The International Marine Minerals Society (IMMS) presents Dr. Sup Hong, with The Moore Medal*, which is given in the name of Professor J. Robert (Robby) Moore for distinction in the development of marine minerals. Professor Moore conducted marine minerals research at Cardiff University in Wales, Great Britain and the Universities of Harvard, Wisconsin, Alaska, and Texas in the United States. He was committed to the intelligent integration of government, industry, and academia to address the development of marine minerals.

Robby founded the Underwater Mining Institute and IMMS, and he committed his research and many other considerable personal efforts to the multidisciplinary development of marine minerals. The Moore Medal is not awarded on any regular basis, but is reserved for those rare occasions when the career of an eminent figure in marine mining and minerals activities warrants such an honor.

*Robert W. Cooke earns a living designing and making monumental sculptures for many customers, mostly in the Northwest. Before becoming a full time artist, Bob was the Exploration Manager for the International Nickel deep seabed mining consortium. He attended many UMIs and became a good friend of the Institute and many of its participants. He designed and made the Moore medal when IMMS decided to initiate the award.
International Marine Minerals Society

Sup Hong

The Moore Medal Award for his Excellence in Engineering for the Advancement of Marine Minerals

Dr. Sup Hong was born in 1959 in Bupyeong, Korea. He majored in Naval Architecture and Offshore Engineering at Seoul National University, Korea, and was awarded his BSc in 1983 and an MSc in 1985. He continued his studies in Offshore Engineering at the Technical University of Aachen, Germany between 1985-1992, and received his doctorate for a dissertation titled: Nonlinear Analyses on Statics and Dynamics of Flexible Risers in Waves and Currents.

Since 1993, he has been working on the development of technology for the extraction of deep-sea minerals at the Korean Research Institute of Ships and Ocean Engineering (KRISO). For over 20 years, he has been in charge of the research and development of mining technology for deep-seabed polymetallic nodules. His research accomplishments are wide ranging; from fundamental experimental research to system development, and from design to operation of systems, where the final goal was focused on performance validations through pilot scale tests.

He established Modeling-and-Simulation Techniques for investigating nonlinear coupled behaviors of complete mining systems. These have been utilized for the Simulation-Based Design (SBD) of deep-sea mining systems. Also, he initiated a Multidisciplinary Design Optimization (MDO) approach to the development of deep-sea mining technologies. He and his research team successfully applied an MDO framework for the development of the mining robot series, MineRo-I and MineRo-II.

His main innovation is the implementation of modular design concepts and robot technology in the development of the nodule collector MineRo-II (pilot mining robot), which has been developed as a combination robot of two single robot modules. This robot was tested in autonomous mode, tracking along complex paths on extremely soft seafloors in the sea trials of 2012-2013 [UMC 2013]. Proving the way for future scaled-up systems and demonstrating the potential for minimal seafloor impacts.

In the development of the pilot lifting system, Dr. Hong emphasized the importance of safety and eco-friendliness and showed a Buffer Station with feed control and sediment discharge [UMC 2014]. He shared operational experiences of underwater systems deployed through the moon-pool of a surface vessel, and validated the integrated performance of buffer and lifting pump together with an on-board nodule/seawater separation facility through a pilot lifting test in 2015 [UMC 2016].
He has contributed to academic and technical advances in offshore engineering with more than 100 publications and presentations. Recently, based on research accomplishments, he authored a chapter on Technologies for Safe and Sustainable Mining of Deep-Seabed Minerals for publication of “Environmental Issues of Deep-Sea Mining: Impacts, Consequences and Management” (to be published). So far he has registered 23 patents on deep-seabed mining and no doubt intends to register more.

In summary, Dr. Hong has conducted systematic research works for the development of deep-sea mining technologies. By means of fundamental experimentation, he has accumulated a fund of data and knowledge about nodule dredging, seafloor geotechnics, slurry transportation and seafloor driving control. He has established key technologies for the design and operation of underwater mining systems: Simulation-Based Design, Multidisciplinary Design Optimization, and automatic control of mining robots. Through his dedicated efforts and systematic approach, state-of-the-art deep-sea mining technologies have been upgraded to the level of robot technology and sustainable development of deep-sea mineral resources has moved closer.

Dr. Robert Goodden
IMMS President and UMC Technical Chair