

# **Industry Advisory Board Meeting**

Friday, November 15, 2002

## *Meeting Minutes*

### **Welcome (Dean Dhir)**

The School of Engineering is emphasizing multidisciplinary research; CEE can play important role in this; We should be preserving strengths while expanding into new areas with faculty recruitment; 40 new faculty expected in school in near future.

### **Department Overview, Objectives, and Goals (Prof. Yeh)**

**Major fields of study:** Environmental., Geotechnical, Structural, and Water Resources Engineering

**Goals:** Improve ranking, national/international visibility, obtain major research grants, seek endowment for faculty chairs, fellowships, replace and upgrade facilities.

### **Needs for Meeting Goals:**

Ranking: Add faculty in key areas, increase enrollment, improve retention; Status: Two faculty in structural and computation hired, one hiring in design optimization.; two faculty hired in Environmental Engineering and Hydrology and Water Resources.

Visibility: Increase research productivity, organize high-profile conferences, etc.

Funding: Increase multidisciplinary research; obtained NEES grant, NSF Center for Embedded Networked Sensing (CENS), new funding from NASA-JPL, Ford, Caterpillar, Caltrans

Endowment: Develop Industrial Affiliates Program, Industry Advisory Board

Facilities: Replace labs in Engineering I building, develop new teaching/research labs, new computer labs

### **Challenges to Goals**

Hire most qualified faculty, retain faculty (just as important!), increase faculty size to 25, develop new major funding sources, endowment, enlarge IAP, sustain IAB, enhance multidisciplinary research collaborations within UCLA

### **Questions/Comments:**

R. Trussell: What particular ranking should be improved? Dean Dhir: US News (yearly), NRC (every ten years); R. Trussell: What are their criteria? Dean Dhir: School reputation based largely on perception of other deans/department chairs (other schools) of your school, how many NAE members?, How much extramural funding? Graduate student selectivity, PhD productivity. R. Trussell: As a practitioner, quality of MS students is important, US News doesn't consider this.

P. Ryan: Presentation seemed to contain no focus on students. Has there been survey of students? Dean Dhir: looking for input from IAB, alumni, etc. B. Yeh: The new freshman seminar is designed to get interest of students early on and expose them to CEE. R. Taylor: Need to compile list of important/challenging projects (now and future); would inspire students. R. Trussell: “Challenging” projects may not always appeal to young people. Need to instead appeal to idealistic nature of CEE field; i.e. making contribution to humanity. R. Taylor: Need both, projects to inspire idealism. M. Lew: Need to make connection with teaching subjects and real engineering projects, by bringing in practicing engineers. J. Stahl: By the time students are recruited interests are well established; challenge to faculty is to bring in, as early as possible, practicing engineers to establish interest and connection with field. Relationship between faculty and student should be #1 priority. M. Lew: Why not bring local engineers/alumni to freshman seminar as well as faculty? Also, internship programs can be a good tool. L. Felton: Need to also attract the best students, which depends on ranking. Shafiq: Mentioned that ranking is important and why students don’t apply. E. Rice: Commented that screening criteria is important to get students from beginning who are well equipped for engineering. Then retaining them will be easier.

## **Curriculum Review**

### **Undergraduate (Prof. Fox):**

**Goals and objectives:** Allow flexibility for specialization in particular areas; Supplement curriculum with courses in other departments; Rework design unit requirements

**Challenges:** Increase breadth of course offerings to include other areas of CE; Have more courses taught by ladder faculty; Teach CEE 101 (Statics) on regular basis; Draw on opportunities in Los Angeles to improve educational experience; Increase TA support for undergraduate courses; Introduce keystone design course into curriculum; Improve requirements for oral/written communication in all courses

### **Questions/Comments:**

F. Naeim: Where is Statics in the curriculum?? It is a crucial course. Prof. Ju: Working on CEE 101 to provide Statics background. M. Lew: Reiterated that Statics is the most important course in CE. F. Naeim: Can be used to attract/keep students. J. Stahl: Stand-alone statics course is a MUST. Teaching fundamentals in key to improving ranking. Need to work up from fundamentals. Ranking will follow. F. Naeim: Cal-Poly grads are preferable hires often because of their fundamental grounding in statics/dynamics.

### **Graduate (Prof. Chen):**

MS Degree: Options: Thesis plan/Comprehensive plan; Focus on practical training  
PhD Degree: Major field exams, minor fields, qual. Exam, final dissertation defense  
Include seminar requirements for breadth

**Challenges for Grad. Program:** Increase graduate enrollment; Better research lab space; Develop new major research funding sources; Major fund raising for graduate fellowships; New equipment and facilities; Enhance multidisciplinary research collaborations

**Questions/Comments:**

P. Ryan: How much collaborative industry research is there? Prof. Chen: Often companies contact faculty directly about research topics.

R. Taylor: It doesn't appear that there is cohesion in the department despite its small size. Perhaps we should capitalize on small size as a strength.

R. Trussell: What are the challenges that relate to the coursework. T. Harmon: All promotion is based on research, hence focus on that. Small incremental effort can be made to connect with students. We might be better served to socialize with students than have disconnected freshman seminar.

P. Jennings: What are the class sizes? J. Stewart: Required undergrad: 50 students; Graduate: 10-15.

J. Wren: What are typical sources of graduate students? P. Fox: M.S. students often from California (many from UCLA); PhD: Many students are international.

R. Taylor: What is level of financial support for incoming students?; B. Yeh: Graduate division give \$200,000 for incoming students for fees/stipends. There are some special fellowships as well and teaching assistantships.

**Research Review (J. Stewart)**

Overview of Research Groups

**Environmental Engineering:**

Stenstrom: Stormwater runoff, water/wastewater treatment

Stolzenbach: Coastal water quality, atmospheric deposition, hydrodynamics

Harmon: Embedded network sensing, contaminant transport in groundwater

Jay: Geochemical modeling, speciation of arsenic in sediments, pathogen distribution in marine sediments

**Structural Engineering and Mechanics:**

Ju: Engineering Mechanics

Felton: Optimum Structural Design

Selna: Reinforced concrete, earthquake engineering, response of concrete structures

Wallace: Structural/Earthquake engineering, reinforced concrete, column and foundation systems, field testing and monitoring

Chen: Computational mechanics

Taciroglu: Coupled problems in solid and structural mechanics, adaptive and parallel computing

### **Geotechnical Engineering:**

Vucetic: Dynamic soil properties and testing, seismic performance

Fox: Flow through porous media, consolidation, landfills, geosynthetics

Stewart: soil-structure interaction, laboratory and field studies of seismic ground failure, field testing of foundation performance

### **Water Resources Engineering:**

Yeh: groundwater modeling, inverse problems, system optimization

Margulis: land-atmosphere interaction, remote sensing, data assimilation, hydroclimatology

Selected research summaries by J.S. Chen (Meshfree methods), M. Stenstrom (Storm water runoff), and J. Stewart (Field testing and monitoring of structural performance)

### **Questions/Comments:**

P. Ryan: There's no "brand" for UCLA, as opposed to other schools. Is there a lack of critical mass that is responsible for this? Or is this just a consequence of the breadth of research? J. Stewart: Former Dean emphasized research groups relating to problems in LA (Earthquake Engineering, Water Resources, Environmental, etc.). T. Harmon: It has been difficult because we have lost faculty and haven't necessarily been able to replace them. R. Trussell: When was dept. formed? M. Stenstrom: 1983. R. Trussell: Time may be primary factor since department is relatively new. J. Stahl: Frank input from IAB is critical for obtaining a "brand". Shouldn't necessarily focus on ranking, but reaching out to community, developing connections, etc. With quality work, the rest will follow. R. Taylor: Continuity and cohesion is important, especially while a small department. F. Naeim: UCSD is a good example of a small group (Structures) that has grown. P. Ryan: Focused growth would establish a reputation.

R. Trussell: What about collaboration with industry? What is the IAP? B. Yeh: Consists of companies who contribute to the department. W. Ju: Different levels based on contribution. R. Taylor: It doesn't seem to bring in enough money. At UC Berkeley, the IAP collapsed. E. Rice: Allows a close connection to students and senior projects. Students can also be tapped for employment recruiting. J. Stahl: The relationship with the engineering community makes the IAP worthwhile. The perception is that what comes out of academic institution is not well connected to industry. R. Trussell: Each group may want to tailor connection to industry in different ways.

## **Faculty Recruiting, Retention, and Department Budget (Yeh)**

Net faculty FTEs Available: 49 (school-wide)  
Allocation of FTEs tied to growth in enrollment  
Currently CEE has 15 tenure-track faculty  
CEE Dept. capped at 18 FTEs for the near future  
Overall, budget heavily tied to number of students.

### **Questions/Comments:**

E. Rice: Would it make economic sense to recruit more junior transfers? B. Yeh: Yes, we would like to get as many as possible. M. Stenstrom: School has limited number of acceptance slots. R. Taylor: What attempts are made to recruit undergraduates? Perhaps a regular attempt at showing an interest is important. Calling students could add a personal touch that would make all the difference. R. Trussell: Having an adviser is not enough, but an attentive adviser is key. W. Ju: We should revitalize effort to call admitted students to encourage them.

R. Taylor: Are there any endowed dept. chairs? M. Stenstrom: There is some at the School level, but none in the department. B. Yeh: The requirement is \$500,000 for an endowed chair. R. Trussell: It's a long-term proposition that should be pursued.

R. Taylor: What about the issue of retention of faculty? B. Yeh: The old Dean did not make significant efforts at retention. The new Dean wants to make significant attempts at retaining faculty. R. Taylor: The key is making faculty happy in which case it will be less likely that leaving will be a problem.

## **Discussion**

### **Curriculum:**

#### **What changes to curriculum are needed to produce students with the optimal training for work in industry?**

Statics should be a stand-alone course!

Freshman Seminar (CEE1) should be given every quarter. Want continuity with students. Possibly request one-page summary of what they heard each time. Should not be a heavy burden, but be interesting to students. Instead of individual faculty each week, should maybe focus on team-building between faculty and/or industry to give more continuity to the course. Make students familiar with the array of professional organizations to be involved in.

Should look at entire first two years of program. Establishing continuity with students. Get undergraduate students into the lab early on. How best can contact be kept with undergraduates during first two years. Statics could be incorporated in first two years.

Courses in probability/statistics, finite element, and optimal design would greatly benefit students.

What about fluid mechanics? Is the MAE course well-connected with CEE applications? Should it be brought into CEE.

Should FORTRAN be dropped completely from the programming course?

**How can IAB and other industry representatives participate in the CEE curriculum?**

Could blend IAB members with presentations in CEE1. Should be used to motivate students.

**How can industry members obtain advanced CEE degrees at UCLA?**

With limited faculty, should focus on other things. Other schools (USC, etc.) have night programs that are already set up.

**Research:**

**What areas of research are needed to improve current civil engineering practice?**

Need periodic meeting with industry representatives to make sure research is relevant to engineering practice. Perhaps annually? Also, may want to gather individual groups for each research area to reach out to industry members.

**Industry Needs and Goals:**

**How can we facilitate the participation of CEE faculty in education outreach to industry (seminars, short courses, etc.)?**

Some weekend short courses have been successful. Could be a vehicle for outreach.

Not necessarily a big return for faculty to get involved in this type of outreach, especially for small faculty.

Use alumni contacts in companies to establish links.

**Can we establish a regular program of industry internships for CEE students?**

Faculty can provide quality students that will perform well at the company. Difficult for many companies to commit to UCLA over other schools. Use research collaboration as expertise that isn't offered by other schools. Because of the two-way benefit of

internships it should be reasonable to set up a regular program. A information packet with student bios., may be helpful.

### **How can we facilitate the hiring of UCLA graduates into industry upon graduation?**

Internships are key. Interns who are liked by the company are often hired. Basic fundamental civil engineering courses are important.

### **Other comments:**

What should be the emphasis on teaching vs. research? From an industry point of view, teaching is most important. Putting effort into teaching will be of most benefit to practicing engineers. How to fit this into the framework of a research university is a difficult problem. Maintaining emphasis on research provides for intellectual growth that can benefit teaching at a later day. The key is finding the right balance.

### **Closing Summary Comments**

IAB is happy with our willingness to be self-examined by IAB. Pleased with our effort in making the presentation. As small program, we have the opportunity to make changes that will have a significant impact.

Take greater advantage of CEE1 course, implement Statics course, better connect with students in the first two years.

Would like to hear from student organization at next meeting, presentations by graduate students, and new faculty.

Should have a more organized effort to reach out to alumni.