Finding Balance in Undergraduate Research for Graduate School and Career Preparation in Agricultural Sciences

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Texas A&M University-Kingsville

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Outline

• Undergraduate training the past 15 years

• Example of Training:
  – STEP UP to USDA Career Success
    • Regional Model

• What We’ve Experienced/Learned
# Past 15 years

<table>
<thead>
<tr>
<th>Faculty as Research Mentors</th>
<th>2002--2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Meeting the Experimental Needs of South Texas students for Career in Agricultural Science.</td>
<td></td>
</tr>
<tr>
<td>2. Teaching and Mentoring South Texas Students for Careers in Agricultural Science and Research</td>
<td></td>
</tr>
<tr>
<td>3. Increasing Student Learning and Career Development through Agricultural and Natural Resources Based Research</td>
<td></td>
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<tr>
<td>4. Experiential Learning and Career Development in Agricultural and Natural Resources</td>
<td></td>
</tr>
<tr>
<td>5. Developing an Experiential Learning and Career Development Program to Foster and Mentor Students in Agricultural and Natural Resources</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Summer Work Internship/Research Internship Outside the University</th>
<th>2011--2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. STEP UP to USDA Career Success: Science, Technology and Environmental Programs for Undergraduate Preparation to USDA Career Success.</td>
<td></td>
</tr>
<tr>
<td>2. BGREEN: Building Regional Energy and Educational alliances: A Partnership to Integrate Efforts and Collaboration to Shape Tomorrow’s Hispanic Sustainable Energy Leaders.</td>
<td></td>
</tr>
</tbody>
</table>
Example of Training

STEP UP to USDA Career Success: 
Science, Technology and Environmental Programs for Undergraduate Preparation to USDA Career Success

(2011-2015)

USDA/NIFA HSI Award #2011-38422-30826
Two Year Institutions
• South Texas College
• Texas State Technical College
• Del Mar Community College

Four Year Institutions
• Texas A&M University-Kingsville
• University of Texas-Pan American

Students Impacted
• Undergraduates
• M.S.
• Ph.D.
Example of Training

USDA Agencies involved with Internships

• **AMS** (Agricultural Marketing Service)
• **APHIS** (Animal and Plant Health Inspection Service)
• **APHIS-PPQ** (Plant Protection and Quarantine)
• **APHIS-WS** (Wildlife Services)
• **ARS** (Agricultural Research Service)
• **FS** (Forrest Service)
• **FSIS** (Food Safety Inspection Service)
• **NRCS** (Natural Resources Conservation Service)
• **NRCS-PMC** (Plant Materials Center)
• **OC** (Office of Communications)
Example of Training

Internship locations in 20 different states
### Example of Training

**Number of students conducting summer internships in research and for USDA.**

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>Research</th>
<th>USDA</th>
<th>n</th>
<th>Research</th>
<th>USDA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td>31</td>
<td>23</td>
<td>6</td>
<td>25</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Bachelor</td>
<td>35</td>
<td>13</td>
<td>17</td>
<td>42</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>66</td>
<td>36</td>
<td>23</td>
<td>67</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>(54.6%)</td>
<td>(34.9%)</td>
<td></td>
<td>(37.3%)</td>
<td>(46.3%)</td>
<td></td>
</tr>
<tr>
<td><strong>Year 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td>25</td>
<td>13</td>
<td>11</td>
<td>38</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>Bachelor</td>
<td>40</td>
<td>14</td>
<td>19</td>
<td>42</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>65</td>
<td>27</td>
<td>30</td>
<td>80</td>
<td>57</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>(41.5%)</td>
<td>(46.2%)</td>
<td></td>
<td>(71.2%)</td>
<td>(35%)</td>
<td></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>278</td>
<td>145</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(52.1%)</td>
<td>(40.3%)</td>
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</tbody>
</table>
Example of Training

Meta-evaluation indicators:

- **Years 1 & 2**
  - n = 310 students
  - 93.5% program satisfaction

- **Year 3**
  - n = 445 students
  - 94.8% program satisfaction

<table>
<thead>
<tr>
<th></th>
<th>USDA Internship</th>
<th>Non-USDA Internship</th>
<th>USDA Job</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Applied</td>
<td>Received</td>
<td>Applied</td>
</tr>
<tr>
<td>Years 1 &amp; 2</td>
<td>63.8%</td>
<td>49.5%</td>
<td>53.4%</td>
</tr>
<tr>
<td>Year 3</td>
<td>66.0%</td>
<td>54.1%</td>
<td>49.5%</td>
</tr>
</tbody>
</table>
What We’ve Experienced/Learned

Experiences Shape Direction

Faculty as Research Mentors

- Intensive faculty-to-student mentoring

Resulted in:
- 50% pursued M.S. degree
- 10% pursued Ph.D. degree
# What We’ve Experienced/Learned

Experiences Shape Direction

## Faculty as Research Mentors
- Intensive faculty-to-student mentoring

**Resulted in:**
- 50% pursued M.S. degree
- 10% pursued Ph.D. degree

## Experience Outside the University
- More mentorship by ag-related agencies & industry partners.
- Less mentorship by faculty

**Resulted in:**
- 10% pursued M.S. degree
What We’ve Experienced/Learned

Needed in the Workforce

B.S. Degrees

|                  |

M.S. Degrees
What We’ve Experienced/Learned

Needed in the Workforce

B.S. Degrees | M.S. Degrees

How do we prepare undergraduates for the choice between graduate school or a career in agriculture at the time of graduation?
What We’ve Experienced/Learned

Balancing Funding

One Summer Ag-related Agencies or Industry Partners

One Summer Undergraduate Research with Faculty
Questions