



Shana L. Woods
Senior
Alabama A&M University
Major: Mechanical Engineering

Faculty Advisor: Dr. Z. T. Deng

Program: Research Alliance in Math &
Science

Email: woodssl@ornl.gov
Home: shaywoosv@yahoo.com

Research Area: Computing and Computational Science

In order to maintain U.S. naval dominance, there is continuing need to develop innovative approaches for near-real-time remote detection of underwater targets. Much attention in anti-submarine warfare (ASW) has focused on adaptive beam-forming, primarily in the context of towed arrays. The emphasis of such research was to achieve robust direction-of-arrival (DOA) estimation. In the present effort, we will consider a GPS-enabled, dynamic sensor network that can substantially improve the coherent detection of stealthy underwater sources. Our effort will involve two tasks: (1) from sensor sampled data compute the time difference of arrival (TDOA) of the source wavefront for each pair of sensors in the network; use techniques that enable the extraction of weak signals corrupted by strong clutter; (2) with the TDOAs in hand, implement (in Visual FORTRAN 95) an algorithm that provides a closed form solution to the source localization problem.

Research Mentor:

Dr. Jacob Barhen
Corporate Fellow and Director,
Center for Engineering Science Advanced Research (CESAR)
Computer Science and Mathematics Division
Oak Ridge National Laboratory

865 574-7131
barhenj@ornl.gov
www.cesar.ornl.gov