

# INTERFACE

Volume 63 • No. 3 • Spring 2024

Journal of the WTEA

## WORKFORCE READY



### SPECIAL FEATURE:

- ◆ WTEA SPRING CONFERENCE HIGHLIGHTS & AWARDS

### Other Highlights:

- ◆ Aviation "Make & Take"





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**Cover Design**  
 by Sarah Wagner,  
 Sussex Hamilton HS

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 the Year, Lifetime  
 Achievement Award  
 and much more!



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 WTEA Spring  
 Conference



**18 Aviation - "Make & Take"**

Teachers learn  
 new content to  
 share with  
 their students



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**Mark Your Calendar!**  
**56th Annual WTEA**  
**State Conference**  
**March 5-7, 2025**

# PRESIDENT'S MESSAGE

## So Much to Be Thankful For

By Mike Paquette, WTEA President



It's good to be thankful. As Doug Dimmer introduced me on Friday at the WTEA conference it was surreal. I have been mentally preparing for a year to be president of the WTEA, but it did not sink in til that day. As I take the reins of the WTEA I can only pause for a second and be thankful.

I am thankful for my mother and

father. This last year has been tough on that front. My father is 81 now and has had major issues with his heart for the last decade, and with strokes for the last year. As I am now caring for them remotely with my sisters, I can't help but think back to all the help they have given me.

My dad coached my little league team, was my fishing guide, den leader, scout master, chauffeur, and mentor. My mom was the typical '80s mom, the support service. She kept me fed, and when my three older sisters went to college she got a job to help pay their way. I am blessed with a mother and father who have been married for the better part of 60 years and are fantastic role models. Without their kindness and guidance I would not be here today.

I am thankful for my wife and kids. My wife has been a fantastic friend and colleague for 20-plus years. She put her career on hold to raise two kids. She helps with advice about teaching, planning projects, canoes with me, travels, and deals with my shenanigans. Without fantastic support like hers I could not think of serving as the president.

I am thankful for the WTEA staff and board. I have a group of fantastic leaders who are willing to help. These dedicated teachers are the best at what they do across the state, I am humbled to be working with them. They are fantastic organizers, time managers and teachers. These teachers are dedicated to teaching, and dedicated to the WTEA. I may be the president at the moment but I have much to learn from these people, they are fantastic professionals. I am excited for the next two years, working with such professionals.

Let me conclude with a final thought I am keeping in mind as I begin my journey as presi-

dent of the WTEA. This goes to my roots in BSA scouting, where I am an Eagle Scout. I am one, like many people, who have worked through the ranks of BSA scouting. Some you may recognize; like Neil Armstrong, and Buzz Aldrin. Others, you may not, they walk among you everyday but

they are leaders and members of society. I am

thankful to BSA and all the lessons they have taught me and the grooming they did to make me who I am today. I am excited to be putting those lessons to use for you the Wisconsin Technology Educators Association. Excited to serve!!

***"I am thankful for the WTEA staff and board. I have a group of fantastic leaders who are willing to help. These teachers are...dedicated to the WTEA. I am humbled to be working with them."***

**SAVE THE DATE!**  
**July 30th, 2024**

**1st ANNUAL: WTEA Foundation**  
**Charity Golf Outing**

**Scramble Format** **Wisconsin Dells**

**Included in your Fee:**

- 18 Holes
- Golf Cart
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- Putting Contest
- Golf Ball Cannon
- Longest Drive
- Hole-in-One Competitions

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## Board of Directors Winter Meeting & General Membership Summaries

By Mac Chopin, WTEA Secretary/Treasurer

### Winter 2023-24 Board Meeting Summary

#### Meeting at Chula Vista Resort, Jan 5-6, 2024

- Call to Order 7:41pm, Jan. 5 - Pres. Doug Dimmer
- Approval of agenda
- Approval of past meeting minutes
- Board changes - Dimmer
  - Appointed Heather Kiefer - Director at-large
- Pres. Report - (Exec. Board Mtg Notes)
  - Conflict of interest form for board members
  - Thank you to the Board
- Vice President's Report - Anna Vitale
  - TEE Standards Review Committee
  - CTE Social media accts shared on TEE listserv
  - Promo videos for conference
  - For future reference, record video of Apricot training?
- President-elect Report - Mike Paquette
- Program Coordinator Update - Steve Johnston
- Exhibit Coordinator Report - Tom Barnhart
  - Trade show sold out & setup plan
  - New exhibitors
  - First Robotics showcase demo
  - SkillsUSA trading booth space for WTEA w/ SkillsUSA state
  - Exhibitor concerns
- SAP & Awards Director Program - Matt Schultz
  - Letter to the Board from Schultz
  - Awards
- Project Showcase Coordinator Report - Steve Meyer
  - Project Showcase update
  - We'll host it Friday AM w/ EAA & their Youth Educ. Ctr.
- Executive Director's Report / Operations Coordinator Report (Joe Ciontea/ Jesse Domer/ Mason Pautsch)
  - Financial report; Membership report
  - Wild Apricot update
  - Conference YAPP update - Domer
  - Business management committee - Joe, Jesse, Mason
  - Transportation facility planning guide - Joe
- Board / Director responsibilities at conference
- Foundation Report - Joe & Jesse
  - Golf outing update; financial report
- Lifetime Achievement Award
- Social media update - Mac Chopin
- *Interface* Report - Duane Apel
- University Reports
  - UW Stout - Barb Bauer
  - UW Platteville - Duane Elfering
- DPI Report / SkillsUSA - Jake Mihm
  - Standards immersive review, public comment, roll out
  - SkillsUSA updates
- ITEEA Report - Mason
- WTEA Advisory Committee update - Mike Cattellino
- District Director Reports
  - District A - Emily Fransway
  - District B - Brian Schiltz
  - District C - Brennen Mickelson
  - District D - Jon Larson
  - District E - Alan Mamerow

- District F - Eric Sutkay
- District G - Stephen Hadfield
- District H - Art Pronschinske
- Director At-large - Matt Schultz
- Director At-large - Ryan Ubersox
- Director at-large - Mason Pautsch
- Director at-large - Heather Kiefer
- New Business - Dimmer / Paquette
  - Summer Board mtg
  - Motion - To spend \$800 for promotional items for District mtgs at 4pm on Thursday at State Conference - approved
  - Add WTEA District number to all name badges
  - Anna Vitale nominee at V. Pres.
- Other new business
  - Motion to have booth at SkillsUSA State Conf - approved
  - Add updates from tech colleges or other TE instruction schools to agenda
  - ACTE - Looking to return to Wisc.; Joe representing to WTEA
  - Lakeland College - Working on TE 220 teaching certificate
- Future Dates
  - Spring Conference - March 6-8, 2024; Wisc. Dells
  - Summer Golf Outing - Tues., July 30, 2024; Wisc. Dells
  - SkillsUSA State Conference - April 9-10; Madison
- Motion to adjourn.

### 2024 General Membership Meeting - March 8, 2024

#### Chula Vista Resort

- Call to Order - Doug Dimmer
- Approval of Minutes
- President's Report - Dimmer
  - Install Anna Vitale as Vice-President
  - Mason Pautsch appointed Communications Director
  - List of District Directors
  - List of Directors at-large
- Announcement of 25+ Year Awards
- Install Mike Paquette as President
- Financial Report - Joe Ciontea
- Student Ambassador Program Report - Anna Vitale
- Program Coordinator Report - Steve Johnston
- New Business - None
- Announcements
  - 56th WTEA Annual Conference, March 5-7th, 2025
- Acknowledgments - Pres. Mike Paquette
- Adjourn

*For additional information contact any member of the Board of Directors. Complete minutes are available from Mac Chopin at [machopin.wtea@gmail.com](mailto:machopin.wtea@gmail.com)*

**NOTICE TO ALL MEMBERS!**  
**OUR ADDRESS HAS CHANGED**  
The new mailing address for the WTEA:

WTEA  
P.O. Box 373  
Hazelhurst, WI  
54531-0373



# EXECUTIVE DIRECTOR'S MESSAGE

## 2024 State Conference Review & Upcoming WTEA Summer Events

By Joe Ciontea, WTEA Executive Director



I hope you were able to attend our annual conference in March. It was a fantastic success and full of professional development and networking opportunities for all. This issue features photos and highlights from the 3-day event.

It started off with our Awards Ceremony and Banquet on Wednesday evening. Congratulations to all the award winners, especially Steve Johnston, Kevin Gain and Arrowhead High School. Thursday was a full day of sectionals, kicked off by our keynote speaker, Matt Simpson, Senior Project Engineer from Trane.

Our 55th annual Trade Show included several new exhibitors. The Trade Show is the best place to shop for products and services that will help you grow your program. The Project Showcase was full of great projects created by students from all over the state, Thank you to everyone who brought items to be displayed.



Josh Goetsch shows off his raffle prize, a 55" TV.

That evening we continued the tradition of holding the President's Reception where attendees and exhibitors had the opportunity to network and reconnect while participating in the silent auction and basket raffle that supports the WTEA Foundation. I want to recognize Dan Zimprich and On 2 The Field for supplying sports memorabilia items for the silent auction. Their participation helps us raise a lot of money for future teacher scholarships.

Friday began with the WTEA membership meeting where our new officers officially began their terms of office. The meeting included recognizing twelve of our members who have reached their 25-year milestone - a tremendous commitment to our profession. The day continued with sectionals and the Friday Make & Take session where the focus was aviation technology. Special thank you to the NEW Manufacturing Alliance, FVTC, EAA and Flite Test. We have been including hands-on activities on Friday morning for a number of years and this was by far, THE BEST EVER!

Friday concluded with a luncheon and keynote speaker, Katherine Frank, UW-Stout Chancellor. Our final activity was the drawing for the WTEA Foundation; the raffle had six outstanding prizes. Over the course of the conference we raised over \$3,000 for the WTEA Foundation. Here is a list of the raffle prize winners:

- Tim Ploeger
- Brain Van Eperen

- Tom Duval
- Al Gomez
- Jack Hart
- Josh Goetsch

I want to thank the WTEA Board members, and all our conference sponsors & donors for their help and support in making the 55th Annual State Conference a success.

### WTEA Milwaukee Brewers Outing

The WTEA Foundation has a block of 25 seats in section 307 on Father's Day (Sunday, June 16th against the Reds). Seats are valued at over \$45 each but we are selling them for only \$25. Tickets will be delivered through the Ballpark app. Contact Joe Ciontea to purchase tickets at: [ionjoe2@gmail.com](mailto:ionjoe2@gmail.com) or 920-904-2747.

### WTEA Foundation Charity Golf Outing

Sign up now for the WTEA Foundation Charity Golf Outing on July 30th at the Wild Rock Golf Club in Wisconsin Dells. Look for details on page 3 of this issue.

### Important Reminder

Don't forget to go online and update your member profile so you keep your place on our mailing list and remain eligible for association awards and recognition.



## Interface Cover Design Contest Winner!

By Duane Apel, Interface Editor

This spring *Interface* issue is the first one ever with a cover designed by a student. Over three dozen designs were submitted, making the WTEA Board's decision very difficult. The winning designer is Sarah Wagner, a student of Tom Schlueter, at Sussex Hamilton High School. Cover designs had to reflect our new theme for the year, "Workforce Ready," along with meeting all technical specifications. Sarah received \$50 for her efforts, and her cover will be used for three issues (spring, fall, winter).



Sarah Wagner

Sarah, a sophomore, is enrolled in Graphics 2 and Woods/Cabinetmaking 2, with plans to take Graphics 3 and Architecture/Construction next year.

Congratulations to Sarah! Watch for details in the fall *Interface* for the 2024-'25 cover design contest information.

# CONFERENCE SPONSORS & CALENDAR

## The WTEA Thanks Our Conference Sponsors & Donors

*Please Support Them Throughout the School Year*

### Platinum Level Sponsors/Donors



### Gold Level Sponsors/Donors



### Silver Level Sponsors/Donors



### Bronze Level Sponsors/Donors



## ◀ Mark Your Calendar ▶

**WTEA Foundation Scholarship Deadline**  
May 15, 2024.....wteafoundation.org

**Fab Labs - Workshops**  
June 17-20 & 23-24, 2024 ..... UW-Stout  
July 8-11, 2024 ..... Mount Horeb

**TE Instructors: Pizza, Beer, & Cheese Tour**  
June 19, 2024 ..... Hilbert & Green Bay

**SkillsUSA National Conference**  
June 24-28, 2024 ..... Atlanta, GA

**WATDA Summer Teacher Training Institute**  
July 10-11, 2024 ..... MATC - Oak Creek

**WTEA Foundation Charity Golf Outing**  
July 30, 2024 ..... Wisconsin Dells

**Interface - Fall Magazine Articles Due**  
August 16, 2024 ..... to Duane Apel

**ACTE CareerTech VISION 2024**  
Dec. 4-7, 2024 ..... San Antonio, TX

**56th Annual WTEA Annual Conference**  
March 5-7, 2025 ..... Chula Vista, Wis Dells

**ITEEA National Conference**  
April 2-5, 2025.....St. Louis, MO

## WTEA CONFERENCE SURVEY RESULTS

- 1) 88% satisfied or very satisfied with the conference program book.
- 2) 94% satisfied or very satisfied with the program agenda and timeline.
- 3) 89% satisfied or very satisfied with the general quality of the presenters.
- 4) 81% satisfied or very satisfied with the relevance of material presented.
- 5) 83% satisfied or very satisfied with the selection of vendors in the trade show.
- 6) 92% satisfied or very satisfied overall with the 2023 WTEA Spring Conference.
- 7) 78% satisfied or very satisfied with Chula Vista as our conference center.
- 8) 94% satisfied or very satisfied with Project Showcase.
- 9) 31% of respondents used Yapp to view the conference program at least 50% of the time.
- 10) 97% of conference attendees are TE teachers.



# Tech Ed Teachers Pizza, Beer, Cheese Tour



Limit  
25  
Teachers

## Tour 3 delicious manufacturing facilities in the area!

Make plans to attend the 4th annual Tech Ed Teacher Tour Exploration event! The NEW Manufacturing Alliance and the WTEA have again partnered to do a fun, educational event in June for TE teachers. Previous plant tours featured boats, trucks and ships. This year's tour will include Sargento Foods, AK Pizza Crust, and Badger State Brewery.

Plus, we will discuss how we can increase the number of students enrolling in your classes and what you need from industry to help you!

**Wed. June 19, 2024**

### ITINERARY:

**8:45am.....Sargento Foods - Hilbert**

**11:45am....AK Pizza Crust (Lunch & tour) - Green Bay**

**2:30pm.....Badger State Brewing (Tour & discussion) - Green Bay**

**4:00pm.....Conclusion**



### REGISTER TODAY!

Scan the QR code or visit:

<https://form.jotform.com/AnnFranz/NEW-MA-WETA-tech-ed-teacher-event-24>



New Manufacturing Alliance  
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**ALL 3 TOURS  
JUNE 19th**

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# UW-STOUT ANNOUNCEMENTS

## Graphic Communications Program Reopens

Submitted by Andrew Delong, Program Director - Graphic Communications;  
with contributions from Chad Nyseth and Peter Schlosser



### Now Accepting Applications for Graphic Communications!

We are thrilled to announce that the Graphic Communications program at the University of Wisconsin-Stout, following a brief hiatus to review, reimagine, and revise the program, is once again accepting applications for the fall of 2024, and beyond. The students in your labs that are doers, problem-solvers, and love learning in an applied and hands-on manner are perfect candidates for our program.

UW-Stout's Graphic Communications major prepares individuals with the technical knowledge and skills required to manufacture graphic communications products from initial concept through end-user distribution. It includes the study of lithography, screen printing, color management, print production, digital imaging, flexography, document design and document finishing. Other concepts studied within the graphic communications major include project management, marketing campaigns, graphic design concepts, quality control, business management, packaging concepts, logistics & distribution, and professional industry standards.



### Graduates Enjoy 100% Placement

Graduates currently enjoy a perfect placement rate, as 100% of our graduates are either employed or continuing their education within six months of degree completion. A graphic communications graduate has a variety of career options within the industry of print and print management including, but not limited to, printing and imaging, marketing, sales, business & management, manufacturing, quality control, project management, and logistics.

Wisconsin boasts a strong printing industry, with the largest concentration of print production taking place in the Fox Valley and Milwaukee area. The employment opportunities continue to the south into the Chicago area, and to the west with the Twin Cities metro area in Minnesota both hosting robust leaders in print and packaging.

### A Rich History

Graphic Communications and UW-Stout share a rich history as the first class specifically designed for the print industry dates back to 1912. At that time UW-Stout was known as the Stout Manual Training School. In 1956, the then Stout Institute program was elevated to a Bachelor of Science in Industrial Technology-Graphic Arts Concentration. And finally, in 1996, Graphic Communications Management was named a standalone major at the University of Wisconsin-Stout. We are humbled to be part of the continued legacy of Graphic Communications at UW-Stout.

Please discuss our program with your students and encourage them to explore the vast career possibilities within it. If you, or one of your students, has questions please contact me at [delonga@uwstout.edu](mailto:delonga@uwstout.edu) or 715-232-2326.

### Teacher Workshop in June 2024

We will be hosting a teacher's workshop this June for those who would like ideas for the classroom and professional development opportunities. Watch the Stout website or email me for more information.

---

## Summer Fab Lab and STEAM Opportunities at UW-Stout

Submitted by Barb Bauer, Technology Education Program Director

The WTEA conference was another great conference. Twenty-one TEECA students from UW-Stout attended many of the breakout sessions, and perused the trade show.

### Professional Opportunities

We have three different ways for teachers to boost their knowledge this summer. If you do not want to attend alone; bring a colleague!

First, we are offering an intro to fab lab equipment for anyone who has never been in a fab lab. Next, is a three-day course focusing on applied learning within the fab lab. That is followed by a three-day course in curriculum development within a fab lab. **These courses will be at UW-Stout, June 17-20 and June 23-24, and again at Mount Horeb, July 8-11.**

### Fun Experiences for Students

UW-Stout Junior STEAM experiences give middle school students opportunities to explore different activities related to science, technology, art, and math. These are hands-on courses and allow students to play games, meet new people and stay on our college campus. Visit [www.uwstout.edu](http://www.uwstout.edu) for more info.



- **The All-in-One Camp: June 16-20**
- **Chain Making: July 7-11.**
- **Fashion Design Drawing: July 7-11**
- **Role-playing, Worldbuilding & Storytelling: July 7-11**

# FUTURE EDUCATORS AT WTEA STATE

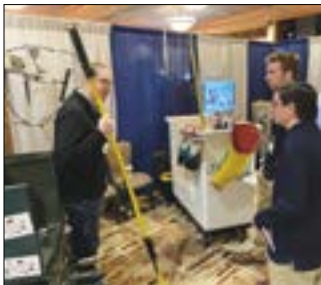
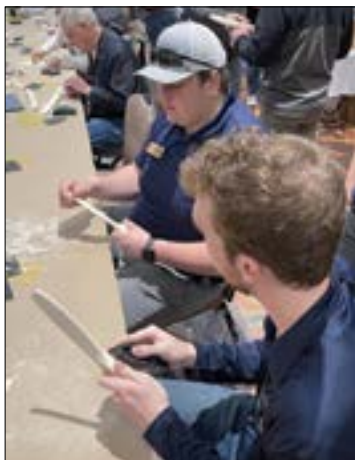
## UW-Stout TEECA Members Gather Information for Their Future Classrooms

Submitted by Dan Spaeth, UW-Stout TEE Student



We had 21 student TEECA (Technology and Engineering Education Collegiate Association) members, and two advisors from UW-Stout make an appearance at the WTEA Conference early this March. There were many very interesting breakout sessions and our students attended as many as they could. The trade show was a hit, as always, and we were able to explore for our betterment. We at Stout were happy to meet educators in our field, discuss common problems we run into in the classroom, and find ways to become more active for our future students. We thoroughly enjoy seeing the exhibits of student projects and gathering ideas for our own future classrooms.

Sam Brouillet, a Stout student attending the conference for his second time, stated, "We get to learn about new things coming to Tech Ed. We usually sit in on the new teacher seminar which allows us to ask questions about what we could possibly experience in our first few years as new teachers. We get to experience the project showcase and take away ideas to implement into our own classrooms in the future and we get to talk to the vendors that are there and pick their brains about what we could possibly include in the classrooms with the stuff that they bring into society these days."



UW-Stout TEECA members at WTEA State Conference: Back row from left - Kyle Stellingworth, Ethan Patz, Charles Girdeen, Kyle Schlicht, Jacob Scheffler, Sam Brouillet, Cooper Radke, Nick Erl-er. Middle row - Nick Cohen, Owen Batten, Kyran Luikens, Evan Verboomen. Front row - Brady Davidson, Miranda Johnstone, Lucas Edson, Dan Spaeth, Advisor Barb Bauer, Carter Amidon, Kyle Hoyem, Cadence Caulkins, Annika Schlueter, Gus Larson.

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# FUTURE EDUCATORS AT WTEA STATE

## My First Experience at the WTEA State Conference

By Jayden Stietz, UW-Platteville TEE Student



At the time of this writing, I am currently a student in my final semester at the University of Wisconsin-Platteville. I am also a student teacher at Cuba City School District. A few weeks before this year's WTEA conference, I was advised by my cooperating teacher, Guy Kopp, as well as both of my UW-Platteville program advisors, Ed Wiegman and Duane Elfering, to attend this meeting. With the influence of these people I decided to take the opportunity presented to me.

Going into the WTEA conference as a student teacher, I did not really know what to expect. This was my first time attending, and obviously I am very new to the world of teaching in general. By the end of the two-day conference, I was very pleased with my decision to follow the advice of my cooperating teacher, as well as my advisors, to take part in the yearly meeting. There was a, "New to Teaching," presentation that I attended right away. In my opinion, this was a great presentation for everyone new to teaching, especially future teachers who have no experience in teaching, or are in their first few years of college. For me, with experience in a classroom setting from both pre-student teaching and student teaching, there was a lot of information covered that I already knew through my experiences. However, there were still different techniques in regard to teaching, grading, and other things that related to running a classroom that were new to me. These ideas were very beneficial for me and I will try some of them while student teaching, as well as early on in my teaching career.

I also had an opportunity to attend a presentation on using artificial intelligence as a teacher. It dove into how to make lesson plans, course outlines, tests and quizzes, as well as how to learn more about a subject by prompting the program, "ChatGPT," to give information on a desired topic. This was very helpful, especially for me, a new teacher who has very little experience teaching certain subjects and who obviously doesn't have a lot of material, such as tests and quizzes.

In conclusion, I recommend every teacher attend the WTEA conference yearly, not only to gain course material, ideas, technologies, knowledge, and techniques for teaching, but also to build connections with other teachers and to experience comradery between people in the world of technology education. With that being said, I would also advise college students interested in teaching technology education to go to the yearly meeting. As I mentioned above there are many benefits in doing so. I, along with the seven other

UW-Platteville students who attended, all look forward to continuing this tradition yearly. I hope that future college students also have the opportunity to enjoy this experience like we did.



UW-Platteville TEE students at the WTEA State Conference

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# DEAR WTEA...

## Fox Valley Tech College CTE Students Share Their Experiences at WTEA State Conference

*Submitted by, Steve Meyer, Manager of STEM Education, Fox Valley Technical College*

**Fox Valley Technical College Career and Technical Education Instruction Program students received a WTEA scholarship to attend the WTEA State Conference in March. Below are three write-ups from the students on their first-ever conference experience.**

*Dear Wisconsin Technology Education Association,*

*The WTEA conference is the first professional conference that I have ever been to. Admittedly, when Steve Meyer asked if any of us would be interested in attending, I was reluctant to say yes. I did not have very great expectations for the event. After all, it's a conference. Every time I've heard someone say they were going to a conference it was*

*always through gritting teeth.*

*Nonetheless, the better part of me simply looked at it as an opportunity.*

*Throughout my life, it has*

*proven time after time that opportunities always lead to other opportunities - this opportunity was no different.*

*When I arrived, I was surprised to see that everyone was up and about mingling with others and freely going about themselves. So, my expectation that the conference would be a death-by-PowerPoint event was shattered. Then I spoke to a variety of vendors who were promoting their new and interesting educational products and technologies. I even ran into my dad's high school best friend, Jake Mihm, and their former Tech Ed teacher from Pacelli High School, Steve Johnston. So, the expectation that this event would be boring and uneventful was destroyed.*

*The fun did not stop at 5:00PM like the typical workday. The Tech Ed teachers all assembled in a banquet hall for an evening social gathering. There I was able to network with Tech Ed teachers from around the state and*



**Fox Valley Technical College CTE students, Nolan Stehly (left) and Alejandro Schloesser, participate in the Aviation Make and Take session at the WTEA State Conference.**

*get an idea of how much opportunity there is to teach in Wisconsin. After this event I applied to several schools for their vacant Tech Ed positions and I am getting more phone calls and correspondence than I ever imagined. My first WTEA conference was amazing!*

*Thank you,*

*Alejandro J Schloesser*

---

*Dear WTEA,*

*I want to thank you for the scholarship that allowed me to attend the WTEA conference. The conference was an incredible experience. I learned a lot of new things and got to meet so many interesting people. From the workshops to the speakers, everything was really inspiring. It was like stepping into a whole new world of possibilities. Without the scholarship, I would not have been able to go, as money can be tight as a college student. I really liked making numerous aviation projects during the Make-and-Take on Friday. This will help me get a jump start on the curriculum for when I become a Tech Ed teacher. I am excited to one day apply what I learned at the conference to my classroom!*

*Thanks,*

*Nolan Stehly*

---

*Dear WTEA,*

*At the WTEA conference I was able to meet up and talk to Tech Ed teachers that I have met through the years. I really learned lots about what it is like being a new Tech Ed teacher and what to expect for curriculum. The trade show showed all the new technology that we can incorporate in our classroom. The sessions were really helpful, learning what is taught in certain classes, special projects, discussions about AI in the classroom, different methods on how to teach a class. I had a great time seeing all the projects in the Project Showcase. During the conference I made many connections with other teachers. Thank you for the opportunity to attend this year's conference.*

*Tyler Gruenwald*



# DIRECTOR'S REPORT

## Northwoods Students Compete in Nicolet College Competition Day

By Brian Schiltz, WTEA District B Director, Tomahawk High School

Tomahawk High School students competed against 11 other Northwoods schools in the Nicolet College Competition Day on March 1st this year. Over 200 students participated in 15 different competitions. Examples include Business Jeopardy, Cosmetology, Welding, Build A Website, Public Safety Challenge, Flash Fiction Writing, Physiology and Biology, and so much more.

This annual event started about 20 years ago, with just the welding competition. Slowly over the years other departments began to join - like autos, robotics, and public safety, and more. Now, the campus is shut down to the college students, some actually help run the event, and the high schoolers visit the facilities and compete. Winners were awarded prizes and four students, including one from Tomahawk High School, received a scholarship from the Nicolet College Foundation.

Tomahawk students represented themselves and the school well in all areas and were awarded five first-place finishes and six second-place finishes. While this success is something to be extremely proud of, perhaps the most important part of the day is for students to network with students from the area, make connections with Nico-

let instructors, and learn about career opportunities available at Nicolet. Thank you to Nicolet College for their work in providing Competition Day.



Welding Contest



The Cupcake Challenge



Robot Pick Up & Place Competition



Ceramics Contest



Beauty Behind the Madness Competition



Automotive Technician Competition

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## DIRECTOR'S REPORT

### District E Updates and Conference Reflection

By Alan Mamerow, WTEA District E Director,  
Sussex Hamilton High School

It was great to see many of you at this year's annual conference and to connect during our District E meeting. Please consider joining us for a District E meeting at Hamilton High School and Templeton Middle School in Sussex in mid-May. By now, you should have received a short survey regarding the time and topics of the meeting. If not, reach out to me at [mameal@hamilton.k12.wi.us](mailto:mameal@hamilton.k12.wi.us).

One of my favorite parts of the conference each year is the project showcase and talking with other teachers to get new ideas of things to do in my classes and build student interest in what I teach. I leave the conference every year with more ideas than I could possibly implement, but full of energy to try a few new things. If you have a project that you see students always excited to complete, consider hosting a "high-tech weekend" to showcase and build that project with other teachers.

If you need anything from me or the WTEA don't hesitate to reach out. I look forward to seeing many of you in May!



## ChallengeUSA 2024 Schedule

By Alan Mamerow, ChallengeUSA Electrathon Coordinator

The annual WTEA conference means that spring has arrived, and with spring comes another ChallengeUSA Supermileage and Electrathon competition season. This year, ChallengeUSA will be putting on four different events in the region:

- ☛ **UW Stout** – April 19-20: Menomonie Municipal Airport
- ☛ **Fox Valley Tech College** – May 3-4: Bluemound Campus and Public Safety Campus
- ☛ **Autobahn** – May 5-6: Autobahn Country Club in Joliet, Illinois
- ☛ **Road America** – May 13-14: Elkhart Lake

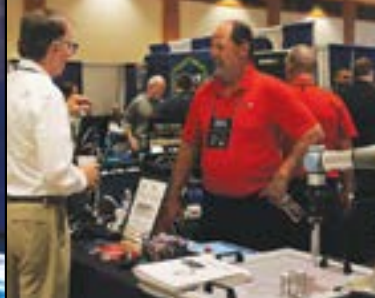
We look forward to seeing many of you at these events, and if you don't have a Supermileage or Electrathon team but want to know more about the organization, the events, and vehicles that students build, we would love to see you at an event. Better yet, bring students along to get inspiration for their future vehicles. Can't wait to see you at the track!

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## 2024 WTEA Awards and Recognition

### WTEA TECHNOLOGY EDUCATOR of the YEAR “For Outstanding Contributions to Technology Education”

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**Kevin Gain** (left) - Grafton HS; & Mike Paquette-WTEA Board.

### LIFETIME ACHIEVEMENT AWARD “For Distinguished Achievement & Leadership in Technology Education”



**Steve Johnston** (right) - State Conference Program Coordinator, & LaCrosse Logan HS instructor, with son, Gabe; & WTEA Executive Director Joe Ciontea.

### WTEA 25 YEAR AWARD “For 25 Years of Service to Education” Sponsored by First Technologies, Inc.



From left: Mike Seegar, First Technologies; Brian Daliege, Lincoln HS; Greg Brown, Shawano HS; Ken Hopperditzel, Wausau Schools; Doug Johnson, Forest Park MS; Ed Weigman, UW-Platteville; Craig Adams, Forest Park MS; David Friend, Rocket Academy; Roger Stanford, Western Tech College; Barb Bauer, UW-Stout; Carolyn Ferroly, First Technologies. Not pictured: Victor Herbst, Janesville Craig HS; Matt Roenz, Neilsville Schools; Christopher Maedke, Janesville Schools.

### WTEA LEADERSHIP AWARD “For Commitment and Service to the WTEA”



**Barb Bauer**  
WTEA University Rep (2020-2024), UW-Stout & WTEA Executive Director, Joe Ciontea.

### WTEA SPECIAL RECOGNITION AWARD “For Contributions and Service to Technology Education”



**Steve Straub**  
Dean of Mfg, FVTC & Jesse Domer-WTEA Board



Jason Kraus, Hartford HS, accepts award on behalf of  
**Todd Doerfert** - Operations Mgr., Mantz Automation; & Jesse Domer -WTEA Board



**Eric Gulla**  
Metal Mgr, Eaton Corp. & Jesse Domer-WTEA Board



**Joe Schwengels**  
Senior Superintendent, JP Cullen, Inc. & Jesse Domer-WTEA Board

**WTEA AWARD of EXCELLENCE**  
*“For Exemplary Achievement in Technology Education”*  
 Sponsored by Goodheart-Willcox Publisher



**Abe Graziano**  
Oak Creek High School &  
Anna Vitale-WTEA Board



**Matt Hansen**  
Slinger High School &  
Anna Vitale-WTEA Board



**Abe Allen**  
DePere High School &  
Anna Vitale-WTEA Board

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- Len Sterry - 2002
- M. James Bensen - 2004
- Jeff Dowd - 2005
- Fred Schroedl - 2007
- Doug MacKenzie - 2008
- Dennis Skurulsky - 2012
- Carl Hader - 2013
- Pete McConnell - 2015
- Joseph Ciontea - 2016
- Bob Abitz - 2017
- Mike Roth - 2019
- Bryan Albrecht - 2023

**WTEA HIGH SCHOOL  
PROGRAM of the YEAR**  
*“Outstanding High School  
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**Arrowhead High School, Hartland**

From left: Anthony Christian, Jeff Luetschwager, Andrew Zuercher, Jeremy Schlitt, Jacob Ruff, Tom Whelan

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AMBASSADOR**



**Naomi Domer**  
Senior, Watertown  
High School.

Naomi will be  
attending UW-Stout  
in fall, 2024

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# Aviation Themed “Make-and-Take” A Big Hit at the WTEA State Conference

*By Steve Meyer, Manager of STEM Education, Fox Valley Technical College*



During the recent WTEA Annual Conference, there was a lot of activity and excitement based around a big event on Friday morning. This year, the conference held an aviation inspired Make-and-Take event. The Make-and-Take event is an informal session with different hands-on, minds-on activities that conference attendees can participate in to make projects that they can take back and replicate in the classroom.

This year’s goal was to immerse teachers in aviation related content to show them some opportunities to use it as a learning content area for their students. Aviation is so naturally full of Science, Technology, Engineering, and Mathematics (STEM) content. It is a great area to bring authenticity to material processing, CAD, electronics, engineering, design, fabrication, simulations, systems thinking, etc.; not to mention all the career opportunities in the aviation, engineering, and manufacturing areas.

During the two-hour event, hundreds of teachers participated in five different activity areas. In station one, teachers had the opportunity to solder a printed circuit board airplane key chain with blinking LED lights to learn about the field of avionics. For many, this was their first experience ever soldering a printed circuit board. In another station, teachers built cross-section wing ribs out of balsa wood to learn about the different parts of a wing such as leading and trailing edge.

Many teachers enjoyed the propeller shaping activity where they were able to take a semi-finished basswood propeller and shape it into a finished product. The other two stations had teachers making large foam gliders and learning how they can be turned into fully radio-controlled airplanes. The projects exposed teachers to some fun, inexpensive activities that students can do, but more importantly showed them how to use these activities to reinforce STEM related content.

These activities and associated curriculum could be used individually for some exploratory classes, as a theme for a STEM summer camp, or as supplementary experiences in a full-fledged semester long engineering class.

A special thank you goes out to the EAA Youth Education Center educators Alyssa Horpedahl, Cindi Pokorny, and Courtney Condon for their expertise, and EAA’s thousands of dollars of donations in time and materials for the event. Other sponsors of the Aviation Make-and-Take event include FVTC, Northeast Wisconsin Manufacturing Alliance (NEW-MA), and Flite Test.

If you are interested in more aviation related opportunities, check out the EAA Youth Education Center in Oshkosh, Wisconsin. They do lots of programming and tours for all ages and work with schools and thousands of kids each year to expose them to aviation opportunities.

<https://www.eaa.org/eaamuseum/education-programs/education-programs-and-groups>



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# WTEA LIFETIME ACHIEVEMENT AWARD

## Steve Johnston Honored for Outstanding Achievements As WTEA Board Member and TEE Instructor

On March 6, 2024, the WTEA Board of Directors presented Steve Johnston with the WTEA Lifetime Achievement Award for his numerous accomplishments and dedication as an educator in the technology and engineering field. Steve has been teaching high school Technology and Engineering Education for 36 years. He was a 1984 graduate of Western Technical College in the Woods Techniques program and later received a BS degree in Technology Education from UW-Stout in 1988, and a MS from UW-Stout in 1998. He began his career at Stevens Point Pacelli High School in 1998, moved to Marion High School in 1990, and since 1996 has been teaching at La Crosse Logan High School, where he is now the department head. Steve was also an adjunct faculty member at Viterbo University from 2004-2020.

Over his career he has taught classes in welding, machining, woods, building construction, digital electronics, robotics, and computer networking and programming.

Steve has been an active member of the WTEA since the early 1990's and joined the Board of Directors in 1998. Joe Ciontea, WTEA Executive Director, added, "After serving as the president from 2002-2004 he was selected to serve as the WTEA Program Coordinator. Prior to Steve assuming that position those responsibilities were fulfilled by a number of different people. Steve revitalized the sectional offerings and keynote speaker selection process for our annual conference. The continued success of our organization is largely due to Steve's leadership and organizational skills. His career exhibits a lifetime commitment to our profession."

Steve currently sits on Western Technical College's Electronics and Computer Engineering Technology Advisory Board, TUMMA's Education Task Force, and is a member of the Logan Faculty Leadership Team. He has served on multiple committees for not only the La Crosse School District, but also his local community, the ITEA, the Wisconsin DPI and UW-Stout, among others.



Steve Johnston

He has received awards and recognition from the Mt. La Crosse Ski Patrol, the DPI, the Upper Mississippi Manufacturing Association, the Massachusetts Institute of Technology, CISCO, and several others.

His students have partnered with local manufacturers to develop functional prototypes for Autonomous Vehicles, Exoskeletons, Desalination Machines, Aerial Drones and Remote Underwater Vehicles. They also designed and created a charging system for a prosthetic limb which gave them the opportunity to file for a U.S. Patent and present their project idea at the Massachusetts Institute of Technology.

Steve has made a point of teaching his students community responsibility as well. A couple of examples include the building of longboards to transport patients for a local ambulance service, and making toys and playground equipment for a daycare center.

In the community, Steve has been a First Responder, EMT, and is currently a volunteer on the Mt. La Crosse ski Patrol certified as an Outdoor Emergency Care Instructor, FEMA Incident Command, and Mountain Travel and Rescue. He ushers at his church and has served as Cub Scout Den leader and Special Olympics Coach.

Steve and his son Gabe have backpacked and climbed in many national parks throughout the U.S. over the last 20 years. Those experiences are some of his most treasured memories.

When asked if he had any advice for new teachers, Steve stated, "At some point in your teaching career you will be faced with making a decision to implement a new class, start a new program or lead some new district initiative. If it will engage your students and help them learn, don't be afraid to jump in and commit to it. As a teacher, you will learn and grow professionally by doing something different that challenges you."

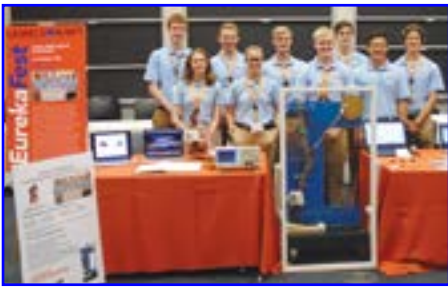
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Steve with son, Gabe, on Mt. Rainier in Washington



Steve and son, Gabe, at Great Sand Dunes National Park in Colorado



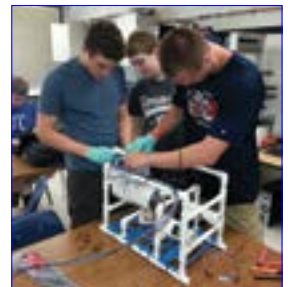
Logan HS InvenTeam showcasing their Energy Management System for prosthetic limbs at MIT.



Logan HS students partnered with Trane to make an Exo Arm Grinder to help prevent repetitive work injuries.



Logan HS at the MIT dome in Cambridge, Massachusetts.



Logan HS students work on a remote underwater vehicle.

## Steve Johnston - WTEA Lifetime Achievement Award Recipient

We honor Steve Johnston for a lifetime of service to our profession. Serving the WTEA as an educator, WTEA board member, State Conference program coordinator, author, presenter, and friend throughout his entire career, Steve continues to serve as an example of professional commitment and servant leadership.

### ACCOMPLISHMENTS:

- 2023 - The Upper Mississippi Manufacturing Association: Tech Educator Excellence Award
- 2021 - Mt. La Crosse Ski Patrol: Kenny Garves Service of Excellence Award
- 2021 - School District of La Crosse: 25 Year Recognition of Service Award
- 2019 - La Crosse Area Development Corporation: Triangle of Achievement Award
- 2019 - Lemelson-MIT Invent Team
- 2018 - Lemelson-MIT Excite Award Recipient
- 2018 - Cisco Networking Academy Instructor: 20 Years of Service Award
- 2015 - ITEA: Certificate of Recognition
- 2005 - WTEA: Special Recognition Award for Leadership
- 2002 - ITEA: Teacher Excellence Award
- 2001 - WTEA: Technology Educator of the Year
- 2000 - Wisconsin DPI: Kohl Teacher Fellowship Recipient
- 1998 - ITEA: Don Maley Graduate Scholarship
- 1996 - ITEA: Technology Education Program Excellence Award
- 1996 - Leavey Award for Excellence in Enterprise Education
- 1995 - WTEA: High School Program of the Year
- 1995 - Hillshire Award for Excellence in Teaching Secondary Education
- 1993 - Wisconsin DPI: Excellence Award for AODA Program
- 1993 - WTEA: Program Excellence Award -Transportation
- 1992 - Selected for Teacher World, UW-La Crosse



# THANK YOU FOR VISITING THE H2I GROUP BOOTH AT WTEA!

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# WATDA AT WTEA STATE CONFERENCE

## Wisconsin Automobile & Truck Dealers Foundation's Automotive Sessions A Big Success Again

By Brent Kindred, WATDA Foundation Vice-President

Each year the Wisconsin Automobile and Truck Dealers (WATDA) Foundation hosts two teacher trainings. This spring, at the WTEA 55th Annual Conference there were many professional development opportunities on both days of the conference for transportation teachers. Holding professional development for transportation teachers is multifaceted. First, it is important for teachers to stay current with a rapidly changing industry, and second, these sessions help teachers and programs thrive in their schools and communities.

Thursday highlighted George Arrants from the ASE Foundation. George is a renowned expert in automotive education and brings decades of experience with him. He had a jam-packed room during his session on CTE Advisory Committees. Also on Thursday, Carl Hader and Aaron Troxell delivered important content on automotive, collision, and diesel facilities planning, and ASE teacher certification preparation. Carl and Aaron are both highly skilled and well respected in transportation education and delivered impactful presentations.

Friday's training was held at Easton Motors, only four miles from the Chula Vista Resort. This setting affords teachers the opportunity to receive training in a shop from industry experts. Teachers enjoyed comprehensive training from Easton Motors technicians, George Arrants, and AC Delco. The highlight of the day was recognizing a few of Wisconsin's ASE Accredited programs. ASE accreditation is a national designation and is the highest honor a transportation program can earn. This accreditation demonstrates a program's commitment to the highest standards in transportation education and is all for the benefit of the students, community, and industry. In addition to presenting banners to the schools, there was a drawing for two shop cars.

The WATDA Foundation's next training is July 10-11, 2024, at the MATC Oak Creek Campus. For more information, please visit <https://www.watda.org/summerinstitute.html>.



Ned Lease (Oregon HS teacher) and Miles Tokheim (Madison Schools teacher) holding their ASE Accreditation banners standing in front of the cars they won.



Aaron Troxell, WATDA Foundation Educational Field Manager, providing an overview of the training day and session for the teachers in attendance at Easton Motors.



EJ Pilarski-Jefferson HS, Ned Lease-Oregon HS, Miles Tokheim-Madison Schools, and Troy Krumm-Marshfield HS, display banners recognizing their programs for being ASE Accredited.



Bill Morse, WATDA Foundation, speaking to teachers and administrators at the WTEA Trade Show about the WATDA Foundation programs.



George Arrants, ASE Foundation, speaking to the teachers about ASE accreditation and program updates.



# STUDENT AMBASSADOR PROGRAM

## Is There a Future Tech Ed Teacher in Your Classroom?

By Anna Vitale, WTEA Vice President & Student Ambassador Chairperson

It made me very happy to see so many future Tech Ed teachers from Stout, Platteville and Fox Valley Tech at the WTEA Conference! It was also really cool that I knew some of them from the SkillsUSA UW-Stout Regional Competition, where we had a chance to talk and I got a chance to get to know them a little. To see them at the conference...that was fun!

But, what was really more wonderful was hearing them talk about their intentional purpose and eager dedication to technology education.

Kevin Gain, WTEA Teacher of the Year, made my heart happy (and I had to grin) when he said being a Tech Ed teacher isn't a job - it's a lifestyle. Amen.

The world of CTE can be complicated - the education world itself is always beset with challenges, right? But, in CTE, we are keenly aware of the complexities forecasted for the future because we are preparing our young people to be the American workforce who can handle the challenges of that future. Nationwide, we hear the cry, "More Tech Ed, more problem-solvers, more critical thinkers, more engineers and careers in STEM occupations!" And, "We need a skilled labor force!"

Students love to take our classes and we make strong connections with the young people that fill our rooms and spaces. Jason Kraus, of Hartford Union High School, made me smile and laugh in his session, "Developing Pathways

***"We have great kids walk through our classes every day who possess the "gift" to be a high quality educator. The time is now for us to recognize them, encourage them, mentor the start of their journey... to be Wisconsin Technology Educators."***

and ACP," when he talked about current students working on projects: "They pay attention to details in order to make a better, more precise project than their parents did years before in their woods classes."

That is a legacy that has more meaning than the recognition of, "My mom had you as their high school teacher!" It's more because there is a physical, tangible object that crosses generations. That object holds stories (friends in the class who had similar projects) and memories (the teacher helping with the project), challenges (nicks when routing), decisions (what color stain?) and perhaps even a wood sliver. Then, it's, "See what I made!" and the elation and pride.

We get to do some incredible things with amazing young people every day...so, why wouldn't we encourage them to be a Tech Ed teacher?

This is where we come in. Post-secondary institutions primarily get their 'candidates' from us, the high school

s y s t e m . Years ago, the WTEA determined that it was vital to do our part in helping to resolve this shortage. After all, we are one of the most highly recognized state technology education associations nationwide.



**Alan Mamerow, WTEA Board member, shares valuable information for future teachers at the state conference.**

At the conference, there were Tech Ed teachers that came forward, asking about the Student Ambassador Program. They told me about their high school students who were planning to go into technology education and that they are interested in learning more about what the WTEA SAP can do to help those students.

In the Arrowhead HS Program of the Year video (check it out on our YouTube channel or our Facebook page!), a high school senior talked about how Mr. Schlitt was his main motivation for choosing technology education for

*Continued on next page...*



**UW-Stout students listen attentively at the new teacher seminar at the WTEA State Conference.**

## A Breakdown of the WTEA Student Ambassador Program

- ◆ Talk to the student, explain what the SAP (Student Ambassador Program) is all about.
- ◆ Register, fill out a little bit of paperwork, get permission from their guardians.
- ◆ Students can begin to take on some extra responsibilities in your classroom (just like being a TA).
- ◆ Mentor teachers help the student prepare a lesson to teach to a class of their choice (The purpose is to provide students with an opportunity to teach. There is a rubric and outline to help them). And, best of all, scoring points towards the end of the year scholarship!
- ◆ Private visitation and info session at UW-Stout and UW-Platteville
- ◆ 20 hours of community service in activities related to technology education. This may be things the student is already doing! For example, volunteering at a local SkillsUSA or ChallengeUSA event, First Robotics, etc.
- ◆ An invitation to the WTEA Conference - WSAP students and mentors will be invited to the conference for a few hours and be honored by Wisconsin educators for their interest in a future as a technology education instructor.
- ◆ An opportunity to apply for a scholarship to their selected institution.

college. The student said “I really look up to him...”

The WTEA Student Ambassador Program can help guide a young person toward one of the best teaching careers ever. The goal is to assist you and that young person in their journey (whether it ends in a technology education career or they decide it's not for them).



A SkillsUSA state officer listens to a vendor at the WTEA State Conference trade show.

The program is simple. Look into your classrooms and think about the students that eagerly come in, smile and say, “I wish I could be in this wing/room/lab all day!” A TA who begs you to take them every semester? A student who takes every class they can possibly take in Tech Ed? You can empower that student because they show potential as a future technology education teacher. You possess the power to

influence a young person to be a part of something big - a CTE teacher who is helping to form, educate and inspire the

future of our country.

We need to get the message out there! We have great kids walk through our classes every day who possess the “gift” to be a high quality educator. The time is now for us to recognize them, encourage them, mentor the start of their journey and empower them to be Wisconsin Technology Educators.

**For more info about SAP program:**  
[wteafoundation.org/wtea-sap/home](http://wteafoundation.org/wtea-sap/home)

**Questions? Email me at**  
[wteasap@wteafoundation.org](mailto:wteasap@wteafoundation.org)

A promotional graphic for the STEM 101 Connections Program. It features a background image of a yellow robotic arm in a factory setting. The text reads: "STEM 101 Connections Program", "Empowering students to see their future.", "Scan for free access" (with a QR code), and "In Partnership With KOMATSU".

A promotional graphic for INKWORKS. It features a circular logo with a rainbow border and the text "INKWORKS" and "UNIQUE DIGITAL &amp; OFFSET SOLUTIONS". To the right, it says "Meeting your Printing Needs!" and includes the website "www.inkworksprinting.com".

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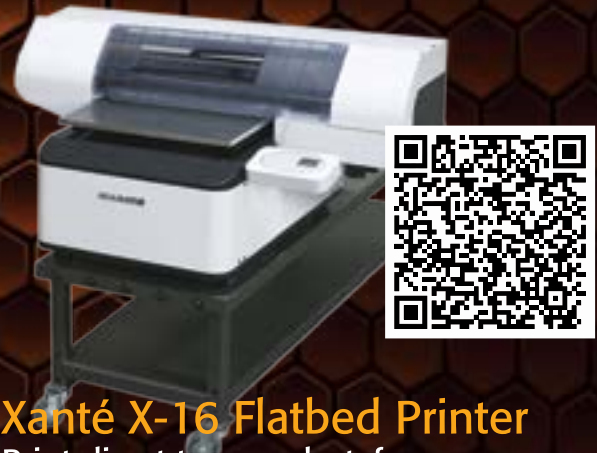
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Check our website for updates: <https://www.watda.org/summerinstitute.html>

# WTEA Districts

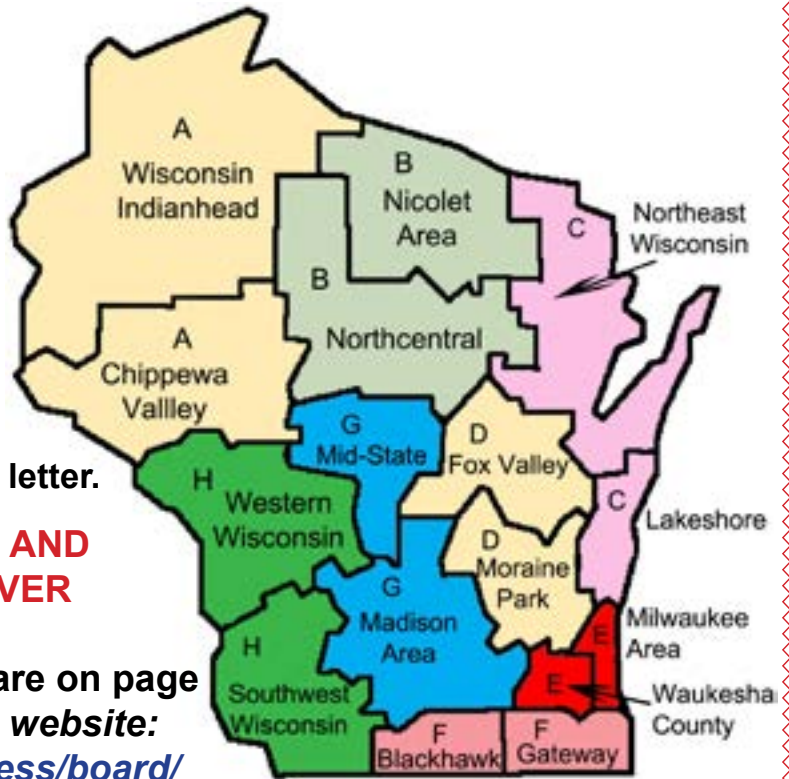
## Q & A

◆ **WHAT WTEA DISTRICT AM I LOCATED IN?**

It is based on your local tech college district. See map for district letter.

◆ **WHO IS MY WTEA DISTRICT REP AND HOW DO I CONTACT THEM IF I EVER HAVE QUESTIONS?**

District reps & their contact info are on page 2 of this *Interface* & on the *WTEA* website:  
<https://www.wtea-wis.org/wordpress/board/>



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# “RENEW OUR SCHOOLS” ENERGY PROGRAM

## Competition Has Students Learning Energy Consumption & Conservation by Studying Their Own School Building’s Energy Usage

By Wendy Stelzer, Youth and Community Engagement Specialist, KEEP (K-12 Energy Education Program), Wisconsin Center for Environmental Education

Careers in energy are among the fastest growing, nationwide, according to the US Bureau of Labor Statistics. Educators across Wisconsin are finding that an innovative and practical way to educate their students about energy is to use their own school building as a teaching tool.

Renew Our Schools is a building-level energy conservation program that uses real-time electricity consumption data to help students visualize school building energy performance. This program engages students through the use of energy measurement tools, participation in a school energy audit, and interaction with energy professionals who visit the classroom during the program. Specialists from KEEP - Wisconsin’s K-12 Energy Education Program, Focus on Energy®, and a school’s own facilities/energy manager or HVAC technician bring a wealth of information and career pathways opportunities to students.

The energy tools and eGauge datalogger become integrated into the school’s permanent curriculum. They provide students with relevant, place-based data that empower students to discover energy flow within their building,



eGauge datalogger portal view showing a school’s weekly electricity consumption and associated costs.

explore multiple career pathways and develop life skills they will need as professionals and community members. Evansville High School’s Introduction to Engineering teacher and Eco Club advisor, Scott Anderson, describes the eGauge; “It is the single most important tool for the students – the ability to see real-time consumption and measure how our energy saving measures really impacted

our use was simply awesome.”

The six-week program is structured as a competition among schools with winners receiving prize money for future conservation initiatives in their school. In addition

to prize money, participating schools can significantly lower their electricity costs and their school’s carbon footprint!

Northland Lutheran Renewable Energy teacher, Rick Grundman, summarizes, “This has been an excellent, real-life practical use of STEM principles. Every time we compete, we find more areas of waste and places

we can improve. The best thing is that students quickly take ownership of conservation habits while learning and they encourage others to practice them.”

The Renew Our Schools energy conservation program builds a strong energy awareness foundation that will not only have immediate impacts but will raise engaged, informed

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1757 TREES PLANTED (GROWS FOR 10 YEARS)

12,925,816 SMART PHONES CHARGED

234,264 LBS OF CO<sub>2</sub> SAVED

119,028 LBS OF FUEL AVOIDED

THE STUDENTS, TEACHERS, AND STAFF INVOLVED SHOULD BE PROUD OF WHAT THEY HAVE ACCOMPLISHED. THANK YOU FOR HELPING OUR SCHOOLS AND OUR PLANET.

PROGRAM SUPPORTED BY: Wisconsin Center for Environmental Education, Wisconsin Department of Natural Resources, focus on energy, RESOURCE CENTRAL

Energy & environmental saving results from the 2023 Renew Our Schools energy conservation competition.

here: Re-

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new Our Schools; UW-Stevens Point ([uwsp.edu](http://uwsp.edu)). Competitions for next school year are October 7–November 15, 2024, and February 24–April 4, 2025. It is not too early to enroll! There is no net cost to Wisconsin schools thanks to support from KEEP and Focus on Energy®.



Evansville HS students on a de-lamping campaign during the competition. Using a light meter, students discovered hallways were over lit. The completed project saves the school \$1000/year.



Northland Lutheran students won the Spring 2023 Renew Our Schools Wisconsin competition.

WTEA WTEA WTEA WTEA

## WTEA Foundation Scholarship Applications Due May 15

The WTEA Foundation is offering a renewable \$1,000 scholarship for a high school senior or graduate who commits to pursue a career as a K-12 Technology & Engineering educator.

### ELIGIBILITY:

- Wisconsin resident
- Enroll in technology education at a Wisconsin university and start the fall semester
- Submit completed application form and 250 word essay by May 15th

Details of the scholarship and the application form can be found on the WTEA Foundation website at [www.wteafoundation.org](http://www.wteafoundation.org)



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# FUNDAMENTALS OF ELECTRICITY

## A Belt Made of Baling Wire, Good Things from Breweries, and the Wisconsin TEE Standards

By Randy Way, Associate Dean - School of Engineering, Science, & Mathematics, Madison College

As I had noted in my previous article, “A Road Trip to Cadott, a Dropped Hamburger, and the Wisconsin TEE Standards,” my intent with this series is to make the Electricity, Electronics, and Controls standards more useful in the classroom. This time around, we’ll be contemplating the standard below.

TE.EEC.11.A: Describe the flow of electrons through circuits.	TE.EEC.11. A.b.8: Identify the ampere as the unit of measure of flow of current in circuits.	TE.EEC.11. A.i.8: Define the ampere as one coulomb of charges passing a point in one second.	TE.EEC.11. A.a.8: Contrast the speed of electrons in meters per second with the flow of electrons in amperes.
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Back when I was a middle school teacher, kids would occasionally come to class with a case of the “droopy drawers.” To be prepared for this, I maintained an inventory of baler twine so that these students could make themselves a belt. I, myself, have upgraded my belt to a piece of baling wire that I keep around my waste. I do my best to stay away from the fried chicken sandwiches in the cafeteria in an effort to keep the length of this wire to one meter. Imagine for a moment that this meter-long wire around my waste became energized, resulting in the flow of electrons from one end to the other. How might we measure this flow?

### Current (SI unit – Amperes)

Well, conveniently, there’s an easy way – create another coil of wire of similar length a meter away from my belt. Luckily, it’s as simple as putting it on the floor, as my waistline is about a meter above the floor. If, as viewed from above, the current in my belt was flowing clockwise, we’d want to make the current in the wire on the floor run in the opposite direction so that the wires repel each other magnetically. A schematic diagram is shown in figure 1.

Jumper cables are usually built of two wires that are laminated together by the insulation, but if you’ve ever used an old set of cables that were individual, you might have observed that the cables jump away from each other when the dead car attempts to crank. This is because when the starter is keyed a large amount of current flows through the cables, setting up a magnetic field around

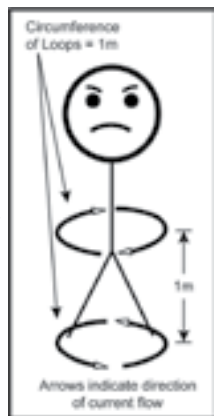


Figure 1

the wires and pushing them apart. This repulsive force, it turns out, is directly proportional to the amount of current flowing through the wires.

The apparatus we’ve contemplated in Figure 1 is calibrated to correlate the force experienced by the wires to a known amount of current. Specifically, when two wires, each one meter long, are spaced one meter apart, and produce a repulsive force of one ten-millionth of a newton, they are by definition experiencing a current of one ampere.

From the previous article you’ll recall that the newton is the SI unit of force approximately equal to the weight of a hamburger patty. So, why use such a tiny amount of force – 1/10,000,000 of a newton? Pretty much because it makes the resulting current values easy to work with. For example – a branch circuit in your home tops out at 15 amps. That’s a nicer number to deal with than 1.5 or 150 amps.

### Charge (SI unit – Coulombs)

A French physicist, Charles Coulomb, figured out that the repulsive force between the wires was directly proportional to the number of charges flowing through it in a second, determining that to produce the force described above, 6,240,000,000,000,000,000 electrons need to flow through the wire every second. That’s a huge number, so instead we just say that a current flow of one amp is equivalent to one coulomb of electrons flowing past a point in one second. Oui, misure!

### Energy (SI unit – Joules)

As you’re probably aware, baling wire is not a perfect conductor, and given enough time my baling wire belt is going to heat up. Heat is a useful thing in this case because it gets us back to a fundamental unit – the joule. As you may recall from the previous article, a joule is approximately equal to the amount of energy expended when returning a dropped hamburger patty from the ground to the surface of a Weber grill – it’s the equivalent of one newton-meter of work.

I neglected in the previous article to explain why. Here’s the story of Joule. He built an apparatus like the one pictured in Figure 2. It has a tank of water with a rotating paddle that spins when string is pulled off the drum by a

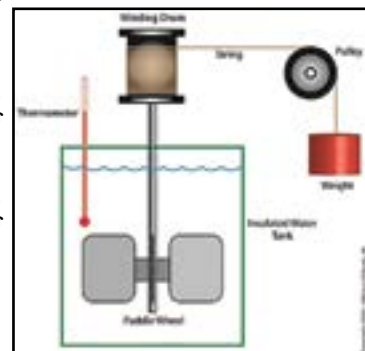


Figure 2

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falling weight. You might have guessed it – the weight weighs one newton and falls a distance of one meter, so the rotating energy of the paddle wheel is 1 newton-meter (equivalent to one joule) after the weight has fallen. Of course, the water doesn't keep moving forever after the paddle has stopped spinning. Instead, the organized circulating motion of the water becomes the disorganized microscopic vibrations we know as heat.

This heat is sensible by the thermometer, which is where we find good luck in Joule's profession. In the 19th century, when these experiments were being conducted, thermometers were exceedingly expensive, and found use in only the most critical of applications. Joule's day job, when he wasn't playing scientist, was as a brewer. We can thank Joule's profession for the access to precise thermometers that made possible our current system of measurement of energy - further proof that good things come from breweries, as if we needed it. Every joule of energy added to one gram of water raises its temperature 4.184 degrees celsius.

### Power (SI unit – Watts)

So, what the heck does any of this have to do with electricity? Well, if we dropped and recovered the weight once per second, we'd be imparting energy on the water in the tank at the rate of one joule per second. You might recall that a shorter way to say one joule per second is to say one watt. We're all familiar with the use of the watt as a unit of electrical power. A typical 100 watt light bulb is releasing (and consuming) the energy equivalent of dropping 100 one-newton weights a distance of one meter every second.

Returning to the baling wire belt – we could do a similar experiment – we could submerge the one meter long belt in one gram of water and see how many degrees per second the water increases in temperature. Experiments show that a standard piece of 14 gauge (2 mm) diameter baling wire that is flowing electrons at a rate of one coulomb per second (stated more succinctly – flowing electrons at a rate of one amp) will heat the water at a rate of about .6 degrees Celsius per second. Thinking about the fact that one watt of heating would raise the same gram of water 4.184 degrees Celsius every second, it becomes clear that my belt is shedding heat at a rate quite a bit less than one watt.



How could we get to one watt rate of heat release? One way is to decrease the diameter of the wire. Think about your toaster - the cord and the orange glowing wires are flowing the

same amount of current. What's the difference? Why do the inside wires get glowing hot but the cord stays cool? You might have guessed it – the diameter of the wires. The smaller a wire gets in diameter, the harder it is for electrons to pass through, and the more heat it has to give off. So, I could use a thinner piece of wire for my belt, and it would throw more heat. A bit of trial and error, and we find that a wire that's about .375 mm in diameter (about .015"), flowing current at a rate of one amp, releases heat at a rate that raises one gram of water 4.184 degrees Celsius every second. Recall that this is equivalent to one watt of heating.

### Voltage (SI unit – Volts)

So, now we have a piece of wire that's flowing a current of one amp and in the process is throwing off one watt of heat. If you think of trying to cram the huge number of electrons in a coulomb through a skinny wire every second, it might occur to you that the electrons are going to lose "pressure" as they travel through the wire in the same way that water flowing quickly through a hose loses pressure. In electricity, pressure is called voltage and quantities of pressure lost are expressed in volts. The definition of a volt is the amount of pressure electrons lose when a current of one amp flows through a wire small enough to make it shed heat at a rate of one watt. My belt - a 1 meter long, .015" diameter piece of wire is flowing a current of one amp, shedding heat at a rate of one watt, and developing a voltage drop of one volt over its length. Notice that I said "voltage drop", not voltage. Volts are a measure of the difference in electrical pressure at two different places in the circuit.

### Resistance (SI unit – Ohms)

Finally, we should talk about resistance. As the wire of the belt got skinnier, it got more difficult for the electrons to get through. This characteristic is called resistance and is expressed in ohms. The definition of one ohm is the resistance needed to hold current to one amp when a voltage of one volt is applied across a conductor. So, now we're really cooking – my belt is flowing a current of one amp, creating a voltage drop of one volt, as the electrons travel through the wire's one ohm of resistance, causing the wire to shed heat at a rate of one watt.

We've covered more than enough ground here. I hope this helps make these fundamental units a bit more clear. And, I hope that perhaps now you have a way to tie quantities you measure in electrical circuits back to a road trip to Cadott and a dropped hamburger.

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