

“The Environmental Sample Processor (ESP) – A Robotic Instrument for Applying Molecular Probe Technology Remotely Under the Sea”

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Abstract:

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The objective of our work is to develop methods and instrumentation that make it possible to conduct molecular biological analyses in real-time, below the ocean surface, autonomously and interactively if desired. Here we present results of preliminary studies that explore this concept utilizing an instrument known as the Environmental Sample Processor (ESP; <http://www.mbari.org/microbial/esp>). To date, the ESP has successfully automated application of 3 different classes of DNA probe arrays in single field deployments lasting 20 days, targeting detection of marine planktonic organisms ranging from heterotrophic and photosynthetic bacteria, archaea, harmful algae, to small invertebrates found in the upper ocean. A competitive ELISA for the algal biotoxin domoic acid, a neurotoxic amino acid, was also fielded in concert with the probe arrays. (http://www.mbari.org/microbial/esp/esp_technology.htm). We are currently expanding the capabilities of the ESP to support higher fidelity analyses (e.g. QPCR, micro arrays) consistent with providing genomic information in a remote sensory context. Development of sample collection module and pressure housing suitable for deploying the ESP at depths to 3000 m is also underway (http://www.mbari.org/microbial/ESP/esp_deep.htm). Application of integrated sensor systems that enable investigators to carry out interactive molecular biological experiments and to test hypotheses using molecular techniques remotely, in situ, is possible in the near term (<http://cmore.soest.hawaii.edu/>; http://cmore.soest.hawaii.edu/cmored_theme3.htm). The same core techniques and technologies being developed for oceanographic research purposes are also applicable to developing new paradigms for carrying out routine water quality assessments (e.g., <http://www.sccwrp.org/>; <http://www.sccwrp.org/about/rspln2006-2007.html#d2>; <http://www.rsmas.miami.edu/groups/ohh/>; <http://www.rsmas.miami.edu/groups/ohh/projects/projects.htm>).

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To view CV, Talk Title and Abstract: <http://www.rsmas.miami.edu/groups/ohh/events/events.htm#Jan>
And for more information visit: <http://www.mbari.org/staff/scholin/>

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