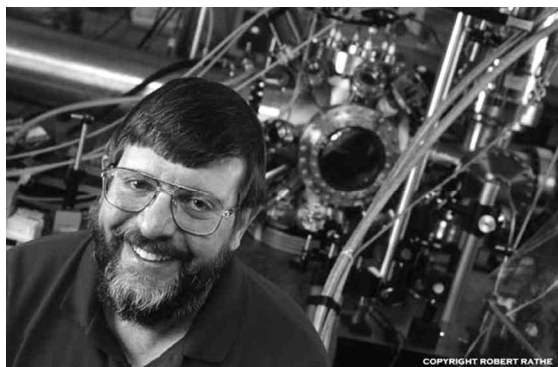


Annual Sigma Xi Research Symposium Set for April 12

The thirteenth Annual Saint Joseph's University Sigma Xi Student Research Symposium will be held on April 12th, 2002. The keynote speaker will be Dr. William Phillips of the National Institutes of Standards and Technologies. His seminar, entitled "Almost Absolute Zero: The Story of Laser Cooling and Trapping", describes his work on ultra-low temperature systems for which he won the 1997 Nobel Prize in Physics.

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Dr. William Phillips of the National Institute of Standards and Technology, will open the 2002 SJU Sigma Xi Symposium. Photo, copyright Robert Rathe.

SJU Hosts Panel Discussion on Anthrax and Bioterrorism

October panel discussion draws crowd of more than 150 faculty, students, staff and community members.

On October 25, 2001, the Saint Joseph's University Chapter of Sigma Xi, in conjunction with the Department of Biology and the Early Responders Distance Learning Center (see story in the June, 2001 newsletter) hosted a panel discussion entitled: "Bioterrorism: Should We be Afraid? (Probably not and we will tell you why)". More than 150 faculty, staff, students and neighbors attended the panel that ran from 11:30 am until 1:00 pm.

The discussion, which was moderated by Dr. Michael McCann, Associate Professor of Biology and Secretary of the SJU Sigma Xi Chapter, began with a description of the biology of *Bacillus anthracis*, the bacterium which causes the disease anthrax, presented by Dr. John Tudor, Professor and Chair of Biology. He described how the *Bacillus* bacterium is able to form dormant spores that can survive for long periods of time, making it ideal for bioterrorism. He also emphasized the important distinction between "exposure" (merely being in an area known to contain *Bacillus* spores) and "infection" (the bacteria are actively growing in the tissues of the person).

This introduction was then followed by a discussion of the clinical issues concerning the diagnosis and treatment of Anthrax, presented by Dr. David Condolucci, an infectious disease specialist. He described the three forms of disease which can be caused by *B. anthracis*: a skin infection (cutaneous anthrax) which is highly treatable and not usually serious, a respiratory infection (inhalation anthrax) which, while treatable, is very serious and can be fatal, and a third form (intestinal) which only results from eating food contaminated by *B. anthracis* spores. "The good news is it's not contagious," Dr. Condolucci said. "That may not seem like a lot, but it's very important. That's a good thing." He further cautioned the audience about the inappropriate use of antibiotics and stated that

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The seminar, which will be held at 5:00 PM in the Mandeville Hall Teletorium, will be free and open to the public. It promises to be a very interesting affair during which Dr. Phillips will demonstrate various properties of materials at ultra low temperatures, such as super-conduction. There will be a question and answer period following his presentation. A short biography of Dr. Phillips and a brief description of his talk are presented below.

Following Dr. Phillips' seminar will be a public reception in the Mandeville Hall Tower Foyer. Light refreshments will be served. The reception will be continue until 6:30 at which point the student poster presentations will open to the public.

This year, the student poster sessions will be held in the Haub Executive Center on the top-floor of McShain Hall. The posters will be open to the public from 6:30 until 8:15. The posters will include work in the areas of Mathematics, Computer Science, Engineering, the Natural Sciences and the Social Sciences. Last year's symposium set a record with eighty posters presented by some 200 students and faculty from fifteen different colleges and universities and this year's should be of similar size. We hope that many of the members of the SJU Sigma Xi Chapter will be able to stop by for the evening and meet with these young scientists.

More information about the 13th Annual Symposium is available online at the SJU Sigma Xi web site, <http://www.sju.edu/honor-society/sigma-xi>. You can also contact Dr. Michael McCann, SJU Sigma Xi Secretary, at (610)660-1823 or by e-mail at "mmccann@sju.edu" if you have any questions.

Biography of Dr. William Phillips

William D. Phillips was born in 1948, in Wilkes-Barre PA, and attended public schools in Pennsylvania. He received the B.S. in Physics from Juniata College in 1970 and the Ph.D. from MIT in 1976. After two years as a Chaim Weizmann postdoctoral fellow at MIT, he joined the staff of the National Institute of Standards and Technology

(then the National Bureau of Standards) in 1978. He is a NIST Fellow, leader of the Laser Cooling and Trapping Group in the Atomic Physics Division of NIST's Physics Laboratory, and is a professor of physics at the University of Maryland, College Park.

Dr. Phillips is a fellow of the American Physical Society, the Optical Society of America, the American Academy of Arts and Sciences, and a member of the National Academy of Sciences. He is the recipient of the Gold Medal of the U. S. Department of Commerce (1993), the Michelson Medal of the Franklin Institute (1996) and the Schawlow Prize of the American Physical Society (1998). In 1997, Dr. Phillips shared the Nobel Prize in Physics with Dr. Steven Chu of Stanford University, and Dr. Claude Cohen-Tannoudji, of the Collège de France and École Normale Supérieure "for development of methods to cool and trap atoms with laser light."

Abstract of Dr. Phillips' Seminar "Almost Absolute Zero: The Story of Laser Cooling and Trapping"

Contrary to intuition, we can cool down a gas by shining a laser on it. This lecture will describe how laser cooling works, and why it works better than anyone had expected it to. We can now cool a gas of atoms to less than a millionth of a degree above absolute zero--the coldest temperatures in the universe. Atoms this cold exhibit weird and wonderful properties and are being used for applications ranging from super-accurate atomic clocks to new quantum devices like atom lasers.

The lecture is an updated version of the Nobel Lecture given in Stockholm on 8 December 1997. It is aimed at a general audience of non-scientists, but discusses some of the newest and most exciting developments in physics.

More information about recent work in the Laser Cooling and Trapping group at NIST directed by Dr. Phillips is available online at <http://physics.nist.gov/Divisions/Div842/Gp4/group4.html>

"Frontiers in Science" Seminar Series Brings Major Speakers to SJU

Speaker series, sponsored by Dr. James McGroddy, '58, focuses on interdisciplinary work.

This past September, the Natural Science Departments at Saint Joseph's inaugurated a new lecture series, "Frontiers in Science", the aim of which is to draw nationally-known speakers working at the interfaces of science. The series is supported by Dr. James McGroddy, who graduated from SJU in 1958 with a B.S. in physics. "The things that are important in science cross disciplinary lines," said Dr. McGroddy, now a member of Saint Joseph's board of trustees. "You see researchers doing DNA-related work on chips that involves physics, engineering, and biology. Talk to people in the pharmaceutical industry and they say the chemistry, biology, and computer simulation of molecular interaction are very important."

More than 100 faculty, staff, students from SJU and other area universities attended the first seminar given by Chris Lovchik from the National Aeronautics and Space Administration. Mr. Lovchik is a lead engineer in the Robonaut program, which is designing and building virtual reality controlled robots for use on the International Space Station. His work on the design of a robot hand that can reproduce the full range of actions of a suited astronaut's hand has led him into a number of areas including studies of the function of the surfaces and the synovial fluid in the joints of the hand. Mr. Lovchik has worked extensively with anatomists, surgeons, ergonomics experts and others to produce a robotic hand that can grasp and manipulate tools, pick up and work with delicate objects, and provide real-time sensory feedback to the operator. More information can be found at the Robonaut web page at http://vesuvius.jsc.nasa.gov/er_er/html/robonaut/robonaut.html

The second seminar in the 2001 - 2002 series was presented last November by Dr. Michael J. Bower, a senior investigator in physical and structural

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people need not be concerned about a lack of antibiotics to treat Anthrax.

Next, Mr. Chad Shabin addressed the audience about the response by public health departments. Mr. Shabin, an epidemiologist with the Centers for Disease Control and Prevention, has been working with the Philadelphia Department of Public Health for the last two years as part of a nationwide effort to prepare for bioterrorism that began in 1996. He stressed that all of the 1000+ reports of possible bioterrorism in the Philadelphia, "have been negative". Mr. Shabin also described the ongoing close coordination between local, state and federal agencies. These relationships were formed as part of the planning process that began at the federal level following the Oklahoma City bombing. He emphasized that most people don't need to be very concerned about the Anthrax attacks since the targets have been very high profile individuals and the general public has not been targeted.

Mr. Robert Drennen, assistant director of Saint Joseph's Public Safety and Environmental Protection Institute and a former battalion commander with the Philadelphia Fire Department, described how emergency responders are trained to respond to chemical or biological weapons using a four-step model involving prevention, preparation, response, and recovery. The first terrorist attack on the World Trade Center, in 1993, "was an eye-opener for this country," he said, and this led to the federal government emphasizing the training and preparation of emergency personnel.

The last panelist, Dr. Paul DeVito, Professor and Chair of Psychology and Director of the Early Responders Distance Learning Center, stressed how the bioterrorism really represent the use of a "weapon of mass disruption, not of mass destruction." He said that the primary intent appeared to be to disrupt day-to-day activity rather than to cause huge numbers of deaths. Dr. DeVito suggested that people view the very small risk posed by bioterrorism against the much larger risks posed by every day activities such as driving a car. He concluded by saying, "If the terrorists stop us from going about our lives, then they have won."

College of Arts & Sciences Holds 2nd Annual Science Student Research Dinner

Dinner brings science students, faculty, staff, alumni and donors together to celebrate student research.

On November 14, the Saint Joseph's University College of Arts & Sciences held its second annual Student Science Research Celebration Dinner in the Haub Executive Center. Some seventy research students, faculty, administrators, and various individuals and representatives of corporations that have supported student research activities at SJU, gathered for the event.

The evening began with an informal poster session during which many of the students who engaged in summer research projects presented the results of their work. During the dinner that followed, the twenty four students who did research during the summer, along with those students who began their work this semester, were recognized, as were the nine individuals and four companies who have sponsored research students and related activities. The student research descriptions can be viewed online at <http://www.sju.edu/honor-society/sigma-xi>.

The dinner was supported by the office of the Dean of the College of Arts and Sciences, with additional support from the participating academic departments, and organized by the SJU Chapter of Sigma Xi.



Dr. Rocco Triolo (left), '54, talks with Angela Haberle (center), '02 and Shannon Swantek, '02, both from the Department of Chemistry, about their research at the poster session preceding the student research dinner.

Chemistry Alum Kathleen McGinty Gives 2001 Faith-Justice Outreach Lecture

Lecture by former presidential policy advisor draws more than 100 people to Haub Executive Center

Kathleen McGinty, '85, opened the 2001 - 2002 Faith Justice Outreach Lecture Series with a talk entitled "Energy, the Environment and the Economy: Friends or Foes?" on October 4. Her talk addressed some of the most contentious issues from the last presidential election such as the opening of the Alaskan National Wildlife Refuge for oil exploration, global warming and the growing U.S. dependency on oil. Ms. McGinty pointed out how, in many instances, compromises could be arrived at that did not harm the economy, would meet the energy needs of the country and still allow for the environment to be protected. Following her talk, she answered many questions from the audience of faculty, staff, students, neighbors and friends of the university.

Ms. McGinty, vice-president of Natsource, a brokerage firm specializing in energy and environ-

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Kathleen McGinty, '85, is seen here addressing the assembled students, faculty, staff and friends of SJU at the 2001 Faith-Justice Outreach Lecture

chemistry with GlaxoSmithKline. His seminar, "Computational Chemistry and Molecular Modeling in Drug Discovery", described work in the pharmaceutical industry using computers to design molecules that will specifically interact with a given enzyme. This "rational" drug design may represent the future direction of pharmaceutical product development as computer systems become able to fully model the behavior of complex molecules in solution.

The next seminar, to be hosted by the Department of Physics, is scheduled for April 2, 2002. It will be given by Dr. Robert Austin, from the Biophysics group at Princeton University. His talk is entitled "Silicon Micro and Nanotechnology in Biological Physics" which will describe ongoing work in his lab to construct microfabricated devices useful in medicine and molecular biology. More information about this seminar, which is free and open to the public, is available from Dr. Paul Angiolillo of the SJU Department of Physics. You can contact him by phone at (610)660-1813 or by e-mail at "pangioli@sju.edu".

The final seminar in the 2001 - 2002 "Frontiers in Science" lecture series will be the address By Dr. William Phillips of the National Institute of Standards and Technology, entitled "Almost Absolute Zero: The Story of Laser Cooling and Trapping", which will open the 13th Annual Saint Joseph's University Sigma Xi Student Research Symposium on April 12, 2002. For more information on the symposium, please see the story on page 1 of this newsletter.



Mr. Chris Lovchik, (right, foreground) is assisted by Dr. Christina King Smith (middle, foreground) as he is about to begin his seminar describing the development of the hand system for the Robonaut robot.

New Efforts Instituted to Increase Local Support

The increasing cost of supporting research and science education force the SJU Chapter to seek additional financial aid.

As one can see by reading this edition of the SJU Sigma Xi newsletter, the number of programs sponsored by the Chapter has increased greatly over the years. Much of this growth has come from increased financial support provided by the SJU administration, the SJU Medical Alumni chapter and the many corporate sponsors of our annual symposium. Recently, several alumni have made substantial gifts that support programs such as the "Frontiers in Science Lecture Series" (see story on page 3) and the Hillman Summer Undergraduate Research Fellowship (generously sponsored by Katherine Schneider, '78). Their support has been essential in the Chapter's expansion of both the quality and quantity of its programming.

Even with the generous support of these donors the Chapter still finds its ability to support student research, run educational and outreach programs, and bring in internationally-known speakers, limited by financial needs. Given this, the Chapter has, for the first time ever, instituted a local dues payment of \$5. This local dues payment will be added to the yearly dues charged by Sigma Xi to all of the SJU chapter members. Please keep in mind that 100% of this \$5 comes directly to the chapter, and that all of the local dues money raised will directly support student research programs at SJU. This portion of your Sigma Xi dues will also be fully tax-deductible.

In addition to the local dues program, there are two other ways for individuals to support the Chapter. One is by specifying that a portion of your donation to the SJU Annual Fund be directed to the SJU Sigma Xi Chapter using the donation form sent to alumni each year. Just check off the box for "Specified Area" and write in Sigma Xi.

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SJU Institutes 5-year B.S. - M.S. Program for High School Math and Science Education

Newly approved programs allow students majoring in Math or Natural Sciences to become state-certified teachers and earn an M.S. in Secondary Education.

In response to the growing need for more high school teachers trained in the areas of math and the natural sciences, the Departments of Biology, Chemistry, Physics, and Mathematics and Computer Science, along with the Environmental Sciences Program, have worked with the Department of Education to develop five-year B.S. - M.S. degree programs. These programs, which are now enrolling current and incoming SJU students, allow students to complete a Bachelor's degree in Math or Science and a Masters Degree in Secondary Education in a total of five years.

A major benefit of these new programs is that they make it possible for many more students to become certified to teach science in public schools than is now possible. Currently, the course requirements for undergraduates majoring in math or science, and the education course and student teaching requirements needed for state certification, make it difficult, if not impossible, for most students to complete both programs in four years. The extra cost of the fifth year, which is not typically covered by scholarships, deters many students from this path. These new programs, by including a fifth year of co-terminal Masters-level work, build in the extra time requirement. And, through the support of the SJU University College, students in the program will receive a 37.5% tuition reduction for the fifth year, making it much more affordable. Students also gain the added benefit of not only having a B.S. in math or science, but also a M.S. in secondary education and their state certification.

In addition, the programs include both research experiences and a number of teaching experiences early in the program. The exposure to research will ensure that these teachers understand how to "do" math and science and will help them to communicate this to their students. The field experiences will enable students in the program to decide early on if teaching is right for them and will help them to make informed decisions early in their college careers.

Again, all of the donations we receive this way will go 100% to support Sigma Xi programs.

The second way to help the SJU chapter is to use an on-line shopping service, iGive.com. Through this service, a percentage of every purchase you make (up to 24%, but generally 0.5 to 2%) will be donated to the SJU Chapter. You will be able to deduct the full amount of the donation on your federal income tax, all without paying any extra money. To sign up to support the SJU chapter through iGive.com, go to the SJU Sigma Xi web page (its located at <http://www.sju.edu/honor-society/sigma-xi>) and click on the "iGive.com" logo located near the bottom of the page. This will take you through the registration process. For each person who registers and then buys even just one thing through iGive.com in forty days, the SJU chapter will receive an extra \$1.

Turtles Take Over Science Center Rooftop

One does not normally find turtles on the roof, but if you're on top of the science center you might come face to beak with an endangered Asian turtle in a new turtle breeding facility built there last year. The following is an article written by Dr. Scott McRobert of the SJU Biology Department, describing the facility, the projects it supports and how it came to be.

"An important part of my research is the study of life history traits in turtles. The animals used include approximately 200 individuals representing about 30 different species. Unfortunately, turtles are very difficult animals to maintain in a laboratory. They require lots of space, special lighting conditions, and complex filtration systems. In addition, since much of my work focuses on juveniles, I need conditions in which the turtles will breed. In 1995 a greenhouse was constructed on the roof of the Science Center to house a turtle breeding colony. This fall, a second greenhouse was built with special conditions to provide eggs and young turtles for a number of distinct research projects. With the completion of the second greenhouse SJU can truly boast a state-of-the-art breeding and research facility for turtles.

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Focus On: SJU Physics

Two new faculty join the Physics Department

Over the last several years, the SJU Physics Department has undergone some changes. In 2000, Dr. Paul Angiolillo was hired as an Assistant Professor, coming to SJU from the University of the Sciences in Philadelphia. Dr. Angiolillo earned his Ph.D. in Physics at the University of Pennsylvania

His laboratory (in collaboration with the Therien Group at the University of Pennsylvania) has been involved in the study of energy trapping, migration and electron transfer reactions in multichromophoric assemblies. This work is essential for modeling of energy transduction and developing synthetic systems based on the biological pigments relevant to artificial photosynthesis, materials chemistry and optoelectronics. To explore these areas, Dr. Angiolillo utilizes a technique known as electron paramagnetic resonance spectroscopy which allows him to "see" the behavior of atoms and atomic particles as materials change states.

Most recently, Dr. Douglas Kurtze came to SJU as a new Chair of Physics, from North Dakota State University, where he was a member of the physics department for 11 years. He has M.S. and Ph.D. degrees in Physics from Cornell and did post-doctoral work at Carnegie-Mellon, and taught at Clarkson before moving to NDSU.

His recent research has been concentrated in three areas. One is an extension of his previous work on pattern formation, trying to understand the effect of random noise on pattern forming systems, and in particular how noise can allow a growing pattern to adjust its shape. The second is application of the techniques of pattern formation to other problems, especially involving flow of granular materials. This has led to work on the dynamics of traffic jams and the formation of ripple marks on wind-blown sand. The third area involves the dynamics of the thermohaline circulation in the Atlantic Ocean, which is a global flow pattern that has profound effects on the Northern Hemisphere climate. This work is focused on trying to understand the mechanisms that drive variations in the circulation over time scales on the order of decades.

Funding for the new facility was provided by a National Science Foundation grant awarded to Dr. Gilbert of Swarthmore College, Dr. Twan of the University of Pennsylvania, and myself. The focus of this grant is to determine the mechanisms underlying turtles shell development. Dr. Gilbert has developed an innovative scheme to implant cells from one turtle embryo into another, then trace the movement and developmental lineage of the implanted cells. To do this we need embryonic cells that, in some way, stand out against the background of the embryo in which they are transplanted. Therefore, we will breed albino turtles in the new facility. It should be relatively easy to visualize the albino cells against the cells of a normal embryo."

The new greenhouse is made of material that lets light in, but reflects the ultra-violet rays of the sun, which could be harmful to the albino turtles. The new greenhouse also contains a second housing chamber where a colony of endangered Asian turtles will spend the summer in an effort to get them to breed.

Both of the turtle greenhouses were built by Len Geria, brother of Mike Geria, '85. His experience in building outdoor pools was valuable in his work on this project. In addition to building the greenhouses, Len designed and built the housing chambers that contain large swimming pools in sand and soil where the turtles lay their eggs. Len also designed the biofiltration units that clean the water for the turtles. These filters are truly innovative as they utilize the action of bacteria and plants to draw nutrients and toxins from the water.



Dr. Scott McRobert (left) of the SJU Biology Department is seen here with Mr. Len Geria (right), who designed and built the rooftop turtle facilities, along with two of its inhabitants.

mentally-related instruments, was director of President Clinton's Office on Environmental Policy and chaired the Council on Environmental Quality.

McGinty has discussed environmental issues countless times in the print and electronic media, as a guest lecturer at several universities, and in Capitol Hill testimony. Prior to her White House tenure, she served as then-Senator Gore's senior legislative assistant for energy and environmental policy. In this capacity, she was congressional staff coordinator for the Senate delegation to the United Nations' Conference on Environment and Development, held in June 1992 in Rio de Janeiro, Brazil, and was an official member of the U.S. delegation to negotiations on the Framework Convention on Climate Change and the Antarctic Protocol.

In 1999 McGinty took a yearlong fellowship with the Tata Energy Research Institute, in New Delhi, India. There she worked to build partnerships among business and government leaders in the United States and India to address several priority energy and

environmental matters, including global climate change and transportation-related pollution.

Ms. McGinty holds a bachelor's degree in chemistry from Saint Joseph's and a law degree from Columbia University.

The lecture was sponsored by the Saint Joseph's University Faith Justice Institute and co-sponsored by the SJU Department of Chemistry and the SJU Sigma Xi Chapter.

The Spring Outreach Lecture on February 20, 2002, will bring Dr. M. Shawn Copeland, Professor of Theology at Marquette University to SJU to explore the role of faith in recognizing and proposing measures for healing the social wounds of racism. Dr. Copeland is an African-American theologian, recognized as one of the most important influences in North America in drawing attention to issues surrounding African American Catholics.

Editor's note - portions of this story were taken from a story in the Oct. 1, 2001 issue of the Hawkeye.

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