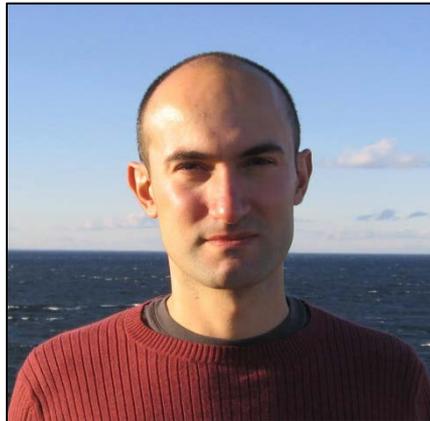




Using Fellowship Proposal Development to Teach a Biomedical Device Engineering Course

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Why?

- Problem: Need for thematic-courses that expose students to knowledge and tools of both academic and industrial utility in order to facilitate pursuit of a specific idea with a multidisciplinary scope.
- Educational Objectives: Utilize development of a fellowship proposal as the framework to teach an interdisciplinary biomedical device engineering course, guide students in identifying research interests, and instill critical thinking skills.

When?

- During my graduate studies, I looked for a course that could deliver the essentials of miniaturization technology in life sciences.
- As a postdoc, I realized that proposal development was a tool for articulating my research ideas and identifying missing knowledge and expertise.
- At UC Davis, I developed the course described here for addressing the academic and industrial needs/interests that I identified during my training.

Where?

- I taught the 10 week-long course at UC Davis to graduate students from biomedical and electrical engineering, as well as materials science.
- The course consisted of 17 lectures, assignments, a midterm, hands-on lab demos, proposal writing, peer review, and a final presentation.
- I am interested in team-teaching a similar course across different institutions, particularly establishing a cross-institutional peer review component.

What?

- My theory of change is that students should identify their true interest, although it may lay outside their immediate expertise, and use structured writing as a tool to formalize their ideas and to identify missing knowledge/skills required to achieve the ideas.
- I facilitate this through course materials including lecture slides, targeted homework sets, a midterm examination, evaluation criteria for the fellowship proposal and project presentation.
- Several fellowships drafted during this course have formed the basis of successful a NSF Graduate Student Fellowship and PhD proposals, and helped students to recognize their interests and devise self-guided learning objectives for accomplishing them.

Prognosis?

- I document impact via evaluating learning outcomes acquired through surveys in conjunction with the Teaching & Learning Resource Center at UC Davis and by keeping track of student fellowship outcomes, as well as any changes in their majors and courses they take outside their required course work.
- I am seeking advice on:
 - How to scale up the course for larger enrollment
 - How to integrate it into an online course format
 - What additional evaluation metrics to use
 - How to evaluate a large number of students
 - How to modify the course for undergraduate education
 - How to add a laboratory component