

## Sciences Units (Biological Sciences, Chemistry, Physics, Mathematics, School of the Environment)

### Questions for Disciplinary Subcommittees

1. What are the most significant disciplinary strengths in the areas represented in your committee that the college should recognize and build on? How are these strengths manifest in educating undergraduates or graduate students? How are these strengths manifest in research or creative activity?

The Sciences have diverse strengths represented over our five units. Biological Sciences emphasizes biotic processes and diversity; Chemistry focuses on research related to the environment, energy and materials science, as well as chemistry of biological systems; Physics emphasizes material and optical physics, astrophysics and extreme states of matter; Mathematics focuses on applied math, computational math, mathematical biology and statistics; the School of the Environment focuses on the dynamics of the Earth and its relationship to the environment with an emphasis on geochemistry. A new ecological group is also joining the School of the Environment. These strengths enable strong undergraduate teaching, undergraduate research opportunities and strong graduate programs in our units. Areas of overlap among units such as materials science, environmental and ecological research and biomathematics present opportunities for interdisciplinary research.

2. What are the most important impediments to capitalizing on our established or emerging strengths so that the faculty can have impact equal to or greater than our aspirational peers? Please be more specific than “money.”

Our most obvious problem is a lack of critical mass of faculty in many disciplines. We have not replaced research faculty at an adequate rate to preserve strength in our programs to enable them to thrive. Inadequate startup funds for new faculty and a need for contemporary research space (both amount and quality) are related problems. Teaching loads are in many cases higher than those in our aspirational peers. Inadequate teaching-related space is also an issue, with labs often needing both modernization and expansion to meet increased demand in the STEM disciplines, and with insufficient space being available for teaching assistant offices. Support staffing is often inadequate for both teaching labs and research support activities.

3. Are there new strategies for supporting departmental excellence that the college should consider? How would these strategic initiatives help us meet our goals? Are there metrics that would allow us to define success?

The strategies we propose relate to enhancing our research programs, and to improving undergraduate student recruitment and program quality.

Related to enhancing our research programs, we propose a program of cluster hiring of faculty to build excellence and maintain critical mass in selected areas. This would enhance the team research efforts that increasingly are necessary for success and extramural funding. Internal awards with sufficient funding for one year of graduate student support should be made available to develop data to support

extramural funding. Release from course responsibilities on a selective basis could also enhance development of competitive proposals. We need to do a better job of “self-marketing” so that both internal and external constituencies better understand the quality of our programs.

Related to undergraduate excellence, market analyses of student needs and the current job market should be performed to enable us to mesh our undergraduate programs with those needs. It is also very important to recruit top undergraduate students to WSU. We propose more face-to-face faculty and staff involvement at high school recruiting events to help recruit the best undergraduate students.

We believe that most of the current performance metrics (publications, graduate training, grant funding, teaching quality) are basically sound. We do believe that there is a need to better collect feedback from former students (five years or more post-graduation) to assess the relevance of their WSU experience to their careers and to incorporate changes as needed.

4. Are there opportunities for interdisciplinary collaboration that we aren't doing already that would advance the missions of the college and units in the college? Can you identify strategies for fostering those collaborations?

We see a number of possibilities for interdisciplinary cooperation. These include both undergraduate and graduate teaching, research and creative activity. We clearly need more interdisciplinary teaching to give our students a more holistic, real-world perspective, and such teaching should be encouraged. Many grant programs (such as NSF) are increasingly emphasizing broader impacts of the research and this presents both challenges and opportunities for interdisciplinary work. Policy may be a natural point of overlap in many cases between the natural and social sciences. There are also excellent possibilities for interdisciplinary work within the sciences (e.g., the Material Science Program, and diverse environmental fields) that have not yet been fully explored. The excellent analytical facilities that exist in the different units (e.g., Geoanalytical lab, Stable Isotope, NMR and Mass Spec facilities) could serve as important catalysts in sparking interdisciplinary research. Interdisciplinary programs will enhance both the quality of our research and training for students and postdoctoral fellows.

There are many possible avenues for promoting interdisciplinary efforts. One of the main limitations is that we often do not know what each other are doing, or who our potential colleagues are. Examples of programs to promote such efforts could include: small internal interdisciplinary grants, funds for cross-disciplinary seminars, and “speed-networking” mixers involving people from different disciplines to connect researchers with interests in common.

Our general campus culture should change to facilitate more interchange. We need more mixers to facilitate interaction among people from different units and disciplines. (The recent CAS event was a good beginning). A faculty club (which has been widely discussed but never implemented) is a natural environment for such interactions. Writing and art are highly relevant to both the social and natural sciences. The Academic Showcase and undergraduate research poster events are very promising developments for promoting interchange and should continue to be encouraged.