

## **Brainstorming Session: "Developing a New Learning Activity for Engineering Interns"**

Julianna Lin, University of Rochester

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**Present:** Oscar Azucena, Lisa Hunter, Ravi Jonnal, Julianna Lin, Anne Metevier, Malika Moutawakkil, Hilary O'Bryan, Lynne Raschke, Fernando Romero, Julia Wilhelmsen

### AGENDA

1. What is Engineering?
2. Possible Content Goals
3. Engineering Inquiries
4. Engineering Problems
5. To Do

Julianna distributed a Brainstorming Worksheet. It is located at:

<http://cfao.ucolick.org/EO/meetings/other/eng2.23.04.pdf>

### NOTES

1. What is Engineering?
  - Reviewed definitions on page 2 of worksheet.
  - There is a lot of overlap between science and engineering. Most people do both.
    - Engineering is used in science.
    - The scientific process underlies engineering.
2. Possible Content Goals
  - Reviewed engineering process from page 2 of worksheet.
  - Will think about other content areas, besides optics, for the next meeting.
3. Engineering Activities/Inquiries
  - For activity, process and content at the same time is ideal, but a challenge.
  - Should understand concepts in Intro Optics Lab before doing inquiry.
  - Inquiry lends itself to engineering questions, but don't want the questions to be too broad. Can limit materials to focus the questions.
  - Possible inquiry starter could be something that doesn't work right and students have to think about "what is the problem" and how to make it work better.
  - Can include cost/risk analysis during synthesis. Students can use different materials (to eliminate competition) and then decide on best possible choice during synthesis.
  - Can have research component, background web and library research, like Scott Seagroves did with COSMOS.
  - Consider computer engineering problems – cheap, easy to set up problems.
4. Engineering Problems
  - How measure and correct aberrations in wavefront – interesting and fundamental problem.

- Shack Hartman Wavefront Demo – can students really interact with it and generate questions?
- Could build big, “crazy” heliostat and have students improve it, make it more compact, etc. Could deliberately put “bad” optics in it.
  - Could get some optical elements from Kerry at UC Davis. Could also borrow a “few” elements from LAO.

#### 5. To Do

- For the next meeting spend more time brainstorming other activities.
- Try to think of more multidisciplinary engineering activities, send ideas to Julianna or Lisa.
- EHR staff will compile list of internship projects and PIs and send out by Friday, March 27.