STUDENT-INITIATED SENIOR DESIGN PROJECTS

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To: Departmental Faculty
From: Senior Design Instructors

We have 150 seniors enrolled in senior design this fall, and we need projects! If you have ideas for process or product design projects, please let us know.

Response: Crickets chirping in the silence

Senior design instructors who want to keep the course content fresh face the annual challenge of identifying new projects. National design competitions,[1] design textbook case studies,[2-4] and industry partners can be good project sources, but another option is to ask the students themselves. Student-proposed projects might be drawn from an extension of their industrial internship or undergraduate research project, entrepreneurial interests, or just a personal curiosity about a particular process or product.

We provide the following guidelines to students who are interested in proposing their own project:

1. *It must have a faculty sponsor (not necessarily in the ChE department).*
2. *The project scope must include (but is not limited to) the following:*
   a. *Processing of chemical/biological material; batch or continuous*
   b. *Market analysis*
   c. *Material and energy balances*
   d. *Equipment sizing*
   e. *Evaluation of capital and manufacturing costs, as well as a profitability analysis*
   f. *Facility design*
   g. *Emissions audit and identification of applicable local, state, and federal regulations*
   h. *Identification and discussion of the "total costs" associated with technology/facility implementation*
   i. *Brief proposal to a local city council describing the benefits of the new/expanded facility*
3. *The project proposal should include a staffing request (# people required; disciplines and skills needed).*
4. *Projects may have experimental components; in that case, include a budget request (supplies, equipment).*
5. *Certain projects do not fulfill all of these requirements. For unique circumstances, see the instructors.*
6. *You cannot select your own project team. The initiator will be guaranteed the project, but it will be open to the class along with other projects listed.*

Some topics based on previous projects from our classes:

- *Edible Muffin Liners*
- *Biodegradable Dental Microspheres*
- *Liquid Body Armor*
- *Cholera Detection in Drinking Water*
- *Remotely Operated Biological Warfare Agent Detector*
- *Ice Cream M&M's®*
- *Odor Reduction from a Hog Farm*
- *Breast Milk Pasteurization*
- *Development of a Disposable Catheter*
- *Barbeque Sauce Co-Packing Facility*
- *Improved Heat Pack for Dialysis*

So if you're scratching your head trying to avoid another "design a (fill-in-the-blank-chemical) facility," consider asking your students to generate their own project proposals within guidelines that you provide. You will likely find, as we have, that students will surprise and impress you with their creativity, innovation, and enthusiasm.

REFERENCES

1 AIChE National Student Design Competition, <https://www.aiche.org/community/awards/student-design-competition-team>, accessed May 30, 2014
2 Turton, R., R.C. Bailie, W.B. Whitning, J.A. Shaeiwitz, and D. Bhattacharyya, *Analysis, Synthesis and Design of Chemical Processes*, Prentice Hall, 4th Ed. (2012)
3 Peters, M.S., K.D. Timmerhaus, and R.E. West, *Plant Design and Economics for Chemical Engineers*, McGraw Hill, 5th Ed. (2003)
4 Seider, W.D., J.D. Seader, D.R. Lewin, and S. Widagdo, *Product and Process Design Principles: Synthesis, Analysis, and Evaluation*, John Wiley, 3rd Ed. (2008) ❐

This one-page column presents practical teaching, advising, and diversity tips in sufficient detail that others can adopt the tip. Focus on the teaching method, not content. The column should be maximum 550 words, but subtract 50 words for each figure or table. Submit as a Word file to Phil Wankat <wankat@ecn.purdue.edu>.