

AC 2007-578: MIND LINKS 2007: RESOURCES TO MOTIVATE MINORITIES TO STUDY AND STAY IN ENGINEERING

Maria M. Larrondo Petrie, Florida Atlantic University

María M. Larrondo Petrie has over 20 years of experience in higher education. Presently she is Professor of Computer Science and Engineering, and Associate Dean for Academic and International Affairs for the College of Engineering at Florida Atlantic University. In the past, she has served as: President and Executive Council member of the Upsilon Pi Epsilon Honor Society for the Computing and Information Disciplines, and on the Education Board of ACM SIGGRAPH. Currently she serves as Executive Vice President and as Vice President of Research of the Latin American and Caribbean Consortium of Engineering Institutions; Member-at-Large on the Board of the Minorities in Engineering Division and Secretary/Treasurer of the International Division of the American Society for Engineering Education; and is on the Executive Committee and Strategic Planning Committee of the newly formed International Federation of Engineering Education Societies. Her email is petrie@fau.edu

Ivan Esparragoza, Pennsylvania State University

Ivan Esparragoza is an Assistant Professor of Engineering at Penn State. His interests are in engineering design education, innovative design, and global design. He has introduced multinational design projects in a freshman introductory engineering design course in collaboration with institutions in Latin America and the Caribbean as part of his effort to contribute to the formation of world class engineers for the Americas. He is actively involved in the Latin American and Caribbean Consortium of Engineering Institution (LACCEI) as a regional Vice-President, and in the International and Minority Divisions of ASEE.

MIND Links 2007: Resources to Motivate Minorities to Study and Stay In Engineering

Abstract

MIND is the acronym for the American Society for Engineering Education (ASEE) MINorities in Engineering Division. The *MIND Links* project gathers useful web links and information on resources that would allow minority students and minority faculty to find and take full advantage of the myriad of programs and information designed to promote their participation in the engineering and technology disciplines. This paper provides more than 600 links.

Introduction

The myriad of programs designed to promote participation of minorities in engineering and technology disciplines often are underutilized because minority faculty and minority students may not be aware of these opportunities, nor of how and where to apply. Opportunities range from programs designed to promote student interest in these fields, to summer enrichment programs, scholarships, fellowships, research opportunities, awards, leadership programs, and career advancement programs. This survey organizes these opportunities and resources, specially targeting those of particular interest to engineering students and engineering faculty throughout the lifecycle of their career, and provides links to internet sites containing further details. An analysis is done of possible areas of need not covered adequately by existing resources.

Engineering Professional Societies and Engineering Education Related Sites

Professional societies for engineers provide scholarships, fellowships, awards, conferences, competitions, publications, and resources for students, parents, educators and professional engineers. Table 1 shows a listing of engineering professional societies. The computer science and engineering technologies societies are included in this table because the computer science and engineering technology programs are often housed in the college of engineering. The table also includes architecture, because students may want to explore the differences between this discipline and construction or civil engineering. Table 2 lists the engineering related honor societies. Table 3 lists other engineering-related societies, including science, mathematics, medical, and education societies. Table 4 lists engineering, technology, science and educational societies that specifically target underrepresented minorities, and the list in Table 5 targets women in these disciplines.

Table 1. Engineering Professional Societies

Engineering Professional Organization	Web link
AAAI American Association for Artificial Intelligence	http://www.aaai.org
AACEI Association for the Advancement of Cost Engineering	http://www.aacei.org/

AAES American Association of Engineering Societies	http://www.aaes.org
ABET Accreditation Board for Engineering and Technology	http://www.abet.org
ACCE American College of Clinical Engineering	http://www.accenet.org/
ACEC American Consulting Engineers Council	http://www.acec.org/
ACM Association for Computing Machinery	http://www.acm.org/
ACTE Association for Career and Technical Education	http://www.acteonline.org/
AEE Association of Energy Engineers	http://www.aeecenter.org/
AEG Association of Engineering Geologists	http://www.umn.edu/~aeg/
AFE Association for Facility Engineers	http://www.afe.org
AIA American Institute of Architects	http://www.aiaonline.com/
AIAA American Institute of Aeronautics and Astronautics	http://www.aiaa.org/
AIChE American Institute of Chemical Engineers	http://www.aiche.org/
AIH American Institute of Hydrology	http://www.aihydro.org/
AIMBE American Institute of Medical and Biological Engineers	http://www.aimbe.org
AIME American Institute of Mining, Metallurgical and Petroleum Engineers	http://www.aimeny.org/ http://www.idis.com/aime/
ANS American Nuclear Society	http://www.ans.org
ARI Airconditioning and Refrigerating Institute	http://www.ari.org
ASA American Society of Agronomy	http://www.agronomy.org
ASABE American Society of Agricultural and Biological Engineers	http://www.asabe.org
ASAE American Society of Agricultural Engineers	http://www.asae.org
ASCE American Society of Civil Engineers	http://www.asce.org
ASEE American Society of Engineering Education	http://www.asee.org
ASHE American Society for Healthcare Engineering of the American Hospital Association	http://www.ashe.org
American Society of Highway Engineers	http://www.highwayengineers.org
ASHRAE American Society of Heating, Refrigeration and Air Conditioning Engineers	http://www.ashrae.org/
ASM International (The Materials Information Society)	http://www.asm-intl.org/
ASME American Society of Mechanical Engineers	http://www.asme.org/
ASNE American Society of Naval Engineers, Inc.	http://www.navalengineers.org/
ASNT American Society for Nondestructive Testing, Inc.	http://www.asnt.org/
ASPE American Society of Plumbing Engineers	http://www.aspe.org
ASSE American Society of Safety Engineers	http://www.asse.org
ASTC Association of Science Technology Centers	http://www.astc.org
ASTM American Society for Testing & Materials	http://www.astm.org/
AWAA American Water Works Association	http://www.awwa.org/
AWS American Welding Society	http://www.amweld.org/
ECUK British Engineering Council	http://www.engc.org.uk/
ENSMP European Federation of National Engineering Societies	http://www.cri.ensmp.fr/feani/
ESA Ecological Society of America	http://www.esa.org/
FMB Federation of Master Builders	http://www.fmb.org.uk
FMS Federation of Materials Societies	http://www.fms.org
HKIE Hong Kong Institute of Engineers	http://www.hkie.org.hk/
HFES Human Factors and Ergonomics Society	http://www.hfes.org
IBET Institute of Biomedical Engineering Technology	http://ibet.asttbc.org/
ICE The Institution of Civil Engineers	http://www.ice.org.uk/
ICHEM The Institution of Chemical Engineers	http://www.icheme.org.uk/
IEE The Institution of Electrical Engineers	http://www.iee.org/
IEEE Institute of Electrical and Electronic Engineers	http://www.ieee.org/
IES Illumination Engineering Society of North America	http://www.iesna.org/
IEST Institute of Environmental Sciences and Technology	http://www.iest.org/
IFCE International Federation of Consulting Engineers	http://www.fidic.org/
IFEES International Federation of Engineering Education Societies	http://www.ifees.net

IIE Institute of Industrial Engineers	http://www.iienet.org/
IMechE The Institution of Mechanical Engineers	http://www.imeche.org.uk/
INFORMS Institute for Operations Research and Management Sciences	http://www.informs.org
ITEA International Technology Education Association	http://www.iteawww.org/A.html
IWITTS Institute for Women in Trades, Technology & Science	http://www.iwitts.com/
JETS Junior Engineering Technical Society	http://www.jets.org
Marine Technology Society	http://www.mtsociety.org/
NACE International – National Association of Corrosion Engineers	http://www.nace.org/
NAE National Academy of Engineering	http://www.nae.edu
NAS National Academies (of Sciences, Engineering and Medicine)	http://www.nas.edu
NASA National Aeronautics and Space Administration	http://www.jpl.nasa.gov/education/educators/
NCHES National Capital Healthcare Engineering Society	http://www.nches.org/
NGWA National Ground Water Association (Association of Ground Water Scientists and Engineers)	http://www.ngwa.org/
NICE National Institute of Ceramic Engineers	http://www.ceramics.org
NSF National Science Foundation	http://www.nsf.gov/
NSPE National Society of Professional Engineers	http://www.nspe.org
SAE Society of Automotive Engineers	http://www.sae.org/
SAME Society of American Military Engineers	http://www.same.org
SFPE Society of Fire Protection Engineers	http://www.sfpe.org
SIM Society for Industrial Microbiology	http://www.simhq.org/
SME Society of Manufacturing Engineers	http://www.sme.org/
SNAME Society of Naval Architects and Marine Engineers	http://www.sname.org/
SPE Society of Petroleum Engineers	http://www.spe.org/
SPIE International Society of Optical Engineers	http://www.spie.org

Table 2. Engineering Honor Societies

Engineering Honor Society	Web link
Alpha Sigma Mu Metallurgy and Materials Engineering Honor Society	http://www.alphasigmamu.org
Chi Epsilon National Civil Engineering Honor Society	http://www.chi-epsilon.org/
HKN Eta Kappa Nu Honor Society for Electrical & Computer Engineers	http://www.etakappanu.org/
Omega Chi Epsilon National Chemical Engineering Honor Society	http://www.omegachiepsilon.org/
Pi Tau Sigma International Mechanical Engineering Honor Society	http://www.pitaisigma.net/
Sigma Chi Honor Society for Scientific and Engineering Research	http://www.sigmaxi.org/
Tau Alpha Pi National Honor Society for Engineering Technology	http://www.taualphapi.org/
TBP Tau Beta Pi National Engineering Honor Society	http://www.tau.org
The Order of the Engineer (Order of the Ring)	http://www.order-of-the-engineer.org/
UPE Upsilon Pi Epsilon Honor Society for Computing & Information Disciplines	http://www.acm.org/upe/

Table 3. Other Engineering, Science or Technology Related Societies

Engineering Professional Organization	Web link
AAA American Anthropological Association	http://www.ameranthassn.org/index.htm
AAAI American Association for Artificial Intelligence	http://www.aaai.org
AAAS American Association for the Advancement of Science	http://www.aaas.org/
AACC American Association of Community Colleges	http://www.aacc.nche.edu/
AACC American Association of Clinical Chemistry	http://www.aacc.org/
AACN American Association of Colleges of Nursing	http://www.aacn.nche.edu/
AACOM American Association of Colleges of Osteopathic Medicine	http://www.aacom.org/
AACP American Association of Colleges of Pharmacy	http://www.aacp.org/
AACU Association of American Colleges and Universities	http://www.aacu-edu.org/

AADS American Association of Dental Schools	http://www.aads.jhu.edu/
AAFS American Academy of Forensic Sciences	http://www.aafs.org
AAG Association of American Geographers	http://www.aag.org/
AAHE American Association for Higher Education	http://www.aahe.org/
AAI American Association of Immunologists	http://www.aai.org/
AAMC Association of American Medical Colleges	http://www.aamc.org/
AAMI Association for the Advancement of Medical Instrumentation	http://www.aami.org/
AAPG American Association of Petroleum Geologists	http://www.aapg.org/
AAPM American Association of Physicists in Medicine	http://www.aapm.org
AAPS American Association of Pharmaceutical Scientists	http://www.aaps.org
AAPT American Association of Physics Teachers	http://www.aapt.org/
AAS American Astronomical Society	http://www.aas.org/
AASCU American Association of State Colleges and Universities	http://www.aascu.org/
AAU Association of American Universities	http://www.tulane.edu/~aau/
AAUP American Association of University Professors	http://www.aaup.org/
ACA American Crystallographic Association	http://nexus.hwi.buffalo.edu/aca/
ACE American Council on Education	http://www.acenet.edu
ACEC American Council of Engineering Companies	http://www.acec.org/
ACerS American Ceramics Society	http://www.acers.org/ http://www.ceramics.org
ACS American Chemical Society	http://www.acs.org/
ACPE American Council on Pharmaceutical Education	http://www.acpe-accredit.org/
American College of Toxicology	http://www.actox.org/
American Dental Association	http://www.ada.org/
AEA American Economics Association	http://www.vanderbilt.edu/aea/
AERA American Educational Research Association	http://www.aera.net/
AGI American Geological Institute	http://www.agiweb.org/
AGU American Geophysical Union	http://www.agu.org/
AIA American Institute of Architects	http://www.aiaonline.com/
AIBS American Institute of Biological Sciences	http://www.aibs.org/
AICHE American Institute of Chemical Engineers	http://www.aiche.org/
AIC American Institute of Chemists	http://www.theaic.org/
AIH American Institute of Hydrology	http://www.aihydro.org/
AIMBE American Institute of Medical and Biological Engineers	http://www.aimbe.org
AIP American Institute of Physics	http://www.aip.org
AIR American Institutes for Research	http://www.air.org/
AMA American Medical Association	http://www.ama-assn.org/
AMS American Mathematical Society	http://www.ams.org/
AMS American Meteorological Society	http://www.ametsoc.org/ams/
ANA American Nurses Association	http://www.nursingworld.org/
ANS American Nuclear Society	http://www.ans.org
AOA American Optometric Association	http://www.aoanet.org/
AOA American Osteopathic Association	http://www.osteopathic.org/
AOCS American Oil Chemists' Society	http://www.aocs.org/
APA American Psychological Association	http://www.apa.org/
APHA American Public Health Association	http://www.apha.org/
APMA American Podiatric Medical Association	http://www.apma.org/
APS American Physical Society	http://www.aps.org/
APS American Physiological Society	http://www.faseb.org/aps/
APS American Phytopathological Society	http://www.scisoc.org/
ASA American Statistical Association	http://www.amstat.org/
ASA American Sociological Association	http://www.asanet.org/
ASA American Society of Agronomy	http://www.agronomy.org
ASBMB American Society for Biochemistry and Molecular Biology	http://www.faseb.org/asbmb/

ASCB American Society of Cell Biology	http://www.ascb.org/
ASHS American Society for Horticultural Sciences	http://www.ashs.org/
ASM American Society for Microbiology	http://www.asm.org/ http://www.asmtusa.org/
ASM International (The Materials Information Society)	http://www.asm-intl.org/
ASNT American Society for Nondestructive Testing, Inc.	http://www.asnt.org/
ASPB American Society of Plant Biologists	http://www.aspb.org/
ASPP American Society of Plant Physiologists	http://www.aspp.org/
ASQ American Society for Quality	http://www.asq.org/
ASTC Association of Science Technology Centers	http://www.astc.org
AVMA American Veterinary Medical Association	http://www.avma.org/
AWAA American Water Works Association	http://www.awwa.org/
Biophysical Society	http://www.biophysics.org/
BFRL Building and Fire Research Laboratory	http://www.bfrl.nist.org
ESA Ecological Society of America	http://www.esa.org/
FASEB Federation of American Societies for Experimental Biology	http://www.faseb.org/
FMB Federation of Master Builders	http://www.fmb.org.uk
FMS Federation of Materials Societies	http://www.fms.org
Geochemical Society	http://www.geochemsoc.org/
Geological Society of America	http://www.geosociety.org/
HFES Human Factors and Ergonomics Society	http://www.hfes.org
ICSI Institute for Clinical Systems Improvement	http://www.icsi.org/
IEST Institute of Environmental Sciences and Technology	http://www.iest.org/
IHI Institute for Healthcare Improvement	http://www.ihl.org/
INFORMS Institute for Operations Research and Management Sciences	http://www.informs.org
ITEA International Technology Education Association	http://www.iteawww.org/A.html
MAA Mathematics Association of America	http://www.maa.org
NA National Academies (of Sciences, Engineering and Medicine)	http://www.nas.edu
NCTM National Council of Teachers of Mathematics	http://my.nctm.org/eresources/
NIH National Institute of Health	http://www.nih.gov/
NSF National Science Foundation	http://www.nsf.gov/
NSTA National Science Teacher Association	http://www.nsta.org/
OSA Optical Society of America	http://www.osa.org/
The Protein Society (Biology, Medicine & Technology)	http://www.osa.org/
Quality Healthcare	http://www.qualityhealthcare.org/
SFN Society for Neuroscience	http://www.sfn.org/
SIM Society for Industrial Microbiology	http://www.simhq.org/
Society of Toxicology	http://www.toxicology.org/
WFEO/FMOI World Federation of Engineering Organizations / Federation Mondiale des Organisations d'Ingenieurs	http://www.wfeo.org/

Table 4. Sites targeting Minorities or Ethnic Groups in Engineering, Science, Technology or Mathematics

Minority Professional Organizations	Web link
AABE American Association for Blacks in Energy	http://www.aabe.org/
AIMD American Institute for Managing Diversity, Inc.	http://www.awm-math.org/
AISES American Indian Science and Engineering Society	http://www.aises.org
AMSE Association of Muslim Scientists and Engineers	http://www.amse.net/
ASEE MIND (Minority in Engineering Division)	http://www.webster.edu/spacecoast/Ali_Shaykhian/MIND/

ASPIRA Association for Puerto Ricans in Science and Engineering	http://www.nas.edu/cwse/ASPIRA.html http://www.aspira.org/
GEM National Consortium for Graduate Degrees for Minorities in Engineering and Science	http://www.nacme.org/
HENAAC Hispanic Engineer National Achievement Awards Conference	http://www.henaac.org/
HESTEC Hispanic Engineering Science & Technology Week	http://www.hestec.org/
La Familia Network: the Hispanic family embracing technology	http://lafamilianet.net/
LACCEI Latin American and Caribbean Consortium of Engineering Institutions	http://www.laccei.org
NACME National Action Council for Minorities in Engineering	http://www.nacme.org
NCOURAGES National Coalition of Underrepresented Racial and Ethnic Advocacy Groups in Engineering and Science	http://www.ncourages.org
NSBE National Society of Black Engineers	http://www.nsbe.org/
SACNAS Society for Advancement of Chicanos and Native Americans in Science	http://www.sacnas.org/
SECME formerly Southeastern Consortium for Minorities in Engineering	http://www.secme.org/
SHPE Society of Hispanic Professional Engineers	http://www.shpe.org

Table 5. Engineering, Technology, Science and Mathematics Societies for Women

Professional Organizations for Women	Web link
AAUW American Association of University Women	http://www.aauw.org/
AAWD American Association of Women Dentists	http://www.aawd.org/
AAWR American Association for Women Radiologists	http://www.aawr.org/
ABIWT The Anita Borg Institute for Women and Technology	http://www.iwt.org/ http://www.anitaborg.org/
AMWA American Medical Women's Association	http://www.amwa-doc.org/
ASEE Women in Engineering Division	http://www.csupomona.edu/%7Esparisay/ASEE/WIED/
ASWA American Society of Women Accountants	http://www.aswa.org/
AWC Association for Women in Computing	http://www.awc-hq.org/
AWG Association for Women Geoscientists	http://www.awg.org/
AWID Association for Women Industrial Designers	http://www.core77.com/awid/
AWIS Association for Women in Science	http://www.awis.org/
AWiSE Association of Women in Science and Engineering	http://www.awise.org/
AWM Association for Women in Mathematics	http://www.awm-math.org/
AWP Association for Women in Psychology	http://www.iup.edu/counsl/awpac/
AWMI Association of Women in the Metal Industries	http://www.awmi.com/
AWSS Association of Women Soil Scientists	http://awss.homestead.com/
CWSE Committee on Women in Science and Engineering	http://www7.nationalacademies.org/cwse/
FWE Forum for Women Entrepreneurs	http://www.fwe.org/
IWITTS Institute for Women in Trades, Technology & Science	http://www.iwitts.com/
SCWIST Society for Canadian Women in Science and Technology	http://www.harbour.sfu.ca/scwist/
SWE Society of Women Engineers	http://www.swe.org/

SWEP Society of Women Environmental Professionals	http://www.swepweb.com/
Systems On Line (community for women in computing)	http://www.systems.org/
WAM Women and Mathematics Network	http://www.mystery.com/WAM/network/Index.html
Women in Bio	http://www.womeninbio.org/
WEPAN Women in Engineering Programs and Advocates Network	http://www.wepan.org
Women's Engineering Society (in UK)	http://www.wes.org.uk
WIEC (IEEE Women in Engineering Committee)	http://www.ieee.org/portal/pages/committee/women/
WiSE Women into Science and Engineering	http://www.lib.iastate.edu/spcl/wise/wise.html
WITI Women in Technology International	http://www.witi.com

Resources for K-12 Student, Parents and Educators

A critical factor in determining whether a student will be successful in engineering is their exposure to Mathematics. Teachers and counselors profile students into college bound and not college bound during their K-12 years, and have been criticized for not motivating or counseling minority and female students to take rigorous math courses. A poster is available through NACME showing a minority child's hand clenched in the "power" sign of a clenched fist. On the digits are written the letters M, A, T, H and states Math is Power, Demand It.

The ASEE has good publications¹ and activities for K-12 level motivating engineering and technology careers². A report, *Engineering in the K-12 Classroom: An Analysis of Current Practices & Guidelines for the Future*, based on the proceedings from the 2004 Leadership Workshop on K-12 Engineering Outreach is available³. The ASEE Engineering K-12 Center offers portals for students and educators. The MAA has many resource materials for motivating Mathematics at the K-12 level⁴. Cornell University sponsors an award winning website⁵ with links to educators and students in grades 9-12. ITEA is a professional association for technology education teachers who teach a problem-based learning approach utilizing math, science and technology principles, their web site includes teacher resources, and they publish the *Journal of Technology Education*⁶. NASA provides many activities for K-12 education⁷. The AAAS provides a ScienceNetLink⁸ web site that provides lessons, tools, resources, benchmarks. MCI Foundation supports the MarcoPolo⁹ website that focuses on K-12 education and technology and provides teacher resources, professional development and a network. SECME, formerly known as the Southeastern Consortium for Minorities in Engineering, offers profession development for teachers, principals and superintendents and provides many programs for K-12 students, including Early College/High School (ECHS), Empowering Parents Program (EP2), ICEMS, JumpStartAtlanta, TeamGirls, and Mathletics.

Teachers often look for profiles of minority or women professionals who have chosen one of the STEM (Science, Technology, Engineering and Mathematics) for their career. A great source of posters, pictures, stories and sometimes direct communications with mentors of color, are the professional societies that focus on underrepresented groups, e.g. NACME, NSBE, SACNAS, SHPE, SWE. Student chapters of NSBE, SHPE and SWE exist in most universities with Colleges of Engineering and can be a source of young guest speakers for K-12 classes. La Familia Network¹⁰ provides many resources at their sites for minority role models and other useful links. AT&T's Virtual Academy¹¹ offers online courses for integrating technology into curriculum. There are numerous sites with links to fun engineering projects¹².

The *4000 Years of Women in Science* project provides links biographies, references and photographs of women in science history, including astronomy, mathematics, physics, biology, chemistry, and the social sciences (see <http://www.astr.ua.edu/4000WS/4000WS.html>). *Contributions of 20th Century Women in Physics* is a centenary project of the American Physics Society, can be found at <http://www.physics.ucla.edu/~cwp>

The Pact⁶² is an autobiography of 3 inner-city African-American youths who made a pact in high school to find a way to go to college and then medical school. This book was on New York Times Bestseller list and won the Books for a Better Life Award. Its popularity led to making *The Pact – The Movie*⁶³, with a web site with clips and screening information. The three published a second book in 2006 *We Beat the Street: How a Friendship Pact Led to Success*⁶⁵ and also formed The Three Doctors' Foundation⁶⁶ which awards scholarships, mentoring and volunteer opportunities. These books have also been included in several middle school's summer reading lists.

Engineers Week held the third week of February each year produces a web site¹³ with many resources and activities appropriate for K-12 and undergraduate students. Celebrating this week with activities and coordinating with local universities will heighten student awareness and motivation for engineering and how creativity is expressed in engineering¹⁴. As part of African American History Month and Hispanic History Month, some organizations are creating events to inspire minority families into motivating children into STEM disciplines, such as National Hispanic Engineering, Science and Technology Week (HESTEC)¹⁵.

Many societies hold competitions for the different grade levels. The Engineering Education Student Center publishes a list of competitions¹⁶. Sally Ride ScienceTM was founded by former NASA astronaut Sally Ride, America's first woman in space, to support girls interested in or who might become interested in science, math, and technology. They support the Sally Ride Science Club¹⁷ for upper-elementary and middle school girls across the country, providing the club newsletter *The Investigator*, and online networking. The Sally Ride Circle¹⁸ networks scientists, engineers, educators, parents, professional women, and science outreach experts to connect them to the Sally Ride programs and events. The Sally Ride Circle serves as a resource to others in the Circle, and get an email newsletter with relevant information.

One of their activities, the Sally Ride TOYchallenge¹⁹, cosponsored by Hasbro Toys, Picker Engineering Program at Smith College, and Sigma Xi Scientific Research Society. This Competition supports Sally Ride Science Club Teams to nationally compete in designing toys in teams made of at least 50% girls at the 5th-8th grade levels.

Sally Ride Science also is publishing an Explore series especially for 9-12 year old readers, the first *What Do You Want To Be? Explore Space Sciences* includes 12 biographies of contemporary women scientist describing what she does, how she got there, and why she enjoys it. The next two books will focus on Earth Science and Health Sciences. The Sally Ride Science Festivals²⁰ held in different locations, bring together more than 1,000 middle school girls, parents and teachers.

Education Unlimited²¹ offers a variety of summer programs for students in grades 4-12. Their A+ Summer Programs²² held at Stanford University builds proficiency in logic, critical thinking and writing skills, dividing students into two sessions: a 12 day camp for 11th and 12th graders²³, and a 9 day camp for 9th and 10th graders²⁴, which focus on critical thinking skills in academic activities: college level writing, research skills, logical thinking/argumentation, study skills, time management, course/major selection, note taking, critical reading, and presentations. Educational Unlimited²¹ and Sally Ride Science Camps²⁵ sponsor a camp for girls for girls entering 6th to 9th grades, are overnight 10-day camps held on college campuses designed to interest girls in science, technology and engineering using the Sally Ride Science Curriculum. Entering 11th and 12th graders can earn college credit and be introduced to the university experience through a variety of special programs. Educational Unlimited²¹ and Berkeley offer *Summer Focus* at University of California - Berkeley 6-week summer academic enrichment program.

Resources for Selecting Engineering Programs

The National Action Council for Minorities in Engineering (NACME)²⁶ offers an easy to use guide to scholarships, engineering majors. This user-friendly site allows students to narrow down their choices of institutions by choosing geographical region, number of undergraduate students, selectivity of the engineering school, top ranked by U.S. News and World Report, NACME rating (1 to 5 stars), and minimum retention rate.

There are a number of historically minority-serving institutions, such as Historically Black Engineering Colleges (HBEC) that offer many scholarships shown in Table 6

Table 6. Historically Black Engineering Colleges in the U.S.

College	Location	Web Site
Alabama A& M University	Normal, AL	http://www.aamu.edu/
Hampton University	Hampton, VA	http://www.hamptonu.edu/
Howard University	Washington, DC	http://www.howard.edu/
Morgan State University	Baltimore, MD	http://www.morgan.edu/
North Carolina Agricultural and Technical State University	Greensboro, NC	http://www.morgan.edu/
Prairie View A & M University	Prairie View, TX	http://pvamu.edu/
Southern University	Baton Rouge, LA	http://www.subr.edu/
Tennessee State University	Nashville, TN	http://www.tnstate.edu/
Tuskegee University	Tuskegee, AL	http://www.tuskegee.edu/

The list of Hispanic Serving Institutions (HSI) in Table 7 was compiled from the membership list Hispanic Association of Colleges and Universities (HACU) at <http://www.hacu.net>.

Table 7. HACU Member Hispanic-Serving Institutions

Institution Organized by U.S. State/Territory	Web Site
Arizona	
Arizona Western College	www.azwestern.edu
Central Arizona College	www.centralaz.edu
Cochise College <i>Douglas</i>	www.cochise.edu
Estrella Mountain Community College	www.emc.maricopa.edu

Gateway Community College	www.gatewaycc.edu
Phoenix College	www.phoenixcollege.edu
Pima County Community College District <i>District Office</i>	www.pima.edu
South Mountain Community College	www.southmountaincc.edu
University of Arizona South	www.uas.arizona.edu
California	
Allan Hancock College	www.hancockcollege.edu
Antelope Valley College	www.avc.edu
Bakersfield College	www.bakersfieldcollege.edu
California State Polytechnic University <i>Pomona</i>	www.csupomona.edu
California State University <i>Bakersfield</i>	www.csub.edu
California State University <i>Dominguez Hills</i>	www.csudh.edu
California State University <i>Fresno</i>	www.csufresno.edu
California State University <i>Fullerton</i>	www.fullerton.edu
California State University <i>Long Beach</i>	www.csulb.edu
California State University <i>Los Angeles</i>	www.calstatela.edu
California State University <i>Monterey Bay</i>	www.csumb.edu
California State University <i>Northridge</i>	www.csun.edu
California State University <i>San Bernardino</i>	www.csusb.edu
California State University <i>Stanislaus</i>	www.csustan.edu
Cañada College	www.canadacollege.edu
Cerritos College	www.cerritos.edu
Chaffey College	www.chaffey.edu
Citrus College	www.citruscollege.edu
College of the Desert	www.collegeofthedesert.edu
College of the Sequoias	www.cos.edu
East Los Angeles College	www.elac.edu
El Camino Community College	www.elcamino.edu
Fresno City College	www.fresnocitycollege.edu
Fullerton College	www.fullcoll.edu
Gavilan College	www.gavilan.edu
Glendale Community College	www.glendale.edu
Hartnell College	www.hartnell.edu
Heald College <i>Salinas</i>	www.heald.edu
Heald College District	www.heald.edu
Imperial Valley College	www.imperial.edu
Kern Community College District	www.kccd.edu
La Sierra University	www.lasierra.edu
Long Beach City College	www.lbcc.edu
Los Angeles County College of Nursing and Allied Health	www.ladhs.org/lacusc/lacnah
Los Angeles Mission College	www.lamission.edu
Los Angeles Trade-Technical College	www.lattc.edu
Los Medanos College	www.losmedanos.edu
Mt. San Antonio College	www.mtsac.edu
Mt. San Jacinto College	www.msjc.edu
National Hispanic University	www.nhu.edu
Oxnard College	www.oxnardcollege.edu
Palo Verde Community College	www.paloverde.edu

Palomar College	www.palomar.edu
Pasadena City College	www.pasadena.edu
Reedley College	www.reedleycollege.edu
Rio Hondo College	www.riohondo.edu
Riverside Community College <i>Riverside City</i>	www.rcc.edu
San Bernardino Community College District	www.sbccd.cc.ca.us
San Bernardino Valley College	www.sbccd.cc.ca.us/sbvc
San Diego State University <i>Imperial Valley</i>	www.ivcampus.sdsu.edu
San Joaquin Delta Community College	www.deltacollege.edu
San José/Evergreen Community College District	www.sjcccd.org
Santa Ana College	www.sac.edu
Santa Monica College	www.smc.edu
Southwestern College	www.swc.cc.ca.us
University of California <i>Merced</i>	www.ucmerced.edu
University of La Verne	www.ulv.edu
Ventura College	www.venturacollege.edu
Victor Valley College	www.vvc.edu
West Hills Community College	www.westhillscollege.com
West Los Angeles College	www.wlac.edu
Whittier College	www.whittier.edu
Woodbury University	www.woodbury.edu
Yosemite Community College District	http://www.yosemite.cc.ca.edu
Colorado	
Adams State College	www.adams.edu
Colorado State University <i>Pueblo</i>	www.colostate-pueblo.edu
Community College of Denver	www.ccd.edu
Otero Junior College	www.ojc.edu
Pueblo Community College	www.pueblocc.edu
Trinidad State Junior College <i>Trinidad</i>	www.trinidadstate.edu
Connecticut	
Capital Community College	www.ccc.commnet.edu
Florida	
Barry University	www.barry.edu
Broward Community College <i>District Administrative Offices</i>	www.broward.edu
Carlos Albizu University <i>Miami</i>	www.mia.albizu.edu
Florida International University	www.fiu.edu
Miami Dade College <i>District Administration</i>	www.mdc.edu
Miami Dade College <i>North Campus</i>	www.mdc.edu/north
Nova Southeastern University	www.nova.edu
St. Thomas University	www.stu.edu
University of Miami <i>Coral Gables</i>	www.miami.edu
Valencia Community College <i>Osceola</i>	www.valenciacc.edu
Illinois	
Malcolm X College <i>City Colleges of Chicago</i>	www.ccc.edu/malcolmx
Morton College	www.morton.edu
Northeastern Illinois University	www.neiu.edu
Richard J. Daley College <i>City Colleges of Chicago</i>	www.ccc.edu/daley
Robert Morris College	www.robertmorris.edu

St. Augustine College <i>Main</i>	www.staugustinecollege.edu
Wilbur Wright College <i>City Colleges of Chicago</i>	www.ccc.edu/wright
Iowa	
Iowa Central Community College <i>Storm Lake</i>	www.iccc.cc.ia.us
Kansas	
Donnelly College	www.donnelly.edu
Massachusetts	
Urban College of Boston	www.urbancollege.edu
New Jersey	
Hudson County Community College	www.hccc.edu
New Jersey City University	www.njcu.edu
Passaic County Community College <i>Paterson</i>	www.pccc.edu
Union County College	www.ucc.edu
New Mexico	
Albuquerque Technical Vocational Institute	www.tvi.edu
Clovis Community College	www.clovis.edu
College of Santa Fe	www.csf.edu
Eastern New Mexico University <i>Main</i>	www.enmu.edu
Eastern New Mexico University <i>Roswell</i>	www.roswell.enmu.edu
Mesalands Community College	www.mesalands.edu
New Mexico Highlands University	www.nmhu.edu
New Mexico Junior College	www.nmjc.edu
New Mexico State University <i>Alamogordo Branch Community College</i>	alamo.nmsu.edu
New Mexico State University <i>Carlsbad Branch Community College</i>	cavern.nmsu.edu
New Mexico State University <i>Doña Ana Branch Community College</i>	dabcc.nmsu.edu
New Mexico State University <i>Grants</i>	www.grants.nmsu.edu
New Mexico State University <i>Main</i>	www.nmsu.edu
Northern New Mexico College	www.nnmc.edu
Santa Fe Community College	www.sfccnm.edu
University of New Mexico <i>Main</i>	www.unm.edu
University of New Mexico <i>Valencia</i>	www.unm.edu/~unmvc
Western New Mexico University <i>Main</i>	www.wnmu.edu
New York	
Boricua College	www.boricuacollege.edu
Borough of Manhattan Comm. College <i>City University of New York</i>	www.bmcc.cuny.edu
Bronx Community College <i>City University of New York</i>	www.bcc.cuny.edu
City College of New York <i>City University of New York</i>	www.cuny.cuny.edu
College of Mount Saint Vincent	www.mountsaintvincent.edu
Hostos Community College <i>City University of New York</i>	www.hostos.cuny.edu
John Jay College of Criminal Justice <i>City University of New York</i>	www.jjay.cuny.edu
La Guardia Community College <i>City University of New York</i>	www.lagcc.cuny.edu
Lehman College <i>City University of New York</i>	www.lehman.cuny.edu
Mercy College	www.mercy.edu
Metropolitan College of New York <i>Main</i>	www.metropolitan.edu
New York City College of Technology <i>City University of New York</i>	www.citytech.cuny.edu
Vaughn College of Aeronautics and Technology	www.vaughn.edu
Pennsylvania	
Eastern University <i>Nueva Esperanza Center for Higher Education</i>	www.eastern.edu
Puerto Rico	

American University of Puerto Rico <i>Bayamón</i>	www.aupr.edu
Atlantic College	www.atlanticcollege-pr.com
Caribbean University <i>Bayamón</i>	www.caribbean.edu
Colegio Universitario de San Juan	www.cunisanjuan.edu
Conservatory of Music of Puerto Rico	www.cmpr.edu
Escuela de Artes Plásticas de Puerto Rico	www.eap.edu.pr
Inter American University of Puerto Rico <i>Aguadilla</i>	www.aguadilla.inter.edu
Inter American University of Puerto Rico <i>Arecibo</i>	www.arecibo.inter.edu
Inter American University of Puerto Rico <i>Barranquitas</i>	www.br.inter.edu
Inter American University of Puerto Rico <i>Fajardo</i>	http://fajardo.inter.edu
Inter American University of Puerto Rico <i>Guayama</i>	www.guayama.inter.edu
Inter American University of Puerto Rico <i>Metropolitan Campus</i>	metro.inter.edu
Inter American University of Puerto Rico <i>Ponce</i>	www.ponce.inter.edu
Inter American University of Puerto Rico <i>San Germán</i>	www.sg.inter.edu
Inter American University of Puerto Rico <i>System Central Office</i>	www.inter.edu
Pontifical Catholic University of Puerto Rico <i>Ponce</i>	www.pucpr.edu
Sistema Universitario Ana G. Méndez <i>Central Administration</i>	www.suagm.edu
Universidad Adventista de las Antillas	www.uaa.edu
Universidad Central del Caribe	www.uccaribe.edu
Universidad del Este	www.suagm.edu/cue
Universidad del Turabo	www.suagm.edu
Universidad Metropolitana <i>Cupey</i>	www.suagm.edu/umet/default.htm
Universidad Politecnica de Puerto Rico	www.pupr.edu
University of Puerto Rico <i>Aguadilla</i>	www.uprag.edu
University of Puerto Rico <i>Arecibo</i>	www.upra.edu
University of Puerto Rico <i>Bayamón</i>	www.uprb.edu
University of Puerto Rico <i>Carolina</i>	www.uprc.edu
University of Puerto Rico <i>Cayey</i>	www.cayey.upr.edu
University of Puerto Rico <i>Humacao</i>	www.uprh.edu
University of Puerto Rico <i>Mayagüez</i>	www.uprm.edu
University of Puerto Rico <i>Medical Sciences Campus</i>	www.rcm.upr.edu
University of Puerto Rico <i>Río Piedras</i>	www.rrp.upr.edu
University of the Sacred Heart	www.sagrado.edu
Texas	
Alamo Community College District	www.accd.edu
Amarillo College	www.actx.edu
Coastal Bend College	www.coastalbend.edu
Del Mar College	www.delmar.edu
El Centro College	www.elcentrocollege.edu
El Paso Community College <i>Administrative Services Center</i>	www.epcc.edu
Galveston College	www.gc.edu
Houston Community College System	www.hccs.edu
Huston-Tillotson University	www.htc.edu
Laredo Community College <i>Main</i>	www.laredo.edu
Midland College	www.midland.edu
Mountain View College	www.mvc.dcccd.edu
Northwest Vista College	www.accd.edu/nvc
Our Lady of the Lake University	www.ollusa.edu
Palo Alto College	www.accd.edu/pac/pacmain/pachp.htm

San Antonio College	www.accd.edu/sac/sacmain/sac.htm
San Jacinto College <i>North</i>	www.sjcd.edu
San Jacinto College Central	www.sjcd.edu
South Plains College	www.southplainscollege.edu
South Texas College	www.southtexascollege.edu
Southwest Texas Junior College	www.swtjc.net
St. Edward's University	www.stedwards.edu
St. Mary's University	www.stmarytx.edu
St. Philip's College	www.accd.edu/spc
Sul Ross State University	www.sulross.edu
Texas A&M International University	www.tamtu.edu
Texas A&M University <i>Corpus Christi</i>	www.tamucc.edu
Texas A&M University <i>Kingsville</i>	www.tamuk.edu
Texas State Technical College <i>Harlingen</i>	www.harlingen.tstc.edu
University of Houston <i>Downtown</i>	www.uhd.edu
University of St. Thomas	www.stthom.edu
University of Texas at Brownsville and Texas Southmost College	www.utb.edu
University of Texas at El Paso	www.utep.edu
University of Texas at San Antonio	www.utsa.edu
University of Texas Health Science Center at San Antonio	www.uthscsa.edu
University of Texas of the Permian Basin	www.utpb.edu
University of Texas, Pan American	www.panam.edu
University of the Incarnate Word	www.uiw.edu
Victoria College	www.victoriacollege.edu
Western Texas College	www.wtc.edu
Washington	
Columbia Basin College	www.columbiabasin.edu
Heritage University	www.heritage.edu

Pre-Professional Publications

There are several publications that are aimed at steering minorities into successful engineering careers, such as *Hispanic Engineer*²⁷, *Tecnica*²⁸, *Black Engineer*²⁹, *NSBE*³⁰, *SHPE*³¹. Some have pre-college versions, such as *NSBE Bridge*³². And some are targeting the professional minority engineers, e.g. *Career Engineer*³³.

ASEE publishes *Engineering Go For It!*¹ Targeting the K-12 students.

Resources for Finding Funding, Scholarship and Fellowship

The U.S. Department of Education provides the Free Application for Federal Student Aid website³⁴ for students to apply for a variety of student financial aid programs, including Pell grants, Campus-based programs, Supplemental Education Opportunity grants, Work Study, Stafford, PLUS and Perkins loans. Help in filling out federal financial aid applications can be found at <http://www.collegeboards.com> and at <http://www.finaid.org>.

Undergraduate and Graduate Scholarships in Naval Engineering can be found at <http://scholarships.fatomei.com/scholar2.html>

Undergraduate and Graduate Scholarship for women in Computer Science include the \$10,000 Google Anita Borg Scholarships that can be found at <http://www.google.com/anitaborg/>

For African Americans doctoral students, the ASEE offers the Helen T. Carr Engineering Fellowships for African-Americans, funded primarily by GE Fund and NASA for \$10,000.

Some scholarships are regional, e.g. The Three Doctors Foundation⁶⁵, which funds \$5,000 and \$2,500 scholarships in partnership with the Council of Higher Education in Newark (CHEN) for students from Newark, New Jersey entering one of the CHEN schools: Rutgers University, the New Jersey Institute of Technology or the University of Medicine and Dentistry.

Research Opportunities for Students and Faculty

National Science Foundation³⁵ sponsors Engineering Research Centers, engineering-focused interdisciplinary centers in US universities that operate in close partnership with industry. For a complete list of current centers see reference³⁶. A Best Practices Manual³⁷ is available online organized by management roles and functional areas, for anyone who would like to become involved or create new center.

Resources for Graduate Students

The National Science Foundation provides a number of programs for scholarships, fellowships and research experiences. The National Consortium for Graduate Degrees for Minorities in Engineering and Science (GEM) provides fellowships for minorities entering graduate programs either at the masters or doctoral levels, 1 year and 5 years of support respectively, that pays tuition, a stipend and provides a paid summer internship³⁸.

Master Fellowships:

NSF's Division of Graduate Education (DGE) provides annually about 1,000 Graduate Research Fellowships³⁹ Including Women in Engineering and Computer and Information Science Program funding \$40,500 annually: \$30,000 stipend and \$10,500 cost of education allowance per award. The grants provide 3 years of support leading to a masters or doctoral degree for students in the earliest stages of their graduate study. Students may apply during the senior year of college, prior to or during the first year of graduate school, and at the beginning of the second year of graduate school. Applicants must have completed no more than a year of full-time graduate study or the equivalent in part-time study. Applicants must be US citizens or nations (native resident of a US commonwealth or territory, e.g., American Samoa, Guam, Puerto Rico, U.S. Virgin Islands, Northern Mariana Islands). Application deadlines for 2004 for Engineering were in December.

Doctoral Fellowships:

The U.S. Department of Defense (DoD) funds the National Defense Science and Engineering Graduate Fellowships⁴⁰, which are portable and allow recipients to pursue graduate studies at a U.S. institution. This program has awarded 2,000 fellowship since its inception 16 years ago, and plans to fund about 180 3-year grants in April to students with demonstrated abilities in

science and engineering, who will pursue a doctoral degree in or closely related to an area of DoD interest within one of the following disciplines: Aeronautical and Astronautical Engineering, Biosciences, Chemical Engineering, Chemistry, Civil Engineering, Cognitive, Neural, and Behavioral Sciences, Computer and Computational Sciences, Electrical Engineering, Geosciences, Materials Science and Engineering, Mathematics, Mechanical Engineering, Naval Architecture and Ocean Engineering, Oceanography, or Physics. Application deadline is in January, notifications are made late March.

NSF's Division of Graduate Education (DGE) provides annually about 1,000 Graduate Research Fellowships³⁹ Including Women in Engineering and Computer and Information Science Program funding \$40,500 annually: \$30,000 stipend and \$10,500 Cost of Education allowance per award. The grants provide 3 years of support leading to a master's or doctoral degree for students in the earliest stages of their graduate study. Students may apply during the senior year of college, prior to or during the first year of graduate school, and at the beginning of the second year of graduate school. Applicants must have completed no more than a year of full-time graduate study or the equivalent in part-time study. Applicants must be US citizens or nations (native resident of a US commonwealth or territory, e.g., American Samoa, Guam, Puerto Rico, U.S. Virgin Islands, Northern Mariana Islands). Application deadlines for Engineering are in December.

NSF DGE provides Graduating Teaching Fellows in K-12 Education⁴¹ allows institutions to provide funding for graduate fellowships that require the student to serve as resources for teachers in science and mathematics instruction. Funding for initial projects is given for up to three years with potential to apply for follow-on project of up to five years. Follow the referenced link to find the institutions that can provide this opportunity.

NSF DGE also runs the Integrative Graduate Education and Research Training (IGERT)⁴² grants. Universities receiving an IGERT grant have unique funding opportunities for their doctoral students with sizable stipends.

ASEE – Helen T. Carr Fellowships for African-Americans⁴³: up to \$10,000 per year to students who are pursuing a doctoral degree. Upon doctoral degree completion, fellow is committed to return to one of the HBEC institutions.

Resources for International Graduate Studies and Exchange Opportunities:

The Erasmus Mundus program was created by the European Union to offer dual- or multiple-Masters Degrees, where students attend 2 or more universities in different countries. The students learn and study in two languages. Some of the programs have technical programs taught all in English and the student learns and practices a second language in language and culture classes. The programs have scholarships in each program for non-European Union countries, which they call third countries. The stipends total about \$25,000 a year for the Master student on scholarship. There are also opportunities for the European students and faculties to research or study up to six months in third countries if the third country institution becomes a partner institution to the Erasmus Mundus program. There are also opportunities for faculty in third countries to participate in the programs as guest faculty for short periods. The main link is

http://europa.eu.int/comm/education/programmes/mundus/projects/index_en.html

The listing of each program is shown in Table 7 organized by the year of the inception of the program. The engineering programs appear in bold.

Table 7. Erasmus Mundus Dual-Degree European Masters Programs

Erasmus Mundus Masters Programs approved to begin in 2004
ALGANT - Algebra, Geometry and Number Theory
CoMundus - European Master of Arts in Media, Communication and Cultural Studies
EMCL - European Masters Clinical Linguistics
EMMS - Joint European Masters Programme in Materials Science
EuMI - European Master in Informatics
EURO-AQUAE - Euro Hydro-Informatics & Water Management
European Joint Master in Water and Coastal Management
European Legal Practice - LL.M. Eur
European Master in Law and Economics
European Masters Program in Computational Logic
HEEM - European Masters Degree in Higher Education
IMRD: Erasmus Mundus International Master of Science in Rural Development
International Master in Quaternary and Prehistory
MEEES - Masters in Earthquake Engineering & Engineering Seismology
MEEM - Mechanical Engineering Erasmus Mundus Masters Course
MERIT - Master in Research in Information Technologies
MSc EF Master of Science in European Forestry
NOHA MUNDUS - European Masters in International Humanitarian Aid
tropEd - European Master of Science Programme in International Health

Erasmus Mundus Masters Programs approved to begin in 2005
AMASE: Joint European Master Programme in Advanced Materials Science and Engineering
EMMAPA: Erasmus Mundus Master in Adapted Physical Activity
EMM-Nano. Erasmus Mundus Master of Nanoscience and Nanotechnology
Erasmus Mundus Masters – Journalism and Media within Globalization: The European Perspective
EuMAS - European Masters Course in Aeronautics and Space Technology
EUROMIME: Master européen en Ingénierie des Médias pour l'Education
European Master in Global Studies
GEM: Geo-information Science and Earth Observation for Environmental Modelling and Management

<u>MA SEN, Special Education Needs</u>
<u>Master International "Vintage", Vine, Wine and Terroir Management</u>
<u>Master Mundus: Crossways in European Humanities</u>
<u>Master of Applied Ethics</u>
<u>Master of Industrial Mathematics</u>
<u>MESPOM: Environmental Sciences, Policy and Management</u>
<u>MSc in Network and e-Business Centred Computing</u>
<u>SEFOTECH.nut: European MSc Degree in Food Science, Technology and Nutrition (no scholarships for third-country participants in 2005)</u>
<u>SpaceMaster - Joint European Master in Space Science and Technology</u>

Erasmus Mundus Masters Programs approved to begin in 2006
<u>AGRIS MUNDUS - Sustainable Development in Agriculture Masters</u>
<u>ATOSIM : Atomic Scale Modelling of Physical, Chemical and Biomolecular Systems</u>
<u>CoDe - Joint European Master in Comparative Local Development</u>
<u>EMIN - Economics and Management of Network Industries</u>
<u>Erasmus Mundus Masters of Science in Photonics</u>
<u>EURO CULTURE</u>
<u>Europubhealth – European Public Health Master</u>
<u>FUSION-EP European Master in Nuclear Fusion Science and Engineering Physics</u>
<u>IMIM : International Master in Industrial Management</u>
<u>M.A. in Economics of International Trade and European Integration</u>
<u>MA LLL - European Master in Lifelong Learning: Policy and Management</u>
<u>Master of Bioethics</u>
<u>M.E.S.C.: Materials for Energy Storage and Conversion</u>
<u>Molecular nano- and bio-photonics for telecommunications and biotechnologies</u>
<u>MSPME, Masters in Strategic Project Management (European)</u>
<u>NordSecMob - Master's in Security and Mobile Computing</u>
<u>PHOENIX EM Dynamics of Health and Welfare</u>
<u>QEM: Models and Methods of Quantitative Economics</u>
<u>SUTROFOR - Sustainable Tropical Forestry Erasmus Mundus Masters</u>
<u>VIBOT – European Master in Vision and Robotics</u>
<u>WOP-P - Master on Work, Organizational and Personnel Psychology</u>

Resources for PostDoctoral Fellowships:

Naval Research Laboratories (NRL) sponsors about 40 NRL PostDoctoral Fellowships⁴⁴ per year, administered by the ASEE, to research at the Naval R&D centers and laboratories:

- **Naval Research Laboratory**
 Washington, DC - www.nrl.navy.mil
 Stennis Space Center, MS - www.nrlssc.navy.mil
 Monterey, CA - www.nrlmry.navy.mil
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nrl-0000.cfm>
- **Naval Air Warfare Center/Weapons Division**
 China Lake, CA
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nawc-ca.cfm>
 Home page: www.nawcwpns.navy.mil
- **Naval Air Warfare Center/Naval Training Systems Center**
 Orlando, FL
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nawc-fl.cfm>
 Home page: www.ntsc.navy.mil
- **Naval Air Warfare Center/Aircraft Division**
 Patuxent River, MD
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nawc-md.cfm>
 Home page: www.nawcad.navy.mil
- **Naval Facilities Engineering Service Center**
 Port Hueneme, CA
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nfesc.cfm>
 Home page: www.nfesc.navy.mil
- **Naval Surface Warfare Center/Carderock Division**
 Bethesda, MD
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nswc-md.cfm>
 Home page: www.dt.navy.mil/div/homepage.html
- **Naval Surface Warfare Center/Dahlgren Division**
 Dahlgren, VA
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nswc-va.cfm>
 Home page: www.nswc.navy.mil
- **Naval Surface Warfare Center/Dahlgren Division**
 Panama City, FL
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nswc-va.cfm>
 Home page: www.nswc.navy.mil
- **Naval Surface Warfare Center/Indian Head Division**
 Indian Head, MD
 Lab Description: <http://www.asee.org/resources/fellowships/nrl/nswc-indian.cfm>
 Home page: www.ih.navy.mil

- **Space and Naval Warfare Systems Center**
San Diego, CA
Lab Description: <http://www.asee.org/resources/fellowships/nrl/snwsc.cfm>
Home page: www.spawar.navy.mil/sandiego

North Atlantic Treaty Organization (NATO) offers Advanced Study Institutes (ASI)⁴⁵, and NSF offers travel awards of \$1,000 each to attend. NSF-NATO Postdoctoral Fellowships for Scientists from NATO Partner Countries⁴⁶ funds scientists and engineers from NATO partner countries, who are within five years of their doctoral degree and are nominated by a scientific or engineering advisor at a US institution. Deadline has been in the beginning of December. For other NATO Fellowships see Reference⁴⁷.

Resources for Transitioning to Faculty or Administrative Positions

There are several web sites that specialize in advertising academic or administrative positions^{48, 49, 50}. The best source for finding Assistant Professor positions is the premier publication targeted to the particular engineering specialty, for example ACM for Computer Science. There are several sources for profiling universities^{51, 52, 53}. The Oklahoma State University salary survey provides low, median and high salaries for professors at different ranks organized by discipline⁵⁴. The Chronicle of Higher Education⁵⁵ provides median salary data by institutional type (doctoral, master's, baccalaureate, or 2 year)⁵⁶.

The 2004 book: *Paths to the Professoriate: Strategies for Enriching the Preparation of Future Faculty*⁶⁷ by Donald H. Wulff and Ann E. Austin is a useful resource for preparing to become a faculty member. The American Society of Engineering Education provides

Jossey-Bass publishes EDUCAUSE a Leadership Strategies book series that focus on IT issues^{68,69,70,71,72,73,74,75}.

Resources for Higher Education Faculty

For advancement and recognition in their profession, faculty must document excellence in at least one their areas of assigned responsibility: teaching, service and research. There are many awards offered by the engineering professional organizations for recognition at different career stages, such as the ASEE Section and Division awards for teaching, service and best paper.

For faculty development: A non-profit organization established in 1944, the International Engineering Consortium⁵⁷ publishes a free monthly newsletter and provides extensive, free, on-line educational programs in high-tech areas.

U. S. Air Force Summer Faculty Fellowship Program⁵⁸, administered by the ASEE, offers 8-12 week research residencies at participating Air Force Research Facilities for full-time science and engineering faculty at U.S. colleges and universities. It provides mentoring under Air Force researchers to faculty who are citizens or legal permanent residents of the U.S. Research is conducted at an Air Force Research Laboratory, the U.S. Air Force Academy, or the Air Force Institute of Technology. Participants receive a weekly stipend depending on their academic rank

(in 2005 it varies from \$1,250/week for Assistant Professors to \$1,650/week for Professor). Additionally the participant receives a temporary moving allowance and a \$50/day expense allowance for those with more than a 50 mile commuting distance. Application deadline in 2005 is: January 7 and notification is made by March.

NASA also sponsors a NASA Faculty Fellowship Program (NSFF)⁵⁹ administered jointly by ASEE and the Universities Space Research Association(USRA). It is a 10 week summer research residency at participating NASA research centers. It combines two successful former and long running NASA programs, the NASA/ASEE Summer Faculty Fellowship Program and the NASA/USRA Joint Venture (JOVE) program. The stipend is \$1,200/week, and provides relocation allowance of \$1,500, plus travel expenses of up to \$1,000. Application deadline is: February 1, and notification is mid-March.

Resources for Finding Grant Opportunities in Engineering, Technology and Education

Grants.Org and SchoolGrants.Org list grants for engineering and technology education.

BellSouth edu.pwr3 is a 2 year \$10 million program of the BellSouth Foundation⁶⁰ to help school leaders, teachers and students fully harness the power of technology for learning.

NSF DGE provides Graduating Teaching Fellows in K-12 Education⁴¹ allows institutions to provide funding for graduate fellowships that require the student to serve as resources for teachers in science and mathematics instruction. Funding for initial projects is for up to three years with potential to apply for follow-on project of up to five years. A Letter of Intent is required. The deadline is in May with full proposal due in June.

NSF DGE also runs the Integrative Graduate Education and Research Training (IGERT)⁴² grants. Universities receiving an IGERT grant have unique funding opportunities for their doctoral students with sizable stipends. Faculty and Administrators you want to apply for funding for their universities be advised that the deadlines are: February preliminary proposal, August formal proposal.

Grants.Gov provides an electronic venue for searching for grant opportunities in over 900 Federal grant programs offered by 26 Federal grant-making Agencies

Resources targeting Minorities and Women

The GE Faculty for the Future program (see <http://www.facultyforthefuture.org>) is a ten year, \$20 million initiative of the GE Foundation and WEPAN to increase the number of women and under-represented minorities faculty in engineering, related sciences and business. It has assisted nearly 200 students, who have earned PhD degrees and accepted faculty positions with over 900 students in the pipeline. The website links a diverse pool of women and under-represented minority candidates from engineering, science, and business with faculty and research positions at universities across the country.

The recently published *African American Men in College*⁶⁶ provides examples successful programs and activities practiced at a variety of institutions across the USA that enhance African American men academic success in the college environment. The book explores factors that promote a climate of academic success, including: participation in extracurricular activities, developing communication and leadership skills, fostering relationships with administrators and community leaders, mentoring programs, and the role of spirituality and religion. These include:

- Student African American Brotherhood Program created by Dr. Tyrone Bledsoe at Georgia Southwestern State University, which is structured into six committees to address (1) personal development, (2) service, (3) academic, (4) financial, (5) spiritual-enrichment/social, and (6) public relations concerns.
- The Black Man on Campus Project at Bowling Green State University, which is organized into four elements:
 1. Transition from high school to college
 2. Involvement in campus life
 3. Academic retention in first to second semester and first to second year
 4. Academic graduation rate
- Black Men's Collective at Rutgers University designed to help develop and retain African American Males
- Black Male Rap Session at the University of Louisville recognizes the rich oral tradition of African Americans, and significant role of rap in this tradition. Rap is used as a discussion format to exchange dialog and ideas, faculty are encouraged to present examples of their research and lead group discussions (rap sessions) on a variety of topics relevant to Black males to facilitate the transition to the college environment.
- African American Men of Arizona State University is a formally recognized student group designed to provide a holistic programming at the university level to enhance the critical analysis, independent study, and programming skills of its African American students to support their retention, leadership training, and cultural development.

Research on Underrepresented Minorities in Science and Engineering

The National Science Foundation (NSF) provides a demographics figures and tables on women, minorities and persons with disabilities in Science and Engineering at <http://www.nsf.gov/sbe/srs/wmpd/list.htm>. The National Academy of the Sciences Committee on Women in Science and Engineering publishes statistics at <http://www.nsf.gov/sbe/srs/wmpd/list.htm>. A faculty study on gender equity and climate at Research 1 institutions is at http://www7.nationalacademies.org/cwse/gender_faculty_links.html.

The *Journal of Women and Minorities in Science and Engineering* is published by Begell House, Inc., 145 Madison Ave., NY, NY 10016-7892. Phone: 212 725-1999; Fax: 212 213-8368. See <http://www.begellhouse.com>. This journal publishes original, peer-reviewed papers on innovative ideas and programs, scientific studies, and formulation of concepts related to education, recruitment, and retention of underrepresented groups in science and engineering.

Networks for Women

The National Academy of Sciences Committee on Women in Science and Engineering keeps a directory of organizations encouraging women in science and engineering. Organized by discipline: <http://www8.nationalacademies.org/cwse/ViewbyDiscipline.asp>; and organized by title: <http://www8.nationalacademies.org/cwse/Viewbytitle.asp>.

- **Association for Women in Computing** – promotes the advancement of women in the computing professions. <http://www.awc-hq.org>
- **Sisters in Science** is an NSF-funded program seeking to increase elementary school girls' interest and achievement in science and mathematics, to create a more positive learning climate for minority school girls and their families, and to increase parents' understanding of their influence in promoting girls' interest and achievement in science and mathematics. (see <http://www.temple.edu/SIS/>)
- **Systems Online** – Includes more than 2550 members from 38 countries, maintained by the Anita Borg Institute. It is largest all-female online community of women in computer science and was the original online community specifically designed for women in computing. (see <http://www.iwt.org/systems.html> and <http://www.systems.org/>)
- **WEPAN – Women in Engineering Programs and Advocates Network** – WEPAN's homepage is at <http://www.engr.washington.edu/~wepan/>. It sponsors the project: *MentorNet*, the National Electronic Industrial Mentoring Network for Women in Engineering and Science, available at <http://www.mentornet.net/> .
- **WISE Campaign – Women Into Science and Engineering** has initiatives and publications to give girls and women information about opportunities and careers in Science, Engineering and Technology. Their web site is located at <http://www.awise.org/>. Their address is WISE, 22 Old Queen Street, London UK SW1H 9HP. Telephone: 020 7227 8421. Fax: 020 7227 8401. Email: <mailto:wisecampaign@semta.org.uk>
- **WISENET: Women in Science and Engineering Network** – The focus of this group is issues relevant to the education and employment of women in the sciences, mathematics, and engineering. To subscribe, send a message to listserv@UICVM.CC.UIC.EDU, no subject, with the message "subscribe wisenet first_name last_name".
- **WITI: International Network of Women in Technology** – An organization committed to supporting professional development, personal growth and self-improvement for women in science and technology. WITI maintains a substantial Web site called *The WITI Campus* at <http://www.witi.com> and also offers a free electronic newsletter called *The Strategist Online* available at <http://www.witi.com/Center/Offices/Witinews/Strategist/>. Internet: witi-request@aero.org, gillam@aero.org
- **Women in Engineering Program Advocates Network (WEPAN)** – Founded to provide greater access for women to careers in engineering. Assists colleges and universities to establish innovative programs or expand existing programs. WEPAN includes

representatives from industry, government and academia. For more information write: *WEPAN member services, c/o Purdue University, 1284 CIVL Building, Room G293, West Lafayette, IN 479071284. Phone: (317) 494-5387. Fax: (317) 496-1349. Email: /wiep@ecn.purdue.edu*

- **Women in Mathematics Information Server** – is an activity of the Mathematical Association of America Committee for the Participation of Women. Useful links can be found at <http://www.mystery.com/WAM/network/Index.html>. for events such as Women Count Conference, Mathematics Awareness Week, Expanding Your Horizons in Science and Mathematics, Math Options, Sonia Kovalevsky Days and other events sponsored by MAA and other organizations, as well as other useful resources.
- **WOMUNSCI - Women Undergraduates in Science** –WOMen UNdergraduates in SCIENCE is a mailing list for discussing increasing participation of undergraduate women in science. Membership is open to college science educators and administrators (of both genders) and women undergraduates interested in science. To subscribe to WOMUNSCI, send mail to majordomo@cs.umass.edu with *subscribe womunsci your-email-address-here (your-name-here)* in the body of the message, the subject line is ignored.

Resources for Engineering Deans and Chairs

The American Society of Engineering Education publishes annually *Profiles of Engineering and Engineering Technology Colleges*⁶¹, which provides data on enrollment, degrees awarded, faculty and research expenditures at the undergraduate and graduate levels. The AAES publishes the *Engineering & Technology Degrees* every year, with data of the number of engineering students awarded degrees in the US in engineering and engineering technology. The Harris Poll conducts a survey for the AAES, *American Perspectives on Engineers and Engineering*, which also provides trend data.

Conclusions

The over 600 links listed in this paper point to resources for engineering education. Currently, there is not one site where the student, parent, educator, administrator, counselor, or professional engineer can go to find them, especially those targeting minorities. Lack of information translates to loss opportunities. This paper continues the research of resources by the ASEE MIND (Minorities in Engineering Division), and presents them in a concise document. Emails to the author with information on additional links or information are greatly appreciated.

Bibliography

1. *Engineering Go For It!* American Society for Engineering Education, <http://www.engineering-goforit.com/>
2. ASEE Engineering K-12 Center, <http://www.engineeringk12.org/>
3. *Engineering in the K-12 Classroom: An Analysis of Current Practices & Guidelines for the Future*, http://www.engineeringk12.org/Engineering_in_the_K-12_Classroom.pdf
4. Calculus for kids. Mathematics Association of America, http://www.maa.org/pubs/calc_articles.html
5. The Cornell University Math and Science Gateway, <http://www.tc.cornell.edu/Edu/MathSciGateway/>

6. *Journal of Technology Education*, <http://scholar.lib.vt.edu/ejournals/JTE/>
7. NASA Education Gateway, <http://www.jpl.nasa.gov/education/educators/>
8. ScienceNetLinks, American Association for the Advancement of Science, <http://www.sciencenetlinks.com/>
9. MarcoPolo Internet Content for the Classroom, <http://www.marcopolo-education.org/>
10. La Familia Network, <http://lafamilianet.net/>
11. AT&T Virtual Academy, <http://www.att.com/learningnetwork/virtualacademy/index.html>
12. Fun Links. Guide me NACME. <http://www.guidemenacme.org/guideme/aboutus/funlinks.jsp>
13. Engineering Week. <http://www.eweek.org>
14. Breaking through: the creative engineer, <http://www.eweek.org/2002/nbm/intro.html>
15. HESTEC <http://www.hestec.org/>
16. Engineering Education Student Center: Competitions. <http://www.engineeringedu.com>
17. Sally Ride Science Club, http://www.sallyrideclub.com/member_home.do
18. Sally Ride Circle, <http://www.sallyridescience.com/src.shtml>
19. Sally Ride Toy Challenge, <http://www.toychallenge.com/>
20. Sally Ride Science Festivals, <http://www.sallyridefestivals.com/>
21. Education Unlimited, <http://www.educationunlimited.com/>
22. A+ Summer Camps, Education Unlimited, <http://www.educationunlimited.com/aplussummer.html>
23. College Achievement Camp, Education Unlimited, http://www.educationunlimited.com/aplussummer_college.html
24. High School Achievement Camp, Education Unlimited, http://www.educationunlimited.com/aplussummer_hs.html
25. Sally Ride Science Camps, <http://www.sallyridecamps.com/>
26. GuideMeNACME. <http://www.nacme.org/precollege/guideme.html>
27. *Hispanic Engineer and Information Technology Online*, Career Communication Group, <http://www.hispanicengineer.com>
28. *Technica Magazine*, HENAAC, <http://www.technicamag.com/>
29. *US Black Engineer & Information Technology*, Career Communications Group, <http://www.blackengineer.com>
30. *NSBE Magazine*, <http://www.nsbe.org/publications/nsbemagazine.php>
31. *SHPE: The Official Magazine of the Society of Hispanic Engineers*, <http://www.shpe.org/index.php/docs/13>
32. *NSBE Bridge: The National Society of Black Engineers Pre-College Magazine*, National Society of Black Engineers, <http://www.nsbe.org/publications/nsbebridgemagazine.php>
33. *Career Engineer*, <http://www.nsbe.org/publications/careerengineer.php>
34. Free Application for Federal Student Aid, U.S. Department of Education, <http://www.fafsa.ed.gov/>
35. National Science Foundation. <http://www.nsf.org>
36. Engineering Research Centers Association. <http://www.erc-assoc.org/>
37. *Best Practices Manual*, Engineering Research Centers. http://www.erc-assoc.org/manual/bp_index.htm
38. GEM Fellows Overview. http://was.nd.edu/gem/gemwebapp/public/gem_01_100.htm
39. National Science Foundation Graduate Research Fellowship Program, <http://www.nsfgradfellows.org/>
40. National Defense Science and Engineering Graduate Fellowship, U.S. Department of Defense, <http://www.asee.org/resources/fellowships/ndseg/index.cfm>
41. NSF Graduate Teaching Fellows in K-12 Education, National Science Foundation, <http://www.ehr.nsf.gov/dge/programs/gk12/>
42. NSF Integrative Graduate Education and Research Training Program, National Science Foundation, <http://www.nsf.gov/home/crssprgm/igert/start.htm>
43. Helen T. Carr Fellowship, <http://www.asee.org/resources/fellowships/hbecc.cfm>
44. Naval Research Laboratory Postdoctoral Fellowship Program, <http://www.asee.org/resources/fellowships/nrl/index.cfm>
45. NATO Advanced Study Institutes Travel Grants, <http://www.nato.int/science/support/asi/asi-nfa.htm>
46. NSF-NATO Postdoctoral Fellowships for Scientists from NATO Partner Countries, <http://www.ehr.nsf.gov/dge/programs/nato/>
47. NATO, <http://www.nato.int/science/>
48. Chronicle Careers. The Chronicle of Higher Education Online. <http://chronicle.com/jobs/>
49. Academic Careers Online. <http://www.academiccareers.com/>
50. Academic Keys. <http://www.academickeys.com>
51. University Employer Profiles. <http://chronicle.com/jobs/profiles/>

52. *Profiles of Engineering an Engineering Technology Colleges*, American Society of Engineering Education, 2004. <http://www.asee.org>
53. America's Best Colleges 2005, US News and World Report. http://www.usnews.com/usnews/edu/college/rankings/rankengineering_brief.php
54. Oklahoma State University Salary Survey 2004-2005. http://www.ndsu.edu/oia/inst_analysis/OK_survey/Oklahoma%20Sal%202004-05.pdf
55. The Chronicle of Higher Education. <http://chronicle.com/>
56. Median Salaries of College Administrators by Type of Institutions, 2002-3. The Chronicle of Higher Education. <http://chronicle.com/free/v49/i31/31a03801.htm>
57. International Engineering Consortium. 300 W. Adams, Suite 1210, Chicago, IL 60606-5114 USA, <http://www.iec.org>
58. U.S. Air Force Summer Faculty Fellowship Program, <http://www.asee.org/sffp/>
59. NASA Faculty Fellowship Program, <http://www.asee.org/resources/fellowships/nffp/index.cfm>
60. BellSouth Foundation, <http://www.bellsouthfoundation.org/grants/guidelines/index.html>
61. *ASEE's Profiles for Engineering and Engineering Technology Colleges*. <http://www.asee.org/about/publications/profiles/index.cfm>
62. Davis, S., Jenkins, G., Hunt, R., and Frazier Page, L. *The Pact*. Riverhead Books, 2003. ISBN 9781573229890.
63. *The Pact – the movie*. Directed and Produced by Andrea Kalin, Distributed by Agdenes Media LLC, Mar Vista, California, USA, 2006. <http://www.thepactthemovie.com>
64. Davis, S., Jenkins, G., Hunt, R., and Draper, S. *We Beat the Street: How a Friendship Pact Led to Success*. Puffin, 2005, 9780525474074 Hardback. Paperback published by Dutton's Children's, 2006 ISBN 9780142406274
65. The Three Doctors, Inc. 65 Hazelwood Avenue, Newark, New Jersey 07106 USA. <http://www.threedoctors.com>
66. *African American Men in College*. Michael J. Cuyjet (Ed.), Jossey-Bass, 2006. ISBN 978-0-7879-6460-3.
67. Wulff, D.H. and Austin A.E. *Paths to the Professoriate: Strategies for Enriching the Preparation of Future Faculty*, Jossey-Bass, 2004.
68. *EDUCAUSE Leadership Strategies, Volume 1, Preparing Your Campus for a Networked Future*, Mark A. Luker (Editor), Jossey-Bass, 1999.
69. *EDUCAUSE Leadership Strategies, Volume 2: The "E" Is for Everything: E-Commerce, E-Business, and E-Learning in the Future of Higher Education*, Richard N. Katz and Diana G. Oblinger (Editors), Jossey-Bass, 2000.
70. *EDUCAUSE Leadership Strategies, Volume 3, Information Alchemy: The Art and Science of Knowledge Management*, Gerry Bernborn (Editor), Jossey-Bass, 2000.
71. Hill Duin, A., Baer, L. L., Starke-Meyerring, D. *EDUCAUSE Leadership Strategies, Volume 4, Partnership in the Learning Marketplace*, Jossey-Bass, 2001.
72. *EDUCAUSE Leadership Strategies, Volume 5, Technology-Enhanced Teaching and Learning: Leading and Supporting the Transformation on Your Campus*, Carole A. Barone and Paul R. Hagner (Editors), Jossey-Bass, 2001.
73. *EDUCAUSE Leadership Strategies, Volume 6, Technology Everywhere: A Campus Agenda for Educating and Managing Workers in the Digital Age*, Brian L. Hawkins, Julia A. Rudy and W.H. Wallace Jr. (Editors), Jossey-Bass, 2002.
74. McClure, P.A. *EDUCAUSE Leadership Strategies, Volume 7, Organizing & Managing Information Resources on Your Campus*, Jossey-Bass, 2003.
75. Luker, M.A., Petersen, R. *EDUCAUSE Leadership Strategies, Volume 8, Computer and Network Security in Higher Education*, Jossey-Bass, 2003.
76. American Society of Engineering Education. Computers in Education Division. <http://www.asee.org/publications/divisions/coed.cfm>
77. American Society of Engineering Education. Educational Research and Methods Division. <http://fie.engrng.pitt.edu/erm>
78. American Society of Engineering Education. New Engineering Educators Division. <http://www.engr.iupui.edu/%7Ereid/nee/>
79. National Effective Teaching Institute. <http://www2.ncsu.edu/unity/lockers/users/f/felder/public/NETI.html>
80. Frontiers in Education. <http://www.fie-conference.org/>
81. Frontiers in Education Clearing House. <http://fie.engrng.pitt.edu/>

82. ASEE Annual Conference Proceedings Database. <http://www.asee.org/conferences/search/>
83. 4000 Years of Women in Science. <http://www.astr.ua.edu/4000WS/4000WS.html>
84. Iowa State University's Archives of Women in Science & Engineering.
<http://www.lib.iastate.edu/spcl/wise/wise.html>
85. Society for Canadian Women in Science and Technology. <http://www.harbour.sfu.ca/scwist/>
86. Women in Technology International (WITI). <http://www.witi.com/>
87. Women of NASA. <http://quest.arc.nasa.gov/women/intro.html>
88. IEEE Women in Engineering Committee. <http://www.ieee.org/portal/pages/committee/women/index.html>