Problem-based Interdisciplinary Collaboration

SUMMARY

Initial Charge

The Problem-Based Interdisciplinary Collaboration Quad is charged with proposing a set of projects to create a space at the University of Miami to facilitate the translation of theories and evidence across disciplines, departments and schools to workable solutions in the world. The proposals will encompass both ideas and a funding mechanism to facilitate this work.

Guiding Principles

- Interdisciplinary collaboration rests on strong individual disciplines that cannot be replaced, though collaboration can create a sum greater than its component parts.
- Structures and programs for interdisciplinary collaboration should reflect UM's unique context.
- Obstacles exist to interdisciplinary collaboration and should be addressed.
- UM should identify a focused set of real world challenges that can coalesce the expertise of multiple disciplines.
- Initiatives should build from UM's existing areas of research strength.
- Successful application of interdisciplinary research efforts often involves a participatory research design – i.e., including end users of information at many stages of problem formulation, data collection and analysis.

Proposals

The proposals in this consultation paper cut across the following areas:

- Structures: Establish a university-wide platform that houses projects and provides the space and opportunities to propel interdisciplinary collaboration toward solutions.
- Systems: Enhance administrative processes including funding mechanisms and incentives to support and encourage collaboration.
- Leadership: Appoint senior University leadership with a mandate and resources that reflect a university-wide commitment to interdisciplinary collaboration.
- Projects: Establish criteria for interdisciplinary projects, teams and thematic areas for collaboration.

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Introduction

The imperative for problem-based interdisciplinary collaboration is clear. The most pressing challenges facing society demand multidimensional solutions. From the changing climate to the evolving nature of global health and wellness, addressing issues critical to human and environmental well-being not only requires excellence in research, but the ability to create intersections in order to integrate expertise, theories and evidence from a variety of disciplines into concrete, comprehensive solutions. This recognition has led to an emphasis on problem-based interdisciplinary collaboration across institutions of higher learning.

As a leading research university, the University of Miami (UM) is well placed to contribute to global problem solving by fostering interdisciplinary collaboration. Investing in problem-focused interdisciplinary research at UM will increase UM's relevance beyond campus. This consultation paper outlines the structures, programs and incentives for interdisciplinary collaboration required for UM to create knowledge to enhance human well-being and global sustainability.

The principles that have guided the development of the proposals include:

- Interdisciplinary collaboration rests on strong individual disciplines and cannot replace them.
- Structures and programs for interdisciplinary collaboration should reflect UM's unique context.
- Obstacles exist to interdisciplinary collaboration and should be addressed.
- UM should identify a focused set of real world challenges that can coalesce the expertise of multiple disciplines.
- Initiatives should build from UM's existing areas of research strength.
- Interdisciplinary teams ideally, but not necessarily, include specialists from three or more disciplines engaging on a given topic.
- The intent of interdisciplinary collaboration is to make a sum that is greater than its parts.
- Successful application of interdisciplinary research efforts often involves a participatory research design – i.e., including end users of information at many stages of problem formulation, data collection and analysis.

1. Structures and systems

Proposal 1: Creation of the IDeA Lab

The University of Miami has established a reputation for interdisciplinary work including collaborations between the marine and social sciences and advances made through synergies among our engineers, neuroscientists and medical scholars. To reach the next level of relevance and excellence, UM must build on these achievements through institutional efforts that explicitly encourage a university culture of problem-based interdisciplinary collaboration, true intersections focused on creating solutions.

The University should create the Intersections Development in Action Laboratory (IDeA Lab) at UM. This would be a continuously evolving platform that fosters interdisciplinary collaboration toward solutions and will:

- Promote interdisciplinary collaboration as a unifying force at UM.
- Offer seed funding for interdisciplinary teams whose problem-based research and education projects require preliminary evidence to demonstrate viability to attract external funding.

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- Provide thematic guidance for UM's problem-based interdisciplinary research and education activities. Selected themes will be monitored for relevance and updated on a periodic schedule.
- Emphasize flexibility and incrementalism in its role and operations. The IDeA Lab will be scalable, nimble and sustainable.
- Work with the UM community to overcome the financial, professional and structural obstacles that have traditionally confronted interdisciplinary collaboration. The IDeA Lab will work with University leadership on redrafting criteria for tenure and promotion to emphasize incentives for interdisciplinary research.
- Foster the inclusion of an interdisciplinarity in the curriculum.
- The IDeA Lab will encourage a spirit of experimentation and innovation. Project failure will be viewed through a constructive lens.

In institutional terms, there are several options for the structure and placement of the IDeA Lab including:

- Joint model: The IDeA Lab would be a joint entity with shared resources, housed under two or more schools/colleges and with a direct reporting relationship to the respective deans. Researchers and instructors would maintain appointments at respective schools and engagement would be project-based.
- School model: The IDeA Lab would be housed at one school, with resources and reporting tied to the school.
- University-wide model**:** The IDeA Lab would be an independent entity, with a university-wide focus, independent finances and a direct reporting relationship to the Provost. Researchers and instructors would receive an IDeA Lab secondary appointment while maintaining primary appointments.

In considering the possible structural formulations for the IDeA Lab at UM, the working group recommends the university-wide model due to its autonomy and flexibility.

Proposal 2: Physical space for the IDeA Lab

Physical space can play a significant role in developing a university culture of problem-based interdisciplinary collaboration. Interdisciplinary teams need a location where they can test their ideas in laboratory, meeting and classroom spaces. A dedicated space can also serve as gathering place for researchers and practitioners interested in interdisciplinary problem solving and demonstrate a university-wide commitment to these efforts.

We propose that a dedicated space be repurposed for the IDeA Lab and its activities with the following specifications:
- Located on the Gables Campus.
- House a combination of laboratory and classroom spaces.
- Include an IDeA Lab Café & Lounge that showcases innovative green design and computational interaction.
- Be equipped with technological resources that facilitate virtual participation for collaborators working off-campus or in remote locations.

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2. Leadership

Successful interdisciplinary collaboration can emerge from both directed and organic processes. While organic processes are ideal, leadership can have an important impact on creating an institutional culture where interdisciplinary work is valued and facilitated. Institutional leadership for interdisciplinary collaboration can create bridges between disciplines, identify and approach external partners, and help teams organize their work around specific problems. Most importantly, institutional leadership can encourage the sustainability of interdisciplinary collaboration.

Proposal 3: Appointment of Leadership

The IDeA Lab should have leadership and administrative support with a mandate and resources that reflect the university-wide commitment to problem-based interdisciplinary intersections and collaboration. There are several options for how this leadership role could be crafted, including:

- Vice Provost for Research: Enhance the responsibilities of this position, currently in the Office of the Provost, to include oversight of the IDeA Lab and overall promotion of a culture at UM focusing on interdisciplinary research.
- Senior leadership position**:** Create a new senior leadership position at the University to convey both the mandate and importance of interdisciplinary research and education at UM. This would be a university-wide position.

Criteria for the leadership of the IDeA Lab include:
- Demonstrated leadership skills. Proven experience in connecting across diverse units in a transformative manner.
- Experience working in a multifaceted context on problem-based, interdisciplinary projects. Background in translating interdisciplinary research to solutions and educational programming.
- Ability to underscore and communicate the importance of interdisciplinary work in furthering UM's excellence and relevance. Be a champion for interdisciplinary culture at UM.
- Ability to think synthetically -- distill information across disciplines and select/curate interdisciplinary teams to solve a given problem.
- Exceptional skills in motivation, cooperation, commitment, creativity, and communication.

During the startup phase of the IDeA Lab, the leadership team will:
- Establish the IDeA Lab's mission as a platform for supporting interdisciplinary research from theory to evidence to solutions.
- Build the IDeA Lab as a platform for university-wide problem-based collaborations. This includes creating structures, processes and relationships across the University and with UM's Office of the Provost, Office of Research and Office of Research Administration.
- Cultivate a culture that supports and values interdisciplinary research focused on problem solving and innovation. This includes initiating opportunities for researchers and instructors to collaborate and serve as mentors for junior researchers and practitioners.
- Select 3-4 themes for initial interdisciplinary research and education teams.
- Select proposals submitted by teams to the IDeA Lab and support the development of research teams.
- Develop proposals for problem-based interdisciplinary teaching and learning to inform a new generation of global problem solvers and innovators.
- Communicate the progress and impact of IDeA Lab activities to stakeholders and potential funders.

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In keeping with a spirit of incrementalism and flexibility, the IDeA Lab should maintain a light institutional footprint during its startup phase. Initially, the leader would be one of a very few permanent personnel appointed to the IDeA Lab. Additional personnel may be added as the IDeA Lab becomes established and demonstrates capacity for resource development and viability.

3. Criteria for IDeA Lab themes, projects and teams

The identification and selection of relevant thematic areas to inspire the work of problem-based interdisciplinary teams will be a central function of the IDeA Lab. The IDeA Lab should periodically review and update the thematic areas as necessary to encourage work that addresses urgent and evolving contemporary challenges.

Proposal 4: Criteria for Themes, Projects and Teams

The following set of criteria should guide the selection of thematic areas for the IDeA Lab:

- Address societal and/or global issues that demand interdisciplinary progress on tangible solutions.
- Provide the opportunity for interdisciplinary collaboration across all schools and colleges.
- Be broad enough to respond to evolving global demands.
- Build on UM's existing substantive research strengths.
- Provide an opportunity for UM to further distinguish itself among peer institutions.
- Deliver opportunities for external funding.

Based on these criteria, the following themes could be considered for the startup phase of the IDeA Lab:

- <u>Environmental Challenges</u>: sea level rise, the impact of nanoplastics.
- <u>Smart Cities/Connected Cities</u>: consider existing work ongoing at UM, demographic and migrant population challenges.
- <u>Health and Wellness</u>: precision medicine, health communications, and medical humanities and global health challenges. Intersection of humanities and medical care.
- <u>Culture of Belonging</u>: many research intersections and questions could emerge from UM's initiative to develop a culture where each individual is valued and has the opportunity to contribute.
- <u>The Potential of Big Data</u>: innovation in managing large data sets and applying to global issues.

While the identification of catalyzing themes should be a central function of the IDeA Lab, to encourage innovation and interdisciplinary experimentation the IDeA Lab should also support open project proposals. This would encourage research teams with novel and innovative project ideas to apply for seed funding even if they do not directly fit one of the IDeA Lab's themes.

Each thematic area will serve as an intersection point for projects and teams working collectively on problem-based research and education. Projects hosted by the IDeA Lab will vary in duration, but the ultimate goal of all projects will be to graduate to a level of autonomy or commercialization. Criteria for project and research team selection should include:

- Projects will demonstrate relevance to one IDeA Lab thematic area and provide preliminary evidence for the need for interdisciplinary, actionable and measurable solutions to a given challenge.
- Teams will include members from multiple disciplines and will demonstrate an equitable distribution of project input from each discipline.

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- Teams will include advisors comprised of active decision makers and end users invested in the solution helping to ensure projects are based in reality and utility.
- Projects will include an educational element, such that research activities contribute to enhanced problem-based interdisciplinary learning opportunities at UM.

The IDeA Lab leadership should assemble a project proposal Review Board comprised of University leadership with relevant experience. The Review Board will be engaged in the project selection process and will help develop proposals.

Potential mechanisms for proposal submission include:

- The Annual IDeA Challenge: A request for proposals (RFP) for pilot projects. Successful proposals will receive startup funds and physical space for pilot phase operations.
- IDeA charrettes: Pop-up, "sand pit"-style multi-day brainstorming sessions on a thematic area bringing together experts from a variety of disciplines to devise potential projects. Initially, the IDeA Lab will convene one charrette each year to test viability of this approach.
- Learning intersections: An annual proposal competition that seeks innovative projects aimed at building interdisciplinary education at UM. Projects can introduce inventive curricular approaches and opportunities for problem-based interdisciplinary collaborations on teaching and learning.
- Theme of the year: Each year the IDeA Lab could call for proposals from teams on a university-wide issue.

4. Resources

As a novel entity in the UM context, the IDeA Lab would require institutional support during its proposed start-up phase beginning in 2017 and going through the end of 2020. Support for the IDeA Lab during this period will allow the entity to establish its operations and demonstrate a UM-wide focus on problem-based interdisciplinary collaboration.

Establishing long-term funding for the IDeA Lab should be an area of focus for IDeA Lab leadership in its initial operations. In particular:

- During the startup phase, IDeA Lab leadership will develop a strategic plan that will include a fundraising strategy and long-term funding plan.
- Core support for IDeA Lab operations should be maintained to compensate for fluctuations in external funding and sustainability of overall mission. This could be supplemented with indirect funds from external grants.
- As they progress, individual projects will graduate from pilot phase funding toward autonomy. Should they become viable solutions to real world problems, projects will need to work with IDeA Lab leadership to attract long-term external funding and other necessary resources.

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5. **Proposed IDeA Lab Start-up Phase Timeline**

	Year 1	Year 2	Year 3	Year 4
Activities	- Launch IDeA Lab, appoint leadership, begin enhancing/creating infrastructure for interdisciplinary collaboration. Selection of themes. - **January:** Launch RFP - Proposal competition for pilot projects in selected thematic areas. Selection based on criteria. - **April**: Selected projects receive approval, seed funding for pilot phase. - **June**: Launch of projects. Quarterly reporting to IDeA Lab leadership	- **January:** Proposal competition for new projects in selected thematic areas. - **April**: Selected projects receive approval, seed funding for pilot phase. - **May:** Evaluation and assessment of progress of Y1 pilot projects. Basis for further funding, or for seeking external funding for longer-term. Collect best-practices. - **June**: Launch of Y2 projects. Quarterly reporting to IDeA Lab leadership. - **December:** Release IDeA Lab annual report. - Long-term Lab strategy development. Creation of financial plan.	- **January:** Proposal competition for new pilot projects in selected thematic areas. Selection based on criteria. - **April**: Selected projects receive approval, seed funding for pilot phase. - **May:** Evaluation and assessment of progress of Y1, Y2 pilot projects. Basis for further funding, or for seeking external funding for longer-term. Collect best-practices. - **June**: Launch of Y3 projects. Quarterly reporting to IDeA Lab leadership. - **December:** Release IDeA Lab annual report. - **December:** Long-term Lab strategy and financial plan finalization.	- **January:** Proposal competition for new pilot projects in selected thematic areas. Selection based on criteria. - **January-March:** UM leadership engages review of long-term strategy and financial plan for IDeA Lab. - **April**: Selected projects receive approval, seed funding for pilot phase. - **May:** Evaluation and assessment of progress of Y2, Y3 pilot projects. Collect best-practices. - **June**: Launch of Y4 projects. Quarterly reporting to IDeA Lab leadership. - **December:** Release IDeA Lab annual report.