

OES Awards Student Scholarships

OES is pleased to introduce two students who received an OES scholarship award in May 2016. Profiled below are Jungwook Han, a doctoral student at the Korean Advanced Institute of Science and Technology (KAIST), and Una 'Letti' Kittel, an undergraduate student at the University of Rhode Island (URI) (URU) and will be graduating in May 2017.

Personal statement by scholarship recipient, Jungwook Han



Jungwook is currently a Doctoral student at the Korean Advanced Institute of Science and Technology (KAIST). He is working towards a degree in Ocean Systems Engineering and plans to graduate in August 2018. He also attended KAIST for his Master's degree. Continuing his graduate education was not a simple choice as he was a newlywed and new father. But his family and he decided that he needed to pursue

his dream of continuing his education.

Jungwook's interest in robotics and engineering started at an early age and was sparked by his fascination with robot cartoons and magazines. He became certain that he wanted to pursue engineering after experiencing the sinking of the Republic of Korea Ship (ROKS) *Cheonan* during his military service after graduation from college. On March 26, 2010, an explosion occurred near the rear of the *Cheonan* and caused it to break in half. Many divers performed search and rescue operations and tried to find clues to the cause of the ship sinking. But limitations of the salvage operation system and environmental conditions, including strong waves and tidal current, proved impossible. This event really focused Jungwook's attention and interest towards capabilities of unmanned robotics technology.

In 2011, Jungwook started his Master's program and joined Ocean Robotics (OSE) at KAIST after leaving the Korean military. To date, his research has focused on unmanned surface vehicles (USVs) and the technology used to make such systems completely autonomous and how such systems can be used to improve human safety for labor intensive and dangerous operations. He has conducted a three-dimensional reconstruction of marine structures, such as bridges and semi-submersible offshore platforms, to propose possible applications of USVs for safety inspections. However, GPS signals that USVs rely on are often unavailable or corrupted under and near large structures. To tackle this, he is working to propose relative navigation techniques between the vehicle and nearby structures by extracting landmark features from LIDAR sensor measurements for high-precision navigation without GPS fixes. But this is only a highlight of his work.

For his remaining Ph.D. years, Jungwook will continue this work towards improving autonomous navigation techniques for USVs and other unmanned systems. After graduation, he plans to continue in a research position where he is able to improve

work efficiency of ocean-related tasks and ensure operational safety in inspection tasks for military and various industries.

Personal statement by scholarship recipient, Una 'Letti' Kittel



Una, who also goes by Letti, is currently an undergraduate student at the University of Rhode Island (URI) and will be graduating in May 2017. She is majoring in Ocean Engineering and has a keen interest, talent and passion for ocean engineering. Since arriving at URI, she has taken an interest in underwater robotics and modern physics. Letti has managed to balance working three jobs while participating as

an undergraduate researcher in the Robotics Laboratory for Complex Underwater Environments.

Letti's passion for ocean engineering is based on her belief that the ocean is one of the last frontiers that we, as a global population, have yet to fully understand and sustainably utilized. "As our population keeps increasing, the world will need to rely more heavily on the ocean and this will involve an advancement of technologies that exist and also a reevaluation of how we currently interact with the ocean. The world of ocean technology is one that I find extraordinarily exciting and full of potential." Transferring into the URI Ocean Engineering program has been one of Letti's best decisions and is allowing her to grow into a leader in this field.

Since coming to URI, Letti has built her expertise by balancing a rigorous course load of ocean engineering fundamentals, such as underwater acoustics, wave mechanics, fluid mechanics, and coastal measurements, with robotic ocean instrumentation and remotely operated vehicle (ROV) design. These courses have provided her a strong foundation and opportunities to work with ocean tools first-hand.

She has also been able to participate in a number of research efforts and applications to broaden her technical foundation. Her work in the laboratory has mostly included studying bodies of water through drone photography and mosaicking. She has been leading the development of a prototype of a shoreline detection sensor that could be mounted on any drone platform. But, this is not the only research she has worked on. More recently, as part of an Office of Naval Research grant, she completed research that improved a computational fluid dynamics platform (LilyPad) to calculate and graph predicted and measured pressure readings along an NACA 0012 foil under different flow conditions in an effort to resolve an issue of noise from the engine moving the physical foil through the tank.

Following her graduation, Letti plans to continue her studies in a graduate program in ocean engineering or a closely related field. She hopes to build her knowledge by conducting research on underwater robotics and/or acoustics with plans to work in industry and eventually start an ocean technology company in the future.