

IBB: Idea for Bio-related Educational Theme

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Big picture: Establish research-intensive and design-intensive courses and infrastructure for sophomore and junior level students in Bioengineering and BioSciences.

Background: Currently, there are some authentic opportunities for students in the freshman year in BIOE (e.g., ENGI 120, GLHT 201) and BIOS (e.g., NSCI 120, BIOC 112). The senior year is often filled with Undergraduate Honors Research (BIOS 401, 402) or capstone design (BIOE 451, 452). Whether students are engaged in authentic experiences in the middle years vary widely, and there is an opportunity for the BIOE and BIOS departments to synergistically create courses and workspace to support curricular changes.

Curricular Opportunities: The vision is to include open-ended, authentic challenges into core sophomore and junior level courses in BIOE and BIOC. These courses will build on the first-year experiences and better prepare students for their senior year challenges. These open-ended challenges include research problems or design challenges. Target courses could include:

- Systems Physiology, which could be revamped to include BIOC students as well as BIOE students
- Cell Biology, which both BIOC and BIOE students take

There is growing interest in both departments in the fields of systems and synthetic biology. Also, both BIOE and BIOC students take the GLHT minor, a further area of collaboration. A goal might be to add authentic projects to four courses in both BIOE and BIOS, with the hope of several being overlapping (i.e., jointly taken) courses.

Workspace - BioDiscovery Kitchen: The development of these courses demands the creation of a BioDiscovery Kitchen. Currently, the OEDK has facilities for creation of ‘dry’ prototypes, mainly involving mechanical and electrical components. The facility almost entirely lacks the ‘wet’ side necessary for work common in BioSciences and Bioengineering. A BioDiscovery Kitchen could be designed to support the materials (e.g., biologics, chemicals) and equipment (e.g., analytical, tissue culture) to support open-ended authentic research questions and design projects.

With the facilities and supporting curriculum, Rice will increase its national leadership role in BioSciences and Bioengineering by engaging students in authentic research and design.