MONTANA
STATE UNIVERSITY

October 9, 2019

Commissioner Clayton Christian
Office of the Commissioner of Higher Education
Post Office Box 203201
560 North Park Avenue
Helena, Montana 59620

Dear Commissioner Christian:

I am honored for the opportunity to nominate Dr. Phil Stewart, Professor in the Department of Chemical and Biological Engineering at Montana State University (MSU), for the distinguished honor of Montana University System Regents' Professor. Such a distinction is properly reserved for a very small number of faculty members who have demonstrated outstanding scholarship of truly international caliber, a genuine commitment to teaching and mentoring, and service at many levels both within and outside the university. Professor Stewart meets all of these criteria.

Dr. Stewart was recruited to MSU after earning his doctorate at Stanford University and working in private industry in Switzerland and San Francisco and at a bacterial genetics laboratory in Paris. He has been a faculty member in the MSU Department of Chemical and Biological Engineering since 1991, making him the longest-serving faculty member in the department. He also served a distinguished career as director of the Center for Biofilm Engineering from 2004 to 2015 and as deputy director from 1996 to 2004.

Dr. Stewart is well-regarded for his seemingly effortless ability to teach difficult material. Students will often remark how he has an amazing ability to teach complex topics using real-world applications. Moreover, Dr. Stewart does so in such a way, students say, that they don't even realize they are learning something complicated until they have already finished learning the basic ideas.

Dr. Jeff Heys – now head of the Chemical and Biological Engineering Department – recalled how he was a first-year student in the very first class that Dr. Stewart taught at MSU, "Elementary Principles of Chemical Engineering." He had been planning to change to another major at the end of his first year, but from Dr. Stewart's very first lecture in that class, about how eating food was both a mechanical and a chemical process, Jeff Heys was hooked. Dr. Stewart "described with incredible eloquence how you could analyze a process like food consumption using 'elementary principles' that we would be learning that semester in the course. ... I am probably a chemical engineer today because of the positive influence of Dr. Stewart and his amazing ability to apply engineering principles in unexpected situations," Dr. Heys recalled.

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Dr. Stewart has served as a graduate adviser for 32 students, including 14 doctoral students from across many departments, including those outside of Dr. Stewart's home department and college, such as microbiology and land resources and environmental sciences. The graduates have gone on to work as faculty members, in industry and in national laboratories. In addition, Dr. Stewart has supervised more than 30 undergraduate students on research projects.

Dr. Stewart has served as a global leader in research into biofilms, those dense aggregates of bacteria or fungi that stick to virtually any wetted surface, coating everything from oil and gas infrastructure to artificial joints and medical implants. Biofilms cost industry billions of dollars annually in maintenance and lost efficiency. In healthcare, medical device infections caused by biofilms can lead to expensive hospital stays. Over the past 25-plus years, MSU researchers at the CBE – the world's first, largest, and best-known biofilm research center – have increased the global understanding of biofilms by combining engineering and microbiology. Dr. Stewart has long been at the forefront of this work and is internationally recognized for his leadership and high-impact publications examining how microbes in biofilms escape being killed by antibiotics and disinfectants.

Dr. Stewart's grant proposals have generated nearly $20 million in funding over the course of his MSU career. He has participated in 53 successful grant proposals, including, in 1986, one of the first National Science Foundation CAREER grants at MSU.

Dr. Stewart has an extraordinarily distinguished research record that includes publishing more than 186 peer-reviewed publications. It is the impact of those publications that really sets Dr. Stewart apart. In total, his publications have been cited more than 41,000 times, and his most-cited paper, "Bacterial biofilms: a common cause of persistent infections," has been cited more than 11,000 times. Moreover, his "h-index" on Google Scholar – the metric that measures the productivity and citation impact of the publications of a scholar – is 82, meaning that he has at least 82 publications that have been cited at least 82 times. According to Google Scholar, Dr. Stewart is the most-cited researcher at Montana State University. (The MSU professor who is the second-most cited researcher, Dr. Neil Cornish, has already been recognized as a Regents Professor. Moreover, Dr. Stewart is the second-most cited professor in the Montana University System, trailing only Dr. Steven Running, Regents Professor at the University of Montana).

Dr. Stewart's early research at MSU included studies on chlorine penetration into biofilms. He published a key paper in 1994 that has now been cited more than 500 times. Over the course of the next 24 years, Dr. Stewart continued to regularly publish groundbreaking and influential research on biofilm control. His 2001 paper on antibiotic resistance of bacteria in biofilms – a paper than

has been cited more than 3,000 times – established the foundations of the entire field of medical biofilms. Another important paper of Dr. Stewart's, from 1999, established the important role of molecular exchange between bacteria in biofilm formation.

Additionally, during his service as director and deputy director at the Center for Biofilm Engineering, Dr. Stewart is credited with facilitating growth of the center in numerous ways. He helped guide the CBE from its origins as a National Science Foundation Engineering Research Center to a stable, self-sustaining center with numerous industrial collaborators and a large professional staff. In fact, during Stewart's acclaimed tenure as director, the Center for Biofilm Engineering grew in number of faculty, research staff and student participation, as well as in research expenditures. The CBE also took a leadership role in facilitating dialogue with both the Environmental Protection Agency and the Food and Drug Administration about addressing biofilm as a public health issue. The CBE is now firmly established as a world leader in advancing understanding of microbial phenomena.

In terms of professional service, Dr. Stewart has served as a reviewer/referee for a number of publications, including "Advances in Wound Care," "Canadian Glycomics Network," "PloS Computational Biology," "National Science Foundation" and "mBio."

I am deeply proud to have him as a faculty member at Montana State University and am delighted to nominate Dr. Stewart for a Montana University System Regents' Professorship.

Thank you for your consideration.

Sincerely,

Waded Cruzado
President