C-DEBI EOD: Research & Education Integration

Stephanie Schroeder
University of Southern California
Outline

1. Overview of EOD Programs
2. Focus on Community Colleges
3. Professional Development
C-DEBI EOD Objectives

1. Engage and retain students in STEM fields
C-DEBI EOD Objectives

1. Engage and retain students in STEM fields

2. Train the next generation of interdisciplinary researchers
C-DEBI EOD Objectives

1. Engage and retain students in STEM fields
2. Train the next generation of interdisciplinary researchers
3. Increase microbial literacy in the general public and at the K-12 levels
Target Audiences

Undergraduates at 2 and 4 year institutions
Target Audiences

Undergraduates at 2 and 4 year institutions

Major focus on research opportunities, especially for community college students
Targeting Community Colleges for STEM Training

http://www.cccco.edu/
Targeting Community Colleges for STEM Training

Why?

- Serve almost half of all undergraduates
- More diverse student population
- Limited research opportunities
Target Audiences

Undergraduates at 2 and 4 year institutions

Graduate students, post-docs, and early career scientists

Major focus on research opportunities, especially for community college students
Target Audiences

Undergraduates at 2 and 4 year institutions

Major focus on research opportunities, especially for community college students

Graduate students, post-docs, and early career scientists

Training and mentoring the next generation of interdisciplinary researchers
### Target Audiences

<table>
<thead>
<tr>
<th>Undergraduates at 2 and 4 year institutions</th>
<th>Graduate students, post-docs, and early career scientists</th>
<th>K-12 and the general public</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major focus on research opportunities, especially for <strong>community college</strong> students</td>
<td>Training and mentoring the <strong>next generation</strong> of interdisciplinary researchers</td>
<td></td>
</tr>
</tbody>
</table>

**Schroeder: Education, Outreach, & Diversity Managing Director**

**C-DEBI Site Visit**
Target Audiences

**Undergraduates at 2 and 4 year institutions**
- Major focus on research opportunities, especially for community college students

**Graduate students, post-docs, and early career scientists**
- Training and mentoring the next generation of interdisciplinary researchers

**K-12 and the general public**
- An appreciation for exploring an unknown world, including the use of new technologies
Target Audiences

- **Undergraduates at 2 and 4 year institutions**
  - Major focus on research opportunities, especially for community college students

- **Graduate students, post-docs, and early career scientists**
  - Training and mentoring the next generation of interdisciplinary researchers

- **K-12 and the general public**
  - An appreciation for exploring an unknown world, including the use of new technologies
# EOD Programs

<table>
<thead>
<tr>
<th>Teacher Training</th>
<th>K-12 and Public Outreach</th>
<th>Undergraduate Students</th>
<th>Graduate Student and Postdoc Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBARI EARTH workshops</td>
<td>SeaGrant Marine Biology Camp</td>
<td>Global Environmental Microbiology <em>(GEM)</em></td>
<td>Networked Speaker Series</td>
</tr>
<tr>
<td>Community College Instructor Workshops</td>
<td>Seafloor Science Camp</td>
<td>Community College Research Internship for Scientific Engagement <em>(CC-RISE)</em></td>
<td>Professional Development Workshop</td>
</tr>
<tr>
<td>Teacher Small Grants</td>
<td>Young Researchers Program</td>
<td>NSF REU: Community College Cultivation Cohort <em>(C4)</em></td>
<td>Annual Retreat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Genomics and Geobiology Undergraduate Research Experience <em>(GGURE)</em></td>
<td>Fellowship, travel and research grants</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>GeoBiology course</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bioinformatics training</td>
</tr>
</tbody>
</table>
CC and Undergrad EOD Objectives

1. Attract and inspire CC and undergrad students to follow STEM path
   - Target students from marginalized groups

2. Create world-class research opportunities
   - Increase diversity in the C-DEBI community and STEM pipeline
## CC and Undergrad EOD Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Location</th>
<th>Student Recruitment</th>
<th>Target institutions</th>
<th>Year Began</th>
<th>#/Year</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>GEM</td>
<td>USC</td>
<td>National</td>
<td>2 &amp; 4 year</td>
<td>2011</td>
<td>16</td>
<td>95</td>
</tr>
<tr>
<td>CC-RISE</td>
<td>USC, UCSC, MBL</td>
<td>Local</td>
<td>2 year</td>
<td>2013</td>
<td>6-12</td>
<td>31</td>
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<tr>
<td>GGURE</td>
<td>USC</td>
<td>USC</td>
<td>4 year</td>
<td>2014</td>
<td>28</td>
<td>84</td>
</tr>
<tr>
<td>C4</td>
<td>USC</td>
<td>National</td>
<td>2 year</td>
<td>2016</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
Targeting Community Colleges

Opportunities for instructors

- C-DEBI CC Instructor Workshops
- MBARI EARTH Workshops
- C-DEBI Grants
- REU CC Liaison
NSF REU: C4

Community College Cultivation Cohort (C4)
Lab Work Modules:

Module A: DNA Sequencing

Module B: Growth Curves

Module C: Metabolic Tests
- Glucose
- Urea
- Mannitol
- D-Fucose

Module D: Morphology
- Phase Contrast
- SEM

OD₆₀₀

Time

30°C  35°C

40°C
C4 Professional Development Seminars

Research
C4 Professional Development Seminars

Research

CC success stories
C4 Professional Development Seminars

Diversity workshop
C4 Activities

REU Poster Symposium

Catalina Island

Jet Propulsion Laboratory
### NSF REU: C4

#### Applicants vs. Participants

<table>
<thead>
<tr>
<th>Category</th>
<th>Applicants</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>Other States</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td>Asian</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>African American</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Multiracial</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Caucasian</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>24</td>
<td>5</td>
</tr>
<tr>
<td>First Gen</td>
<td>28</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>27</td>
<td>4</td>
</tr>
<tr>
<td>Male</td>
<td>29</td>
<td>4</td>
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C-DEBI Site Visit
Metrics of Success

1. Facilitate the successful transition from a 2-year institution to a 4-year STEM program

2. Attract and retain diverse, motivated, talented students in the STEM pipeline
Metrics of Success

2016 CC-RISE/C4 Evaluations

<table>
<thead>
<tr>
<th>ATTITUDES TOWARD THE PROGRAM</th>
<th>Mean (1-5)</th>
<th>% Agree</th>
<th>% Strongly Agree</th>
</tr>
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<tbody>
<tr>
<td>Help with my career</td>
<td>4.9</td>
<td>15%</td>
<td>85%</td>
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<tr>
<td>Worthwhile way to spend summer</td>
<td>4.8</td>
<td>20%</td>
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<td>Would recommend to others</td>
<td>4.8</td>
<td>15%</td>
<td>80%</td>
</tr>
<tr>
<td>Introduced me to new career options</td>
<td>4.6</td>
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n=20
Metrics of Success

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92% still in STEM!

76% transferred to a 4 year institution!

18% graduated from a 4 year institution!

2013-2016, n=38
Success Stories

Sanjin Mehic, CC-RISE UCSC 2014

Karla Abuyen, C4 2016
Graduate Student & Postdoctoral Program Objectives

1. Train, inspire, and nurture the next generation of interdisciplinary researchers
Graduate Student & Postdoctoral Program

Objectives

2. Develop cutting edge technical and professional skills

- Networked Speaker Series
- Annual Meeting
- Weekly posts on mailing list

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naturejobs.com

AGU

On the Cutting Edge — Strong Undergraduate Geoscience Education
an NAGT Program

C-DEBI Site Visit

NSF
Professional Development Workshops

2013 Communicating Science to Different Audiences (IODP)

2014 Preparing for Interdisciplinary Careers (MARINE)

2015 Making the Transition from Graduate Studies to the Interdisciplinary Workforce (MARINE)

2016 Building Leadership in Science Communication (Metcalf Institute for Marine & Environmental Reporting)
People getting jobs

Mark Torres  Rice U, Assistant Professor (2017-)
Ileana Perez-Rodriguez  U Penn, Assistant Professor
Delphine Defforey  Nature Comm, Editor
Rika Anderson  Carleton College, Assistant Professor
Leila Hamdan  U Southern Mississippi, Assoc. Prof.
Cara Magnabosco  Simons Center, Systems Biologist
Roland Hatzenpichler  MT State, Assistant Professor
Jessica Labonté  TAMU, Assistant Professor
Carolyn Buchwald  Dalhousie, Assistant Professor
Rachel Lauer  Univ Calgary, Assistant Professor
Jason Sylvan  TAMU, Assistant Professor
Brandi Reese  TAMU, Assistant Professor
Dustin Winslow  GrowthIntel, Data Scientist
Erin Field  ECU, Assistant Professor
Anne Dekas  Stanford Univ, Assistant Professor
Brandon Briggs  Univ. Alaska, Assistant Professor
Bill Orsi  LMU-Munich, ‘Assistant’ Professor
More people getting jobs

Karyn Rogers  RPI, Assistant Professor
Roy Price  Stony Brook U, Research Professor
Esther Schwarzenbach  Res. Scientist, Freie Universität Berlin
Everett Salas  Chevron, Decision Analysis Advisor
Charles Vidoudez  Harvard Core Facility, Mass Spectrometrist
Cecilia Batmalle Kretz  CDC, Molecular Microbiologist and Bioinformatician
Brian Marquardt  MarqMetrix Inc, Chief Science Officer
Giora Proskurowski  MarqMetrix Inc, Manager, Raman Division
Amanda Martino  Saint Francis U, Visiting Asst. Professor
Andrew Steen  UTK, Assistant Professor
Joshua Steele  SCCWRP, Microbiologist
Doug LaRowe  USC, Research Assistant Professor
Anne Kaster  DSMZ, Junior Group Leader
Ulrike Jaekel  A/S Norske Shell, Environmental Engineer
Kiana Frank  Univ Hawaii, Research Assistant Professor
Melissa Adams  Clark & Elbing LLP, Patent Agent
Tina Lin  National Taiwan U, Assistant Professor
# People getting postdocs

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Bradley</td>
<td>USC, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Jacqueline Goordial</td>
<td>Bigelow, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Maria Pachiadaki</td>
<td>Bigelow, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Gus Ramirez</td>
<td>URI, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Lily Momper</td>
<td>MIT, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Alexander Michaud</td>
<td>Aarhus U, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Stephanie Carr</td>
<td>Bigelow, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Beate Kraft</td>
<td>University of Southern Denmark, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Katrina Twing</td>
<td>Univ Utah, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Kristin Woycheese</td>
<td>MIT, NAI Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Luke McKay</td>
<td>Montana State, NAI Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Roman Barco</td>
<td>Bigelow, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Mark Torres</td>
<td>Caltech, Post-Doc</td>
<td></td>
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<tr>
<td>Julie Meyer</td>
<td>U Florida, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Alberto Robador</td>
<td>USC, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Esther Singer</td>
<td>DOE JGI, Post-Doc</td>
<td></td>
</tr>
<tr>
<td>Ben Tully</td>
<td>USC, Post-Doc</td>
<td></td>
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Creating a C-DEBI community
Questions?