



Vision 2030: Ocean Science for the Global Good

Discovery and fundamental science at WHOI stem from a deep, broad tradition of world-class ocean scientists working closely with world-class ocean engineers and technicians. WHOI's extraordinary blend of observation, theory, and access to the sea has produced entire chapters of oceanographic knowledge and remains a sustaining business and intellectual model for the Institution.

Vision 2030: We apply WHOI's distinctive capabilities to advance ocean science for the global good at a pace commensurate with the urgency of challenges ahead. Providing transformative freedom and opportunity for our staff to advance basic research, we accelerate innovation, engage the world, and commit to making WHOI and ocean science a diverse and welcoming place for all.

The vision meets WHOI where we are today and positions us to thrive, grow, and lead in a world that is rapidly changing around us. Built upon our independent, entrepreneurial culture and [core mission](#), this vision affirms our fundamental, long-standing commitment to federally supported basic science while also positioning us to be more competitive within an evolving funding landscape. At the April 15, 2021 [Senate hearing](#) on the potential expansion of NSF funding, NSF Director Panchanathan noted U.S. science and technology leadership requires "unleashing the potential of economies of innovation across the nation and tightly integrating curiosity-driven research and use-inspired outcomes". The accelerated pace of change in the federal, business, and philanthropic sectors mirrors these views. Given what WHOI is capable of, this vision is a call to action to realize our potential as we take on these critical ocean challenges.

Principles Guided by Core Values

This Vision 2030 plan is guided by Core Values that frame how we view ourselves, how we look at the world, and how we engage with the scientific community, policymakers, funders, industry, and the public. Among these are:

- A passion for innovation and discovery;
- The capacity to take on challenges of extraordinary scale and complexity;
- An enduring commitment to rigorous, independent, and trusted science;
- Distinctive capabilities in ocean science and engineering, exploration, education, and marine operations; and
- A close-knit community of distinguished, committed, and entrepreneurial staff.

We are committed to developing a more diverse, inclusive, and welcoming environment with Equity, Diversity and Inclusion principles overlaying and weaving through all goals and activities. Doing so is essential to our future, our science, and our larger engagement with society. Recognizing that the earth and ocean sciences are among the least diverse of the natural and physical sciences, WHOI's Senior Administration and Staff Council must lead a community-wide effort to recruit and retain new

generations of scientists and engineers from diverse backgrounds and to better reflect the larger society we serve.

Visioning Process

WHOI's **Vision 2030** reflects contributions from more than 80 percent (~800) of our staff who participated in dozens of listening sessions between October 2020 and April 2021. More than 50,000 words of comments and ideas were submitted through an online survey and these were discussed along with the vision framework at a WHOI-wide Town Hall event in January 2021.

Vision Framework

Vision 2030 focuses on three strategic actions - **Investing in Inclusive Excellence, Leading Innovation, and Engaging the World** – to guide the institution into the next decade and beyond. It provides greater security, freedom, opportunity, and impact for the entire institution, particularly for our scientific, engineering, technical, and marine operations staff who collectively drive WHOI's research engine. It invites administration, support staff, and systems to become even more capable and efficient. The vision is built upon our deep commitment to fundamental science and discovery coupled with world-class engineering that has served WHOI well for nearly a century. It is a pathway to direct our strategic capabilities to serve a larger purpose. Together, we become more diversely funded, financially secure, capable, efficient, socially representative, and inclusive.

A measure of courage is required.

Much of what we are familiar with for basic science proposals and projects will continue with vigor, and sustained, core support from federal agencies is key to overall success. But achieving the vision will also require significant funding from philanthropy and the private sector. Resources will be deployed in novel yet disciplined ways that support innovation and drive growth, while also embracing risk and tolerating failure. Some activities will be familiar (e.g., analogous to the current Catalyst program), whereas others will invite us to be more creative and collaborative.

This document is deliberately not prescriptive of *what* specific research priorities and goals should be implemented. These will be shaped by opportunities and WHOI's entrepreneurial energy as WHOI has always done. But it does provide an overall approach addressing *how* and *why* the entire WHOI enterprise can succeed in the decade ahead.

1. Investing in Inclusive Excellence. WHOI is its people. Maintaining our competitiveness and continued position at the forefront of ocean science requires a bedrock commitment to recruiting and retaining the best scientific and engineering talent. A core deliverable of this vision is to strengthen and increase investment in our staff, a need explicitly included in capital campaign planning.

Additional endowment and current-use funds are needed to bolster salary support, lab and startup needs, establish new fellowships and research chairs, and provide new capacity to pursue strategic hires and facilities. Bolstering recruitment and retention of early career staff is especially critical as they represent the future of the institution, as well as opportunities for diverse and inclusive hiring.

Providing more support for our staff to pursue new ideas, technologies, and collaborations is the cornerstone principle of the vision. WHOI's current research and salary support funded by endowment income are vital. But much more research funding capacity and strategic investment is needed to mobilize the full ranks of our scientific, engineering, and technical staff to pursue the research challenges in the decade ahead. WHOI is also making significant, lasting diversity and inclusion gains in our graduate and post-doc programs, underscoring the need to invest in earliest career excellence.

This vision invites reflection on how we govern ourselves. Do we have strategic research and hiring plans to develop the workforce WHOI needs? How can we authentically implement diversity, equity, and belonging principles throughout all we do to make WHOI even more welcoming to all people? How are we lowering barriers to enhance cross-departmental collaboration? How can we reduce churn and deliver results with these new resources? How can senior administration and the Board of Trustees optimally work together in aligned, collaborative, and generative ways to achieve the vision goals? How can we apply our distinctive culture and capabilities to deliver on the needs of a planet in crisis?

2. Leading Innovation. To meet these urgent, complex, and multidisciplinary challenges, we envision a new Innovation Accelerator at WHOI, designed to serve as a “solutions engine” that directs new and existing institutional funds to support our scientific and engineering staff as they pursue high-risk, high value research and engineering questions that can accelerate the search for actionable answers. This will help WHOI safely explore new avenues without jeopardizing our traditional research, development, and education portfolio.

We anticipate several million new dollars per year, ideally much more, to be interleaved with existing DD/VPSE programs. With disciplined investment and tracking outcomes, WHOI will develop novel and sustained research funding across the basic and applied science spectrum through strategic partnerships with philanthropy, industry, federal and state agencies, and other sectors.

The Innovation Accelerator is envisioned as an internal funding ecosystem driving advances across the full spectrum of basic and applied science and engineering at WHOI. Strategic investments in people, projects, and places will spark disruptive, transformational advances on specific ocean research themes. These programs will engage staff across the institution and be available to individuals and teams, to scientists, engineers, and technicians, and to all career stages. Some programs are comparable to, but larger than, the current Catalyst to provide strategic resources for investing in new ideas, advancing knowledge and discovery, and unlocking new external funding from foundations, federal and state agencies. Historically, such funds have achieved a leverage factor of 6 or more. New opportunities will be created to advance novel transdisciplinary approaches that amplify our science through collaborative partnerships with policy specialists, social scientists, and stakeholder groups. We envision a portfolio of activities to support:

- People who are pursuing frontier research questions with significant new support for endowed chair positions, research fellowships, research awards, technical support, graduate students, and post-docs.
- Projects carried out of teams of individuals or collaborative networks that can make creative progress on bigger challenges given sufficient group support, and
- Places, both physical and virtual, that focus on the vital importance of innovation infrastructure to develop new core services (such as a “collaboratory” for big data, machine learning, and artificial intelligence), waterfront facilities, and collaborative “collision spaces” (e.g., AVAST).

This approach presents a triple-win for WHOI and society: Our staff gain new freedom and support to pursue high-value research; these new ideas in turn elevate our visibility and attract new philanthropic and external support that further sustains the Institution; and, finally, these efforts drive viable solutions and engage global stakeholders. From our existing Catalyst Program we know that disciplined investments in innovation drive outsized research advancement and external funding returns, with greater potential for broader translational impacts.

In addition, as we look to replace our aging Iselin Dock facility, we have an opportunity to revitalize WHOI's access to the sea. The Complex for Waterfront Access and Research (CWATER) envisions a waterfront facility that anticipates and supports WHOI's next half-century of ocean research. CWATER develops an ecosystem for research that provides improved access and vessel support, autonomous vehicle testing and sensor development, and fosters greater internal and external collaboration.

3. Engaging the World. Major ocean challenges are larger than any single institution. A focus on WHOI scientific excellence and innovation invites an outward-facing effort to build external partnerships that amplify new scientific understanding by engaging philanthropic and private-sector partners, education, public (federal, state, and local), policy, and international stakeholder communities. These partnerships are themselves vehicles for greater engagement, visibility, and support.

Philanthropy

Philanthropic interest in and concern about the environment is on the rise: A 2020 ClimateWorks [study](#) notes that foundation funding for climate change mitigation has nearly doubled since 2015, and this trend appears to be increasing. A 2018 [Bridgespan report](#) co-authored by WHOI trustee Thomas Tierney observed that the wealthiest Americans—just 2000 households—control \$4.2 trillion in wealth. The urgency and agency of this vision plan is attractive to major philanthropists who invest in big ideas that no one else will take on. Moreover, WHOI's capabilities, can-do culture, and enduring commitment to rigorous, unbiased science can attract transformative philanthropy.

Private-Sector

New collaborative opportunities with industry, reinsurance, banking, finance, energy, and other sectors will be explored. These can take many forms ranging from direct philanthropic support, to industry collaborations focusing on research themes of common interest, to corporate collaborations linked to risk mitigation and science-based decision making.

Emerging ocean industries, demands for sustainability, and changing national defense needs are driving interest in Blue Economy research. Capitalizing on our entrepreneurial culture, we can grow ocean industry and private sector collaborations, public-private partnerships, and start-up ventures to spur new market applications. Benefits include great societal engagement and impact, diversifying WHOI's research base, as well as opportunities for startup, licensing, and tech-transfer income streams. WHOI's independence, research integrity, values, and staff are paramount, and are safeguarded by review from WHOI's Advisory Committee on Ethics, Conflicts, and Security (ACECS).

Education

This is a propitious time to strengthen our educational partnerships. The MIT-WHOI Joint Program (JP) in Oceanography/Applied Ocean Science and Engineering attracts world-class students to work closely with our staff and amplify research activity and visibility. In addition to the JP, WHOI's Postdoctoral Scholar (PDS) Program is nationally-ranked and has for decades been a successful path for recruitment

onto the WHOI Scientific Staff and into top-calibre ocean science and engineering programs worldwide. New undergraduate and graduate education programs with MIT and other institutions regionally, nationally, and internationally will be explored to develop new curricula and degree programs led by WHOI staff. These programs can provide significant new revenue-sharing streams while simultaneously supporting WHOI teaching staff and providing career-building teaching opportunities.

National Security

WHOI has had a long and productive relationship with the Navy and Office of Naval Research (ONR). The Department of Defense recognizes the importance of having full, complete, and timely knowledge of the ocean environment for maximum operational readiness. Further, understanding the evolution of the ocean environment also has impact on infrastructure resiliency, geopolitical decision making, and strategic planning.

As ocean conditions change, so do naval strategic and tactical preparedness that is intimately dependent on knowledge of the operational environment. These changes impact the physical, chemical, biological, and geological parameters of the global ocean, the marginal seas, and the seafloor. Our national defense depends on our ability to understand, interrogate, and predict this environment, both on short- and long-time scales. Growing this engagement with the various units of the Navy and ONR will be facilitated by improving our shore-based facilities, institutional security, and our ability to address basic and applied naval research needs.

Marine Policy

Successful policy solutions to prior environmental challenges such as ozone depletion and acid rain have shared characteristics: Trusted science frames the problem, communications shapes public understanding of risk, and industry and science partner to develop regulatory policy and technology solutions. Our Marine Policy Center (MPC) has a long and successful history, and greater integration of the MPC into the institutional research portfolio and future vision can propel even greater impact and relevance. Our collective scientific and engineering assets can be deployed to advance science-based solutions to societally relevant problems including adaptation to ocean and climate change, ocean health and aquaculture, carbon management, offshore wind energy, national defense, pharmaceuticals, ocean minerals and resources, geohazards (earthquakes, volcanoes, tsunamis), and others.

Ocean Communications Initiative

WHOI's Ocean Communications Initiative (OCI) represents a unique opportunity to promote broader understanding of the benefits, risks, and consequences of humanity's actions to protect and ensure a healthy and productive ocean for future generations. With dedicated resources and a firm institutional commitment to leadership in communications, the OCI at WHOI will drive the Institution's approach to communications and long-term, large-scale efforts to raise awareness, inform government and industry leaders, enable individuals to make informed choices, and inspire action.

Campus Sustainability

Leadership on the climate challenge begins at home. WHOI commits to actively increase campus sustainability and energy efficiency initiatives. We have an opportunity to accelerate campus sustainability by increasing recycling, efficiency, clean transportation, and renewable energy initiatives across campus. Major capital projects must employ adaptive, smart design to anticipate future changes, as we have done for the CWATER facility.

Summary and Next Steps

Vision 2030 envisions a decade of institutional investment in Excellence, Innovation, and Global Engagement to vigorously pursue transformative knowledge when the global need is most acute. These activities translate to greater research freedom, opportunity, and impact. Institutionally, WHOI can expand its influence and reach with strategic collaborations to drive greater engagement and relevance.

This is not only the right thing to do, but it also aligns with emerging federal and private-sector funding directions, international science priorities, and the U.N. Ocean Decade call to transform ocean science for the global good. This builds upon our fundamental commitment to federally-funded ocean science while providing new opportunities to engage and lead critically important research.

Achieving this vision requires significant resources and fund-raising is already underway as a new capital campaign takes shape. A parallel Vision Implementation Plan is being developed in close consultation with staff and leadership to build a portfolio of programs to support the vision themes.

A Call to Action

The biggest single force shaping this institutional vision is Earth itself. Global population has quadrupled since WHOI was founded, and the attendant ocean health, ecosystem, and climate stresses are directly impacting planetary function, the economy, national security, and the continued availability of life's essentials—food, water, shelter, and health. Nearly every ocean vital sign—ocean temperature, acidification, sea level, sea ice, coral bleaching, extreme weather events, and so forth—is transitioning sharply away from historical baselines—even baselines extending back many tens of millions of years. Other challenges arise from humanity's increasing demand for ocean resources such as energy, food, water, minerals, and pharmaceuticals, and our need to anticipate natural hazards.

How will the Earth system—the physical, chemical, geological, and biological processes of our planet—change in the decades ahead? How can ocean research and technical innovation help address these challenges? To answer these and other pressing questions we must develop an actionable path forward. The next decade will define not only the fate of WHOI intellectually and financially, but also reputationally in terms of how we have served society's most fundamental needs. Did we rise to the generational challenge we face? Did we optimally position WHOI to respond to the opportunities before us? Did we anticipate and adapt to changes in the scientific and engineering funding landscape? Did we succeed in elevating understanding of and appreciation for our mission in the minds of policymakers and the public?

WHOI's timing couldn't be better: The United Nations "Decade for Ocean Science for Sustainable Development" (2021-2030) calls for a global movement to transform ocean science for a better and more sustainable world. In 2030, WHOI will celebrate its centennial anniversary of exceptional accomplishment in ocean science and discovery. National science funders and professional organizations are emphasizing the need for innovation and partnerships that include both basic and applied research ([NSF](#), [AGU](#), Ocean Visions). New technologies and methods are enabling nimbler and lower cost approaches to studying the ocean. And philanthropists are looking to make a difference with trusted partners like WHOI.

The stakes have never been higher. The opportunity for impact has never been greater. This is our time.