

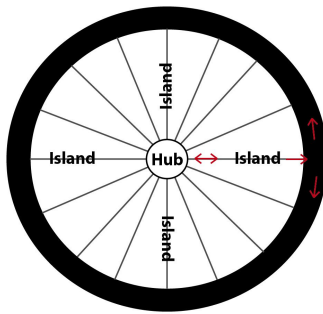
## Island Innovation Incubator

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### Idea in a nutshell:

We recommend the creation of a hub focused on island-based research, highlighting the unique risks and vulnerabilities of islands, their role as proxies for the earth, and also the innovations and adaptations that have and will emerge from island systems due to limited resources.



The hub will develop a network of island-based research centers (spokes), with community-driven research priorities and needs (arrows). The hubs will be convergence sites for considering the technological, institutional, environmental, economic and socio-cultural factors affecting isolated and tightly coupled systems. Through networking and stakeholder input the islands themselves will become interconnected units that work together to further foster knowledge sharing and innovation.

### What is your specific differentiated recommendation?

- Create a hub focused on shared lessons and challenges of islands, which are highly vulnerable, but are also model systems of adaptation for isolated communities and microcosms for the earth itself.
- Focus research on existing and emerging innovative, culturally-relevant solutions for climate related shock and stressors around food, water, energy and natural resources on islands.
- The structure should be a unifying hub with spokes that are local community-based innovation centers that leverage existing partnerships, e.g Small Island Developing States, IUCN Island Ecosystems, EPSCoRs on U.S. islands, NOAA National Coral Reef Monitoring Program, Pacific Islands Ocean Observing System, Caribbean Ocean Observing System, Sea Grant College Program, Polynesian Voyaging Society, 'Ohana Wa'a, etc.
- The hub and its research center spokes should aim to create innovative spaces for community-engaged, participatory research and processes around envisioning and creating sustainable and inclusive futures.
- The island-based research centers (spokes) function as convergence sites for considering the technological, institutional, economic, environmental, and sociocultural factors affecting isolated and tightly coupled systems.

Examples of possible research questions include:

- How have varying social, economic, institutional, and biophysical factors shaped island social-ecological systems over time?
- How have island communities (both human and natural) adapted to slow and rapid

- environmental change? What factors enabled or constrained this adaptive capacity?
- What are the social, cultural, economic and policy implications of displaced populations, and how do the complex interactions between the natural environment, climate forcings and culture influence migrating and receiving communities?
  - How can participatory processes envision and create more sustainable and equitable futures and lead reverse innovation?
  - How do different avenues of communication and connection among islands and between islands and the “mainland” affect the resilience of natural and human communities?

### **What impact or value does it seek to deliver?**

1. The hub will build resilience within and beyond islands by facilitating learning among island communities facing rapid environmental change.
2. This hub will **broaden participation** by increasing research and research capacity in areas with groups under-represented in STEM - For example, Hawai‘i, Guam, Puerto Rico, & US Virgin Islands are EPSCoR states/territories with majority Pacific Islander, Hispanic, & African American populations.
3. A network of island-based research centers will promote sustainable land, food, water, energy, and natural resource management, cultural diversity and inclusion, and adaptive learning.
4. The hub will promote cross-island research that leads to reverse innovation technologies, future proofing, adaptation and governance surrounding their development and implementation with broad impacts beyond islands.
5. The hub will leverage resources that meaningfully connect with other islands/island nations, including associations like the Small Islands Development States (SIDS) and therefore facilitate **global competency** training of US researchers.
6. The hub will align with the Blue Economy, an emerging area of interest and investment around the world.

### **What is the reasoning or supporting evidence behind it?**

As communities around the world face growing pressures from climate change and resource limitations, there is an increasing need for rapid innovation around sustainable and equitable adaptation strategies. Islands present an unprecedented opportunity to study, develop, and learn from diverse responses to limited resources and environmental change. Islands are both highly vulnerable to environmental change, but are also characterized by social resilience stemming from strong social networks, local ecological knowledge, and cultural connection to place. Islands are limited in natural resources; connections to other islands and the mainland can determine their resilience to disturbance. Historically they have developed strategies to deal with resource limitation that may inform larger resource distribution systems. Mechanisms of adaptation have emerged on islands because of necessity and because of isolation.

Technologies like solar and wind energy, desalinization, drought and salt tolerant aquaponics/aquaculture, & resource recovery are implemented at greater rates - and bring with them new issues of infrastructure management, governance, and economic benefit.

As discrete tightly interconnected social-ecological systems, islands around the world present a natural laboratory to understand and innovate around adaptation strategies.

In addition to being model systems, islands are also economic and politically important regions. For example, the majority of the U.S. EEZ (Exclusive Economic Zone) is located around islands like Hawai'i, Northern Marianas, Guam, American Samoa, Puerto Rico, the U.S. Virgin Islands, and waters adjacent to Alaska. EEZs have important influences on both island and continental coastlines and economies and are places of tremendous opportunity for the building upon the blue economy (Patil et al. 2016; U.S. Commission on Ocean Policy, 2004). Islands are also important sites for strategic defence for the U.S. and other continental nations

A network of islands provides opportunities for learning on islands as well as lessons and implications for continental systems due the cultural, economic, and ecological importance of islands and the potential for adopting island innovations. Island communities are majority under-represented groups in STEM, and connections between local researchers and the community are often already strong, but creating spaces for collaboration can strengthen these connections. Therefore, increasing research and research infrastructure on islands will naturally result in broader participation and will provide strategies and lessons for community-engaged and inclusive research more broadly.

Islands are on the frontline of climate change. They are amongst the first and most severely impacted areas. Some island nations are already experiencing displacement due to sea level rise, affecting immigration to the US and international relationships. Globally, 100,000 islands support 20% of global biodiversity (IUCN). Eighty percent of known species extinctions have occurred on islands and currently 45 percent of IUCN Red List endangered species occur on islands. Predicting the timing and impacts of future hazards on islands is challenged by the timing onset of extreme events. Climate change will impact tropical cyclone intensity and/or storm tracks. For example more frequent tropical cyclones are projected for the waters near Hawai'i (Murakami, H., et al. 2013). Slow onset processes of climate change are expected to impact local communities and blue economies. For example, the central equatorial Pacific ocean reefs are projected to experience ocean warming and acidification by 2030, while global reefs will experience similar impacts by 2050 (Hooidonk et al., 2014). This will not only devastate local coral reef ecosystems but will also have profound impacts on ocean ecosystems in general. Ultimately it will threaten the human communities and economies that depend on a healthy ocean (Marra and Kruk, 2017).

## References

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