



RE-ENVISIONING ROBOTICS IN
ENGINEERING EDUCATION:
A PARTNERSHIP BETWEEN E4USA & FIRST

ASEE WEBINAR
TUESDAY, DECEMBER 12





TODAY'S AGENDA

1. Quick Introduction
2. e4usa+FIRST
3. eXperiential Robotics
Platform (XRP)
4. Practicing Teacher
Reflections
5. Q&A / Discussion

E4USA+ FIRST TEAM



Adam Carberry

Principal Investigator and Co-Principal Investigator for e4usa



David Rogers

Project Consultant



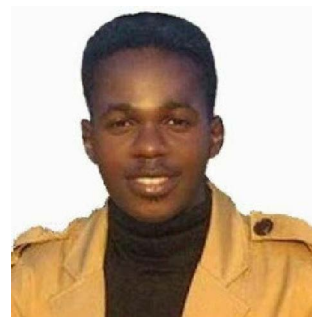
Medha Dalal

Co-Principal Investigator



Brad Miller

Project Consultant



Steve Efe

Principal Investigator



Petronella James-Okeke

Co-Principal Investigator



Assad Iqbal

Visiting Research Scholar

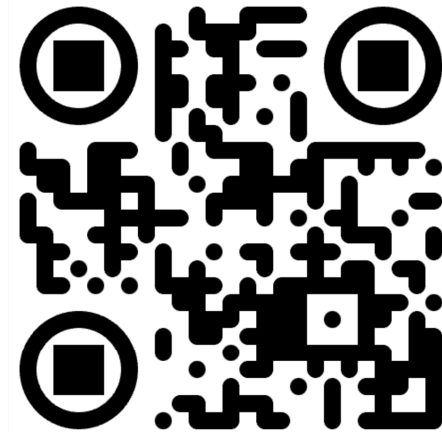
ACKNOWLEDGEMENT



Collaborative Research:
Leveraging the Collective
Strengths of e4usa and FIRST for
Greater Impact on the Future
Engineering Workforce, EEC-
2113312 & EEC-2113402



engineering
4 us all



<https://e4usa.org/>

E4USA CURRICULUM OVERVIEW

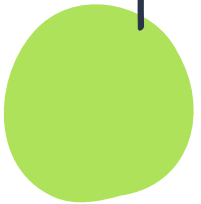
Established 2018; 30-week, high school level course consisting of 4 threads.

Discover
Engineering

Engineering
Professional
Skills

Engineering in
Society

Engineering
Design



E4USA CURRICULUM UNITS

Introducing Engineering

Unit 1 - Engineering is Everywhere

Unit 2 - Engineering is Creative

Applying Engineering:

Generating a solution to a local problem

Unit 3 - Engineering is Human-Centered

Unit 4 - Engineering is Responsive

Applying Engineering:

Generating a solution to a global issue

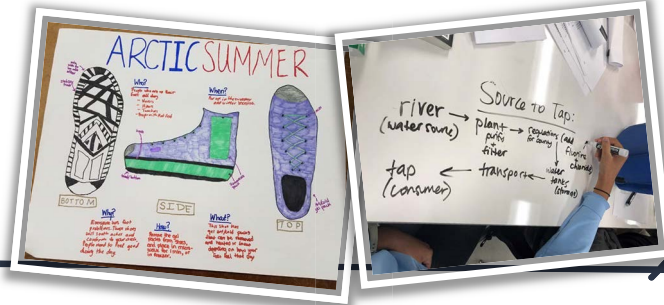
Unit 5 - Engineering is Intentional

Unit 6 - Engineering is Iterative

Generating an engineering solution
to a problem relevant to you

Unit 7 - Engineering is Personal

Unit 8 - Engineering is Reflective



E4USA COMMUNITY OF PRACTICE

e4usa
university/industry
liaison



community
partners

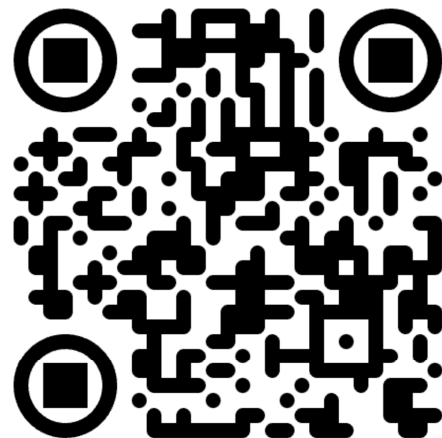


e4usa
engineering
educator



e4usa
coach





<https://www.firstinspires.org>

FIRST

Established (1989) robotics community preparing young people for the future. Offers multiple team-based robotics programs (PreK-12) facilitated in school or afterschool. FIRST philosophies of *gracious professionalism* and *coopertition* are expressed through 6 core values.

Discovery

Impact

Teamwork

Innovation

Inclusion

Fun

FIRST TECH CHALLENGE OVERVIEW



“Way more than building robots.”

- X teams of up to 15 members
- X grades 7-12
- X head-to-head competition
- X guided by adult coaches and mentors
- X reusable robot kit



**ENGINEERING
FOR US ALL**

+



FIRST®

Creating and Leveraging Synergies

OVERARCHING GOAL

Provide engineering education experiences to underserved populations

- X Create blended e4usa and FIRST models
- X Offer e4usa+FIRST teacher professional learning
- X Link teachers to mentors, universities, and industry
- X Establish program scalability and sustainability

Implementing a Diverse, Equitable, and Inclusive Culture

WHAT IS MEANT
BY BLENDING?





Blending content in
a single classroom



Blending between
multiple teachers &
multiple offerings



Blending classroom
& extracurricular

Maybe something we haven't
thought of...yet.

e4usa+FIRST Models

FIRST = FIRST Tech Challenge (FTC)



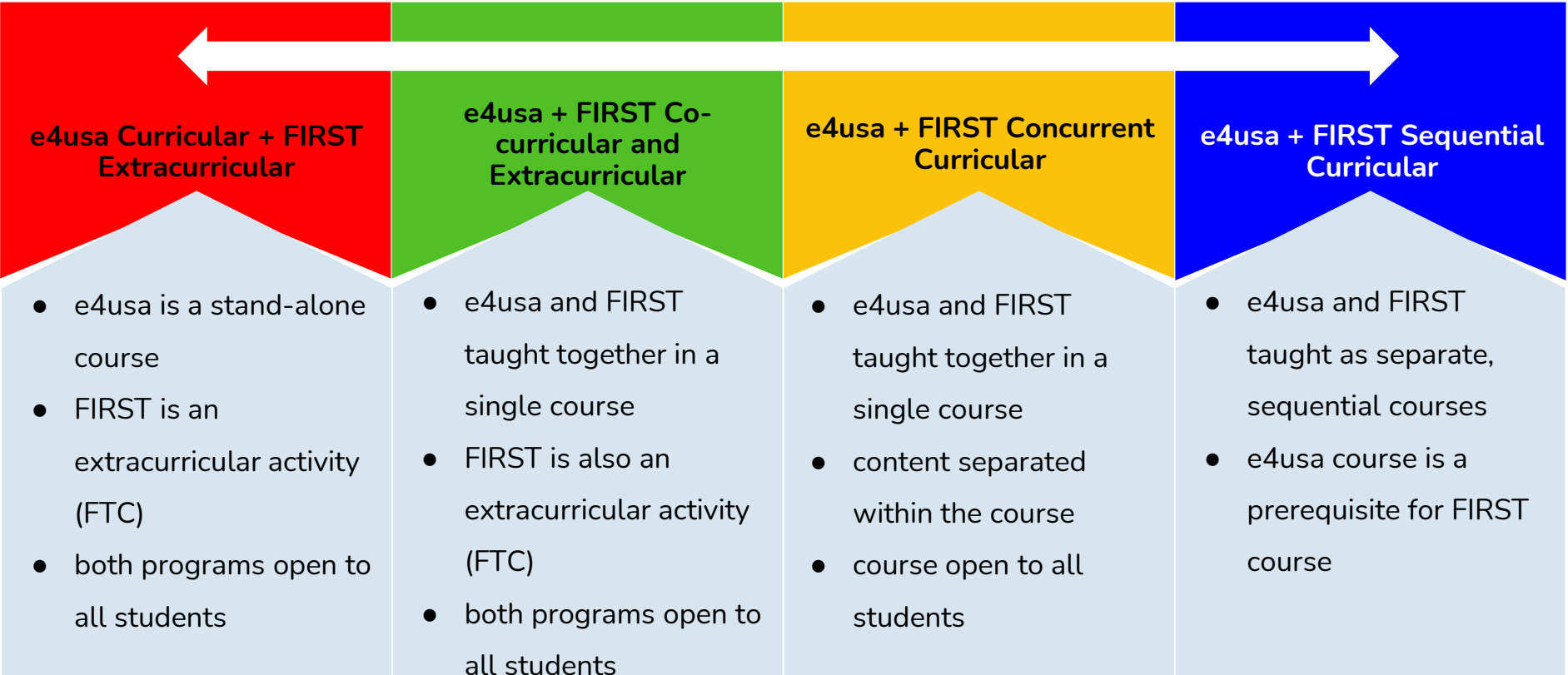
e4usa Curricular
+ FIRST
Extracurricular

e4usa + FIRST
Co-curricular
and
Extracurricular

e4usa + FIRST
Concurrent
Curricular

e4usa + FIRST
Sequential
Curricular

OVERVIEW OF MODELS



e4usa Curricular + FIRST Extracurricular

- e4usa is a stand-alone course
- FIRST is an extracurricular activity (FTC)
- both programs open to all students

e4usa + FIRST Co-curricular and Extracurricular

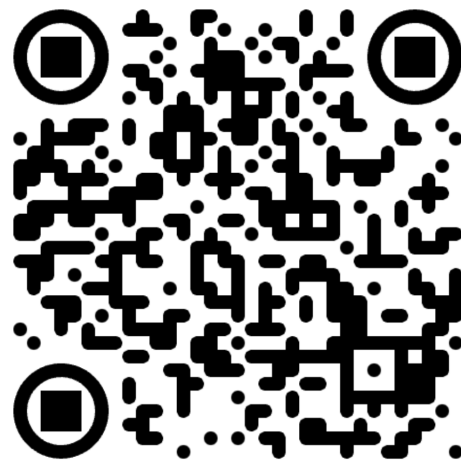
- e4usa and FIRST taught together in a single course
- FIRST is also an extracurricular activity (FTC)
- both programs open to all students

e4usa + FIRST Concurrent Curricular

- e4usa and FIRST taught together in a single course
- content separated within the course
- course open to all students

e4usa + FIRST Sequential Curricular

- e4usa and FIRST taught as separate, sequential courses
- e4usa course is a prerequisite for FIRST course



<https://experientialrobotics.org>

EXPERIENTIAL ROBOTICS: ASSEMBLY



EXPERIENTIAL ROBOTICS: MOVEMENT GUIDE



EXPERIENTIAL ROBOTICS: DELIVERY CHALLENGE



HEAR FROM E4USA + FIRST TEACHERS

Amanda Jones - Riverdale High School (TN)

Arren Buck - Sandia Preparatory School (NM)

Scott Dooley - Christel House Academy South (IN)

Karolyn Thacker - White Plains Academy (TN)

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