

Individual Achievement Award

Dr. Jennifer A. Williams, NUWC Keyport, Lead Research Scientist



As the lead research scientist for Naval Undersea Warfare Center (NUWC) Division, Keyport's Obsolescence Management Division, Dr. Jennifer Williams developed unprecedented predictive obsolescence models using machine learning techniques whose outcome will shift the paradigm of the Department of Defense (DoD) Diminishing Manufacturing Sources and Material Shortages (DMSMS) program activity. Her research and development efforts focus on increasing the accuracy of predictive modeling. The research has resulted in significant advancements to existing obsolescence ship class/hull/system impact predictive modeling tools. These advanced toolsets significantly improve obsolescence identification, prediction, analysis, prioritization, and resolution capabilities for all DoD and NAVSEA Programs supported by NUWC Division, Keyport.

Using machine learning to fill in missing data, Dr. Jennifer Williams researched and developed novel techniques to create useable datasets out of elements that are varied and often incomplete. She then built models from those datasets to predict critical features including part types, introduction dates, and obsolescence dates. This innovation resulted in a comprehensive approach to identifying and predicting the predominance and pervasiveness of future obsolescence throughout the fleet, allowing an automated analysis capability that has never existed previously. These models are now being used to improve existing tools as well as build new predictive tools. These advanced toolsets significantly improve obsolescence identification, prediction, analysis, prioritization, and resolution capabilities for all DoD and NAVSEA Programs supported by NUWC Division, Keyport. For the first time, technical activities are in a position to manage obsolescence out of their system designs well in advance of impact.

Dr. Williams collaborates with the University of Washington (UW) through the Naval Engineering and Education Consortium (NEEC) program on a project to create a model that will predict the expected life cycle of technology segments including hard drives, monitors, and central processing units. Dr. Williams also provided leadership and mentorship on an Office of Naval Research (ONR) project to develop methodologies that enable Program Offices to quickly

scan systems for long-term obsolescence threats, project optimal technology refresh cycles, and graphically display risks of critical systems due to technology obsolescence forecasts.

Dr. Williams' leading-edge achievements have resulted in six additional applications for patents and have garnered wide recognition from the research community, NUWC Division, Keyport management, and customers alike. She has briefed the results of her achievements at the Machine Learning Symposium, held by NUWC Division, Newport as well as the Naval Applications of Machine Learning Workshop, held by SPAWAR Pacific. Her work represents a unique application of Machine Learning to the field of DMSMS and is one that has been very well received by the Machine Learning Science community.