

The Saint Joseph's University Sigma Xi Newsletter

Volume 3, Issue 2

Summer, 2002

The SJU Sigma Xi Chapter Inducts 35 New Members

Dr. Elizabeth Bove of the Fox Chase Cancer Research Center Gives Guest Lecture

On April 23, 2002, in a ceremony held in the Haub Executive Center, the Saint Joseph's University Sigma Xi Chapter inducted 35 new members in recognition of their outstanding achievements in scientific research (see list below). Of these, four people were inducted at the Full Member level and 31 were inducted as Associate Members. The distinction, as described in the Sigma Xi By-laws, is based on the demonstrated (for full membership) or potential (for associate membership) ability for performing scientific research.

One of the new Full Members of the SJU Chapter, Dr. William Brendley, is the Dean of Philadelphia University and a SJU Chemistry Alum. He is the second faculty member from Philadelphia University to be inducted in an effort to form a Sigma Xi chapter at their institution.

Following the induction ceremony, Dr. Elizabeth Bove, Manager of the Clinical Molecular Genetics Lab at the Fox Chase Cancer Center, gave a lecture entitled

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SJU Hosts 13th Annual Sigma Xi Student Research Symposium

More than 250 people, including more than 180 students and faculty from 30 schools, attend meeting.

The 13th annual Saint Joseph's University Sigma Xi student research symposium was held on April 12, 2002. More than 250 people attended the symposium, which opened with a public lecture by Nobel Laureate Dr. William Phillips of the National Institute of Standards and Technology. His talk, entitled "Almost Absolute Zero: The Story of Laser Cooling and Trapping" described his research into the use of lasers to create extremely cold gases for use in the next generation of atomic clocks. The talk was introduced by Dr. William Ott, '63, Director of the Atomic Physics Division of NIST and Dr. James McGroddy, '58, member of the SJU Board of Trustees and sponsor of the "Frontiers in Science" lecture series.

This year's symposium was by far the largest ever with 121 posters presented by more than 200 students and faculty from 30 colleges and universities. These posters included work in the areas of engineering, mathematics,

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Beatrice Mushi, from the University of the Sciences in Philadelphia, describes her work on liquid crystal systems to Nobel Prize winner and keynote speaker, Dr. William Phillips.

"*brcA1* and *brcA2* and hereditary breast cancer." The chapter's connection to Dr. Bove was made through Dr. David Wojciechowski, '98, who conducted research with Dr. Bove while attending medical school at PCOM.

Full Members

William Brendley, Ph.D.	Dean, Philadelphia Univ.
Sean Forman, Ph.D.	Math/Computer Science
Douglas Kurtze, Ph.D.	Physics
Deborah Lurie, Ph.D.	Math/Computer Science

Associate Members

Janel Burgos	Biology
Joseph Byrne	Physics
Carlos Carre, Jr.	Biology
Ellen Cho	Biology
Melissa Cooper	Psychology
David Creech	IHS/Bio
Diane Czastkiewicz	Biology
John Dougherty, III	Biology
Suzanne Funk	Psychology
Lisa Germanis	Biology
Angela Haberle	Chemistry
James Holstein	Psychology
Robert Kelly	Math/CSC
Matthew Kieber-Emmons	Chemistry
Lisa Lowchjy	Chemistry
Jennifer Diane McBride	Biology
Kathleen Marie McElwee	Biology
Carah Lynn Merolli	Psychology
Holly Elizabeth Newman	Psychology
Michelle P. Orton	Biology
Danielle Raffa	Psychology
Meghan Elizabeth Rowe	Biology
Eileen Kimberly Rucker	Biology
Nikki R. Shames	Psychology
Jessica Sherman	Chemistry
Jessica A. Siclare	Biology
Lori Simoni	Psychology
Patrick Stump	Math/CSC
Shannon Swantek	Chemistry
Ann Faye Tannous	Biology
Diana Tsombaris	Biology



David Wojciechowski, D.O., '98 and member of the SJU Sigma Xi Chapter, is shown here with the guest speaker, Elizabeth Bove, Ph.D, after the induction ceremony.

NSF Grant Supports "Place-Based" Science Education

Over one million dollars will support SJU BS and MS students working in urban K-6 school classrooms.

Tom Durso – Director of University Communications

A Saint Joseph's University biologist has been awarded an \$850,000 grant from the National Science Foundation for a project that sends university students to public elementary schools in North Philadelphia to develop and teach hands-on science programs that increase science literacy in traditionally underserved neighborhoods.

NSF will support Dr. Karen Snetselaar's "GK-12 and GeoKids: Bringing Place-Based Science to Urban Philadelphia Schools" for the next three years. The project, which received strong bipartisan support from Senator Rick Santorum and U.S. Representatives Chaka Fattah and Joe Hoeffel, will also receive \$180,000 in matching funds from SJU.

"GK-12 and GeoKids" builds on strong existing collaborations between Saint Joseph's science faculty and North Philadelphia's Wagner Free Institute of Science (WFIS), and between WFIS staff and principals at three nearby public schools - Meade Elementary School, General Philip Kearny School, and Reynolds Elementary School.

The GK-12 Fellows are graduate Biology students and advanced undergraduate students majoring in Biology, Chemistry and Environmental Science. Under the program, for each of the next three years, four to eight Fellows will work with WFIS education specialists, university faculty, and teachers of kindergarten through sixth grade to develop and present semester-long thematic units at the three schools.

The schools' own neighborhoods will be used as resources for the teaching of earth and life sciences. The program emphasizes hands-on science, project-based learning, and development of fundamental skills, such as reading, writing, and observing.

"The activities supported by this grant are perfect for Saint Joseph's -- encouraging excellent teaching,

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NSF Grant Supports "Place-Based" Education –continued from page 2

promoting quality research by faculty and students, providing meaningful service opportunities, and creating partnerships with other educational institutions in our area," said Dr. Snetselaar, associate professor of biology. "The program is complex, but it's going to let us carve out a special niche for the university in which teaching, research and community service activities are not only intertwined but strengthen each other."

Joining Dr. Snetselaar as co-principal investigators from Saint Joseph's are Dr. Michael McCann and Dr. Scott McRobert, of the Department of Biology, and Dr. Roger Murray, of the Department of Chemistry. They and others planning the project expect that it will result in the development, testing and documentation of environmentally based lessons, as well as the empowerment of K-6 teachers to develop their own placed-based lessons. Additionally, they hope to build on the commitment of Saint Joseph's faculty and graduate students to enhancing science literacy, and to incorporate elements of the project into existing Service-Learning activities at the university.

The program includes annual summer workshops at which GK-12 Fellows, K-6 teachers, and participating Saint Joseph's and WFIS educators will review curriculum standards, study in appropriate content areas, and become more familiar with education issues specific to students from the target schools. Students in Saint Joseph's doctoral program in education will collaborate with education assessment experts in designing and administering assessment tools.

Developed by the Wagner Free Institute 10 years ago, GeoKids now serves 250 schoolchildren. Even prior to the NSF funding, Saint Joseph's science faculty members worked with WFIS in the program. "One of the distinguishing features of GeoKids is the intimate involvement of professional scientists who serve as collaborators on program development and also interact with the children in the classroom and on field trips," said WFIS director Susan Glassman, a co-principal investigator on the project. "The addition of Saint Joseph's graduate and undergraduate Fellows will allow us to bring GeoKids to more children, and it will reinforce a central goal of engaging the children's enthusiasm for science and learning. We have found no better way to do this than by interaction with people who love the subject.

"Salome Thomas-El, the principal at Reynolds Elementary School, which is participating in GeoKids for the first time, noted "the dramatic effect" the program has had in the school's community. "As a principal and teacher, I truly believe that quality teachers and effective educational programs are the key to closing the achievement gap in inner-city schools," he said. "With GeoKids, we will have taken a big step toward achieving that goal."

"Because of Kearny's participation in GeoKids, student achievement in science has improved dramatically in the SAT-9 achievement test," said Kearny principal Eileen Spagnola. "Due to the problem-solving format of the program, students write about their discoveries, explain the various steps taken to achieve the outcome, and prove their understanding of the concept.

"Since the Wagner Institute has partnered with Kearny School, great strides have been made with student achievement. The GeoKids program is so innovative, challenging, and extremely popular with all the teachers. Teachers and students are so excited when they are selected to take part in the program."

SJU Hosts 13th Annual Student Symposium, continued from page 1

computer science, and the natural the social sciences.

The success of this year's symposium is due in no small part to the support of various offices, groups and companies. These include the SJU Medical Alumni chapter, the Office of the Dean of CA&S, the Office of External Relations, and the McGroddy Frontiers in Science seminar series fund. Additional support was provided by Covance Periapproval Services, B&B Microscopes, VWR Scientific and JEOL USA.

Next year's symposium is scheduled for April 11, 2003. Dr. Andrew von Eschenbach, an SJU alum and new Director of the National Cancer Institute, is scheduled to give the opening lecture. For more information, and to read the abstracts and view photos from this year's symposium, go to our web site at www.sju.edu/honor-society/sigma-xi.

Chemical Biology Degree Added to Natural Sciences

BS program allows students to pursue a combined Biology and Chemistry program

The natural sciences at Saint Joseph's University have initiated a new major in Chemical Biology. This major will be entering its third year beginning in the Fall, 2002. This new major resulted from the increased interest that many biologists have in molecular aspects of biology and the increasing emphasis that many chemists now place on the significance of chemical interactions and reactions in biological systems. A major in Chemical Biology provides a strong academic background for students who want to pursue careers in areas such as molecular biology, biochemistry, pharmacology, medicinal chemistry, and neurobiology. This option is important for our students, given the concentration of pharmaceutical and other life science industry in the region. The courses that are included in the first and second years of the "Typical Program for a Major in Chemical Biology" include all of the courses that a current student would take who was planning to major in Biology or Chemistry (premedical option). Thus, at any time during the first two years of study as a Biology major or a Chemistry major, it would be possible for a student to choose to major in Chemical Biology. Similarly, if a student entered Saint Joseph's University as a major in Chemical Biology, it would be possible for the student to become a Biology major or a Chemistry major at any time during the first two years of study.

A byproduct of the implementation of this new major is that it will continue to enhance the developing scientific relationships of the faculty members in the Departments of Biology and Chemistry. The Chairs of the Departments of Biology (Dr. Paul Tefft) and Chemistry (Dr. Roger Murray) serve as co-Chairs of the major in Chemical Biology. There are currently six students pursuing a major in Chemical Biology.

Focus On: Teaching Styles Beyond Traditional Lectures

Independent projects, inquiry-based and group learning techniques used in Math/Natural Science courses.

Pick up any magazine or newspaper article about different teaching techniques in the last few years and you will probably find references to things like "inquiry-based" learning and "cooperative group" styles. While these terms might not be familiar to you, they mean a lot to the many SJU students and faculty using these approaches in mathematics and natural science courses.

Inquiry-based learning in the sciences is often used in the lab to change the way in which students learn about concepts and relationships. Traditional lab approaches usually center on students being given a series of instructions (a protocol) to follow to perform an experiment or series of observations to illustrate some concept. Often times this "cook book" approach leaves students with no real understanding of why they are doing the things they are doing and thus defeats the purpose of the lab activity. Inquiry-based approaches have the students design an experiment to answer a specific question. Obviously, to do this, students must first develop a thorough understanding of the concepts involved in the process they are examining. They then actually "do" the science and (hopefully) get a meaningful answer to their question.

One example of this approach is being used in the lab sections of the introductory Biology course, Bio I: Cells, taught by Dr. Denise Marie Ratterman. After successfully completing a "cook book" study of the rate of an enzyme-catalyzed reaction, student groups design their own experiments to answer questions about how changing parameters like temperature or pH will affect the reaction. Each comes up with its own questions, develops the experimental design, collects the necessary equipment and does the work the following lab period. The students then present their work to the rest of the class in poster form at the end of the semester. Their work is critiqued by junior

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Two New Faculty Join the Department of Chemistry

Tom Halasinski, Ph.D. and Mark Reynolds, Ph.D., join the SJU Department of Chemistry.

In August 2001, Dr. Thomas Halasinski joined the Department of Chemistry as an Assistant Professor in Physical Chemistry. Tom received his B.S. degree with a major in chemistry from Fordham University in 1988. His graduate studies (Ph.D., 1996) were carried out at Michigan State University where he worked with Professors John Allison and George Leroi on developing a method for using vibrational spectroscopy to obtain direct structural information on ions formed via mass spectrometry.

After a year of postdoctoral research at Michigan State University, Tom became a National Research Council Postdoctoral Research Associate at the Astrochemistry Laboratory of the NASA Ames Research Center in Moffett Field, California. Working with Dr. Farid Salama of NASA, Tom built an apparatus that could employ the technique of matrix-isolation to study the anions and cations of various polycyclic aromatic hydrocarbons with ultraviolet/visible and infrared spectroscopy.

In 1999, Tom became a Research Scientist at the SETI Institute in order to continue his work with Dr. Louis Allamandola and Dr. Salama. During 1999-2001, Tom also gained valuable academic experience as an adjunct faculty member in the Department of Chemistry at San Jose State University.

At Saint Joseph's University, Tom will construct an instrument comparable to the one he had at NASA so that he can investigate the reactions of hydroxyl radicals with aromatic hydrocarbons in low-temperature matrices. Currently, Tom is teaching Physical Chemistry for Chemical Biology (see story on page 4), the Physical Chemistry Laboratory, and a section of the General Chemistry Laboratory.

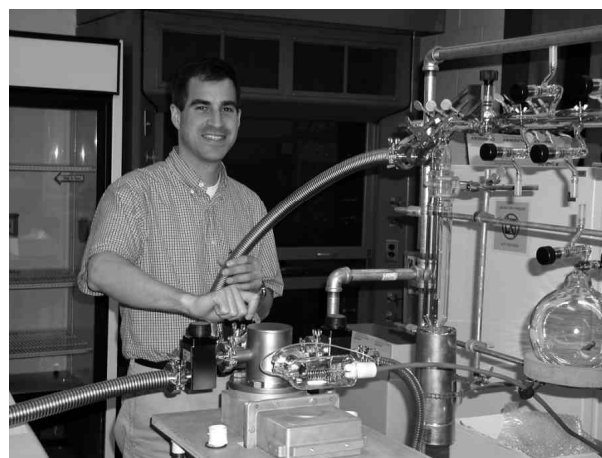
Mark Reynold's commitment to undergraduate teaching and research was inspired by his own predoctoral education at Grinnell College where he received a B.A. with a major in chemistry in 1993. Mark learned the fine art of making the most of his

time by carrying out a successful research project in molybdenum chemistry with Professor Martin Minelli and playing four years of varsity tennis.

Mark continued his education at the University of Wisconsin in Madison where he received his Ph.D. degree in 1999. For his doctoral research, Mark worked with Professor Judith Burstyn in the Department of Chemistry on the synthesis and characterization of model nitrosyl metalloporphyrins. Mark also was involved in a collaborative project with the research group of Professor Gary Roberts in the Department of Bacteriology at Wisconsin in an investigation of CO-responsive heme protein *CooA*.

For the last three years, Mark has been a post-doctoral research associate with Professor Lawrence Que in the Department of Chemistry at the University of Minnesota. Mark has been using site-directed mutagenesis and various spectroscopic techniques to explore the active site of a manganese-dependent catechol dioxygenase.

At Saint Joseph's University, Mark plans to explore the mechanism of oxygen-sensing in the heme protein *FixL* and to determine the roles that the heme prosthetic group and the iron-bound histidine ligand play in this process.



Dr. Tom Halasinski is pictured here standing in front of a vacuum chamber that he has built to study extremely reactive molecules using matrix-isolation spectroscopy. He is currently examining chemical reactions of pollutants within the Earth's atmosphere as well as learning how to recognize prebiological carbon molecules in interstellar space.

Fall 2002 Sigma Xi Events

The SJU Chapter will sponsor or co-host a variety of events relating to research, medicine and education.

This Fall, the Saint Joseph's University Sigma Xi chapter will be sponsoring or co-sponsoring several events to which all members of the chapter, the SJU Community and our neighbors are invited.

The first of these events will be the opening lecture in the second year of the "Frontiers in Science" seminar series, sponsored by SJU alum, board member and Sigma Xi member, Dr. James McGroddy, '58. The first speaker in the 2002 – 2003 series will be Dr. James Iandolo, Professor and Chair of the Department of Microbiology and Immunology at the University of Oklahoma Health Science Center. Dr. Iandolo is the director of the *Staphylococcus aureus* genome sequencing project and his talk will focus on genomic sequencing technology and bioinformatics. It is currently scheduled for Wednesday, September 18, 2002 at 4:00 PM in room 200 of the Science Center. For more information, contact Dr. Christina King Smith, Assistant Professor of Biology, at (610)660-1118 or by e-mail at csmith@sju.edu.

On October 23, 2002, the Chapter is sponsoring a panel discussion entitled "Stem Cells: Scientific, Clinical and Ethical Perspectives". The panel members will describe exactly what stem cells are, how fetal and adult stem cells differ, how stem cells may be used as therapeutics for treating diseases and injuries, and some of the moral and ethical considerations involving their use. As of the date of publication, confirmed panelists include Charles P. Emerson, Jr., Ph.D., Department of Cell and Developmental Biology, University of Pennsylvania School of Medicine, Itzhak Fischer, Ph.D., Chair, Department of Neurobiology and Anatomy, MCP Hahnemann University, Bartholomew Tortella, M.T.S., M.D., M.B.A., FACS, Chief of Trauma Services, Hahnemann Hospital, and Ausim Azizi, Ph.D., Department of Neurology, Temple University School of Medicine. One or two additional panelists will be scheduled in the coming months. The panel presentation will begin at 7:00 PM in the Haub Executive Center of McShain Hall. Following opening comments by each panelist, questions will be taken from the audience. For more information

contact Dr. Mike McCann, at (610)660-1823 or by e-mail at mmccann@sju.edu.

The third event scheduled for the Fall of 2002 is an Alumni Panel discussion about careers in science education. The panel will be held on October 30, at 5:30 PM, in the Campion Student Center and will feature alumni from the Natural Sciences and Mathematics departments who are teaching in K-12 public, private or parochial schools. This is the latest in a series of career panels that have brought back SJU alumni working in such areas as Allied Health, the Biotech Industry and those who have pursued doctoral training in medicine. It is co-sponsored by the Biology Department and the Career Development Center. More information will be available at the Career Development web site at <http://www.sju.edu/careers/students/cal.htm>

The final event scheduled for the Fall Semester (date TBA) is the Third Annual Celebration of Student Research in the Sciences Dinner, sponsored by Sigma Xi and the Dean of the College of Arts & Sciences. These dinners bring together student researchers, faculty, staff, administrators, donors and representatives of corporate supporters to recognize both the outstanding research done by both undergraduate and master's level students at SJU and the generous support provided by individuals and corporations. At last year's dinner, 24 students, working with 11 faculty, were recognized for their research in Biology, Chemistry and Physics. In addition, seven companies and eight individuals were recognized for their support of student research and related activities at SJU. Importantly, as a direct result of last year's dinner, the SJU Biology Department received a Summer Research Fellowship from Merck & Co., which is currently supporting Adam Zwolak, '04 working in the lab of Dr. John Tudor. Additionally, Nicholas Nicolaides, Ph.D., '87, President, CEO and Chief Science Officer of Morphotek, a biotech company located in Exton, PA, established a Summer Research Internship program for SJU students. The first SJU Morphotek intern is Crystal Fox, '03, a student majoring in Biology. Contact Dr. Mike McCann, Associate Professor of Biology, at (610)660-1823 or by e-mail at mmccann@sju.edu for more information about this year's science celebration dinner.

and senior students enrolled in the Advanced Cell Biology course taught by Dr. Christina King Smith. The benefit of this approach is that it helps get students to think more about the actual purpose of experimental science, namely finding out how things work, rather than just following a protocol.

Cooperative and group learning techniques are being used in other courses as well. During the last several years, with the support of a National Science Foundation grant, Dr. Paul Tefft, Associate Professor and Chair of the Biology Department, has changed the format of both the Histology and Systemic Physiology courses. The Histology course is now taught in two, three hour long blocks two afternoons each week. The traditional separate lecture and lab approach has been changed to one that is more self-paced. Each period begins with Dr. Tefft reviewing the goals for that day and providing a general over view of the tissue being studied. The lab manual then provides students with a series of questions about the structure and function of the relevant tissues. The students are given a variety of tools to use, including microscopes and slide collections, CD-ROM tutorials and access to various histology web sites. Key to this approach are the 12 computer systems located in the lab that students can use at any time. This allows students to easily view a tissue using their microscope while simultaneously examining images from an atlas and answering questions about it on an on-line tutorial.

In order to encourage "active learning" in the classroom, Dr. Tefft sometimes assigns individual and group presentations at the start of a class period. The students use the class time to research the topic and prepare their presentation for their classmates. This may involve capturing digital images of microscope slides, getting information about tissue and organ structure from texts, web sites or CDs, and designing the presentation so as to best illustrate the relevant concepts. In this way, every student is both a learner and a teacher.

Dr. Paul Klingsberg has used a similar approach in his Combinatorics and Graph Theory course last Fall. Students were assigned topics beyond the

normal classroom material. Over the course of the semester they researched these specialized areas and developed twenty-minute long presentations for the rest of the class. These included such things as Warshall's algorithm, a series of rules that takes as input a network of cities and the distance between each pair; the output is the shortest route between each pair of cities.

This semester-long project approach is also being used in other courses for both group and individual projects. For example, students in the Light and Electron Microscopy course taught by Dr. Karen Snetselaar of the Biology Department, do individual and group projects using various techniques to prepare micrographs of biological specimens. Their photos, many of which are quite beautiful, are presented in poster form at the end of the semester. The students taking the course this Fall will be the first group to use the new JEOL electron microscope purchased with the support of a grant from the National Science Foundation earlier this year (see story in January, 2002 newsletter).

Students enrolled in Dr. James Watrous' Biometrics and Computer Modeling course also engage in semester-long group projects culminating in a poster presentation. These students develop mathematical models of biological systems. Projects have included modeling the spread of a disease through a population and modeling competition between native purple finches and the imported, more aggressive house finch.

As can be seen from the examples presented here, faculty in Mathematics and the Natural Sciences are going well beyond traditional class room teaching styles as part of a continuing effort to maintain excellence in education here at SJU. In addition to the innovations described in this article, a number of faculty are currently writing grant proposals to support additional changes in pedagogical style. Others are working to further incorporate computer technology, image analysis and multimedia presentations in their every day teaching. The next newsletter will feature a program called Supplemental Instruction being used in introductory courses to help students "learn how to learn".

The Benefits of Sigma Xi Membership

There are a number of benefits to being a dues-paying Sigma Xi member. First, part of the annual dues (\$20 for students, \$52 for non-students) comes back to the SJU chapter to help us cover the costs of our intramural grants-in-aid of research, our annual student research symposium and various other activities. Further, your dues pay for a subscription to the award-winning *American Scientist* magazine, which contains news and reviews about work in all fields of scientific research. Members also receive discounts on various goods and services, such as car rentals through Hertz, discounts on scientific journals, and many others. Members can also participate in the many Sigma Xi expeditions to areas throughout the world each year. For a complete list of the benefits of continued membership, visit the Sigma Xi web site at www.sigmaxi.org. If your membership has lapsed, you can easily renew it online or via phone. All the information you will need is at www.sigmaxi.org or you can call the membership office toll-free at 800-243-6534.

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