Overcoming barriers, finding solutions, creating incentives and rewards

• **Culture Change**
  • Acceptance of nonacademic careers as valuable
  • Success is not just replicating self

• **Education**
  • Discovery & exploration of alternative careers, skills needed in changing world
  • Teaching methods/course changes, programmatic activities to develop skills

• **Collaboration**
  • Involve employers – who hires your students?
  • Business schools – in house & online
  • Career services – university & professional society resources
  • Toastmasters, public speaking, etc.
Common Advice

• Patience, patience, patience – process takes time. Take it slow and spend the time to get faculty buy-in.

• Be patient, but insistent that changes can improve our programs and be beneficial to our students. In times of budget problems, these kinds of changes can be program savers.

• Open dialogue and communication is key.

• Large faculty – use core group but get faculty buy-in first and keep updated.

• Find a champion!

• Bring in outside speakers that inspire faculty to change.

• Make sure that there is some mechanisms in place for driving and enforcing your proposed changes.

• Leverage institutional processes and resources.

• Before you start, figure out how to overcome entrenched ideas regarding what constitutes a “real” Ph.D. or M.S.
Issues to resolve

• Resources – financial and space needs
  • Time and support to develop and pilot new instructional approaches
  • Space redesigned from lecture-based to interactive classes
  • Technology infrastructure
  • Performance-based incentives to change
  • Investment in professional development activities
    *Supplemental funding for PIs from NSF and other federal government agencies available to fund internships*

• Rewards & incentives
  • Release time, awards, advancement
  • Recognize “change” efforts in annual performance evaluations and tenure and promotion
  • Professional development; short courses

• Different incoming student backgrounds & quantitative preparation
Proposed Incentives

Does your department use or offer any of the following?

- Professional development for faculty teaching
- Effective teaching as an important hiring criterion
- Improvement in instructional infrastructure (including technology)
- Rewards for innovative teaching
- Incentives (including release time) for developing new courses using research-validated pedagogies
- Effective teaching as a part of graduate student professional training

Out of 354 departments
Important to Consider

Evaluate where skills learned – course vs experiences

• Decide what kind of skills
  • need to be framed in course or other formal setting - - i.e. can’t be captured in an experience
  • are learned in process of conducting research
  • best learned through “experiences” (i.e. teamwork, leadership, etc.) but not well suited for ‘courses
  • best learned through co-curricular activities
    • Conference presentations, writing scholarly papers, public outreach experiences, etc.

• Use of team-based cross-disciplinary, longer-term projects or case studies for student groups to work on together. (e.g. Imperial Barrel)
Potential adoptions to suggest

• Introduce some Agile methods (project management methodology) in the lab or student cohorts build exposure to a common business process
• Require reading of key outside publications, like The Economist for exposure
• Exposure and use of remote communications (web meetings, sharing across distant team members)
• Virtual mentoring – AGU partnering with other societies to provide mentors from outside of academia
• Get students to boil down their research reason to something relevant to a local level, such as to a congressperson and their constituency
• Integrate writing/communications/project management into all classes in graduate programs to help develop these skills and reinforce them during their studies
• Build opportunities for students to have to communicate with outside layperson groups, such as seniors groups, etc. to ensure they can discuss the research in an accessible manner and relevance.
• Build exposure opportunities, such as having visiting talks by individuals from outside areas, such as from the business school
• Have students write proposals (GSA research grants, GRFP, etc.) or help with NSF/NOAA, NASA proposals to understand something about budgets