Biomedical Engineering Outreach

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Why BME Outreach?

- Pair and Share
- Enhance K-12/public understanding of:
  - Fundamental science related to engineering
  - Biomedical engineering concepts
  - UW BME research
  - BME undergraduate education—design projects
- Share the excitement and potential of biomedical engineering
- Voting/Donations (education and research)
- Encourage underrepresented groups to pursue engineering—Diversity!
Why is diversity important in engineering?

• Pair and Share
Why is diversity important in engineering?

<table>
<thead>
<tr>
<th></th>
<th>State of Wisconsin K-12(^3)</th>
<th>Madison Metropolitan Schools K-12 (^3)</th>
<th>UW-Madison Undergrads(^2)</th>
<th>College of Engineering Undergrads(^1)</th>
<th>Biomedical Engineering Undergrads(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>48.50%</td>
<td>48.53%</td>
<td>51.61%</td>
<td>19.89%</td>
<td>36.78%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>9.90%</td>
<td>18.29%</td>
<td>4.22%</td>
<td>3.53%</td>
<td>3.66%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>9.76%</td>
<td>19.47%</td>
<td>2.30%</td>
<td>1.84%</td>
<td>0.81%</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>1.28%</td>
<td>0.45%</td>
<td>0.31%</td>
<td>0.80%</td>
<td>0.73%</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>0.08%</td>
<td>0.10%</td>
<td>0.10%</td>
<td>0.21%</td>
<td>0.26%</td>
</tr>
<tr>
<td>2 or more races</td>
<td>1.99%</td>
<td>7.01%</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>


\(^2\) Data Digest by Academic Planning and Institutional Research, UW–Madison Office of the Provost and Vice Chancellor for Finance and Administration (2009-2013)

Why is diversity important in engineering?

- Engineering Grand Challenges are complex
  - Requires a diversity of ideas to solve these complex problems based on different:
    - Knowledge and Skills
    - Experiences
  - Cultural awareness
    - Inclusiveness (climate on campus)
    - Global market
Outreach Connections

• Strongly encouraged to conduct outreach at specified locations (underrepresented minority groups-URMs) and will receive t-shirts and possibly funding.
  ➢ Must submit a short 1 page proposal with a table of materials and costs
• New online form, found here:
  • https://www.engr.wisc.edu/department/bme/bme-outreach/

Past Outreach Events:
• Boys and Girls Clubs
• Madison Children’s Museum
• Madison/Monona/Sun Prairie school districts
Outreach Requirements

Read through all materials BEFORE you conduct outreach!

Individually or teams up to 5

Deliverables:

- **Presentation**
  - 10-15 min introductions (personal story), define BME, and activity

- **Activity**
  - 45 min FUN hands-on activity!
  - Must have clear learning objectives (2-3)

- **Report**

- **Teacher/Leader Evaluation**

*See course website: http://bmedesign.engr.wisc.edu/outreach/*
Outreach Deliverables Submission

http://bmedesign.engr.wisc.edu/outreach/

Please follow the directions listed!

Activity Guide Due date: Wednesday December 9th, 2020

Final Outreach Deliverables Due date: Friday April 2nd, 2021
Outreach Activity

• Consider BME topics that interest you
  - **MUST** Set up meeting with me once you have an idea!

• When creating activity:
  - Be creative
  - Be resourceful
  - Modify existing activities
    - Cite sources!
  - Keep it simple
  - Have clear instructions
  - Test it several times!!!
Sources of Outreach Activities

• Past BME activity guides will be available upon request

• MRSEC IEG: Materials Research Science and Engineering Center Interdisciplinary Education Group

• Nanotechnology and advanced materials educational products
  ➢ K-12, college-level, general public

• Can use their activity guides
  ➢ Must acknowledge them

http://education.mrsec.wisc.edu/index.htm
Sources of Outreach Activities

- Teach Engineering (K-12) https://www.teachengineering.org/index.php
- http://education.mrsec.wisc.edu/index.htm
- How Stuff Works http://www.howstuffworks.com/
- https://www.discovere.org/engaging
- http://teachers.egfi-k12.org/
- https://pbskids.org/designsqaud/
- https://wisconsin.pbslearningmedia.org/collection/zoom/
- Many many others…google it!
BME Outreach Lessons Learned

• Students talk about past experiences
• Any questions?
• Helmet presentation/activity
Design a Helmet Activity

- Design (5 min) and build (20 min) a helmet to protect a water balloon
- Must “look like a helmet” with an open area for the face and the neck
- Will be judged on staying intact
- Use materials provided:
  - 4 ft of tape
  - Newspaper (take one small section only)
  - Water balloon (in cooler)
  - Two other materials (popsicle sticks, cup, bowl, egg carton, rubberbands, etc) Ask volunteer if uncertain how to pick materials
What worked?
What did NOT work?