LANDING ENGINEERING JOBS

a presentation by
Debbie Kaylor, Career Services
Don Plumlee, COEN MBE
Steve Villachica, COEN OPWL

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AGENDA

• What are Mechanical Engineers Doing?
• What are newly graduated or “freshout” engineers doing in the workplace?
• What are the skills and competencies you need for initial success in the workplace?
• A panel discussion of your questions, concerns, and comments

What are Mechanical Engineers Doing?

Mechanical Engineering is the BROADEST of the engineering disciplines. A unifying theme of mechanical engineering is the conversion of ENERGY from one form into another, usually work.

Now for some REAL Examples!
Manufacturing

- Processing
- Tooling
- Materials
- Organization
- Quality Control

Robotics

- Dynamics
- Power
- Sensing
- Controls
- Systems Integration

Power Generation

- Renewable Energy
- Traditional Power Plants
- Energy Efficiency
- Pollution Controls
- Energy Storage
Aerospace

- Materials
- Controls
- Pumps/Valves
- Thermal Management
- Aerothermodynamics
- Reliability
- Structures/Vibrations
- Systems Integration

What are “Freshout” Engineers Doing?

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The Research Team
- Don Plumlee, PhD.
- Linda Huglin, PhD.
- Steve Villachica, PhD.
- Tony Marker, PhD.
- Amy Chegash
- Lorece Stanton

Why You Should Care?

- 64% engineering employers are somewhat satisfied with quality of new hires (Blom & Sakei, 2011).
- Professional skills for the engineering workplace include teamwork, communication, data analysis and problem solving (Hoey & Gardner, 1999; Jonassen, Strobel, & Lee, 2006; Grant & Dickson, 2006; Korte, Sheppard, & Jordan, 2008; Borrego & Bernhard, 2011; Passow, 2012).
What sort of engineers do engineering firms *REALLY* want to hire?

Boundary Crossing Competencies:
- Communication, teamwork, networks, critical thinking, global understanding, perspective, organizational culture, project management, etc.

Many Disciplines
Many Systems
Deep at least one discipline
Deep at least one system
(c.f. Brown, 2005)

What sort of engineers do engineering firms *REALLY* want to hire?

Engineering Practice Survey Findings

Time to Competency for "Fresh-Outs" (in months)

- 2 in Six to Nine
- 3 in Ten to Twelve
- 4 in Thirteen to Sixteen
- 4 in Seventeen to Twenty-Four
- 10 in More than Twenty-Four

Engineering Practice Survey Findings

ISPE Meeting, 23 Engineers

Typical Independent Assignments for "Fresh-Outs" (Large/Complex Projects)

- Design: 2
- Analysis: 2
- Drawing Drafting: 6
- Project Management: 2

Typical Independent Assignments for "Fresh-Outs" (Small/Simple Projects)

- Design: 19
- Analysis: 14
- Drawing Drafting: 19
- Project Management: 1
Engineering Practice Survey Findings

Typical Independent Assignments for "Fresh-Outs"
(Client/Customer Interaction)

- Data Collection: 6
- Persuading/Selling: 3

Engineering Practice Survey Findings

Organizational Support for "Fresh-Outs"

- Formal Training: 9
- Formal Mentoring: 8
- Informal Mentoring: 15
- Orientation: 11
- Performance Feedback: 20
- SOPs: 10
- Other: 3

Focus Group Findings
7 Focus Groups with 26 Participants

What Freshouts Are and Aren't Doing on the Job

- Communication and Teamwork
- Design
- Analysis
- Technical Fundamentals
- Software Skills
- Problem solving
- Motivation
- Positive attitude
- Leadership
- Work Ethics
- Critical Thinking
- Problem solving and critical Thinking
- Real world Engineering
- Process Knowledge
- Programming
- Business Systems Knowledge
- Other
Thanks to Our Industry and Professional Sponsors

- Focus Groups at local engineering firms
- Practicing engineers at ISPE

Regardless of Your Major or Job...

Skills and Competencies Needed for Initial Success

**HIGHEST PRIORITY**

- Perform with integrity
- Solve problems
- Manage time and priorities
- Take the initiative
- Think critically
- Analyze, evaluate, and interpret information
- Contribute to a team
- Effectively communicate orally
- Build and sustain working professional relationships

- Embrace change
- Acquire knowledge
- Manage and synthesize different sources of information
- Effectively communicate through writing
- Create original ideas and innovations (be innovative)
- Plan and manage a project
- Develop further professional competencies

How important are Internships?

Expectation for Prior Professional Experience

- No Expectation (8%)
- Some Expectation (22%)
- Moderate Expectation (27%)
- High Expectation (25%)
- Required (8%)
Prepare for an Intentional College Experience—
A degree alone will not be enough!

- Develop and practice professional skills
  - Classroom experiences
  - Clubs and Organizations
  - Leadership Opportunities
- Gain practical experience
  - Internships
  - Service Learning
  - Study Abroad
- Develop a network of professionals

Workforce Readiness Reflection Worksheet

1. Self-assess your skills/competencies.
2. Determine how you’d prove or demonstrate your competencies/skills to a potential employer.
3. Specify how and where you can get the proof.
4. Specify any questions, concerns, or comments for the panel discussion to follow.

Thank You!

We now move to a panel discussion of your questions, concerns, and comments.