

Candidate Recommendation

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ORIGINAL BIG IDEA

1: Plan to leverage resilience efforts that are focused on threats common to a geographic region through a sustained seminar series that helps develop stakeholders from the private, public, and university sectors. A seminar series is essential to promote the inclusion of powerful partnerships extending from local to regional scales that leverage big data resources and viable data analytics. Develop a website that connects coastal resilience resources to facilitate progress in a field that is already developing globally. The website should feature digital scholarship developed by natural and social scientists, especially results from grand challenges such as the coupling of inundation and social “urban planning” models. This website will provide a foundation for progress and the development of fully-integrated partnerships that include government, university, and industry members. Provide an opportunity for limited objective experiments that allow partnership assessment and evaluation of approaches that best achieve integrated environmental, engineering, and community resilience results at the local level. These experiments would apply data that includes historical information, in situ observations, imagery, and numerical models. Based on local successes, provide an opportunity for the planning and execution of a regional-scale research experiment where science-based results can be demonstrated to benefit a large geographic region, one that might include observational networks such as the NSF LTER Network, NOAA's U.S. Integrated Ocean Observing System, and the NSF Ocean Observing Initiative. Importantly, rapidly deployable in situ observations should be collected to characterize extreme events. A capstone demonstration should be conducted to objectively assess research results by operational users from local emergency responders and federal stakeholders such as BOEM, EPA, FEMA, NOAA, USCG, and USGS.

What is your specific* recommendation?

A prerequisite for this work involves the establishment of an agreed upon definition for a science-based CoPe Hub. For this effort, we assume a Hub is an especially vulnerable area based on coast type, a definition generalizing appropriate biological, physical, and community factors that impact resilience. This definition should be further refined to support the integration of environmental, engineering, and community resilience.

Plan and execute a stakeholder workshop based on coastal vulnerability for a site within the NSF defined Hub; Build a multidisciplinary and integrated team to focus research by social and physical scientists that addresses local hazards and resilience issues; Leverage big data resources and improve data analytics; Extend research to benefit local, state and federal governments; Demonstrate transdisciplinary research (coupling of physical and social science models) results in a capstone experiment with users ranging from citizen scientists to government participants. Make scholarship discoverable to benefit the community to include NSF designated hubs and other resilience programs.

Why is it valuable?

Who does it impact? How? How will the world be better? Who are the stakeholders and who will you partner with to make it stronger?

This transdisciplinary research impacts local communities from the most vulnerable to those that seem to be resilient and want to stay that way. Team science will bring to the forefront technologies that can be used to better understand and reduce risk across a range of socio-economic groups. Key to this effort is the identification of internal and external stakeholders. Internal stakeholders will include funded multidisciplinary and integrated performers from universities, industry, and selected operational partners from local, state, and federal government. Researchers focused on physical and human factors need to operate in a common context. Unfunded external stakeholders will include the larger communities (e.g., industry and university researchers that are tracking progress) and interested state and federal agencies such as FEMA, EPA, USGS, USACE, NWS, and NOS. An independent third party might be utilized to promote collaboration, i.e., the sharing and integration that is required for such a coalition of performers and operational partners.

What's the reasoning or supporting evidence behind it?

Evidence based, fact based, Takes into context current research (hasn't already been tried and failed). How will you validate success? How is it grounded in existing scholarship? Why do this now, above all the other things we could do?

This results-driven research requires a viable partnership that exploits citizen science and will highlight measurable improvements in data collection and inundation models for potential user groups. The partnership would include shared leadership among university, government, and industry members. Collaboration leaders will help to ensure that transdisciplinary research achieves prescribed goals and meets expectations for participating users.

Next generation data analytics will be developed and evaluated through science-based testing during limited objective experiments. The assessments will highlight improved performance. Demonstrations will be used to assess the effectiveness or utility of the research results for users. The program will leverage existing resources such as NSF and NOAA big data - national archives, ocean observations, models, and imagery holdings. New technologies will be implemented to observe critical factors that cannot be measured by fixed sensors, especially during and immediately following extreme events (e.g., social media, rapidly-deployed survivable sensors, microsatellites, drones, etc.).

The effectiveness of this research and development will be evaluated not only through the publication of journal articles, but through quantitative and qualitative input from user groups. This will require the planning and execution of possibly a scenario-based workshop to demonstrate emerging technologies from transdisciplinary research that benefits the Hub. An independent third party will be used to facilitate deep integration of knowledge, tools, and new ways of thinking.

The planning of CoPe research at key "hubs" around the US will benefit communities and future research by showcasing advances that are ripe for transition to users from the public

and to government agencies.