
AC 2011-855: MIND LINKS 2011: RESOURCES TO MOTIVATE MINORITIES TO STUDY AND SUCCEED IN ENGINEERING

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MIND Links 2011: Resources to Motivate Minorities to Study and Stay In Engineering

Abstract

The Minorities in Engineering Division (MIND) of the American Society of Engineering Education (ASEE) created the MIND Links project in 2004, recognizing that, although there are many resources available to inform, motivate, fund, mentor, promote, and support minorities and women to pursue a career in science, technology, engineering and mathematics, but finding these resources is not easy. MIND Links gathers and updates each year links to resources in an organized manner that is useful for parents, students, professionals, academics and administrators. Special attention is paid to provide useful resources to every stage of forming the engineer, including

- Exploratory and motivational stage: K-12, enrichment activities, competitions
- Preparatory: scholarships, fellowships, rankings of undergraduate and graduate engineering programs, internships
- Professional careers: publications, salary surveys, organizations
- Academic careers: career development, evaluating institutions and offers, research opportunities and grants, summer research opportunities, fellowships, organizations
- Leadership: leadership training, career advancement programs and administration in higher education
- Recognition: awards

In 2005, the first MIND Link paper appeared with a little more than 300 links. This year's MIND Links paper organizes and provides over 800 links to resources that can be used to motivate minorities and women to study, stay and succeed in engineering and technology disciplines. This survey organizes these opportunities and resources, specially targeting those of particular interest to engineering students and engineering faculty, and provides links to internet sites containing further detail. This paper available online at <http://www.asee.org/conferences/paper-search-form.cfm> using the keywords MIND Links. To recommend links for inclusion please contact please email petrie@fau.edu with the subject MIND 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.

The American Society of Engineering Education (ASEE) Minorities in Engineering Division (MIND) started the MIND Links project in 2004 to gather links to resources and opportunities, and publish them in the form of a paper. The paper is submitted annually for review and publication in the ASEE Proceedings. The first paper was published in 2005. The MIND Links Project papers are available online through the ASEE Proceedings Search Engine accessible through the ASEE website: www.asee.org > Conferences > Search Conference Proceedings (or directly: <http://www.asee.org/conferences/paper-search-form.cfm>) and inputting the key words:

MIND Links

This paper will be joining the archived papers; this provides one easy to remember location to download one document with all the latest links. Funding is being sought to build and maintain a web site for the MIND Links project, but even when that is available, many individuals have commented that is very useful to have it in one document with live links.

By gathering links to resources and opportunities in one document, although lengthy, provides one single source for up-to-date links that can be of used by parents, teachers, students, professors, academic administrators, and engineering professional wishing to motivate and provide background resources to help guide minority or women during their studies or careers in engineering, e.g.

- children to consider careers in the STEM (Science, Technology, Engineering, and Mathematics),
- undergraduate and graduate students to select and pursue a major in an Engineering or STEM discipline, and find scholarships to fund their studies
- faculty to survive the tenure process and thrive in an academic environment
- academic administrators to get training in academic administration
- professionals to thrive and stay viable, competitive and current in their professional life
- researchers who want to study, publish and get funding for research in pedagogy and diversity

By collecting links in one place that are helpful throughout the lifetime of a minority or women interested in a career in engineering, it is hoped that this gives the reader a lifelong perspective of considering the entire career and short and long term opportunities available to motivate them to pursue and persist in engineering. To reach this goal, the information is organized by topics covering: engineering professional societies; engineering education sites; sites targeting minorities and women in engineering, technology, science and math; resources K-12 for students, parents and educators; resources for selecting engineering programs; resources for finding funding opportunities, scholarships and fellowships; resources for research opportunities and graduate programs; resources for international opportunities; resources for minorities networking; and resources for deans and chair. Although many links center specific in opportunities only open to minorities and women, the links include more general links of opportunities open to all.

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 Environmental & Engineering Geologists	http://www.aegweb.org/i4a/pages/index.cfm?pageid=1
AFE Association for Facility Engineers	http://www.afe.org
AIA American Institute of Architects	http://www.aia.org/index.htm
AIAA American Institute of Aeronautics and Astronautics	http://www.aiaa.org/
AIChE American Institute of Chemical Engineers	http://www.aidche.org/
AIH American Institute of Hydrology	http://www.aihydrology.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/
ANS American Nuclear Society	http://www.ans.org
ARI Airconditioning Heating and Refrigerating Institute	http://www.ahrinet.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
ASHE 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.asminternational.org/portal/site/www/
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.materialsocieties.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 Biomedic Engineering Technology	http://ibet.asttbc.org/
ICE The Institution of Civil Engineers	http://www.ice.org.uk/
ICHEME 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 Institution of Mechanical Engineers	http://www.imeche.org/Home
INFORMS Institute for Operations Research & Mngmt. Sciences	http://www.informs.org
ITEA International Technology Education Association	http://www.iteaconnect.org/
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.nasa.gov/audience/foreducators/index.html
NCHES National Capital Healthcare Engineering Society	
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/
Eta Kappa Nu Honor Society for Electrical & Computer Engineers (HKN)	http://www.hkn.org/
Omega Chi Epsilon National Chemical Engineering Honor Society	http://www.omegachiepsilon.org/
Pi Tau Sigma International Mechanical Engineering Honor Society	http://www.pitausigma.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.tbp.org/pages/main.cfm
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	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.aaanet.org/
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.org/
AAFS American Academy of Forensic Sciences	http://www.aafs.org
AAG Association of American Geographers	http://www.aag.org/
AAHEA American Association for Higher Education & Accreditation	http://www.aahea.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.aau.edu
AAUP American Association of University Professors	http://www.aaup.org/
ACA American Crystallographic Association	http://www.amerocrystalassn.org/
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/
ADEA American Dental Education Association	http://www.adea.org/Pages/default.aspx
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.aia.org/index.htm
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://aihydrology.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.the-aps.org/
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.asbmb.org/
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/
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.nist.gov/bfrl/
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.materialsocieties.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.iteaconnect.org/
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://www.nctm.org/
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://proteinsociety.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/
AHETEMS Advancing Hispanic Excellence in Technology, Engineering, Math and Science	http://www.ahetems.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://temp.amseweborg.officelive.com/default.aspx
ASEE MIND (Minority in Engineering Division)	http://www.webster.edu/spacecoast/Ali_Shaykhan/MIND/
ASPIRA Association for Puerto Ricans in Science and Engineering	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
NAMEPA National Association of Multicultural Engineering Program Advocates	http://www.namepa.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://wied.asee.org/
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.awidweb.com
AWIS Association for Women in Science	http://www.awis.org/
AWISE Australian Women in IT, Science and Engineering	http://www.awise.org.au/
Cambridge AWISE Cambridge Association for Women in Science and Engineering	http://www.camawise.org.uk/
AWM Association for Women in Mathematics	http://www.awm-math.org/
AWP Association for Women in Psychology	http://www.awpsych.org/
AWMI Association of Women in the Metal Industries	http://www.awmi.com/
AWSS Association of Women Soil Scientists	http://www.womeninsoils.org/
CWSE Committee on Women in Science and Engineering	http://www7.nationalacademies.org/cwse/
FWE Forum for Women Entrepreneurs	https://www.fwe.ca/
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://anitaborg.org/initiatives/systems/
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.wisecampaign.org.uk/
WITI Women in Technology International	http://www.witi.com

Resources for K-12 Student, Parents and Educators

The Public Broadcasting System provides a web site called *PBS Kids Go! Design Squad Nation*, of resources, guides, training and blog aimed at parents, educators & engineers (<http://pbskids.org/designsquad/engineers/events.html>). They include at least 20 hands-on engineering challenges: <http://pbskids.org/designsquad/parentseducators/activities.html> and <http://pbskids.org/designsquad/parentseducators/guides/index.html>, An Online workshop on how to lead hands-on engineering activities with kids and introduce them to the design process: <http://pbskids.org/designsquad/parentseducators/workshop/welcome.html>. An Educator's Guide for 9-12 grader teachers and volunteers bringing engineering to life in the classroom or after school: pbskids.org/designsquad/parentseducators/educators_guide.html.

The Foundation for Advancing Hispanic Excellence in Technology, Engineering, Math, and Science (AHETEMS, see <http://www.shpefoundation.org/>) provides up to \$10,000 ACE Mini-Grants to fund Society of Hispanic Professional Engineers (SHPE) Jr, student, and professional chapters to conduct educational activities with pre-college students (PreKindergarten to 12th grade). Proposals need to be postmarked before April 15 and submitted as complete packages.

Notifications of awards are done by September 1. A booklet is available ACE Mini-Grants: Procedures, Formats and Tips for a Successful Project, http://www.ahetems.org/media/docs/ACE_Business_Plan_Jul2010.pdf AHETEMS also provides an annual Pre-College Symposia (<http://www.shpefoundation.org/pre-college/ahetems-pre-college-symposia/>), Regional Science Bowls (<http://www.shpefoundation.org/pre-college/regional-science-bowls/>), Summer Camps (<http://www.shpefoundation.org/pre-college/summer-camps/>) and Summer Camp Scholarship for high school students it funds Society of Hispanic Professional Engineers (SHPE) Jr. Chapters (<http://www.shpefoundation.org/pre-college/shpe-jr-program/shpe-jr-chapters-program/>) or At-Large Members for those in a high school without a chapter (<http://www.shpefoundation.org/pre-college/shpe-jr-program/shpe-jr-at-large-members/>) and provides a newsletter <http://www.shpefoundation.org/pre-college/shpe-jr-program/shpe-jr-newsletter/>.

For Hispanic Heritage Month in October, AHETEMS and SHPE student and professional chapters across the United States coordinate a one-week national campaign *Noches de Ciencias* (Family Science Nights) that host K-12 students to promote science, engineering, scholarship and college opportunities. Grade appropriate hands-on activities are provided during the 3 hour events. Spanish and English workshops for parents are offered on choosing colleges and financial aid. For more information on *Noches de Ciencias* events, see <http://www.shpefoundation.org/pre-college/noches-de-ciencias-family-science-nights/>.

The National Academy of Engineering (NAE) is developing National K-12 Engineering Standards, just as there are National K-12 Standards for Science and Math. The Engineering standards should reinforce the learning of the Math and Science standards. See the NAE site <http://www.nae.edu/cms/14727.aspx>. The NAE has also developed a web site for girls: <http://www.engineergirl.org/> that contains sections on Why Be An Engineer, Fun Facts, Cool Links, Cool Readings, Great Achievements, and an Engineer Girl Essay Contest <http://www.engineergirl.org/?id=3821>.

The NAE has listed 14 engineering grant challenges for the 21st century: <http://www.engineeringchallenges.org/> and has an accompanying related Grand Challenges Scholars Program website: <http://www.grandchallengescholars.org/>. There are a series of events scheduled posted at <http://summit-grand-challenges.pratt.duke.edu/> with the goals to:

1. Enhance student interest in engineering and science.
2. Increase the visibility and importance of engineering and science to society.
3. Underscore the importance of recognizing that engineering education must be coupled to policy/business/law and must be student-focused.
4. Enhance student interest in engineering, science, and technology entrepreneurship.
5. Foment future collaborations of interested scientists, engineers, policy makers and researchers in business, law, social sciences and humanities needed to successfully address these complex societal issues.

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 publications including *Engineering Go for It!*¹ 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. ASEE has increased its efforts and has an excellent publication in its GfI 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/>). *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 Pact⁶³ 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*⁶⁴, 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.

The ExxonMobil Bernard Harris Summer Science Camp (EMBHSSC)²⁶ is a free, academic program run by The Harris Foundation (<http://www.theharrisfoundation.org>), for students in

grades 6-8, which takes place in the fall. It promotes science, technology, engineering and mathematics for underrepresented students in middle school. It originally developed as a collaborative effort of the Harris Foundation, the Houston Independent School District, the University of Houston and the Southwestern Oklahoma State University, to support economically-challenged, historically underserved and underrepresented students. For additional information write to The Harris Foundation 1330 Post Oak Boulevard Suite 2550, Houston, TX 77056, call 1 (713) 877-1731, fax: (713) 877-8669 or email info@theharrisfoundation.org. Table 6 shows the 2009 camps locations and the contact person

Table 6. The 2009 ExxonMobil Bernard Harris Summer Science Camp Campuses and Contacts

<p>AISES / University of New Mexico http://www.theharrisfoundation.org/sitecontent/638/aises-university-of-new-mexico/category/466/embhssc-universities.aspx Marisa Page (505) 765-1052 ext 106</p>	<p>Central State University http://www.theharrisfoundation.org/sitecontent/640/central-state-university/category/466/embhssc-universities.aspx Philip Coates (937) 376-6037-5837</p>
<p>Florida A&M University http://www.theharrisfoundation.org/sitecontent/641/florida-am-university/category/466/embhssc-universities.aspx Dr. Edith G. Davis (850) 561-5465 or (850) 561-2791</p>	<p>Howard University http://www.theharrisfoundation.org/sitecontent/802/howard-university/category/466/embhssc-universities.aspx Dr. LaWanda Peace (202) 806-6627</p>
<p>Lamar University http://www.theharrisfoundation.org/sitecontent/643/lamar-university/category/466/embhssc-universities.aspx Becky Broussard (409) 880-7786</p>	<p>New Jersey Institute of Technology http://www.theharrisfoundation.org/sitecontent/644/new-jersey-institute-of-technology/category/466/embhssc-universities.aspx Charlotte Gillis (973) 596-6445</p>
<p>Northeastern University http://www.theharrisfoundation.org/sitecontent/645/northeastern-university/category/466/embhssc-universities.aspx Jillian Wudarczyk (617) 373-2036</p>	<p>Oregon State University http://www.theharrisfoundation.org/sitecontent/653/oregon-state-university/category/466/embhssc-universities.aspx Virginia Bourdeau (503) 371-7920</p>
<p>Prairie View A&M University http://www.theharrisfoundation.org/sitecontent/654/prairie-view-am-university/category/466/embhssc-universities.aspx Hebert Thomas (936) 261-3573</p>	<p>Rensselaer Polytechnic Institute http://www.theharrisfoundation.org/sitecontent/655/renselaer-polytechnic-institute/category/466/embhssc-universities.aspx Cynthia Smith (518) 276-3098</p>
<p>Southern University http://www.theharrisfoundation.org/sitecontent/656/southern-university/category/466/embhssc-universities.aspx Brenda McNeely (225) 771-2770</p>	<p>Southwestern Oklahoma State University http://www.theharrisfoundation.org/sitecontent/657/southwestern-oklahoma-state-university/category/466/embhssc-universities.aspx Dr. Wayne Trail (580) 774-3124</p>
<p>Temple University http://www.theharrisfoundation.org/sitecontent/658/temple-university/category/466/embhssc-universities.aspx Robin Neal 1(215) 204-2888</p>	<p>Texas Tech University http://www.theharrisfoundation.org/sitecontent/659/texas-tech-university/category/466/embhssc-universities.aspx Jana Winter 1 (806) 742-3451 ext 276</p>

<p>University of Alaska Anchorage http://www.theharrisfoundation.org/sitecontent/673/university-of-alaska---anchorage/category/466/embhssc-universities.aspx Michael Bourdukofsky (907) 786-6362</p>	<p>University of Arkansas at Little Rock http://www.theharrisfoundation.org/sitecontent/662/university-of-arkansas---little-rock/category/466/embhssc-universities.aspx Vernard Henley, Jr. (501) 569-8203</p>
<p>University of Houston http://www.theharrisfoundation.org/sitecontent/663/university-of-houston/category/466/embhssc-universities.aspx Cari Loehr (713) 743-8644</p>	<p>University of Oklahoma http://www.theharrisfoundation.org/sitecontent/665/university-of-oklahoma/category/466/embhssc-universities.aspx Holly Mills (405) 325-6897</p>
<p>University of South Alabama http://www.theharrisfoundation.org/sitecontent/666/university-of-south-alabama/category/466/embhssc-universities.aspx Martha Matherne (251) 405-9930</p>	<p>University of Southern California http://www.theharrisfoundation.org/sitecontent/667/university-of-southern-california/category/466/embhssc-universities.aspx Ben Louie (213) 740-1999</p>
<p>University of Texas at Arlington http://www.theharrisfoundation.org/sitecontent/668/university-of-texas---arlington/category/466/embhssc-universities.aspx Lori Norris (817) 272-3494</p>	<p>University of Texas-Pan American http://www.theharrisfoundation.org/sitecontent/669/university-of-texas---pan-american/category/466/embhssc-universities.aspx Claudia L. Farias (956) 292-7471</p>
<p>University of Virginia http://www.theharrisfoundation.org/sitecontent/670/university-of-virginia/category/466/embhssc-universities.aspx Carolyn Vallas (434) 924-0614</p>	<p>University of Wyoming http://www.theharrisfoundation.org/sitecontent/671/university-of-wyoming/category/466/embhssc-universities.aspx Heather Earl (307) 766-2862</p>
<p>Worcester Polytechnic Institute http://www.theharrisfoundation.org/sitecontent/799/worcester-polytechnic-institute/category/466/embhssc-universities.aspx NaTonia Trammell (508) 831-5796</p>	

AHETEMS Space Camp and Space Academy Scholarship

The Advancing Hispanics Excellence in Technology, Engineering, Math and Science (AHETEMS, pronounced a-teams, see <http://www.shpefoundation.org/>) is a 501(c)3 not-for-profit foundation to develop educational enrichment and academic outreach initiatives for Hispanics that extend from pre-college through the PhD. They inform about technical careers, internships and educational opportunities, maintaining educational centers. AHETEMS provides several Summer Camps:

- AHETEMS SciTech Summer Camp at University of Texas at Arlington
<http://www.shpefoundation.org/ahetems-scitech-summer-camp-at-university-of-teas-at-arlington/>
- CATALYST Summer Program at Cornell University
<http://www.shpefoundation.org/catalyst-summer-program-at-cornell-university/>
- AHETEMS Space Camp and Scholarship

<http://www.shpefoundation.org/pre-college/ahetems-space-camp-scholarship/>

Target audience: middle school student (grades 6 to 8) who are between 11 and 14 years old between June 1 and August 15.

Program: To attend a 3-day Space Camp or 6-day Space Academy in Huntsville, Alabama during the summer.

Deadline for mailing complete application – postmarked by **February 15**. Selections announced on April 1. Application Packet can be downloaded:

http://www.shpefoundation.org/media/docs/2010_Space_Camp_Application-FINAL.pdf

Requires: 250-word essay on “Which Hispanic inventor had the most impact in the 20th Century? Why?” and a letter of recommendation from a Teacher. Scholarship includes airfare and tuition for the student.

Resources for Selecting Engineering Programs

The *U.S. News & World Report* annually ranks the Best Undergraduate by Specialty, including Engineering Programs, <http://colleges.usnews.rankingsandreviews.com/best-colleges/engineering>. The ranking for those that offer doctoral degrees for 2010 is: <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-engineering>, They rank the top 169 schools that offer doctoral degrees in Engineering, the top 10 are:

- #1 Massachusetts Institute of Technology, Cambridge, MA,
<http://colleges.usnews.rankingsandreviews.com/best-colleges/cambridge-ma/mit-2178>
- #2 Stanford University, Stanford, CA,
<http://colleges.usnews.rankingsandreviews.com/best-colleges/stanford-ca/stanford-1305>
- #3 University of California-Berkeley, Berkeley, CA,
<http://colleges.usnews.rankingsandreviews.com/best-colleges/berkeley-ca/uc-berkeley-1312>
- #4 California Institute of Technology, Pasadena, CA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/pasadena-ca/cal-tech-1131>
- #4 Georgia Institute of Technology, Atlanta, GA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/atlanta-ga/georgia-tech-1569>
- #6 University of Illinois-Urbana-Champaign, Champaign, IL
<http://colleges.usnews.rankingsandreviews.com/best-colleges/champaign-il/uiuc-1775>
- #7 University of Michigan – Ann Arbor, Ann Arbor, MI
<http://colleges.usnews.rankingsandreviews.com/best-colleges/ann-arbor-mi/university-of-michigan-9092>
- #8 Carnegie Mellon University, Pittsburgh, PA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/pittsburgh-pa/carnegie-mellon-university-3242>
- #8 Cornell University, Ithaca, NY
<http://colleges.usnews.rankingsandreviews.com/best-colleges/ithaca-ny/cornell-university-2711>
- #8 Purdue University-West Lafayette, West Lafayette, IN
<http://colleges.usnews.rankingsandreviews.com/best-colleges/west-lafayette-in/purdue-1825>

For those that do not offer doctoral degrees the top 10 ranking of 181 schools ranked for 2010 is:

- #1 Rose-Hulman Institute of Technology, Terre Haute, IN
<http://colleges.usnews.rankingsandreviews.com/best-colleges/terre-haute-in/rose-hulman-institute-of-technology-1830>

- #2 Harvey Mudd College, Claremont, CA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/claremont-ca/harvey-mudd-college-1171>
- #3 Cooper Union, New York, NY
<http://colleges.usnews.rankingsandreviews.com/best-colleges/new-york-ny/cooper-union-2710>
- #3 United States Military Academy, West Point, NY
<http://colleges.usnews.rankingsandreviews.com/best-colleges/west-point-ny/west-point-2893>
- #5 California Polytechnic State University-San Luis Obispo, San Luis Obispo, CA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/san-luis-obispo-ca/cal-poly-1143>
- #5 United States Air Force Academy, USAF Academy, CO
<http://colleges.usnews.rankingsandreviews.com/best-colleges/usaf-academy-co/air-force-academy-1369>
- #5 United States Naval Academy, Annapolis, MD
<http://colleges.usnews.rankingsandreviews.com/best-colleges/annapolis-md/naval-academy-2101>
- #8 Franklin W. Olin College of Engineering, Needham, MA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/needham-ma/olin-college-39463>
- #9 Bucknell University, Lewisburg, PA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/lewisburg-pa/bucknell-university-3238>
- #9 Villanova University, Villanova, PA
<http://colleges.usnews.rankingsandreviews.com/best-colleges/villanova-pa/villanova-3388>

The *US News and World Report* also ranks schools by Engineering specialty, including:

- Aerospace/Aeronautical/Astronautical
Non-PhD : <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-aero>
PhD : <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-aero>
- Biological / Agricultural
<http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-agricultural>
- Biomedical / Biomedical Engineering
<http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-biomedical>
- Chemical
Non-PhD: <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-chem>
PhD : <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-chem>
- Civil
Non-PhD: <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-civil>
PhD : <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-civil>
- Computer Engineering
Non-PhD: <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-computer>
PhD: <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-computer>
- Electrical / Electronic / Communications
Non-PhD : <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-electrical>
PhD: <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-aero>

- Engineering Science / Engineering Physics
<http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-science>
- Environmental / Environmental Health
<http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-environmental>
- Industrial / Manufacturing
<http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-industrial>
- Materials
<http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-materials>
- Mechanical
Non-PhD : <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-mechanical>
PhD : <http://colleges.usnews.rankingsandreviews.com/best-colleges/spec-doct-mechanical>

The *U.S. News and World Report* also ranks the Best Graduate Schools in Business, Education, Engineering, Law, and Medicine, see <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools> . The “Best Engineering Schools” online site allows searching by ranking, location, tuition, school size, test scores, and by engineering specialty: <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-engineering-schools>. The U.S. News & World Report also ranks the World’s 400 Best Universities: <http://www.usnews.com/sections/education/worlds-best-universities/index.html> . These are organized by areas: Canada, Latin America, Europe and United Kingdom, Asia and the Middle East, and Australia and New Zealand; or overall ranking worldwide or ranking by subject, such as Engineering and Information Technology: <http://www.usnews.com/articles/education/worlds-best-universities/2010/09/21/worlds-best-universities-engineering-and-it-.html>

The *U.S. News and World Report* also lists Schools that offer Online Engineering Programs, and notes the enrollment, cost, whether is it accredited by ABET, whether there is limited class size and whether on campus attendance is required for testing or labs. For the Online Bachelors in Engineering Sciences, the list is at: http://www.usnews.com/directories/online-education/specialty/index_html/cat+eng/ The Online Master’s of Engineering Degrees available can be found at: <http://www.usnewsuniversitydirectory.com/masters-mba/engineering.aspx>

The National Action Council for Minorities in Engineering (NACME)²⁷ 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 7

Table 7. 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.ncat.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 HispanTelligence, the research arm of Hispanic Business magazine annually ranks top 10 Graduate School for Hispanics Students in Engineering, Medicine, Law and Business. In Engineering the rankings done in 2009

http://www.hispanicbusiness.com/rankings/headlines/2009/9/4/2009_top_10_engineering_schools_for.htm are shown in Table 8.1

Table 8.1. Top 10 Engineering Schools for Hispanics in the U.S.

Rank	College	Location	Web Site
1	Georgia Institute of Technology	Atlanta, GA	http://www.gatech.edu/
2	Purdue University	West Lafayette, IN	http://www.purdue.edu/
3	University of Texas at El Paso	El Paso, TX	http://www.utep.edu/
4	Cornell University	Ithaca, NY	http://www.cornell.edu/
5	University of Florida	Gainesville, FL	http://www.ufl.edu/
6	University of Central Florida	Orlando, FL	http://www.cecs.ucf.edu/
7	The University of New Mexico	Albuquerque, NM	http://www.unm.edu/
8	Massachusetts Institute of Technology	Cambridge, MA	http://www.web.mit.edu/
9	The University of Texas at Austin	Austin, TX	http://www.utexas.edu/
10	Florida Atlantic University	Boca Raton, FL	http://www.fau.edu/

The list of Hispanic Serving Institutions (HSI) in Table 8.2 was compiled from the membership list Hispanic Association of Colleges and Universities (HACU) at <http://www.hacu.net>.

Table 8.2. 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.lattec.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.valleycollege.edu/

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.swccd.edu/
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.westhillscollge.com
West Los Angeles College	www.wlac.edu
Whittier College	www.whittier.edu
Woodbury University	www.woodbury.edu
Yosemite Community College District	www.yosemite.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>	daley.ccc.edu/
Robert Morris College	www.robertmorris.edu
St. Augustine College <i>Main</i>	www.staugustinecollege.edu
Wilbur Wright College <i>City Colleges of Chicago</i>	wright.ccc.edu/
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	
Central New Mexico Community College	www.cnm.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>	nmsua.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.ccny.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/
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/UNE/
Universidad del Turabo	www.suagm.edu
Universidad Metropolitana <i>Cupey</i>	www.suagm.edu/umet/
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.htu.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.alamo.edu/pac/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.tamiu.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

A ranked list of Women's Colleges is also provided by *U.S. News and World Report*.

Pre-Professional Publications

There are several publications that are aimed at steering minorities into successful engineering careers, such as *Hispanic Engineer*²⁸, *Tecnica*²⁹, *Black Engineer*³⁰, *NSBE*³¹, *SHPE*³². Some have pre-college versions, such as *NSBE Bridge*³³. And some are targeting the professional minority engineers, e.g. *Career Engineer*³⁴.

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

Resources for Finding Funding, Scholarships and Fellowships

The U.S. Department of Education provides the Free Application for Federal Student Aid (FAFSA) website³⁵ (<http://www.fafsa.ed.gov>) for students to apply for a variety of student financial aid programs from the U.S. Federal Government, state colleges and some scholarship agencies to determine how much and what kind of aid a student is eligible to receive, including Pell grants, Campus-based programs, Supplemental Education Opportunity grants, Work Study, Stafford, PLUS and Perkins loans. Eligibility includes: have a high school diploma or General Education Development (GED) certificate; working toward a degree or certificate in an eligible program; U.S. citizen, U.S. Permanent Resident with an Alien Registration Card, or an eligible non-citizen (refugee, asylum granted); and have a valid Social Security Number. Help in filling out federal financial aid applications can be found at <http://www.collegeboard.com/parents/pay/scholarships-aid/21405.html> and at <http://www.finaid.org>. The application includes the student and parents' incomes, savings and

investments, benefits and state tax rates. Need to get a PIN number online at www.pin.ed.gov, and apply only or on paper (online applications are processed in a few days, paper applications can take a few weeks to process). The FAFSA processing results in a U.S. Department of Education Federal Student Aid Report (SAR) sent to the college and to the student via mail or email, which must be retained for personal records. The SAR includes the Expected Family Contribution (EFC). A new FAFSA application must be submitted per student for each academic year. Each college has its own financial aid deadline. A PowerPoint slides explaining the process are available in English:

(www.ahetems.org/media/docs/AHETEMS_Scholarships_and_Financial_Aid.ppt) and in Spanish:

(www.ahetems.org/media/docs/AHETEMS_Scholarships_and_Financial_Aid_SPANISH.ppt).

There are several websites that provide information on scholarships and funding. The *U.S. News & World Report* has online resources related to paying for college

(<http://www.usnews.com/sections/education/paying-for-college/index.html>) and graduate school

(<http://www.usnews.com/sections/education/paying-for-graduate-school/index.html>).

College Confidential (<http://www.collegeconfidential.com>) provides a link to estimate your Federal Expected Family Contribution (EFC) required when filling out the Free Application for Federal Student Aid (FAFSA) forms: http://www.collegeconfidential.com/financial_aid/efc.htm.

This is useful to estimating whether you would qualify for federal funds. In filling out FAFSA you will need to only use the actual EFC determined by the Department of Education after processing your FAFSA. Their web site, http://www.collegeconfidential.com/financial_aid/, reviews and recommends readings related to funding such as:

- *The Scholarship Advisor: Hundreds of Thousands of Scholarships Worth More than \$1Billion* by Chris Vuturo, published by Princeton Review-Random House, 933 pages.
- *Paying for College Without Going Broke*, by Kalman Chany with Geoff Martz, published by Random House, 2002, 312 pages. (good guide to filling out the FAFSA and CSS Profile forms)
- *Going Broke by Degree: Why College Costs Too Much* by Richard Vedder, American Enterprise Institute Press, 2004, 259 pages.
- *Peterson's Sports Scholarships and College Athletic Programs*, edited by Ron Walker, published by Peterson's Guides, 872 pages.
- *The Princeton Review Student Athlete's Guide to College*, by Hillary Abramson, published by Princeton Review-Random House, 195 pages.

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 Foundation⁶⁶, 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.

Resources for Finding Internships

The Advancing Hispanics Excellence in Technology, Engineering, Math and Science (AHETEMS, see <http://www.shpefoundation.org/>) Foundation develops educational enrichment and academic outreach initiatives for Hispanics that extend from pre-college through the PhD. They provide information about technical careers, internships and educational opportunities, maintaining educational centers. In partnership with the Society of Hispanic Engineers and corporations they have developed several summer internship and fall-spring semester scholarships programs:

- **AHETEMS NASA Marshall Space Flight Center Internship**
Target: Students who are U.S. citizens and attend an accredited 2-year or 4-year college or university in the U.S. or Puerto Rico. Rising sophomore, junior or senior. Enrolled fulltime (minimum 12 credit hours for undergraduates) during the current academic year, and maintaining a minimum 3.0 Grade Point Average on a 4.0 scale. Majoring in science technology, engineering, mathematics or a related field.
Program: Research internship in Huntsville, Alabama at the NASA Marshall Space Flight Center for ten (10) weeks during the summer.
Amount: Provides a stipend and up to \$500 for travel to and from the internship site.
Application Form:
<https://www.applyahetems.org/ahetems/internship.action?internship=9>
Deadline: Postmarked by February 1.
For more information: <http://www.shpefoundation.org/internships/ahetems-nasa-marshall-space-flight-center-internship/>
- **AHETEMS SHPE/CDM Summer Internship, Mentorship and Scholarship.**
Target: undergraduates students who have at least a 3.0 grade point average and are majoring in an engineering, science or construction discipline (particularly environmental, chemical, civil, electrical, mechanical, structural and geotechnical), or will be pursuing their first year in the Master's in one of these disciplines in the Fall.
Selection: Selected by CDM and its subsidiaries (CDM Federal Programs Corporation and CDM Constructors Inc)
Program: Summer Internship at a CDM office. Student is assigned a CDM mentor, and participate in recreational and cultural activities to help build a bond to endure through the scholars' college career and beyond. After successful completion of the internship, participants receive a scholarship to help cover expenses for the next academic year.
Amount: Student receives a maximum of \$2,000 housing and living reimbursement available. Students receive \$6,000 scholarship for the next academic year after successfully completing the internship
Application Form: <http://shpe.threshotech.com/cdm/application.action?scholarship=10>
Deadline: Postmarked by January 14th.

For more information: see www.cdm.com and <http://www.shpefoundation.org/scholar-internships/shpe-cdm-scholars/> for more details

- **AHETEMS Freeport McMoRan Copper and Gold Internship-Scholarship**

Target: Full-time undergraduates pursuing engineering or mining-related degrees at an accredited college or university in the United States or Puerto Rico, at least a 3.0/4.0 overall GPA and in good university standing. Scholarships are available to students of U.S. citizenship, and to international students with citizenship in Canada, Chile, Peru, Mexico and Australia. Student must be enrolled in Engineering and/or Mining related degrees – Mining Engineering, Metallurgical Engineering or Geology / Geological Engineering degree programs. Preference is given to juniors and seniors.

Selection: Freeport-McMoRan Cooper and Gold (FCX) is an international mining industry leader based in North America with large, geographically diverse reserves of copper, gold and molybdenum. FCX will interview at a Freeport-McMoRan operation or corporate office in January of the academic school year in which the scholarship is awarded. Selections are conducted in March of each school year.

Program: Internships will be paid, temporary positions for 9-12 week internship during the summer. Students will be responsible for housing and other living expenses during the internship (may be eligible for company subsidized housing where available, where it is not available a small housing stipend may be provided).

Application Form:

<https://www.applyahetems.org/freeport/application.action?internship=3>

- **AHETEMS General Internship Referral**

These have a common application process which require the following:

1. Application form for the program (see above)
2. Online Internship Certification Form
<http://www.ahetems.org/media/docs/2010-11%20Scholar-Internship%20Certification%20Form.pdf>
3. Official school transcript(s)
4. Two letters of recommendation (preferably the engineering chairperson and a professor from his/her major)
5. Resume
6. Personal Statement
7. Sent in a single, complete packet via mail (not fax nor email), **postmarked by the deadline for the program (see above)** to:

AHETEMS, Inc
c/o Internship Program
The University of Texas at Arlington, Room 609
Box 16019, 416 Yates St.
Arlington, TX 76019-0019

An additional internship available through AHETEMS with a slightly different application process is:

- **National Nuclear Security Administration (NNSA) Consortium Internship**

Target: Undergraduate and Master's students. Member of SHPE, SACNAS (Society for the Advancement of Chicanos and Native Americans in Science) or MAES (Society of

Mexican American Engineers and Scientists). U.S. Citizenship required. Rising junior, senior or graduate student, Minimum 3.0 Grade Point Average for undergraduates, minimum 3.25 Grade Point Average for graduate. Attending an accredited college/university in the U.S. or Puerto Rico. Pursuing a degree in science, engineering, technology or math.

Selection: There is no guarantee that students will be placed at their preferred sites; if accepting an internship, students must be willing to relocate for the duration of the internship/co-op.

Program: Provides challenging, hands-on, educational internship opportunities for 10 or 15 weeks in a federal laboratory or office in Washington D.C., Texas, New Mexico, California, Nevada and Tennessee.

Application Form: <https://applyahetems.org/nnsa/internship.action?internship=9>

Deadlines: Internship cycles:

Summer: 10 weeks – June-August – Deadline: **February 6**

Fall: 15 weeks – September-December – Deadline: **June 15**

Spring: 15 weeks – January – April – Deadline: **November 17**

Amount: In addition to a travel allowance students receive the following stipend:

Undergraduates: \$6,000 for 10 weeks in Summer, \$9,000 for 15 weeks in Spring or Fall

Graduates: \$7,200 for 10 weeks in Summer, \$10,800 for 15 weeks in Spring or Fall

Students are responsible for living expenses during the intership/co-op period

For more information: <http://www.shpefoundation.org/internships/national-nuclear-security-administration/> and <http://www.consortiuminternships.org>

Research Opportunities for Students and Faculty

National Science Foundation³⁶ 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 reference³⁷. A Best Practices Manual³⁸ is available online organized by management roles and functional areas, for anyone who would like to become involved or create new center.

The AHETEMS (Advancing Hispanic Excellence in Technology, Engineering, Math and Science) web site, <http://www.shpefoundation.org/>, has several research opportunities for students through research internships (see internship section in this paper for deadlines and more information). These include

- AHETEMS / NASA Marshall Space Flight Center Internship (<http://www.shpefoundation.org/internships/ahetems-nasa-marshall-space-flight-center-internship/>)
- National Nuclear Security Administration Consortium Internship (<http://www.shpefoundation.org/internships/national-nuclear-security-administration/> and <http://www.consortiuminternships.org/>)

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 internship³⁹.

Master Fellowships:

NSF's Division of Graduate Education (DGE) provides annually about 1,000 Graduate Research Fellowships⁴⁰ 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 Fellowships⁴¹, 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 Fellowships⁴⁰ 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 Education⁴² 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)⁴³ grants. Universities receiving an IGERT grant have unique funding opportunities for their doctoral students with sizable stipends.

ASEE – Helen T. Carr Fellowships for African-Americans⁴⁴: 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://eacea.ec.europa.eu/erasmus_mundus/index_en.php

The listing of each Erasmus Mundus Masters Programs is shown in Table 9, organized by major discipline, while the Erasmus-Mundus Doctoral Programs appear in Table 10.

Table 9 Erasmus-Mundus Masters Courses

Agricultural and Forestry Sciences
AFEPA - European Master in Agricultural, Food and Environmental Policy Analysis http://www.uclouvain.be/afepa
AGRIS MUNDUS - Sustainable Development in Agriculture Masters Course http://www.agrismundus.eu/agris-mundus/
EM-ABG - European Master in Animal Breeding and Genetics http://www.emabg.eu/
EMFOL - Food of Life http://www.emfoodoflife.eu/
IMHS - International Master in Horticultural Sciences http://www.imahs.unibo.it/
IMRD - International Master of Science in Rural Development http://www.imrd.ugent.be/
Master International Vintage, Vine, Wine and Terroir Management

<http://www.vintagemaster.com/>

MScEF - Master of Science in European Forestry

<http://www.europeanforestry.net/>

SUFONAMA - Sustainable Forest and Nature Management

<http://www.sufonama.net/>

SUTROFOR - Sustainable Tropical Forestry Erasmus Mundus Masters Course

<http://www.sutrofor.net/>

VINIFERA EuroMaster - European Master of Science of Viticulture and Enology

<http://vinifera-euromaster.eu/>

Communication and Information Science

DILL - International Master in Digital Library Learning

<http://dill.hio.no/>

EMDC - European Master in Distributed Computing

<http://www.kth.se/emdc>

EMSD - European Master programme in System Dynamics

<http://www.europeansystemdynamics.eu/>

EMMSP - Erasmus Mundus Master of Science in Photonics

<http://www.master-photonics.org/>

EUROMIME - Master européen en Ingénierie des Médias pour l'Education

<http://www.euromime.org/>

LCT - European Masters Program in Language and Communication Technologies

<http://lct-master.org/>

MAPNET - Masters on Photonic Networks engineering

<http://mapnet.sssup.it/>

Engineering and Technology

ATOSIM : Atomic Scale Modelling of Physical, Chemical and Bio-molecular Systems

<http://www.erasmusmundus-atosim.cecam.org/>

CEMACUBE - Common European Master's course in Biomedical Engineering

<http://www.biomedicaltechnology.eu/>

COMEM - Erasmus Mundus MSc - Coastal and Marine Engineering and Management

<http://www.comem.tudelft.nl/>

COSSE - Computer Simulation For Science and engineering

<http://www.kth.se/cosse>

CSSM - Complex Systems Science

<http://www.warwick.ac.uk/go/emmcs>

DMKM - Data Mining & Knowledge Management

<http://www.em-dmkm.eu/>

ECOHYD - Erasmus Mundus Master of Science in Ecohydrology

<http://www.ecohyd.org/>

EMM-Nano - Erasmus Mundus Master in Nanoscience and Nanotechnology

<http://www.emm-nano.org/>

EMARO - European Master in Advanced Robotics

<http://emaro.irccyn.ec-nantes.fr/>

EMDC - European Master in Distributed Computing

<http://www.kth.se/emdc>

EMECS - European Master Embedded Computing Systems
<http://mundus.eit.uni-kl.de/>

EMIN - Economics and Management of Network Industries
<http://www.eminmaster.eu/>

EMMEP - Erasmus Mundus Minerals and Environmental Programme
<http://www.emmep.org/>

EMMSP - Erasmus Mundus Master of Science in Photonics
<http://www.master-photonics.org/>

EMSHIP - European Education in Advanced Ship Design
<http://www.emship.eu/>
<http://www.anast.ulg.ac.be/EMSHIP>

EU4M - European Union Master's Course in Mechatronic and Micro-mechatronic Systems
<http://www.eu4m.eu/>

EURHEO: European Masters in Engineering Rheology
<http://www.eurheo.eu/>

EUROAQUAE - Euro Hydroinformatics and Water Management
<http://www.euroaquae.org/>

EUROPHOTONICS - Master in Photonics Engineering, Nanophotonics and Biophotonics
<http://www.europotonics.org/wordpress/>

euSYSBIO - erasmus Mundus Master's Course in euSYSBIO Systems Biology
<http://www.kth.se/eusysbio>

FUSION-EP - European Master in Nuclear Fusion Science and Engineering Physics
<http://www.em-master-fusion.org/>

GIM - MSc in Global Innovation Management
<http://www.globalinnovationmanagement.org/>

IMACS - International Master in Advanced Clay Science
<http://www.master-imacs.org/>

IMFSE - International Master of Science in Fire Safety Engineering
<http://www.imfse.ugent.be/>

IMMSSET - International Master in Materials and Sensors Systems for Environmental Technologies
http://ec.europa.eu/education/programmes/mundus/projects/action1/immsset_en.pdf

JEMES - Joint European Master Programme in Environmental Studies
<http://www.jemes.eu/>

M.E.S.C. - Materials for Energy Storage and Conversion http://www.u-picardie.fr/mundus_MESC/

MAMASELF - Master in material science exploring European large scale facilities
<http://etudes.univ-rennes1.fr/mamaself>

MAPNET - Masters on Photonic Networks engineering
<http://mapnet.sssup.it/>

Master International Vintage, Vine, Wine and Terroir management
<http://www.vintagemaster.com/>

MATHMODS - Mathematical Modelling in Engineering: Theory, Numerics, Applications
<http://www.mathmods.eu/>

ME3 - European joint Masters in Management and Engineering of Environment and Energy
<http://www.mastereurope-me3.org/>

MEEES - Masters in Earthquake Engineering and Engineering Seismology

<http://www.meees.org/>

MERIT - Master of Science in Research on Information and Communication Technologies

<http://www.meritmaster.org/>

MESPOM - Master of Science in Environmental Sciences, Policy and Management

<http://www.mespom.eu/>

MONABIPHOT - Molecular nano- and bio-photonics for telecommunications and biotechnologies <http://www.ens-cachan.fr/monabiphot/>

MSCM - Master of Science in Computational Mechanics

<http://www.cimne.com/cm-master/>

NORDSECMOB - Masters programme in Security and Mobile Computing

<http://nordsecmob.tkk.fi/>

OPSCITECH: Optics in Science and Technology

<http://www.master-optics.eu/>

SAMHC - Advanced Masters in Structural Analysis of Monuments and Historical Constructions

<http://www.msc-sahc.org/>

SEFOTECH.NUT - European MSc in food science, technology and nutrition

<http://www.sefotechnut.org/>

SELECT - Environmental Pathways for Sustainable Energy Systems

<http://www.kth.se/select>

SPACEMASTER - Joint European Master in Space Science and Technology

<http://www.spacemaster.eu/>

THRUST - Erasmus Mundus Master's Course in Turbomachinery and Aeromechanics University Training <http://www.kth.se/thrust>

VIBOT - European Master in Vision and Robotics

<http://www.vibot.org/>

Mathematics and Informatics

ALGANT - International integrated Master course in Algebra, Geometry and Number Theory

<http://www.algant.eu/>

CIMET - Color in Informatics and Media Technology

<http://www.master-erasmusmundus-color.eu/>

COSSE - Computer Simulation For Science and engineering

<http://www.kth.se/cosse>

CSSM - Complex Systems Science

<http://www.warwick.ac.uk/go/emmcs>

DMKM - Data Mining & Knowledge Management

<http://www.em-dmkm.eu/>

EMCSE - European Masters Course in Software Engineering

<http://www.fi.upm.es/emse>

EMDC - European Master in Distributed Computing

<http://www.kth.se/emdc>

EMECS - European Master Embedded Computing Systems

<http://mundus.eit.uni-kl.de/>

EUROAQUAE - Euro Hydroinformatics and Water Management

<p>http://www.euroaquae.org/ euSYSBIO - erasmus Mundus Master's Course in euSYSBIO Systems Biology</p> <p>http://www.kth.se/eusysbio IM in NLP & HLT - International Masters in Natural Language Processing and Human Language Technology</p> <p>http://mastermundusnlp-htl.univ-fcomte.fr/ IMSE - International Master in Service Engineering</p> <p>http://www.erasmusmundus-imse.eu/ MATHMODS - Mathematical Modelling in Engineering: Theory, Numerics, Applications</p> <p>http://www.mathmods.eu/ MERIT - Master of Science in Research on Information and Communication Technologies</p> <p>http://www.meritmaster.org/ QEM - Models and Methods of Quantitative Economics</p> <p>http://erasmusmundus-qem.univ-paris1.fr/</p>
<p>Education and Teacher Training</p>
<p>EUROMIME - Master européen en Ingénierie des Médias pour l'Education http://www.euromime.org/</p> <p>IMEC - International Master in Early Childhood Education and Care http://www.imec.hio.no/</p> <p>MA LLL - European Master's in Lifelong Learning: Policy and Management http://www.lifelonglearningmasters.org/</p> <p>MULTIELE: Multilingualism: Master degree in Learning and Teaching of Spanish in Multilingual and International Context http://www.multiele.org/</p> <p>MUNDUSFOR - Formation de professionnels de la formation http://www.ugr.es/~mundusfor/</p>

Table 10 Erasmus-Mundus Joint Doctorates

<p>Agricultural and Forestry Sciences</p>
<p>FONASO - Forest and Nature for Society http://www.fonaso.eu/</p>
<p>Engineering and Technology</p>
<p>ETeCoS3 - Environmental Technologies for Contaminated Solids, Soils and Sediments http://www.internationaldoctorate.unicas.it/</p> <p>EUROPHOTONICS - Doctorate Program in Photonics Engineering, Nanophotonics and Biophotonics http://www.europotonics.org/</p> <p>EUROSPIN - European Study Programme in Neuroinformatics http://www.kth.se/eurospin</p> <p>ICE - Interactive and Cognitive Environments http://www.icephd.org/</p> <p>SETS - Erasmus Mundus Joint Doctorate in Sustainable Energy Technologies and Strategies http://www.iit.upcomillas.es/sets/</p>
<p>Mathematics and Informatics</p>

ALGANT-DOC - Algebra, Geometry and Number Theory Joint Doctorate http://www.algant.eu/ EUROSPIN - European Study Programme in Neuroinformatics http://www.kth.se/eurospin ICE - Interactive and Cognitive Environments http://www.icephd.org/
Communication and Information Sciences
ICE - Interactive and Cognitive Environments http://www.icephd.org/

General information, Program Guide, Application Forms to create new Joint Programmes, and Applications for new Joint Doctoral Programs can be found at http://ec.europa.eu/education/external-relation-programmes/doc72_en.htm. And also http://eacea.ec.europa.eu/erasmus_mundus/programme/documents/guide_emdec09_%20en.pdf
The Masters Portal found at http://www.mastersportal.eu/students/search_results/stored/1/erasmus-mundus.html allows a search of the 81 active Joint Degree Erasmus Mundus program organized by country, city, university, duration and cost. These programs are available in 16 countries: Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom.

A general website called Study in Europe can be found at <http://www.studyineurope.eu/>. Other links include DEEP – Database on Educational Exchange Programs in Europe <http://deep.asef.org/> as well as a Database of Programs in Europe that are taught in English (<http://www.study-info.eu/>), and the Ploteus (Portal on Learning Opportunities throughout the European Space) <http://ec.europa.eu/ploteus/home.jsp> web site, which provides a search engine to help job seekers, worker, parents, guidance counselors, and teachers find information about studying in Europe, including exchange and grants available in European countries, such as Erasmus, Leonardo Da Vinci, Socrates, Tempus.

Resources for PostDoctoral Fellowships:

Naval Research Laboratories (NRL) sponsors about 40 NRL PostDoctoral Fellowships⁴⁵ 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.nasa.gov/centers/stennis/home/index.html
Monterey, CA - www.nrlmry.navy.mil
Lab Description: http://onr.asee.org/participating_laboratories/naval_research_laboratory
- **Naval Air Warfare Center/Weapons Division**
China Lake, CA
Lab Description:
http://onr.asee.org/participating_laboratories/naval_air_warfare_center_weapons_divisi

[on](#)

Home page: <http://www.navair.navy.mil/nawc wd/>

- **Naval Air Warfare Center/Naval Training Systems Center**
Orlando, FL
Lab Description:
http://onr.asee.org/participating_laboratories/naval_air_warfare_center_naval_training_systems_division
Home page: <http://nawctsd.navair.navy.mil/>
- **Naval Air Warfare Center/Aircraft Division**
Patuxent River, MD
Lab Description:
http://onr.asee.org/participating_laboratories/naval_air_warfare_center_aircraft_division
Home page: <http://www.navair.navy.mil/nawcad/>
- **Naval Facilities Engineering Service Center**
Port Hueneme, CA
Lab Description:
http://onr.asee.org/participating_laboratories/naval_facilities_engineering_service_center
Home page: <https://portal.navfac.navy.mil/portal/page/portal/navfac/>
- **Naval Surface Warfare Center/Carderock Division**
Bethesda, MD
Lab Description:
http://onr.asee.org/participating_laboratories/naval_surface_warfare_center_carderock_division
Home page: <http://www.navsea.navy.mil/nswc/carderock/default.aspx>
- **Naval Surface Warfare Center/Dahlgren Division**
Dahlgren, VA
Lab Description:
http://onr.asee.org/participating_laboratories/naval_surface_warfare_center_dahlgren_division
[on](#)
Home page: www.navsea.navy.mil/nswc/dahlgren/default.aspx
- **Naval Surface Warfare Center/Dahlgren Division**
Costal Systems Station
Panama City, FL
Lab Description:
http://onr.asee.org/participating_laboratories/naval_surface_warfare_center_dahlgren_division
[on](#)
Home page: www.navsea.navy.mil/nswc/dahlgren/default.aspx
- **Naval Surface Warfare Center/Indian Head Division**
Indian Head, MD
Lab Description:

http://onr.asee.org/participating_laboratories/naval_surface_warfare_center_indian_head_division

Home page: <http://www.navsea.navy.mil/nswc/indianhead/default.aspx>

- **Naval Undersea Warfare Center (NUWC)**
Newport, RI
Lab Description:
http://onr.asee.org/participating_laboratories/naval_undersea_warfare_center_newport_division
Home page: <http://www.navsea.navy.mil/nuwc/default.aspx>
- **Space and Naval Warfare Systems Center**
San Diego, CA
Lab Description:
http://onr.asee.org/participating_laboratories/space_and_naval_warfare_systems_center
Home page: <http://www.public.navy.mil/SPAWAR/PACIFIC/PAGES/DEFAULT.ASPX>
- **Defense Equal Opportunity Management Institute**
Cape Canaveral, FL
Lab Description:
http://onr.asee.org/participating_laboratories/defence_equal_opportunity_management_institute
Home page: <http://www.deomi.org/>
- **Naval Medical Research Center**
Silver Spring, MD
Lab Description:
http://onr.asee.org/participating_laboratories/naval_medical_research_center
Home page: <http://www.med.navy.mil/sites/nmrc/Pages/index.htm>
- **Naval Health Research Center**
San Diego, CA
Lab Description:
http://onr.asee.org/participating_laboratories/naval_health_research_center
Home page: <http://www.med.navy.mil/sites/nhrc/Pages/ContactUs.aspx>
- **Navy Personnel Research, Studies and Technology**
Millington, TN
Lab Description:
http://onr.asee.org/participating_laboratories/navy_personnel_research_studies_technology
Home page: <http://www.nprst.navy.mil/>
- **Naval Submarine Medical Research Laboratory**
Groton, CT
Lab Description:

http://onr.asee.org/participating_laboratories/naval_submarine_medical_research_laboratory

Home page: <http://www.med.navy.mil/sites/nsmrl/Pages/default.aspx>

- **Naval Aerospace Medical Research Laboratory**

Pensacola, FL

Lab Description:

http://onr.asee.org/participating_laboratories/naval_aerospace_medical_research_laboratory

Home page: <http://www.med.navy.mil/sites/nhrc/namrl/Pages/default.aspx>

North Atlantic Treaty Organization (NATO) offers Advanced Study Institutes (ASI)⁴⁶, and NSF offers travel awards of \$1,000 each to attend. NSF-NATO Postdoctoral Fellowships for Scientists from NATO Partner Countries⁴⁷ 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 Reference⁴⁸.

Resources for Transitioning to Faculty or Administrative Positions

There are several web sites that specialize in advertising academic or administrative positions^{49, 50, 51}. 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^{52, 53, 54}. The Oklahoma State University salary survey provides low, median and high salaries for professors at different ranks organized by discipline⁵⁵. The Chronicle of Higher Education⁵⁶ provides median salary data by institutional type (doctoral, master's, baccalaureate, or 2 year)⁵⁷.

The 2004 book: *Paths to the Professoriate: Strategies for Enriching the Preparation of Future Faculty*⁶⁸ 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^{69,70,71,72,73,74,75,76}.

Resources for Higher Education Faculty

To excite undergraduate students and make learning interesting and relevant explore the programs based on the Millennium Challenges. For example, in 2008 the National Academy of Engineering (NAE) has listed 14 engineering grant challenges for the 21st century:

<http://www.engineeringchallenges.org/>

In 2008, the NAE unveiled 14 Grand Challenges for Engineering in the 21st Century [12b]:

Alternative Energy:

1. Make solar energy economical
2. Provide energy from fusion

The Environment:

3. Develop carbon sequestration methods
4. Manage the nitrogen cycle
5. Provide access to clean water

Health:

6. Advance health informatics
7. Engineer better medicines

Security:

8. Prevent nuclear terror
9. Secure cyberspace
10. Restore and improve urban infrastructure

Learning and Computation:

11. Reverse engineer the brain
12. Enhance virtual reality
13. Advance personalized learning
14. Engineer the tools of scientific discover

In 2009 the NAE endorsed the Grand Challenge Scholars Program

<http://www.grandchallengescholars.org/>, proposed by Duke's Pratt School of Engineering, Franklin W. Olin College, and the University of Southern California's Viterbi School of Engineering. The Program calls for a new engineering education paradigm that includes five components to prepare the next generation of engineers:

1. Research experience. Project or independent research related to a Grand Challenge.
2. Interdisciplinary curriculum = Engineering+. Prepare engineering students to work at the overlap with public policy, business, law, ethics, human behavior, risk, medicine and the sciences.
3. Entrepreneurship. Preparing students to translate invention to innovation; to develop market ventures that scale to global solutions in the public interest.
4. Global dimension. Developing the students' global perspective necessary to address challenges that are inherently global as well as to lead innovation in a global economy.
5. Service learning. Developing and deepening students' social consciousness and their motivation to bring their technical expertise to bear on societal problems.

There are a series of events scheduled for 2010 posted at <http://summit-grand-challenges.pratt.duke.edu/> with the goals to:

1. Enhance student interest in engineering and science.
2. Increase the visibility and importance of engineering and science to society.
3. Underscore the importance of recognizing that engineering education must be coupled to policy/business/law and must be student-focused.
4. Enhance student interest in engineering, science, and technology entrepreneurship.
5. Foment future collaborations of interested scientists, engineers, policy makers and researchers in business, law, social sciences and humanities needed to successfully address these complex societal issues.

The NCEES is awarding cash prizes for engineering programs with team projects that collaborate with licensed engineers, called *NCEES Engineering Award for Connecting Professional Practice and Education*. First price is \$25,000 and five remaining prices are \$7,500.

The 2010 award deadline is February 1, 2010. Read more at http://www.ncees.org/licensure/engineering_award.php

To find proven, effective and innovative teaching techniques, the NAE has developed a site called PR2OVE-IT: Peer Reviewed Research Offering Validation of Effective and Innovative Teaching, see <http://www.pr2ove-it.org/proveit/>.

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 Consortium⁵⁸ publishes a free monthly newsletter and provides extensive, free, on-line educational programs in high-tech areas.

U. S. Air Force Summer Faculty Fellowship Program⁵⁹, 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)⁶⁰ 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 Foundation⁶¹ to help school leaders, teachers and students fully harness the power of technology for learning.

NSF DGE provides Graduating Teaching Fellows in K-12 Education⁴² 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)⁴³ 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 for Engineering Education Research

The National Academy of Engineer (NAE) has an initiative called *Annals of Research on Engineering Education* (AREE), see <http://www.reeonline.org/>, an online resource of journal articles that contains extended summaries, abstracts and discussion essays on relevant engineering education publications to promote discussions between readers and authors on best practices, case studies and other resources to disseminate results and transfer to practical use. To register go to <http://www.reeonline.org/CMS/Login.aspx>. The CASEE has categorized each reflective essay under one or more themes of its initial taxonomy of education research:

1. Teaching, Learning and Assessment Processes
2. Teachers and Learners
3. Courses, Laboratories, Curricula, Instructional Materials and Learning Technologies
4. Educational Management and Goal Systems
5. Political, Economical, and Social Influences on Engineering Education
6. Diffusion of Educational Innovations

The AREE advocates rigorous standards for engineering education research, promoting:

1. American Educational Research Association (AERA)Standards [34c]
2. National Research Council Standards for Scientific Research in Education (SRE)
<http://www.aera.net/?id=1480>

WEPAN – The Women in Engineering ProActive Network announced the ENGAGE Minigrants (Engaging Students in engineering through Instruction and Mentoring, funded by NSF. The project will go for 3 years and fund teams from 10 universities each year. The first application deadline was October 28, 2009, more information and contact information can be found in the website:

http://www.wepanknowledgecenter.org/c/journal_articles/view_article_content?groupId=1007&articleId=1243&version=1.0&p_1_id=PUB.1.81

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*⁶⁷ 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/statistics/wmpd/start.cfm>. The National Academy of the Sciences Committee on Women in Science and Engineering publishes statistics through the National Center for Science and Engineering Statistics (NCSES, formerly the Division of Science Resource Statistics, SRS) at <http://www.nsf.gov/statistics/about>. 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.

The NAE has also developed a web site for girls: <http://www.engineergirl.org/> that contains sections on Why Be An Engineer, Fun Facts, Cool Links, Cool Readings, Great Achievements, and an EngineerGirl Essay Contest <http://www.engineergirl.org/?id=3821>. It also has a site for Women Engineer

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://sites.nationalacademies.org/PGA/cwsem/ViewbyDiscipline/index.htm> ; and organized by title: <http://sites.nationalacademies.org/PGA/cwsem/Viewbytitle/index.htm>.

- **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.sistersinscience.org/>, note at time of publication of this paper the domain needed to be renewed)
- **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.systems.org/>)
- **WEPAN: Women in Engineering Programs and Advocates Network** – 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*. WEPAN's homepage is at <http://www.wepan.org/>. 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.wisecampaign.org.uk/>. Their address is WISE, 22 Old Queen Street, London UK SW1H 9HP. Telephone: 020 7227 8421. Fax: 020 7227 8401. Email: wisecampaign@semta.org.uk

- **WISNET: 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/magazines/strategist/archive/2005/03-29.php>. Internet: witi-request@aero.org, gillam@aero.org
- **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*⁶², 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.

The International Federation of Engineering Education Societies (IFEES), www.ifees.net, created a *Global Engineering Deans Council* (GEDC) see <http://www.gedcouncil.org>, in collaboration with Dassault Systemes and ASEE. Read their Inaugural Statement, called the Paris Declaration at http://www.ifees.net/documents/GEDC_Brochure.pdf. A status report of planned training workshops and meetings can be found at <http://www.ifees.net/documents/GEDC-Austin-Presentation.ppt>

Conclusions

The over 800 links listed in this paper point to resources for engineering education, over 80 previously listed links changed and have been updated. 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. To contribute links and information please email the authors at petrie@fau.edu with the Subject MIND Links.

Currently, the authors are working in the development of a website to present this information in a dynamic format and with the hope of reaching a wider audience to promote science, technology and engineering among underrepresented groups.

This paper is archived in the American Society for Engineering Education website under conferences – under Conference – under Search Proceedings⁹⁰ using the key words MIND Links.

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