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Navy Researcher Poised to Tackle Corrosion 'in the Fleet'

Elissa Bumiller awarded SMART scholarship and grants from Navy and DoD Corrosion Office

By Cynthia Greenwood

Thanks to three DoD agencies, a talented Navy engineer is realizing the dream of anyone working in government — to take a hiatus from work and return to school full-time.

Elissa Bumiller

In July 2007, DoD awarded Elissa Bumiller the SMART scholarship. (SMART, a Defense Scholarship for Service program, stands for "Science, Mathematics, and Research for Transformation.") Further, after receiving grants from the Navy and DoD Corrosion Office, Bumiller became free to ramp up her graduate studies, attend classes full-time, and make headway on her dissertation. Today she is pursuing a doctorate in materials science and engineering at the University of Virginia (UVA).

As a mechanical engineer, Bumiller has performed corrosion research and focused on the corrosion characterization of naval alloys at the Naval Surface Warfare Center (NSWC), Carderock Division, for five years.

"At Carderock, we offer the chance for our 'stars' to take extended term training," explained Rich Hays, manager of the facility's Corrosion Research and Engineering Branch. "We pay their full salary and send them on a full university scholarship."

Throughout her tenure at NSWC's corrosion lab, Bumiller has conducted corrosion testing on aluminum alloys in different environments. She has also tested novel aluminum anode materials, while contributing to other coatings and cathodic protection projects. At the master's-level, her research centered on the contamination of electronic assemblies, particularly as regards corrosion.

Bumiller is conducting doctoral research under Robert Kelly, a professor of Materials Science and Engineering at UVA, a NACE International fellow, and a recognized expert in localized corrosion. Specifically, Bumiller is studying the insidious problem of sensitization in 5XXX series aluminum alloys. "This is a problem that is difficult to detect when the alloy is in service," Bumiller explained. "With Dr. Kelly, we are developing an electrochemical test for detection of sensitization in aluminum similar to the electrochemical potentiokinetic reactivation test for stainless steels."

As a member of NACE, Bumiller also serves as vice chairperson of the Marine Corrosion strategic technology group. Bumiller completed UVA's one-year residency requirement from August 2007 through May 2008. She is now preparing for her PhD qualifying exams in August and her oral comprehensives in September.

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"I'm extremely excited to be working on this study," Bumiller said. "I feel the research I'm doing will help the naval fleet in huge ways." Bumiller adds that she is indebted to the SMART program, administered by ASEE (American Society of Engineering Education), the DoD Corrosion Office, and the Navy.

"The support of these three agencies has enabled me to continue my education and conduct research on real issues encountered by the fleet," Bumiller said. "I realize what a truly outstanding opportunity I have been provided and feel very honored to be a part of such a great organization."

DoD Investment in Training Provides Immeasurable Impact

"Investing in young people who will take the place of older Navy professionals is important," said Hays. "Our goal is to keep Elissa around for many years to come and encourage her to stay in the government. If we can make one person inside government smarter and more knowledgeable about corrosion, we can create a much bigger impact on government and industry, over the long term, than we would by developing a new paint system."

Hays added: "Having a government expert like Elissa available to help the design and maintenance community specify a solution to a materials problem, or detect a potential problem, is extremely important. The positive impact she'll have is immeasurable but huge. In the long-term it will undoubtedly be significantly larger than any ROI (return on investment) from other corrosion projects."

Hays also commended the DoD Corrosion Office community of experts — known as the Corrosion Prevention and Control Integrated Product Team — and their willingness to support candidates like Bumiller and other next-generation corrosion researchers.

"We're hoping that leaders of the DoD Corrosion Office will continue to provide this type of support," Hays added. "It's a great retention tool for, and a wise investment by government."