

## Minutes of the ME Industrial Advisory Board Meeting

April 15, 2005

**Members Present:** Hasan Akay (Dept. Chair), Robert Delaney, Dan Dempsey, Ray Fiechter, David Fulton, Steve Laymon, Pankaj Mohan, John Moore, C. Fred Smith.

**Faculty and Staff:** Kelly Koher, Razi Nalim.

1. Meeting was called to order at 1:07 pm following the lunch.
2. Packets including the meeting-related material were distributed.
3. The Agenda was approved.
4. The following announcements were made:
  - Dr. Akay thanked everyone for coming; looking forward to another good meeting with advice and support.
  - Introduction of John Moore from Raytheon. This is his first meeting. He is an ME graduate.
  - Introduction of Fred Smith. He replaces Lynn Snyder from Allison Advanced Development Company.
  - Bob Delaney has been elected onto the Dean's Industrial Advisory Council (DIAC). He is always welcome to participate in our meetings too, as his experience and wisdom are valuable for us.
  - We have some new initiatives on which to seek the IAB's advice.
  - A reminder of the bylaws developed by the Board. We have been following the bylaws and ABET acknowledged the Board's activities in their visit.
    - Members serve a three-year term with a possible extension.
  - Please check the membership list for corrections and updates to be made.
5. The Minutes of the October 01, 2004 meeting were reviewed and approved.
6. Dr. Akay reported on departmental events and activities. His report is attached to the minutes.
  - Dr. Akay welcomed and thanked everyone for attending.
  - He would like to have another joint IAB and USAB meeting be held this fall. Students will appreciate the good advice on communication skills and manners in the workplace and importance of continuing education, advanced degrees, etc.
  - The final ABET report is expected to arrive in summer. The draft received is quite positive, listing one concern on academic advising, and four observations for improvement.
    - Steve Laymon asked about the concerns in advising. Dr. Akay

- responded that there is a demand to register early; students need to see their advisors before the hold is released to register.
- o There are arrangements being made to have students meet with the chair or associate chair when they first arrive to the department to be introduced to their advisors.
  - o A plan is in effect to have students complete their POS as an assignment in a mandatory course.
  - o Steve Laymon mentioned that ECE students taking statics as an elective are doing so without proper advice. They seem to be unaware of the expectations.
  - o Dr. Fred Smith asked if ABET gave advice on the concerns. Dr. Akay answered no, but they made us aware of the concern to make it better for the students.
- An IUPUI Internal Review of our program will be held Oct 12-14, 2005 along with Electrical and Computer Engineering and Biomedical Engineering programs. Every program on campus has to go through such a review periodically. Bob Delaney is on the program review board representing industry.
    - o This will be more extensive than ABET; this will cover undergraduate, graduate and research programs.
  - The two new graduate programs, the joint Ph.D. program with Purdue and the five year BSMS program, are progressing well with new students applying. Ph.D. students will be supervised by one IUPUI and one WL professor with open communication between both. This will help the growth of research on campus. We will have three new Ph.D. students this fall. The program will be potentially available to industry students too. Our department has the only engineering BSMS program among all Purdue campuses.
    - o As a note: the IUPUI Top 100 Students included 8 ME students; the top male is an ME student, a BSMS student.
  - The search and screen process for a faculty in solid mechanics and advanced materials area is ongoing. We expect a new faculty member on board by August 1. We have interviewed several very good, competitive candidates this year.
  - Ongoing research projects:
    - o 21<sup>st</sup> Century/Allison Advanced Development Company – Dr. Nalim & Dr. Fred Smith.
    - o 21<sup>st</sup> Century/Rolls-Royce – Dr. Andrew Hsu.
    - o Cummins – Dr. Razi Nalim & Brett Barnhard.
    - o Eli Lilly – Dr. Akay & Dr. Pankaj Mohan.
    - o NSF/STTR – Dr. Hazim El-Mounayri.
    - o NASA – Dr. Siva Krishnan.
  - Multidisciplinary Undergraduate Research Institute (MURI):
    - o Annual budget of \$110,000.
    - o Mentors (Engineering Faculty) declare a project and students apply to that project to work as a team.
    - o Dr. Akay will like to have industry sponsorship with this project to

- o attract and retain good students.
- o Dan Dempsey asked if students get a reward for this project. Dr. Akay answered that they receive course credit and a stipend of \$1,500/semester.
- o Bob Delaney asks if this is available to students at a senior level. Dr. Akay explained that students at a junior or senior level may apply, depending on the project.
- o Dr. Smith pointed out that propulsion and gas turbines were missing on the flyer listing the research areas.
- Industry-Supported Capstone Design Projects.
 

Dr. Akay gave a summary of department's capstone design course ME 462, where students work on industry projects in teams. He submitted a proposal to the industry to solicit support as summarized below:

  - o A fee of \$2,500 will be charged to an industrial sponsor for each project. The money will be exclusively used for the course.
  - o The sponsor will receive a copy of the final report, computer models and a copy of the product development files.
  - o Students go through systematic design process including project management and the students work in teams.
  - o Dr. Chen who currently teaches the course helps with the design process, teamwork, timeline, and giving presentations to jury of faculty and industry experts.
  - o Projects are very competitive. There is a \$1,500 award for best design instituted by Rolls-Royce. Very good design projects are produced each semester. Several projects resulted with patent applications in the past.
  - o Question:
    - How can we advertise to industries?
    - How can we pay for costs of materials?
    - Is the fee of \$2,500 reasonable?
  - o Dr. Bob Delaney stated that his company does this with other universities. It needs to be something beneficial to the company.
  - o Discussion:
    - If a project goes beyond Dr. Chen's expertise, Drs. Nalim, Krishnan, and Hsu would be possible advisors.
    - Can students come out to the industry to test project?
    - This is a one semester course; semester continuity on a project is possible.
  - o Dan Dempsey asked if the fee covers ownership of the project. Dr. Akay answered that ownership is part of the agreements signed.
  - o Prompted by David Fulton's question, Drs. Chen and Akay are the contacts for Capstone project initiations.
  - o Projects are defined before a semester starts. July or early August for Fall; Nov or Dec for Spring.

The Board endorsed the proposal.
- Internship and Coop Programs in ME:
  - o ME revised its internship and coop programs inn Fall 2003 in order to

increase the student-faculty interaction during and following the internship and coop sessions.

- o Starting in Spring 2004, best presenters are invited to speak to the students of the learning community course ENGR 195 explaining the benefits of the program. They are role models to other students.
- o Carrier has \$5,500/year scholarships to students from high school. It is designed for minority and female students. This brings in good students and internships can be offered. Dr. Akay would like to see other companies participating.
- o Similar programs may be possible at the graduate level too. They may even get involved with company-specific projects with the help of faculty members.
- o Dr. Bob Delaney is currently supporting some co-op students.
- o Dr. Akay asked board members' help in promoting this program.

The Board supported the idea of strengthening coop and internship programs.

- Center for Large-Scale Computing (an industry consortium):  
Dr. Akay gave an overview of a consortium effort of the department in establishing a computing center for providing hardware and software services to industry. This has started with an equipment grant submitted to NSF and is planned to be submitted to other agencies with a larger scope. He reviewed a call for partnership letter sent to some industrial partners (Carrier, Cummins, Eli Lilly, Rolls-Royce, Raytheon, Remy Inc., etc.) recently. Many of the Board members expressed interest in such an engineering computing service and resource center and provided the following suggestions:
  - o A multi-level consortium with different levels of memberships would be advisable, such as:
    - a) Hardware only.
    - b) Hardware plus technical services.
    - c) Training.
    - d) Customized research and development.
    - e) Etc.
  - o The service aspect is important as well as the data security and confidentiality.
  - o It is worthwhile to seek additional support from government for this.

The Board expressed support to the idea of a solution center under the name of Indiana Center for Industrial Computing.

Dr. Akay thanked everyone for attending the meeting and the valuable recommendations provided by the Board. The meeting adjourned at 3:10 pm.

**Chair's Report**  
**ME Industrial Advisory Board Meeting**  
**April 15, 2005**

1. I am pleased to welcome all of you to the ninth meeting of the ME Industrial Advisory Board since its inception in October 2001. This Board has been and continues to be very valuable in helping us in many matters, including curriculum, student recruitment, course contents, and industry funding. We are grateful for the support you have provided and look forward to the Board's continued help in all these matters.
2. I am pleased to welcome the newest member of the Board, Dr. Fred Smith, from Allison Advanced Development Company (AADC). He is a program manager at AADC, and collaborates with Dr. Nalim on the wave rotor project. He will be replacing Dr. Lynn Snyder, who previously represented AADC on the Board. We are delighted to have him on the Board and look forward to working with him.

I would like to thank former members for their contributions to our department, Dr. Martin Myers from Cummins, who left the Board due to his transfer to Minneapolis; Fred Keller from Carrier Corporation and Dr. Lynn Snyder from AADC who left the Board due to their work commitments.

3. We have received the draft report from ABET on the results of the review we had back in October. I am pleased to report that ABET has not found any deficiency of weakness in our program, which is very good news. There were only one concern and four observations (A *concern* indicates that a criterion is currently satisfied; however, the potential exists for this situation to change in the future for that criterion not to be satisfied. Therefore, action is required to ensure continued full compliance with the criteria. An *observation* is a comment or suggestion that does not relate directly to the accreditation action, but is offered to assist the institution in its continued efforts to improve its programs).

The concern was in the area of student advising and observations were advised in making design project reports more formal, lab experiment reports less extensive, receiving continuous feedback on assessing the program changes, using safety goggles in experimental labs. We have already taken measures to accommodate the concern and observations and responded ABET with a report. The final report is expected to arrive in summer. All indications show that we may receive another six-year accreditation without any major concern. I would like to note that the documented activities and feedback of the Industrial Advisory Board were very instrumental for attaining this positive result.

4. Now that ABET has finished, we need to undergo through another program review, called IUPUI internal review, done every other 6-7 years. It is a review required by the campus administration to monitor quality. A board of 6-7 members composed of

external and internal reviewers is chosen to evaluate undergraduate, graduate, and research programs of departments. It has a wider scope than the ABET review. We are now in the process of preparing a self-study report to reflect our program's features. Last review was in 1998. Next one is scheduled for October 12-14, 2005. The Industrial Advisory Board's activities will again be one of the highlights of the report.

5. Our two new graduate programs: 1) the joint Ph.D. program with Purdue WL and 2) the five-year BSMS degree program, are progressing well, with new students being admitted to both programs.
6. We are currently going through a search and screen process to hire a new faculty in the area of solid and advanced materials. We had several excellent candidates among the applicants. So far we have interviewed nine candidates and will interview the last candidate on Monday, who were selected among 230 applicants. We expect to have a new faculty member on Board by August 1.
7. Ongoing research projects in the department:
  - A round five 21<sup>st</sup> Century project partnered with Allison Advanced Development Company and Purdue University, WL, titled: "Expansion of Propulsion and Power Center of Excellence," with IUPUI's share at \$341,524 and Dr. Razi Nalim as the IUPUI principal investigator. Dr. Fred Smith from AADC, our new Board Member, works with this group. This project is also supplemented by a NASA grant from NASA.
  - Another round five 21<sup>st</sup> Century project partnered with Rolls-Royce Corporation and Purdue University, WL, titled: "Enabling Technologies for 70% Nox Reduction in Next Generation Environmentally Friendly Aircraft Engines," with IUPUI's share at \$98,400 and Dr. Akin Ecer as the IUPUI principal investigator.

With the above two projects, we now have three 21<sup>st</sup> Century projects ongoing in the department. The third one being funded in round four, titled "Multiscale Methodology for Design of Active Materials" partnered with Delphi Automotive," with principal investigator Dr. Andrew Hsu, \$525,967 (IUPUI share \$350,000).

- A research project with Cummins on cooling system design of diesel engines led by Dr. Razi Nalim (\$100,000), which may receive an extension. This project is jointly conducted by Brett Barnhard's group at Cummins (a member of our Industrial Advisory Board).
- A research project with Eli Lilly in the amount of \$120K for an 18-month effort, started on March 1, 2004 on "Development of Computational Fluid Dynamics Models for Improving Performance of Pharmaceutical Isolators of Lilly for Making of Drugs." I am pleased to be the principal investigator of this project at IUPUI side. Dr. Mohan Pankaj, a member of our Industrial Advisory Board, is the principal project monitor from Eli Lilly working with us, along with several members from Lilly.

- An NSF/STTR grant partnered with a CAD/CAM company for “Developing and Commercializing Virtual Reality Training Tools for CNC Machining,” with Dr. Hazim El-Mounayri as the IUPUI investigator. This tool is planned to be used in undergraduate courses and industry training. IUPUI share in this project is \$40,000, which has been doubled by the 21st Century funds as a supplement. A phase II proposal has been submitted.
  - A research project with NASA (Office of Biological and Physical Research) on Oxygen and Fuel Jet Diffusion Flame Studies in Microgravity, motivated by spacecraft oxygen storage fire safety” continues with Dr. Siva Krishnan as the PI with \$84,500 for October 1, 2003 - May 31, 2007. A part of the project is also conducted at Purdue University WL.
  - A new initiative for inter/multidisciplinary in place to establish a center for large-scale computing for industrial project. We are making plans to apply for funding from different sources, including state and industry.
7. A new institute named Multidisciplinary Undergraduate Research Institute (MURI) has been formed within the School of Engineering and Technology, with an annual budget of \$110,000. It has originated with a proposal from our department. I am pleased to be the founding director of this institute. It is designed to prepare students to conduct multidisciplinary team research under the mentorship of engineering and technology faculty. It is expected to expand our industry research, student recruitment, and graduate programs. We plan to expand this institute with external government and industry funds. A flyer is attached.
8. I would like to remind our board members that we have a very diversified group faculty, whose expertise cover computational modeling, design, solid mechanics, thermal and fluid sciences, and advanced materials. Attached pamphlet summarizes that. They will be very happy to talk or work with you on their areas of expertise.
9. **IUPUI's Top 100 Student List.** I am happy to report that this year we have eight ME students on the IUPUI's Top 100 list. These students are selected because of their academic achievements coupled with strong service to community, campus, and profession.