

# Columbia University

NATIONAL SCIENCE FOUNDATION

## **Research Experiences for Undergraduates in Materials Science and Engineering**

*Summer Program for 2007*

The Materials Research Science and Engineering Center at Columbia University, called the Center for Nanostructured Materials, will support approximately ten outstanding undergraduates as Summer Research Fellows for the period from May 29-August 3, 2007. The National Science Foundation - Research Experiences for Undergraduates (NSF-REU) program provides a \$3500 stipend for each successful candidate, free campus housing (worth over \$2600) in which you are expected to reside, and possible assistance with round-trip transportation (up to \$500 if necessary). Those selected will have an opportunity to participate fully in the activities of one of the nation's outstanding interdisciplinary Materials Research Science and Engineering Centers, as well as in other exciting materials research on campus. This Center draws faculty from Materials Science, Chemistry, Applied Physics, Chemical Engineering, Physics, and Electrical Engineering, and works closely with nearby universities (including CCNY) and industry (including IBM).

The focus of the research in our Center for Nanostructured Materials is on the exciting new areas of the synthesis, properties and applications of films composed of nanoparticles and other mixed organic/inorganic structures. There are REU opportunities in one of the many projects in the Center, and in other materials programs on campus in materials processing (including thin film laser and plasma processing), surface science, optical properties of materials, electron and scanning tunneling microscopies, polymers, semiconductor physics and technology, and the electronic transport and optics of low-dimensional systems. Every student will be assigned a faculty mentor with whom the student conducts research. We particularly encourage applications from students who will be entering their junior or senior years, and exceptional students who will be entering their sophomore year.

During the REU period, students will also be involved with workshops, seminars, visits to local industry, recreational activities, a symposium of presentations by REU students, and other activities.

Prospective candidates should arrange to have an official transcript and two letters of recommendation (preferably from math, science or engineering professors at their home institution) forwarded to the Program Director at the address below, along with the completed application form; this form can be found at <http://www.cise.columbia.edu/mrsec/>. The deadline for receipt of completed applications is Thursday, March 1, 2007. Successful candidates will be notified by the end of March. For additional information, please visit the website or contact:

Justine Herrera  
Materials Research Science and Engineering Center – REU  
Columbia University  
530 West 120th St. MC 8903  
Schapiro/CEPSR, Room 1001  
New York, NY 10027

Tel: 212-854-3964  
Fax: 212-854-1909  
E-mail: [jh2477@columbia.edu](mailto:jh2477@columbia.edu)

*Columbia University is an affirmative action, equal opportunity employer, and the Center specifically invites and encourages applications from women, minorities, and the physically challenged.*

Materials Research Science and Engineering Center at Columbia University

Summer 2007

Research Experiences for Undergraduates

Complete application must be received by March 1, 2007 for program consideration.

APPLICATION FORM

Name: Last \_\_\_\_\_ First: \_\_\_\_\_

Social Security Number: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Resident status (By NSF Guidelines, this program is available to U.S. citizens and permanent residents only):

U.S. citizen \_\_\_\_\_ Permanent resident \_\_\_\_\_

**Optional** (The following information is strictly confidential; it is requested for NSF statistical purposes only):

Gender: M \_\_\_\_\_ F \_\_\_\_\_

*Ethnic group/racial background:*

White, not of Hispanic origin \_\_\_\_\_

Hispanic \_\_\_\_\_

African American/Black, not of Hispanic origin \_\_\_\_\_

Asian \_\_\_\_\_

Native American or Alaskan Native \_\_\_\_\_

Pacific Islander \_\_\_\_\_

College/University: \_\_\_\_\_

Major/Department: \_\_\_\_\_

School Address: \_\_\_\_\_

School Phone: \_\_\_\_\_

\_\_\_\_\_

Home Address: \_\_\_\_\_

Home Phone: \_\_\_\_\_

\_\_\_\_\_

E-mail Address: \_\_\_\_\_

Currently Completing (year):      1<sup>st</sup>    2<sup>nd</sup>    3<sup>rd</sup>    4<sup>th</sup>

Please answer this question: "Will final exams at my university be completed before Sunday, May 27, 2007?"

YES  NO

Please answer this question: "Do I plan to be in residence in the program from May 29-August 3, 2007?" (*Does not include special events such as weddings.*)

YES  NO

Have you participated in other NSF REU programs in the past?  YES  NO

If "yes", which program(s)? \_\_\_\_\_

Expected Date of Graduation from College: \_\_\_\_\_

**Research Interests** [*Please rank top 5 interests from 1 (most interested) to 5 (least interested) and place an "X" next to those topics that do not interest you.*]

***Synthesis and Processing***

- Altering the Properties of Materials by Processing
- Analysis of Surfaces
- Assembly or Growth of Nanostructured Layers and Films
- Attaching Biological Materials to Nanoparticles
- Patterning of Nanomaterials
- Polymer Processing
- Semiconductor Processing
- Synthesis of Nanoparticles

***Analysis and Properties***

- Electrical Properties of Nanocomponent Films
- Mechanical Properties of Nanocrystal Thin Films
- NMR Studies of Nanoparticles
- Optical Properties and Spectroscopy of Nanocrystals and Thin Films
- Properties of Magnetic Thin Films
- Proximal Probing of Lithographic Patterning
- Semiconductor Physics

***Other***

- Sensors
- Theory

Please arrange for an up-to-date official transcript to be sent to the address below, along with the completed application form, biographical statement and two letters of recommendation:

Justine Herrera  
Materials Research Science and Engineering Center – REU  
Columbia University  
530 West 120th St. MC 8903  
Schapiro/CEPSR, Room 1001  
New York, NY 10027

*This REU program is supported primarily by the MRSEC Program of the National Science Foundation under Award Number DMR-02-13574.*

**Materials Research Science and Engineering Center at Columbia University**

Summer 2007

*Research Experiences for Undergraduates*

**BIOGRAPHICAL STATEMENT**

Please return the completed biographical statement by Thursday, March 1, 2007 to the following address:

Justine Herrera  
Materials Research Science and Engineering Center – REU  
Columbia University  
530 West 120th St. MC 8903  
Schapiro/CEPSR, Room 1001  
New York, NY 10027

In order to help us learn more about you, please write a brief essay (no more than 1 page) describing:

- 1) Your research interests and experiences.
- 2) Which REU projects interest you and why?
- 3) Expectations for the summer.
- 4) Graduate school plans, and your career plans and goals.
- 5) Why do you want to do research in a materials center and why particularly at the Columbia MRSEC?

**Materials Research Science and Engineering Center at Columbia University**

Summer 2007

*Research Experiences for Undergraduates*

LETTER OF RECOMMENDATION

Please return the completed letter of recommendation with this cover letter by Thursday, March 1, 2007, to the following address:

Justine Herrera  
Materials Research Science and Engineering Center – REU  
Columbia University  
530 West 120th St. MC 8903  
Schapiro/CEPSR, Room 1001  
New York, NY 10027

Applicant's Name: \_\_\_\_\_

Recommender's Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_