



# NEEC

NAVAL ENGINEERING  
EDUCATION CENTER

# **Our Mission**

**Developing the Next Generation  
of Civilian Engineers for the Navy  
through project-based education,  
collaboration, and curriculum  
development.**

# Who We Are

## Participating Universities

- Florida Atlantic University
- Florida State University/Florida Agricultural and Mechanical University
- Georgia Institute of Technology
- Massachusetts Institute of Technology
- Old Dominion University
- Pennsylvania State University
- Stevens Institute of Technology
- Tennessee State University
- University of Iowa
- University of Michigan
- University of New Orleans
- University of Texas-San Antonio
- University of Washington
- Virginia Polytechnic Institute
- Webb Institute

## Professional Societies

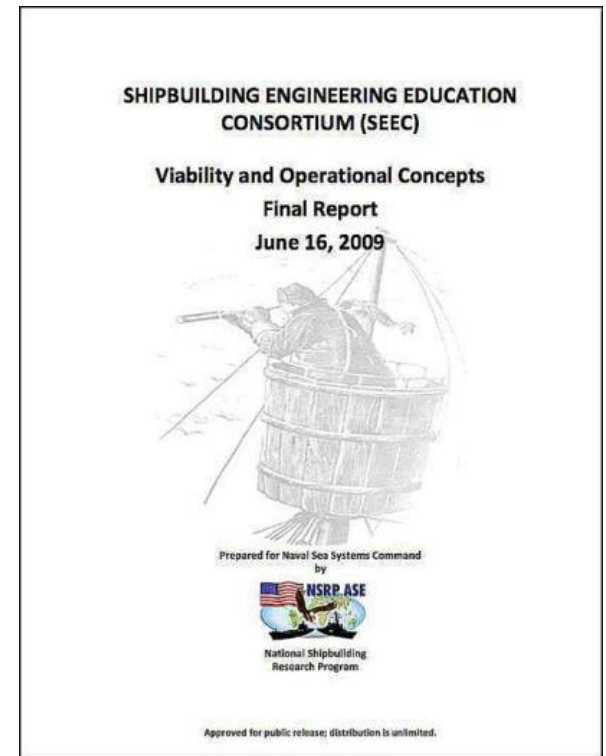
- The American Society of Naval Engineers (ASNE)
- The Society of Naval Architects & Marine Engineers (SNAME)



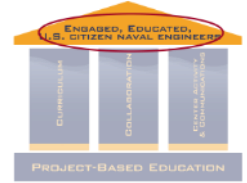
# Why Does NEEC Exist?

*Approximately 30% of the Navy's engineering workforce will be eligible to retire by 2014.*

*Source: Shipbuilding Engineering Education Consortium (SEEC) Viability and Operational Concepts Final Report (June 16, 2009) by National Shipbuilding Research Program (NSRP)*



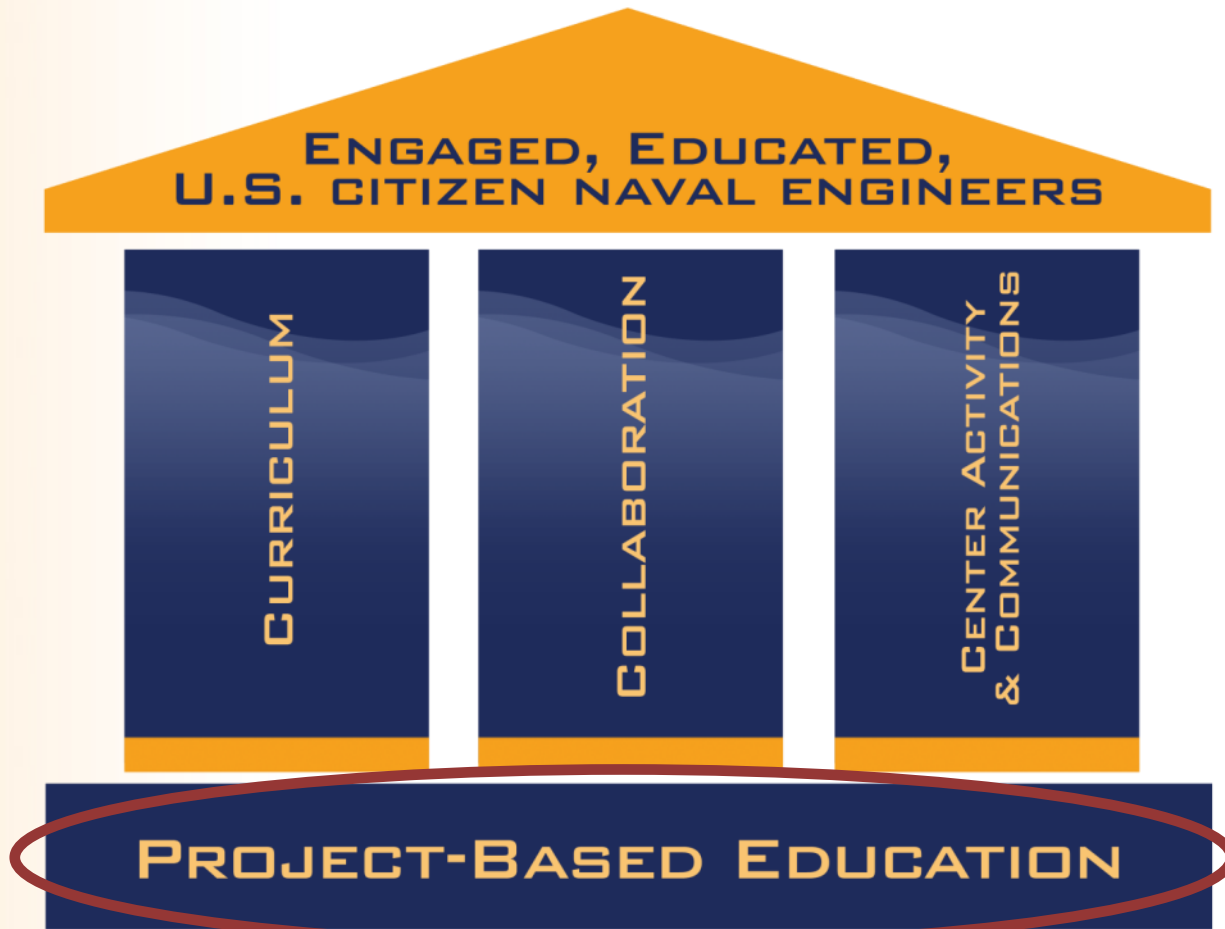
# Major Accomplishments



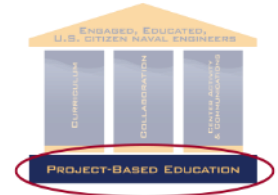
## Developed and initiated 23 NEEC project teams

- 215 Undergraduate and Graduate students directly engaged in projects
- Projects engaging cross-section of NSWC
- SMART (11) & NREIP (9) students engaged
- Projects cover a wide-range of important Navy topics
- *Base funding – 133 targeted students*
- **166 engaged after PoE1**
- **215 engaged during current PoE2**

# The Pillars of NEEC



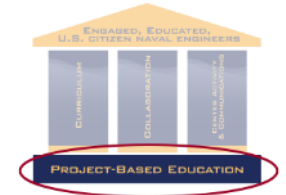
# NEEC Project-based education



- Engage students in *multi-disciplinary research*.
- Investigate *real Navy problems*.
- Generate interest in *Navy-related career opportunities*.
- Focused on *undergraduate students*.
- Projects coordinated **NAVSEA** and Naval Surface Warfare Centers across the country



# Project-based Education Projects – PoE1 (15)

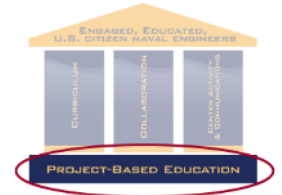


Project	Member
Acoustic Diagnostics for Sound Sources in a Noisy Environment	University of Michigan
Air Layer Drag Reduction for Energy Conservation	University of Michigan
Assessing the Relative Capabilities of Large-Scale System Architectures Using Network Science	Georgia Tech
Automating Concurrency Refactoring of Time Critical Combat System Software On Multicore Platforms: Theory, Methodology, and Run-Time Support	Virginia Tech
Battery Systems Engineering	Penn State
Design and Construction of Reduced-Sale Railgun	Virginia Tech
Life Cycle Performance Prediction Informed by Wireless Hull Monitoring	University of Michigan
Nanosensors for Explosive Detection	Tennessee State University
Noise Source Detection and Localization in Reverberant Chambers	Penn State
Robotic Inspection of Tanks and Voids	Virginia Tech
Ship Design Initiation Through Comparative Naval Architecture and Its Influence on the Programmatic Process of Ship Design	Massachusetts Institute of Technology
Synthetic Aperture Imaging of Turbulent Sheet Breakup and Ship Spray	Massachusetts Institute of Technology
Total Ship Powering Systems Architecture to Support High Energy Weapons	Webb Institute
Unmanned Autonomous Vehicle Testbed-A Multi-Agent Testbed for Teaching, Training and Learning	University of Michigan
Control of Single and Dual Shaft SOFC/GT Hybrid Power Systems for All Electric Ships	University of Michigan



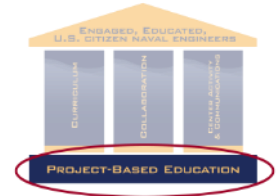
# Project-based Education

## Additional Projects – PoE2



Project	Member
Adaptive Control, Communication and Navigation for Navy-Relevant Autonomous Vehicles	University of Texas, San Antonio
Noise and Thermal Management of Naval Systems Part 1 - Aircraft Carrier Noise Measurement and Mitigation Part 2 - Thermal Management	Florida State University
Design Integration of Ship and Combat Systems	Old Dominion University
Development of a 2nd Law Analysis for the Evaluation and Design of Network-Centric Systems-of-Systems	Georgia Tech
Evaluation of Marine Corps' Future Amphibious Vehicles and Systems	Stevens Institute of Technology
Flow control on marine vehicles for high maneuverability and station keeping in shallow waters	Florida Atlantic University
Robust, Property Driven, Automated Hull Shape Generation and Optimization	University of New Orleans
Schedule/Budget Implications of Shipyard Production Manning Options	University of Washington

# NEEC Featured Projects

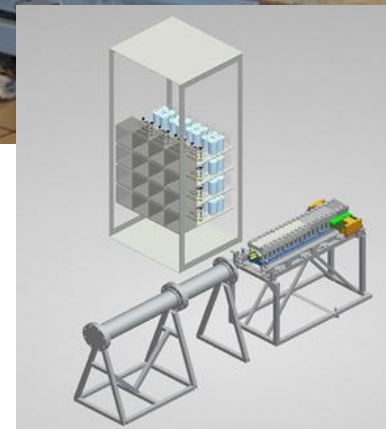
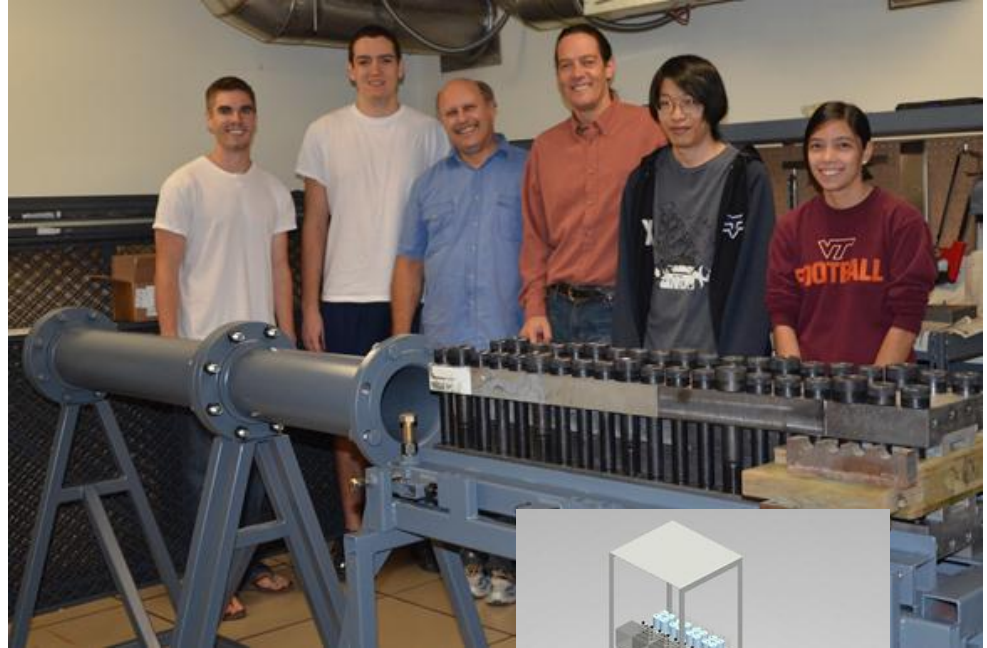


## Design and Construction of a Reduced Scale Railgun

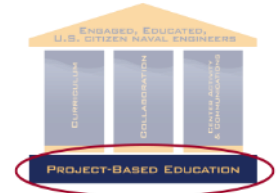
*Institution:* Virginia Tech

*Principal Investigator:*  
Prof. Hardus Odendaal

*Navy POCs:* Mr. Jack Bernardes, Dahlgren  
and Mr. Charles Garnett, Dahlgren



# NEEC Featured Projects



## Unmanned Autonomous Vehicle Testbed – A Multi-Agent Testbed for Teaching, Training and Learning

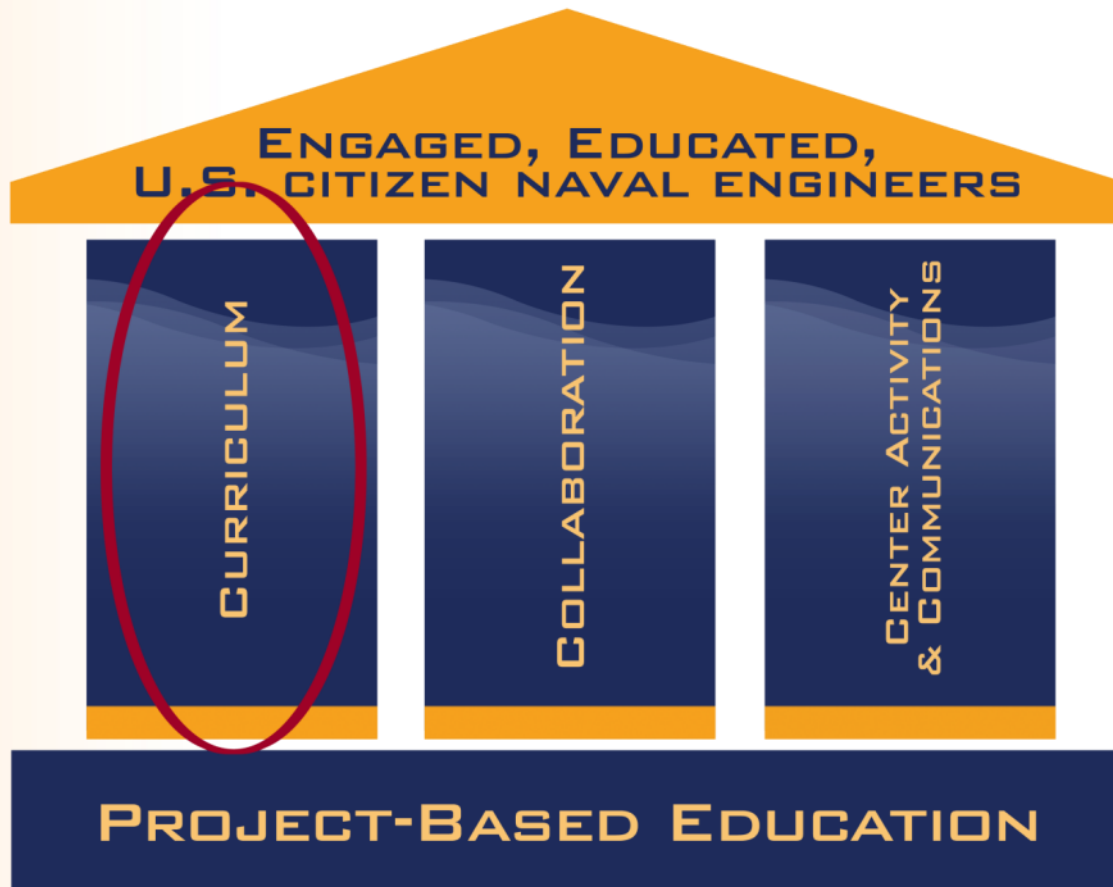
*Institution:* University of Michigan

*Principal Investigator:* Prof. Ryan Eustice

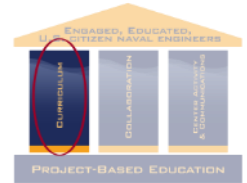
*Navy POCs:* Mr. Frank Ferrese, Carderock-Philly;  
Mr. Roger Anderson, Panama City;  
Mr. Nelson Mills, Dahlgren



# The Pillars of NEEC - Curriculum



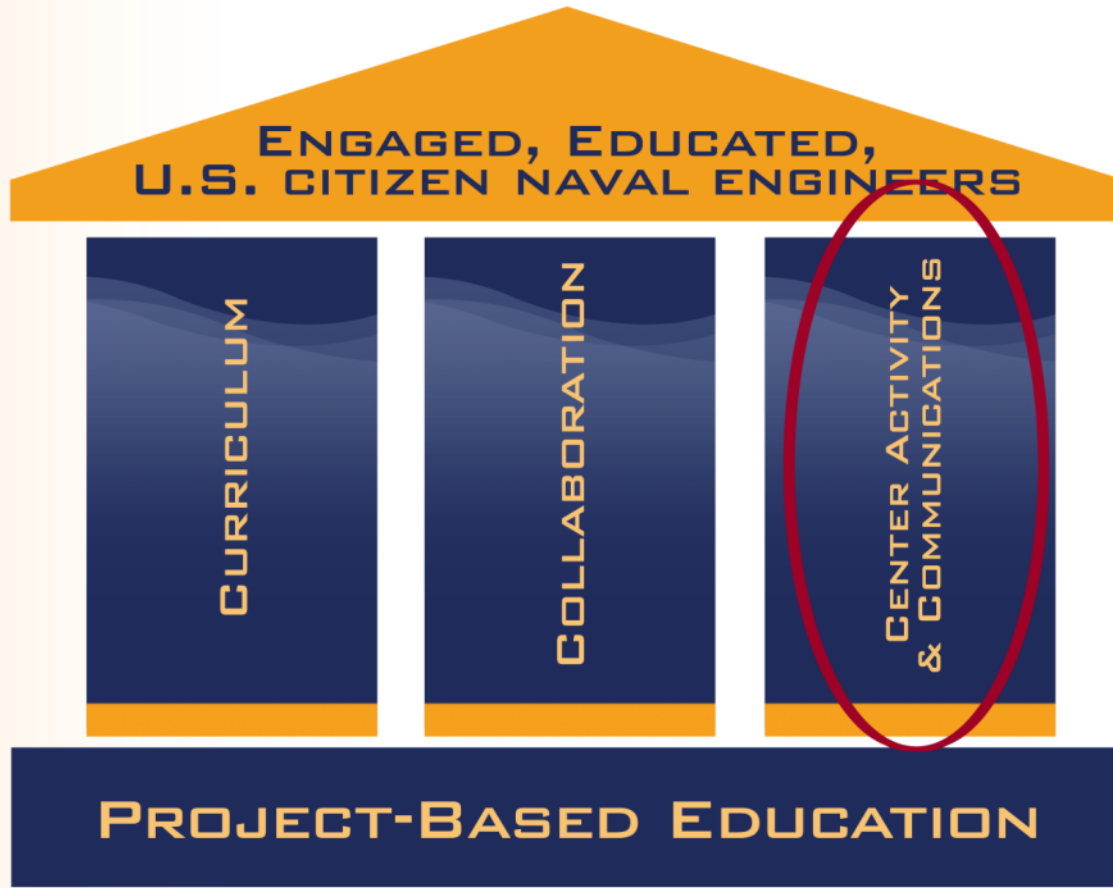
# NEEC Curriculum Goals



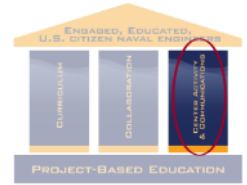
- *Faculty expertise and diversity at NEEC schools is very rich.*
- Would like to have a variety of long and short courses for **credit, enrichment and professional development.**
- Would like NEEC schools to offer NE minor and certificate programs.
- Would like to capture and share knowledge from NEEC projects with all NEEC students and beyond.
- Collaborate with NEEC universities to join “Team-Taught” courses.
- Work with other universities to set up NE minor and certificate programs.
- Develop short and clip courses (asynchronous) and post on NEEC website.



# The Pillars of NEEC – Center Activity & Communications



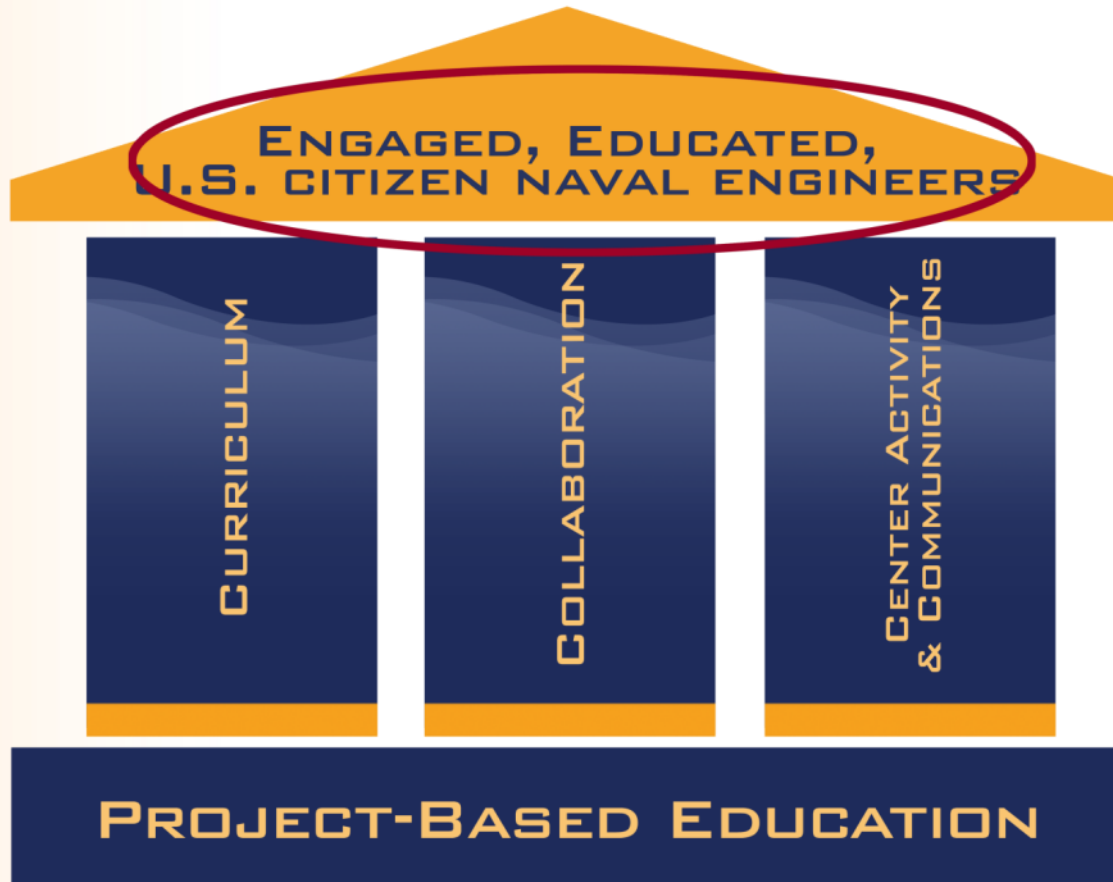
# NEEC Communications



- **Communication Strategy**
  - Understanding messages and markets
  - Creating value
- **Communication Tools**
  - Website
  - Social media
  - E-strategies and E-news
  - Print material
  - Press and PR
- **Overall, how does our communication generate value and extend our reach?**

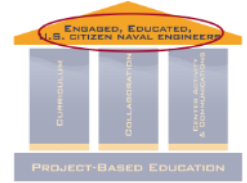


# The Value of NEEC





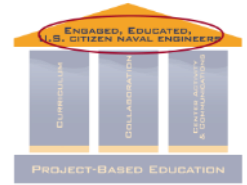
# The Value to NEEC: Students



- **Career Development**
- **Peer Exposure**
- **Facilitate Connections** (Faculty, Mentors, Navy Personnel)
- **Insight to Navy Experience** (How the Navy Works, Navy Problems, Navy Culture)
- **Enrichment** (Activities, Meetings and Conferences)
- ***Exposure***

*Overall, Students who engage NEEC are better connected, have a more experience, will be in a better position to compete for jobs and fellowships, and are better prepared to contribute to the naval enterprise*

# The Value of NEEC: Navy



- Providing engineers that understand multidisciplinary engineering in a time of need.
- Contributes to Navy STEM initiative.
- Strengthen Naval Engineering faculty cohort.
- Provide a centralized focus for Naval Engineering Education at an Undergraduate level.
- Connect the Navy with capable students who understand what naval engineering is all about!
- Engage students in important Navy problems through project-based education.



# Conclusion

- Contact us with any questions
- Potential partnerships?
- Website: [www.GoNEEC.org](http://www.GoNEEC.org)
- Contact: Steve Ceccio
- Find our social media networks:
  -  Facebook: [www.facebook.com/GoNEEC](http://www.facebook.com/GoNEEC)
  -  Twitter - @GoNEEC
  -  LinkedIn – NEEC

