Interdisciplinary Activities at MSU: A Rationale and Some Opportunities

This document provides a rationale and suggestions for specific actions to advance activities at MSU that are critical to the Strategic Plan’s interdisciplinary objectives. Current interdisciplinary activities at MSU are not systematically well documented or supported by policies, processes, budgeting, and infrastructure. We have opportunities to change that.

Why is interdisciplinary work important to faculty, students, the community, and society?
The 21st century is the era of global interconnection. Solutions to our current and future problems require the integration of far more diverse inputs (technological, economic, political, cultural, social, and environmental) than we have seen in the past. In order for us to manage these complexities we need to reconsider the approach, creating teams that are interdisciplinary and integrated, both in the academy and the workplace.

Educated people prepared to work at the frontiers of knowledge recognize that interdisciplinary teamwork is essential. The most challenging problems are inherently at the boundaries between areas of established knowledge and areas of the unknown. Discovery and innovation occur particularly well when existing ideas are projected onto the unknown from different perspectives and with unanticipated, serendipitous cross-pollination.

Why is MSU particularly poised to be successful at this time and at this type of work?
MSU has an opportunity to leverage momentum, but without specific and immediate action, the gap between where we are and where we want to be will remain. Our Mission Statement and Strategic Plan update Montana State University’s traditional Land-Grant focus on teaching, research, and service to emphasize integration of learning, discovery, and engagement. The Strategic Plan specifically seeks to “increase work across disciplines.” Moreover, the explicit goal of the marquee Integration section is: “By integrating learning, discovery, and engagement, and by working across disciplines, the MSU community will improve the world.” The MSU Strategic Plan 2014 Status Report identifies 12 successes in reaching the Strategic Plan Objectives, but none directly relate to the “increase work across disciplines” objective.

Fortunately, MSU’s interdisciplinary vectors are aligned improbably well: our campus already has relatively low barriers between departments for interdisciplinary work; we have experienced steady growth in enrollment; we have new campus buildings deliberately incorporating interdisciplinary features (Jabs Hall, Gallatin Hall, and the Norm Asbjornson Innovation Center); we are motivated for research expansion; and our culture boasts the tradition of taking new students—many of them Montanans from across our sparsely populated state—and enabling them to launch successful careers founded on broad-based knowledge, hands-on experience, and a work ethic of persistence and tenacity. MSU students and faculty don’t merely read and talk about art, politics, science, the environment, and engineering, they actually get involved directly in discovering, inventing, and implementing new and innovative systems that improve our world and our joy of living.
In addition, we are in the process of re-envisioning our CORE requirements. The current requirements tend to separate disciplines, and the new requirements will likely combine them.

Strengthening interdisciplinary work is a strategic choice. While in recent years MSU has principally chosen to invest incremental revenue from enrollment growth into faculty lines aligned with specific undergraduate programs rather than in targeted interdisciplinary areas, our campus leadership is now in a position to pivot toward strategic resource allocation decisions and policy initiatives that will ensure MSU’s future by enhancing our prominence in interdisciplinary learning, discovery, and engagement. These urgent decisions will put MSU on the trajectory to attain and sustain the national stature to which we aspire as the leading Land-Grant institution in our region. We are poised to accept and succeed at these challenges.

What would be the goals and objectives of interdisciplinary opportunities at MSU?

The overall goal for interdisciplinary activities at MSU is to better prepare students and faculty to address 21st century challenges. In order to achieve the interdisciplinary goals of MSU’s Strategic Plan by 2019, reasonable objectives for interdisciplinary opportunities at MSU include the following:

- Increase the number of interdisciplinary learning experiences offered (degrees, courses, workshops, assignments) for students. Examples include: “Start-up Weekend” style workshops; assignments that require faculty and students to collaborate across departments to create the deliverables; interdisciplinary team-taught assignments; interdisciplinary team-taught courses.
  **Why?** Working with people of different points of view develops empathetic listening and improves communication skills, and incorporates peer-to-peer active learning, which increases learning retention. Recognizing dependencies among stakeholders and resources develops abilities to describe and address complex problems. Designing low-stakes experiments and prototypes encourages substantive critique, rapid iteration, and accelerated learning. Adapting to changing situations through improvisation creates new knowledge, whether ideas, processes, or products.

- Increase the number of interdisciplinary team-teaching opportunities for faculty.
  **Why?** When teachers from different disciplines work together to craft an assignment or a course, they learn from each other and model for their students effective collaborative problem-solving skills. Courses based on interactive pedagogy accelerate learning for students by asking them to make connections across different realms of experience. Satisfying more than one point of view requires more iterations in the work (both through conversation and tangible projects), which require more neural synapses, which deepens learning. For faculty, team teaching re-energizes their research as well as teaching, as they learn from their peers.

- Increase the number of interdisciplinary projects and research proposals submitted to funding agencies that involve faculty, graduate students, and undergraduate students.
  **Why?** The University strategic plan calls for us to engage in research to create new knowledge, both theoretical and applied, and to increase interdisciplinary research and creative projects. National funding agencies’ calls for interdisciplinary and transdisciplinary research have increased significantly (for example, from 0.25% to 40%
at NSF over 10 years). The strategic plan also calls for increased interdisciplinarity to prepare students as responsible global citizens and for increased involvement of students in faculty research. In order to accomplish these goals while increasing graduation rates, well-designed interdisciplinary research that gives rise to and is informed by interdisciplinary teaching must be integrated into undergraduate and graduate curricula.

- Incorporate as a matter of course interdisciplinary goals in the planning for and renovation of MSU’s built environment.

**Why?** MSU’s built environment should support the activities that will move us toward our strategic goals.

### Possible models for interdisciplinary faculty and student activities:

- **For students:** interdisciplinary first-year seminars; the Directed Interdisciplinary Studies Degree proposed by the Honors College; interdisciplinary service-learning opportunities both curricular and co-curricular; interdisciplinary design courses such as the courses piloted in spring 2015 (Innovation Ideation and Design Thinking for the Community).

- **For faculty:**
  - Full-on internal sabbatical: Faculty would change what they are doing for that period—move out of their current office into a space designated for specific interdisciplinary projects. Faculty would apply, and applications would need to be submitted by an interdisciplinary group of faculty. The proposed work could be for an amount of time from one semester to two years. Deliverables could include new courses, an externally funded project (either the proposal stage or the project stage), or an entrepreneurial project that could result in technology transfer. This would create backfill issues for the home department, so some centralized funding would likely be necessary.
  - A more “casual” program that would circulate faculty through offices in a space designated for interdisciplinary projects. Faculty would still be responsible for their regular workload. Faculty would apply, and those accepted would be expected to produce some sort of deliverable: a new course, a proposal.

- **For the larger community:** A summer program that would combine MSU faculty with people from the community, industry, and/or faculty from other institutions. This model could possibly generate revenue. MSU faculty involved could receive summer salary for participating in and leading group efforts. Faculty from other institutions and people from industry would pay for the program. MSU faculty would submit proposals for programs and put together the teams. Deliverables could be courses/curricula, proposals, entrepreneurial projects. This type of program could possibly be started with funding from, say, NSF, then sustained by participants.

### Critical next steps necessary to meet the MSU Strategic Plan Integration goal:
We are in agreement with the relevant strategies articulated in the MSU Strategic Plan 2014 Status Report, some of which are echoed below.
• Identify the faculty in each department and/or college who are already known as interdisciplinary “catalyzers” and deliberately take steps to encourage, expand, and reward their roles.

• Ensure that the budgeting process prioritizes interdisciplinary work. For example, by providing funding for faculty who wish to design an interdisciplinary course and by focusing the annual Faculty Excellence Grant program on interdisciplinary work, with those proposals receiving special consideration.

• Modify promotion and tenure process to reward interdisciplinary.

• Make interdisciplinary faculty hires.

• Establish a university-level council to strategize about, implement, and administer interdisciplinary activities.

Resources our colleagues might be interested in:

• “Assessing Interdisciplinary Learning” (http://miamioh.edu/oue/interdisciplinary/assessment-interdisciplinary.html) from Miami University provides an overview of constructs and resources addressing the challenge of assessing learning in interdisciplinary courses and activities.

• Creating Significant Learning Experiences by Dee Fink (http://www.amazon.com/Creating-Significant-Learning-Experiences-Integrated/dp/1118124251/ref=sr_1_1?ie=UTF8&qid=1419989756&sr=1-1&keywords=dee+fink) describes specifics on how to design assignments and classroom time to enhance active and interactive learning.

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1 This document was prepared by the Ad Hoc Interdisciplinary Faculty Committee on Curricular/Co-curricular Change:

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5 Montana State University Strategic Plan, Objective 1.2.

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