Women in the Sciences at Illinois State University

Only a few of the many women faculty and students from some of these departments are profiled in this exhibit:

Applied Computer Science

Biological Sciences

Chemistry (& Biochemistry)

Geogology/Geography

Computational Physics

mathematics

Physics

Technology

Illinois State University

Expanding Your Horizons Conference

Association for Women in Science
AWIS
Heart of Illinois Chapter

This exhibit was created and sponsored by the ISU Physics Department, the *Expanding Your Horizons Through Math, Science, and Technology Conference*, The Association for Women in Science (Heart of Illinois Chapter), and the scientists and students profiled in this exhibit. Eventually, all of the departments listed will have a profile page for this exhibit. ISU Physics, February 2003gfj

Women in the Sciences at Illinois State University

PHYSICS

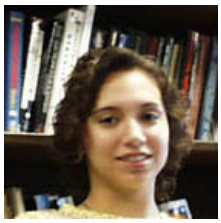
Dr. Shang-Fen Ren
Associate Professor of Physics

For more information, visit
www.phy.ilstu.edu/~ren/cren

Dr. Ren's research area is in computational semiconductor physics. Her recent research interest is focused on microscopic modeling of semiconductor nanostructures.

In recent years, Dr. Ren and her co-workers have developed a microscopic valence force filed model to study phonon modes in semiconductor QDs with up to about 12,000 atoms(about 8.5 nm in size). The uniqueness of this model is that the projection operators of the irreducible representations of the group theory are employed to reduce the computational intensity. By using this method, all the vibrational frequencies and vibrational strengths can be calculated directly from the dynamic matrices in five different irreducible representations. Not only this allows the investigation of all the microscopic detail of phonon modes in QDs with a much larger size, but also it allows the investigation of phonon modes in QDs with different symmetries. These investigations lead to many interesting physics that otherwise can not be revealed. At present, Dr. Ren and her co-workers are further applying the results of this microscopic model to investigate other related physical properties of QDs, such as the Raman scattering, the electron-phonon interaction, the carrier relaxation, and the light emission of QDs.

A Few of Our Recent Undergraduate Women Physics Majors, Research Assistants and Graduates



Shelley L. Dexter
Computer Physics Graduate in 2002; and Physics Teaching Assistant and Research Assistant

Sarah E. Radovich
Physics Sophomore in 2003; Physics Teaching Assistant

Rebecca A. Hahn and Shannon M. Mandel,
2001 & 2002 Physics Teacher Education Major Graduates; and Physics Teaching Assistants

Ingrid Ronquist and Valerie Hackstadt
Physics Teaching Assistants (Ingrid, Senior Computer Physics Major, also presented her research with the Space Physics group at the Argonne Undergraduate Research Symposium in November 2002) (Valerie, a Physics Teacher Education Major, is also Vice-President of the Physics Club)

Rebecca D. Yapp
Engineering Physics Major Junior, 2003
Physics Teaching Assistant ; Co-Workshop Leader at the 2002 & 2003 EYH Conferences (presenting her research at the Argonne Undergraduate Research Symposium in November 2002)

For more information, visit
www.phy.ilstu.edu

Women in the Sciences at Illinois State University

CHEMISTRY (& BIOCHEMISTRY)

Dr. Jones research interests include enzymes involved in heme metabolism; science education.

Porphyrins occur widely in nature serving a variety of biological functions. Porphyrin derivatives are involved in oxygen transport (hemoglobin), photosynthesis (chlorophylls), oxygen storage (myoglobin), as well as energy metabolism (cytochromes). Heme is a porphyrin that is the important non-protein component of hemoglobin. The general pathway for heme and chlorophyll biosynthesis has been well known yet several of the enzymes are as yet poorly understood in terms of active site amino acids and catalytic mechanisms. In her lab, Dr. Jones and her colleagues study two of the enzymes involved in heme biosynthesis and are especially interested in the molecular recognition of substrate by the enzymes. Synthetic substrate analogs are used to probe the substrate fit into the active site of the two specific enzymes, Coproporphyrinogen Oxidase and Uroporphyrinogen Decarboxylase. Enzymic activities are evaluated following extractions and HPLC evaluation. Covalent modification of active site amino acids is also animportant method being used to evaluate enzyme activity of both crude and partially purified proteins. Enzyme purification and evaluation of the catalytic mechanisms of these enzymes remain important experimental goals of this lab. In Dr. Jones' lab, students get extensive experience with spectroscopy and HPLC.

Dr. Marjorie A. Jones
Professor of Biochemistry

For more information, visit:
www.che.ilstu.edu/people/faculty/jones.htm

Dr. Szczepura's research interestes involve the coordination chemistry of supraoctahedral transition metal clusters.

Dr. Szczepura's research involves the development of the coordination chemistry associated with several new families of transition metal clusters. This is a new area of supramolecular and cluster chemistry in that it involves the use of chelating ligands in conjunction with new transition metal clusters that position metal centers and ligands (L) in an octahedral fashion. She is interested in conducting fundamental studies which will allow us to understand the steric and electronic ligand effects on the properties and reactivities of these clusters. This knowledge is essential for the deliberate manipulation of these new clusters towards specific applications, including hydrodesulfurization.

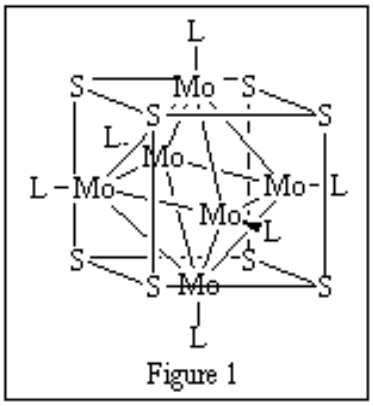


Figure 1

Dr. Lisa F. Szczepura
Assistant Professor of Inorganic Chemistry

For more information, visit:
www.che.ilstu.edu/people/faculty/szczepura.htm

For more information, visit
www.che.ilstu.edu

Women in the Sciences at Illinois State University

BIOLOGICAL SCIENCES

Dr. Sabine S. Loew
Assistant Professor of Population & Conservation Biology

For more information, visit:
www.bio.ilstu.edu/loew/

Dr. Loew's research interests include evolutionary and behavioral ecology of mammals, and conservation genetics.

Dr. Loew's research interests in evolutionary biology and behavioral ecology currently focus on the effect of environmental pollutants on the mutation rate of wild rodents and the conservation genetics of American ginseng, a rare commercially valuable herb. Previous and ongoing research has emphasized questions on inbreeding and dispersal in rodents as well as paternal care and reproductive success in toque macaques, a threatened Sri Lankan primate. Her efforts to contribute to wildlife conservation focus on theoretical issues such as the use of population genetics to conservation biology, and more applied approaches, for example, specific recommendations to the genetic management of giant kangaroo rats. Field research techniques involve trapping and collection of biological samples, radio telemetry, focal observations and mapping of animal movements. Genetic analyses in her laboratory may range from determination of paternity and genetic diversity using mini- and microsatellite DNA fingerprinting and single-copy nuclear DNA analysis to MHC typing via DNA cloning, Southern blotting and SSCP analysis.

Dr. Cynthia J. Moore
Assistant Professor of Biological Sciences
Director, Biology Teacher Education

For more information, visit:
www.bio.ilstu.edu/moore/

Research Interests

Dr. Moore's laboratory is currently working on the application of recent discoveries about the zebrafish genome to endangered killifish species, and in genes involved in cellular aging mechanisms and cancer. Her other focus is on science education research assessing techniques for presenting human molecular genetics to all levels of high school students, and strategies for developing effective partnerships between university scientists and K–12 schools. She has taught a variety of courses in molecular genetics, biochemistry, and aquarium science, including numerous professional development courses designed for in-service K-12 teachers.

Dr. Laura A. Vogel
Assistant Professor of Biology

For more information, visit:
www.bio.ilstu.edu/Vogel/

Research Interests

Dr. Vogel's research focus is immunology, particularly how immune responses are regulated. She studies interactions between white blood cells known as B lymphocytes and T lymphocytes using the mouse as a model system.

For more information, visit:
www.bio.ilstu.edu/

Women in the Sciences at Illinois State University

GEOGRAPHY/GEOLOGY

Research Interests: stable isotope geochemistry, petrology, origin of granitic rocks, Precambrian geology, stable isotope geochemistry of accessory minerals especially zircon and titanite, hydrothermal alteration of igneous rocks

Teaching: Principles of Geology, **Mineralogy, Petrology, Geology Field Camp**

For more information, visit:
www.cas.ilstu.edu/geo/emking/

Dr. Elizabeth M. King
Assistant Professor of Geology

Research Interests: Geographic Information Science, Urban Geography, Social Theory, United States, South Asia.

GIS and Society, Public Participation GIS for Community Empowerment, Role of GIS in Local Government Planning, Societal Implications of Digital Technology, Rural and Urban Gentrification, Counter-urbanization, Growth Management and Smart Growth Movement, New Urbanism, Housing and Public Policy, Poverty and Social Justice. She conducts case study research using mainly qualitative research methods; her research is strongly influenced by social theories.

Teaching Interests: GIS, Urban Geography, South Asia, World Regional Geography.

For more information, visit:
www.geo.ilstu.edu/department/faculty_profiles/ghose.shtml

Dr. Rina Ghose
Assistant Professor of Geography

Research Interests: Interannual, decadal climate variability and change; Canadian climate

Teaching Interests: Earth's Dynamic Weather, Quantitative methods, Geographic Information Systems Applications

Dr. Dagmar Budikova
Assistant Professor of Geography
Advisor for the Environmental Studies Program

For more information, visit:
www.geo.ilstu.edu/

Women in the Sciences at Illinois State University

MATHEMATICS

Teaching and Research Interests: Gender Equity for math, science, and technology

A dedicated teacher, Dr. Benson also teaches at ISU's University High School Math Department. She has mentored many students to achieve state and national academic achievement awards. As Director of ISU's *Expanding Your Horizons Through Math, Science, and Technology Conference* since its inception, Dr. Benson translates her love of things mathematical into practical ways to encourage young women to enter these fields.

Expanding Your Horizons Conference
www.eyh.ilstu.edu

Dr. Carol T. Benson
Assistant Professor of Mathematics

For more information, visit: www.math.ilstu.edu/benson/

Research Interests:

Elementary mathematics education, Development of students' thinking in probability, statistics, and algebra Professional development of teachers.

For more information, visit: www.math.ilstu.edu/langrall/

Dr. Cynthia Langrall
Assistant Professor of Mathematics

Research Interests:

Mathematics education issues at the secondary and post-secondary levels, including: students' understanding of geometry, calculus, and proof; secondary mathematics teacher development.

For more information, visit: www.math.ilstu.edu/tsmartin/

Dr. Tami S. Martin
Assistant Professor of Mathematics

Research Interests:

Statistical Thinking in Children, Teaching and Teacher Education, Mathematics Learning of Students with Special Learning Needs and Urban Students "At Risk."

Dr. Thornton is a national leader in the mathematics education of young children and was awarded the honor of Distinguished Professor from her peers at Illinois State University. Only a small percentage of faculty achieve this level of distinction. Dr. Thornton was also instrumental in helping to establish the Expanding Your Horizons Conference chapter at Illinois State University.

Dr. Carol Thornton
Distinguished Professor of Mathematics

For more information, visit: www.math.ilstu.edu/

Women in the Sciences at Illinois State University

Applied Computer Science and Technology

Research Interests:

Database design, relational database management systems including DB2, data modeling, distributed systems, systems analysis and design, information engineering, interface design, development tools, information systems education.

Dr. Carol A. Chrisman
Professor of Applied Computer Science

For more information, visit:
www.acs.ilstu.edu/cachrism/cachrism.htm/

Dr. Melanie A. Johnston
Graduate Advisor and Lecturer
Applied Computer Science

For more information, visit:
www.acs.ilstu.edu/

Research Interests:

Emerging technologies in telecommunications and computer networks
Evaluation of instructional techniques and technologies to promote critical thinking
Curriculum design and evaluation to enhance student learning
Gender equity in science and technology
Technology transfer for South Asia

Dr. Gokhale was also a Fulbright Scholar in 2002. For 2003, the National Science Foundation Grant funded her grant proposal titled "An Integrated Approach to Change Attitudes of College Freshmen Toward Female Participation in SME&T."

Dr. Anu Gokhale
Professor and Coordinator
Industrial Computer Systems for Technology

For more information, visit:
http://www.cast.ilstu.edu/tec/faculty_staff/profiles/gokhale.shtml

For more information, visit:
http://www.cast.ilstu.edu/tec