



# MAGNET/SEM



Minority Access/Graduate Networking in the Sciences, Engineering and Mathematics

## A New Metropolitan Area Alliance Promotes SEM Doctoral Study

**M**AGNET/SEM brings together private and public institutions in New York and New Jersey to enhance the recruitment, retention, and graduation rates of doctoral candidates in the sciences, engineering, and mathematics. The Graduate Center of the City University of New York is the lead institution in a partnership which includes New Jersey Institute of Technology, Stevens Institute of Technology, Polytechnic University, and six CUNY colleges (Brooklyn, City, Hunter, Lehman, Queens, and the College of Staten Island).

The MAGNET/SEM alliance is funded through the National Science Foundation's AGEP program (Alliances for Graduate Education and the Professoriate). AGEP, which is dedicated to increasing the number of underrepresented minority students who achieve the Ph.D. in SEM disciplines and,

in particular, choose the professoriate as a career, is a nationwide initiative which supports fifteen alliances. According to NSF Program Director Dr. Roosevelt Y. Johnson, "AGEP provides an opportunity for individual institutions to create a more nurturing graduate environment without sacrificing the standards that have made graduate education in the United States the best in the world by many standards." The program is based on the premise that academic institutions become more effective when they act cooperatively. At a time when the demand for university faculty is increasing, the program seeks to promote the "preparation and hiring of highly qualified minority candidates" who can serve as role models for minority SEM students.

MAGNET/SEM already is reaching 34 fellows who are conducting research in biochemistry, biopsychology, biology, chemistry, computer science, earth and environmental science, engineering, mathematics, physics, and speech and hearing sciences. Mentoring is an essential part of the program, and 35 faculty members from the four universities are participating as mentors.

The CUNY Graduate Center figures prominently in the roster of institutions which lead in the production of minority Ph.D.s in the sciences, mathematics and engineering. It was the recipient in 1996 of the Council of Graduate



MAGNET/SEM fellows at the welcoming reception held at the CUNY Graduate Center

### Inside this Issue:

Partner Institutions	page 2
Project Direction	page 4
Mentoring Partnerships	page 5

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*"I envision a network of SMET professionals drawing from each other's expertise and resources to create nurturing graduate and professional education environments that will become national models for the production of large numbers of outstanding minority professionals, changing the culture of graduate education in the process."*

*Dr. Roosevelt Y. Johnson,  
NSF AGEP Program  
Director*

**MAGNET/SEM** is an alliance of

The City University of New York Graduate Center, New Jersey Institute of Technology, Polytechnic University, and Stevens Institute of Technology with Brooklyn College, City College, Hunter College, Lehman College, Queens College, and The College of Staten Island, CUNY.

## **The National Science Foundation Alliances for Graduate Education and the Professoriate (AGEP)**

Roosevelt Y. Johnson, *Program Director*

### **The CUNY Graduate Center**

Frances Degen Horowitz, *President*  
William P. Kelly, *Provost*

#### **Principal Investigator**

Gail Smith, *CUNY Graduate Center*

#### **Co-Principal Investigators**

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Neville Parker, *City College*

#### **Project Administrator**

Godfrey Gumbs, *Hunter College*

#### **Research Associate**

Marilynne Diggs-Thompson

#### **Steering Committee**

Mirella Afron, *College of Staten Island*  
Robert Bradley, *Lehman College*  
Ted Brown, *CUNY Graduate Center*  
Louis Celenza, *CUNY Graduate Center*  
Richard Chappell, *CUNY Graduate Center*  
Judy Lea Cuddy, *Stevens Institute of Technology*  
Jozef Dodziuk, *CUNY Graduate Center*  
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Bernard Gallois, *Stevens Institute of Technology*  
Joseph Glick, *CUNY Graduate Center*  
Robert Goldfarb, *CUNY Graduate Center*  
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Jeffrey Osleeb, *CUNY Graduate Center*  
Richard Pizer, *Brooklyn College*  
Vita Rabinowitz, *Hunter College*  
Horst Schulz, *CUNY Graduate Center*  
Nancy Tooney, *Polytechnic University*  
Dennis Weiss, *City College*

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**Editor** Helena Leslie

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Schools/Peterson's Award for Innovation in the Recruitment and Retention of Minority Graduate Students. In February, 2000, it was among the institutions honored by the Quality Education for Minorities Project, based at the Massachusetts Institute of Technology, for its important contribution to the number of doctoral degrees in mathematics, the physical sciences, and engineering earned by underrepresented minority students.

MAGNET/SEM fellowships at the Graduate Center will supplement existing CUNY financial support, in addition to granting full tuition remission for two years. The awards include a summer stipend to ensure that awardees devote themselves full time to their academic pursuits. CUNY doctoral student Hua Liu has worked with Project Administrator Dr. Godfrey Gumbs to develop the state of the art MAGNET/SEM website. This provides a crossroads for students, mentors, and faculty at participating institutions and will, in due course, spotlight students' research.

Students will benefit from the Graduate Center's well established programs for recruitment and reten-

tion of minority students in SEM disciplines. These include:

- the CUNY Pipeline program which provides preparatory summer institutes for prospective minority students interested in doctoral studies leading to careers in college teaching and research;
- Project Ascend, which introduces and prepares first-generation college students for doctoral study;
- the Bridge to the Doctorate, which encourages students pursuing master's degrees in biomedical sciences to continue to the doctorate;
- the MAGNET Program's peer mentoring and networking resources, including its monthly luncheon seminars, at which faculty, administrators, community leaders, and alumni lunch with students and help to create a sense of community among minority scholars.

MAGNET/SEM works closely with its participating CUNY campuses and with the CASI, LSAMP, MARC, and MBRS programs. The CUNY Conference in Science and Engineering will bring the entire MAGNET/SEM community together in February.

## **Snapshots of **MAGNET/SEM**'s Partner Institutions**

### **New Jersey Institute of Technology (NJIT)**

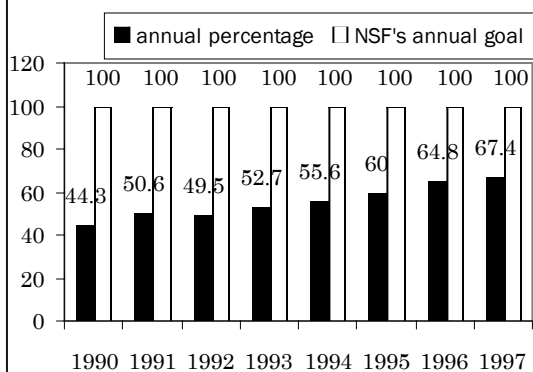
**N**JIT, located in Newark, is the public technological university of New Jersey. Throughout its history it has been committed to developing technological skills in underrepresented populations. According to Dean of Graduate Studies Dr. Ronald Kane, "Establishing MAGNET/SEM on our campus has made our graduate program directors more aware of the interest of the NSF in helping minority students succeed at the doctoral level."

In MAGNET/SEM, NJIT will build on the work it is doing to recruit minority students under the auspices of the Ronald E. McNair Postbaccalaureate Achievement Program and the GEM Program (National Consortium for

Graduate Degrees for Minorities in Engineering and Science, Inc.). MAGNET/SEM will be part of a pipeline of student support which includes the Institute's Educational Opportunity, Undergraduate Research Experience, and BS/MS Programs, all of which provide paths in SMET disciplines for minority students.

Approximately 20% of NJIT's undergraduate students are African-American or Hispanic, and the University has active chapters of the National Society of Black Engineers and the Society of Hispanic Engineers. MAGNET/SEM will expand the peer group of NJIT's Presidential Fellows, a group of the University's most highly qualified doctoral candidates. Support from MAGNET/SEM will complement NJIT's existing efforts to draw into its

## The Scope of the Challenge



The National Science Foundation has set a goal of producing 2,000 Minority SEM doctoral degrees per year by the year 2000. The adjoining chart shows the percentage of that goal reached between 1990 and 1997.

Source: National Science Foundation WebCASPAR database at <http://caspar.nsf.gov/webcaspar>, courtesy of GEM.

doctoral programs students who have already embarked on highly-paid technological careers.

### Polytechnic University

“At Polytechnic University,” says Dr. Nancy M. Tooney, Associate Dean of Engineering and Applied Sciences, “MAGNET/SEM funds make it possible for deserving and highly qualified students to conduct Ph.D. research in engineering and physical science programs. The costs of attending a private university in the NYC area are very high, and we are grateful to MAGNET/SEM for providing opportunities for graduate students to succeed.”

NACME ranked Polytechnic 23rd nationally among institutions enrolling the greatest number of minority freshmen in 1997-1998. It was one of the very few private, non-HBCU/HACU institutions to rank in the top 25. In 1996-1997, Polytechnic ranked 33rd in graduating minority engineers with relatively few private universities ahead of it. The University, which is situated on campuses in Brooklyn and on Long Island, mostly serves students from low income families.

For most of the past decade, Polytechnic and CUNY have worked together to integrate financial, mentoring, peer, and academic supports to help minority students succeed. From 1992-1995, a program at Poly funded by NSF's RCMS initiative and the Office of Naval Research provided research and transfer opportunities for students at CUNY's Medgar Evers

and New York City Technical Colleges. Polytechnic has also been a partner in the CUNY LSAMP program.

### Stevens Institute of Technology

Stevens, founded in 1870, is located in Hoboken, New Jersey. It is a private university which emphasizes a comprehensive and unified approach to engineering, science, technology, and management. This is exemplified by its ten interdisciplinary industrial alliances which focus on solving key technological problems facing industry. Stevens is one of the few universities to hold both general and specialized engineering accreditations in seven disciplines from the Accreditation Board for Engineering and Technology.

“Participating in the MAGNET/SEM project is the perfect complement to our 10-year strategic plan, which includes a commitment to increasing the number of high quality full-time students at Stevens,” says the Institute's Director of Graduate School Services, Judy Lea Cuddy. “Our funds are being leveraged to help fulfill our commitment to provide first-year support for all new students,” she continues. “The collaboration with the MAGNET/SEM partner institutions enhances our ability to increase the number of underrepresented individuals in science and engineering. The workshops, roundtables, and mentoring activities provide the support needed for our students to succeed.”

## MAGNET/SEM

### Congratulates Its Fellows

#### The City University of New York

Diana Almodovar, *Speech and Hearing Sciences*  
 Adil Benmoussa, *Physics*  
 Karin Block, *Earth and Environmental Sciences*  
 Amber Bradshaw, *Biopsychology*  
 Nicholas Carrasco, *Biochemistry*  
 Ericka Calton, *Biomedical Engineering*  
 Steve Castro, *Chemistry*  
 Claudette Davis, *Biology*  
 Racha Estephan, *Biochemistry*  
 Rima Estephan, *Biochemistry*  
 Lynda Felder, *Speech and Hearing Sciences*  
 Laura Hatten, *Computer Science*  
 Eduardo Hernandez, *Engineering*  
 Farah Jayman, *Biochemistry*  
 Alicia Joseph, *Engineering*  
 Estavan Limon III, *Biopsychology*  
 Tibab McNeish, *Physics*  
 Anika McPhie, *Biopsychology*  
 Efua Okoh, *Mathematics*  
 Jorge Piniero-Barcelo, *Mathematics*  
 Jason Rauceo, *Biology*  
 Miurka Silvestre, *Biomedical Engineering*  
 Sophia Suarez Gustave, *Physics*  
 Lorraine Towns, *Biopsychology*  
 Selwyn Williams, *Biology*

#### New Jersey Institute of Technology

Dawn Bennet, *Mechanical Engineering*  
 Karen Hare, *Computer Science*  
 Nnemi Nmolim, *Chemical Engineering*  
 Kevin Russell, *Mechanical Engineering*

#### Polytechnic University

David Hernandez, *Electrical Engineering*  
 Andrea Tuckett, *Chemical Engineering*

#### Stevens Institute of Technology

Russell Ford, *Environmental Engineering*  
 Claudia Giller, *Chemical Biology*  
 Peter Kurunczi, *Physics*

## MAGNET/SEM

### Recognizes Its Mentors

#### The City University of New York

Gordon Barr  
Ki Chon  
Jozef Dodziuk  
Robert Engel  
Ray Gavin  
Chris Gerry  
Lane Gilchrist  
Steve Greenbaum  
Godfrey Gumbs  
Zhen Huang  
Mumtaz Kassir  
Peter Lipke  
Victoria Luine  
Richard Schwartz  
Winifred Strange  
Ruth Stark  
Jeffrey Steiner  
Lucien Szpiro  
Zahara Zakeri  
Probal Banerjee

#### New Jersey Institute of Technology

Nadine Audbry  
Fadi Deek  
Ronald Kane  
Rajpal Sodhi  
Trevor Tyson

#### Polytechnic University

Frank Cassara  
Kalle Levon

#### Stevens Institute of Technology

Kurt Becker  
Judy Lea Cuddy  
Marc Mansfield  
Joseph Moeller, Jr.  
Charles L. Suffel  
David Vaccari  
Edward A. Whittaker  
Trevor Williams

## Experience at the Helm: A Tested Team Heads MAGNET/SEM

The MAGNET/SEM team brings a wealth of research, teaching, and administrative experience to its mission of recruiting underrepresented minority students into SEM doctoral programs and encouraging and supporting them as they embark on scientific careers.

Dr. Gail Smith, MAGNET/SEM's Principal Investigator, is the CUNY Graduate Center's Acting Assistant Provost with responsibility for the Office of Educational Opportunity and Diversity Programs and is also a professor of classics at Brooklyn College. She is a graduate of Montclair State, Columbia, and New York Universities with degrees in classical philology. Dr. Smith, who was a Fulbright Scholar, continues to teach and publish in the classics while spearheading important student programs at CUNY. She directed the Mellon Minority Undergraduate Fellowship Program at Brooklyn College and is currently Co-Principal Investigator of the CUNY Pipeline Program for Careers in Biomedical Research: Bridges to the Doctorate and of the CUNY Pipeline Program for Careers in College Teaching and Research.

Dr. Godfrey Gumbs, MAGNET/SEM's Project Administrator, is the Maria Chianta and Alice Stoll Professor of Physics at Hunter College. He is a condensed matter theorist who holds degrees from Trinity College, Cambridge and the University of Toronto. Dr. Gumbs is known for his work on the photonic and electron transport properties of very small semiconductor materials, whose dimensions of interest are on the nanoscale. His primary research draws conclusions on the effect of quantum confinement, impurities, and electric fields in applications such as the performance of



Dr. Gail Smith with Dr. Jeffrey Osleeb, Graduate Center Executive Officer in Earth and Environmental Sciences, at the MAGNET/SEM reception



Dr. Godfrey Gumbs presenting the MAGNET/SEM web site

optoelectronic devices. Dr. Gumbs has also studied the microscopic properties of biological systems. He is widely published and has been a collaborator at world renowned laboratories such as the Wright Patterson Air Force Laboratory in Ohio, the Army Research Laboratory in Maryland, and the Cavendish Laboratory at Cambridge University.

Drs. Linda N. Edwards and Neville A. Parker are MAGNET/SEM's Co-Principal Investigators.

Dr. Edwards is an economist whose undergraduate degree is in mathematics. She is Associate Provost and Dean for Academic Affairs and Professor of Economics at the CUNY Graduate Center. Dr. Edwards has been active in promoting the role of women in the economics profession, serving as a board member of the American Economic Association's Committee for the Status of Women in the Economics Profession. She has also served as a member of the AAUW American Fellowship Awards panel. Her recent publications include *Immigration/Migration and the CUNY Student of the Future*. In addition to her academic responsibilities, Dr. Edwards is a member of the advisory board of The City of New York Independent Budget Office.

Dr. Parker is the Herbert G. Kayser Professor of Civil Engineering at City College and Director of the City University of New York's Institute for Transportation Systems at City College. He is the Principal Investigator of the Louis Stokes Alliance for Minority Participation program (LSAMP). "Like LSAMP," he says, "MAGNET/SEM is a key part of the NSF strategy for increasing access to careers in the sciences and engineering for underrepresented minorities. LSAMP offers undergraduates opportunities to do research, mentor

their peers, and gain experience in the precollege classroom. Its alumni are excellent candidates for MAGNET/SEM with its mission of groom-

ing minority students to join the professoriate in SEM disciplines. By collaborating closely, these programs can reinforce each other's

effectiveness in building a strong SEM pipeline to the doctorate in the New York metropolitan area."

## MAGNET/SEM's Mentoring Partnerships

### Russell Ford and David Vaccari, Stevens Institute of Technology

**A**t thirty-one, Russell Ford was already a successful environmental engineer when his longtime mentor, Dr. David Vaccari, who is a professor in Stevens's Department of Civil, Ocean, and Environmental Engineering, convinced him that he could make an important contribution to his field by returning to the Institute for his Ph.D. "Russell," says Dr. Vaccari, "is a well respected engineer in the water industry in New Jersey. MAGNET/SEM has enabled him to take time off from work to focus on research."



Dr. David Vaccari

Mr. Ford holds a BS in chemical engineering from Syracuse University and earned his master's at Stevens, where he worked with Dr. Vaccari. "Dave Vaccari and I served together on the Research Committee of the New Jersey section of the American Water Works Association," he says. "Dr. Vaccari brought my research interests to the Committee's attention, and it immediately understood their implications for the field. I saw that I could render an important service by pursuing these ideas."

Mr. Ford's thesis is entitled *Optimizing Filtration for the Removal of Microbials Using Multivariate Statistical Analysis*. His research is aimed at generating a mathematical model to predict and optimize the performance of filters in response to variables at water treatment plants. His findings should provide the water industry with important new tools for keeping such microbial compounds as *Giardia* and *Cryptosporidium* out of the water supply.



Russell Ford collecting data at a water treatment plant

Mr. Ford has collected huge data sets on which to base his analyses of the relationship between filter performance and causative variables. In addition to generating safeguards for public health, his project is developing a powerful new tool for statistical analysis. He is pioneering the use of an alternative to artificial neural networks which has the advantage of producing much simpler mathematical interpretations.

### Sophia Suarez-Gustave and Steve Greenbaum, Hunter College, CUNY

**S**ophia Suarez-Gustave is a CUNY success story. A graduate in physics of the Hunter BA/MA program, she passed the very tough physics Ph. D. qualifying exam at the CUNY Graduate Center on her first try. The exam, which is a major hurdle, is only one of the obstacles Ms. Suarez-Gustave has overcome on her road to the doctorate. As a single parent, she has had to balance the competing claims of family and a demanding academic discipline.

Dr. Steve Greenbaum has been Ms. Suarez-Gustave's mentor throughout her academic career. He is devoted to his students and has been determined to provide Ms. Suarez-

Gustave with the institutional support necessary for her to fulfill her immense potential. Ms. Suarez-Gustave, who has been part of the Mellon, MBRS, and LSAMP programs at Hunter and the Graduate Center's Bridge to the Doctorate, can truly profit from MAGNET/SEM. "The community of minority physicists, especially women is small," says Dr. Greenbaum, "and the fact that MAGNET/SEM is an alliance of four institutions should provide Sophia with invaluable peer contact."

Ms. Suarez-Gustave's doctoral research centers on the study of ion and molecular transport through membranes being developed for

fuel cells. "Fuel cells," says Dr. Greenbaum, "are devices much like batteries which convert chemical energy to electricity. It is believed by many experts that, during the next century, they will be a vital



Sophia Suarez-Gustave and Dr. Steve Greenbaum with a high power state NMR probe in the lab at Hunter

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[web.gc.cuny.edu/magnetsem](http://web.gc.cuny.edu/magnetsem)

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power source for important applications such as electric cars.” Ms. Suarez-Gustave’s main research tool is nuclear magnetic resonance. She is also involved in theoretical modeling of ion transport processes and has been invited to spend this coming January at Los Alamos National Laboratory doing research in that area with a colleague of Dr. Greenbaum’s. “In a real way,” says Ms. Suarez-Gustave, “MAGNET/SEM is making it possible for me to go to Los Alamos. The program’s support allows me to concentrate exclusively on my studies. I have wanted to work in a national laboratory since I first visited Los Alamos as an undergraduate Mellon Fellow. This is a great opportunity for me to put theory into practice, and I have been taking the appropriate courses in quantum mechanics to be prepared.”

In addition to her research, Ms. Suarez-Gustave has been teaching a general physics course at Borough of Manhattan Community College. “Teaching,” she says, “has been developing my ability to communicate what I know about physics to others. I enjoy the interaction with the students, and it keeps lower-level physics fresh in my mind. At some point I hope to combine university teaching with my career in research.”

“Hunter’s physics graduates are being accepted into some of the most prestigious graduate programs in the country,” says Dr. Greenbaum. “For those who want to be in New York, CUNY provides excellent resources. The MAGNET/SEM alliance is expanding opportunities, and that is important.”

## Mark Your Calendar

### **CUNY Conference in Science and Engineering** The Graduate Center

Friday, February 23, 2001, 9am-5pm

The all day conference will include presentations and a poster session highlighting the work of the students in CUNY’S MAGNET, BRIDGES, AGEP, PIPELINE, MARC, LSAMP, MBRS, McNair, AND CASI research programs.

Deadline for abstracts is January 10, 2001.

For further information call the Office of Educational Opportunity and Diversity Programs at 212 812-7543.

### **MAGNET Roundtables**

October 20, November 17

December 8, February 16

March 9, April 6

May, 11

All meetings are on Fridays from 12:00pm to 2:00pm at the CUNY Graduate Center.