Benefits of this program:

- Participate in cutting-edge research in nanotechnology
- Learn about career opportunities in science and engineering
- 10 weeks of hands on research at Notre Dame or in Budapest, Hungary
- Paid travel, tuition, room and board, research budget and $3,000 stipend
- Earn two credits of undergraduate research

Qualifications:
We are seeking undergraduate students who are majoring in one or more of the following fields:
- Biology
- Physics
- Chemistry
- Electrical Engineering
- Chemical Engineering
- Geosciences, Environmental Engineering
- Mechanical Engineering
who have a strong interest in interdisciplinary science and engineering and the potential to excel in research. Previous research experience is not necessary.

Freshmen, Sophomores, and Juniors who are US citizens and permanent residents are eligible to apply. Participants will travel to Notre Dame for a ten week program of research, seminars and minicourses culminating in a research symposium. Some students will travel abroad for 2 to 3 weeks as exchange students, taking part in cooperative research efforts with a university in Budapest, Hungary.

Important Dates: 2005
January 31: Applications due (Decision by March 1)
June 1: Start date
July: Budapest research cooperative
August 10: End date

For more information visit our website at: http://www.nd.edu/~nanoreu

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Program of research in nanotechnology

Participating Faculty

- Mark Alber: Mathematics and Physics
- Joan Brennecke: Chemical Engineering
- Patricia Clark: Chemistry & Biochemistry
- Holly Goodson: Chemistry & Biochemistry
- Gregory Hartland: Chemistry & Biochemistry
- Prashant Kamat: Radiation Laboratory
- Peter Kogge: Computer Science & Engineering
- Marya Lieberman: Chemistry & Biochemistry
- Patricia Maurice: Civil Engineering & Geosciences
- Dani Meisel: Radiation Laboratory
- Robert Nerenberg: Civil Engineering & Geosciences
- Agnes Ostafin: Chemical & Biomolecular Engineering
- Andre Palmer: Chemical Engineering
- Samuel Paolucci: Aerospace & Mechanical Engineering
- Wolfgang Porod: Electrical Engineering
- Joseph Powers: Aerospace & Mechanical Engineering
- Greg Snider: Electrical Engineering
- Jennifer Woertz: Civil Engineering & Geosciences

Some of the Research Projects for 2005

**Title: Biologically inspired visual microprocessor chips**
Students will design and fabricate sensors for visible and infrared light for a 128x128 pixel artificial retina. Part of the project will take place at the Technical University of Budapest in Hungary.

**Title: Computer modeling of microtubule dynamics**
Students will record images of microtubules assembling/disassembling on a microscope slide and will help to refine a computer model of MT growth.

**Title: Destruction of biochemical molecules at the surfaces of metallic nanoparticles**
Students will use metal nanoparticles as “antennae” to receive and concentrate light energy on biomolecules or tissues. Biomedical applications may be explored in a subsequent summer.

**Title: Bacterial absorption and mobility through soil and aquifer materials**
Students will study how natural organic matter affects bacterial adhesion to minerals and will help to build and test a model for how bacteria move through wetland soils.

**Title: Semiconductor nanostructures as chemical sensors in supercritical media.**
Students will make semiconductor nanoparticles and study their interaction with pollutant molecules in supercritical solvents. Students will investigate changes in fluorescence that could be used to sense the presence of organic pollutants.

Comments from previous participants

“It was my first real research experience and I learned more than I ever thought I could in 10 weeks. It gave me an idea of what a life in science would be like and taught me innumerable techniques and analytical skills”.

“It gave me the opportunity to work with specialized equipment, new materials and in a very different setting than at my school. I had the opportunity to do reactions and manipulate the results and to be more exposed to the scientific community and the way research works”.

“This REU program allowed me to see the graduate school environment. The environment was challenging and sometimes very frustrating to get to the reward of results from hard work and determination. I feel it was a good exposure to graduate school, that in return has urged me even more to become something that makes use of my full potential”.

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