

# Catalyzing Interdisciplinary Computing Research

## *Best Practices for Researchers*

July 2024

The Computing Research Association (CRA) and CRA's Computing Community Consortium (CCC) facilitated six round table discussions with 40 subject matter experts<sup>1</sup> on interdisciplinary computing practices across academia, industry, and government to identify the challenges and needs of the computing community to catalyze interdisciplinary research. The task force conducted a thematic analysis of roundtable transcripts and paired findings with established evidence-based practices. We found each interdisciplinary team member brings specific expertise and perspectives to address a research problem, and these diverse contributions can be difficult to integrate. Individually, members may be impacted by different institutional and disciplinary incentives, norms, and expectations. From these roundtable discussions and relevant literature,<sup>2,3</sup> we created this document to help researchers interested in adopting best practices throughout an interdisciplinary research project - from finding collaborators to dissemination.

Overall, researchers should:

- Engage collaborators or join research teams early in the research process.
- Be flexible about new ways of thinking and disseminating. Be willing to learn.
- Be transparent about disciplinary norms (e.g., authorship, funding, methods).
- Acknowledge your biases and assumptions about other disciplines.

## Finding Collaborators

Finding collaborators can be difficult and falls on the individual. You can:

- **Be proactive** and participate in interdisciplinary campus or national events. Ask colleagues, school and department-level administrators, and center directors to introduce you to potential collaborators and invite you to present in interdisciplinary venues.
- **Have multiple conversations before committing to a long term collaboration** about research goals, approaches, outcomes, and work practices, to ensure alignment.

## Starting an Interdisciplinary Collaboration

Setting norms early can avoid conflicts or lost time later in the collaboration. You can:

- **Build trust** by engaging in trust-building activities such as co-advising students, collaborating on service, and understanding individual goals and aspirations.<sup>2</sup>
- **Build a shared vocabulary** by identifying terms with different meanings, or describing similar concepts, in various fields. Ask researchers to define terms as they speak to help people understand conversations.<sup>3</sup>
- **Create shared research goals and practices** which include the problems and scope of activities; measurable project goals, what constitutes success; outcomes, publication venues, and the authorship practices for publications. Rotate publication venues.
- **Develop practices that align with your values** regarding research; data acquisition, management and analysis; IRB and ethics.
- **Agree on collaboration practices** including individual responsibilities, communication and meeting practices, timelines, technologies, data management, and communication.
- **Write a collaboration agreement** outlining research and collaboration practices.<sup>4,5</sup> Leverage existing team-science resources.<sup>4,5</sup>

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### Conducting Interdisciplinary Research

Aligning perspectives and integrating approaches can take a long time. Even building a shared vocabulary can take more than a year. You can:

- **Keep a living document that gets updated and revisited frequently** including a shared research vision; short and long-term goals; methodology, terminology; communication.
- **Manage differences and conflict** by co-developing a conflict resolution plan.<sup>5</sup> Do not ignore issues. Encourage all team members, regardless of seniority, to bring up issues.
- **Conclude a project** by offering alternate collaborators or mechanisms for collaborators to continue the research. Successful collaborations can often continue and translate into new endeavors (e.g., new research projects, implementation in real world setting).

### Disseminating Research

Different disciplines can have different authorship and publication norms. You can:

- **Transparently communicate** the norms of authorship, such as contribution expectations and career trajectories as it relates to publication needs. Be prepared to advocate for student contributors as co-authors or authorships for members who contribute early in the project before dissemination.
- **Consider including contribution statements** in collaborative work products (e.g., Use the CRedit author statement).<sup>6,7,8</sup>
- **Be willing to disseminate in new ways** and in different venues (e.g., publications outside of your research area(s)), or alternative artifacts (e.g., a museum artifact).

### Supporting Career Trajectories

Interdisciplinary collaboration can impact one's career differently. For example, junior faculty may be impacted by the increased time to create interdisciplinary collaborations. To mitigate career trajectory risks, you can:

- **Communicate your contributions to interdisciplinary work** to colleagues and in your promotion materials (e.g., team management, access to participants, translating concepts across fields).<sup>6,7,8</sup>
- **Be aware of power differentials when collaborating** - specifically, senior faculty should help junior faculty by highlighting their contributions, and shift opportunities of power to junior faculty while decreasing administrative overhead on them.
- **Address subdiscipline and interdisciplinary biases and disparities** by communicating what your research role is, and what you can, and cannot do. This is especially important if one's role is considered less prestigious (e.g., tech support, usability professional, broader impacts person). Senior faculty are encouraged to address negative biases and proactively highlight the value of interdisciplinary research contributions.

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<sup>2</sup> National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. 2005. Facilitating Interdisciplinary Research. Washington, DC: The National Academies Press. <https://doi.org/10.17226/11153>.

<sup>3</sup> National Research Council. 2015. Enhancing the Effectiveness of Team Science. Washington, DC: The National Academies Press. <https://doi.org/10.17226/19007>.

<sup>4</sup> Team Science Community Toolkit, <https://www.teamscience.net/home/resources>

<sup>5</sup> Team Scholarship Acceleration Lab, UC Irvine, <https://tsal.uci.edu/>

<sup>6</sup> CRedit author statement, <https://www.elsevier.com/researcher/author/policies-and-guidelines/credit-author-statement>

<sup>7</sup> Collaborative Contributions List <https://ap.uci.edu/faculty/guidance/collablist/>

<sup>8</sup> UW Interdisciplinary Appointment, Promotion, and Tenure Toolkit <https://collaborate.uw.edu/online-training-and-resources/apt-toolkit/>

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