Preface to the MME Special Issue in Honor of Professor Emeritus Douglas W. Fuerstenau

Jim Gebhardt¹ · Pradip²

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Douglas W. Fuerstenau (DWF) grew up on a farm and in several small communities in rural South Dakota during the depression years, where he learned the value of hard work. Working hard can produce results but being clever and hard-working will give you a bright future. In his later school years, Fuerstenau's family moved to Rapid City where his intellectual curiosity and capacity helped him graduate with a B.S. in Metallurgical Engineering from the South Dakota School of Mines and Technology in 1949. His technical interests led to graduate studies and completion of a master's degree from the Montana School of Mines in 1950 and Sc.D. degree from the Massachusetts Institute of Technology (MIT) in 1953. While at MIT, he studied with Professor Antoine M. Gaudin, who was the world's leading mineral processing academician at

that time. He taught briefly at MIT then worked in industrial research for Union Carbide and Kaiser Aluminum. Although his primary interest was in teaching and research, his strong interest in the mineral industry began with summer jobs in metallurgical plants during his undergraduate and early graduate years: two in Chicago steel mills, one in an Idaho lead smelter, and a fourth in a Washington flotation mill. Prof. Fuerstenau joined the faculty in 1959 and spent the rest of his career at the University of California at Berkeley. During his academic career, he supervised 60 doctoral and 62 masters' degree students, nearly all at Berkeley. Many of his Ph.D. students went on to exemplary careers of their own at various universities and institutions around the world. Someone counted a few years ago that there could be as many as 100+ grandstudents and 30+ great-grandstudents of DWF, and even a few great-great grandstudents.

Prof. Fuerstenau's technical interests cut a broad swath across mineral processing and extractive metallurgy subjects. But his advice to young professionals was always to focus on a few select topics and excel at those. DWF generally followed his own advice, and his research activities were typically focused on a few select topics. However, due to the expansive number of years devoted to research and teaching, he has made significant contributions in nearly every aspect of minerals engineering, including fundamental and applied surface chemistry as related to flotation, dispersion-flocculation, mineral/aqueous systems, and more importantly reagents design and development. Equally significant are his pioneering efforts in modeling-simulation of mineral processing unit operations—particle size reduction (crushing and grinding), particle size enlargement, i.e., pelletization processes, mixing of solids, and flotation modeling. World-class research on high pressure grinding rolls (HPGR) arose out of his collaboration with the inventor of HPGR, Professor Klaus Schoenert, University of Clausthal, Germany. DWF was a pioneer in the research on processing and extraction of metals from deep-sea manganese nodules, spodumene (lithium mineral), and rare-earth minerals; topics which are of critical importance today for the growth of the mineral and metals

✉ Jim Gebhardt
Jim.Gebhardt@FLSmidth.com; <https://www.flsmidth.com>

¹ FLSmidth Inc., 7158 S FLSmidth Drive, Midvale, UT 84047-5559, USA

² Tata Consultancy Services Ltd., Hadapsar, Pune 411013, India

industry in general and for the transition to renewable energy-based electricity. In addition, coal beneficiation and surface phenomena held his interest for a number of years. Prof. Fuerstenau has more than 400 publications and has been the recipient of numerous awards and honors, too numerous to recount here. He was the founder co-editor-in-chief of the International Journal of Mineral Processing, one of the most respected journals in the field.

One could say the pinnacle of Professor Douglas W. Fuerstenau's career was achieved when he was awarded as the first recipient of the Lifetime Achievement Award from the International Mineral Processing Council (IMPC) in 1995, some 24 years ago. Yet, here he is at the age of 90 and still engaged technically in a profession that he obviously loves. Professor Fuerstenau received the Distinguished Service Award from the IMPC in 2018 at the 29th IMPC meeting in Moscow. Elected to the National Academy of Engineering (USA) in 1976, he has also been recognized internationally by election to foreign membership in the engineering academies of Australia, India, and the Russian Federation. His full oral history entitled, *Mineral Processing Engineer and Scientist in Education, Research, Industry, and International Cooperation*, is available on the internet by searching AIME Oral Histories. In tribute to his 90th birthday, he will be honored by a gathering of renowned engineers and scientists for a special international symposium on "Reflections, Challenges and Opportunities in Mineral Processing" to be held in conjunction with the

2019 SME Annual Conference. It will be a rare opportunity for young (and old) professionals to learn from and interact with some of the great names in the field of mineral processing.

Some of the papers to be presented at the Denver SME Symposium are part of this inaugural issue of SME's new journal. When the call for papers went out to the professional community, many former DWF-students (and grandstudents) and professional colleagues found the time to contribute and honor this giant, a legendary figure in our industry. It is a broad range of topics covered by the 20+ papers of this special issue, befitting to the multifaceted career of the man we are honoring. But the common theme is that all of the papers deal with some aspect of the processing of fine particulates. We hope you will enjoy the diversity. We thank everyone who has participated in the process of putting together this issue, that is, the authors foremost but also all of the people behind the scenes, the journal editorial staff and the reviewers, whose diligent work made it happen. We hope to see you at the DW Fuerstenau symposium in Denver at the 2019 SME annual meeting.

James E. Gebhardt and Pradip
Guest Editors

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