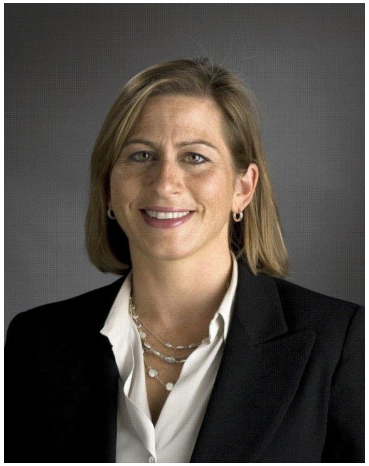
# Standards Education for Infrastructure Improvement & Resilience

RIT | Rochester Institute of Technology

Lisa Greenwood, PhD
Yewande Abraham, PhD
Sumita Mishra, PhD
Jennifer Schneider, ScD

Image source: https://www.oecd.org/finance/sustainable-infrastructure.htm

# Our Core Team



Lisa Greenwood Ph.D.

*Environmental Sustainability, Health & Safety*

Yewande Abraham Ph.D.

*Civil Engineering Technology*

Sumita Mishra Ph.D.

*Computing Security*

Jennifer Schneider Sc.D., CIH

*Environmental Sustainability, Health & Safety*

# Motivation:

- **As evidenced by the passing of the Infrastructure Investment and Jobs Act (IIJA), recognizing, understanding, and being able to apply relevant standards to improve infrastructure will be a useful, practical, and sought-after professional skill set as the U.S. seeks to enhance its competitiveness and its resilience to shocks and stresses.**

- **These modules will help students develop the knowledge and skills needed for engineers and other professionals to utilize national documentary standards in the domains of**
  - **resilient power infrastructure,**
  - **sustainable buildings and sites, and**
  - **infrastructure resilience to climate change and other disruptions**

# Project Goals

**Curricular Goal:** Develop and embed a set of reusable, adaptable, and interchangeable course modules on the *application of standards related to resilient and secure infrastructure design, construction, and operation*, at different levels appropriate for undergraduate and graduate students.

**Faculty Goal:** Support cross-disciplinary faculty expertise development in infrastructure system standards application by sharing content both internally and externally.

**Educational Effectiveness Goal:** Ensure the effectiveness of the course modules via a cohesive and proven educational structure.

**Dissemination Goal:** Disseminate our results via published papers, conference presentations, and a website.

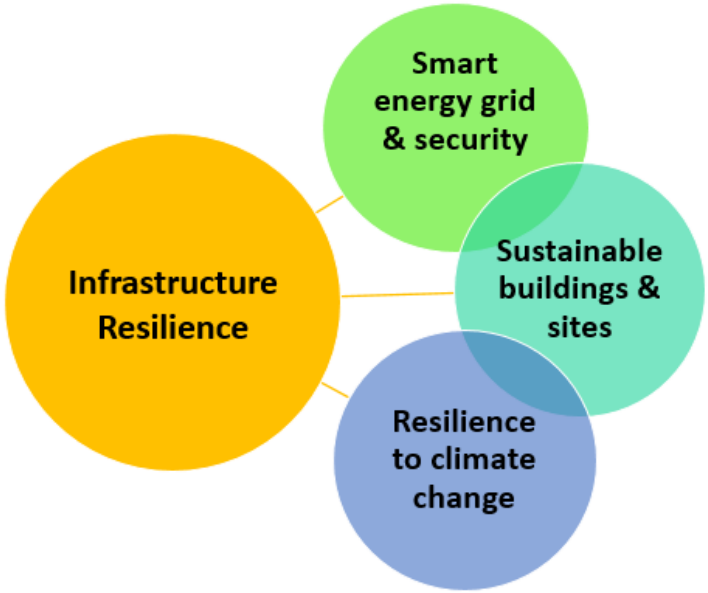
# Project Approach

## Multi-Disciplinary, Standards-Based Learning Modules

**1. Resilient Power Infrastructure:** Smart energy grid security and privacy.

**2. Sustainable Buildings and Sites:** Efficient, healthy buildings and remediation of legacy pollution to minimize harm to the environment and to communities.

**3. Infrastructure Resilience:** Enhancing infrastructure resilience to climate change and other disruptions.



# Project Deliverables and Outcomes

- Curricular Modules – multidisciplinary, standards-based

- Modules include
  - Curricular content organized in 6 themes
  - Tools, guidance, and resources for faculty
- Sphere of influence
  - Students in engineering technology
  - Students in computing and information sciences
  - Students and faculty in other programs and institutions

# Project Approach – Course Integration

**Table 2: Infrastructure Standards Content: Relevance for RIT, GWU and PSU Courses**

| Theme Relevance for Existing Courses at RIT, GWU, and PSU | | | Learning Modules and Themes in Infrastructure Standards | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | (1) Power Infrastructure | | (2) Sustainable Buildings & Sites | | (3) Infrastructure Resilience | |
| | | | Cyber security | Smart Grids | Sustainable building | Sustainable sites | Climate Change | Other Disruption |
| **RIT** | CVET 170 | Introduction to Civil Engineering | | | ✓ | ✓ | | |
| | CONM 650* | Principles of Construction Leadership and Management (online) | | | ✓ | | ✓ | ✓ |
| | CONM 690* | Sustainable Building Design and Construction (online) | | ✓ | ✓ | ✓ | ✓ | |
| | CSEC 468 | Risk Management for Information Security | ✓ | ✓ | | | | ✓ |
| | ESHS 150 | Principles of Environmental Sustainability, Health and Safety (blended) | | ✓ | | ✓ | ✓ | ✓ |
| | ESHS 310 | Solid & Hazardous Waste Management | | | | ✓ | | ✓ |
| **GWU** | ECE 6669* | Smart Electricity Grids | ✓ | ✓ | | ✓ | | |
| | ECE 6070* | Electrical Power Systems | ✓ | ✓ | | ✓ | | |
| **PSU** | AE 579* | Sustainable Building Project Leadership | | ✓ | ✓ | ✓ | ✓ | |
| | AE 445 | Building Re-tuning | | ✓ | ✓ | | | ✓ |

*Graduate-level courses

# Dissemination

- Internal
  - Targeted courses in Environmental Sustainability, Health and Safety, Civil Engineering Technology, Construction Management, and Computing Security
  - Shared with RIT programs in architecture, computing, engineering, engineering technology
- External
  - Validation institutions – George Washington, Penn State
  - NIST final summary paper
  - NIST workshops
  - Academic or professional journals and conferences
  - ANSI Standards Education Website

# Questions?

Contact:
Lisa Greenwood
lisa.greenwood@rit.edu