

Summary

UNIVERSITY DISTINGUISHED PROFESSOR

April 3, 2017

The University Distinguished Professorship (UDP) is Virginia Tech's pre-eminent faculty rank bestowed by the Board of Visitors upon members of the university faculty whose scholarly attainments have attracted national and/or international recognition. An extensive nomination and vetting process involves department and college honorifics committees, a specially convened university committee, the executive vice president and provost, and the president.

Following the established protocol, and consistent with the recommendations received from the university committee and the executive vice president and provost, President Timothy Sands recommends the appointment of Dr. Dushan Boroyevich and Dr. Marc Edwards as University Distinguished Professors. Both faculty members are truly outstanding scholars, making exceptional contributions in their fields to the betterment of people and communities around the globe. Their achievements and contributions have garnered national and international recognition. The appointment to University Distinguished Professor also carries with it an annual operating account for use by each professor.

UNIVERSITY DISTINGUISHED PROFESSOR

Dr. Dushan Boroyevich is currently the American Electric Power Professor in the Bradley Department of Electrical and Computer Engineering (ECE) in the College of Engineering. He also serves as the co-director of the Center for Power Electronics Systems (CPES) at Virginia Tech.

Appointed to the faculty at Virginia Tech in 1990, Dr. Boroyevich is nationally and internationally recognized as a foremost leader in the field of power electronics, making exceptional contributions through research, teaching, and technology transfer to industrial applications and partnerships. The technologies he has researched and developed over the past several decades are being used widely in many industrial products and have been further expanded by numerous other researchers for new developments. Specifically, his innovative techniques have found their way into electric power designs for data centers and residential-scale power grids. By all accounts he is a world leader in this area, his work having been a dominant influence at national labs and in leading companies on advanced electrical energy systems. The strong technical alliances that he has developed over more than 20 years have resulted in sustained industrial contributions of over \$2M annually that support the students and researchers dedicated to breakthroughs in power electronics.

In the teaching domain, Dr. Boroyevich has pioneered lecture and lab courses that support electrical and computer engineering and provide greater breadth and industrial relevance to his department's electronics course offerings. In his time at Virginia Tech, he has supervised 40 Ph.D. and 42 master's students to completion, and is currently advising 11 Ph.D. and three master's students. This record of graduate student supervision can be matched by only a few professors in this field. He receives very high praise from current and prior students for his skills in teaching and graduate student mentorship, which are also recognized both internally externally by peers and colleagues.

Dr. Boroyevich has published over 60 invited papers and presentations, 136 journal articles, and nearly 450 conference proceedings, and his body of work has been cited over 18,500 times as measured by Google Scholar. Further, the leadership that he has provided to the power electronics community at large, including through service as president of the Institute of Electrical and Electronics Engineers (IEEE) Power Electronics Society, serving as an instructor at numerous short courses within industry, and his broad participation as an invited lecturer and panelist at dozens of technical conferences is truly outstanding.

In addition to garnering recognition from researchers and industrial partners for advancing the field of power electronics, Dr. Boroyevich's work has been recognized with numerous awards. In 2014, he became a member of the prestigious National Academy of Engineering for advancements in control, modeling, and design of electronic power conversion for electric energy and transportation. He became an IEEE Fellow in 2006 for advancement of control, modeling, and design of switching power converters. He has received numerous awards and honors from professional societies, including the IEEE

Power Electronics Society (PES) Harry A. Owen Distinguished Service Award in 2016, the IEEE William E. Newell Power Electronics Technical Field Award in 2007, and the *Transactions* Prize Paper Award of the IEEE PES in 2003. Especially noteworthy is that in addition to receiving technical awards from the IEEE, Dr. Boroyevich received the most important service award from his professional society. Dr. Boroyevich is clearly recognized as a prominent researcher and leader in his field.

Through all facets of his work, including teaching, research, and service, Dr. Boroyevich demonstrates that he is a high impact scholar, an excellent teacher, an outstanding mentor of graduate students, a dynamic force in obtaining external funding, a model leader in growing a university center, and a leader in his discipline and profession. He has made outstanding academic contributions, which have resulted in practical contributions that have shaped the industry related to his work.

RECOMMENDATION:

That Dr. Dushan Boroyevich be appointed University Distinguished Professor effective April 10, 2017.

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UNIVERSITY DISTINGUISHED PROFESSOR

Dr. Marc Edwards is currently the Charles P. Lunsford Professor in the Charles E. Via, Jr. Department of Civil and Environmental Engineering in the College of Engineering.

Appointed to the faculty at Virginia Tech in 1997, Dr. Edwards is nationally and internationally recognized as a foremost leader advancing research and knowledge, as well as practice and policy in areas related to water safety and quality. The depth and breadth of his contributions across Virginia Tech's multiple missions of teaching and advising, research and scholarship, service and outreach are truly remarkable. Since his arrival at Virginia Tech, Dr. Edwards has contributed significantly to the university's growth in research and reputation (e.g., from 16th to 7th in the US News ranking of graduate Environmental Engineering programs), and his work has had a transformative impact on the day-to-day lives of people around the world.

Throughout his academic career, Dr. Edwards has consistently prioritized teaching and mentoring. In addition to teaching required undergraduate classes, including large-enrollment, freshman, engineering chemistry classes, he developed an upper-level class called *Engineering Ethics and the Public*. Through a unique "aspirational ethics" approach, this course has been credited with providing the ethical foundation for several of the graduate and undergraduate students who went on to form the now widely known and highly impactful Flint Water Study Team. His commitments to high ethical standards and expectations for work of superior quality and excellence are common threads through Dr. Edwards' research and contributions.

Dr. Edwards is recognized for outstanding contributions to undergraduate education and advising, as evidenced by numerous awards received from the American Water Works Association, the University Council on Water Research, and the Association of Environmental Engineering and Science Professors. Equally committed to our graduate instruction and mentoring mission, he was recognized in 2012 with the Virginia Tech Alumni Award for Excellence in Graduate Advising. Additionally, the range of honors garnered by his advisees speaks volumes about his mentorship and the inspiration he provides to students. In his time at Virginia Tech, he has supervised over 50 master's and Ph.D. students.

Dr. Edwards is widely recognized as an exceptional scholar, committed to the highest standards of quality and ethics, focusing on topics that are visionary and creative, and grounded in the reality of serving society's greatest needs. He has authored/co-authored 185 peer-reviewed journal articles and given several hundred technical presentations. His research has tremendous societal impact as evidenced by the fact that his patented water treatment technologies have led to derivatives that are in use today at treatment plants all over the world. His discoveries and approaches have impacted water treatment, builder and consumer water delivery issues, and water safety. Not only has he advanced knowledge and practice in areas of water safety, but his work has influenced policy and legal oversight of water treatment and delivery systems to the betterment of human health.

Dr. Edwards' research and scholarly contributions have been recognized with numerous awards from organizations such as the American Waterworks Association and the Water Pollution Control Federation. He received a Presidential Faculty Fellowship from the White House, the Walter Huber Research Prize from the American Society of Civil Engineers, and was the first environmental engineer to be recognized with a MacArthur Foundation "Genius" Grant. Following the water crisis in Flint, Michigan, the awards Dr. Edwards continues to receive are too numerous to count. A few examples include: The ACLU Water is Life Award, The Greater Flint Humanitarian Award, The National Academy of Engineering Ethics Education Exemplar, and the American Society for Public Administration Public Integrity Award.

Beyond the more usual measures of scholarly academic performance and contributions, Dr. Edwards shows a tireless commitment to communicating important science and health issues to the public. Working closely and continuously with the media, he translates his work in ways that clearly demonstrate issues and challenges related to water quality and delivery, and he has become a role model for transparency, ethics, and accountability for results. Water quality is one of the grand engineering challenges facing our nation and our world, solving these water-related problems is key to the future development of humanity.

In service of all of the missions of the university, Dr. Edwards has made exceptional contributions. He is recognized as an outstanding scientist, advocate, and hero for public health and environmental engineering. He is regarded as a visionary, an intellectual, and an engaged scientist, whose work educates scientists, governments, and the world community about the critical need to address environmental contaminants and their effects on human health.

RECOMMENDATION:

That Dr. Marc Edwards be appointed University Distinguished Professor effective April 10, 2017.

April 3, 2017