Choosing Collaboration
IMPLICATIONS FOR RESEARCH

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Today’s Specials

Defining collaborative research

Different types of collaborations
- Within & across disciplines
- Within & across institutions
- Individual projects & formal structures

Grantsmanship
- Writing proposals
- Funder guidelines
- Expectations for defining collaboration, budget, reporting

Management of collaborative research

Institutional Review Board – Special considerations

Thinking it through via case studies
What is collaborative research?
What is collaborative research?

Basic level – Groups of researchers acting as equal or nearly equal partners working on a common project (Stenek, 2007)

- Working within the same discipline
- Working in different disciplines and economic sectors

Roles, competencies, & tasks not well explored in the literature (Eisner & Vasigard, n.d.)

Characteristics of collaborative research include (Aboelela, Larson, Bakken, et al; 2007)

- Interdisciplinary or transdisciplinary approaches
- Combines skill and knowledge from multiple perspectives linked to more fully answer critical questions or to facilitate application of knowledge in a specific area

Roles, norms, expectations not well defined in literature
Inter? Multi? Trans?

Interdisciplinarity is a more robust approach to scientific integration in the sense that team members not only combine or juxtapose concepts and methods drawn from their own different fields, but also work more intensively to integrate their divergent perspectives, even while remaining anchored in their own respective fields.

Transdisciplinarity is a process in which team members representing different fields work together over extended periods to develop shared conceptual and methodologic frameworks that not only integrate but also transcend their respective disciplinary perspectives.

- Stokols et al, 2008

Interdisciplinary is also the most common term used in the NIH Roadmap for Medical Research. A long-term goal of OBSSR is to facilitate a process for moving from interdisciplinary analyses to the deeper conceptual synthesis and transformative momentum promised by transdisciplinary science. - Mabrey et al, 2008
What Is a Scientific Research Team?
...think of it as a continuum...

<table>
<thead>
<tr>
<th>Low</th>
<th>Level of Interaction and Integration</th>
<th>High</th>
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<tbody>
<tr>
<td>Independent Research</td>
<td>• Investigator works largely independently on a research problem with his or her lab.</td>
<td>Integrated Research Team</td>
</tr>
<tr>
<td></td>
<td>• Each group member brings expertise to address the research problem.</td>
<td>• Each team member brings specific expertise to address the research problem.</td>
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<tr>
<td></td>
<td>• Group members work on separate parts of the research problem, which are later integrated.</td>
<td>• Team meets regularly to discuss team goals, individuals’ objectives, and next steps.</td>
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<tr>
<td></td>
<td>• Data sharing or brainstorming among lead investigators varies from limited to frequent.</td>
<td>• Team shares leadership responsibility, decision-making authority, data, and credit.</td>
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NIH Commitment to Team Science

2003 NIH’s Bioengineering Consortium (BECON) hosts “Catalyzing Team Science” symposium

NIH Roadmap includes “Research Teams of the Future” as a focus area

2006 NIH Tenure Review Committee revises criteria to include “team science”

Clinical and Translational Science Awards (CTSA) Consortium is established to support and promote interdisciplinary teams

2006-2007 *NIH Guide for Intramural Research* is revised to include a more robust description of collaborative teams

2007 NIH institutes a multiple-PI grant mechanism

(Bennett et al., 2010)
Types of Collaborations
Types of Collaborations

Is the collaboration happening within...
- An individual project?
- A collaborative structure? Examples: collaborative networks & centers

Is the collaboration happening within...
- A single institution?
- Across multiple organizations?
- Across public and private organizations?

Is the collaboration happening within...
- A single discipline or field
- Across multiple disciplines
What do collaborations offer?

- Help to identify actual needs
- Helps to identify research questions worth answering

- Carves out time for research
- Develops & sharpens ideas
- Helps establish scope of research
- Develops methodology
- Lends strength to grant applications

- Often means working across geographic & institutional boundaries
- Financial collaborations require planning & involvement of institutional officials
- Important to know the appropriate personnel for help in your own institution

- Flexibility in funding
- Access to a larger resource pool
- Wider range of research settings
- Practical needs may spur innovation
Specific types

Technology transfer

° = process of transferring skills, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities among governments or universities & other institutions to ensure that scientific & technological developments are accessible to a wider range of users who can then further develop the technology into new products, processes, applications, materials or services

Bayh-Dole Act encourages tech transfer

° 1980 Federal Act allows universities to keep ownership
Specific types of collaborative research (Drolet & Lorenzi, 2011)

Knowledge translation

- Movement of information from bench to bedside
- Although advances have been made in basic science & biomedical research, the goal of improving health has not often been achieved
  - Fewer than 25% of highly promising discoveries resulted in published randomized clinical trial
  - <10% were established in clinical practice within 20 years
Management of collaboratives
Why?

1. Generative, innovative, creative, distinct solutions emerge from collaboration
2. Research is difficult
3. Share risk and increase credibility
4. Pressure to increase extramural funding
5. Research funding is finite and competition is fierce
6. Increased trend toward interdisciplinary emphasis at NIH, NSF
7. Research expenditures for collaborative projects growing more quickly than base expenditures

"Most of the work still to be done in science and the useful arts is precisely that which needs knowledge and cooperation of many scientists...it is necessary for scientists and technologists to meet...even those in branches of knowledge which seem to have least relation and connection with one another."

-Antoine Lavoisier

“A long-term goal of OBSSR is to facilitate a process for moving from interdisciplinary analyses to the deeper conceptual synthesis and transformative momentum promised by transdisciplinary science.”

- Mabry et al., 2008
As technologies and markets become more complex, collaboration is increasingly required both to contribute to the frontier of knowledge and to create new product combinations

- **Phillip Auerswald, 2015**

Research centers/institutes may provide a professional and welcoming structure for the community and potential external collaborators

May allow for testing of similar hypotheses simultaneously by different individuals and also on different systems

Opportunity to learn from other disciplines (new thoughts, ideas, models, perspectives)- Genetic algorithm

Bringing together diverse disciplinary can be tough due to:

◦ Specific localized definitions and meaning of terms
◦ Paradigmatic differences in research philosophy and approaches
◦ Discipline-specific norms for conducting scholarly inquiry

Added responsibilities from collaborative relationships (Stenek, 2007)

◦ Complex roles and relationships
◦ Different interests
◦ Management
◦ Cultural differences
“Most often, problems arise in scientific collaborations because the scientists failed to explicitly define their expectations of one another.”

“Preempting Discord: Prenuptial Agreements for Scientists”

Howard Gadlin and Kevin Jessar, NIH Ombudsmen
When the sandbox gets crowded...

- Authorship disputes
- Lack of compliance ("that was my collaborator’s job")
- Improper attribution or credit
- Disagreement about sharing time, work, data, and resources
- Disputes over disseminating findings
- Researcher’s intellectual property
- Who gets credit for Promotion & Tenure and CVs

*Case Study 1*
And stays crowded...

Researchers at different career levels, imbalance of power and benefits (Assistant Professor versus Professor)

Oversight of students and postdocs on collaborative projects
  ◦ Who is responsible?
  ◦ Who do they take direction from?
  ◦ What level of credit will they receive?

Liability
And bumps into other sandboxes...

• All of the previous concerns plus:
  • Non-profit vs. for-profit perspectives
  • Which entity owns the Intellectual Property (what fraction of it)
  • Ability to disseminate information (proprietary information, trade secrets, etc). This has the potential to be especially damaging to graduate students and junior faculty.
  • Different operating parameters may lead to more compliance/legal requirements – material transfer agreements, review by multiple IRBs, etc.
  • Differing ethical and cultural standards and customs.
Explicit Planning for building communication in collaborative research

Communicative competencies

- A shared language among collaborators is needed to coordinate ideas and action when individuals interact to solve a problem (Molinari, et al., 2009)
- Address language differences and discipline-specific terminology, ensure time for informal conversation and social activities, facilitate a safe space for collaboration where negative and derogatory communication is not acceptable, and to defuse conflict-ridden communication at early signs (Pennington, 2008; Thompson, 2009).

Integrated action planning

- Research on integrative team functioning suggests that differences in research approaches can create barriers to team productivity (Qin et al., 1997).
- Try double-loop approach (Pennington, 2011)

Collaborative writing

- Collaborative writing can offer challenges such as when partners hold different implicit goals for the writing product, variations in planning and goal setting, endless revisions, and emotional investment, to name a few (Lowry et al., 2004).
Plans should include (Stenek, 2007)

Clear identification of roles & relationships
- Writing
- Changes to research
- Data collection & storage oversight
- Point person for sharing information/answering inquiries

Financial Management & Reporting
- Equipment ownership & maintenance
- Travel

Compliance

Mentoring & supervision
Strategies for success

Establish a leadership structure

Collaboratives develop – create a plan for the lifespan of the collaborative

- Exploratory phase – allow for interaction to develop shared frameworks, meanings, and goals.

- Maturing phases - These efforts must continue throughout the life of the project, and facilitate cross disciplinary interactions needed for idea generation, successful completion of project goals, and utilization of tools and resources.

Strategies for finding common ground may include activities to elicit explicit statements about values (e.g., Hall, Ahn & Greene, 2012) related to research in general, discipline specific beliefs about research methods, and research in education.
Tips for successful collaborations - NIH

Establish ground rules for collaborations among all participants from the beginning including:
◦ Publications
◦ Authorship

Research data should be made available to all researchers on a project upon request
◦ Core issues should be addressed in advance or early by collaborators

Posing questions & answering them early should include coming to consensus on
◦ Overall goals
◦ Who will do what
◦ Publications
◦ Authorship
◦ Credit
◦ Contingencies
◦ Communicating
More Tips for Success...

Choose collaborators
◦ With complementary skills
◦ You like to work with

Bring all members along!
◦ Developing a shared framework is also beneficial for graduate student development, who require practical experience working in integrative teams to develop competencies necessary for them to function as productive members of heterogeneous collaboratives in future careers.

Agree on intellectual property (IP) ahead of time, review the university’s IP policy.
◦ Determine if any collaborators are bringing IP into the project and likely IP outcomes of the project

Discuss accountability to the project.
◦ All institutions must observe federal rules, disclose Conflicts of Interest ahead of time.

Appoint a project manager that can facilitate collaboration
◦ NOT PIs
◦ Post-docs
◦ Dedicated staff
◦ Use project management tools/software (e.g., freedcamp, basecamp, etc.)
I'm designing a suite of internet collaboration tools.

It's part of my long-term goal to eliminate all forms of direct human contact.

That's messed up.

You're exactly what I'm trying to avoid.

Communication?
**TABLE 4-5 Questions for Scientific Collaborators**

Although each research project has unique features, certain core issues are common to most of them and can be addressed by collaborators posing the following questions.

**Overall goals**
1. What are the scientific issues, goals, and anticipated outcomes or products of the collaboration?
2. When is the project over?

**Who will do what?**
1. What are the expected contributions of each participant?
2. Who will write any progress reports and final reports?
3. How, and by whom, will personnel decisions be made? How, and by whom, will personnel be supervised?
4. How, and by whom, will data be managed? How will access to data be managed? How will long-term storage and access to data be handled after the project is complete?
NIH Questions for Scientific Collaborators

Authorship and credit
1. What will be the criteria and the process for assigning authorship and credit?
2. How will credit be attributed to each collaborator’s institution for public presentations, abstracts, and written articles?
3. How, and by whom, will public presentations be made?
4. How, and by whom, will media inquiries be handled?
5. When and how will intellectual property and patent applications be handled?

Contingencies and communicating
1. What will be the mechanism for routine communications among members of the research team (to ensure that all appropriate members of the team are kept fully informed of relevant issues)?
2. How will decisions about redirecting the research agenda as discoveries are made be reached?
3. How will the development of new collaborations and spin-off projects, if any, be negotiated?
4. Should one of the principals of the research team move to another institution or leave the project, how will data, specimens, lab books, and authorship and credit be handled?
Grantsmanship
Funding mechanisms

Structure of Relationship
- Collaborative research
  - Which institution is the lead?
  - Budget and reporting separate
- Subaward
  - Indirects on first $25,000 of subaward
  - Subawardee will usually assess internal indirects
  - Subawardee responsible to PI

Single project or Collaborative Center?
- Are you applying to conduct a single research project collaboratively?
  - How does the collaboration strengthen impact?
- Are you creating a center or collaborative network?
  - Typically need to more explicitly state collaborative mechanisms and evaluation
Considerations

Policy alignment amongst collaborators

Sharing of documents
  ◦ Budgets?
  ◦ Consistency of formats?

Contact:
  ◦ During the proposal stage?
  ◦ During post-award?

Avoid delays and challenges:
  ◦ How will IRB be handled?
  ◦ Who is single point of contact (e.g., multiple subawards)
  ◦ How much flexibility is allowed in budgetary changes? What is approval process?
Ethical Considerations
Institutional Review

• For studies involving human subjects
  ◦ Be aware of the need for review and approval from Institutional Review Board
  ◦ Some funders require approval ahead of time, so plan ahead
  ◦ Remember to modify approved studies to concur with funder demands

• For studies involving animal models
  ◦ Be aware of the need for Institutional Animal Care and Use Committee
    ◦ required for use of all vertebrate animals.
Regulatory Basis (PRIMR, 2016)

§46.114: “Cooperative research projects ... involve more than one institution. ... each institution is responsible for safeguarding the rights and welfare of human subjects and for complying with this policy. With the approval of the Department or Agency head, an institution participating in a cooperative project may enter into a joint review arrangement, rely upon the review of another qualified IRB, or make similar arrangements for avoiding duplication of effort.
Movement toward single IRB model (PRIMR, 2016)


Revision to Common Rule: Notice of Proposed Rulemaking (NPRM): MustUse Single/Central IRB for Multi-Site Research

NIH Movement – other agencies likely to follow
Final National Institutes of Health (NIH) Policy Requires Use of a Single Institutional Review (sIRB)

• Release Date: June 21, 2016; Effective Date: May 25, 2017

• Applies to All Competing Research Grant Applications (New, Renewal, Revision, or Resubmission) With Receipt Dates On or After May 25, 2017

• Ongoing, Non-Competing Awards Will Not be Expected to Comply With This Policy Until the Grantee Submits a Competing Renewal Application

NIH Policy Applied to...

• NIH Funded Multi-Site Research (i.e. More Than One Site)

• Conducted in US Domestic Sites Where Each Site Conducts the Same Protocol (Does Not Apply to Foreign Sites) (Does Apply to NIH Intramural Program)

• Involving Nonexempt Research (i.e. Expedited & Convened)
Critical Questions (PRIMR, 2016)

1. Does the Sponsor Mandate Use of a Single IRB?

2. Which Collaborative Institutions are “Engaged” in the Research? Is An Assurance Needed at the Other Site(s) and at Your Site?

3. Which IRB Will Be the Relied Upon IRB or Will Your Institution Accept Sponsor or Other Institution’s IRB?

4. Are Appropriate Agreements in Place?

5. Does Your IRB Has Appropriate Expertise if Your IRB is the Relied Upon IRB?

Formal Agreements may be Required

- Teaming Agreements
- Collaboration Agreements
- Intellectual Property Agreements
- Material Transfer Agreements
- Memorandums of Understanding
- Data Sharing Plans
- Facility Use Agreements
- Subawards
Thinking it through
It’s not enough to start the project...

Ask yourself...
- When is it working?
- When is it not working?

Build a regular evaluation of the collaborative (not the research) into the project plan
- Identify indicators that can be used to gauge progress at the:
  - Individual
  - Group
  - Institutional level
- Define process for diffusing problems
1. Why should collaborative research be encouraged?

2. When should research collaborations be formalized?

3. Are there any drawbacks to collaborative research? What problems can they raise?

4. Which country's rules should be used in collaborative projects that are carried out in different countries?

5. What steps should be taken when a collaborative project comes to an end or a collaboration is dissolved?
Case study #1
(Modified from NIH Office of Research Integrity)

Yolanda, a graduate student in Prof. Zhu's lab, is talking with Wanda, Prof. Zhu's secretary. She notices the title page of a manuscript atop a pile of papers on Wanda's desk. When she looks at it more closely, Yolanda is surprised to see that there are only three co-authors: her, Prof. Albert, and Prof. Zhu.

Four months ago, Yolanda spent several weeks in Prof. Albert's lab at a different university with Ben Brown (a post-doctoral scholar). Ben taught her the experimental technique for her thesis, gave advice about the experiment, and reviewed her literature review and methods section for her thesis.

"Wanda, I think there's an error here," Yolanda begins. "Ben Brown's still missing from the co-authors, and I know I put a note on the last draft about this."
"Oh, now that you mention it, I do recall seeing his name before," replies Wanda. "Well, what I got from Prof. Zhu before he left on his trip was what he told me was the final version. I'm supposed to finish up the manuscript and get it sent out to the Journal of Important Research today and I can't add an author without Prof. Zhu's permission."

"But you can't do that," exclaims Yolanda. "It wouldn't be fair. You've got to put Ben's name back on the paper before you send it."

Questions:
What are Yolanda’s obligations in this case?

What are the options for resolution of this issue?
Case Study #2: Disagreement

Two research teams (computer science) at the same institution develop a new search engine.

Tech transfer and faculty agree that the new algorithm should be licensed and marketed.

Differences exist in strategy:
- One group wants to work with existing company (e.g., google)
- Another group wants to take start up approach

Tech transfer agrees with existing company approach – legal action threatened by start up group.

Who “owns” the intellectual property?

What would be a way to diffuse this?

Adapted from Columbia university RCR
Resources

At UNLV

- **Office of Technology Transfer**
  - Office of Research
    - Office: FDH 331
    - Phone: (702) 895-0456
    - Email: [stan.smith@unlv.edu](mailto:stan.smith@unlv.edu)
    - Fax: (702) 895-5464
    - Mail Stop: 1087

- **Office of Research Integrity – Human Subjects Research**
  - 4505 Maryland Pkwy
    - Box 451047
    - Las Vegas, NV 89154-1047
    - Phone: (702) 895-2794
    - Toll free: (877) 895-2794
    - Fax: (702) 895-0805

- Dr. Lori Olafson
  - Director, Research Integrity
  - [lori.olafson@unlv.edu](mailto:lori.olafson@unlv.edu)
Resources

Collaboration and Team Science: A Field Guide (NIH)

https://ombudsman.nih.gov/collaborationTS.html

Introduction to the Responsible Conduct of Research

http://ori.hhs.gov/ori-introduction-responsible-conduct-research

Interdisciplinarity and Systems Science to Improve Population Health

Questions?