

Building a Technology Education Pipeline

Northwestern Connecticut Community College is working with the Torrington School District and area manufacturers to build a technology education pipeline from middle school to high school and on to the community college and careers. This collaborative effort involves coordinating activities with industry, providing math tutoring for students, and providing industry-related professional development activities for teachers. We will share how we structured our program and how we formed industry partnerships. Participants will be invited to share their experiences and will outline plans to bridge the gap between their local school districts, colleges, and industries. Supported by NSF ATE grant #1801062. **Sharon Gusky, Doug Mooney, Amanda Gregg, Ashley Johnson**, Northwestern Connecticut Community College, Winsted, CT

Building a Technology Education Pipeline

Engaging Students from Classrooms and Camps to College and Advanced Technical Careers

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- **Student Mentors:** Amanda Gregg, Ashely Johnson

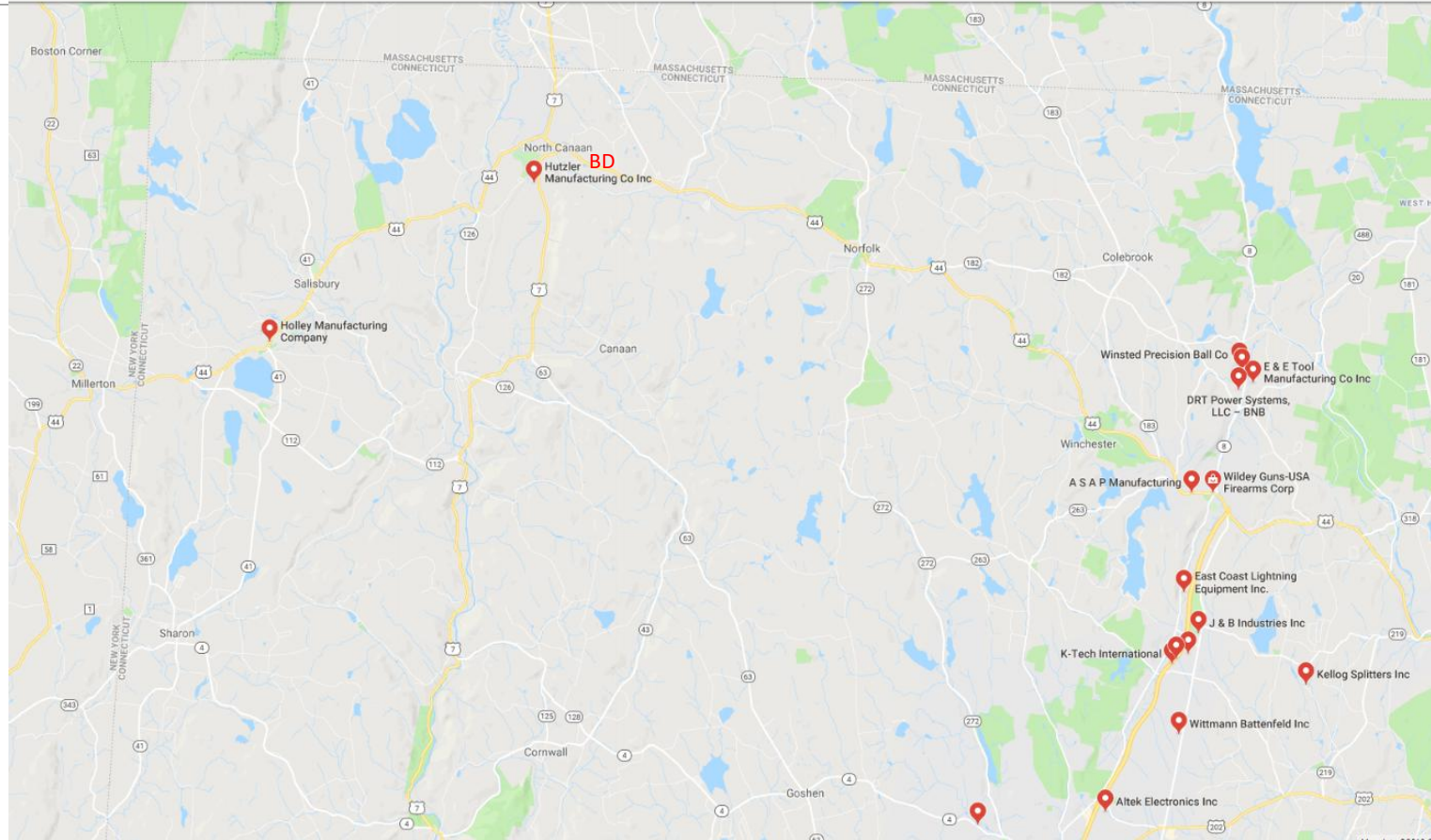
NSF ATE
PROJECT
DUE #
1801062

Intro to project

Engaging Students from Classrooms and Camps to College and Careers, brings 7th-12th grade teachers, community college professors, students, and industry members together to develop a strong technical workforce.

A STEM pathway, with a focus on technology education, is being developed from the middle school through the high school and the community college and into the workforce, to address this need for more technicians.

Map of Manufacturers in Northwest CT



Manufacturers Coalition Northwest Chamber of Commerce



Meetings focus on:

- Employee recruitment and retention
- Workforce development, on-the-job training programs and grants
- Legislative updates that affect manufacturers
- Facility tours
- Sharing of best practices
- Development of industry-specific curriculum for local educational institutions.

Survey of Manufacturers

1. Are you aware of Northwestern's Manufacturing program

☒ YES

☐ NO

2. Did you know that Northwestern offers Certificates in Manufacturing as well as an Associates Degree?

☒ YES

☐ NO

3. Have you ever hired Northwestern students?

☒ YES

☐ NO

☐ Not Sure

4. Have you ever hired Northwestern graduates?

☒ YES

☐ NO

☐ Not Sure

5. If yes, on a scale of 1-5 with 1 being unsatisfied and 5 being very satisfied. How satisfied overall were you with their:

Technical skills

1

2

3

4

☒ 5

"Soft Skills"

1

2

3

4

☒ 5

6. Have you ever sent your employees to Northwestern to gain job skills?

☒ YES

☐ NO

7. Do you have any comments or suggestions for us?

- would like to work with you more
- tours
- internships
- etc...

Please select the following Grant activities that you or members of your company would be interested in participating in by circling them.

☒ 1) Classrooms visits to the Middle School/ High School to talk about what your company does and the type of jobs that are available

☒ 2) Having Middle School/ High School students visit your company for a day ie job shadow

☒ 3) Having a group of Middle School/ High School students tour your facilities

☒ 4) Having Middle School/ High School Teachers and Counselors visit your company for a day

☒ 5) Providing a week long externship visit for Middle School/ High School Teachers so they can learn about what you do and bring that back to their classroom in the form of activities and lesson plans

☒ 6) Mentoring students who are completing CAPSTONE projects

7) Teaching a course at the college on your area of expertise

8) Other ideas?

we do more chemical manufacturing we would like to explore a program similar to Altec, but for chemical manufacturing

Used survey responses to develop and plan our activities that directly involved the manufacturers

Manufacturing your future- At technical school

Technical Career Day at the high school

Manufacturing Bus tour

Externships for Teachers

Classroom /Club visits

Developing an Industry based Course

Emailed thank you for your response and I look forward to working with you on.....

Developed a timeline

Emailed Invitations to the companies that expressed an interest in participating in the activity

Manufacturing Your Future and STEM Technical Career Days



Manufacturers were asked to do hands-on sessions and to write a description of their session

Dymax: Our demonstration will show the students what makes our adhesive product so special- students will be making keychains from our state of the art material and will be able to cure the adhesive under light within seconds. The adhesive will go on colored, when it cures it will be clear, and will fluoresce under black light. Students will leave the demonstration with a better understanding of how our chemistry works and is used in everyday products.

Kent Scientific: Students will learn about the assembly procedures, skills/educational requirements and types of jobs available in the manufacturing/production side of Kent. They will handle samples of equipment that are fully assembled as well as many of the components used in the assemblies and review how we use the written procedures. An overview of other positions at Kent as well as the educational requirements (high school, college, technical) for these positions will also be presented.

Six companies and 300 Students

All students who had a STEM class attended the event during their class period.

Prior to the day 14% of the students expressed an interest in pursuing a STEM career. After the day 38% of the students expressed an interest in pursuing a STEM career.

Of the six companies that attended only one had ever presented at the school before.

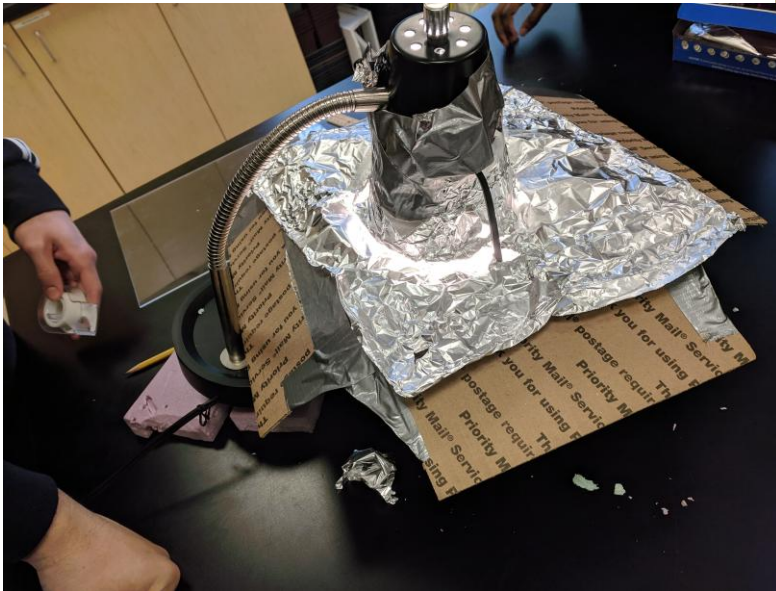
“It's important that those preparing to enter the workforce see scientists and engineers as real people with their own interests and stories.”

Experience College Day

Engineering and Manufacturing

Data Science

Biotechnology





Experience College Day Student Comments

“The STEM field has a vast amount of career options and there may be one for you”

“It is fun to create things by yourself”

“Chemistry offers many different careers that seem interesting to me”

“Genetic engineering is a career I could really get into”

“The career options in data science”



Bus Tour –Eight School brought 20 students each on the tour and they each visited two manufacturing facilities and learned about what they make and what careers they have.



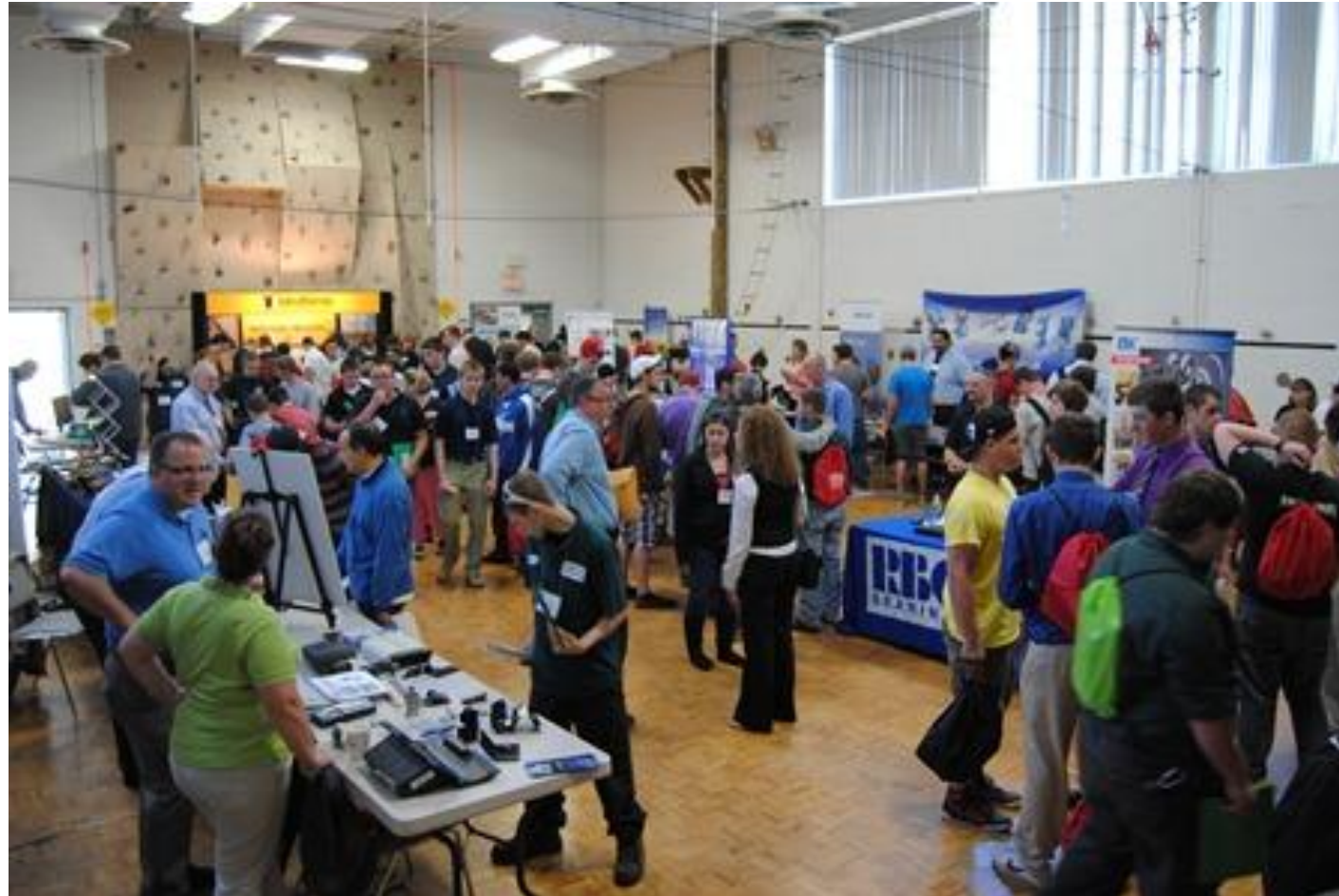
Impact of Student Tours of Manufacturing Facilities

Dr. Marilyn Barger, National Science Foundation ATE Centers

In 2013 American Society for Engineering published an article on the impact of Student tours on student interest in STEM careers

Cumulative data (2005-2012) for collected surveys shows a 36% positive change in agree responses toward consideration of a career in a high tech manufacturing after the tour (n = 2,369).

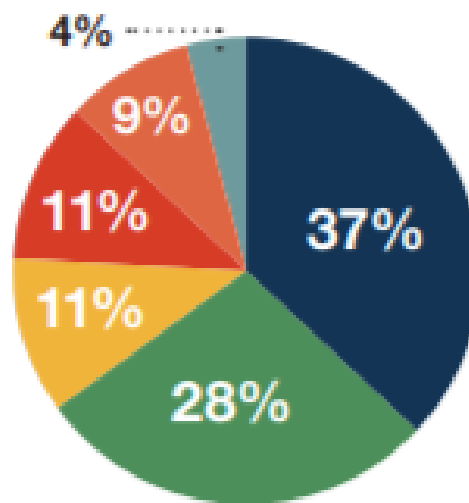
Job fair



Meeting Employers Needs

Workforce skills/credentials in greatest demand

- Industry-specific/specialized skills (e.g., medical, utilities, manufacturing, and construction)
- Computer/IT skills
- Work ethic/reliability
- Other*
- Communication
- Education



**Responses in the 'other' category included sales/marketing, bilingualism, and financial skills.*

Greatest need is for Industry-specific /specialized skills

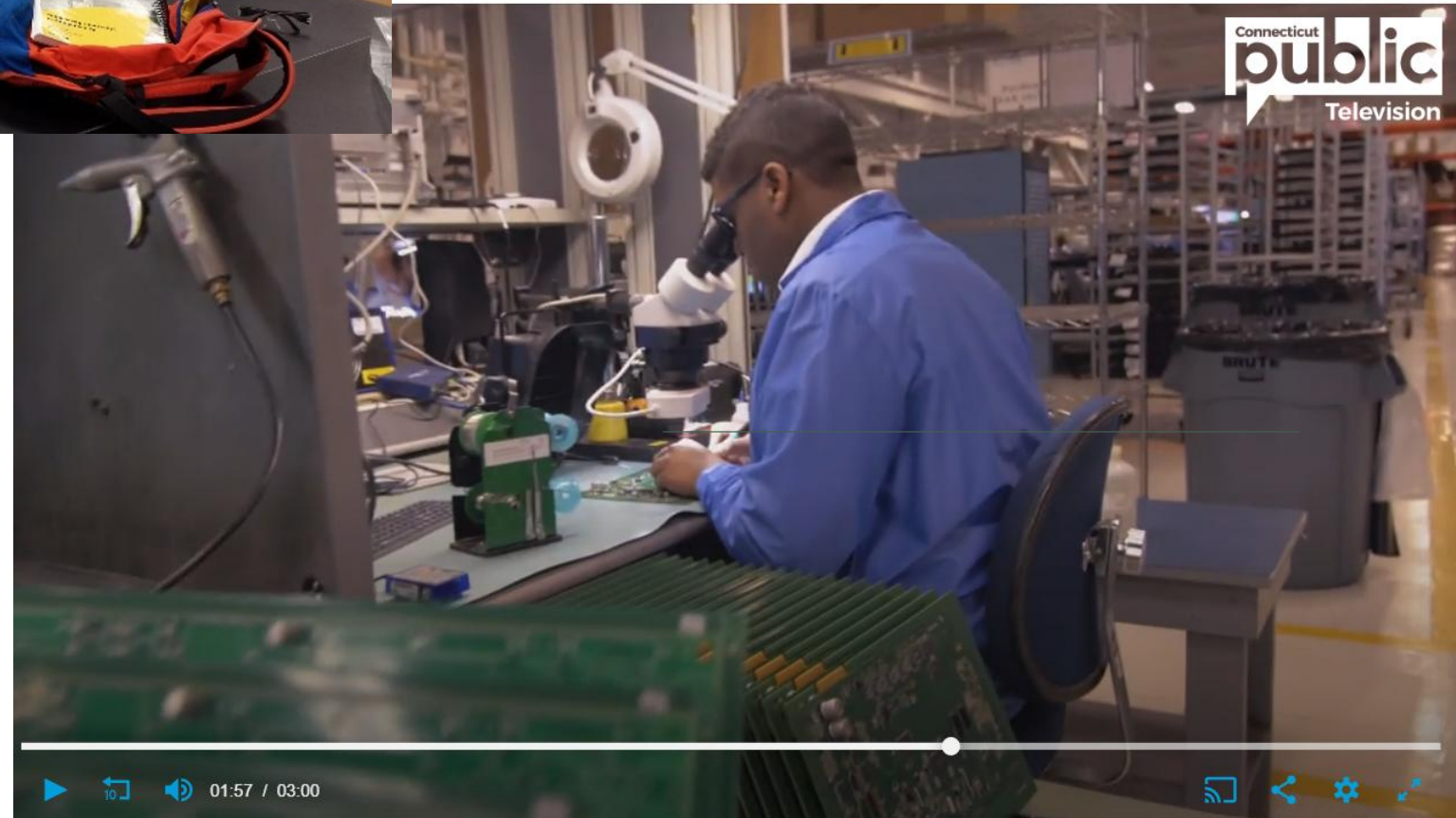
- Soldering Course
- Chemical Process Technician Course
- Financial literacy and business communications



Altek Soldering Course at Northwestern

Student working at Altek

<https://cptv.org/episode/alain/?jwsourc=cl>



Summer Chemical Process Technician Course with Dymax Corp



Summer Externship for Teachers

High School Chemistry Teacher and
High School VP/ Head of Guidance at
Dymax Corporation

Middle School Science Teacher and
High School Physics Teacher at
Wittmann Battenfeld

High School Biology Teacher at The
Jackson Laboratory Workshop



College Student Involvement

Math Boot Camp and Tutoring



Tutoring

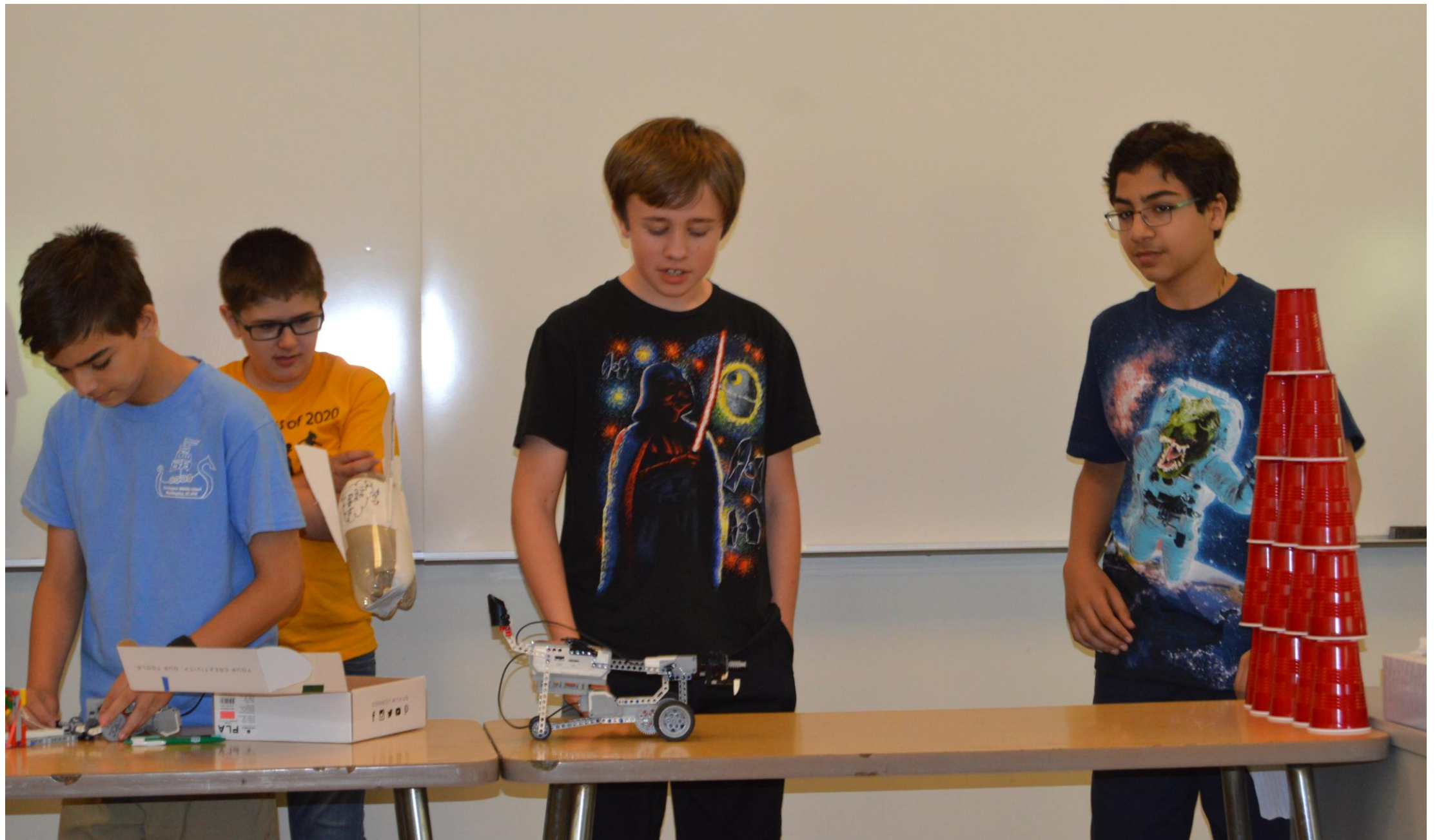
College student tutors all agreed that:

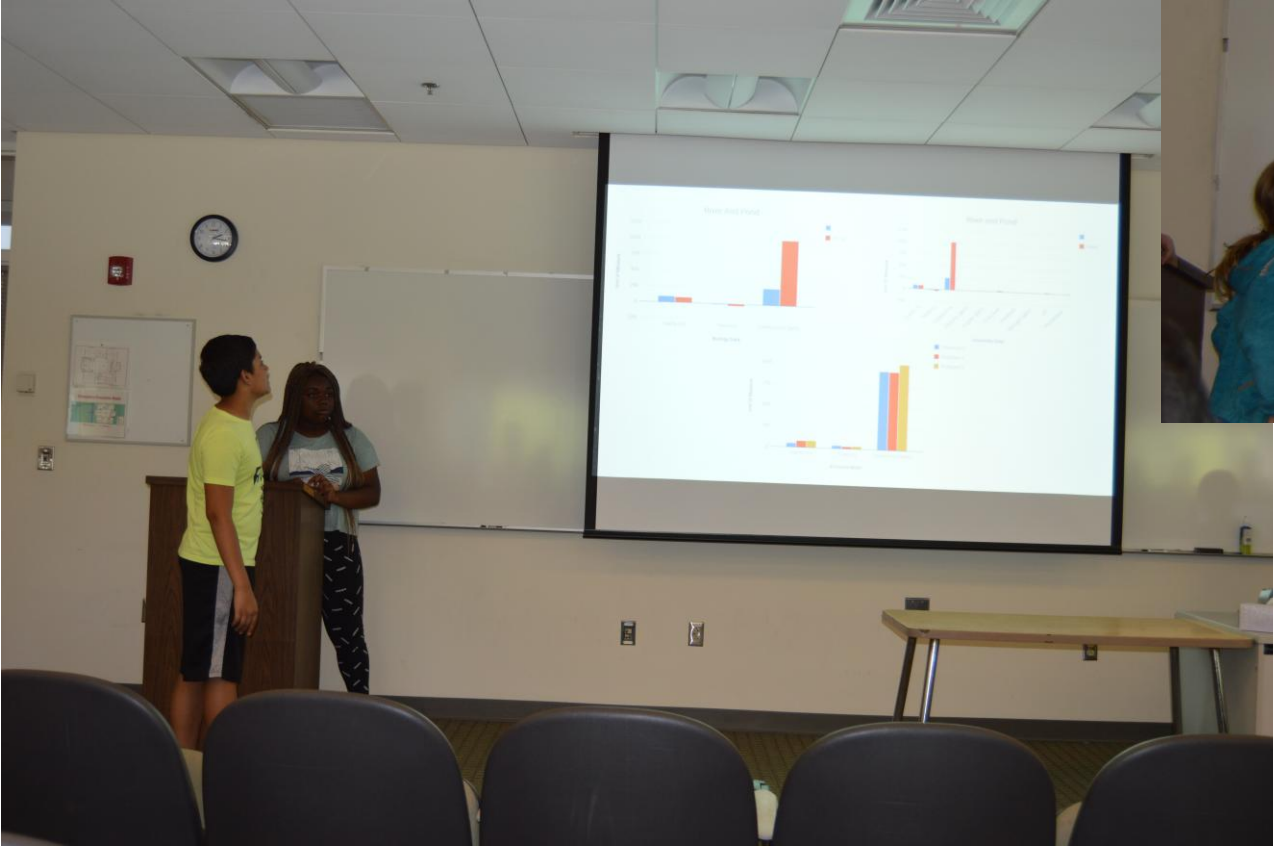
Tutoring further motivated them to succeed in college and enhanced their own learning experiences.



Summer Experience STEM Week





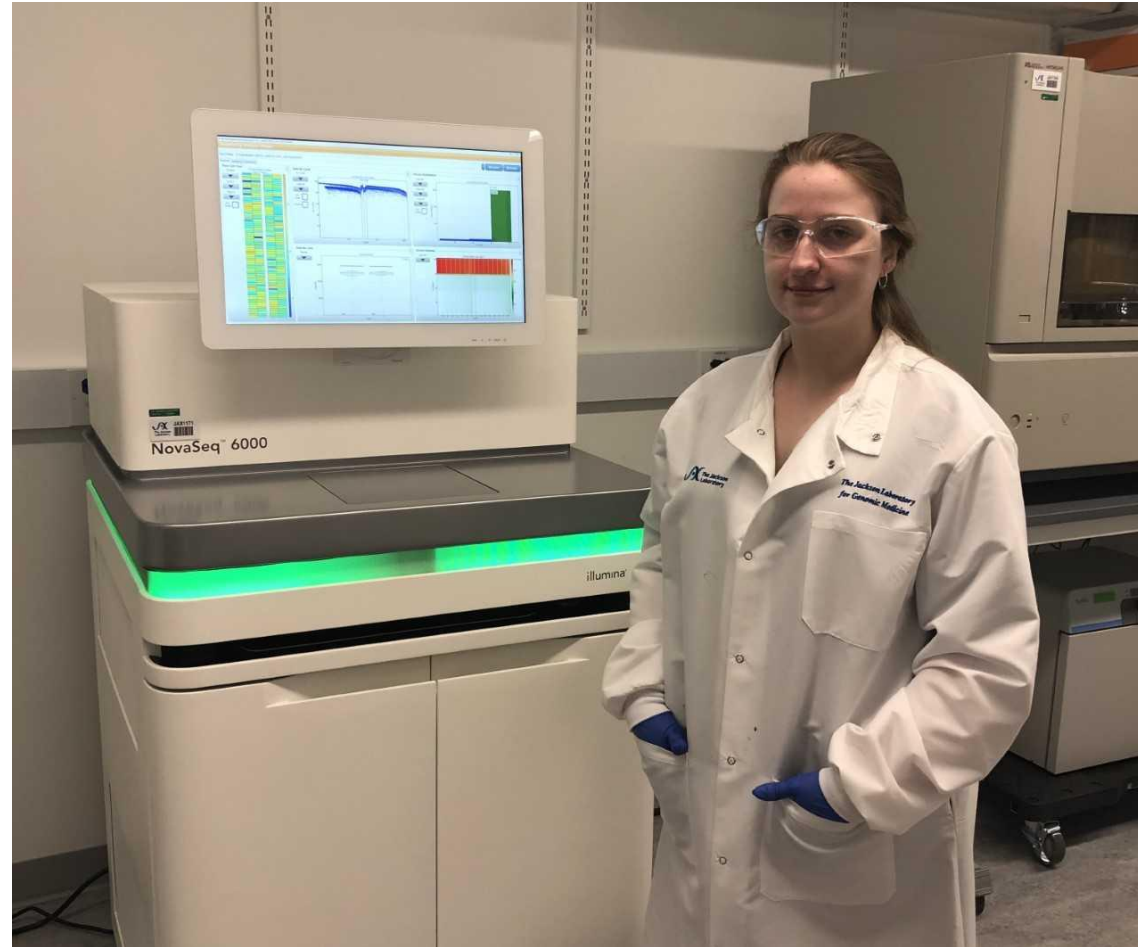


	River	tap	Pond					
Clarity (5%)	59.5	100	1		polluted water 1	polluted water 2	polluted water 3	polluted water 4
temp. (C)	26.6	24	30	Clarity (%)	0	0	0	
Conductivity (ppm)	248	95	1027	Temp. (C)	27.6	23.9	26.2	
Chlorine (ppm)	0.5	N/A	0.5	Conductivity (ppm)	3572	3799	3627	
copper (ppm)	0	N/A	0					
dissolved oxygen	4	N/A	8					
Hardness (ppm)	0-60	N/A	0-60					
Nitrogen (ppm)	0	N/A	0					
pH	7	N/A	10					
Phosphates (ppm)	1	N/A	1					



Internships at Sterling Engineering

Job Shadowing at The Jackson Laboratory



Manufacturers' Summit



Connecticut high school gets green with Wittmann Battenfeld's help

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Members of the Torrington High School Science Club at the Expo Fest in Wallingford, Conn.

Wittmann Battenfeld Inc.

PLASTICS CAPS & CLOSURES 2019

Plastics Caps & Closures- September 9th-11th, 2019

The only North American conference targeting plastics caps and closures makers, the Plastics Caps & Closures conference, held Sept. 9-11, 2019, in Chicago, provides a hotbed of discussion on many of the top innovations, process and product technologies, materials, trends and consumer insights that influence both packaging and caps and closures development.

[REGISTER >](#)

UPCOMING EVENTS

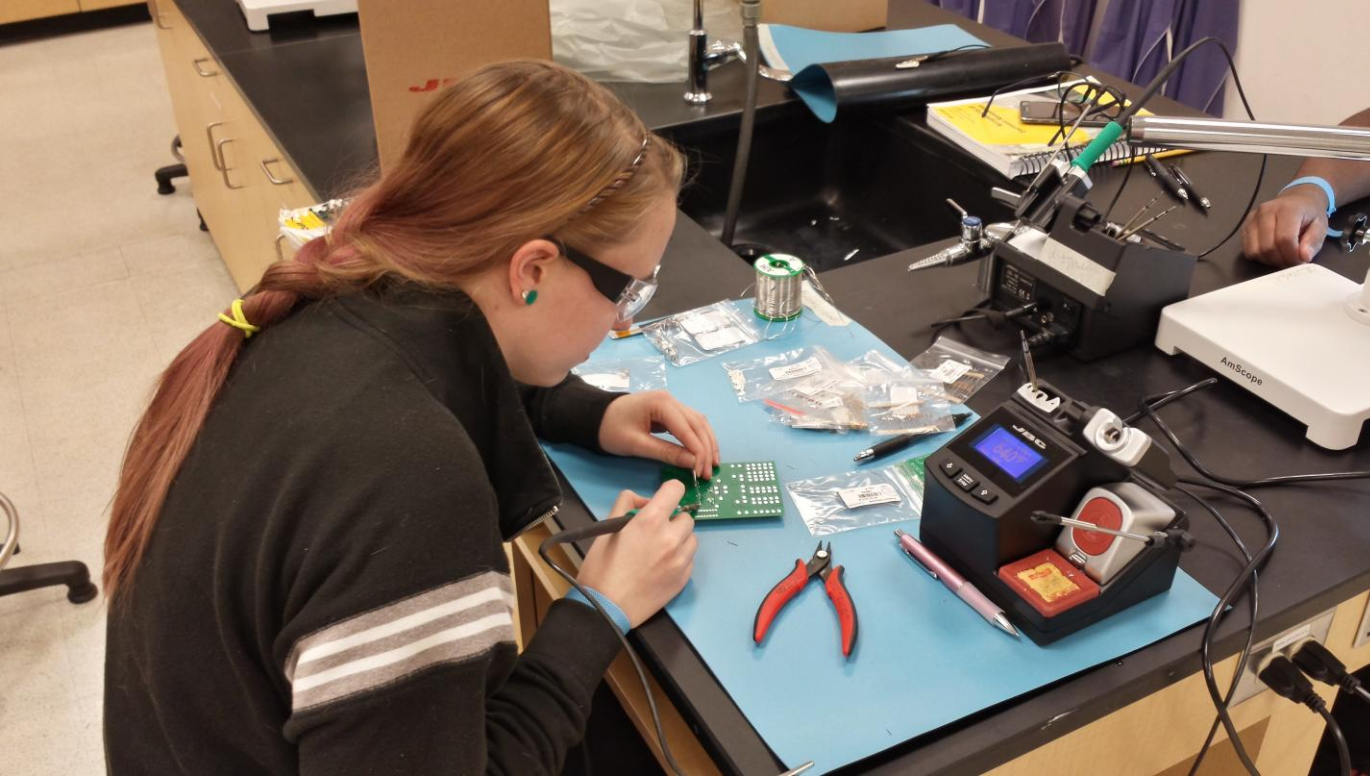


WBM Networking Forum - November 2019

November 10-11, 2019

[REGISTER >](#)

Women and Girls in Manufacturing



Grant from Women and Girls Fund Community
Foundation
and
Grant from the Draper Foundation for STEM equipment

Take aways on linking industry with Schools

Work with Chamber of Commerce- they can provide emails/ connections

Do a Survey –what is their interest and what they are willing to do

Then build your activities around the responses

Get commitments early –Google forms sign up sheets

Survey industry participants after their participation– get their feed back , etc – address concerns ideas

Get teachers and guidance involved and invested.

Have college students interact with both industry and students

Thank you!

Our Steering Committee

- Donna Labbe
- JoAnn Ryan, Northwest Chamber of Commerce
- Sabrina Beck , Vice President, Altek Industries
- David Preusse, President, Wittmann Batenfeld
- Karen W. Birch, Director, Regional Center for Next Generation Manufacturing
- Sarah Wo...