Informational Session
31 March/1 April 2022
NRT = National Science Foundation Research Traineeship Program

Nationally prestigious program to train graduate students as leaders in the academic and non-academic workforce.

NSF Goals:
• Catalyze interdisciplinary research
• Produce diverse STEM professionals
• Promote transformative graduate education
Purpose

Prepare students to apply *data science* to help *communities* adapt to change

- Climate
- Health
- Habitat
- Sea Level
- Population
- Economy
- Infrastructure
A Roadmap to Your Success!

- Applied Data Science Certificate
- Team Challenges
- Peer Support Networks
- Application Seminars
- Science Communication Training
- Engagement and Outreach Scholars Academy (EOSA)
- Capstone Project (e.g., chapter in thesis)
- Community-Based Research
Key Training Elements

- Graduate Certificate in Applied Data Science
- Community-Based Research
- Communications Training
Professional Development

• Applications Seminars
• Team Challenges
• Peer Mentoring (Coffee Rings)
• Faculty Training

Have you ever felt like an imposter?
Who is this for?

- ECU MS or PhD student from any field relevant to community or environmental resilience
- Interest in *using* data science in your research
- Desire to make a difference for communities
Grad Certificate in Applied Data Science

Program Mission
• To prepare students to use practical data-driven research methods within their research & professional careers.

Program Purpose
• Provide graduate students with quantitative skills needed to analyze and evaluate coastal change via observational data and modeling
• Value-added program for students to increase data literacy and improve employability
• Advance professional careers by supplementing their experience with additional data science skills
Grad Certificate in Applied Data Science

LEARNING OUTCOME 1
Research question + Data integration

LEARNING OUTCOME 2
Development of data science toolkit

LEARNING OUTCOME 3
Communication of data products

LEARNING OUTCOME 1 | RESEARCH QUESTION + DATA INTEGRATION

- Define an appropriate research question that can be addressed with data science analytic tools

- Develop a research plan that includes a description of the data analysis methods required to answer their research question

- Understand that research plan development is iterative

LEARNING OUTCOME 2 | DATA SCIENCE TOOLKIT

• Demonstrate mastery of multiple data science tools suitable for analyzing a diversity of applied and basic research problems in disciplinary field(s).

• Toolkit areas include:
  1. Data wrangling (i.e., the ability to efficiently modify, reformat, and filter a dataset)
  2. Informed selection of parameters and method options for using their analysis toolbox
  3. Application of the data science method
  4. Problem shooting errors and developing contingency plans to deal with unexpected outcomes

LEARNING OUTCOME 3 | COMMUNICATION

- Ability to communicate principal findings verbally and in writing to different audiences
- Ability to connect results with the original scientific question(s), differentiate between key findings vs finer details
- Communicate “data story” to convey major insights

Certificate Curriculum

- **Computer science** – Courses that focus on (1) a software program to conduct data science analyses, or; (2) focus on development of computer science skills that are transferrable across a variety of platforms – includes learning programming language.

- **Applied statistics** – Courses that focus on applying statistical approaches to summarize and detect patterns in quantitative and/or qualitative data.

- **Domain expertise** – Courses that are quantitative/qualitative and relate to a STEM discipline. At least 25% of the course’s content should be focused on teaching quantitative skills and/or data science applications.
## Certificate Curriculum (13 Credit Hours)

<table>
<thead>
<tr>
<th>Program</th>
<th>APPLIED DATA SCIENCE CERTIFICATE</th>
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<tbody>
<tr>
<td>Capstone</td>
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<tr>
<td>Categories</td>
<td>COMPUTER SCIENCE</td>
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<tr>
<td>Certificate Training Requirements</td>
<td>Core (3 cr)</td>
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<tr>
<td>Seminar Course: Applications of Data Science &amp; FAIR Data Science Principles (1 credit)</td>
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<tr>
<th>Occupational Task Alignment (Kastens, 2015)</th>
<th>Define Problem</th>
<th>Wrangle Data</th>
<th>Analyze Data</th>
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<tbody>
<tr>
<td>Manage Data Resources</td>
<td>Methods and Tools</td>
<td>Data Visualization</td>
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<td>Professional Development</td>
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<td>Communicate Findings</td>
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<tr>
<th>Disciplinary example: Ecology</th>
<th>BIOL 6220 Practical Computing</th>
<th>BIOL 7900 Ecological Statistics</th>
<th>BIOL 6850 Ocean Global Change Biology</th>
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<tr>
<td>Seminar Course: Applications of Data Science &amp; FAIR Data Science Principles</td>
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<tr>
<th>Disciplinary example: Economics</th>
<th>ECON 6112 SAS Programming for Research 2</th>
<th>ECON 6302 Econometrics 2</th>
<th>ECON 6901 Quantitative Methods in Health Economics</th>
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<tbody>
<tr>
<td>Seminar Course: Applications of Data Science &amp; FAIR Data Science Principles</td>
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- **1-credit seminar course** introducing primary methodologies, tools, and applications in data science.
- **Up to 3 credit equivalents** of informal training can be used to demonstrate introductory skill development OR 3 credits for capstone project.
- **Additional 9 credit hours** of applied data science courses to demonstrate advanced mastery and application of data science knowledge and skills.
- **Completion of a data science portfolio and capstone experience.**
Dr. Rebecca Asch, Assistant Professor of Biology (Co-Chair)
Dr. Haiyong Liu, Professor of Economics (Co-Chair)
Dr. David Lagomasino, Assistant Professor of Coastal Studies
Dr. Jeffrey McKinnon, Professor of Biology
Dr. Sid Narayan, Assistant Professor of Coastal Studies
Dr. Ariane Peralta, Associate Professor of Biology
Dr. Hannah Siriani, Assistant Professor of Geography, Planning, Environment
Dr. Rui Wu, Assistant Professor of Computer Science
Dr. Emily Yeager, Assistant Professor of Recreation Sciences
Community Engaged Research

• Partnership between academic institutions/researchers and communities for the mutually beneficial exchange of knowledge and resources

• Community is equal partner and works collaboratively with researcher through all aspects of the program, including topic identification, data collection, implementation, analysis, dissemination
EOSA and Community Science Practicum

EOSA
- Complete EOSA workshops
  - Four workshops on engaged scholarship, partnership development and management, building mutually beneficial scopes of work, ethical considerations for community engagement, research and creative activities approaches
- Work with faculty member who has established community partner to develop a plan for a community engaged project

Practicum
- Implement engaged project they developed during EOSA workshops
- Team will include faculty member and undergraduates

Note: Trainees have opportunity to develop projects that become a dissertation chapter
Science Communication Immersion
Applying foundational elements of art and design to enhance science communication, education, and community engagement

Science of Storytelling
Apply science communication principles to environmental storytelling using multiple modalities, perspectives, and audiences
Convergent Science

Activities that integrate transdisciplinary science and teamwork within existing PhD courses (ICS 8000, BIOL/CHEM/BISC 8815)

Team Challenges: focused 10-day “situation room” collaboration addressing community problems
Professional Development Faculty

- Improve research mentoring relationships for mentors and trainees
- Enable faculty to guide graduate students build alternative career plans outside of academia
- Identify and support graduate students not meeting their potential due to confidence issues, impostor feelings, and stereotype threat
Mission & History

Mission

To improve the research mentoring relationships for mentees and mentors at all career stages through the development, implementation and study of evidence-based and culturally-responsive interventions.

The Center for the Improvement of Mentored Experiences in Research (CIMER) will:

- Facilitate research mentor and mentee training for mentees and mentors at all career stages
- Develop and study new approaches and resources for advancing mentoring relationships
- Promote cultural change that values excellence in research mentoring
- Build a network of mentors, mentees, and those engaged in enhancing and studying research mentoring relationships
- Advance diversity in the research enterprise
Building best practices

Each semester, we will host an invited speaker

• Share theory, experiences, and best practices for graduate student mentoring

• Discuss practices to enable students in overcoming anxieties, successful goal setting, and addressing fears in career planning
Building mentoring communities

- Share mentoring experiences 2-3 times per semester
- Provide feedback on faculty mentoring plans
Eligibility

- IDPBBC PhD
- ICS PhD
- Natural science master’s students
- Social science master’s students
- Health sciences master’s students
- Engineering master’s students

CCEDS Training
## Project Activities

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<tr>
<th>Year in NRT program</th>
<th>0</th>
<th>YR1</th>
<th>YR2</th>
<th>YR3</th>
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<tbody>
<tr>
<td>Semester in NRT program</td>
<td>FALL</td>
<td>SPRING</td>
<td>SUMMER</td>
<td>FALL</td>
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<tr>
<td><strong>Technical Training &amp; Scientific Skills</strong></td>
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<tr>
<td>(1) Applied Data Science Certificate</td>
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<tr>
<td>(3a) Convergent Science Courses</td>
<td>BIOL 8815 sect 002</td>
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<td>(3b) Team Convergence Challenge at the Coast</td>
<td>5 days (8 hrs/day)</td>
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<td>(3c) Retooling Seminars</td>
<td>weekly (2 hrs)</td>
<td>bi-weekly (1 hr)</td>
<td>bi-weekly (1 hr)</td>
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<td><strong>Science Communication</strong></td>
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<td>(2a) Communications Bootcamp (1 week + 4 sessions)</td>
<td>3 async training modules 2-3 hrs/module</td>
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<td></td>
<td>4 virtual/in person workshop meetings (3 hrs/meeting)</td>
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<tr>
<td>(2b) Science of Storytelling (forming identity) (course)</td>
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<td>bi-weekly (2 hrs)</td>
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<td><strong>Community Engagement</strong></td>
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<tr>
<td>(4) Engagement and Outreach Scholars Academy</td>
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<td>4 workshop meetings (3 hrs/meeting)</td>
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<tr>
<td>(5) Community Research Practicum</td>
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<td>Weekly (4-10 hrs - will vary by project)</td>
<td>Weekly (4-10 hrs - will vary by project) *</td>
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<tr>
<td><strong>Personal &amp; Professional Development</strong></td>
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<td>(6) Coffee Rings Peer Mentoring</td>
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<td>(7) Career Fear (Faculty) Mentoring</td>
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* MINDS Career Mentoring Roadmap
Application Process

[LINK TO APPLICATION]

Review of applications will start April 29, 2022
Full vs. Partial NRT Participant

Participation in all NRT program components is considered a full NRT participant.

Participation in a subset of NRT program components is considered a partial NRT participant.
• Ariane Peralta | Biology | peraltaa@ecu.edu
• Sid Mitra | Geological Sciences | mitras@ecu.edu
• Rachel Gittman | Biology | gittmanr17@ecu.edu
• Nadine Heck | Coastal Studies | heckn19@ecu.edu
• Jim Morley | Biology | morleyj19@ecu.edu
• Natasha Bell | Engineering | bellna19@ecu.edu
• Cindy Grace-McCaskey | Anthropology | gracemccaskeyc15@ecu.edu
• Sam Mosier | Political Science | mosiers18@ecu.edu
Contact Information

NRT Program Coordinator | Kelsey Dwyer | dwyerk19@ecu.edu

Website | https://water.ecu.edu/nrt/

Admissions | Link to form