



DEVELOPMENT OF THE STEM SCHOLARS PROGRAM AT RED ROCKS COMMUNITY COLLEGE: FINDING WAYS TO HELP STUDENTS SUCCEED



13300 W. Sixth Ave.
Lakewood, CO 80228

Barbra Maher Sobhani and Liz Cox, *Red Rocks Community College, Lakewood, CO*
Barbra.sobhani@rrcc.edu

ABSTRACT

Community colleges are ideally placed to provide STEM career access to a diverse population and increase transfers to four year programs. Red Rocks Community College (RRCC) has built a robust transfer pathway through diligent development of articulation agreements, course alignments and recruiting. Geoscience at RRCC is part of an interdisciplinary science department, which offers many opportunities for unique programs and partnerships. Through our NSF IUSE grant: Empowering the Invisible Minority: Engaging the Low-Income/First Generation Student in STEM, we have been focusing on retention and transfer of our diverse student population. RRCC has developed a multi-pronged effort to address this, including developing a student STEM Scholar Program (SSP), student mentoring, faculty cultural competency training, and increasing access to undergraduate student research and internships.

The SSP is for low-income, or first generation college students interested in STEM and looking to transfer to a four-year school. The student program provides community building, mentoring, training, and opportunity through career workshops, research projects, outreach activities, and competitive internship positions. STEM Summer Scholars Research Program is a paid internship for RRCC students, placing them in research projects on either the Colorado School of Mines or CU-Boulder or RRCC campus. With successful summer internships in 2015 and 2016, we are looking to expand the research program to include experiential learning field classes; and climate, atmospheric and aerospace related internships. Students are also encouraged to present their research in a professional setting. There are challenges to designing programs for community colleges that we have tried to address, such as transfer credit limits, a commuter student body, and differential preparation of the students for college. Mentoring, clear pathways and strong partnerships with four-year programs are crucial for the success of our STEM students.

Red Rocks Community College has a history of commitment to the national challenge of creating and sustaining a diverse STEM workforce. The science department has led the effort in developing more opportunities for students to engage with research, design and innovation. We have enhanced our introductory course offerings. The STEM Scholar Summer Internship Program gives students further opportunity for mentorship and scholarship.

STEM at RRCC

- Active learning in the classroom
- Research and design projects
- Transfer Pathways
- STEM Clubs
- NASA Space Grant Projects
- IDEA Lab



Introducing InTeGrate modules into many courses



Students presenting their work at conferences and research fairs and working on their projects in the IDEA Lab



Program Transformation

A College-wide Focus on STEM and Sustainability



RRCC Solar array that powers our water quality management program building, maintained by our solar energy program students and faculty

Red Rocks Community College has a history of commitment to the national challenge of creating and sustaining a green workforce and increasing access and retention in STEM and have created a campus-wide focus on STEM and sustainability. The science department has led the effort in developing more sustainability focused course offerings. We have a robust science program at RRCC and have recently started the STEM Scholars program to encourage and support a more diverse student population to persist in STEM. Offering a wide array of interdisciplinary science courses at an introductory level encourages students to follow their interests and become involved in active learning from the beginning of their undergraduate career.

As educators we know that no matter where our students go after they attend college, the issues of Energy, Environmental Stewardship, and Renewable Resources will face them. We realize these issues will affect how productive they can be on the job or at home. Therefore, we have made the commitment to teach these issues specifically in general education science and physics classes as well as across the curriculum. We developed many new courses that specifically address these issues and engage students.

STEM Scholars Program

The STEM Scholars Program (SSP) supports students who are either low-income and/or first-generation and who plan on transferring to a four-year college or university to complete a degree in engineering. STEM Scholars participate in undergraduate research experiences, leadership opportunities and more. SSP is supported by the National Science Foundation.

Increasing Access to STEM

Red Rocks is committed to providing students many pathways into STEM. The science department has developed new introductory, high-interest courses to attract a more diverse student population into the STEM disciplines. We recently added Geology of the National Parks, Science and Society, Natural Disasters to our regular course offerings.

Emphasis on Inquiry and Experiential Learning

Red Rocks is committed to teaching science using best practices across disciplines. Our courses emphasize the interdisciplinary nature of science and focus on effective teaching. STEM Lecture classes are taught using inquiry and project-based learning. Our small class size is ideal for these techniques.

RRCC also has a history of offering experiential learning classes. We have led interdisciplinary science trips to Hawaii, Peru, Costa Rica, Tanzania, and New Mexico, pairing geology, biology, astronomy, archeology and physics. These courses immerse the students in the learning experience and increase their awareness of their place in the earth system.



Project Based Learning: Passive Solar Home Construction and Testing

In Integrated Science (SCI 155), the design challenge is to build a model passive solar home that can warm up to a comfortable temperature and then retain that heat once out of the sun for a specified period of time. The students can incorporate multiple methods of passive heating. They have to provide their testing data and analysis. The teams present their projects in class and one section build a model solar neighborhood. Embedded in the project are lessons about renewable energy and solar technology.

Emphasis on Innovation, Research and Design

The IDEA Lab offers:

- Real world projects in partnership with business, industry and community organizations
- Workshop for students
- Mentoring for technical projects
- Collaboration space

Follow Us at: The IDEA Lab

<http://www.facebook.com/rrccidealab>

Summer Research Experience Opportunities

The STEM Scholars Program at Red Rocks Community College has developed a competitive Summer Internship Research Program for the current STEM Scholars. Visit our website: <http://www.rrcc.edu/stem/scholars>

Program Admission Requirements:

Enrolled in the Spring and Summer semesters

Minimum GPA of 2.7

Completed at least one STEM course

Demonstrated involvement in STEM at RRCC

- IDEA class
- Engineering or other STEM club
- IDEA lab
- NASA Space Grant
- STEM outreach

Program Completion Requirements:

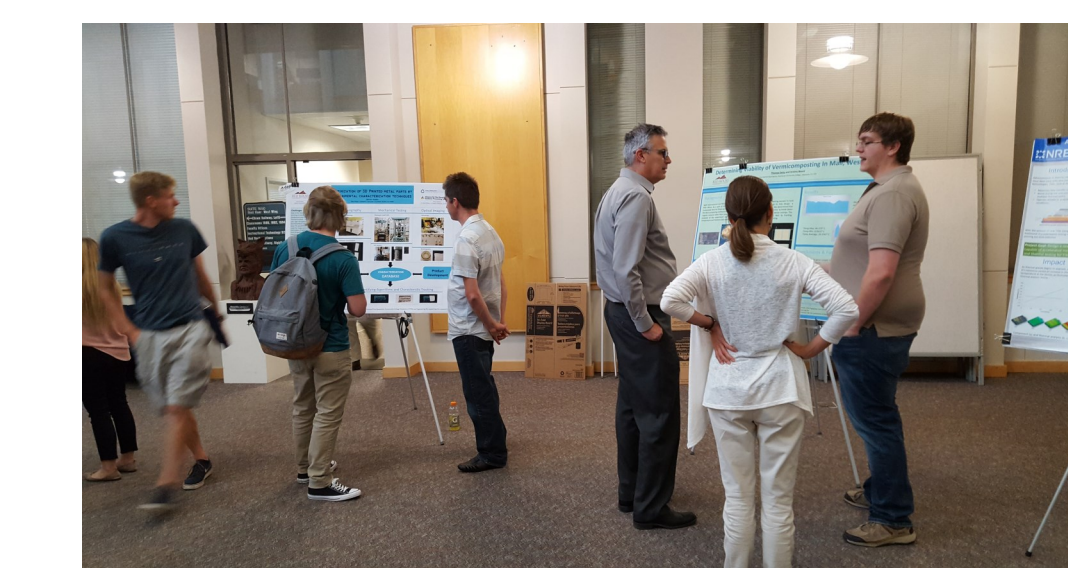
Complete 8 week, full time research commitment

Present the project in a professional setting

Produce a short video about their project

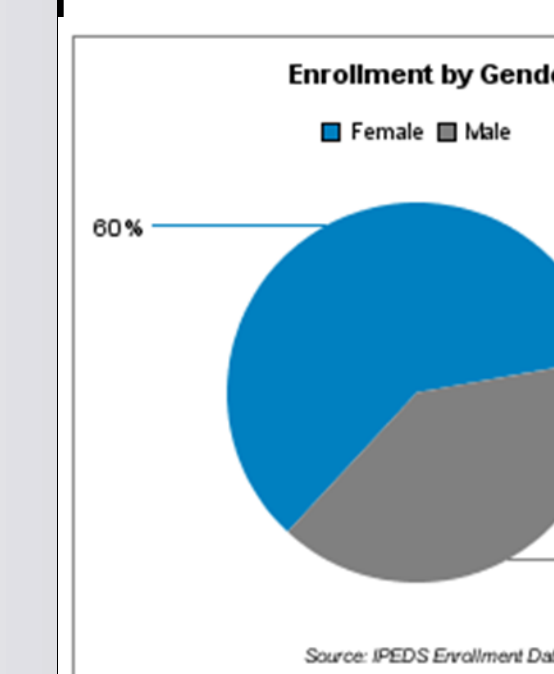
Produce a professional poster

LIFG students are selected to complete summer research projects at RRCC and our 4 year partners. Our 2016 interns worked on projects at Colorado School of Mines, NREL, CIRES and RRCC.

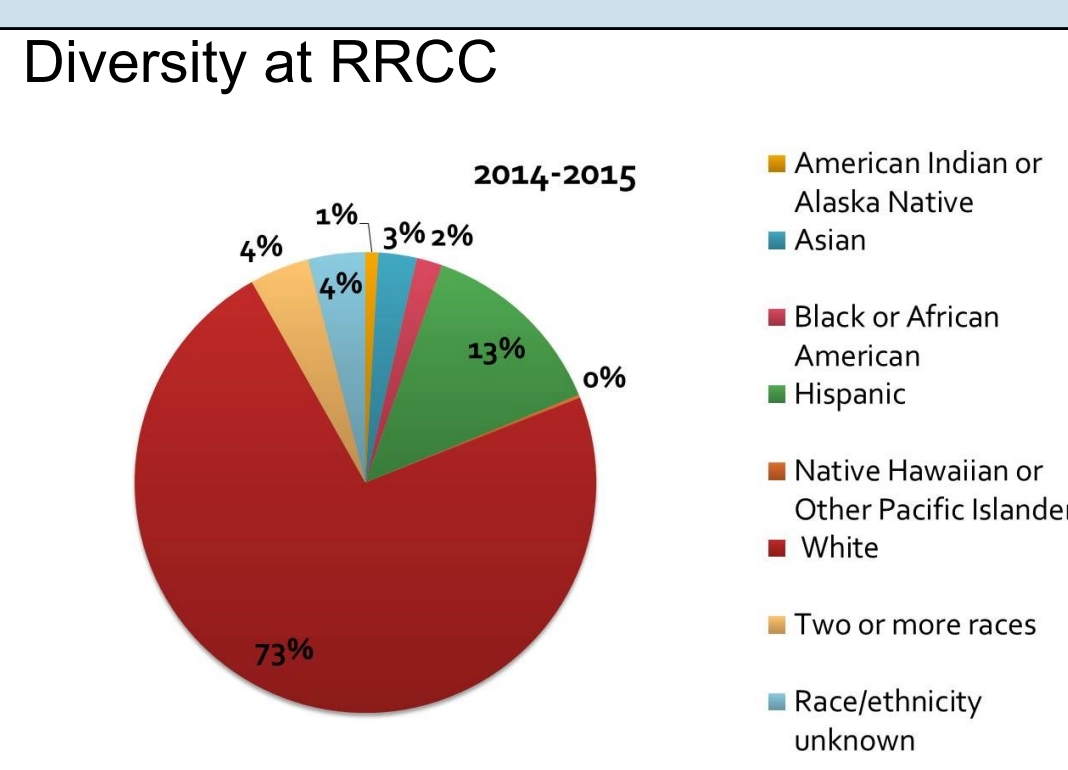
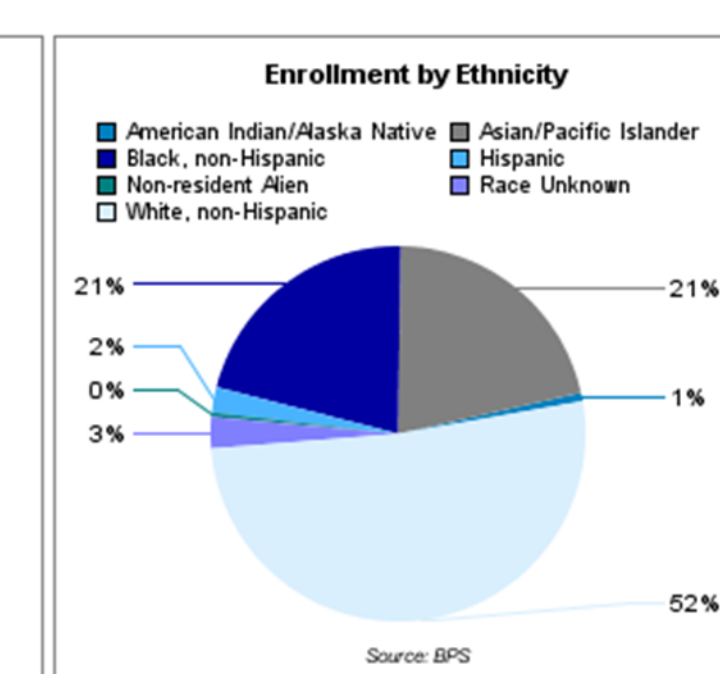


DIVERSITY TRENDS IN EDUCATION and STEM

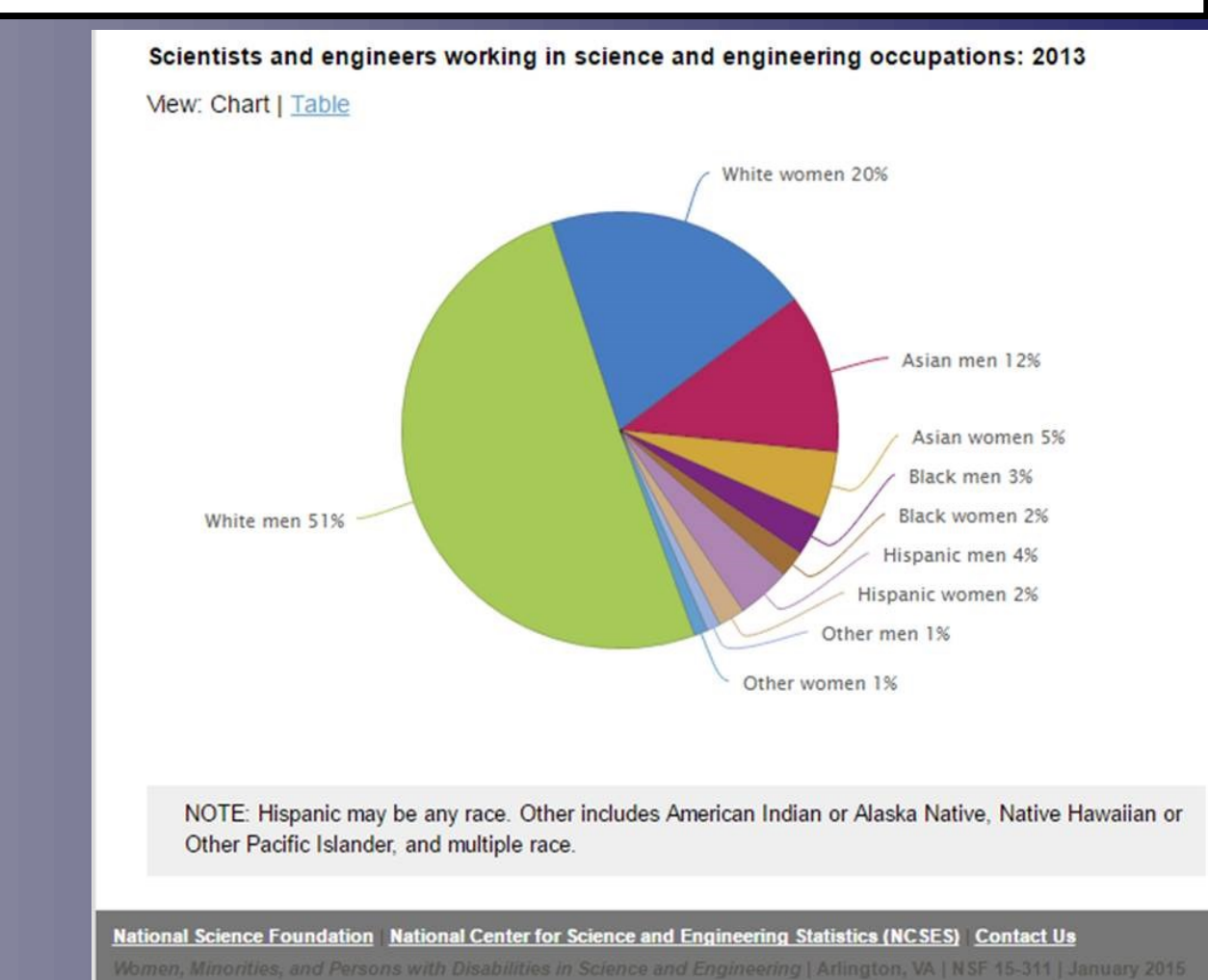
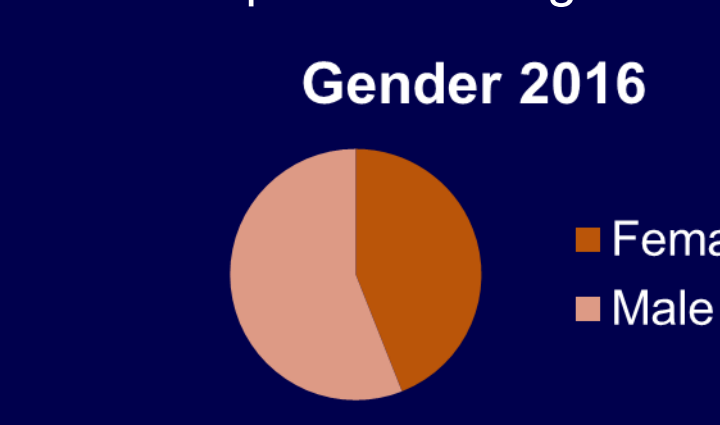
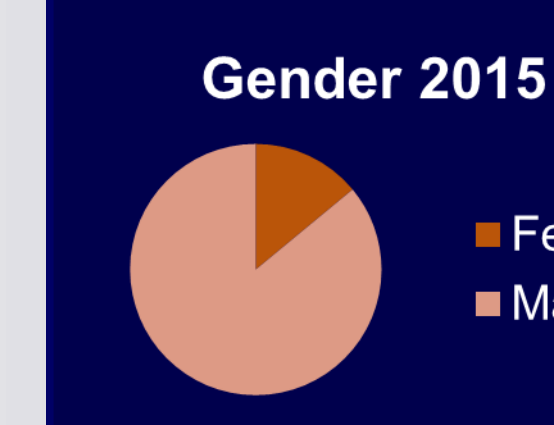
Community College Enrollment Nationally



Diversity at RRCC



Gender in STEM Scholars Research Experience Program



This initiative is supported by the NSF DUE #143-126 Engaging Low-Income/First-Generation Community College Students in STEM and Engineering. Red Rocks Community College is committed to diversity in its people and programs. The College is an equal opportunity educational institution which prohibits all forms of discrimination and harassment including those that violate federal and state law, or the State Board for Community Colleges and Occupational Education Board Policies 3-120 and/or 4-120. For information, contact: Executive Director of Human Resources, Title IX Administrator, Title VIII/Equal Opportunity Administrator, ADA/Section 504 Administrator, PO Box 11, 13300 West Sixth Avenue, Lakewood, CO 80228-1256. Telephone: 303.914.6298