

Nomination of Talat Rahman for AVS Recognition for Excellence in Mentorship

1. Nominator's Name, Affiliation, E-mail.

Shirley Chiang

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2. Nominee's Name, Affiliation, E-mail, website, high-resolution photograph of the nominee in a science/engineering setting.

Talat Shahnaz Rahman

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Please also see two high resolution photos of Prof. Rahman, which are attached separately.

3. Short paragraph describing the nominee's training or mentoring accomplishments, and their effective guidance to a significant number of persons who might not otherwise have considered or had access to opportunities in science, engineering and technology (including persons with disabilities, women and underrepresented minorities).

Professor Rahman has an extraordinary record in mentoring, enhancing diversity, and scholarship. She has already mentored 10 women Ph.D. recipients. She currently mentors 2 woman and 2 underrepresented minority (URM) graduate students in her research group. She mentored 4 undergraduate women who received Ph.D.'s from other institutions. Her tenure as department chair (2006-2015) led to a doubling in size of the graduate program, with the percentage of female graduate students increasing from 18% to 28%, reaching 32% in 2019. She was instrumental in establishing and continues to lead the American Physical Society Bridge Program at the University of Central Florida, which recruits, mentors, and prepares URM students for admission to Physics Ph.D. This APS-UCF Bridge Program has helped increase the URM graduate student cohort at UCF from 5% in 2014 to 22% in 2021. In her capacity as the PI of the APS-UCF Bridge Program she has served as mentor to 29 URM graduate students, working tirelessly to help them find financial support, assisting them to

present and publish their work, providing psychological support when they question their abilities, and giving career guidance. Three of these students have now graduated with physics PhDs and moved onto professional careers in physics – one is at NIST, one a postdoc at University of Utah, and one has joined industry. As UCF chair of Physics, she was instrumental in recruiting and mentoring 14 junior faculty members (tenure track assistant professors). Ten of these junior faculty members went onto receive either NSF or DOE or AFOSR CAREER awards and all 14 continue to be productive members of the department. As the founding lead of the newly established faculty cluster in Renewable Energy and Chemical Transformations (REACT), Prof. Rahman is also engaged in mentoring 5 junior faculty members who were recruited to join this UCF initiative. Earlier in her career as the first female physics faculty member at Kansas State University, she helped create a female friendly environment, leading to increased numbers of female graduate students and faculty in the period 1984-2006. She also served formally as a faculty mentor at Kansas State University to several female faculty members, as part of a Sloan Foundation Grant (1993-1995). These faculty members are now all successful professionals. At UCF, she has made systemic changes in the department culture to value inclusivity and diversity, holistic admission policies, evidence-based instructional reforms and to foster the success of women and URM students. Through her mentoring, Professor Rahman has demonstrated her dedication to developing the potential of URM students, making her a truly deserving candidate for the 2022 AVS Mentor Award.

4. Short biography of the nominee.

Talat Rahman is a UCF Trustee Chair Professor and a Pegasus Professor of Physics at University of Central Florida (UCF). She received her BS in Physics from University of Karachi, MS from Islamabad (now Quaid-e-Azam) University, and PhD in Physics from University of Rochester. After serving as a postdoctoral researcher and assistant research physicist at University of California, Irvine, she went through the professorial ranks at Kansas State University (1983-2006). She was appointed University Distinguished Professor at Kansas State University in 2001. She joined the University of Central Florida in 2006 as a Distinguished Professor of Physics and served as the chair of Physics (2006-2015). She was awarded the title of UCF Pegasus Professor in 2012. At UCF, she has led the effort to transform undergraduate instructions by infusing evidence-based active-learning strategies. She was instrumental in establishing a faculty cluster in Renewable Energy and Chemical Transformations (REACT) at UCF in 2015 which she continues to lead. Her research interests are in computational design of functional nanomaterials through the development of a microscopic understanding of their physical and chemical properties. A related interest is in multiscale modeling of chemical reactions and thin film growth processes. While density functional theory (DFT) based methods are the standard workhorse, her group also develops techniques that go beyond DFT and are suitable for examining phenomena that are far from equilibrium, as well as those displaying interesting features at femto and atto second time scales (ultrafast processes) particularly in systems in which electron correlations play a significant role. Her research continues to be funded through grants from the US Department of Energy and the National Science Foundation. She has held visiting appointments at institutions in Germany, Finland, Spain, Pakistan, Switzerland and Italy which have helped her collaborate with scientists, particularly experimentalists on whom she relies for validation of her theoretical predictions.

She is a fellow of the American Association for the Advancement of Science, American Physical Society, Royal Society of Chemistry (UK) and the American Vacuum Society. She is the recipient of several professional awards including the Research Incentive and Excellence Awards from UCF, Visiting Miller Professorship from University of California-Berkeley, Mercator Fellowship from Ruhr University Bochum, Alexander von Humboldt Research Prize, Higuchi Research Award from the University of Kansas, and the Distinguished Graduate Faculty Award, Kansas State University. She has published over 315 articles, mentored three dozen PhD students (30% female), and engaged in promoting scientific collaborations in several countries. She continues to help promote research initiatives in Pakistan, particularly through organization of regular workshops. She has been involved in efforts to promote the participation of women and minorities, particularly through the Bridge Program of American Physical Society, one of whose sites she helped establish at UCF with the goal of increasing the number of physics PhDs from underrepresented minority (URM) groups. This program has enabled the increase of URM physics graduate students from 4% in 2014 to 22 % in 2021. She is committed to bringing pedagogical reforms in the teaching of physics and in the training of students for careers in teaching whose seeds were sown through her leadership in APS PhysTEC program at UCF, which aims to increase the number of high school physics teachers who are trained in physics. She served as the chair of the Diversity and Inclusion sub-Committee of the American Vacuum Society and facilitated the formation of the Diversity, Equity, and Inclusion Committee in which she continues to serve. She continues to serve in the executive editorial board of the Journal of Physics Condensed Matter and is the founding section editor for Physics of Chemical Processes. She is also the chair-elect of the APS Division of Computational Physics (DCOMP).

5. Brief letter detailing the said mentorship from someone who has directly benefitted from the nominee's mentoring. The nominee does not need to be an AVS member.

See attached PDF file for letter from Professor Dr. Marisol Alcantara Ortigoza.