

# Executive Summary

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The Smithsonian Institution, the National Science Foundation, and the Ocean Studies Board of the National Research Council convened a symposium in May 2010 in Washington, D.C., to celebrate the scientific contributions and value of scuba as a research methodology. The “Research and Discoveries: The Revolution of Science through Scuba” symposium presented research findings by U.S. scholars with particular focus on the scientific contributions accomplished using self-contained underwater breathing apparatus. This symposium was the first major effort to highlight and validate the use of scientific diving techniques by evaluating the output of scientific research that has been presented through high-impact journal publications.

During the two-day event, fifty scholars discussed their research findings and discoveries from around the world on coral reefs, blue-water environments, under-ice polar habitats, temperate kelp forests, and other systems of interest. This symposium showed the strong integration and validation of scientific diving within the overall science domain since the introduction of scuba to the science community in 1951. Overarching symposium themes celebrated past, present, and future scientific diving contributions, and evaluated the accomplishments and impact of underwater research on our overall understanding of nature and its processes. Exemplars of the first generation of scientific diving research include Paul Dayton’s groundbreaking ecological work under Antarctic ice sheets; William Hamner’s pioneering studies of gelatinous zooplankton in surficial blue waters of the open ocean; Mark and Diane Littler’s multidisciplinary long-term phycological studies; William Herrnkind’s crustacean behavioral ecology research; John Pearse and Michael Foster’s kelp forest ecological work; and Ian Macintyre, Peter Glynn, and Chuck Birkeland’s baseline-establishing coral reef research.

Approximately thirty years after the advent of scuba another research tool, molecular techniques, became more generally available to marine scientists. Together these two tools offer broad techniques to further our understanding of biodiversity, systematics, and genomics. The advances in biopharmaceutical work and the understanding of chemical defenses of marine organisms, harmful algal bloom outbreaks, and invasive species have encouraged more scientists to don scuba gear and conduct their research under water. In an era of increasing occurrences of multiple stressors on such systems as coral reefs, deep-time geological studies show patterns and trends of previous episodic events. It continues to be difficult to understand ecological processes and interactions and the functioning of nature itself in the underwater environment without actually immersing oneself in it to make firsthand observations and data collections.

Enduring materials from the symposium, including abstracts, speaker bios, and webcast videos of presentations, have been posted on the website [www.si.edu/sds](http://www.si.edu/sds).

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