LaRuth C. McAfee, Ph.D.

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Professional Positions

University of Colorado Boulder (Boulder, CO)
Director of Student Engagement and Community Building, The Broadening Opportunity through Leadership and Diversity (BOLD) Center, College of Engineering and Applied Science (August 2009 – present)
Responsible for overseeing the development, implementation, and evaluation of BOLD Center initiatives related to student persistence and academic success. Key activities include:

- Oversee BOLD Center scholarship program, including student selection, monitoring of progress toward meeting renewal requirements, and proactive academic interventions
- Analyze performance, retention, and graduation data for engineering students, identifying and making student support recommendations that have contributed to increases in retention and graduation rates for diverse students
- Develop activities and support student society-led efforts to strengthen community of diverse scholars at CU Engineering
- Interact with CU Foundation to develop funding proposals and maintain contact with current donors, contributing to a tripling of scholarship opportunities and development of the BOLD Center scholarship endowment
- Support CU Engineering recruiting initiatives, with efforts leading to doubling of historical enrollments of women and underrepresented minority students
- Collaborate with offices to support students and campus-wide diversity efforts through various College and campus-wide committees (Undergraduate Engineering Committee, Engineering Assessment Committee, Chancellor's Committee On Race and Ethnicity)

Research Areas: Impacts of facilitated dialogues, effective faculty-student interactions, spatial visualization training, and everyday examples of engineering on student retention and success.

Case Western Reserve University (Cleveland, OH)
Executive Director for Education, Center for Layered Polymeric Systems, Case School of Engineering (August 2006 – July 2009)
Responsible for overseeing the development, implementation, and evaluation of all education and diversity initiatives of the Center. Key activities included:

- Implemented and managed Polymer Envoys Program, involving Cleveland public school students in research activities and exciting them toward STEM opportunities
- Maintained communication with partners at other institutions to ensure all education and diversity efforts remained aligned
- Led preparation of education and diversity components for annual report submitted to NSF and Site Visit presentation for NSF

Research Area: Impact of high school research on disadvantaged students' interest and success in pursuing STEM degrees.

Stony Brook University (Stony Brook, NY)
Postdoctoral Engineering Education Researcher, National Academy of Engineering Center for the Advancement of Scholarship on Engineering Education (August 2005 – August 2006)
Research Area: Status and Experiences of Minority Graduate Students, Postdoctoral Fellows, and Faculty in Science, Technology, Engineering, and Mathematics Disciplines.

Education

Massachusetts Institute of Technology (Cambridge, MA)
Doctor of Philosophy (Chemical Engineering), June 2005. Thesis: Polysiloxane-Based Liquid Crystal Block Copolymers for Piezoelectric and Mechano-Optical Applications (P. Hammond, advisor). Minor: Science, Technology, and Society.

The University of Michigan (Ann Arbor, MI)
Bachelor of Science in Engineering (Chemical Engineering), Summa Cum Laude, April 1999. Participated in undergraduate catalysis research resulting in conference paper and presentation (L. Thompson, advisor).

Funding Leadership

Colorado Alliance for Minority Participation (NSF LSAMP Program, CU-Boulder PI, 2009-present)
ENGAGE Project (NSF GSE Program/WEPAN, CU-Boulder PI, 2011-present)
Lead author of various funded proposals to individual, foundation, and corporate donors (2009-present)

Research Experience

CU-Boulder BOLD Center (Boulder, CO)
Collaborators: Daniel Knight, Beverly Louie
Various engineering education studies are being performed to better understand successful practices to increase persistence and academic success in engineering for diverse students. Questions studied include 1) how can facilitated dialogues be used to combat stereotype threat and positively impact self-efficacy of diverse students in engineering, 2) how do effective faculty-student interactions, spatial visualization training, and introducing everyday examples of engineering affect student retention and success, especially for diverse first-year and sophomore students? Quantitative and qualitative analytical methods are being used to study these questions and draw conclusions leading to implementable recommendations. (August 2009 – present)

Stony Brook University Department of Technology and Society (Stony Brook, NY)
Advisor: David Ferguson
This study sought to determine key factors influencing the career choices and experiences of underrepresented minority undergraduates, graduate students, postdoctoral fellows, and faculty members in STEM disciplines. Special attention was given to exploring factors influencing decisions to move along paths leading to the professoriate. Primary questions studied included 1) what are the key factors influencing minority students' decisions to pursue graduate study in STEM, 2) what are the key factors influencing graduate students' decisions to select the STEM professoriate as a career choice, and 3) what are patterns in the experiences of minority graduate students, postdoctoral fellows, and faculty in STEM disciplines, with particular attention to experiences in engineering fields? A survey and focus groups were developed and implemented, and results were used to make recommendations to improve the graduate student experience. (August 2005 – August 2006)

MIT Department of Chemical Engineering (Cambridge, MA)
Advisor: Paula Hammond
This research sought to develop novel polymeric materials for use as actuators in many applications that require gates or valves. The materials studied were elastomeric liquid crystal side-chain block copolymers, with a low-T_g liquid crystalline block and a high-T_g amorphous block. Research activities focused on the synthesis and characterization of elastomeric side-chain liquid crystal block copolymers. Mesogens that exhibit the smectic C* phase were used so that the polymers synthesized should exhibit ferroelectric and piezoelectric properties. Work involved polymer synthesis by anionic polymerization methods, polymer characterization using NMR, GPC, and DSC, and characterization of the polymer's mechanical properties using DMA and rheological methods. Liquid crystal characterization and block copolymer morphology determination were accomplished using the optical microscope, AFM, TEM, SAXS, and WAXS. (January 2000 – May 2005)

Teaching Experience

CU-Boulder General Engineering (Boulder, CO)
Instructor
Revised syllabus for GEEN 1510 ("Self-Management and Leadership") course to incorporate research-based information on techniques to increase student retention and success in engineering. Presented active learning-based lectures and developed homework assignments. Held weekly office hours. (Fall 2009 – Spring 2011)

CWRU Seminar Approach to General Education and Scholarship (Cleveland, OH)
Instructor
Prepared syllabus for new course ("Communicating Technology"). Presented lectures and led discussions on how engineers communicate concepts and research developments to the public. Served as academic advisor and held office hours with students. (Fall 2008)

Professional Organizations

National Association of Multicultural Engineering Program Advocates (Member; Former Treasurer, Region D), American Society for Engineering Education (Member), American Institute of Chemical Engineers (Member; Chair, Fundamental Research in Education Session, 2009 Annual Meeting), American Chemical Society (Chair, Chemical Education Symposium, 2009 Central Regional Meeting), Tau Beta Pi (Member), Omega Chi Epsilon (Member)