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## **AC 2012-3287: INFUSING PROFESSIONAL SKILLS DEVELOPMENT INTO CO-OP STUDENT**

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Jack Selter has 30+ years of experience developing and managing partnerships between industry, government, and higher education. Past organizational affiliations include Clemson, University of Pittsburgh, and Carnegie Mellon University. Currently, Selter is a Senior Research Associate at the Institute for Simulation and Training, Research in Advanced Performance Technology and Educational Readiness, at the University of Central Florida.

## Infusing Professional Skills Activities into Co-op Work Assignment

For over three decades, industry workforce groups, engineering education researchers, and national engineering societies have all come to the same conclusion; the gap between what engineering colleges teach in their undergraduate curriculum and what skill sets employers expect new engineering graduates to have, has widened. Employers point out that new engineering graduates do have technical competence but severely lack professional skills necessary to manage projects, work with others collaboratively, write and present proposals, etc.

**Presenters include:**

Maureen Barcic  
 Director, Cooperative Education  
 University of Pittsburgh  
 Swanson School of Engineering

Bryan Dansberry  
 Higher Education Experiential Programs Specialist  
 Project Manager - Undergraduate Student Research Program  
 NASA Johnson Space Center - Education Office

Reginald McGregor  
 Manager, Engineering Employee Development  
 Research & Technology Strategy  
 Rolls-Royce Corporation

**Moderator:**

Jack Selter  
 Sr. Research Associate  
 Institute for Simulation and Training/RAPTER  
 University of Central Florida

**The panel discussion is focused on the following question:** What role can Co-op employers play in helping their engineering school partners address the professional skills gap?

ABET has defined key skills or “professional skills” in their Criteria 3. As shown in Table 1, we have divided these skills into 2 categories: “Engineering Skills” and “Professional in the Workplace Skills.”

Engineering Skills	Professional In the Workplace Skills
<ul style="list-style-type: none"> <li>• (a) an ability to apply knowledge of mathematics, science, and engineering;</li> <li>• (b) an ability to design and conduct experiments, as well as to analyze and interpret data;</li> <li>• (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;</li> <li>• (e) an ability to identify, formulate, and solve engineering problems;</li> </ul>	<ul style="list-style-type: none"> <li>• (d) an ability to function on multidisciplinary teams;</li> <li>• (f) an understanding of professional and ethical responsibility;</li> <li>• (g) an ability to communicate effectively;</li> <li>• (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;</li> <li>• (i) a recognition of the need for, and an ability to engage in life-long learning;</li> <li>• (j) a knowledge of contemporary issues;</li> <li>• (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;</li> </ul>

This panel will describe how employers can actively participate in helping engineering schools and their students address ABET Criteria 3 recommendations. By identifying and linking workplace skills with specific activities that can take place over the course of several co-op experiences or be bundled into a single co-op work term depending on student and employer needs and requirements.

For example, during a work assignment a student would be assign to work in a functional team to solve a specific problem or design a new system. Students would be required to record their experience in the team, how was the team structured, what were some of its key components and what outcomes did the team produce.

Student engagement into one or several of these skills related activities will be used to establish a **student portfolio** of professional practice which can be used to demonstrate professional skills proficiency, be used by the employer as an end of work term student assessment, and/or help establish a working roadmap for the students' continuing professional skills develop, or all of the above.