Addressing Inequality in Education

Dr Suzanna M. Rose

Scientia

Three generations of STEM women at FIU (L-to-R): (1) The Trailblazer: Dr Yesim Darici, Professor of Physics and FIU ADVANCE Co-PI. In the mid-1980s, she was the first woman physics professor to be hired in the State of Florida. (2) The Changemaker: Dr Zahra Hazari, Associate Professor, Physics Education. She and colleagues were awarded a $3 million NSF grant to partner with 10,000 high school physics teachers who are willing to recruit at least one female student each to pursue a physics degree in college. (3) The Future: Natasha Blanch. The first FIU student to complete the FIUteach program when she graduated in 2017 with a bachelor's degree in mathematics and a teaching certification.

ADDRESSING INEQUALITY IN EDUCATION

The underrepresentation of women and minority groups in science, technology, engineering, and mathematics (STEM) related fields of employment and study is a widespread and serious issue in academia. **Dr Suzanna Rose** of Florida International University (FIU) is breaking down the barriers that women and minorities face in taking up faculty positions within higher education institutions. Her mission is to achieve, sustain and advocate for faculty diversity at FIU.

The Barriers to Equity and Diversity

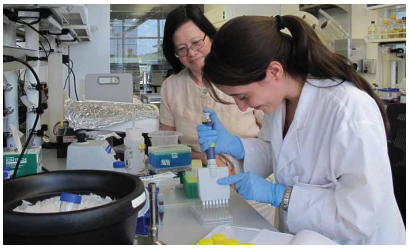
Addressing the underrepresentation of women and minority groups in science, technology, engineering, and mathematics (STEM) is high on the global agenda. STEM related fields of study and employment have long been dominated by specific sub-sections of the global population. In the United States, the representation of women, people with disabilities, and members of certain racial and ethnic groups in STEM, as a percentage of the total, does not begin to match the representation of these groups in the general population. Furthermore, instances of gender and racial harassment, discrimination, and inequity in STEM-related fields of employment and study continue to come to light.

Indeed, there are many obstacles to women and minority groups reaching out for greater opportunity and advancement, especially in higher education institutions, and no less so than in higher faculty positions. It is vital that this be addressed by way of systemic change and improved practice, policy, and education. Dr Suzanna Rose and her colleagues at Florida International University's Office to Advance Women, Equity & Diversity (AWED), in collaboration with other researchers and stakeholders, are very much committed to this cause.

Dr Rose says that: 'It's simple. A diversity of perspectives enriches the sciences, mathematics and engineering, and it makes these professionals more responsive to global needs. At a time when engineering and science are increasingly important to our economy and competitiveness, we need a diverse pool of science and engineering faculty – including women and minorities – to fuel our future.'

Similarly, Dr Yesim Darici, Co-Principal Investigator (Co-PI), Professor of Physics, Director of the Center for Women's and Gender Studies and Assistant Provost for STEM, noted: 'In this day and age, we need to ensure women's voices are heard. There are many obstacles women in academia and industry face throughout their careers and now is the time for everybody to be aware of them. As such, it's important to educate both international faculty and US faculty on issues of diversity and equity.'

Their approach to tackling the issue is multi-faceted. The team describes how, 'AWED develops and manages a wide range of programs to promote faculty equity, diversity, and inclusion, including workshops and training to improve faculty hiring and promotion processes, faculty mentoring, and interdisciplinary networking.' Other activities include strategic planning for salary equity, policy analysis and development, and other initiatives that support faculty diversity. Of particular note is their program known as 'FIU ADVANCE.' FIU ADVANCE aims to increase, retain, and promote more women and underrepresented minorities throughout their institution, especially in higher faculty positions, and has initiated two new directions for achieving these goals. First, it addresses the gender, cultural, and ethnic biases implicit in the field, and second, it focuses on promoting behavioural change as well as paradigm shifts in attitude through its Bystander Leadership Program.



The National Institutes of Health awarded Biomolecular Sciences Institute Director and Chemistry Professor, Yuk-Ching Tse-Dinh (left) and colleagues, nearly $2 million to study how targeting bacterial DNA can be used to kill antibiotic-resistant superbugs.

Sheryl Weir-Latty and Cynthia LeRouge, College of Business, enjoying the Super Networking exercise at the 8th Annual FIU Women Faculty Leadership Institute.

Why FIU ADVANCE Was Needed

Dr Rose and her colleagues established the FIU ADVANCE project to address the changes that were needed at FIU. Given the university's excellent record of incorporating diversity, however, the notion that FIU needed

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FIU physicist and Director of the Center for Imaging Sciences, Angie Laird, leading a team of researchers embarking on a new phase of the National Science Foundation’s BRAIN Initiative, titled the Automated Text Harvesting and Exploration of Neuroimaging Annotations (ATHENA) Resource.

to improve its practices may have at first seemed unnecessary. Indeed, in 2015, FIU had 54,000 students, of which 61 percent were Hispanic and 20 percent were from other underrepresented groups. FIU was number one in the nation in awarding bachelor’s and master’s degrees to Hispanic students and second in terms of granting STEM degrees. Furthermore, of the 10,170 undergraduates in STEM departments in Fall 2015, 42 percent were women and 32 percent were women of colour. So why was FIU ADVANCE needed?

The team had identified a problem. The diversity in the student body was not reflected at the faculty level. And of course, this could have a long-term negative impact on student success, their aspirations for faculty positions, and the attitudes of the community. Dr Rose and her colleagues have highlighted some startling statistics in relation to this issue. For example, after an initial five-year effort from 2011 to 2016 to increase the number of women in tenure-line, research faculty positions in STEM, the percentage of women had increased from 12% to 18% – well short of the national average of 31% – with only four of the 255 combined STEM faculty members being women of colour. This was a positive but exceedingly slow change.

What was even more notable was the attitudes that had contributed to this poor representation of women and minority groups in faculty positions. Women reported feeling less respected by the faculty in their departments, that they were taken less seriously in departmental meetings, and were more dissatisfied with how tenure and promotion was managed in their department. This situation was contributed to by low morale and ultimately the low number of women and minority groups in higher faculty positions.

Furthermore, past research conducted by Dr Rose, Dr Darici, and their colleagues about STEM faculty and intersectionality and the interconnections of gender, race, class, and cultural identity had suggested unique barriers to recruiting minority and underrepresented women. FIU is a multicultural institution, but that means faculty members from around the world bring with them culturally-based gender stereotypes about women from their own culture and different gender-by-cultural stereotypes about women from other cultures. As a result, Dr Rose and her team felt that it was time to intervene and be a force for change and so FIU ADVANCE was initiated.

The Central Goals of FIU ADVANCE

FIU ADVANCE was preceded by a National Science Foundation (NSF) program and funding initiative. The NSF ADVANCE program was established to, ‘increase the representation and advancement of women in academic science and engineering careers, thereby contributing to the development of a more diverse science and engineering workforce.’ Their approach focuses on the aspects of an institution’s structure, processes, and culture that may be contributing to an inherent bias towards women and minority groups. The NSF has invested over $270M to support ADVANCE projects at more than 100 institutions of higher education and STEM-related not-for-profit organisations in 41 states, the District of Columbia, and Puerto Rico, including at FIU.

FIU’s ADVANCE program focuses on four central objectives. Firstly, to attract, recruit, retain, and promote more women STEM faculty, particularly underrepresented minority women, to better reflect the demographics of the FIU student body. Secondly, to educate faculty about gender-by-ethnic biases and microclimates that affect the advancement of women. Thirdly, to move faculty from insight to action to promote gender equity by developing and implementing an evidence-based intervention program and a university-wide diversity, inclusion, and excellence plan. Finally, they aim to develop the ADVANCE Florida Network, a joint steering committee and seminar series for women STEM faculty and postdoctoral fellows comprised of the Florida metropolitan research universities of FIU, University of Central Florida, and University of South Florida.

A Thorough and Systematic Approach

The theoretical basis for FIU ADVANCE is being established by ongoing and relevant social studies. These studies began in year one of the program, in which Dr Rose and

FIU women faculty with Kathrin Zippel, keynote speaker, sociologist, Northeastern University, and author of Global Women in Science (2017).

her team explored how a multi-ethnic cultural climate within FIU STEM departments could affect the advancement of women. In addition, in research that spans from the second to the fifth year of the program, the team will examine the longitudinal effectiveness of their Bystander Leadership Program in improving diversity related knowledge, beliefs, attitudes, and behaviours among professors. This research will be a source of feedback and will continue to inform the implementation and improvement of FIU ADVANCE.

The project's central goals are to be achieved by several detailed programs and initiatives. These initiatives focus on changes to recruitment and advancement practices, providing high quality support and mentoring, reviewing current departmental policies and procedures, networking with other experts and organisations, communicating relevant information and successes to the public, and carrying out effective and meaningful evaluation and reflection.

Some of FIU ADVANCE's Programs and Strategies

The Bystander Leadership Program is one facet of FIU ADVANCE. It aims to address discrimination by not only educating and raising awareness about issues such as bias, power and privilege, intersectionality, and oppression, but by providing a framework for action. The program does not simply dispel information to attendees but uses case scenarios and interactive theatre to actively engage faculty in skills training, so that they can practice effective intervention techniques that address instances of bias.

The subsequent program interventions help to create a social system that supports and institutionalises positive change in several key areas – including demonstrating greater appreciation for diversity and a reduction in prejudicial attitudes, greater knowledge of and confidence in using intervention and diversity skills and strategies, and an increase in diversity-affirming behaviours.

Another central initiative of FIU ADVANCE is the creation of diversity and inclusion action plans by all colleges and departments at the university. These plans, currently under development, aim to increase the representation of faculty from historically underrepresented groups and to ensure an equitable and supportive institutional climate for all faculty, students, and staff.

FIU ADVANCE's programs and strategies highlight the project's thorough and systematic approach that is key to its current and projected success. Targeting diversity in recruitment, the STRIDE program purposes to educate faculty on how to create a more diverse pool of candidates when hiring for STEM-related positions and the Women in STEM program aims to recruit more women by way of targeted outreach, recruitment, and support practices. The ADVANCE Florida Network follows on from that to provide mentoring, networking, collaboration, and professional opportunities to tenured and tenure-track STEM women faculty and STEM women postdoctoral fellows among the three urban public research universities in Florida.

FIU ADVANCE Already Making a Difference

Evaluation and measurement of the FIU ADVANCE project's success is systematic, thorough, and formative. Evaluation consists of both internal and external assessment. For example, Dr Mariko Chang – a sociologist who has served as an external evaluator for many ADVANCE grants and on ADVANCE review panels and site visit teams – serves as FIU ADVANCE's external evaluator. Dr Barbara King serves as internal evaluator and provides in-house assessment of the success and efficacy of activities throughout the project.

The project's assessment criteria are aligned with their respective objectives and consist of both quantitative and qualitative parameters. For example, each objective has an associated list of evaluation questions and numerical benchmarks or indicators, as well as further data evaluation procedures such as surveys, interviews, reviews and auxiliary data collection. While in the fifth year of FIU ADVANCE it will be subject to a full review and summative assessment, initial reports and reviews indicate that the project is already having a positive impact.

For example, the STRIDE workshop series has been successfully conducted and, according to a 2017 progress report, has been well received by attendees. 82 percent of participants expressed that the workshops were effective in helping them to understand the benefits of having a diverse faculty, the role of stereotypes in career advancement, and how to find solutions to these issues.

The ADVANCE Florida Network (AFN) initiative has also yielded positive results. In Fall 2016, a steering committee for the initiative was established, including Dr Rose and colleagues, and they developed guidelines for what's known as the 'ADVANCE Florida Network Women in STEM scholars' strategy. This strategy aims to highlight and support the professional work of women in STEM-related faculties by funding their travel to one of the three urban public research universities that comprise the Florida Consortium of Metropolitan Research Universities in order to foster research collaborations and networks.

Twenty-two applicants have been awarded funding since 2016, with participants reporting numerous benefits after having engaged in exchange programs and professional development. For example, during an AFN visit, faculty at the host institution told one participant about the McKnight Junior Faculty Fellowship, which the AFN participant subsequently applied for and received. The award includes a one-year sabbatical and $15,000 to the institution. Similarly, another participant was encouraged during her visit to apply for an NSF CAREER award, which she was recently awarded. The award is for $760,607 over five years.

Clearly, FIU ADVANCE is already having a significant, positive impact. It will only continue to do so as it moves towards completion. There are many barriers to women and minority groups reaching out for faculty positions in higher education institutions and it is vital that this is addressed by way of systemic change and improved practice, policy, and education. FIU ADVANCE is certainly already achieving that – removing the obstacles to advancement for many women and minority groups.

Meet the researcher

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Suzanna Rose, PhD, is founding Associate Provost for the Office to Advance Women, Equity & Diversity and Professor of Psychology and Women's and Gender Studies at Florida International University. Dr Rose is also the lead investigator for FIU's NSF ADVANCE Institutional Transformation grant that is aimed at improving the recruitment, promotion and retention of women and underrepresented minority faculty at FIU. A key research project associated with the grant includes the development of an evidence-based Bystander Leadership Program to reduce gender and race bias in faculty hiring, promotion, and retention. Her previous administrative roles included serving at FIU within the College of Arts, Sciences & Education as Executive Director of the School of Integrated Science and Humanity, Senior Associate Dean for the Sciences, Chair of Psychology, and Director of the Center for Women's and Gender Studies. Prior to that she served as Women's Studies Director and Professor of Psychology at the University of Missouri-St. Louis. Dr Rose has published extensively on issues related to gender, race, and sexual orientation, including professional networks, career development, leadership, friendship, and personal relationships. She has consulted with many universities both nationally and internationally concerning strategies for recruiting and retaining women faculty in science and engineering.

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FUNDING

National Science Foundation (NSF)

FIU