Master of Engineering Committee Meeting
April 8, 2009 ~ 8:00am – 9:00am
240 Carpenter Hall

Attendees: Kathryn Caggiano, Chair (ORIE), Jim Bartsch (BEE), Peter Jackson (SYS), David Grubb (MSE), David Lipson (BME), Graeme Bailey (CS), William Olbricht (CBE), Larry Cathles (EAS), David Muller (AEP), Al George (MAE), Mark Turnquist (CEE) Pete Loucks (CEE), John Belina (ECE)

Guests: Yoanna Ferrara, Jeff Newman, Helen Baker, Marcia Sawyer, Ron Kline, Park Doing

Meeting Minutes
Approval of March 11, 2009 MEC Meeting Minutes was deferred to the next meeting.

CEE Petition to allow certain S/U credits to be counted towards Karl Smolenski’s MEng degree. Submitted by Mark Turnquist (see Attachment 1)
Approved unanimously, with note that the courses are substantive and be taken with a serious purpose embedded appropriately, and that this decision is based solely on individual merits, and is not to be used as a precedent.

CEE Petition to allow 20 credits earned as a CU exchange student from Seville, Spain be counted as transfer credits towards Miquel Escassi’s MEng degree. Presented by Mark Turnquist (see Attachment 2)
Approved with one abstention (Graeme Bailey) with the condition that his credits be verified by University of Seville, and the student register for 12 credits in MEng program at Cornell.

Proposed Change Item #8 of Financial Aid Procedures Adopted by the MEC on February 5, 1992
Approved unanimously, with the addition of the word “substantial” as follows:

“Approximately 20 percent of undesignated funds will be allocated on an annual basis to substantial fellowships to the top Master of Engineering candidates”.

Subcommittee Reports

Finance
Finance Committee to meet and recommend changes to MEC fellowship award in May. Jeff Newman reported on MEng fellowships: #3 ranked candidate accepted, #2 declined, and #1 has not yet decided. Offers will be made to next ranked candidates until fellowships accepted.

Marketing & Outreach
Subcommittee should meet in 2 weeks to prepare materials. Updates will be sent out as well as invitations to all to meet to brainstorm, prioritize for the next meeting.

Projects
Solicitations to MEng representatives regarding joint projects will be posted in advance. What project is and whom to contact? Will the project accommodate new students in Fall? What were the past projects? Identify special cross-field projects.
West (westpharma.com) Program for summer of 2009 in Lionville, PA (see Attachment 3) engages large # of students, pay and living expenses, real projects, exceptionally good getting r&d staff to engage students, multi-disciplinary. MAE would take at least one class? Contact: Paul Norton or David Lipson

University Relations – no updates to report

Business and Engineering Ethics Workshop for MEng in Fall 2009 - Presentation by Ron Kline and Park Doing (see Attachment 4)

Ron Kline and Park Doing presented a proposal for an afternoon half-day workshop in the Fall 2009 (maybe October) on engineering and business ethics, for MEng students. This workshop is a gift from Robert Braudy, a Cornell alum in Civil Engineering and the endowment would pay for all materials, a meal for the workshop and other associated expenses.

MEC gave advice, and suggestions:
- Friday am (possible conflicts) Friday pm might be better. Students don’t like weekends.
- 2-3 hour session – 2 case studies preferred.
- MEC thinks there will be great interest. Would like to have as many MEng students as possible.
- Application for MEng students; primary and alternates, write a short essay.
- Important that selection process reach students from different areas; 3-4 per field or fewer.
- Hold it before the first prelim (end of September)
- Start sending out letters before students arrive or at Orientation
- Agreement with donor is once a year. If popular, consider trying to offer every semester.

Other Business
Larry Cathles announced that EAS is considering forming a masters of science program. The oil industry wants master-level people and thesis. Descriptions are being developed, and people interested in coming, may start immediately. MS tuitions return to college/department under discussion.

Energy Programs in MEng: MEng minors and concentrations in energy and sustainability – discussion at May meeting.

Meeting ended 9:10am
Master of Engineering Committee
Wednesday, April 8, 2009
8:00 – 9:00 am, 240 Carpenter Hall

Meeting Agenda

• Approval of MEC Meeting Minutes (draft to be posted on intranet by Monday, April 6) (vote)

• Petition to allow certain S/U credits to be counted by Karl Smolenski toward his MEng degree– Mark Turnquist (see petition on intranet) (vote)

• Proposed Change Item #8 of Financial Aid Procedures Adopted by the MEC on February 5, 1992 (see p. 2) (vote)
  • If approved, Finance Subcommittee meeting needed to discuss possible changes to MEC Fellowship and report to MEC in May.

• Subcommittee Reports:
  • Finance
    • Update on Fellowships for MEng – Jeff Newman
  • Marketing and Outreach
    • Report on Best Practices Survey results
    • Charge for May meeting: meet to prioritize college-level activities/initiatives to facilitate recruiting, retention and placement, including but not limited to consideration of
      • MEng Info Day in Fall ’09;
      • standardization of admission requirements and deadlines;
      • MEng recruiting best practices to be endorsed by MEC, such as saying that there is limited financial aid, not no financial aid, making financial aid offer with offer letters
      and report to MEC in May.
  • Projects
    • Charge for May meeting: meet with Research and Grad Studies Office to develop uniform practice and college-level mechanism for collection/referral of information on project opportunities to potential home fields and report in May
  • University Relations

• Business and Engineering Ethics Workshop for MEng in Fall ‘09– Ron Kline and Park Doig (invited to join meeting at 8:45)

• Other Business
March 26, 2009

TO: Kathryn Caggiano, MEC Chair  
FROM: Mark Turnquist, CEE  
RE: Program Approval for Karl Smolenski

Karl Smolenski is a staff research employee at the Wilson Synchrotron Lab who is a candidate for the MEng in Engineering Management via the Employee Degree Program. In 2003-2004, before he decided to do the MEng, he took two 600-level courses in accelerator physics (Phys 656 and Phys 688) as an extramural student. One of those courses (Phys 688) was offered “S/U only.” Karl took both courses on an S/U grade basis, and received S grades in both. Those courses were not part of any degree program at the time, but he would now like to use those 6 credits as part of his MEng program. I am supportive of his request, but it raises two issues that I think must be petitioned to the MEC:

1) There is a usual limit of two credits of S/U grades for MEng students. This normally applies to students after matriculation. If students apply to use transfer credits toward their MEng degree, the usual policy is to accept the credits (up to 9) and ignore the grades (especially if the courses were taken at another university). In this case, the courses were taken here, but before matriculation, so they are considered transfer credits from the Extramural Division. Since his matriculation in the MEng program, Karl has taken all courses for regular grades. Because I think this is quite a specialized case (involving PhD-level courses, one of which was offered S/U only), I don’t think that accepting these “transfer credits” for this student opens up a general loophole in the MEng requirements, and I think we should approve the request.

2) These two courses were taken more than five years ago. Karl was admitted to the MEng through the Employee Degree Program in Fall 2007, and is proposing to complete his MEng program in January 2010. Thus his total time from admission to completion of degree requirements is within the normal 4-year limit for the MEng degree, but these two courses are outside that window. The by-laws (at least by my reading of them) appear to be silent on the issue of age of transfer credits, but I want to make sure that the MEC is aware of the age of the courses and agrees with their use in the program.

I am seeking approval from the MEC for use of these two Physics courses as part of Karl’s MEng program. Thanks.
April 2, 2009

TO: Kathryn Caggiano, MEC Chair  
FROM: Mark Turquist, CEE  
RE: Program Approval for Miguel Escassi

Miguel Escassi came to Cornell as a graduate exchange student from the University of Seville in Spain during the 2007-2008 academic year. While he was here, he took courses that would be appropriate for an MEng in Engineering Management, but because his time here was arranged through Cornell Abroad, he was not registered in the Graduate School. He then returned to Spain and completed an Engineer’s degree in Telecommunications Engineering there. He has now asked to be admitted to the MEng program, come back here for one more semester (Fall 2009) and complete an MEng degree in Engineering Management, partially using credits from the courses he took while he was here in 2007-2008. These credits were not part of his degree program in Spain, so they have not been used as part of any other degree. However, he was not a registered graduate student here at the time he took the courses, so they need to be considered as transfer credits for the MEng degree. The request is to allow a total of 20 credits for the following courses (with term taken and grades listed) to be used toward his 30-credit requirement for the MEng degree:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Term</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 590</td>
<td>Project Management</td>
<td>4</td>
<td>Fall 2007</td>
<td>B+</td>
</tr>
<tr>
<td>CEE 593</td>
<td>Engineering Management Methods</td>
<td>3</td>
<td>Fall 2007</td>
<td>A-</td>
</tr>
<tr>
<td>CEE 594</td>
<td>Econ Anal for Engrs &amp; Mgrs</td>
<td>4</td>
<td>Fall 2007</td>
<td>B</td>
</tr>
<tr>
<td>NBA 666</td>
<td>Negotiations</td>
<td>3</td>
<td>Fall 2007</td>
<td>B+</td>
</tr>
<tr>
<td>CEE 690</td>
<td>Creativity, Innovation &amp; Leadership</td>
<td>3</td>
<td>Spring 2008</td>
<td>B+</td>
</tr>
<tr>
<td>NBA 601</td>
<td>Electronic Commerce</td>
<td>3</td>
<td>Spring 2008</td>
<td>B</td>
</tr>
</tbody>
</table>

I am supportive of his request, but because it exceeds the normal 9-credit transfer limit, it must be petitioned to the MEC.

The DGS in CEE (Jim Bisogni) has discussed this case with the Graduate School, to be sure that there is no objection to the use of courses taken while he was here as an exchange student toward a later degree. Their response was that as long as Miguel is later admitted to the MEng program, and registers and pays tuition for the required one residence unit, they have no objection, but that it is up to the MEC to determine acceptability of the program under our rules.

I am seeking approval from the MEC for use of these 6 courses (a total of 20 credits) as part of Miguel’s MEng program. Thanks.
We have a number of exciting projects for 2009

**Injection pain**: Billions of injections are given every year. The pain response from new devices that give automatic injections is not well characterized.

- Research and testing into the pain response from auto injection devices
- Understanding key design elements that contribute to or mitigate pain perception
- Development of subsystems to reduce pain perception
- Testing to validate improvement in pain perception

**Subcutaneous (SubQ) injections**: SubQ injections are currently limited to relatively small volumes of liquid. This leads to complications for drug companies to formulate compounds that are effective and can be stored safely without damaging the drug.

- Research tissue uptake of a SubQ injection
- Understand physiological limits of this type of injection
- Develop device(s) that are capable of delivering much higher volumes
- Test to validate performance and practicality of device

**Intradermal (ID) injections**: Recent research has shown equivalent or higher effectiveness of vaccines injected into the intradermal space using far less vaccine compared to traditional intramuscular (IM) injections

- Research the effect of immunogenicity of ID injections of vaccines
- Understand how depth of injection in the ID space effects uptake and vaccine performance
- Develop device(s) to perform ID injection easily and consistently
- Test to validate performance and practicality of device
2009 projects continued

**Technology transfer from nature to injection:** Nature gives us injections more often than we would like, whether it be a bee sting or mosquito bite.
- Research types of “natural” injections
- Understand how they work, particularly how they mitigate pain
- Develop an actual or conceptual model of transferring the desirable attributes of a natural injection to a therapeutic injection
- Test or development of a test plan to evaluate effectiveness

**Practical applications of nano technology to medical devices:** Nano technology is an active area of research as applied to the delivery of therapeutic agents. There is also potential application in the fabrication of medical devices.
- Research applications of nano technology into the area of injection molding of plastic components as a potential polymer filler replacement
- Understand the effects on physical properties
- Build example device
- Test to validate effect on performance

**Lyophilization process for prefilled syringe:** More and more, parenteral drugs are being packaged in prefilled syringes for ease of administration. Also more and more, drugs are not stable in liquid form. These drugs are usually formulated in a “freeze dried” or lyophilized form. Currently the freeze drying process takes many days! This is because of poor heat transfer into the syringe contents.
- Research and understand the current lyophilization process for prefilled syringes
- Conceptualize innovative syringe designs or process improvements to reduce cycle time by 50% or more
- Conduct theoretical analysis to screen multiple concepts for selection of optimum solution
- Develop syringe system or process improvements
- Test to evaluate performance

**Gas powered auto injector:** As drug delivery moves from the clinical setting to the home, sophisticated devices are being used to deliver drugs. Auto injectors are a key product that provides this function. These are relatively new devices and have challenges to provide reliable performance. A previous Cornell student team has partially developed a gas powered auto injector.
- Research currently marketed auto injectors and a previously developed gas powered auto injector
- Understand performance issues with current auto injectors
- Design and fabricate a complete auto injector that resolves all known issues with current auto injectors
- Characterize prototype performance with actual prefilled syringes

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If you are interested in this program, please send your project preference and resume to: Paul.Norton@westpharma.com

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Job #4966
April 8, 2009

Proposed MENG Workshop on Business Ethics in Engineering

In 2008, Robert Braudy, a Cornell alum in Civil Engineering, endowed the Sidney and Anne Braudy and Louis and Edith Manker Workshop on Business Ethics in Engineering, to be conducted annually by the Bovay Program in History and Ethics of Engineering.

In talking with the donor and Associate Dean David Gries, we think the best target audience for the workshop would be MENG students since they have a strong interest in professional issues like ethics, especially in a management-engineering setting.

Consequently, we propose holding the first Braudy workshop in Fall 2009, probably in October, and inviting MENG students to sign-up for the workshop as part of their professional education at Cornell. We would limit the workshop (probably to 30-40 participants) and run it along the lines of doing hands-on case studies.

Currently, we are thinking of conducting two case studies in a one-half day setting (probably a Friday morning in late October), in such general areas as the Life Sciences, Sustainability, and Financial Engineering. Park Doing and I would run the workshop, breaking the participants into groups to study each case. We might also invite guests who have workplace experience in these areas.

The endowment would pay for all materials, a meal for the workshop, and other associated expenses.

We would like the MENG oversight group’s opinion on this proposal and its advice on the content of the workshop, how to run it, and how to select students for it.

Ronald Kline
Bovay Professor in History and Ethics of Engineering
School of ECE

Dr. Park Doing
Bovay Lecturer
School of ECE