Workforce Development
NITRD Middleware and Grid Interagency Coordination Team (MAGIC)

Linda Bailey Hayden
Science Gateways Community Institute
Director of Workforce Development
LBHAYDEN@ECSU.EDU
Success is in the Numbers

• The 23 NITRD member agencies invest approximately $6.5 billion annually in R&D programs that identify, develop, and transition to practical use the advanced networking and IT capabilities needed by the Federal Government and the Nation.

• With this size investment it is critical that not only the advanced networking and IT capabilities produce outstanding outcomes but the workforce development outcomes are equally impressive.
Success is in The Numbers

African American Women

Excel in Math Ph.D. Program
by Kathleen Kennedy Manzo
Pages 40-43
Black Issues In Higher Education Magazine
May 19, 1994

Dr. Nina Roscher Chemistry Professor, American University (Deceased) NSF PAESMEM1998
Dr. Mary Gray, Distinguished Professor of Mathematics and Statistics, American University, NSF PAESMEM 2001
Dr. Linda Bailey Hayden, Professor Emeritus, Elizabeth City State University, NSF PAESMEM 2003

Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring
Building capacity in polar sciences

Working with cyberinfrastructure in remote locations has offered Dr Linda Hayden the opportunity to support a wide range of students to develop research interests in Polar Regions.

How does your approach for remote sensing of ice sheets differ from previous studies?

The POLAR Grid project displays innovative technology to students and educators in polar science research on an online platform. Our current cyberinfrastructure activities include support of field expeditions that build on previous POLAR Grid work. There is increasing activity in training and education, through computer science, to support the interpretation of radar data. Cloud and advanced visualization technologies are also being explored in the work.

Field cyberinfrastructure consisted of field servers to process data in near time and moves to back-up data collected during each mission. One shore- based fly-in flight and one shore-based flight were able to maintain a close to two locations strategy. This data is then copied into electronic archives and verified. The copied data is processed with computer systems, much like the radar algorithms using a field server. The processed data is usually formatted for archiving, data analysis, processing, and storage generation. Similarly completed within 24 hours of completion of a mission, the data is then passed in the P32 program to check quality and quality control for ice sheet mission. This end-of-flight analysis is ongoing. We have had many successes and parts of pride for the CReSIS and POLAR Grid projects within both the research and education arena. Regarding research, we have developed technologies and applications for remote sensing of ice sheets.
CyberInfrastructure for Remote Sensing of Ice Sheets

Demographics for the REU students are given in the chart below; women made up 42% to 63% and minorities made up 66% to 89%.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>11</td>
<td>42%</td>
<td>22</td>
<td>63%</td>
<td>12</td>
<td>55%</td>
<td>13</td>
<td>50%</td>
</tr>
<tr>
<td>White</td>
<td>5</td>
<td>19%</td>
<td>12</td>
<td>34%</td>
<td>4</td>
<td>18%</td>
<td>3</td>
<td>11.5%</td>
</tr>
<tr>
<td>Black</td>
<td>20</td>
<td>77%</td>
<td>21</td>
<td>60%</td>
<td>17</td>
<td>77%</td>
<td>21</td>
<td>80.8%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>4%</td>
<td>1</td>
<td>3%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>3%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Native American</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>5%</td>
<td>2</td>
<td>7.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>35</strong></td>
<td><strong>22</strong></td>
<td><strong>22</strong></td>
<td><strong>26</strong></td>
<td><strong>26</strong></td>
<td><strong>26</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

Plus CReSIS minority graduate student participation went from 7% in yr.1 to 40%
Over all CReSIS WD programs

• 55% being female students and 80% minority students (African American, Hispanic and Native American).

• 44% of the participants who provided information regarding their socio-economic status shared they were from single-parent households with an annual income of less than $45,000.


Thousands of K-16 and Graduate Students were impacted.
SGCI WD Connects Students to Gateway Experts and Technology

QUBES
nanoHUB
TACC
ILLINOIS Technology Services
SRTI Lab
SCIENCE GATEWAYS RESEARCH CENTER
BEACON
RCSB
SGCI
OPEN OnDemand
SFI
Electronic Transponder Analysis Gateway
SGCI Workforce Development Impact

- Internships
SGCI Workforce Development Impact

- Internships
- Supercomputing Hackathon
SGCI Workforce Development Impact

- Internships
- Supercomputing Hackathon
- PEARC Hackathon
SGCI Workforce Development Impact

- Internships
- Supercomputing Hackathon
- PEARC Hackathon
- ADMI Professional Development Seminar
SGCI Workforce Development Impact

- Internships
- Supercomputing Hackathon
- PEARC Hackathon
- ADMI Professional Development Seminar
- Young Professional Awardees
SGCI Workforce Development Impact

• Internships
• Supercomputing Hackathon
• PEARC Hackathon
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• Coding Institute
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- Academic Year Workshop
SGCI Workforce Development Impact

- Internships
- Supercomputing Hackathon
- PEARC Hackathon
- ADMI Professional Development Seminar
- Young Professional Awardees
- Coding Institute
- Academic Year Workshop
- Gateway Conference
### SGCI Internships by the Numbers

<table>
<thead>
<tr>
<th>Year</th>
<th># Interns</th>
<th># Male</th>
<th># Female</th>
<th># Minority</th>
<th>% Minority</th>
<th>% Women</th>
<th>% Clients Paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>50%</td>
<td>25%</td>
<td>39%</td>
</tr>
<tr>
<td>2018</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>50%</td>
<td>17%</td>
<td>75%</td>
</tr>
<tr>
<td>2019</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>50%</td>
<td>50%</td>
<td>69%</td>
</tr>
<tr>
<td>2020</td>
<td>15</td>
<td>11</td>
<td>5</td>
<td>8</td>
<td>53%</td>
<td>33%</td>
<td>53%</td>
</tr>
<tr>
<td>Totals</td>
<td>33</td>
<td>23</td>
<td>11</td>
<td>17</td>
<td>52%</td>
<td>33%</td>
<td>59%</td>
</tr>
</tbody>
</table>

Women made up 33% of the participants and 52% were minority.
SGCI Mentoring Model

Building a community of mentors

• Partner with NSF REU community through NCAR led by Valerie Sloan, Director of the NCAR|UCAR GEO REU Network
• Mentoring in a virtual environment webinar
• 81 mentors to date for hackathons, interns and conference
• Mentoring resource toolkit

Provide Mentoring Opportunities
  - Gateway conference mentoring
  - Internship and coding institute mentoring
## Traction - Building a Mentoring Community

<table>
<thead>
<tr>
<th>SGCI Community Mentors</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>2020 Internship Mentors</td>
<td>10</td>
</tr>
<tr>
<td>2019 Internship Mentors</td>
<td>11</td>
</tr>
<tr>
<td>2018 Internship Mentors</td>
<td>6</td>
</tr>
<tr>
<td>2017 Internship Mentors</td>
<td>6</td>
</tr>
<tr>
<td>2019 Conference Mentors</td>
<td>8</td>
</tr>
<tr>
<td>2018 Conference Mentors</td>
<td>12</td>
</tr>
<tr>
<td>2017 Conference Mentors</td>
<td>14</td>
</tr>
<tr>
<td>2019 PEARC Hackathon Mentors</td>
<td>7</td>
</tr>
<tr>
<td>2018 PEARC Hackathon Mentors</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>81</strong></td>
</tr>
</tbody>
</table>
Current Status of Past Participants
Where are they now

- **Graduate Student @ ECSU**
  - Disaiah Bennett
  - GIS Reservist at FEMA (Joel Gonzales-Santiago)
  - Hagen Hodgkins

- **System Administrator at IBM SoftLaser**
  - Derek Morris
  - Andrea Dumalagan

- **Cloub Engineer at Oracle**
  - Andrea Dumalagan

- **Technology Analyst @ Bank of America**
  - Andrea Dumalagan

- **Returning Intern at Ohio Supercomputer Center**
  - Andrea Dumalagan

- **DESIGNER 1 @ Newport News Shipbuilding**
  - Andrea Dumalagan
Suggestions for NITRD members

• Assure that reviewers understand and value WD
• Consider ways to **partner** with minority professional organizations (MPO). (i.e. joint meetings/events, speakers, etc)
• Consider ways to increase scholarships and fellowships funds
• Consider tier 1 and tier 2 summer research training programs based on the Team concept
Suggestions for Federal Agencies

- Have the MPO to nominate students for a conference travel award from your organization. You can specify your requirements: Classification, GPA, major, research interest, etc. should be factors.

- Mentor the students during the conference. Attend sessions with them to bring your discipline area relevance to what they hear. Let them know about other opportunities you have for them i.e. internships, AY scholarships, etc.

- Name seminars/lecture series after your organization.

- Make presentations as part of the MPO conferences.
Suggestions for NITRD members

• National Association of Black Geologists and Geophysicists (NABGG)

• Advancing Hispanic/Chicano and Native Americans in Science (SACNAS)

• The Association of Computer and Information Science/Engineering Departments at Minority Institutions (ADMI)

• The National Technical Association (NTA)
Successful Partnerships with Minority Organizations

Suggestions for NITRD members

• Society of Black Physicists (NSBP)
• National Association of Black School Educators (NABSE)
• National Association of Mathematicians (NAM)
• National Society of Black Engineers (NSBE)
• National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE)
Hold Awardees Accountable for Broader Impact Outcomes
– Results from Prior Funding: Include WD
– Assure that reviewers hold awardees accountable when proposals are being reviewed

Invest in Successful MSI-TWI Partners to Help Them Mentor New Partnerships that Involve MSI’s

Conduct strategy sessions with the MPOs and MSIs where they have a voice in the development of the partnership.
NITRD WD programs should not produce average, mediocre or typical numbers.

NITRD WD efforts should produce FRONT PAGE, JUMP OFF THE PAPER numbers.

NITRD WD outcomes should be as impressive as the science and technology outcomes.
"Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Networking and Information Technology Research and Development Program."

The Networking and Information Technology Research and Development (NITRD) Program

Mailing Address: NCO/NITRD, 2415 Eisenhower Avenue, Alexandria, VA 22314

Physical Address: 490 L'Enfant Plaza SW, Suite 8001, Washington, DC 20024, USA Tel: 202-459-9674, Fax: 202-459-9673, Email: nco@nitrd.gov, Website: https://www.nitrd.gov