College of Engineering and Ma hema ical Science

Pillar 1: Academics

Central to the mission and strategic goals of the University of Vermont is excellence in the academic experience to help prepare members of our community to be globally responsible and engaged citizens, advance knowledge, and build critical thinking and problem-solving skills.

1. What are the benefits, impacts, and/or learning outcomes of your initiatives and practices? How do these initiatives and practices promote inclusive excellence in your college/division?

More diverse teams have been shown to produce better results/products. This is especially true in technology, but unfortunately the tech industry is still dominated by white males. This is not only bad for women and persons of color, who are missing out on high-paying and satisfying job opportunities, but is also bad for the tech industry and the economy as a whole[1]. For example, although women's choices impact up to 85% of purchasing decisions, they make up only 15-25% of the technology workforce, even while over half a million jobs in computing went unfilled last year in the U.S. Actively working to recruit and retain women and students of color to our CEMS programs will thus have wide-ranging benefits to our students and our society.

CEMS has made substantial improvements in the number of females, students of color and international students. Since the fall 2013 the number of female students in CEMS has increased by 67%, the number of students of color has increased by 35% and the number of international students has increased by 34%.

Many of our initiatives are described as best-practices in more detail in response to question 2 below.

We have upgraded our facilities which are now providing fertile spaces for hands-on work and collaboration for our students, staff and faculty. This will help us create a more inclusive, supportive and welcoming environment for all students. As part of the summer 2017 remodel of Votey Hall a number of new spaces were created which have resulted in increased interactions between students and between students and faculty. For example, the new Design Studio (Votey 120) is occupied throughout the day with students working together on projects or classes. Also, Votey 308 is used by the Electrical and Biomedical Engineering faculty for office hours and ad hoc review sessions.

CEMS offers courses that promote diversity and inclusivity. In recent semesters, the College has increased the number of sections of these courses and has offered them more regularly, thus reaching more students. These courses include:

[1] https://www.theatlantic.com/technology/archive/2013/10/we-need-more-women-in-tech-the-data-prove-it/280964/

1) ENGR 010 (D1: Diversity in Math/Sci/Engr) addresses underrepresentation of women and people of color in STEM, ethical considerations, equal opportunity and Title IX;
2) ENGR 101(Engineering Communications) covers traditional and scientific writing forms and oral communication with the goal of improving students' overall communication skills. This course is particularly effective and advantageous for our international student population and other English Language Learners;

certain preparations before class (e.g. watch short on-line video lectures on new concepts prepared by the instructor, read sections from the text, etc.). In the next class, they are given the opportunity to first ask questions about the pre-class materials and are then given a short clicker quiz on this material, following by in-class team program design and development exercises on paper. The other class day each week they bring their lap-tops and do laboratory exercises using pair programming. This emphasis on pair programming and teamwork helps the students get to know each other and form study groups. Each week they then are to complete programming assignments as homework individually. Both sections are given the same exams, during common exam period.

Most of the females select the green section. In the spring of 2017, 79% of the females selected the green section where as 48% of the males selected the green section. The result was that the green section was 30% female whereas the gold section was only 10% female. The findings so far are that the green section environment is overall less-intimidating for both males and females and both tend to speak out more than we believe they would if mixed with the more confident students in the gold section. In general, the green section tends to be a much more talkative crew. As a whole, they tend to do the pre-

3. What goals does your college/division want to achieve within the next year? Within the next three years?

The college has had an aggressive goal of increasing the female representation of our student body. We have made substantial gains in this area over the last four years by increasing the percent of female students in CEMS from 18.6% to 23.6%, while at the same time increasing the percent of females in our incoming class from 17.5% to 25.8%. Over the next few year we hope to continue this trend with the goal of increasing the percent of females in our incoming class to 30% in three years.

CEMS implemented a practice that for faculty searches we invite three candidates to campus and the search committees are provided the opportunity to invite a fourth candidate if that individual is a diverse candidate. The goal is to increase the recruitment of minorities and underrepresented groups.

4. What strategies and resources (e.g., skills, expertise, financial) will your college/division use to meet your goals within a given component? What resources are needed?

CEMS has created a recruiting piece called Spotlight on Women in CEMS. This recruitment

We have also invested heavily in CEMS Student Services in recent years, increasing student support across the board. Since Dean Garcia's arrival in 2013, we've created four new positions in CEMS Student Services:

1) An Academic Advisor for International & Special Programs who provides academic advising and support to international students and CEMS students studying abroad.
2) An Academic Advisor for Recruitment & Student Services who works closely with Admissions to recruit talented first year and transfer students from diverse backgrounds.
3) A Career Readiness Program Coordinator who facilitates internships, co-ops and professional opportunities for CEMS students; teaches professional development courses that prepare students to work in diverse workplaces; and works closely with employers to develop more opportunities for CEMS students.
4) A Graduate Programs Coordinator whose responsibilities include the development of a diverse graduate student applicant pool and holistic support of our current graduate students: a diverse group of students from many different nations and ethnic, racial and religious backgrounds.

As an example in the Department of Computer Science we have implemented a number of

1.5 day event includes lots of free food and cash prizes and complements their formal curricula with industrial scale software engineering experience.

iv. Using BRAID funds, we sent 18 students to the Tapia Celebration of Diversity of Computing Conference in S'15, and 18, 24, and 22 students to the Grace Hopper Celebration of Women in Computing Conference in F'15, F'16, and F'17, respectively. These conference experiences are tremendously empowering for our students, who come back with a renewed sense of commitment to staying in the field of computing; it also helps to strengthen bonds between the students who travel together on these trips.

In Mathematics we host the Sonya Kovalevsky Day—We have hosted two SK days—it is now an annual tradition. Dr. Kovalevsky was the first major Russian female mathematician and a

and Vermont Technical College's Williston Campus) to create a framework for supporting STEM Students of Color in the area. Despite recent increases in diversity in the CEMS student body, our college still lacks the critical mass to sustain active chapters of national organizations – such as the American Indian Science and Engineering Society, the National Society of Blacks in Computing, or the Society of Hispanic Professional Engineers – that exist at larger institutions. Given the realities of our size and the persistent underrepresentation of people of color in STEM, collaboration with other institutions seems like a powerful way to create that critical mass. We hope that together we can build a vibrant, multi-institution, student-run organization to support STEM students of color in greater Burlington. CEMS Student Services is currently seeking a HESA practicum student for the spring 2018 semester to help launch this initiative.

The Assistant Dean for Student Services has reached out to the National Action Council for Minorities in Engineering (NACME) to determine if/how UVM and CEMS might get involved in the organization. We are currently awaiting a response.

Through a combination of College growth and faculty turnover, we expect to further increase and diversify our faculty. Our new recruitment policies that further encourage bringing diverse candidates to campus set the stage for helping us achieve this goal.

4. What strategies and resources (e.g., skills, expertise, financial) will your college/division use to meet your goals within a given component? What resources are needed?

Dedicated funds to support advertising in appropriate venues to attract diverse faculty candidates.

organization they hope to help create. This will help them determine if and how to move forward with the organization.

Other appropriate statistical data measures.

Pillar 3: Environment

The University of Vermont strives to create physical, virtual, and educational living, learning and work environments that are inclusive and accessible to all in our community.

1. What are the benefits, impacts, and/or learning outcomes of your initiatives and practices? How do these initiatives and practices promote inclusive excellence in your college/division?

Increased collegiality amid diversity of viewpoints.

Returning Engineering to Departments has resulted in increased engagement by faculty and new initiatives. For example, the BS Electrical Engineering degree program is being revised to increase student choice in coursework. This may result in more EE students pursuing non

the next three years?

With the opening of the new STEM building our faculty, staff, and students will have a more focused home base.

4. What strategies and resources (e.g., skills, expertise, financial) will your college/division use to meet your goals within a given component? What resources are needed?

The new STEM complex will provide the necessary base for a much improved faculty/staff/student environment. Once that is in place, we will re-evaluate its' impact and develop new initiatives to continue to enhance the diversity climate in the college.

Once Innovation is open every department will have a home office area and for the first time our college faculty in each of our departments will be co-located. We expect this to have a huge positive impact on the morale and climate in the college.

Our Academic Advisor for International & Special Programs is seeing an increase in CEMS students interested in studying abroad. He has begun to work with the Office of International Education to offer group information sessions to educate students on their options and responsibilities. In the coming year, he hopes to work more closely with OIE to identify programs through which more students can access study abroad without significant financial burden, and without getting out of sequence in their highly structured curricula.

4. What strategies and resources (e.g., skills, expertise, financial) will your college/division use to meet your goals within a given component? What resources are needed?

These strategies and resource needs will evolve as we move into the Innovation building.
As our Academic Advisor for International & Special Programs continues to work with increased numbers of international students and domestic students studying abroad, we may need to decrease his first year advising load. This may have resource implications.

5. What metrics will your college/division use to gauge it