

# UVM CEMS and Extension 4-H Partnership for Youth Outreach

## Inaugural Program Report

2021–2022

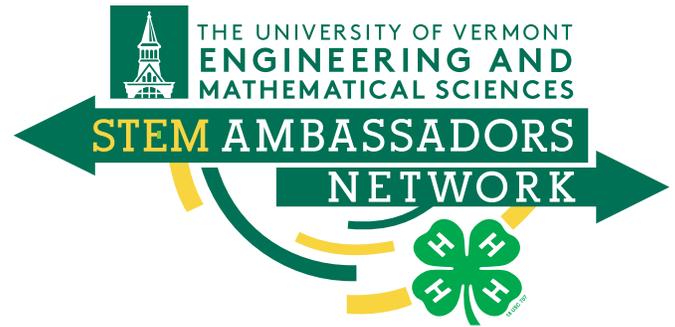


THE UNIVERSITY OF VERMONT  
COLLEGE OF ENGINEERING &  
MATHEMATICAL SCIENCES



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**EXTENSION**

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## Overview

University of Vermont Extension's 4-H Program provides positive youth development experiences for young people in science, civic engagement, and healthy living education. These experiences help build necessary life skills while providing opportunities to explore and find the “spark” which ignites a path leading to important relationships, education, and careers.

Offered across Vermont, UVM 4-H opportunities (in-person and virtual) are facilitated by trained staff and volunteers through clubs, afterschool programs, and community-based or third space programs. 4-H'ers can be found exploring robots, livestock, food systems, physical literacy, health coaching and emotional wellness, informational career path interviews, and more.

In 2021, UVM's College of Engineering and Mathematical Sciences (CEMS) invested in and partnered with UVM Extension 4-H to help expand statewide outreach STEM initiatives. CEMS Dean Linda Schadler recognized the

opportunity to harness 4-H's existing infrastructure and relationships across Vermont, and that 4-H's existing focus on and work in STEAM (science, technology, engineering, arts, mathematics) education would be beneficial to both entities.

This investment allowed 4-H to increase capacity, establish new initiatives, and strengthen programs. Throughout FY22, the CEMS/4-H partnership rolled out a new STEM Ambassador Program; enhanced and increased support of FIRST Technical Challenge (FTC) Robotics as part of FIRST Lego® League; re-visioned and executed the Aiken Discover Engineering Month; and helped coordinate Vermont's Science Olympiad.

This report highlights the success of STEM Ambassadors, FTC, and Discover Engineering and looks ahead to the future of the Vermont Science Olympiad. Visit K–12 Stem Outreach (<https://www.uvm.edu/cems/k-12-stem-outreach>) to learn more about these and other experiences.



# STEM Ambassadors

Inspiring and creating enthusiasm for STEM subjects through dynamic, hands-on learning activities for Vermont youth is at the core of this program. STEM Ambassadors helps K–12 students see themselves as scientists, engineers, mathematicians, coders, etc. while building a connection to higher education. On-campus opportunities engage Vermont youth with UVM (specifically) and connect them with UVM STEM resources, for current learning and for post-secondary planning.

STEM Ambassadors was successfully launched in fall 2021, with a total of 16 ambassadors hired for the year. Virtual trainings and staff meetings helped undergraduate ambassadors introduce topics such as experiential learning, child safety and protection, educational equity, lesson planning, and hands-on activity design. UVM students experienced the opportunity to share knowledge they learn in their respective majors while gaining valuable collaboration, presentation, facilitation, and communication skills.



Program Name	Program Date	Attendance	Age Range
STEM Showcase	12/4/2021	47	8-14
Association of Africans Living in Vermont (AALV) Career and College Panel	2/4/2021	35	13-19
STEM Showcase 2.0	3/19/2022	42	8-14
STEM Ambassadors Math Lesson on Tessellation	3/31/2022	9	14-16
STEM Ambassadors Presentation at Charlotte Clovers Club	4/14/2022	15	5-12
STEM Ambassadors College Panel at Essex High School STEM Academy	4/26/2022	26	14-18
STEM Ambassadors Two Roads Academy Presentation	4/29/2022	4	13-19
STEM Ambassadors Holland Community Center Presentation	4/30/2022	2	12
Essex CHIPS Afterschool Program	multiple	4	8-11
Winooski 21c Afterschool Program	multiple	12	8-11
<b>Total youth reached</b>		<b>196</b>	<b>5-19</b>

# Discover Engineering

CEMS and 4-H teamed up to host a variety of programs in February 2022 designed to introduce youth to engineering, build skills, and help them understand different pathways they can take to pursue future careers as engineers.

A variety of virtual workshops, at-home contests, and activities were offered. Unfortunately, due to a COVID surge, the planned signature in-person event at UVM was cancelled. The following events were exclusively designed to connect youth to engineering and reached over 200 young people (grade levels in parentheses):

- Create Your Own Invention Contest (3–12)
- Rube Goldberg Challenge (3–12)
- 4-H World Changers: Learn to Code (5–12)
- 4-H Teen Time: Career Explorations — Engineering & Product Design (7–12)
- VTeen 4-H Science Pathways Cafés: The Design Innovation Mindset (7–12)
- VTeen 4-H Science Pathways Café: NASA Internship Research About the Space Suit (7–12)
- 4-H@Home Engineering Activities (new activity shared each Monday in February)

Virtual programming allowed greater access to youth, with attendees from every Vermont county as well as from Maine, Pennsylvania, Ohio, Illinois, Massachusetts, Rhode Island, California, Washington, Colorado, Florida and Virginia. And the 4-H “How Did You Get There” career panel series for students included a segment in February titled “Electrifying Learning and Engineering.”

## FIRST Technical Challenge (FTC)

FIRST is a global youth robotics program, and FTC is for teams of youth in grades 7–12. Youth work together to design and build competitive robots for a game which changes annually, while learning engineering and communication skills. Approximately 200 youth competed on 22 Vermont FTC teams this past year, and 17 teams competed at the state championship.

CEMS staff coached and mentored 4-H staff to take on the state program delivery partner (PDP) role, splitting the position between two individuals who will focus on the annual competition and on outreach. CEMS/4-H hosted an all-Vermont state championship competition, sent two teams and an award finalist to the FIRST World Championship in Houston, Texas, and are making progress bringing together the multiple program levels of FIRST.

In Vermont, FIRST holds in-person outreach events such as Tech Jam at Hula (Burlington, September 2021), where approximately 40 youth from 9 teams at all three FIRST program levels (FLL\*, FTC\*\*, and FRC\*\*\*) demonstrated their robots for Vermont’s tech community.

4-H has been instrumental in bringing together the larger FIRST community this past year through strategic planning and united coordination. This had been a long-standing and elusive goal, which led to formation of a non-profit and securing a three-year, \$375,000 invited grant from the Argosy Foundation to support hiring a state coordinator as well as growing and sustaining teams, and supplementing competition travel costs.

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\* FLL — First Lego® League (grade school)

\*\* FTC — First Tech Challenge (grades 7–12)

\*\*\* FRC — First Robotics Competition (high school only)



# Looking Ahead

FY23 will mark this partnership's second year and 4-H will build on the success of STEM Ambassadors, FTC Robotics and the Aiken Discover Engineering month while developing the Vermont Science Olympiad and MathCounts competitions, and continuing to expand in-person event offerings outside Chittenden County.

STEM Ambassadors will continue offering the successful STEM Showcases and expand programming for schools, afterschool programs, community groups and others. There are 10 returning Ambassadors and one newly hired for fall. We plan to hire between one and three additional Ambassadors before the start of the semester for a total of at least 12 Ambassadors. A returning Ambassador has been hired as the STEM Ambassador Student Coordinator and will help lead communication among the Ambassadors, organize activity and resource materials, facilitate weekly staff meetings, maintain a calendar of events and expand outreach to potential venues for presentations.

Strengthening the entire FIRST continuum is a key step toward an environment where teams have more opportunity to play, practice, and compete. Mentorship of new coaches will help grow and sustain the number of teams. Over the next year, we intend to pull back from coordination and focus more on providing opportunities for youth to connect with career exploration including Vermont technology businesses — hoping to find some in forestry and farming as well as more traditional STEM sectors.



## Summary

This inaugural year was extremely successful, especially given the ongoing backdrop of the COVID-19 pandemic. Knowledge of these programs continues to expand through television and media. The Across the Fence “FTC Robotics Competition” episode (<https://www.youtube.com/watch?v=OIWBf-3VpNk>) included an interview with a STEM Ambassador. And a number of press releases, including “Robotics Teams Quality for World Tournament” (<https://www.uvm.edu/news/extension/robotics-teams-qualify-world-tournament>) and “Vermont High School Teams Compete in Science Olympiad at UVM” (<https://www.uvm.edu/news/cess/vermont-high-school-teams-compete-science-olympiad-uvm>) put the spotlight on the success of these programs.

*“Just wanted to thank you for opening up some of these cafes to us from out of state! Really got some lively conversation stirred up in our household about academic and career paths!”*

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Author credits: Sarah Kleinman, Director of 4-H, Farmworker & Family Education Programs; Margaret Coan, 4-H Educator; Liz Kenton, Youth Agriculture Project Coordinator; Lauren Traister, Teen & Leadership Specialist. Production credits: Editing and design, Cathy Yandow and Alec Julien, UVM Extension Media Team.

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