ROSE-BUD
(Rose Building Undergraduate Diversity)
MAPS
(Mentoring and Professional Skills)

Carlotta A. Berry, Ph.D.
Deborah J. Walter, Ph.D.
Associate Professors
Electrical and Computer Engineering
Rose-Hulman Institute of Technology
Goal

Increase the recruitment, retention, and development of women and underrepresented minorities in ECE

- Scholarships
- Internships
- Workshops
- Seminars
- Networking
- Mentoring
- Community building

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Motivation and Background

national decline of enrollment in ECE, in particular women and minorities

- Job gap
- World model
- Maximize potential
- Team dynamics
- Communication skills
- Problem solving
- Remain competitive
- Institute diversity goals
- Change the culture

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## Engineering Employment Trends

### Table 1: Job Gap Predictions, National Employment Matrix


<table>
<thead>
<tr>
<th></th>
<th>Employment #</th>
<th>Employment %</th>
<th>Change #</th>
<th>Change %</th>
<th>Total job openings due to growth and net replacements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total, all occupations</td>
<td>150,620</td>
<td>166,220</td>
<td>100</td>
<td>100</td>
<td>15,600</td>
</tr>
<tr>
<td></td>
<td>15,600</td>
<td>10.4</td>
<td>50,732</td>
<td></td>
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<tr>
<td>Engineers</td>
<td>1,512</td>
<td>1,671</td>
<td>1.0</td>
<td>1.0</td>
<td>160</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>10.6</td>
<td></td>
<td>505</td>
</tr>
<tr>
<td>Civil</td>
<td>256</td>
<td>302</td>
<td>0.2</td>
<td>0.2</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18.0</td>
<td></td>
<td>114</td>
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<tr>
<td>Computer</td>
<td>79</td>
<td>82</td>
<td>0.1</td>
<td>0.0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4.6</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Elec &amp; Electronic</td>
<td>291</td>
<td>306</td>
<td>0.2</td>
<td>0.2</td>
<td>15</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>5.0</td>
<td></td>
<td>82</td>
</tr>
<tr>
<td>Electrical</td>
<td>153</td>
<td>163</td>
<td>0.1</td>
<td>0.1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6.3</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>Electronics, except comptr</td>
<td>138</td>
<td>143</td>
<td>0.1</td>
<td>0.1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4.7</td>
<td></td>
<td>37</td>
</tr>
<tr>
<td>Industrial</td>
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<tr>
<td></td>
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<td>20.3</td>
<td></td>
<td>89</td>
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<tr>
<td>Marine and Naval</td>
<td>9</td>
<td>10</td>
<td>0.0</td>
<td>0.0</td>
<td>1</td>
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<td></td>
<td></td>
<td></td>
<td>10.9</td>
<td></td>
<td>3</td>
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<td>Material</td>
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<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4.0</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Mechanical</td>
<td>226</td>
<td>235</td>
<td>0.1</td>
<td>0.1</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4.2</td>
<td></td>
<td>58</td>
</tr>
</tbody>
</table>

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About Rose-Hulman

- Small engineering school in the Midwest
  - 2100 undergraduates, 100 graduates
- Ranked top undergraduate engineering institution
- Hands on education with emphasis on teamwork
- 1:13 faculty ratio
  - average class size: 20
- 80% retention rate
- 25% female, 5% URM

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ROSE-BUD Program

- Established in 2009
- $600,000 grant from NSF S-STEM program
- Maintain minimum GPA
- Emphasis on women and URM in ECE
- Attend 1 professional development or networking activity each quarter
- Complete at least 2 internships, co-ops, research experiences

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Assessment of Activities

All activities were assessed by using the Assessing Women in Engineering STEM assessment tools [www.aweonline.org](http://www.aweonline.org)

- Welcome Picnic
- Faculty/Student Dinner
- Roundtable Discussion
- Basketball Game
- Career Fair Walkabout
- Dress for Success
- Time Management/Study Skills
- Explore Engineering
- Luncheon with NI engineers
- Four Ways Identity Mapping Workshop
- Spring Design Challenge

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ROSE-BUD Students

- 17 current ROSE-BUD students
- 8 female (47%)
- 6 URM (35%)
- 2 dropped out, 1 switched majors (85% retention rate)
- CPE (71%), EE(24%), CS/CPE (5%)

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Preliminary Results

- Increased enrollment of female students in ECE
- Slightly increased URM students in ECE
- Efforts recognized by the institute and program will transition into institutional program already garnered institutional and corporate support

<table>
<thead>
<tr>
<th></th>
<th>2007-2008</th>
<th>2011-2012</th>
<th>National average percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical &amp; Computer Majors</td>
<td>277</td>
<td>327</td>
<td></td>
</tr>
<tr>
<td>WOMEN</td>
<td>18 (6%)</td>
<td>33 (10%)</td>
<td>14%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>URM</td>
<td>5 (2%)</td>
<td>10 (3%)</td>
<td>14%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

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MAPS Program

- Extension of the ROSE-BUD program to facilitate growth into a university-wide program
  - Mentoring and professional skills workshops
  - Mentoring program
  - Professional meeting experience

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MAPS Goal

Develop the person as well as the professional to be able to function effectively within a multi-cultural workplace and world

• Engineering students typically have excellent technical preparation
  – MAPS will help with the personal and professional preparation

• Goal achieved with personal and professional mentoring and advising

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Program Components

- Communication
- Teamwork
- Ethics
- Professionalism
- Social networks and community and cohort
- Cross cultural mentoring
- Peer mentoring
- Internship fair

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Conclusions

- **ROSE-BUD MAPS** program will help educate, train and provide awareness to benefit the community at large regarding diversity issues.

- **ROSE-BUD MAPS** will provide the formal mechanism for the university to improve the recruitment, retention and development of minority students in STEM.

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Acknowledgement

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