



## MACH Focus Areas



# Transdisciplinary Research and Co-Production Design

## What problem does this focus area address?

Traditional academic practice—sometimes marked by disciplinary silos and distance from real-world problems— isn't always well-suited for the kind of complex, practical applications climate change poses. MACH responds to this situation by turning the lens of scientific inquiry back on itself. The Transdisciplinary Research and Co-Production Design group treats MACH as an experiment in doing science differently. The objective is to learn more about producing science that is both rigorous and relevant.

Terms like “interdisciplinary,” “transdisciplinary,” and “co-production” are often used interchangeably and sometimes vaguely. MACH, however, tries to make those terms real. MACH's research groups are bringing stakeholders—government officials, city planners, community groups—into the scientific process itself. Stakeholders aren't just interviewed or presented with finished results—they're invited in at the design phase to help shape the questions researchers are trying to address and to advise on how their findings can be used to benefit their communities.

## Progress and challenges

Of course, none of this comes easily. A recently published study from MACH's first year documents the painstaking process of selecting sites for research partnerships. The process included extensive internal discussions among researchers as well as meetings with external partners to ensure local needs and values were represented.

Another effort, known informally as the Longitudinal Survey Study, is tracking

## What is MACH?

The Megalopolitan Coastal Transformation Hub (MACH) is a consortium of 13 institutions that brings together academics, policymakers, and community leaders to research climate change impacts and develop effective, evidence-based responses in the Philadelphia–New Jersey–New York region and beyond. Learn more about MACH at [coastalhub.org](http://coastalhub.org).



Coastal Climate Risk



Housing, Insurance, and  
Mortgage Markets



Adaptation Strategy Design



Municipal Finances



Household Decision-Making

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researchers involved in MACH over the life of the project, surveying them every two years about their experiences and challenges with collaborative research: What's working? What's frustrating? How has their perspective on collaboration changed? The study aims to provide insights into how interdisciplinary and societally-engaged science efforts evolve over time, how they can be designed at the outset for the best results, and how to avoid common pitfalls.

Despite its promising model, the project faces challenges. For example, many Ph.D. students and postdoctoral researchers involved in MACH must balance the project's time-intensive, collaborative demands with the traditional expectations of academic success, including producing high-impact publications. Longer timelines and the necessity of collaborating and possibly compromising with external partners can make it harder to produce the kinds of published work that advance a career in academia. Postdocs and Ph.D. students are often the people doing the lion's share of the work, but they are also the ones who have the most at stake professionally.

### How can this research be used?

By documenting the experiences of their MACH colleagues, the Transdisciplinary Research and Co-Production Design group is drawing a roadmap for how to effectively conduct societally-engaged, transdisciplinary science with advice on successful strategies and warnings about unsuccessful ones. In effect, they are helping to make MACH a model for research institutions and individual scientists who are interested in pursuing science that is “both useful and used.” The group's findings are equally

relevant to funding agencies who may be realizing that climate solutions—and actionable science in other fields—don't emerge from the Ivory Tower alone. They require community partnerships, skillful communication, and the capacity of researchers to collaborate with colleagues across disciplines.

*The work described here is led by researchers at Penn State University affiliated with the MACH consortium. Reach out to [coastalhubinfo@gmail.com](mailto:coastalhubinfo@gmail.com) for more information.*

### KEY POINTS

- Traditional academic practice is often ill-suited for addressing complex, real-world challenges like climate change.
- MACH endeavors to conduct science differently—focusing on transdisciplinary research and co-production of knowledge.
- The Transdisciplinary Research and Co-Production Design group tracks researcher experiences to learn more about effective strategies for, and potential challenges to, working across disciplines and collaborating with stakeholders.
- The group is creating a roadmap for how to conduct societally-engaged, transdisciplinary science; its findings are valuable not only to researchers but also to funding agencies.



*MACH researchers representing a wide range of disciplines gather at Rutgers University to discuss their work, exchange ideas, and share their findings.*



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