

**Engineering and Computer Science Advisory Board Meeting -- Summary**  
**November 4, 2016, 4 p.m.**  
**SC 152**

Board members present:

Dr. Paul **Brand**, Center for Neutron Research, NIST ; Mr. Adrian **Chapman**, President and Chief Operating Officer, Washington Gas; Dr. Lorraine **Fleming**, Professor, Civil and Environmental Engineering, Howard University; Dr. William **Fourney**, Associate Dean of Engineering, University of Maryland College Park; Ms. Mary **Kraft**, U.S. Director of Services, Hewlett Packard; Mr. Bobby **Patton**, CEO, Patton Electronics; Mr. Daniel **Sawyer**, Group Leader, Dimensional Metrology Group, NIST; Dr. Devdas **Shetty**, Dean of Engineering and Applied Science, University of DC; Dr. Joseph **Teter**, Director of Technology Transfer, Naval Surface Warfare Center; Dr. Benjamin **Tsai**, Physical Scientist, Sensor Sciences Division, NIST.

Board member not present:

Dr. Julia Ross, Dean of Engineering and Information Technology, U. of Maryland Baltimore County.

Montgomery College faculty and staff present:

Dr. Nawal **Benmouna**, Department Chair and Professor; Dr. David **Hall**, Department Chair and Professor; Dr. Chienann Alex **Hou**, Program Coordinator and Professor; Dr. Muhammad **Kehnemouyi**, Collegewide Dean; Ms. Margaret **Latimer**, Vice President and Provost; Dr. Max **Nam**, Program Coordinator and Professor; Dr. Alla **Webb**, Program Coordinator and Professor; Ms. Claudia **Greer**, Writer and Assistant to Deans (taking minutes).

After Dr. Muhammad Kehnemouyi and Provost Margaret Latimer welcomed participants, Board members and Montgomery College (MC) participants introduced themselves.

Dr. Kehnemouyi and Dr. Nawal Benmouna presented an overview of the engineering and computer sciences programs at MC, focusing on enrollment growth, transfer options, external funding, open educational resources, teaching strategies, academic support, internships, learning communities, student clubs, and undergraduate research opportunities.

The conversation then turned to challenges facing engineering and computer science. In addition to the limits on transfer credits placed by the Maryland Higher Education Commission and the budget constraints on hiring more full-time faculty to support program growth, a major challenge is the **high rate of D/F/W grades** in gateway courses: Physics I (35%), Calculus I (30%), and Chemistry for Engineers (35%). Acknowledging the various personal and academic reasons for this situation, participants articulated some suggestions:

- The "**flipped classroom**"—where students see or hear a lecture electronically at home but actively work in classes on problems. Most faculty who use flipped classrooms don't go back to earlier approaches.
- **Doubling the time in a classroom period**, so students have a longer period in which to work through problems and devise solutions.
- **Coaching** from programs such as "**Achieving the Promise.**" Students need to understand that hard work makes a difference, and we need to reach out to students where they are.

- **Holding faculty accountable** for a large number of D/F/W grades in their classes; one participant said that a "pay for results" program should be in place, tying faculty pay levels to grades.
- **Professional development** to help faculty understand and work with diverse student experiences.
- **Obtaining clear feedback** from students on how well faculty are teaching. A question, though, is how to get sufficient teacher feedback from students. A professor at UMCP makes feedback results available to students who have done the feedback questionnaire. His own feedback response rate is 90 percent: he tells students that **if 90 percent of them do the feedback**, he'll take their lowest homework grade and throw it out.
- The **Keystone Initiative**. Faculty at UMCP who care about teaching freshmen and sophomores are the Keystone professors. They receive a \$2500 stipend to help them improve their teaching, and then they get a small raise. The goal is motivating students to develop into engineers.
- **Integrated learning blocks**, where students can discover connections with other courses and disciplines. Similarly, courses such as Wright State University's Mathematics for Engineers course shows the engineering student why they are studying math.
- **Internships**. One participant wants to see improved and sustained participation of Montgomery College students in the **NIST SURF program**.
- **More training in vocational programs**, with MC playing a more direct role in offering certifications, technician trainings, and related programs.
- **Consistently attracting new and diverse students**.

Participants were asked what are the top qualities needed by industry from our graduates. Among the responses:

- **Communication skills**. "Those engineers who cannot write will work for those who can write."
- **Project management skills**. Employees must be able to deliver the results they have designed.
- Skills in **engineering management**, separate from engineering science.
- **The ability to state and define a problem**. Without that skill students cannot define a solution. They also need to know **how to state and solve algorithms**. **Analytic capacities**, grounded in a clear understanding of physics and mathematics, are important.
- **High emotional intelligence**. Critical problem solving is valuable but students also need to relate to customers.
- Being able to **pass security clearances** by "living cleanly." This is especially true in cybersecurity jobs that support the intelligence community. At MC we've implemented **academic integrity pledges** for our students.

The meeting concluded with comments on the **value of community colleges**. Dr. Fourney of UMCP noted that almost 50 percent of UMCP students are transfer. They can get an education for the first two years so much cheaper at a community college, and they should do that. That can have a major impact on student debt.

Dr. Fourney believes **students should finish their associate's degree** before they come to College Park. Their general education is taken care of. So many of them come early, and he wishes **the University of Maryland would give priority to students who complete their associate's degrees**. He believes there should be a guarantee that if you complete your degree and meet the gateway courses, you'll get into the University of Maryland.