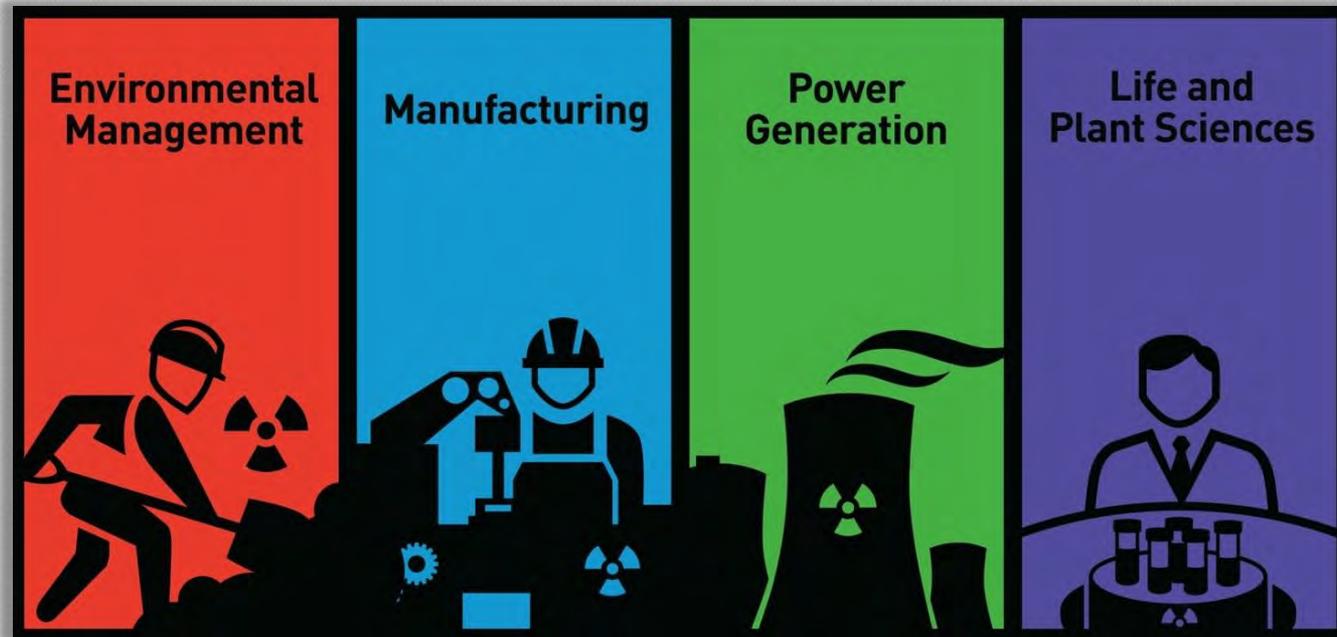# Regional Center for Nuclear Education & Training
Summary - 2024
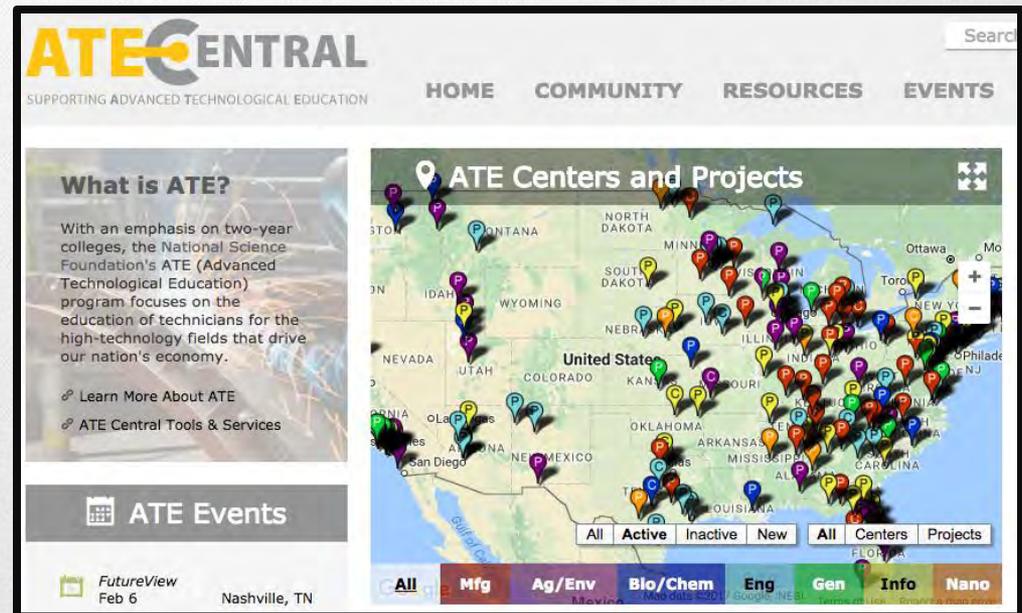

RCNET | www.GoNuke.org

What is ATE?

ATE: Advanced Technological Education

- Is a funding Division of the National Science Foundation under the Education Directorate
- Receives ~ $70M every year since 1990 to fund community college training
- Approximately schools currently funded
- Highest level of funding (~10 are centers at $1-2M/year)

What is RCNET

- **RCNET is an NSF ATE Center funded since 2008 to focus on nuclear energy technician training**

- **Through 40+ college partnerships across the nation, RCNET graduates ~ 4,000 A.S. nuclear technicians since inception**

- **RCNET in conjunction with NEI and INPO created a portable nuclear energy credential for A.S. technicians called the NUCP (Nuclear Uniform Curriculum Program)**

- **Expanded to Environmental Fields in 2012**

- **Focus on Standardized Curriculum, National Program Sustainability, and Professional Development**

National Impact

- Developed and standardized over 1,200 lectures, 16 classes, 1 biographical textbook, and 8 advanced technology modules.

- Graduated over 4,000 students with 90% placement at over 100 industry partners.

- Helped 14 colleges launch or expand their nuclear program.

- Developed and launched 4 standardized articulation agreements with Excelsior College, FIU, UF, and Bismarck State College.   Over 40 graduates continue on to a 4 year degree programs every year!

- Developed partnership with United States Navy standardizing credit for veterans at partner colleges.

- Developed partnership and funding mechanism with NRC and United Negro College Fund to increase minority ranks in nuclear programs.

- Annually, host over 40 outreach events that directly reach 2,000+ students and 470 educators at 231 schools.

- Annually, host 10 professional development seminars attended by 20+ colleges and 40+ industry partners to share best practices in nuclear training.
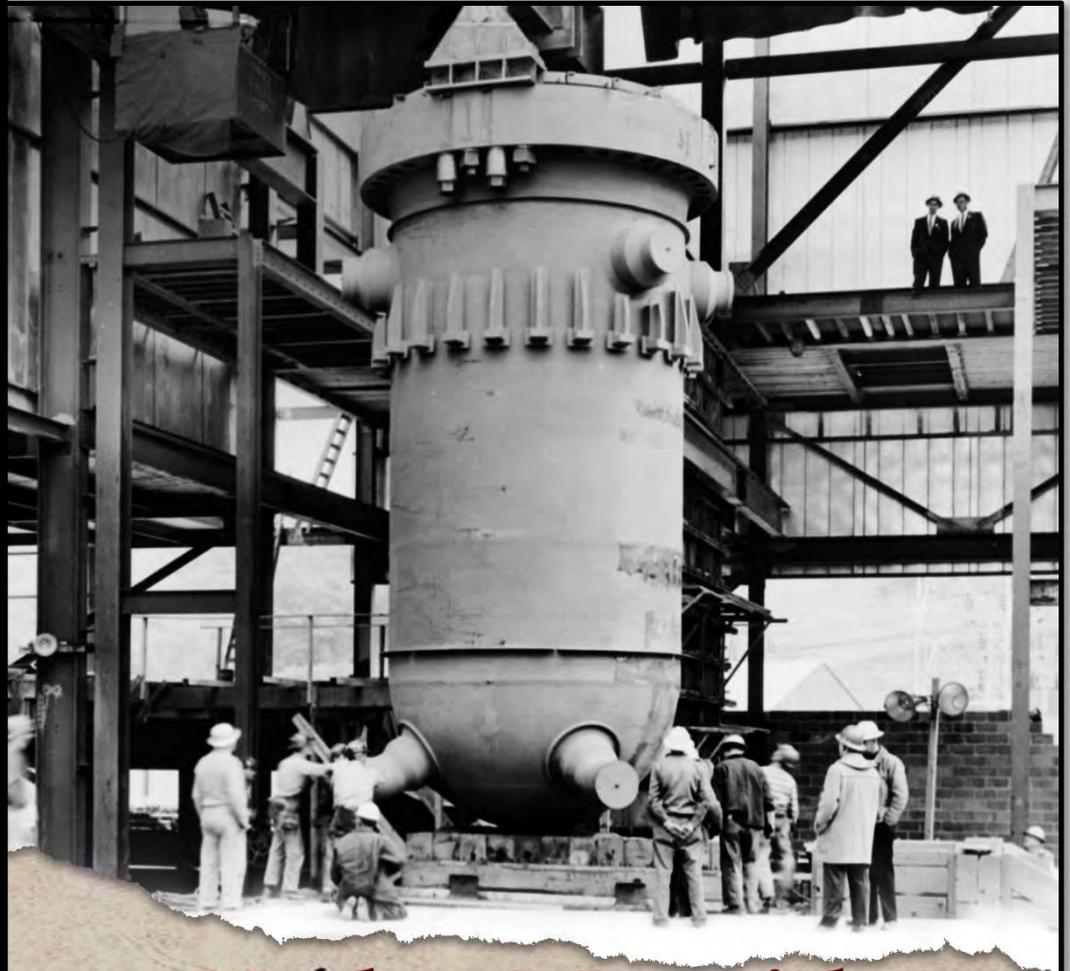
Nuclear Mavericks

RCNET STEM Textbook

Nuclear Mavericks describes the trials and tribulations of 9 nuclear pioneers but can be used in all STEM introductory courses to impart a sense of historical pride and ownership.
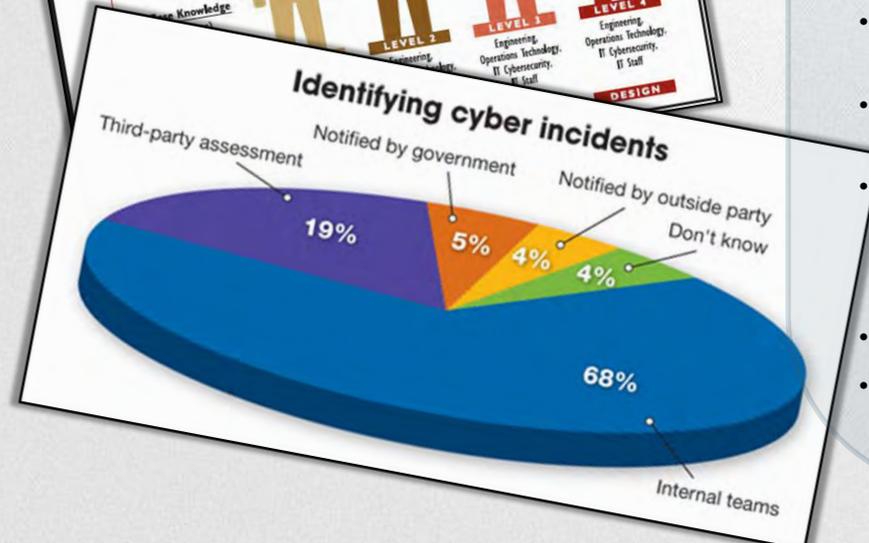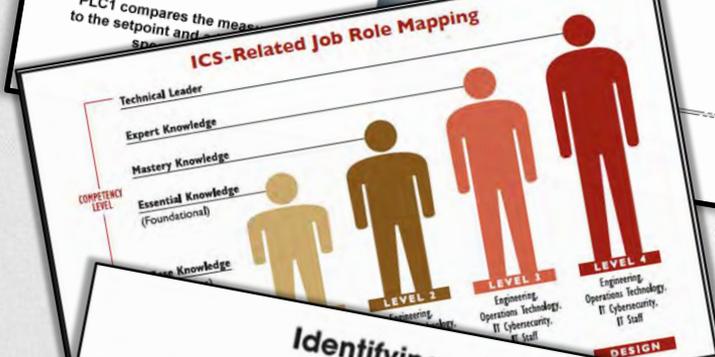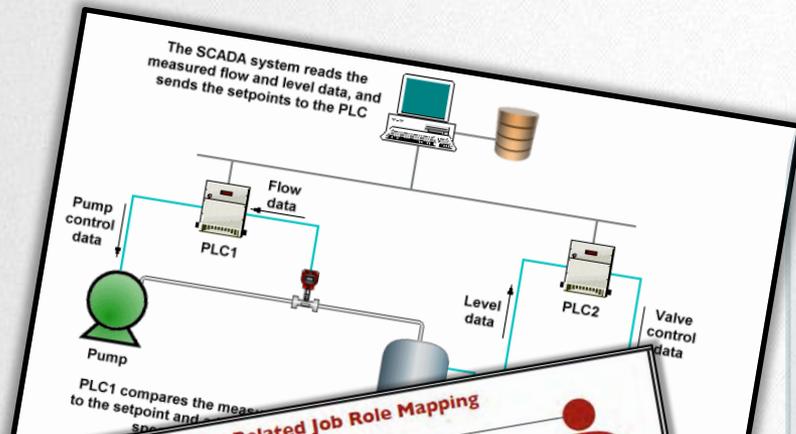
To order books for your school, visit GoNuke.org

Nuclear Mavericks
A Biographical Compilation of the Men & Women Who Shaped the Nuclear Workforce

RCNET Module: Nuclear Cyber Security

Learning Objectives

- Develop and reinforce a common language and understanding of Industrial Control System (ICS)

- Demonstrate the necessary cyber-to-physical knowledge to better understand the importance of ICS operational drivers and constraints that require specific safety protection, communications needs, system management approaches, and cybersecurity implementations.

- Know the adversary's approaches to attacking an ICS SCADA environment to be better prepared to defend that environment.

- Develop a better understanding of where specific attack vectors exist, as well as the tools to use to discover vulnerabilities and exploit them along with specific capabilities available on servers, workstations, and applications, students will now learn network-specific defense approaches.

- Better understand attacks targeting the types of web servers used on many ICS devices for management purposes.

- Discuss essential ICS-related server and workstation operating system capabilities, implementation approaches, and system management practices.

- Examine concepts that benefit SCADA ICS systems such as system hardening, log management, monitoring, alerting, and audit approaches, then look at some of the more common applications and databases used in ICS environments across multiple industries.

- Implement technologies used to defend ICS networks.

- Discuss the various models, methodologies, and industry-specific regulations that are used to govern what must be done to protect critical SCADA ICS systems.

Dynamic Flow Loop

- **Multi-million-dollar dynamic flow system built in partnership between FP&L, DOE, and IRSC**
- **Replicates all conditions in a nuclear power plant**
- **Built with digital and analog controls and controlled by 1970s and 2020 control systems**
- **2-story flow loop contains 3 variable speed pumps, motor controls, rigging and lifting system, 15 different type of valves (AOVs and MOVs), strainers, 30 different types of digital and analog sensors, 500-gallon tank, sampling ports, radiation detection and monitoring, and a SCADA control room.**
- **Tied to curriculum and lessons plans to teach tag in/tag out, maintenance procedures, event responses, cyber security (NERC-CIP), radiation monitoring and detection, conditioned based maintenance, and SCADA systems.**

Dynamic Flow Loop

Rigging & Lifting

Radiation Detection, Monitoring, and Clean Up

Dynamic Flow Loop

Condition based Maintenance (Data Science)

**Cavitation sensor on pump

Welding & Pipefitting

Dynamic Flow Loop

Event Response and Just in Time Training

Digital Controls, SCADA, and Cyber Security (NERC-CIP)
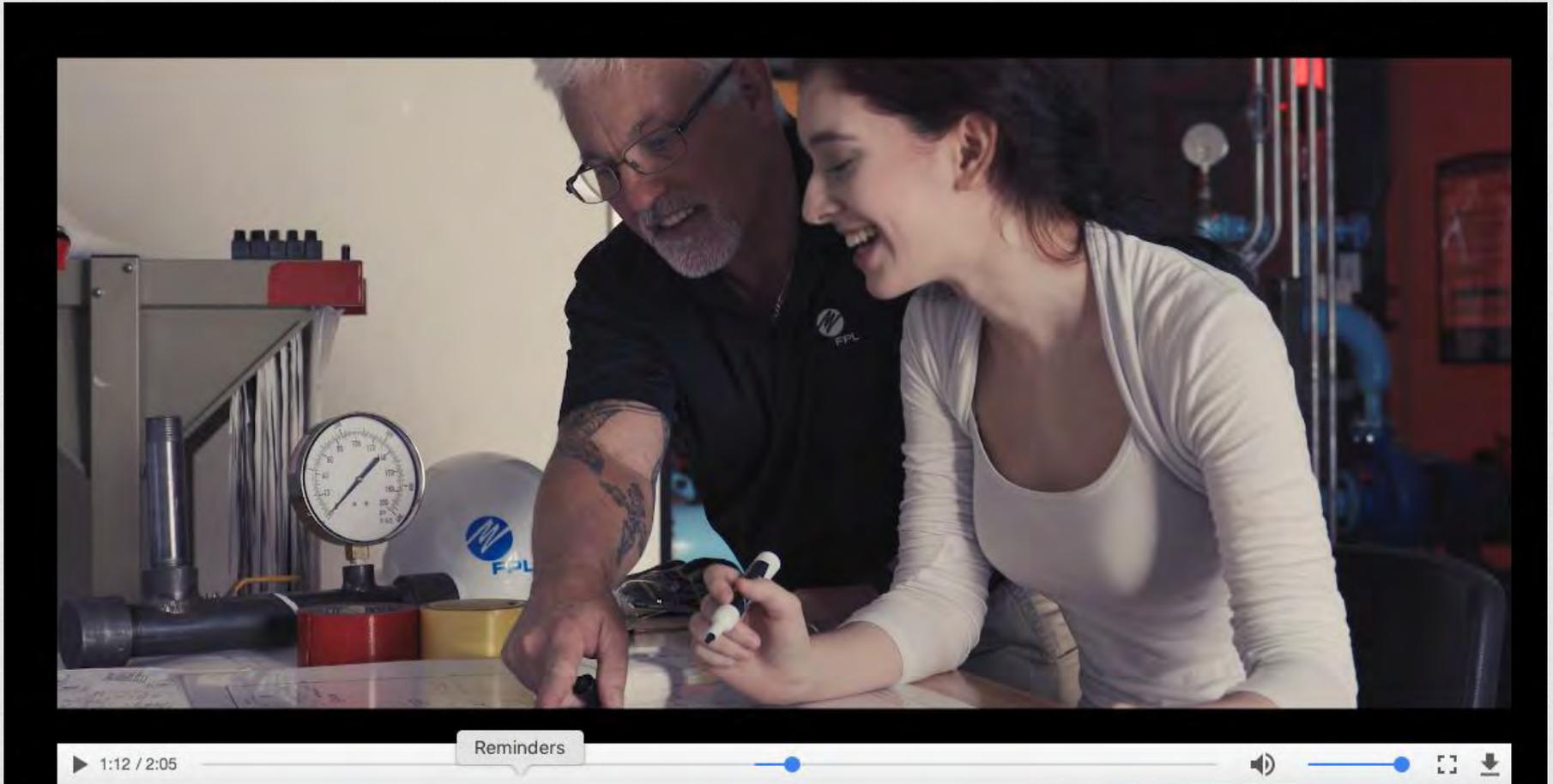
2017

2008

Indian River State College's Fall 2019 Incoming Nuclear Power Technology Class

- **31 ICE (Instrument and Controls and Electrical) students**

- **26 Men; 5 Women (83% Men; 17% Women)**

- **16 Caucasian; 15 Minority (7 African American; 6 Hispanic; 2 Other) (48% Minority)**

Customized Marketing Material

- **Viral video promoted by White House with custom beginning and end options**
- **https://www.youtube.com/watch?v=4QH-D4_FK18&t=28s**

Best Practices on Math and Minority Engagement

- **Implemented at 14 colleges and institutionalized at 2 colleges**

- **Increased national minority Involvement by ~6%**

- **Featured in Diverse Magazine, National Academy of Science, and by ASPEN Foundation**

Details of IRSC's Program

- Formally established in 2006 an FPL partnership (St. Lucie Nuclear Generation Station).

- Informally, IRSC has trained FPL employees for greater than 30 years.

- SACS Accredited 2-year A.S. Program.

- 1st Certified NUCP College.

- Certified to offer mechanical, electrical, instrument and controls, radiation protection, and chemistry technician tracks.

- Program articulates to 4 year degree programs at Excelsior College, Thomas Edison State College, Florida International University, and University of Florida.

- Program has 0 full time faculty and 8 SMEs with experience in the field.

- Program mapped to ACAD 08-006 standards.

- IRSC has been benchmarked by and helped 8 schools and 4 countries establish programs.

Program Accomplishments

- 95% Graduation and 95% Placement Rates

- $55,000 Average Annual Starting Salary for graduates

- 4 industry recognized certificates (OSHA, MSSC, NanTEL, and NUCP)

- Degree articulates to FIU, UF, and Excelsior College.

- 312 graduates since 2006 (176 FPL, 100 BHI/Bartlett, + 36 Other)

- 163 NUCP certificates awarded (most of any program in nation)

- $100,000 = Reported Earnings after Outages

- IRSC graduates received jobs at Savannah River Nuclear Labs, Duke Energy, Exelon, Oak Ridge National Labs, GE, Westinghouse, FPL, and Southern Company

ECONOMIC IMPACT IN THE COMMUNITY:

- 312 jobs at $55,000/year = $17,160,000/year

- Multiplier of 2 = $34,320,000 /year

- 900 additional support jobs.

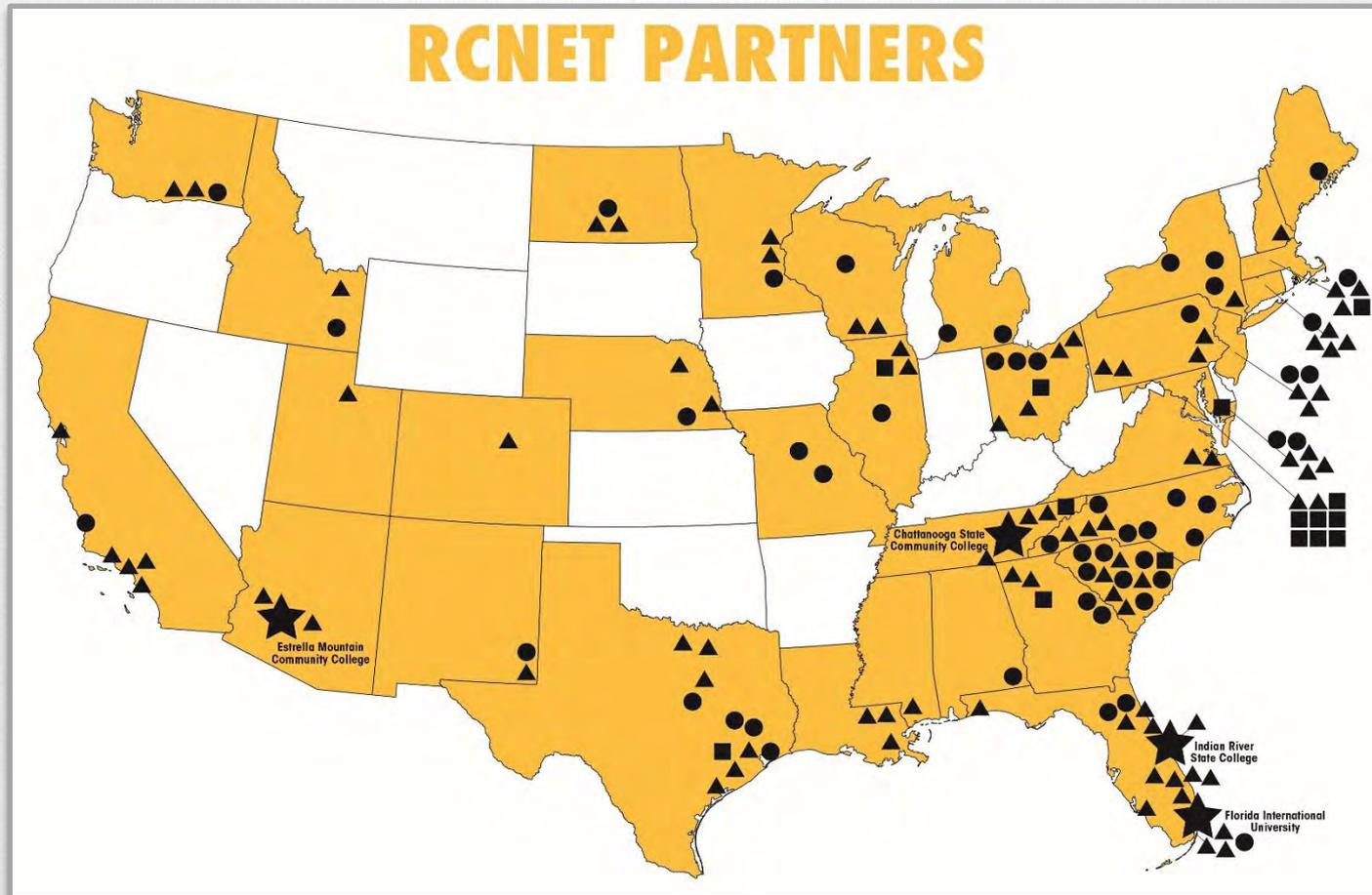- >$14M in grants ($9.5M NSF; $2M DOE; $1.5M NRC)

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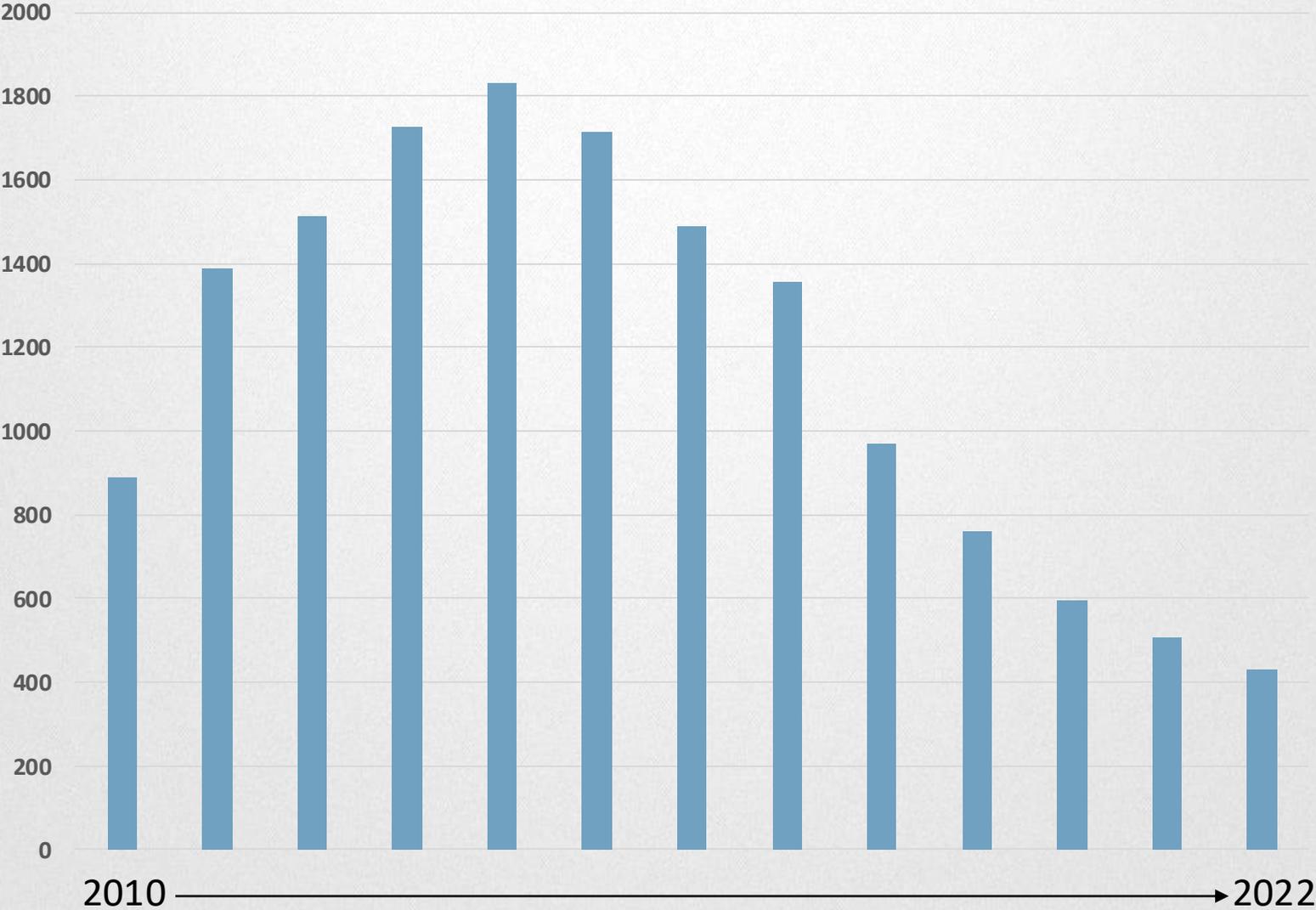
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Program Closed in 2019
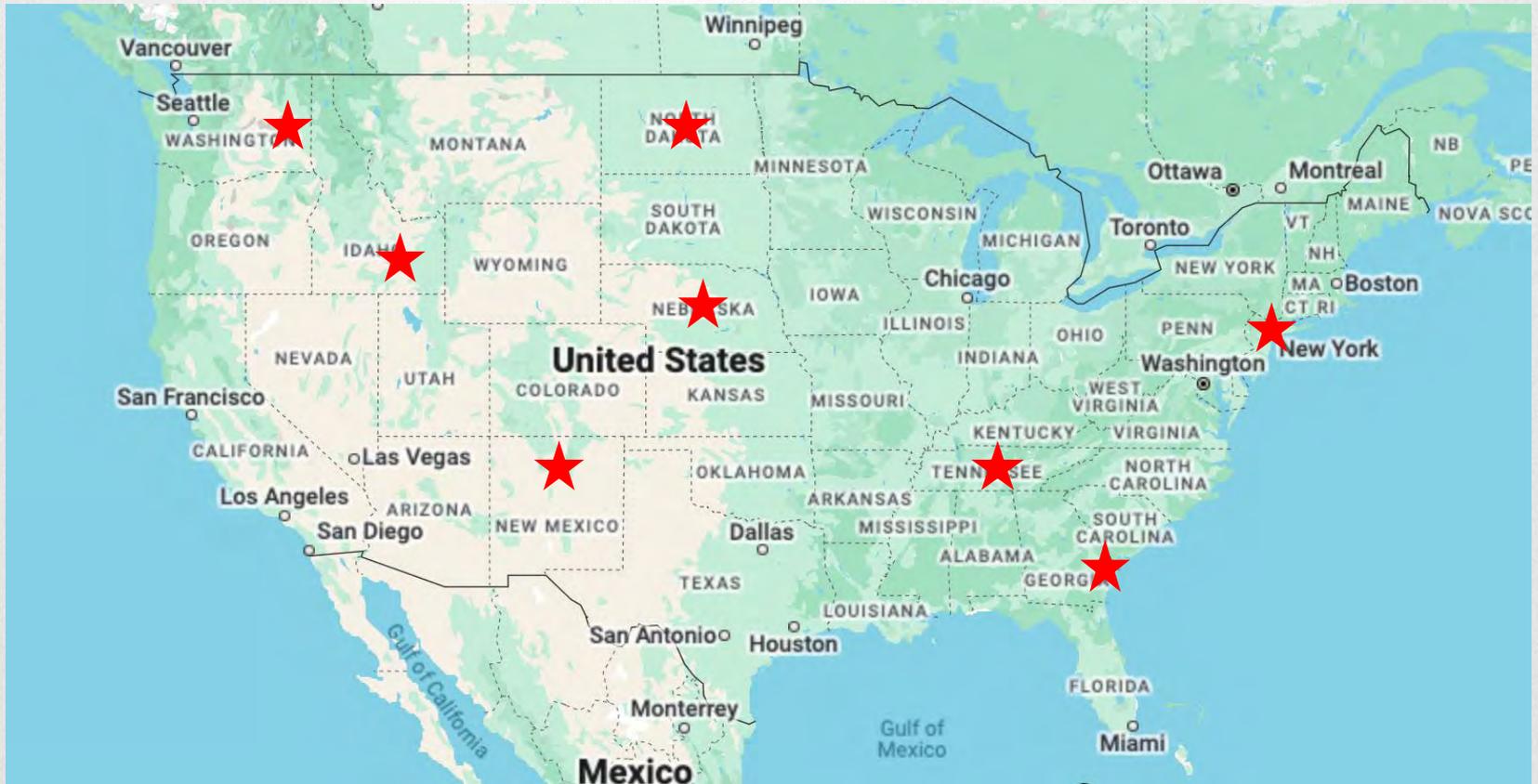
RCNET Partners

RCNET is headquartered at **Indian River State College** in Fort Pierce, FL and is a consortium of of **100 industry, 55 academic, and 15 agency** partnerships across the **United States and 7 countries**.
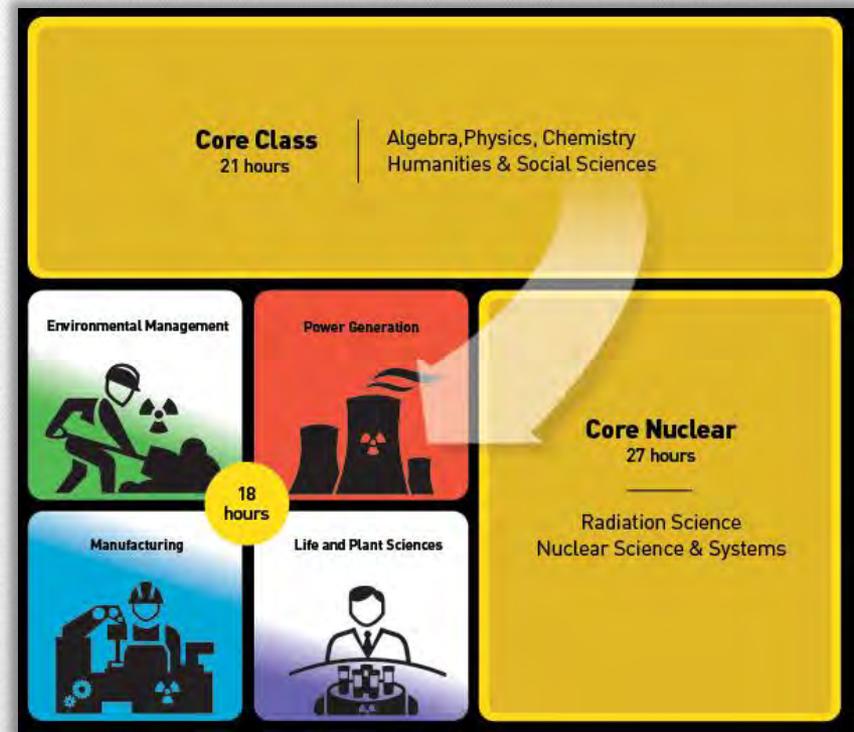
2024 Program Status

Huge Workforce Opportunities

There are Proven Solutions to Most Challenges

1. Sustainability - - DO NOT CREATE A BOUTIQUE PROGRAM

2. Minority and Female enrollment – RCNET + General ATE Community has a lot of replicable processes

1. **Cohort**

2. **Guided Pathway**

3. **Common 1st year**

4. **Embedded Internship**

5. **Embedded Certifications**

The Hardest Challenge

1. **College Buy In**

   a) Community College Landscape has changed

   b) Workforce programs across the nation are condensing or closing

   c) Hard to find faculty

   d) Facilities have been repurposed

WWW.GONUKE.ORG

Thank You

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