

Joseph F. Ware, Jr. Advanced Engineering Lab

Annual Report: 2025-26



Introduction

This report presents Ware Lab demographics, competition results, team budgets, and sponsorship for the 2025-26 academic year. Demographic data is taken from surveys that lab students must complete prior to receiving admission. Competition, budget, and sponsorship data are submitted to lab management by teams to receive yearly stipends. Additional information on Ware Lab team may be found on our lab site at...

<https://eng.vt.edu/undergraduate/ware-lab.html>

Our yearly newsletter has in-depth information on Ware Lab teams and is available at...

https://eng.vt.edu/content/dam/eng_vt_edu/ware-lab/ware-lab-newsletter-2024-25.pdf

Any questions or comments about the contents of this report should be directed to the Ware Lab manager, Dewey Spangler, at spangler@vt.edu.

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Ware Lab Demographics

In addition to completing six EHS (Environmental Health and Safety) online certifications, signing a safety waiver form, and completing a general online quiz, Ware Lab team members must complete a comprehensive survey to assess student backgrounds. The demographic data below is a summary for 2024-25.

Ware Lab Team	Number Responding	Percentage
Astrobotics	107	9.6%
Baja SAE	248	22.2%
Battery Operated Land Transport (BOLT)	102	9.1%
Concrete Canoe (CCT)	11	1.0%
Design Build Fly (DBF)	103	9.2%
Formula SAE (FSAE)	242	21.7%
Human Powered Sub (HPS)	71	6.4%
Hybrid Electric Vehicle Team (HEVT)	74	6.6%
AutoBoat	63	5.6%
Steel Bridge (SBT)	96	8.6%

Academic Major	Number Responding	Percentage
Aerospace and Ocean Engineering (AOE)	120	10.7%
Biomedical Engineering and Mechanics (BEAM)	5	0.4%
Business	10	0.9%
Civil and Environmental Engineering (CEE)	94	8.4%
Communications	3	0.3%
Computer Science (CS)	42	3.7%
Construction Engineering and Management (CEM)	5	0.4%
Electrical and Computer Engineering (ECE)	208	18.6%
Engineering Education (ENGE)	58	5.2%
Industrial Systems Engineering (ISE)	22	2.0%
Materials Science Engineering (MSE)	12	1.1%
Mechanical Engineering (ME)	479	42.7%
Mining and Minerals Engineering (MINE)	1	0.1%
Physics	3	0.3%
Other	59	5.3%

Ware Lab Demographics (cont.)

Academic Level	Number Responding	Percentage
Freshman	391	36.3%
Sophomore	334	31.0%
Junior	224	20.8%
Senior	113	10.5%
Grad Student	14	1.3%

Academic Credit		
Senior Design Credit	67	5.9%
Volunteer (no academic credit)	773	67.7%
Independent Study	97	8.5%
Undergraduate Research	48	4.2%
Other	156	13.7%

How did you learn about Ware Lab?		
Word-of-Mouth	331	21.0%
Lab Tour	133	8.4%
CEED O'Show	187	11.8%
Gobblerfest	285	18.0%
Team Info Session	566	35.8%
Other	77	4.9%

Ware Lab Team Leads and Faculty Advisors

Ware Lab teams select new student leadership each year to manage multiple team activities. Leads are selected based on experience, demonstrated work ethic, and dedication to team success. Team leads typically have attended several competition events during their time as team members, serving as mentors for new recruits. Team leads for 2025-26 are shown below.

Ware Lab Team	Name	Role
Astrobotics	Cameron Williams	Team Lead
AutoBoat	Anne-Kinsey Wash	President/Propulsion Lead
Baja SAE	Baile Liu	Co-Team Lead
	Peter Mercatili	Co-Team Lead
BOLT	Hannah Tripoli	Co-Administration Lead
	Charlie Steinman	Co-Administration Lead
CCT	Leah Goulet	Captain
Design Build Fly	Kate Taipale	Chief Engineer
Formula SAE	Max Mueller	IC Project Manager
HEVT	Alec Boron	Project Manager
Human Powered Sub	Nicole Quiram	President
Steel Bridge Team	Evan Marshall	Co-Captain
	Oliver Fishman	Co-Captain

Ware Lab teams are assigned a faculty advisor(s) who are experts in the technical areas that teams are engaged in. Advisors also provide critical administrative support and knowledge-based continuity. Advisors for 2025-26 are shown below.

Ware Lab Team	Name	Engineering Department
Astrobotics	Kevin Shinpaugh	Aerospace and Ocean
AutoBoat	Stefano Brizzolara	Aerospace and Ocean
Baja SAE	Jared Bryson	Mechanical
BOLT, FSAE	Rick Clark	Mechanical
BOLT	Arthur Ball	Electrical and Computer
CCT	Alex Brand	Civil and Environmental
DBF	Rakesh Kapadia	Aerospace and Ocean
FSAE EV	Bill Baumann	Electrical and Computer
HEVT	Scott Huxtable	Mechanical
HPS	Robert Stone	Biomechanical
SBT	Matt Eatherton	Civil and Environmental

Ware Lab Team Competition Results for 2024-25

Ware Lab teams consistently place in the top 10% at world class competitions throughout North America. Teams travel from coast to coast, engaging with students from other top engineering programs, having similar interests. Ware Lab teams often outperform other programs having substantially higher operating budgets, demonstrating the hard work ethic and ingenuity of our students. To note for 2025: our two Civil Engineering teams (Steel Bridge and Concrete Canoe) performed better this year at national events than in the entire history of both programs! Our Ocean Engineering team: Human Powered Sub finished 2nd overall beaten by a much better funded Canadian team (ETS) and Design Build Fly finished in the top 10 for the fifth year in a row, making them one of the most successful teams in U.S. history.

Ware Lab Team	Competition	Location	Ranking
Astrobotics	NASA Lunabotics	University of Central Florida	14th overall out of 35 teams , 1 st Project Management, 12 th STEM Outreach, 19 th Presentation and Demonstration.
Astrobotics	COSMIC	Iowa State University	11th overall out of 15 teams.
AutoBoat	Promoting Electric Propulsion - <i>PEP</i>	Virginia Beach, Virginia	8th overall out of 30 teams , unmanned category.
AutoBoat	International Robotic Sailing Regatta (SailBOT)	Worcester, Massachusetts	3rd overall out of 6 teams.
Baja SAE	Baja SAE Arizona	Marana, Arizona	8th overall out of 69 teams , 10 th Endurance, 1 st overall Dynamic Events, 16 th overall Static Events, 1 st Suspension and Traction, 3 rd Pilot Pull, 8 th Acceleration, 12 th Design.
Baja SAE	Baja SAE Maryland	Mechanicsville, Maryland	13th overall out of 98 teams , 18 th Endurance, 4 rd overall Dynamic events, 1 st Suspension & Traction, 8 nd Maneuverability, 3 rd Hill Climb, 16 th Acceleration, 9 th Design.
Baja SAE	Baja SAE South Carolina	Gary Court, South Carolina	14th overall out of 66 teams , 17 th Endurance, 14 th overall Dynamics, 15 th Suspension & Traction, 7 th Hill Climb, 19 th Acceleration, 8 th Design, 3 rd Cost.

Ware Lab Team Competition Results for 2024-25 (cont.)

Ware Lab Team	Competition	Location	Ranking
Concrete Canoe	ASCE 2025 Virginias Regional Competition	Beckley, West Virginia	1st overall out of 9 teams , 1st Final Prototype, 1 st Technical Proposal, 1 st Paddling Races, 1 st Oral Presentation.
Concrete Canoe	ASCE 2025 National Competition	San Luis Obispo, California	2nd overall out of 19 teams , 1 st Final Prototype, 4 th Technical Proposal, 2 nd Paddling Races, 3 rd Oral Presentation. Best performance in the history of Virginia Tech's Concrete Canoe program!
DBF	AIAA 2024-25 Design Build Fly Competition	Tucson, Arizona	7th internationally, 5th nationally overall out of 96 finalist teams , Winner: <i>Stan Powell Memorial Award</i> for most valuable lessons learned at competition. 5 th top 10 finish in a row, making VT DBF the 5th most successful team in AIAA competition history!
Formula SAE	Formula SAE IC Michigan	Brooklyn, Michigan	15st overall out of 120 teams , 11 th Design, 18 th Business Presentation, 20 th Acceleration, 16 th Skidpad.
Formula SAE	Michelin 2025 Formula SAE Shootout	Mountville, South Carolina	6th overall out of 7 teams.
Hybrid Electric Vehicle Team	EcoCAR EV Challenge - CARB Dyno Testing	Riverside, California	3rd overall out of 13 teams. 1 st EV Efficiency.
Hybrid Electric Vehicle Team	EcoCAR EV Challenge - End of Year Competition	San Diego, California	7th overall out of 13 teams.
Human Powered Sub	18 th International Submarine Races	Bethesda, Maryland	2nd overall out of 17 teams. 3 rd Underwater Speed (4.24 knots, fastest VT sub in 20 years). Winner: <i>Smooth Operator</i> award for excellent diver underwater performance.

Ware Lab Team Competition Results for 2024-25 (cont.)

Ware Lab Team	Competition	Location	Ranking
Steel Bridge	ASCE 2025 Virginias Regional Competition	Morgantown, West Virginia	1st overall out of 9 teams. 1 st Aesthetics, 1 st Construction Speed, 1 st Lightness, 1 st Stiffness, 1 st Construction Economy, 1 st Structural Efficiency, 1 st Cost Estimation.
Steel Bridge	AISC Student Steel Bridge Competition National Finals	Ames, Iowa	3rd overall out of 45 teams, 1 st in Aesthetics, 4 th Construction Speed, 3 rd Lightness, 3 rd Stiffness, 11 th Construction Economy, 2 nd Structural Efficiency, 15 th Cost Estimation. Best performance in the history of Virginia Tech's Steel Bridge program!

Ware Lab Team Outreach for 2025

In addition to attending competitions, Ware Lab teams participate in multiple outreach events and host visitors to the lab throughout the year during facility tours. Our teams traveled to Roanoke, Virginia in October of 2025 to participate in STEAM Day (STEM + the arts) where they interacted with over 900 visitors from K12 public and home schools, many who were from underrepresented local communities. In total over 2100 members of the public came into face-to-face contact with Ware Lab team members in 2025, inspiring many young people to pursue engineering as a career.

Tour Group or Outreach Event	Number of Participants
STEAM Day 2025 - on site in Roanoke Va.	996
4H Groups	40
ABET Appraisers	2
Admitted Students	17
Alumni Families	16
CEED Summer Camp - BLAST	20
CEED Summer Camp - Imagination	54
CEED Summer Camp - C-Tech^2	32
CEED Summer Camp - Pathways	57
Environmental Health and Safety Staff Tour	2
Elementary School Students	207
Hendrick Motorsports Representatives	5
High School Students	141
Holston High School Science Group	40
Josh Johnson with Ingersoll Rand	4
LabCORE Conference	20
Lucid Motors CEO	3
Middle School Students	235
Prospective Students and Families	110
SAE Club	4
SuperDARN Conference Participants	20
UPWARDS@VT	20
VT Office of Admissions New College Counselors	16
WEE VT	64
Total	2125

Ware Lab Team Budgets

To support fabrication, testing, and competition expenses Ware Lab teams must raise their own funds. Over 80% of funding comes from corporate or private donors with the rest provided by the SEC (Student Engineering Council), the College of Engineering, and team home departments. Ware Lab teams collectively raised over \$1.1 million in 2024-25, a new lab record!

Ware Lab Team	Corporate	Private	Ware Lab Stipend	Student Engineer's Council (SEC)	Other Virginia Tech Sponsorship	Total VT Sponsorship	Total All Sponsorship	Expenditures	Net Balance
Astrobotics	\$2,000	\$1,410	\$800	\$8,600	\$14,500	\$23,900	\$27,310	(\$19,900)	\$7,410
AutoBoat	\$200	\$10,000	\$800	\$8,000	\$3,910	\$12,710	\$22,910	(\$13,520)	\$9,390
Baja SAE	\$21,250	\$7,000	\$800	\$8,470	\$9,740	\$19,010	\$47,260	(\$36,050)	\$11,210
BOLT	\$35,000	\$3,500	\$800	\$5,000	\$14,000	\$19,800	\$58,300	(\$48,000)	\$10,300
Concrete Canoe	\$4,250	\$1,075	\$800	\$0	\$0	\$800	\$6,125	(\$25,750)	(\$19,625)
Design Build Fly	\$6,600	\$0	\$800	\$5,150	\$19,230	\$25,180	\$31,780	(\$42,500)	(\$10,720)
Formula SAE	\$72,500	\$5,000	\$800	\$5,000	\$5,000	\$10,800	\$88,300	(\$95,800)	(\$7,500)
Hybrid Electric Vehicle Team	\$793,300	\$0	\$800	\$10,000	\$0	\$10,800	\$804,100	(\$805,000)	(\$900)
Human Powered Sub	\$39,400	\$1,000	\$800	\$7,610	\$26,300	\$34,710	\$75,110	(\$27,350)	\$47,760
Steel Bridge	\$14,850	\$0	\$800	\$7,150	\$14,250	\$22,200	\$37,050	(\$33,800)	\$3,250
Totals	\$989,350	\$28,985	\$8,000	\$64,980	\$106,930	\$179,910	\$1,198,245	(\$1,147,670)	\$50,575

Ware Lab Corporate Support

Generous corporate support comes from multiple sources in the form of cash, equipment, software, and hardware donations. Companies including GM, Lockheed Martin, Nucor, and MathWorks gave over \$990,000 to support Ware Lab teams. Thanks to all our corporate partners who without their support, Ware Lab teams could not perform advanced engineering and attend world class competitions!

	Astrobotics	AutoBoat	Baja	BOLT	CCT	DBF	FSAE	HEVT	HPS	SBT	Total
Blue Origin	\$2,000										\$2,000
Polymaker		\$200									\$200
GM			\$10,000	\$10,000			\$10,000	\$206,000			\$236,000
GMN Bearings			\$3,220								\$3,220
Torc Robotics			\$3,000								\$3,000
Schunk Intec. USA			\$2,530								\$2,530
Sullivan Steel			\$2,500								\$2,500
Vector				\$10,000				\$83,900			\$93,900
Lockheed Martin				\$5,000		\$5,000					\$10,000
Altium				\$5,000							\$5,000
Harley Davidson - Roanoke Valley				\$2,500							\$2,500
Alro Steel				\$1,200							\$1,200
Ingersoll Rand				\$1,300							\$1,300
Whiting Turner Contracting					\$2,500						\$2,500
ZMM Architects and Engineers					\$1,000						\$1,000
Sika Corp.					\$500						\$500
Walker Consultants					\$250						\$250
Composite Envisions						\$300					\$300
Electra Aero						\$500					\$500
Reliable Robotics						\$500					\$500
Scorpion Motors						\$300					\$300
Gillig							\$15,000				\$15,000

Ware Lab Corporate Support (cont.)

	Astrobotics	AutoBoat	Baja	BOLT	CCT	DBF	FSAE	HEVT	HPS	SBT	Total
Hillman Consulting							\$15,000				\$15,000
H.R. Kirkland							\$10,000				\$10,000
BvB Tech							\$5,000				\$5,000
Realis							\$12,500				\$12,500
Altair							\$5,000				\$5,000
MathWorks								\$110,000			\$110,000
U.S. Department of Energy								\$72,500			\$72,500
dSPACE								\$148,000			\$148,000
Costal Enterprises									\$15,000		\$15,000
Flying S Inc.									\$7,000		\$7,000
Aquatrek Adventures									\$6,000		\$6,000
Sherwood SCUBA									\$5,600		\$5,600
Northrop Grumman									\$3,000		\$3,000
Hytek Collison									\$1,000		\$1,000
Fincanteri marine Group									\$500		\$500
Kodiak Cutting Tools									\$500		\$500
Dell									\$450		\$450
Polymaker									\$300		\$300
RK & K										\$3,000	\$3,000
Nucor										\$2,850	\$2,850
CSI										\$12,000	\$12,000
Misc. Sponsorship								\$172,600			\$172,600
Totals	\$2,000	\$200	\$21,250	\$35,000	\$4,250	\$6,600	\$72,500	\$793,000	\$39,350	\$17,850	\$992,000