SUCCESS IN INTERDISCIPLINARY GRANTSEEKING AND DEVELOPING TEAMS FOR COLLABORATIVE PROPOSALS

Prepared for the University of Tennessee Institute of Agriculture

June 11, 2021

AGENDA

FUNDERS FOR INTERDISCIPLINARY PROJECTS

HALLMARKS OF STRONG INTERDISCIPLINARY PROJECTS

COLLABORATION BASICS

BUILDING AN EFFECTIVE TEAM

MANAGING TEAM-BASED PROPOSAL DEVELOPMENT

Q&A

SHORT BREAK
& Q&A

INTRODUCTION

DEFINING INTERDISCIPLINARY RESEARCH

According to the National Academies, interdisciplinary research is:

> *"a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to **solve problems whose solutions are beyond the scope of a single discipline or area of research practice**.*"*

*Committee on Facilitating Interdisciplinary Research, Committee on Science, Engineering, and Public Policy (2004). *Facilitating interdisciplinary research*. National Academies. Washington: National Academy Press, p. 2.

KEYS TO INTERDISCIPLINARY RESEARCH

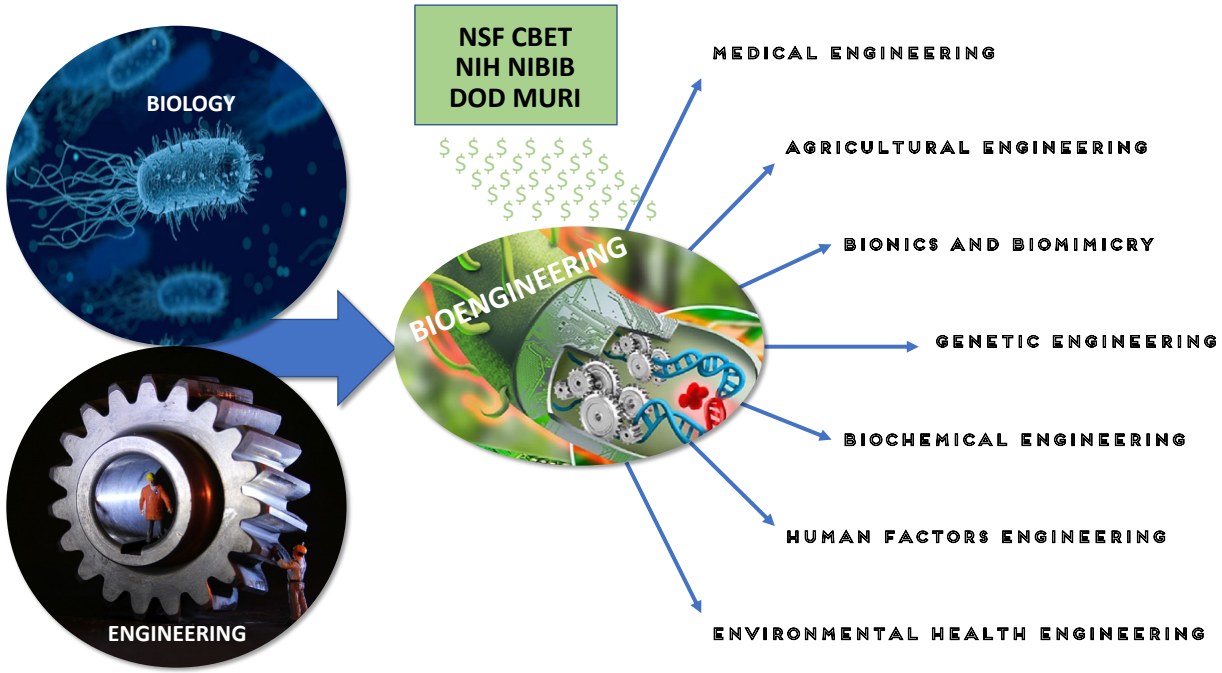
William Berry, former director of the Department of Defense's Office of Basic Research says ***Interdisciplinary Research does three key things****:*

1. It **accelerates research progress** by bringing groups of people together to address the problem.
2. It expedites the **transition of research into products** that can actually be used by the funder and the community in general.
3. It prepares students to **think in an interdisciplinary manner** and prepares them to be a more agile sort of workforce.

THE INTERDISCIPLINARY RESEARCH FUNDING LANDSCAPE

WHAT IS CONSIDERED "INTERDISCIPLINARY"?

"What is considered interdisciplinary today might be considered disciplinary tomorrow."
—NSF



INTERDISCIPLINARY FUNDERS

Funders with **complex science and research missions** tend to be the most likely to support interdisciplinary research.

SUPPORT IDR

- USDA
- DOD
- DOE
- HHS (Primarily limited to NIH)
- DOT
- VA
- EPA
- NASA
- NSF
- SSA (Primarily limited to CMS)

TYPICALLY DO NOT

- USAID
- Corp. for National and Community Service
- Dept. of Commerce
- Dept. of Education
- Housing and Urban Development
- Dept. of the Interior
- Dept. of Justice
- Dept. of Labor
- Dept. of the Treasury
- Institute of Museum and Library Services
- National Archives and Records Administration
- NEA
- NEH
- Small Business Administration

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FUNDERS MAY INFORM IDR FOCUS

DOD MULTIDISCIPLINARY UNIV. RESEARCH INITIATIVE (MURI)

Supports teams of investigators that include more than one traditional science and engineering discipline to accelerate research progress in 24 special topic areas.

- 24 topics across three branches (e.g., Advanced Analytical and Computational Modeling of Arctic Sea Ice, Multi-layer Network Modeling of Plant and Pollen Distribution across Space and Time, Group-IV Alloy Synthesis and Materials Properties)
- $1.25M - $1.5M per year for three years with option to extend to five
- White papers due in June each year
- Invited full proposals due in October each year
- Announcements in March and awards begin in June the following year
- One award per topic area
- Most awards are multi-institutional in addition to interdisciplinary

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NSF INTERDISCIPLINARY SUPPORT

- **Solicited Interdisciplinary Programs**
  - Smart & Connected Communities (S&CC)
  - BIGDATA
  - TRIPODS
  - INFEWS
- **Areas of National Importance**
  - Networking and Information Technology Research and Development (NITRD)
- **Center Competitions**
  - Science and Technology Centers (STCs)
- **Unsolicited Interdisciplinary Proposals**
- **Education and Training**
  - NSF Research Traineeship (NRT)
- **Workshops, Conferences, and Symposiums**

NIH INTERDISCIPLINARY SUPPORT

Historically, NIH favors funding large interdisciplinary projects through a combination of award types or the use of center-type mechanisms.

MAINSTREAM NIH OPPORTUNITIES

- Traditional investigator-initiated R-type and P-type awards (via parent announcements)
- Solicited R-type and P-type awards (via targeted announcements)
- Solicited U-type awards

HALLMARKS OF STRONG INTERDISCIPLINARY RESEARCH PROJECTS

SUCCESSFUL INTERDISCIPLINARY PROJECTS

Successful interdisciplinary projects combine:

- ✓ the **right people**,
- ✓ the **right tools**, and
- ✓ the **right disciplines**
- ✓ to solve the **problems that cannot be solved by a single discipline** alone.

SUCCESSFUL INTERDISCIPLINARY PROJECTS

And we would add…

- ✓ the **right people**,
- ✓ the **right tools**, and
- ✓ the **right disciplines**
- ✓ to solve the **problems that cannot be solved by a single discipline** alone, supported by
- ✓ the right **funder** and **funding opportunity**.

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COMMON PITFALLS

1. **Lack of integration** across disciplines in the research.
2. Selection of the correct disciplines, but **the wrong investigators** for the team.
3. **Lack of direction** or disagreement about direction across the team.
4. **Failure to identify the best funding sources** for the project.
5. **Failure to tailor** proposals to the funder and reviewers.

AN INTERDISCIPLINARY APPROACH

Successful interdisciplinary projects tackle research questions that require an interdisciplinary approach.

- Why is a **single discipline inadequate** to address the question?
- **Which disciplines** do you need and why?
- **What tools and insights** do the disciplines bring to the table?

AN INTERDISCIPLINARY TEAM

Successful interdisciplinary projects tackle research questions with the best team.

- Strong representation from the **right disciplines**.
- Access to the right **experience / expertise** relevant to the right aspects of the discipline.
- Contributors with **complementary skills**: setting the project vision, motivating team members, managing process, mediating conflict.
- Team members have a **history** of working and publishing together.

INTERDISCIPLINARY TOOLS

Successful interdisciplinary projects tackle research questions with the best tools.

- Access to the **right instrumentation**, **techniques**, and institutional **resources**.
- Access to **human resources,** including trainees and partner organizations.
- Access to **grant development and project management support**.

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INTERDISCIPLINARY FUNDING SOURCES

Successful interdisciplinary projects tackle research questions with the best funding sources.

- Obtain **institutional support for pilot data** to demonstrate history of working together and generate publications.
- Pursue **targeted funding opportunities**, when available.
- **Confirm fit** with program officers before applying.
- Address the **mission of the funder** and the specific opportunity.
- Avoid **mission creep**.

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BENEFITS OF INDUSTRY PARTNERSHIPS

Academic-industry partnerships are led by an interdisciplinary academic research team collaborating with at least one industry partner

For the industry partner:

- Access to early-stage research and insight
- Talent pipeline
- Access to a network of faculty, opinion leaders, lead scientists

For the academic partner:

- Additional resources for conducting research
- Industry insight and feedback
- Support for graduate students and postdocs

Societal benefits:

- More innovative research at a fraction of the cost
- Trained workforce

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LOCAL SUCCESS STORY:

University of Tennessee And Siemens

Scintillation Materials Research Center

https://smrc.utk.edu/research/

NSF PARTNERSHIPS FOR INNOVATION (PFI)

PFI program goals:

1. Identifying and supporting NSF-sponsored research and technologies
2. Supporting prior or current NSF-sponsored investigators, institutions of higher education, and non-profit organizations that partner with an institution of higher education
3. Promoting sustainable partnerships between NSF-funded institutions, industry, and other organizations within academia and the private sector
4. Developing multi-disciplinary innovation ecosystems that involve and are responsive to the specific needs of academia and industry
5. Providing professional development, mentoring, and advice in entrepreneurship, project management, and technology and business development to innovators.

NSF PARTNERSHIPS FOR INNOVATION (PFI)

Two tracks:

1. **Technology Translation (PFI-TT) track :**
   - translate prior NSF-funded research results into technological innovations with promising commercial potential.
2. **Research Partnerships (PFI-RP) track:**
   - complex, multi-faceted technology development projects that are typically beyond the scope of a single researcher or institution

COLLABORATION BASICS

TYPES OF COLLABORATION

Collaboration means working together.

Types of collaboration:

- Unidisciplinary
  - Collaboration within a field.
- Multidisciplinary
  - Collaboration between fields, boundaries intact.
- Interdisciplinary
  - Collaboration across field boundaries.
- Transdisciplinary
  - Collaboration integrating fields.

Definitions vary and evolve (e.g., NSF's "Convergence Research").

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COLLABORATION TRENDS

Everybody loves (the idea of) collaboration.

- NSF: "The convergence paradigm intentionally brings together intellectually-diverse researchers to *develop effective ways of communicating across disciplines by adopting common frameworks and a new scientific language,* which may, in turn, afford solving the problem that engendered the collaboration, **developing novel ways of framing research questions, and opening new research vistas**."
- NIH: "It is important to understand that, even in this competitive funding environment, research is shifting to teams. And when we look more closely at the impact of the shift, we see that **collaboration is proving to move science forward in important ways**."

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COLLABORATION PITFALLS

Grantmakers' great love of collaboration may drive grantseekers to engage in collaborations simply for the sake of funding.

This can lead to:

- Hastily arranged collaborations
- Undefined collaborations
- Ill-structured collaborations
- Ill-considered collaborations
- Conflicting collaborations

The wrong kinds of collaborations can cause significant damage to relationships, research, and careers.

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WHY COLLABORATE?

Collaborate because it's the best way to do what you want to do.

Good reasons to collaborate:

- Varied skills and backgrounds.
- Multiple perspectives.
- Learning from each other.
- Working toward the same goals.

Not-so-good reasons to collaborate:

- It's what your target funder wants!
- Team members are impressive.
- Someone asked.

Collaboration should serve the work.

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HOW TO COLLABORATE

Collaborate carefully.

Think through and articulate:

- Goals of the collaboration
- Collaborative structure
- Roles and responsibilities
- Implementation and communication plans

Do not ignore:

- Potential conflicts and challenges
- Development of formal structures and agreements

Plan your collaborations thoughtfully and keep communicating openly and clearly.

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WHEN TO COLLABORATE

Collaborate when you are ready and the work demands it.

Ask how a potential collaboration:

- Advances your long-term goals
- Fits into the context of your overall work
- Develops key relationships
- Contributes to the field

Be careful about:

- Overcommitment
- Scattered effort
- Clarity of purpose

Always make sure you know what you are getting into.

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UNDERSTANDING CHALLENGES

The National Research Council Committee on the Science of Team Science identified seven key features that create challenges for team science.

1. High diversity of membership
2. Deep knowledge integration
3. Large size

UNDERSTANDING CHALLENGES

The National Research Council Committee on the Science of Team Science identified seven key features that create challenges for team science.

Seven features that create challenges:

1. High diversity of membership
2. Deep knowledge integration
3. Large size
4. Goal misalignment with other teams
5. Permeable team and group boundaries
6. Geographic dispersion
7. High task interdependence

Identify challenges early and address them as necessary.