Description of the Panel

Evaluation, reporting, tracking, and dissemination of longitudinal outcomes are critical for capturing and conveying the impact of your REU Site, which helps NSF make the case for continued investment. This panel will provide an overview of the NSF Education and Training Application (ETAP), the NSF-wide common application system, and the support it offers for collecting data about applicants and participants. Additionally, the Center for Evaluating the Research Pipeline (CERP) from CRA will share information about their evaluation services including data collected and methods for collecting data for evaluating REU Site outcomes.
Panelists

Eliot Winer  
Iowa State University  
(Moderator)

Heather Wright  
CERP

Andrés Nigenda Zárate  
Mathematica
Andrés Nigenda
Supporting the evaluation, reporting, tracking, and dissemination of longitudinal REU outcomes

Presentation to 2023 NSF CISE REU PI Workshop
April 21, 2023

Andrés Nigenda, Deputy Project Director
Mathematica
NSF Education and Training Application (ETAP)  
https://etap.nsf.gov

Provides a **service to the NSF community**
- Gives PIs access to a customizable common app
- Connects applicants with NSF Opportunities

Allows NSF to comply with **congressional requirements**

Enhances NSF’s **ability to monitor and evaluate programs**

![Graph showing opportunities and applicants from 2019 to 2023](image)

- **2019**
  - 58 Opportunities
  - 4.5k applicants
- **2020**
  - 39 Opportunities
  - 3k applicants
- **2021**
  - 58 Opportunities
  - 3.1k applicants
- **2022**
  - 124 Opportunities
  - 4.9k applicants
- **2023**
  - 277 Opportunities
  - 12.4k applicants
Adoption of ETAP across the REU program

196 REU sites using ETAP in FY 2023 (21% of all REU active awards)

REU Site participation in ETAP in 2023, by Directorate

<table>
<thead>
<tr>
<th>Directorate</th>
<th>Number of Awards</th>
<th>Percentage of all awards in Directorate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE</td>
<td>64</td>
<td>47%</td>
</tr>
<tr>
<td>BIO</td>
<td>46</td>
<td>29%</td>
</tr>
<tr>
<td>MPS</td>
<td>40</td>
<td>12%</td>
</tr>
<tr>
<td>ENG</td>
<td>31</td>
<td>21%</td>
</tr>
<tr>
<td>GEO</td>
<td>13</td>
<td>12%</td>
</tr>
<tr>
<td>SBE</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>EDU</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: NSF ETAP system 03/27/2023.

REU CISE Sites in ETAP in 2023, by Division

<table>
<thead>
<tr>
<th>Division</th>
<th>Number of Awards</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Cyberinfrastructure</td>
<td>9</td>
<td>47%</td>
</tr>
<tr>
<td>Computing and Communication Foundations</td>
<td>53</td>
<td>21%</td>
</tr>
<tr>
<td>Computer and Network Systems</td>
<td>11</td>
<td>5%</td>
</tr>
<tr>
<td>Information and Intelligent Systems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- REU-CISE: ~2,400 unique applicants submitted an average of 4.5 applications each.
ETAP’s common application information

Personal information ✔
Contact information ✔
Demographic characteristics ✔
Current enrollment ✔
Prior education ✔
Prior research experience ✔
Work experience ✔
Parental education ✔

Some fields are optional; other fields are required but include an option for “do not wish to provide”

The OMB control number for this collection is 3145-0248
ETAP provides tools for reporting

**PI Data Tables** benchmark statistics for Opportunities in your Directorate and across all REU Opportunities.

Applicant-level data augmented with extant administrative data for your different reporting purposes.
Among applicants to 2023 REU CISE Opportunities:

- 36% identify as female
- 32% received a Pell Grant
- 28% belong to underrepresented racial/ethnic groups in STEM
- 14% report at least one disability
- 14% are first-generation college students
- <1% are Veterans
- 59% attend a public university
- 19% attend an institution with a special designation

90%+ response rates for all demographic questions
# Tracking educational outcomes for REU participants

In January 2022, we requested NSC data on 2 cohorts of REU participants (N=9,362)

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>2013 REU cohort</td>
<td>Rising seniors</td>
<td>4th year</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Rising juniors</td>
<td>3rd year</td>
<td>4th year</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Rising sophomore</td>
<td>2nd year</td>
<td>3rd year</td>
<td>4th year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rising first years</td>
<td>1st year</td>
<td>2nd year</td>
<td>3rd year</td>
<td>4th year</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2014 REU cohort</td>
<td>Rising seniors</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>4th year</td>
</tr>
<tr>
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<td>3rd year</td>
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<td></td>
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</tr>
<tr>
<td></td>
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<td>4th year</td>
<td></td>
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<td>1st year</td>
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<td>3rd year</td>
<td>4th year</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

We analyzed these data!
Tracking educational outcomes for REU participants

100% Participant
N=9,362

54% Matched to NSC (has outcome data)
N=5,088

46% Did not match to NSC (outcome unknown)

96% Earned a degree

4% No degree

49% Highest degree is a graduate degree

46% Highest degree is a bachelor’s degree

White (non-Hispanic/Latino) participants are overrepresented in the matched sample.
Tracking educational outcomes for 2013-2014 REU participants

Nearly all degree recipients got a bachelor’s or graduate degree in Science and Engineering and related fields (97% and 93% respectively).

REU participants received bachelor’s degrees from:
• 50% from an institution with high or very high research activity
• 16% from an MSI
• 8% from an HSI
• 6% from an HBCU

Within 7 years of participating in REU:
• 71% enrolled in graduate school
Plans for tracking additional participant outcomes

NSF plans to track additional outcomes for participants whose data was collected through ETAP.

Employment and educational outcomes
- Survey on employment and educational outcomes
- Allows to test different follow-up strategies to inform future survey administrations

Scientific productivity
- Algorithm to match participants with scientific publications
- Test strategies to disambiguate authors and match them to participants at zero respondent burden
Thank you!

Photo credit: Courtesy of IRES site at University of North Texas, Sub-Antarctic Bio-cultural Conservation Program

NSF ETAP https://etap.nsf.gov
1-800-232-8024 help@nsfetap.org
Heather Wright
NSF CISE REU SITE EVALUATION
CRA CENTER FOR EVALUATING THE RESEARCH PIPELINE (CERP)

Heather Wright, Associate Director of Data and Evaluation
heather@cra.org
Primary goals for CERP evaluation

• **Goal 1**: Provide standardized and systematic evaluation of CISE REU experiences, with a unique comparative component

• **Goal 2**: Understand the impact of research experiences on undergraduates, with attention paid to students considered underrepresented in computing based on one or more of their identities (gender, race/ethnicity, and disability status)

• **Goal 3**: Communicate evaluation findings to PIs, NSF, and the broader CISE community. Develop and refine procedures as we learn from our stakeholders about successes and challenges.

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## Evaluation Questions

<table>
<thead>
<tr>
<th>NSF CISE REU Program Goals</th>
<th>Corresponding CERP Evaluation Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruit and retain students in science and engineering fields</td>
<td>How does REU program participation impact students’ interest in and trajectories into science and engineering careers (focusing on computing)?</td>
</tr>
<tr>
<td>Broaden participation in science and engineering fields</td>
<td>In what ways does REU participation impact recruitment and retention of students considered underrepresented in computing?</td>
</tr>
</tbody>
</table>
Evaluation Plan (birds-eye view)

• CERP will conduct **comparative, pre-post evaluation** for each REU project (free!)
  – Participants complete a survey before and after their REU
    • CERP provides you with the survey links to send to students
    • Does not include qualitative evaluation (e.g., focus groups, etc.)
  – Reporting will compare your REU participants to students from similar REU sites

• CERP will collect key details from PIs to learn about your successes and challenges during the summer.
  – You will receive a form to complete **both before and after** your REU Site

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Evaluation Survey Measures

✔ Student characteristics (academic background, computing experience)

✔ Previous REU experiences

✔ Attitudes and beliefs regarding computing and skills

✔ Experiences in the summer REU

✔ Future plans and career aspirations

✔ Demographics
<table>
<thead>
<tr>
<th>To what extent do you have a mentor who...</th>
<th>Your REU Site</th>
<th>Similar REU Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>...explores career options with you?</td>
<td>Before REU Mean (SD)</td>
<td>2.69 (1.34)</td>
</tr>
<tr>
<td></td>
<td>After REU Mean (SD)</td>
<td>3.66 (1.23)</td>
</tr>
<tr>
<td>...helps you improve your computing skills?</td>
<td>Before REU Mean (SD)</td>
<td>2.93 (1.44)</td>
</tr>
<tr>
<td></td>
<td>After REU Mean (SD)</td>
<td>3.72 (1.19)</td>
</tr>
<tr>
<td>...supports your research ideas?</td>
<td>Before REU Mean (SD)</td>
<td>2.97 (1.64)</td>
</tr>
<tr>
<td></td>
<td>After REU Mean (SD)</td>
<td>3.83 (1.00)</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
Participants gained knowledge between pretest and posttest.

Participants were asked…
How much do you feel you know about the following?

$p < 0.05$ & Cohen’s $d > 0.3$

$n = 310 - 312$

Prepared by Dr. Ama Nyame-Mensah, Lead Evaluator

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Multi-time point and long-term tracking

• For the REU participants who complete CERP’s surveys through the REU Site Evaluation, consenting students will complete a one-year follow up survey.
  – Participants from the 2022 summer will receive it this fall

• CERP has also followed up with past REU participants and mentors from 2013-2021 to understand the impact of the REU experiences on their academic and career trajectories.
  – CERP will be publishing results from this survey in the near future
Students with Disabilities May Need Additional Support in their NSF REUs.

Past **Participants with disabilities** reported receiving similar rates of project support as their **peers without a disability**, except for access to resources they needed to do their work.

- Sample includes former REU participants from projects that ran between **2013 and 2021**

- Survey instrument collected data about educational and professional history, details about REU experiences, and perceptions of outcomes and impacts of their REU participation

N for participants without a disability = 347-352
N for participants with a disability = 126-128

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<table>
<thead>
<tr>
<th></th>
<th>No Disability</th>
<th>Has a Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>I received a stipend</td>
<td>81%</td>
<td>81%</td>
</tr>
<tr>
<td>I had sufficient access to resources I needed to do my work</td>
<td>82%</td>
<td>70%</td>
</tr>
<tr>
<td>I had a dedicated space to do my work</td>
<td>69%</td>
<td>68%</td>
</tr>
<tr>
<td>I was provided with a computer</td>
<td>29%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Prepared by Dr. Ama Nyame-Mensah, Lead Evaluator
Sign-up, Feedback, and Contacts

Contact CERP via cerpreu@cra.org

CERP Contract Representative:
• Burçin Tamer, burcin@cra.org

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• Termia Millard, tmillard@nsf.gov

NSF Contract Technical Lead:
• Jill Denner, jdenner@nsf.gov

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Question
PIs’ Q&A with panelists