

SUMMARY

University Distinguished Professor

June 6, 2023

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. Incumbents carry the rank of University Distinguished Professor until resignation or retirement from the university, subject to the usual standard of continuous high performance. The rank is conferred only by the university Board of Visitors and is altered by that body alone, on the recommendation of the president. Each academic year the president and provost determine if there will be one or more appointments to the rank of University Distinguished Professor and, if appropriate, issue a call to the academic deans for nominations. There is no quota by college, school, or department.

Following the established protocol and consistent with the recommendations received from a university committee and the executive vice provost, President Sands recommends the appointment of Drs. Stefan Duma and Linsey Marr as University Distinguished Professors. Both faculty members are genuinely 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. Stefan Duma is currently the Harry C. Wyatt Professor of Engineering in the Department of Biomedical Engineering and Mechanics (BEAM) in the College of Engineering, and serves as Director of the Institute for Critical Technology and Applied Science (ICTAS) at Virginia Tech.

Appointed to Virginia Tech faculty in 2000, the breadth and impact of Dr. Duma's scholarship has established him as an exceptional faculty member in the College of Engineering. His research and leadership have fundamentally changed the study of injury biomechanics, and he has distinguished the university and elevated brand awareness in a way few researchers can match.

Dr. Duma is an outstanding instructor who has continued to teach despite his heavy administrative load. His Interdisciplinary Concussion Perspectives course is taken each year by more than 1500 students from every college. He helped establish the Adaptive Brain and Behavior minor, now the second most popular of the 30 Pathways minors. He has built his program around teaching graduate students about research and scholarship by letting them lead the research efforts including interaction with sponsors, giving presentations, and attending national and international conferences. In addition, he consistently writes papers in cooperation with students. Dr. Duma has supervised 27 M.S. students and eight Ph.D. students and served on over 50 student committees led by other faculty members.

Dr. Duma's distinguished career has been marked by seminal research that fundamentally transformed crucial and often neglected areas of practice. His groundbreaking data and research methods have altered the study of injury biomechanics, enabled subsequent breakthroughs by other researchers, and, by informing the development of better equipment and safer practices, prevented an untold number of injuries. He was the first researcher to systematically study injury risk to pregnant automobile occupants; his papers and book on this topic are still among the few sources of reliable data on the leading causes of fetal mortality in the United States. His landmark research on female upper extremity and eye and facial injuries led directly to improved designs for airbags and other vehicle safety systems. He also revolutionized the study of head injuries in sports when he worked with Virginia Tech's football team to install helmet sensors in 2003 – the first time this had been done for a collegiate football team. The resulting data on hundreds of thousands of impacts provided unprecedented insight into head impact exposure in collegiate football and formed the basis of the Virginia Tech Helmet Ratings, setting off a sea change in the sports equipment industry by providing the first independent, evidence-based safety ratings for protective headgear. Since its first ratings for football helmets were released in 2011, the program has expanded to include nine sports, giving millions of athletes worldwide access to unbiased information about helmet performance and driving improvements in helmet design. The Helmet Ratings have consistently been one of the most visible research programs at the university, attracting high-profile media attention and elevating the university's reputation to a broad audience. His leadership in concussion research was responsible for Virginia Tech's selection as a core member of the prestigious NCAA-DoD CARE consortium, which has led the most extensive and in-depth analysis of concussion and repetitive head impact exposure in history. His work has corrected long-held misunderstandings about the link between impact exposure and concussion. These discoveries led directly to policy changes that will continue to protect collegiate athletes and military members.

While serving department head of Biomedical Engineering and Mechanics, Dr. Duma grew the department's research expenditures by 37 percent, increased faculty actively involved in research from 55 percent to 74 percent, created a biomedical engineering minor, laid the groundwork for what is now the department's degree-granting program, and led an initiative to hire instructors and collegiate faculty, allowing the department to provide fundamental mechanics courses to 2,500 students each year. As director of the Institute for Critical Technology and Applied Science, he has facilitated interdisciplinary research by more than 300 faculty across nearly all of Virginia Tech's colleges, contributing to over \$100M in research expenditures. His strategic leadership has steered the development of key university research initiatives, including drone research, quantum information science and engineering, cybersecurity, and materials science and engineering, building Virginia Tech's capacity in high-priority areas, and providing resources for faculty to extend their research in new directions. Dr. Duma's 567 publications, including 203 refereed journal papers and two books, have been cited more than 13,000 times; he has an h-index of 56 and has attracted more than \$55M in extramural funding.

In his many roles, Dr. Duma has established himself as a champion for diversity and inclusion, widely acknowledging that female subjects are underrepresented in biomedical data, contributing to gender-based disparities in health and safety outcomes. His work has been directly responsible for addressing some of those gaps. He regularly lends his expertise to other organizations, including serving as the editor-in-chief of the *Annals of Biomedical Engineering* which has enjoyed an impact factor increase from 3.22 to 4.22 under his leadership. He has advised the NCAA and Pop Warner on rule changes to reduce head impact exposure for youth and collegiate athletes, and created outreach programs for K-12 students that raise awareness about concussion risk and provide a gateway to STEM fields, often for students from underrepresented populations. He also served as associate editor for Accident Analysis and Prevention and on the Scientific Committee for the Association for the Advancement of Automotive Medicine, and reviews manuscripts for the Journal of Biomechanics, Journal of Biomechanical Engineering, and Archives of Ophthalmology as well as reviewing papers for the primary conferences in his field including Biomedical Engineering Society, International Research Council on the Biomechanics of Impact, Association for the Advancement of Automotive Medicine, and the American Society of Biomechanics. At Virginia Tech, he has served on search committees, program and administrator periodic review committees, the BEAM promotion and tenure committee, and the BEAM Honorifics committee.

Dr. Duma has been recognized nationally and internationally for his research. He earned many Best Paper Awards, Editors Choice Awards, Fellowships, and Achievement Awards from 1998 through 2017, providing additional evidence of his exceptional contributions. to the betterment of people and communities nationally and internationally.

RECOMMENDATION:

That Dr. Stefan Duma be appointed University Distinguished Professor, effective June 10, 2023.

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UNIVERSITY DISTINGUISHED PROFESSOR

Dr. Linsey Marr is currently the Charles P. Lunsford Professor in the Department of Civil and Environmental Engineering (CEE) in the College of Engineering.

Upon her arrival at Virginia Tech in 2003, Dr. Marr single-handedly built an air quality engineering program. Before her appointment, CEE had minimal ongoing research and graduate education activity in air resources engineering. Dr. Marr developed and taught four advanced courses focused on air quality, and also teaches a foundational course to first-semester graduate students majoring in environmental Engineering as well as an undergraduate Introduction to Environmental Engineering class for students in various engineering and science majors. She strives for instructional excellence in the classroom and is known as a demanding instructor who is well-respected by her students. She has mentored 28 graduate students to degree completion and 13 post-doctoral researchers and Ph.D. students.

Dr. Marr is one of the world's foremost researchers of bacteria and virus transmission in indoor and outdoor air. Over the last decade, she has developed fundamental knowledge and tools to advance understanding of this nexus of multiple disciplines and new technology frontiers, producing improvements in monitoring, predicting, and controlling microbes in the air. Her results overturned long-term paradigms that contributed to misunderstandings about the nature of the current global COVID-19 pandemic, specifically, that the coronavirus was spreading through the air, at least as much as it was spreading via conventional person-to-person contact. The importance of this discovery was acknowledged in several *New York Times* articles and was reflected in policy changes at the World Health Organization and the U.S. Centers for Disease Control.

Dr. Marr brought the rigorous quantitative tools of aerosol dynamics and environmental microbiology to the study of pathogens and other microorganisms in the air. She has published over 146 papers in peer-reviewed scientific journals that have been cited over 13,000 times. Nearly one-quarter of these papers have appeared in *Environmental Science and Technology*, and she has co-authored papers in high-impact journals such as *Science* and *Proceedings of the National Academy of Sciences*. Her current continuing external research grants in progress exceed \$12M, and her external awards over her career at Virginia Tech exceed \$26M from diverse sources, including the National Science Foundation (NSF), the National Institutes of Health (NIH), the Environmental Protection Agency (EPA), the Department of Agriculture, the Army Research Office, the Virginia Department of Environmental Quality, the Alfred P. Sloan Foundation, the Water Environment Research Foundation, and other industry sources.

A fellow of the International Society of Indoor Air Quality and Climate, Dr. Marr has been invited to give plenary/keynote lectures at eight conferences and to give seminars at more than 20 universities, including Carnegie Mellon, Columbia, Cornell, Duke, Harvard, Johns Hopkins, National Taiwan University, Rice University, University of California at Berkeley, University of Illinois, University of Michigan, University of Minnesota, University of Washington, and Yale. She was a plenary speaker at the American Association for Aerosol Research Conference in 2015 and again in 2020.

Few individuals can match the extraordinary contribution of Dr. Marr to the health, safety, and welfare of citizens throughout the United States and the world during the response to the global COVID-19 pandemic. She was recognized for meeting the high standard of genuinely extraordinary service to humanity with the *Ut Prosim* Scholar Award in 2020. Dr. Marr stepped forward as a leading authoritative source of knowledge on airborne viruses and became a voice of reason to a fearful world dealing with misinformation on COVID-19 transmission. Through her exceptional ability to communicate the science of viral transmission risks and prevention clearly and effectively to the public, Dr. Marr became a household name that people learned to trust for reliable and understandable information. Despite her demanding responsibilities and workload during the COVID-19 pandemic, Dr. Marr engaged in an enormous level of pandemic-related outreach activities. She granted over 300 interviews, including live television news programs on the leading networks.

Dr. Marr's stellar research has been recognized with prestigious awards including an NSF CAREER award early in her tenure at Virginia Tech, appointment to the National Academies of Sciences, Engineering, and Medicine's Board on Environmental Studies and Toxicology in 2020, the Walter J. Weber, Jr. Frontier in Research Award from the Association of Environmental Engineering and Science Professor, a Fellowship of the American Geophysical Union, the American Association for Aerosol Research, and the International Society of Indoor Air Quality and Climate, and the Outstanding Faculty Award from the State Council of Higher Education for Virginia. In recognition of the exceptional creativity and potential impact of her early groundbreaking work experimental and modeling work on the flu virus, Dr. Marr received an NIH New Innovator Award in 2013, which provided \$2.3M for continued research in this area. This award is exceptionally prestigious; very few engineers have ever received it. She received a Fulbright Scholarship to study atmospheric transport of the flu virus from mainland China across the ocean channel to Taiwan. Internally, she earned the Civil Engineering Alumni Teaching Excellence Award in 2010 and the Excellence in Teaching Award from the Virginia Tech Center for Excellence in Teaching and Learning in 2019.

Dr. Marr has established an impressive array of achievements and a professional trajectory that is still on a steep upward trend. She has demonstrated excellence and a significant impact across all areas of Virginia Tech's tripartite mission. She is an extraordinary engineer and citizen.

RECOMMENDATION:

That Dr. Linsey Marr be appointed University Distinguished Professor, effective June 10, 2023.

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