

# The Saint Joseph's University Sigma Xi Chapter Newsletter

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## SJU Hosts Second Round of Frontiers in Science Seminars

*The 2002 – 2003 McGroddy "Frontiers in Science" Lectures Cover a Range of Interdisciplinary Topics*

Story and photos by Mike McCann, Ph.D.

This fall, the successful "Frontiers in Science" seminar series was continued thanks to the generous support of alum and board-member Dr. James McGroddy, '58. The series brings nationally-known scientists and engineers engaged in work in "edge" areas where traditional research disciplines overlap. Often it is work at these interfaces that brings forth exciting new discoveries and sometimes even spawns whole new fields of research. "The things that are important in science cross disciplinary lines," said Dr. McGroddy. "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."

This past fall the 2002 – 2003 series began with a lecture given by Dr. John J. Iandolo, professor and chair of the Department of Microbiology and

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## Annual Sigma Xi Research Symposium Set for April 11

*Seminar by Andrew von Eschenbach, M.D., '63, Director, National Cancer Institute, to open symposium.*

Story by Mike McCann, Ph.D.

The 14<sup>th</sup> Annual Saint Joseph's University Sigma Xi Student Research Symposium is scheduled for April 11, 2003. The symposium will begin at 5:00 PM with a lecture by SJU alum Andrew von Eschenbach, M.D., '63, director of the National Cancer Institute of the National Institutes of Health. His seminar, which is free and open to the public, will be the final "Frontiers in Science" lecture of the year (see story this page), and will be held in the Wolfington Teletorium of Mandeville Hall. Dr. von Eschenbach's lecture will be followed by a public reception in the Mandeville Hall Tower Foyer, lasting until 6:45 PM.

The student research poster presentations will be held in the Campion Student Center from 7:00 until 8:30. The posters, displaying research performed by undergraduate and graduate students in the areas of engineering, mathematics, computer science, the natural and the social sciences, will be set up in the Sun rooms and North Lounge. The poster presentations will be followed by a dinner for the students, their faculty mentors and guests.

Last year's symposium set another record in terms of the number of posters, with more than 120 being presented by over 250 students and faculty mentors from more than thirty colleges and universities in five states. This year's symposium is expected to be comparable in 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 14th 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.

## Math & Computer Science Holds Annual Sonia Kovalevsky Day

*Math careers highlighted for area high school students.*

Story by Tom Durso, University Communications

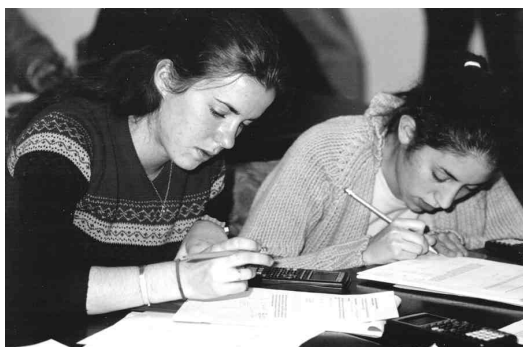
Saint Joseph's University honored the memory of the first woman to receive a Ph.D. in mathematics at its annual Sonia Kovalevsky High School Mathematics Day, on Wednesday, October 16.

Female high school students from across Philadelphia came to campus to receive encouragement to continue their study of math and to hear about careers in which math plays a major role. Workshops, problem-solving contests, and guest speakers served to inspire the high school students and demonstrate the many rewards a career in mathematics can bring.

"It's a fun day as well as a challenging one," said Dr. Deborah Lurie, assistant professor of Mathematics and Computer Science. "We want to expose the students to many different ways of using mathematics."

Participants in the career panel included Gina Panichella '01, an actuary at IBC Actuarial and Analytical Services; Dr. Linda Thiel, acquisitions editor at SIAM; and Molly Megraw, a math consultant with Wagner Associates.

In 1874, Kovalevsky, a Russian, earned her Ph.D. in math from the University of Gottingen, in Germany. She went on to land a professorship at the University of Stockholm, and to make important contributions in the theory of differential equations. Kovalevsky died of influenza in 1891, at the age of 41. Sonia Kovalevsky High School Mathematics Day is sponsored nationally by the Association for Women in Mathematics, through grants from Coppin State University, IMO 2001 USA, Inc., Microsoft Corp., and the National Security Agency.



*Two students participate in the annual Sonia Kovalevsky day hosted by Math & Computer Science.*

## SJU Sigma Xi Chapter Holds Stem Cell Panel Discussion

*Panel Entitled "Stem Cells: Scientific, Clinical and Ethical Perspectives" draws nearly 100 people.*

Story and photo by Mike McCann, Ph.D.

Stem cells, the cells that have the ability to become many, or in some cases all, of the different kinds of cells that make up the human body have been in the news of late. Even with the media coverage, many people still don't have a clear picture of what stem cells are and how fetal and adult stem cells differ. These issues have become more important, with the recent claims of human cloning, in light of the interest in "therapeutic cloning" to produce embryonic stem cells. As governments debate regulation of stem cell and cloning research, it is all the more important that the public understand the issues involved.

To address this, the SJU Sigma Xi Chapter held a panel discussion on stem cells this past October. The panel, moderated by Dr. Mike McCann of SJU, began with Charles Emerson, Ph.D., Professor and Chair of the Department of Cell and Developmental Biology and the U. Penn Medical School. Dr. Emerson described what stem cells are and how they can develop into the various types of tissues found in the adult body. He related this to his own work on identifying the genes controlling the development of embryonic muscle stem cells.

The next speaker, Itzhak Fisher, Ph.D., Professor and Chair of the Department of Neurobiology and Anatomy at Drexel University College of Medicine, discussed the differences between fetal and adult stem cells. Fetal stem cells seem to be better able to differentiate into all types of cells than do adult stem cells. A problem with fetal cells, however, is their source; early embryos that must be destroyed to obtain the stem cells. Another problem with using embryonic stem cells for clinical therapies has to do with rejection of the donated cells by the recipient's immune system. Adult stem cells, being derived directly from the patient, do not pose this difficulty.

Dr. Fisher pointed out that this could be avoided by the use of therapeutic cloning, in which a cell from the patient is injected into an unfertilized egg, the nucleus of which has been removed. The egg is

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## When Hawks Meet Owls

*SJU Faculty, Staff and Students Visit Owl-Banding Project and Hawk Mountain Refuge*

Story and photos by Mike McCann, Ph.D.

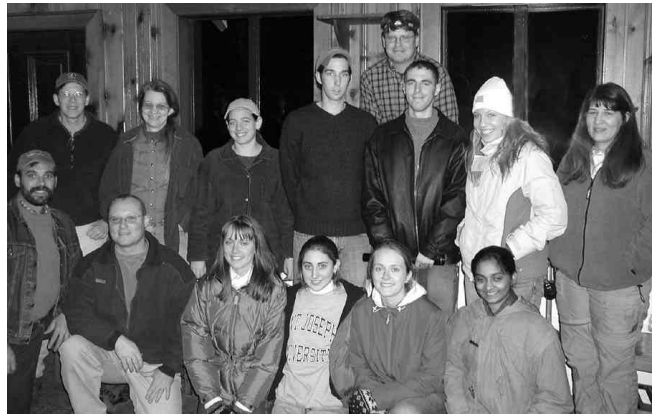
A group of Saint Joseph's University faculty, staff and students recently visited the owl banding project run by Scott Weidensaul, a naturalist and author studying the migration patterns of the little-known Saw whet owl. Weidensaul, a federally-licensed bird bander and acclaimed author of such books as "Living on the Wind: Across the Hemisphere with Migratory Birds" and "The Ghost With Trembling Wings: Science, Wishful Thinking, and the Search for Lost Species", kindly allowed a dozen SJU Hawks to join him and his volunteer staff on a cold and blustery November night in a cabin just outside of Friedensburg, PA.

As we arrived, we were greeted by what sounded like the "beep beep" of a truck backing up but was, in reality, a recording of the Saw whet's call. Weidensaul explained that they use the tape to lure migrating birds into the area where they have set mist nets, gossamer thin strands that entangle the owls without hurting them.

Soon after we arrived, Scott, along with some of the volunteers and SJU folks, walked the rather treacherous few hundred yards to the nets for the first check of the night. They were rewarded with a single Saw whet that turned out to be the only bird enticed by the call that evening. Scott then told us how many stations that band Saw whet owls in Pennsylvania and New Jersey have



*Author and naturalist Scott Weidensaul attaches a tiny radio transmitter to a Northern Saw Whet owl.*



*The SJU folks and the owl banders take time out from the night's work for a group photo.*

reported low numbers this year, while further north they are banding record numbers of birds. These data suggest that Saw whets are irregular migrants, their movements influenced by food availability and weather conditions.

The owl that was caught was carefully measured (it was about 7 inches long), weighed (all of about 2 ounces), and had its feathers checked (nice and shiny, meaning it was probably less than a year old). The owl was then equipped with a tiny radio transmitter to allow Weidensaul and his volunteers to track the bird's movements over the course of the next week or so. They have found that these tiny birds can move around quite a bit, ranging over a dozen miles in a single day.

The next morning, the SJU folks moved on to the Hawk Mountain Sanctuary, where between August 15 and December 15, an average of 18,000 hawks, eagles and falcons pass and are counted. That day's birding was pretty good, with a number of Red-tailed hawks and Turkey vultures, along with a few of the smaller Sharp-shinned and Cooper's hawks, being spotted.

Geography drives many migrating hawks and eagles towards Hawk Mountain each fall. Rather than flap their wings, migrating raptors soar to conserve energy. Thermal soaring is when a raptor circles up within a rising column of warm air formed when the sun heats the ground. In slope soaring, raptors 'hitch' a ride on winds deflected upward by hills and mountains. For more information on migrating raptors, contact the Hawk Mountain Sanctuary at [www.hawkmountain.org](http://www.hawkmountain.org).

## "The Doctor is In" to Answer Questions from K-12 Students

*Online system connects SJU experts with students.*

Story by Mike McCann, Ph.D.

As part of the ongoing National Science Foundation GK-12 grant awarded last year to Dr. Karen Snetselaar of the Biology Department (see "NSF Grant Supports 'Place-Based' Science Education" Summer, 2002 newsletter), the SJU Sigma Xi chapter has established an online question system for K-12 students. Named "The Doctor is In", the web site permits students to submit questions about all sorts of things, from biology to political science, to be fielded by nearly two dozen volunteer SJU faculty members in seven different departments.

"I expect that we will get quite a few questions, both from students in our partner schools through the GK-12 Geokids project, and from students at other schools as well" said site-designer and operator Dr. Mike McCann. "The more the better since the whole point of this project is to help keep students enthusiastic about the natural and social sciences."

Questions submitted via the web page are electronically forwarded to Dr. McCann who then determines which volunteer would be best suited to provide an answer. The volunteers then compose an answer appropriate to the age and grade-level of the student, and reply via e-mail. The goal is to turn around answers within a few days of the question being submitted so that students don't wait too long and lose interest.

Teachers are also encouraged to use the system to ask questions about classroom material, in class projects, or to get ideas for experiments or demonstrations they could do for students. "We hope that this will further develop relationships between SJU faculty and K-12 teachers in the area," said Dr. Karen Snetselaar, Project Director of the SJU GK-12 Geokids project. "Teaching students is what we are all about, whether they are in college or third grade."

"The Doctor is In" on the web at:  
[www.sju.edu/honor-society/sigma-xi](http://www.sju.edu/honor-society/sigma-xi)

## Math & Computer Science Dept. Receives NSF Grant

*Grant funds scholarships to attract minority students to SJU's Math and Computer Science Programs*

Story by Elaine Terry, Ph.D., Assistant Professor of Mathematics and Computer Science

In September, 2002, the Department of Mathematics and Computer Science was awarded a National Science Foundation grant through the Computer Science, Engineering & Mathematics Scholarship (CSEMS) program. The funds are earmarked as scholarships for the Pathways to Careers in Mathematics and Computer Science (PACMACS) program.

PACMACS is a program developed within the Department of Mathematics and Computer Science. Its purpose is to attract local, academically talented minority high school students, who are financially disadvantaged, to the mathematics and/or computer science programs at Saint Joseph's University. While PACSMACS has been created as an outreach program, it is expected to increase enrollment in the undergraduate mathematics and computer science programs at Saint Joseph's University, as well as helping to achieve one of the university's goals of increasing student diversity.

Any PACMACS student who successfully completes the program and is accepted to attend Saint Joseph's is awarded a CSEMS scholarship. Any funds that are not used for PACMACS students are awarded to students already enrolled in the department.

For the spring 2003 semester, six students in the department have been awarded scholarships in the amount of \$3125 each. These students will serve as tutors to the incoming PACMACS students. They are:

Paul Simon Grow  
Joseph Flannick  
Kathleen Ryan  
Kevin Dietzler  
Vincent Russo  
Stephen Campbell

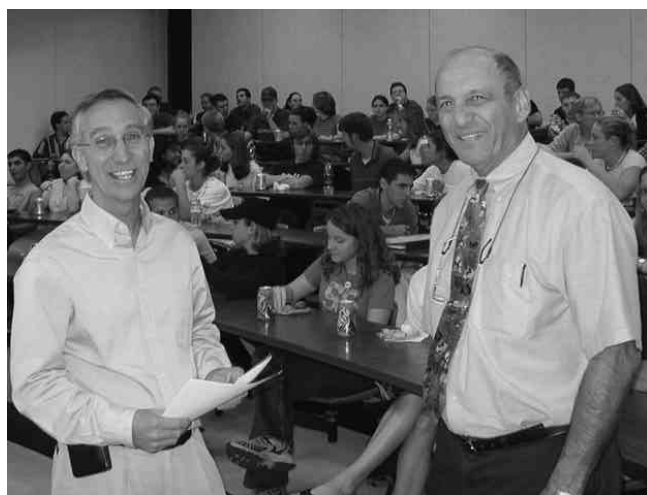
Immunology at the University of Oklahoma Health Sciences Center. More than 100 students and faculty, from SJU and other area colleges and universities, filled Room 200 of the Science Center to hear his lecture entitled "Deciphering the *Staphylococcus aureus* genome".

"Because of the non-discriminatory use of antibiotics, this bacterium has again become a serious threat to the health and well being of society," said Dr. landolo. "Virtually all strains of *S. aureus* isolated from infections are resistant to penicillin, and most are resistant to a wide array of antibiotics as well."

With funding from the National Institutes of Health, Dr. landolo's team was able to map the genetic code of *S. aureus*, a step he hopes will lead to development of a strategy for the search for new antibiotics and new antibiotic targets.

"Technological advances have made genome sequencing a rather routine operation in the modern molecular biology laboratory," he said. "This has allowed us to assemble the genome of this organism. "We have identified the individual genes and are using a process of high-throughput analysis to determine the environmental conditions, timing, and extent of their expression. This area of research is called functional genomics and can identify many of the genes involved in the infection process."

The second Frontiers in Science lecture was presented this November by Dr. Jerrold Meinwald, the



Dr. John Tudor (left) prepares to introduce Dr. John landolo (right) of the University of Oklahoma Health Sciences Center for the opening "Frontiers in Science" lecture of the 2002 – 2003 academic year.

Goldwin Smith Professor of Chemistry at Cornell University, the cofounder of the field of chemical ecology, the study of chemical interactions of organisms in nature. As always, faculty and students packed the lecture room to hear his talk entitled "Chemical Defense and Communication Mechanisms in Nature".

Traditionally, chemists have attempted to utilize naturally occurring compounds for medicinal purposes. It is only relatively recently that serious attention has been devoted to the role that natural products play in the lives of the organisms that actually produce them.

In his lecture, Dr. Meinwald focused on some of the interactions among insects and plants in which specific chemicals are used by the organisms to help defend themselves from predators and in intraspecific and interspecific signaling behavior. For example, Dr. Meinwald and his colleagues have found that whip scorpions, a 400 million-year-old species, defend themselves by spraying their predators with a supervinegary mixture; however, what gives this "vinegar" its bite is the small amount of n-octanoic acid that is present which enables the spray to penetrate the protective cuticles of the predators.

In addition, Dr. Meinwald discussed some of the potential contributions of this research to the understanding of ecological relationships at the molecular level, to future drug discovery, and to the conservation of biodiversity.

This spring will see two more "Frontiers in Science" seminars at SJU. At 4:00 PM on April 9, Dr. Gary D. Patterson, Professor of Chemical Physics at Carnegie Mellon University, will give a talk entitled "Shimmer, Shimmer, Nanopops" in room 300, Science Center. The final 2002 – 2003 lecture will be given by National Cancer Institute Director Andrew von Eschenbach, M.D., '63. His lecture on April 11<sup>th</sup> at 5:00 will open the 14<sup>th</sup> Annual Saint Joseph's University Sigma Xi Student Research Symposium (see story page one). More information about these talks is available from Dr. Mike McCann at (610)660-1823 or by e-mail at mmccann@sju.edu.

Portions of this story were taken from press releases from the University Communications Office.

## SJU and Children's Hospital Team for Student Shadowing

*Program developed by Fred Cusick, R.N., '96, allows SJU students to shadow cardiac intensive care nurses.*

Story by Kelly Morrisey, University Communications

"To witness an open heart surgery of a two-year-old child was an incredible and inspiring experience for me," said Keith Milligan, a junior at Saint Joseph's. "I am definitely considering a career in health care, knowing I could someday help sick children get better."

Thanks to a dedicated Saint Joseph's alumnus, Fred Cusick '96, RN, undergraduate students such as Milligan have the opportunity to job-shadow nurses in the Cardiac Intensive Care Unit at The Children's Hospital of Philadelphia (CHOP). This is the first time CHOP has permitted undergraduate, non-professional students to job-shadow in such a highly sensitive patient care unit.

Cusick, a registered nurse in the pediatric cardiac care unit, was instrumental in developing the program as an educational outreach effort of CHOP, providing a unique and invaluable learning experience for SJU students. He suggested the idea to CHOP officials after speaking at several alumni career panels at Saint Joseph's. The hospital recognized the value in educating future generations interested in pursuing a career in health care, especially in light of the national nursing shortage crisis.

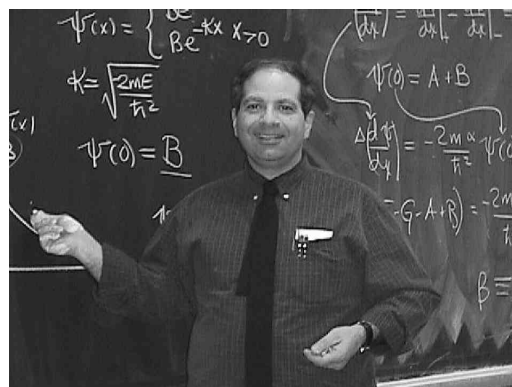
"It really lets the students see the reality of health care, and not as a patient or a visiting relative," said Dr. Michael McCann, associate professor of biology and coordinator of the CHOP job-shadowing program at Saint Joseph's. "By observing a shift on the intensive care unit, the students gain a better appreciation for the nursing profession and expand their field of career possibilities."

Eligible students job-shadow a nurse on his/her evening shift on the cardiac intensive care unit. Shadowing may include observing individual patient care, preparation for surgery, and additional nursing duties on the unit. Students must be at least in their second semester and have completed courses in biology, anatomy or physiology. In addition, they must also attend an introductory lecture given by Cusick on pediatric cardiac defects and cardiac care, and provide a full record of their immunizations. To date, more than 20 students have attended the lecture, and the first hospital visit took place in early October.

## Dr. Paul Angiolillo, '78 New SJU Sigma Xi President Elect

Paul J. Angiolillo started his career in science as a chemistry major. After two years he saw the photons and transferred to what was then Saint Joseph's College as a physics major, and graduated with a BS in physics in 1978. He went on the University of Pennsylvania and earned a Ph.D. in molecular biophysics at the Johnson Research Foundation, considered a "Mecca" for biophysical research. After a stint at the University of the Sciences, Paul came to Saint Joseph's in 2000 and joined the Department of Physics.

His research is in the area of materials physics. His laboratory has been involved in the study of primary singlet and triplet photoexcitations and spin dynamics in a class of highly conjugated exotic oligomeric materials. The past decade has seen the establishment of a new area - that of nanoscale molecular electronics. Much of this work has been spurred by attempts to mimic the highly efficient electron and energy transfer processes typified by the reaction center and the light harvesting antenna complexes of green plants. The physics of photoexcitations and charge transport phenomena in  $\pi$ -conjugated materials lies in stark contrast to that observed in traditional metals and semiconductors. Understanding energy trapping, migration and electron transfer reactions in multichromophoric assemblies is essential for biomimetic modeling of energy transduction. These properties render these materials not only scientifically intriguing but also potentially useful in optoelectronic devices.



*Dr. Paul Angiolillo, '78, assistant professor of Physics and president-elect of the SJU Chapter*

then stimulated to divide. The cells are then separated, and embryonic stem cells are isolated. These cells will be genetically identical to the patient and should not be rejected. Dr. Fisher stressed that this differs from reproductive cloning, such as that claimed to have been performed by Cloneaid, in that there is no intent to produce a clone of the individual, rather, the intent is to produce a clone of the patient's stem cells.

The third speaker, Ausim Azizi, M.D., Ph.D., Professor and Chair of the Department of Neurology at Temple Medical School, then elucidated some of the potential clinical applications of both fetal and adult stem cells. He pointed out that adult stem cells are already being used in treatment of disease such as certain types of leukemias, in which bone marrow, which contains stem cells, is transplanted. He pointed out that the great potential of stem cells lies in their possible use to repair or even replace tissues and organs that have been damaged by injury or disease. One obvious candidate for this therapy is nerve cells. Spinal cord and brain injuries are often so severe because most adult neurons lack the ability to regrow. Stem cells thus hold a great deal of promise for treating patients with paralysis, Parkinson's Disease, Alzheimer's and damage due to stroke. Dr. Azizi also pointed out that many other diseases could potentially be treated or even cured using stem cells. These include diabetes, damage to heart muscle due to heart attacks, damage to joints due to arthritis, etc. He stated that at this time it was not clear if either embryonic or adult stem cells would be able to be developed into useful therapeutics for a variety of reasons, but that research in both areas should be continued.

The final speaker was SJU alum Bartholomew Tortella, M.D., '75, Chief of Trauma Services at Hahnemann Hospital. Dr. Tortella addressed the ethical considerations that need to be made when considering stem cell research. Much of the ethical debate has focused on embryonic stem cells, as the harvesting of adult stem cells can be done with the consent of the donor and does not typically entail significant risk. He reiterated the fact that harvesting embryonic stem cells requires the destruction of an embryo and thus the embryo can serve as a good starting point for the discussion. At one end of the

spectrum are people who hold that personhood begins at the time of fertilization and thus, any destruction of an embryo is equivalent to murder. At the other extreme are individuals who hold that personhood is not invested until birth and thus one can make and use embryos for any beneficial purpose.

People holding views at either of these extremes, Dr. Tortella said, can't really engage in constructive debate, as neither "side" can say anything to change the other's views. Given this, Dr. Tortella focused on the idea that perhaps personhood is invested at some time during fetal development. He pointed out that, for example, there is the issue of twinning, where an early embryo can split into two, creating identical twins. If the embryo has a soul before twinning occurs, is the soul split between the two identical twins? Is a new soul created? These issues, which cannot be resolved scientifically, create a moral and ethical gray area and thus open the possibility that it would be ethical to use cells derived from early embryos even if it meant killing the embryos.

Dr. Tortella then went through a description of the types of ethical considerations routinely used in making decisions about medical ethics. He recounted events from his experiences on Institutional Review Boards of Hospitals and described parallels between the debate on stem cell research and other types of therapies. In the end, Dr. Tortella left the audience with the realization that there are no simple answers to the question of should embryonic stem cells be used in research or clinical work.



Dr. Bartholomew Tortella, '75, describes some of the ethical considerations relating to stem cell research and use.

## SJU Masters Programs Offer Opportunity for New Careers

*Full and part-time programs in math, the natural and the social sciences provide paths for career change.*

Considering a career change? Interested in moving into the areas of life sciences, computer sciences, criminal justice, K-12 teaching or psychology? Maybe one of the SJU Masters programs is just what you are looking for.

These programs combine a flexible curriculum with full or part-time courses of study, to suit every student's need, whether they are right out of college or coming back after years in the work force. Masters programs relevant to the mission of Sigma Xi are offered in the following areas:

- Biology (MA or MS)
- Computer Science (MS)
- Criminal Justice (MS)
- Education (MS with certification in Biology, Chemistry, Math or Computer Science)
- Health Administration (MS)
- Psychology (MS)
- Public Safety and Environmental Protection (MS)

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ADDRESS CORRECTION REQUESTED

For more information about these programs, contact the appropriate graduate director from the list below or go to [www.sju.edu/academic\\_affairs](http://www.sju.edu/academic_affairs) and click on the "Graduate Arts & Sciences" link.

### Graduate Directors:

- Biology – Dr. Karen Snetselaar  
Phone: (610) 660-1826  
E-mail: [ksnetsel@sju.edu](mailto:ksnetsel@sju.edu)
- Computer Science – Dr. Gary Laison  
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E-mail: [glaison@sju.edu](mailto:glaison@sju.edu)
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