

Opportunities for Community College Students in Micro and Nanotechnology Education, Research, and Workforce Development

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What is the *Micro Nano Technology Education Center? (MNT-EC)*

- NSF Funded National Center founded on the idea that better prepared educators create better prepared technicians.
- Mentoring
- **Undergraduate Research (AT3)**
- Industry Partnerships and BILT

MNT Collaborative Undergraduate Research Network



Esteban Presenting at Purdue
Currently Ph.D. Program UC Irvine



Students at University
of New Mexico
Making Art Wafer and
MEMS Sensors



Paula in lab at Penn State
Currently at UC San Diego

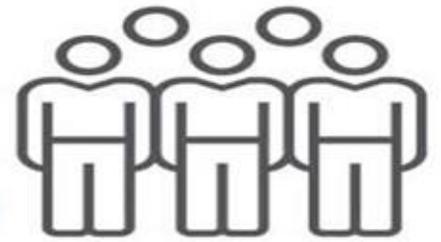
Support Community College Undergraduate Research; One of the most impactful practices to increase success and equity in STEM

What is the Micro Nano Technology Collaborative Undergraduate Research Network (MNT-CURN)?

- 10-month community college internship program for students.
- Weekly Zoom sessions of industry and university partners to recruit and make aware of job and academic opportunities.
- Students: \$1,500 stipend paid in 3 installments when milestones are met.
- Facilitate entrance into summer internships with university partners.
- At conclusion of program, students get a certificate and an opportunity to showcase their work at a conference or a journal article.



**One-on-One
Mentoring**



**Group
Mentoring**



**Peer-to-Peer
Mentoring**



MENTORING



Online Mentoring



**Industry
Mentoring**



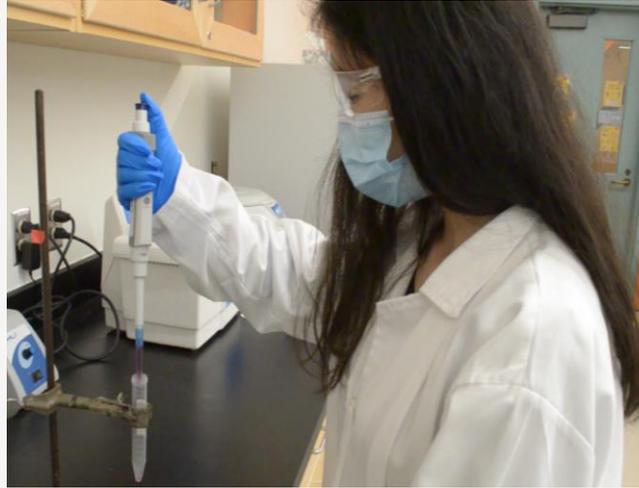
**Faculty Research
Mentoring**

Opportunities for Students: MNT-CURN

Micro Nano Technology Education Center DUE #2000281



Remote Research



In Lab at CC



Presentations



Summer REU



Industry Engagement



Most Important: Have Fun

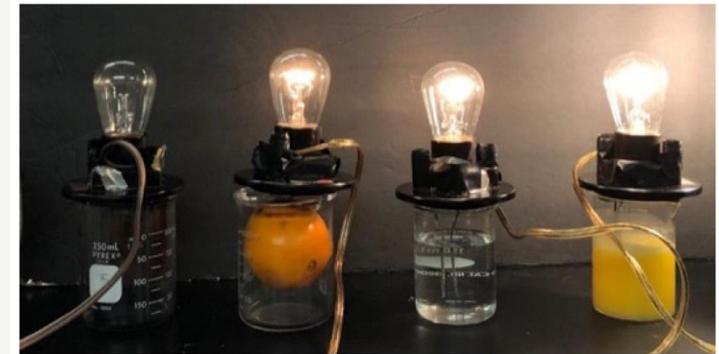
The Start of MNT-CURN: BUILD PODER and Early Research Projects



From our labs...



...to any classroom



Evolution of MNT-CURN: More Serious Projects

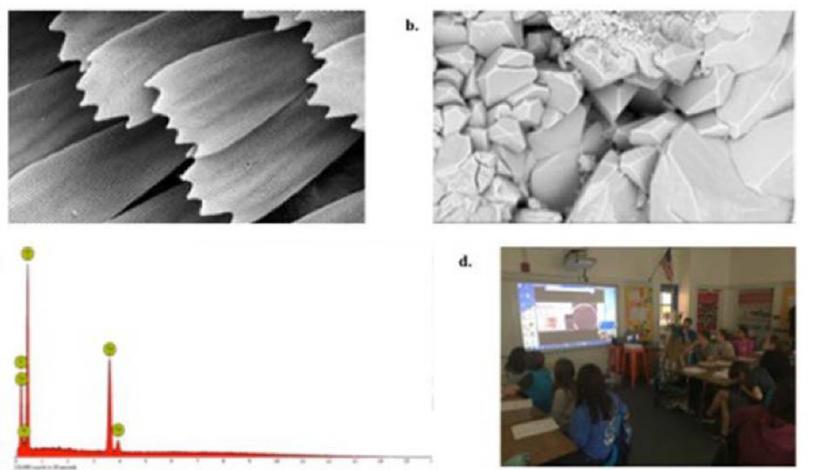


Table 1 Matched-pair t test analysis pre- and post-responses

Matched pair t test	Pre-survey	Post-survey
Mean	0.38	0.50
Variance	0.044	0.090
Observations	29	29
Hypothesized mean difference	0	
Degrees of freedom	28	
t Stat	-2.04	
$P(T \leq t)$ one-tail	0.025	
t Critical one-tail	1.70	
$P(T \leq t)$ two-tail	0.050	
t Critical two-tail	2.05	

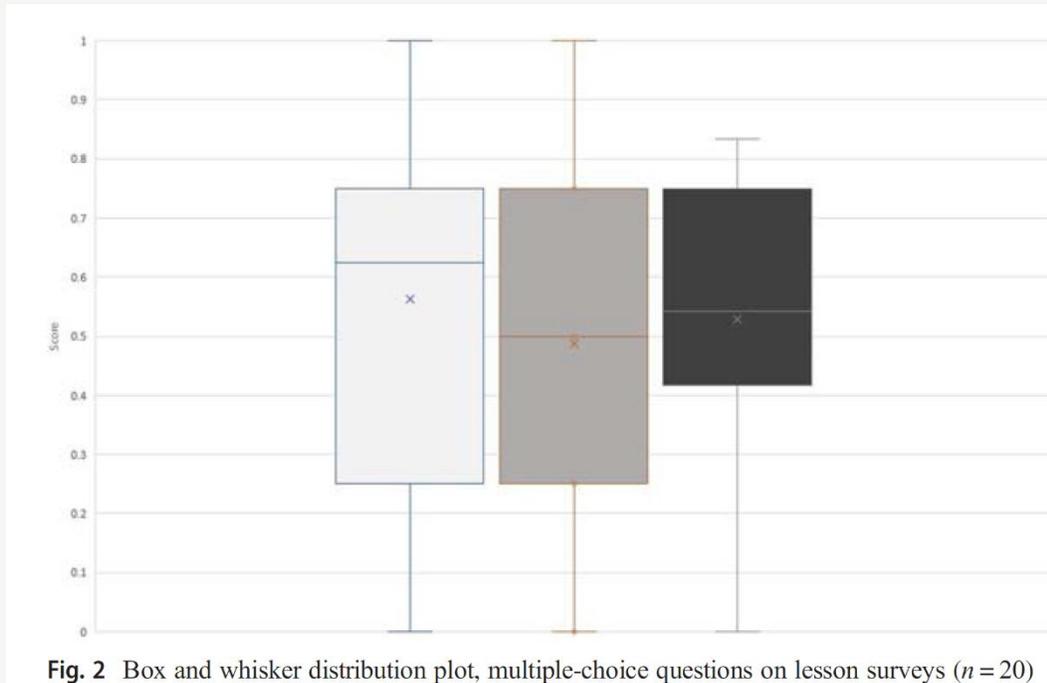
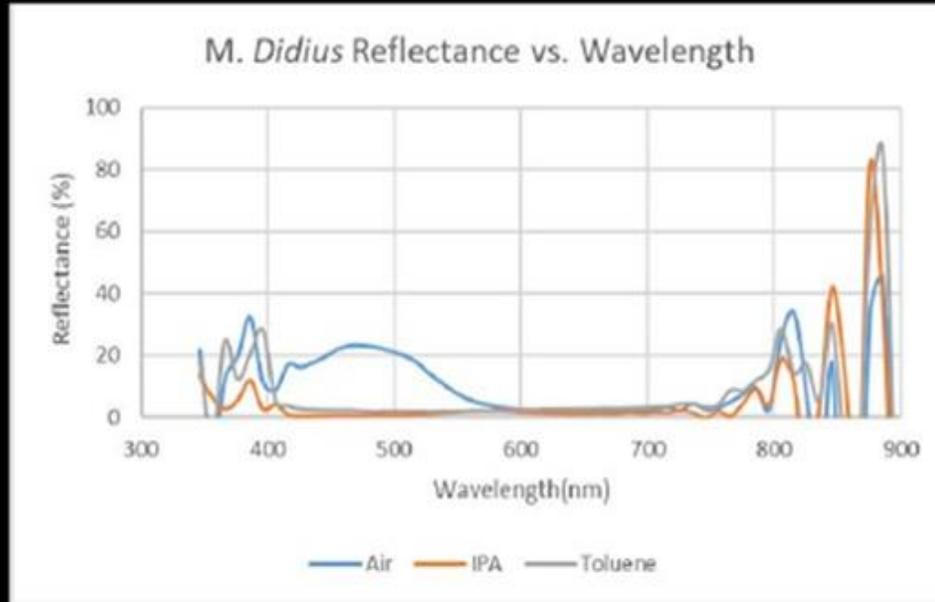
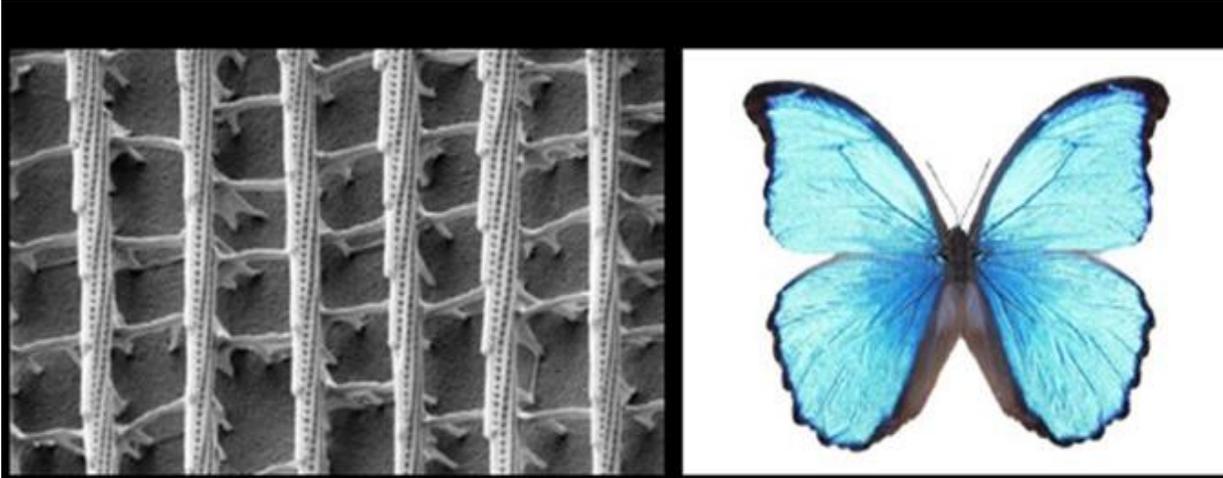


Fig. 2 Box and whisker distribution plot, multiple-choice questions on lesson surveys ($n = 20$)

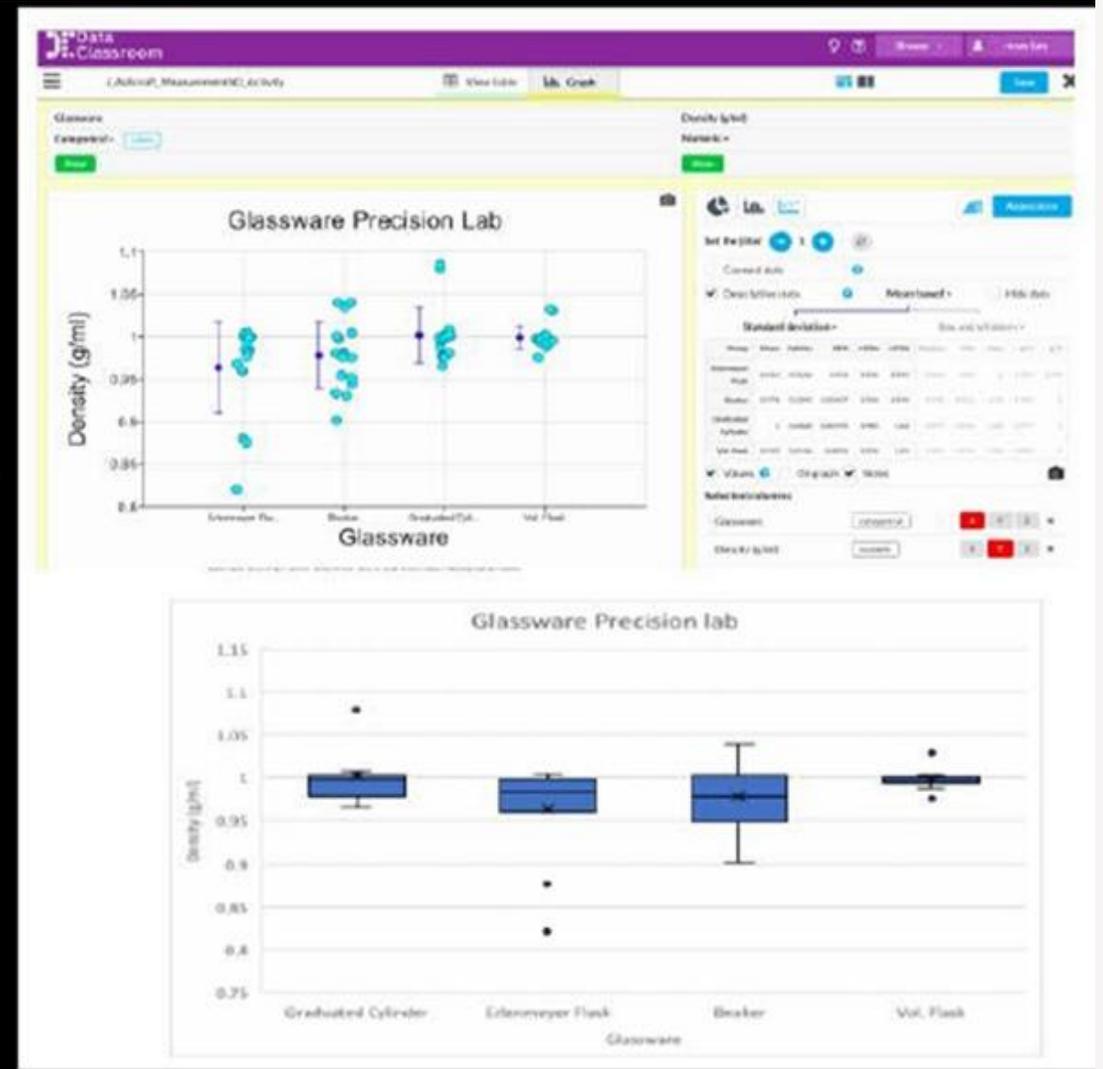
Table 2 Wilcoxon matched-pairs signed-rank test on Likert data

Wilcoxon matched-pairs signed-rank test (pre/post-survey)		Two-tailed test		Left-tailed test		Right-tailed test	
$n = 29$		$H_0: M = 0$		$H_0: M = 0$		$H_0: M = 0$	
		$H_1: M \neq 0$		$H_1: M < 0$		$H_1: M > 0$	
		alpha: 0.15		alpha: 0.15		alpha: 0.15	
		p value	H	p value	H	p value	H
<i>Attitudes toward technology</i>							
Q8	Nanotechnology has led to discoveries in chemistry and engineering.	1.00	0	0.56	0	0.50	0
Q17	Nanotechnology offers many insights that other scientific tools do not offer.	0.13	1	0.94	0	0.07	1
Q19	Nanotechnology has impacts on ordinary people's lives.	0.23	0	0.89	0	0.12	1
Q24	I know how to use remote access to operate scientific equipment.	0.50	0	0.76	0	0.26	0

Evolution of MNT-CURN: More Serious Projects



Blue Morpho Butterfly Wings and Nanophotonics



*DataClassroom Statistical Analysis
Education Modules*

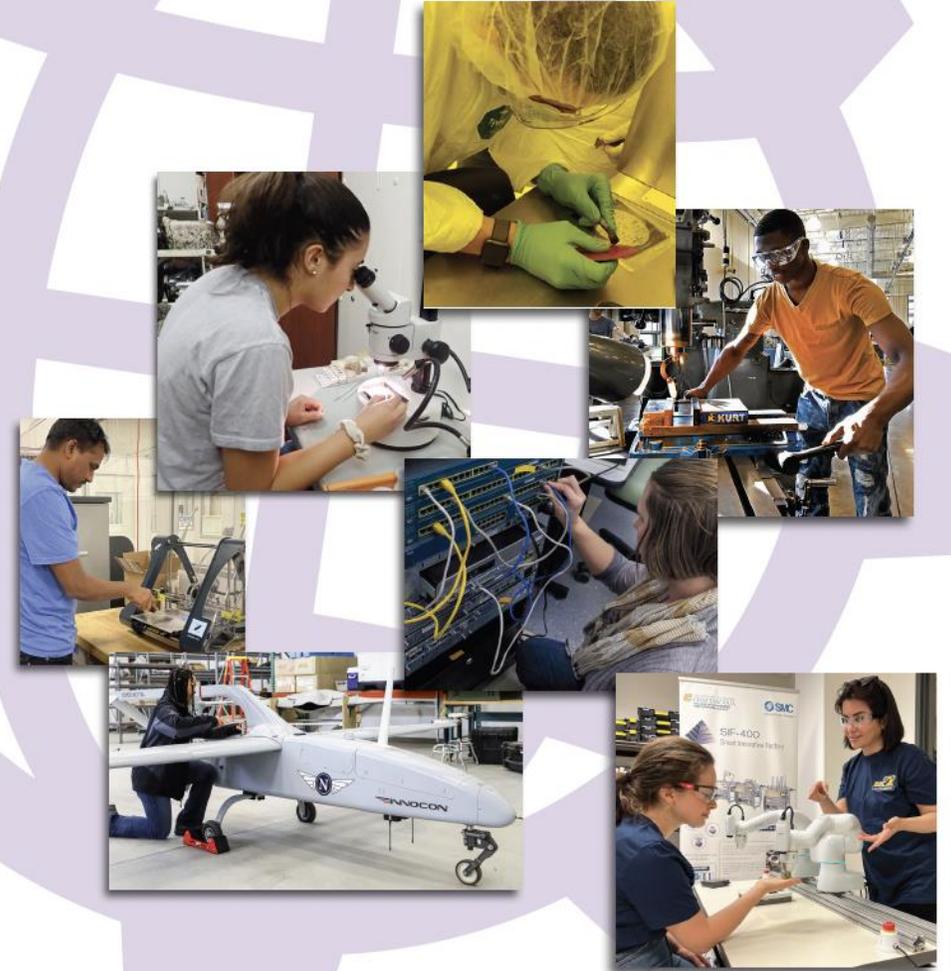
Focus on Student Outcomes: Over 50 students published, Over 100 Presentations



The First Peer-Review Journal For the ATE community

- Editorial Board Members
- Article Submission & Author Guidelines
- Peer Review Process
- J ATE Content: “Technician Education”

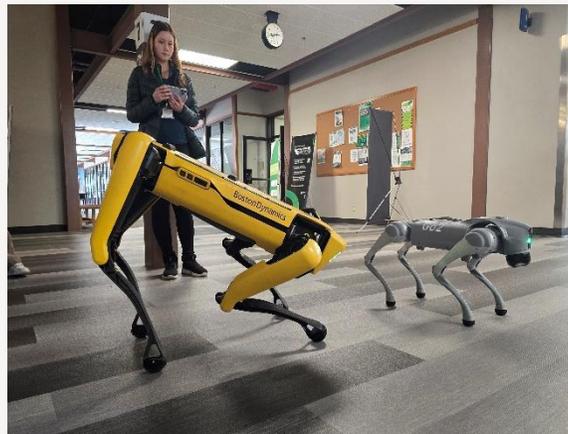
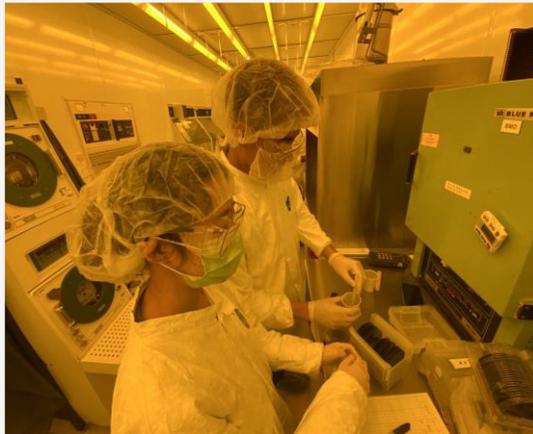
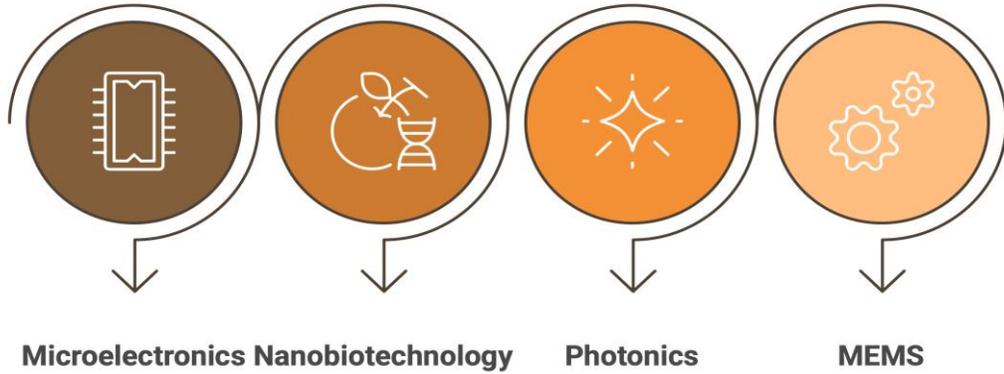
JATE 
JOURNAL OF ADVANCED TECHNOLOGICAL EDUCATION
Volume 1, Issue 1, 2022





Advanced Technology Technician Training Program

Students are introduced to a range of MNT disciplines:

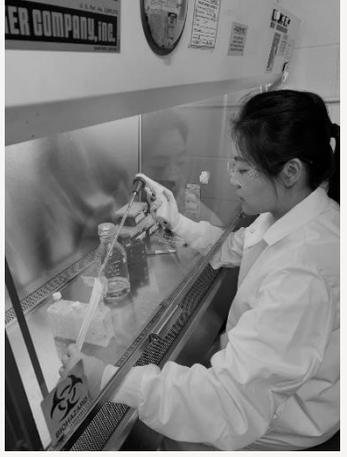
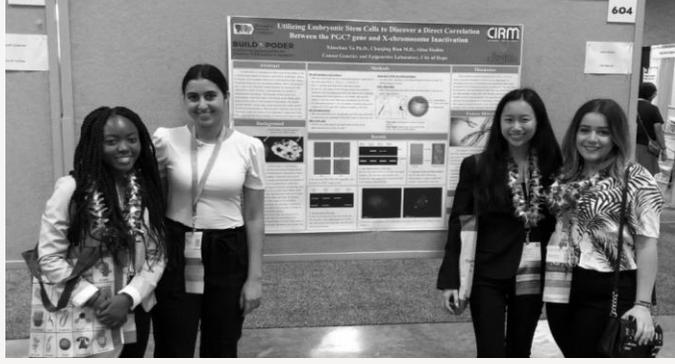


What is AT³?

- 8-month community college internship program for students in programs that lead to technician jobs.
- Weekly Zoom sessions of industry and university partners to recruit and make aware of job and academic opportunities.
- Tier 1 Students (300): \$1,000 stipend, VR headset, and access to TAP 3D course modules, internship application and placement support.
- Tier 2 Students (200): \$2500 stipend, internship application and placement support.
- Facilitate entrance into summer internships funded by industry or university partners
- At conclusion of program, students get a certificate and job interviews to become technicians at industry partner sites.

CTECS: how we use it

- Pilot of 45 students from Pasadena City College
 - All 45 received the digital badge
- 250 students this year will be offered the assessment as part of the program.
 - Students who take the assessment will be surveyed and feedback given to CTECS





**Thank You for attending this presentation
by Billie Copley:
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