
Woods Hole Oceanographic Institution
Biology Department Seminar



Thursday, May 30, 2024 – 12:00 Noon

Genetic Diagnostics for Rapid Detection of Domoic Acid-Producing Pseudo-Nitzschia Species

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Pseudo-nitzschia, a pennate diatom found globally, can produce the neurotoxin domoic acid (DA) that causes Amnesic Shellfish Poisoning (ASP) in both humans and marine life. To protect against ASP, environmental managers use light microscopy to enumerate *Pseudo-nitzschia* cells as an indicator of bloom activity. But this method does not distinguish species or toxicity, which are dynamic in blooms, creating a need for rapid tests. Existing lab-based tests for determining which species are present and accurately measuring toxicity require technical expertise and >24 hours to get results, leading to suboptimal response. Alternative genetic methods like isothermal amplification coupled with CRISPR/Cas detection have high sensitivity and specificity and can be simplified to user-friendly, portable hand-held devices for detecting multiple genetic targets in less than 1 hour. We developed LAMP + CRISPR and qPCR assays to do genetic monitoring of species associated with toxicity and of toxin gene expression, indicating likelihood of DA production. We have tested a range of samples from synthetic target, genomic extracts from cultures, and field samples, and are able to detect DNA and RNA targets similarly across LAMP + CRISPR and qPCR assays. Alongside improved monitoring efficiency, these tests would allow resource managers to have earlier knowledge of toxic events and species present to make more informed decisions that support both the shellfish industry and public health.

HYBRID! **In Person:** Redfield Auditorium **Zoom:** <https://whoi-edu.zoom.us/j/97000865816> Meeting ID: 970 0086 5816 **By phone:** Find your local number: <https://whoi-edu.zoom.us/u/adlvMow3LQ>