

THE OHIO INFORMAL LEARNING PROGRAM

• 2017-2018 ANNUAL REPORT •



THE OHIO STATE UNIVERSITY

COLLEGE OF ENGINEERING

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Overview

This is the first official year of *The OHI/O Informal Learning Program* ("the OHI/O Program") and the first annual report. Offering informal and experiential learning, the OHI/O Program fits between formal classroom curriculum and the students' next steps in either academic or industry careers. It has **a proven record of undergraduate engagement in tech learning**, regardless of the student's major.

One of the most obvious strengths of the OHI/O Program is the relationship with industry. Hailed by the Ohio State **Alumni Magazine** as the "best pipeline of tech talent," representatives from the Central Ohio tech industry, as well as nationwide, look at OHI/O to **recruit the best talent**. With such attention, there are growing **opportunities for advancement** within corporate and individual donors. Alumni are flocking back to the OHI/O events to volunteer their time and talents to help the next generation of creative engineering minds.

The OHI/O Program aligns with The Ohio State University's strategic plan in all five areas:

- Teaching and Learning – through **informal and experiential hands-on learning** with aid from industry experts and alumni partnering with faculty and staff to provide support.
- Access, Affordability and Excellence – **all programs and events are free and open to every student**, regardless of major or experience, and completely free to participate. Even with this broad reach, the events maintain high levels of satisfaction.
- Research and Creative Expression – self-guided learning is an essential component for successful research. Similarly, **creative problem solving** and expression is found in the core of all OHI/O Program facets.
- Academic Health Care – The Wexner Medical Center supports HackOHI/O through projects and mentorship, bringing medical industry tech challenges to the participants.
- Operational Excellence and Resource Stewardship – with limited funding, care is taken to minimize waste and offer only the most impactful resources. The OHI/O Program runs on a lean staff and many volunteer hours.

The OHI/O Program aligns with the College of Engineering's strategic plan goals:

- Education for Career Development
- Research for Impact
- Faculty and Facilities that Enable
- Diversity and Inclusion for Excellence
- Advancement for Sustained Growth

A detailed explanation of support and objectives of each goal is available on the OHI/O website.

Mission

The OHI/O Program fosters a tech culture at Ohio State and its surrounding communities, ultimately providing students the opportunity to learn and build with real technologies outside of the classroom. Through the platform, OHI/O better connects students to real world problems and opportunities by engaging with the community and industry partners.

Vision

OHI/O aims to enhance the student learning experience and engagement between students, community members, industry professionals, alumni and staff.

OHI/O emphasizes providing students an informal and diverse learning platform regardless of experience or background. Organizers possess a fundamental belief in the power of creation and are dedicated to empowering students to develop skills such as technical ability, communication, creativity, and critical thinking. In other words: to grow the excitement, the camaraderie, and access to resources for the thinkers, the makers, and the do-ers of Ohio State.

Primary Goals for 2017-2018 Academic Year

- Host 4 annual events: Hack OHI/O, MakeOHI/O, HighSchool I/O and ShowOHI/O
- Operate budget in the black on a path to fiscal sustainability
- Formalize student leadership on a path to operational sustainability
- Apply for the program's first National Science Foundation research grant
- Build network of support around campus

All goals were met. As in past years, the **competitive events filled to maximum capacities with strong support from industry and community volunteers**. Additional focus was placed on student satisfaction and educational gains. ShowOHI/O partnered with the STEAM Factory to present a student showcase coinciding with a public Franklinton Friday event. All events were **100% funded through industry and individual contributions** and managed within operating budget. New growth plans for both corporate and individual support were designed and will be implemented next academic year.

The student leaders for the 2018-2019 academic year were selected in January 2018, and officially formed the OHI/O student organization in April. As a student organization recognized by the Office of Student Life, OHI/O qualifies for discounts to rental space at the Ohio Union, the ability to book classrooms for meetings, access to a resource room and funds, ability to apply for up to \$2,000 in operating support, and recognition as an Engineering Student Organization which opens up additional funds through the College of Engineering. **This organization represents the largest consortium of software and hardware student organizations on campus**, coming together to bring amazing events to all students.

For the first time, OHI/O was included on NSF grant applications. Two were sought after this first year: NSF IGE and NSF AISL grants. While the first did not proceed past the pre-proposal state, the NSF AISL (Advances In STEM Learning) grant pre-proposal was selected



by the university and the final application submitted in October 2017. It was recently announced that **OHI/O (in partnership with STEAM Factory and COSI) is awarded a 3-year \$1.2 Million NSF AISL**. See more in the *Grant Applications* section of this report.

In addition to the program co-founders, Arnab Nandi and Meris Longmeier, actively introducing the new Program Director, Julia Armstrong, to various leaders around the university and tech community of Columbus, Armstrong has also been seeking connections on and off campus. She has begun to build partnerships and collaborations that will mature in the coming years. (See *University Partnerships* section for more detail.)

NEWS & HIGHLIGHTS



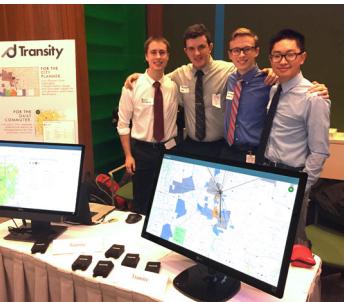
Program Highlights

- Fifth Annual HackOHIO/hackathon: once again maxed out capacity and is the **largest hackathon program in the state**, the biggest student coding vehicle in the university, and the largest culture accelerator in recent history. HackOHIO was and is **the only Ohio State Signature Event in tech**, now renewed through 2020. This event has extremely strong industry support, media attention, plus 138 volunteer mentors and judges. The feedback survey indicated that **over 90%** of the participants were “Satisfied” or “Very Satisfied” with their experience.
- New Program Director position supported by College of Engineering, Departments of Computer Science and Engineering, and Electrical and Computer Engineering
- OHI/O recognized as an Ohio State Student Organization as of May, 2018 and is now eligible for additional funding sources and Office of Student Life activities
- First Hack the Hack event where student leaders for OHI/O came together to build software to aid in facilitation of future OHI/O events.
- OHI/O supported Engineering Education faculty, John Schrock, to leverage a \$4,000 ORAU grant for his project to create an AgTech Zone at HackOHIO and MakeOHIO.
- High School I/O outreach event was a success in 2017, so has been adopted into the OHI/O portfolio and **increased enrollment to max capacity** at the PAST Foundation, serving 84 high school students from 29 schools in the Columbus and surrounding communities.
- ShowOHI/O also a new addition to the OHI/O portfolio with a 2017 pilot success. This spring, **top student projects were demonstrated** as part of the STEAM Factory's annual student showcase event for the public on the night of April's Franklinton Friday.

Notable Student Projects

- Transity App: This Teradata sponsored challenge received several outstanding entries, but the prize went to four sophomore students in ECE and CSE: Andrew Fu, Gus Workman, Bobby Yost and Austin Reifsteck. They **presented to the US Census Bureau in Washington D.C.** in November, to Smart Columbus and COTA in January, and at the Qlik Connections conference in Florida in April.

The image shows the Transity app interface, which includes a map view and a section titled "FOR THE CITY PLANNER" that highlights transportation issues. To the right, a group of four young men, presumably the winning team, are standing together and smiling, wearing name tags and professional attire.

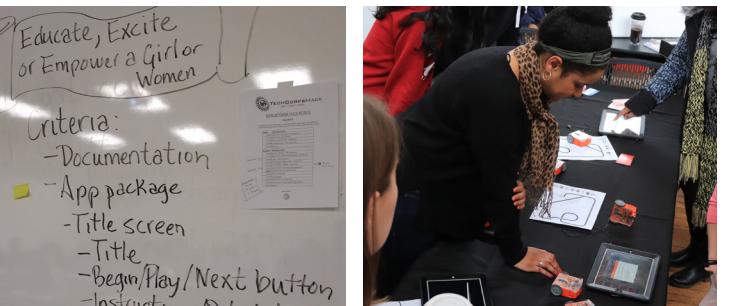


engineering.osu.edu/news/2017/12/students-show-smart-city-commuter-solution-d-c.

- Dog Treat Shooter: Ohio State's Toy Adaptation Program, with financial backing from AEP, connected MakeOHIO to May We Help **and a patient with cerebral palsy**. She wanted to be able to better interact with her dog, so students created a prototype dog treat “shooter” the user has the ability to load and activate. The winners, team Magnet Dog, built a solenoid-based dog treat launcher, with members Matthew Curran (CIS) and Nathan Tian (ECE). The final prototype will be recreated this summer with more durable construction and long-lasting materials.

Outreach

- Girls of Color Hack presented by TechCorps Columbus as **part of Computer Science Education week** was supported by OHI/O with supplies and volunteer efforts. The 60 Columbus-area high school girls of color focused on app development to "Educate, Excite or Empower a Girl or Woman".
- Hour of Code (at the Idea Foundry) presented by CoverMyMeds: OHI/O supported this family-friendly event by hosting a table with Edison Robot programming at the Idea Foundry for over 120 people.
- High School I/O, the program's largest outreach event, took place for the second time at the PAST Foundation. This year's event had **nearly double the enrollment**, reaching over 80 students from 29 high schools.
- The ShowOHI/O end of year showcase featured 14 of the best projects from this year's events and continued work. ShowOHI/O was part of the STEAM Factory's annual student showcase event which saw about **three times as many attendees** as in 2017 thanks to being part of a Franklinton Friday: open to the public in an urban environment.
- Panel discussion on innovation in the workforce was held with Governor John Kasich, Les Wexner of L Brands, Inc., and Eric Schmidt, executive chairman of Alphabet, Inc. The three discussed the **impact of the technology industry** on Ohio's economy, tech **innovation in the workforce**, and the improvement needed to our education system to better prepare future generations toward **a tech-focused workforce**. An OHI/O student representative was one of six students hosting Governor Kasich, Wexner, and Schmidt, and had the opportunity to speak about OHI/O with them at a meet and greet.



Guest speakers

DR. HARVEY MILLER

Director of Center for Urban and Regional Analysis.

- Professor Miller **presented an interactive demonstration** of the Columbus Smart City Project and discussed the science behind why smart cities can have bad as well as good outcomes. Smart cities attempt to make the movement of people and goods safer, greener and more equitable. He explained **the new data sources and urban science** that can shape smart cities toward better outcomes.

RICHARD HIPP

Architect and primary author of SQLite

- Dr. Hipp presented on the history and use of SQLite, but also the maintenance of widely used software. He focused on sound quality assurance practices to an audience of **over 200 students and faculty**. He also held a faculty luncheon and dinner with student leaders, offering more insight to his business and practices in software quality.



ANDY JENKS

Drive Capital Partner

- Andy Jenks presented to **approximately 50 entrepreneurial-minded students** about his startup history. He then met with students subsequent days on campus to hear their idea pitches, in collaboration with the College of Engineering.

ALEXIS OHANIAN

Reddit Co-Founder

- Alexis Ohanian presented to approximately 450 in the Ohio Union Grand Ballroom thanks to OHI/O's collaboration with Ohio Union Activities Board, Big Data Analytics Association and Business Builders Club. He gave an inside scoop on **creating one of the world's largest online communities**, as well as the responsibilities and challenges that come with maintaining that community in the age of disinformation.



EDUCATIONAL IMPACTS

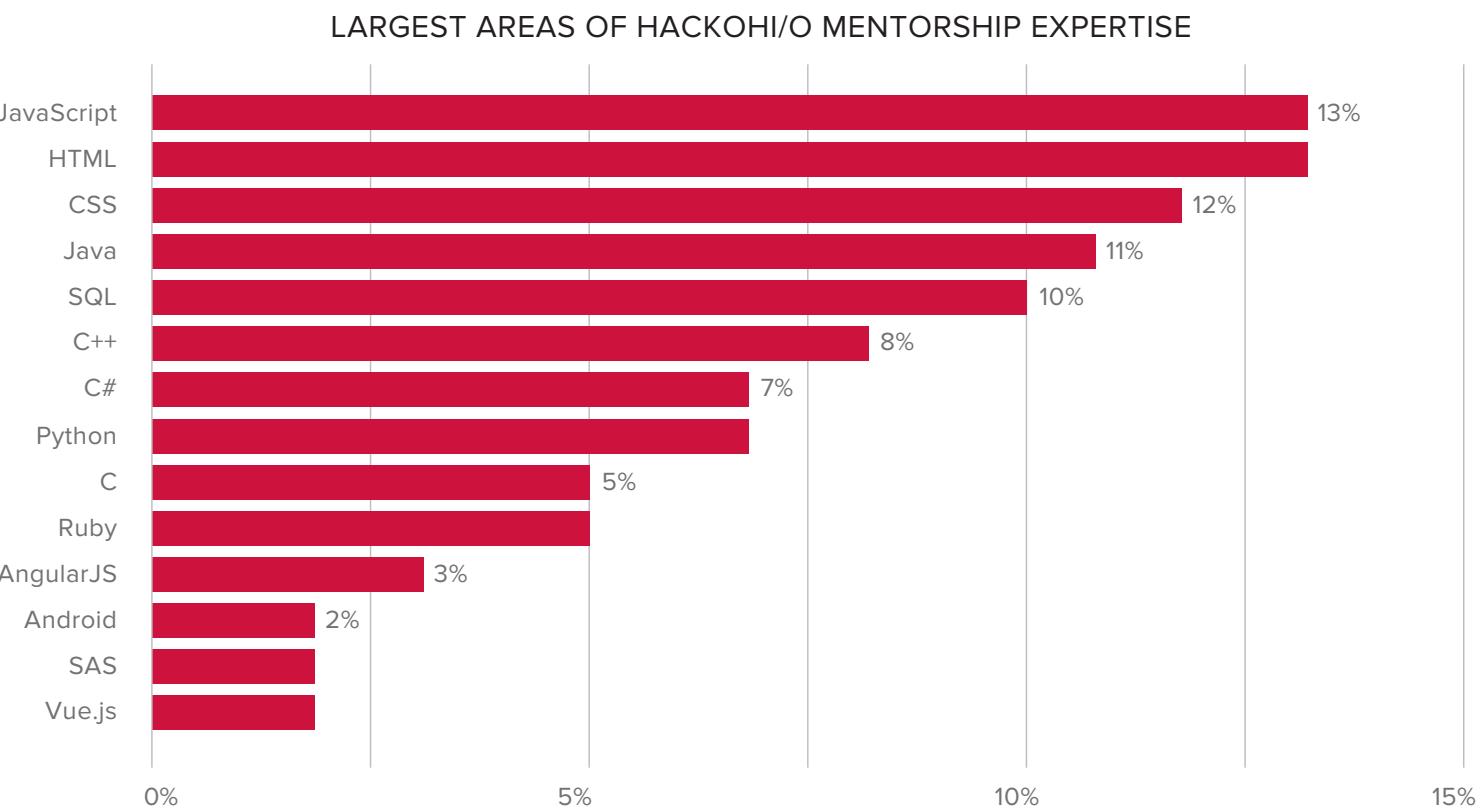
Educational Impacts

In addition to the guest speakers who presented details of Smart Columbus, SQLite, entrepreneurship, and online communities, other industry representatives came to work with students on topics such as Cisco routers and switches, big data through the Qlik toolset, web development, preparing for a technical interview, the React Native platform, computer vision and web application development.

Throughout the year, **mentors from the tech industry volunteer** to help student participants troubleshoot their projects. Data from

the post-HackOHI/O survey highlights the technologies students used and the valuable experience they gained. This year, an online tool, HelpQ, was used to encourage participants to anonymously ask questions of the mentors. This **proved a useful tool in student learning** through the solicitation of a mentor, as well as matching mentor expertise to the problem at hand.

Over 64 student projects were completed at HackOHI/O, and 22 at MakeOHI/O. The ShowOHI/O year-end showcase featured 14 of the best student projects from these events.





FUNDING & EXPENSES

Fiscal Overview

Upon inception, the OHI/O Program committed to two fiscal goals:

- Provide all student opportunities free of charge
- Focus on fiscal responsibility to provide high quality events at a low per-person cost to the program

A third goal was added this year:

- Build a path to fiscal self-sufficiency

This is being addressed by:

- **improving relationship management** with the corporate sponsors identifying their goals and molding the program to help them meet their goals to increase engagement.
- investing additional dollars into elements that have **strong potential revenue growth**, such as alumni engagement and individual donors
- investing time into faculty relationships and submitting new grant applications
- aligning with the **strategic goals of the College of Engineering and Ohio State** to increase our broader fiscal responsibility

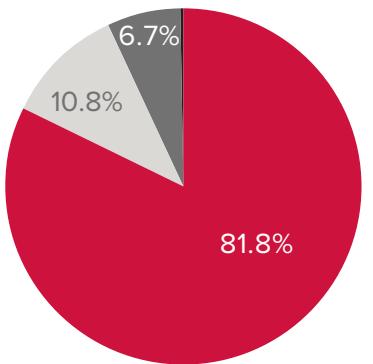
Corporate Sponsorships

There were **over 30 agreements for in-kind and cash sponsorships** from corporate partners for HackOHI/O, MakeOHI/O and High School I/O this year. The largest being the hackathon, where the size and timing of the event draws the attention of recruiters both locally and nationwide. Various opportunities to engage with students are offered to the sponsors based on their gift amount.

The OHI/O Program is now also seeking program-level sponsors in addition to event specific sponsors. This also allows for enhancements through creative partnership ideas and unique engagement opportunities for sponsors and students.

2017-18 DONATIONS
BY SOURCE

- Corporate
- OSU Entities
- Signature Event



University Support

Ohio State awarded HackOHI/O Signature Events status last year for both the 2016 and 2017 HackOHI/O events. The event was **renewed for Signature Event status for 2018-2020** and will be recognized as a **Sesquicentennial Marquee Program in 2019**.

The OHI/O program relies on the in-kind support of many university faculty and staff for the guidance, facilitation and resources to carry out the mission of the program:

Charlene Brenner
STEAM FACTORY

Grace Buchholz
TECHHUB

Shawna Burger
UNIVERSITY MARKETING

Courtney Falato
CORPORATE ENGAGEMENT
OFFICE

Roz Gjessing
OFFICE OF STUDENT LIFE

Ryan Hansen
OFFICE OF STUDENT LIFE

Beth Hume
Vice Provost
UNDERGRADUATE STUDIES

Todd Jones
UNIVERSITY MARKETING

Rachel Kajfez
ENGINEERING EDUCATION
DEPARTMENT

Bruce McPheron
Provost
OFFICE OF ACADEMIC AFFAIRS

Tim Raderstorf
COLLEGE OF NURSING
INNOVATION

Matt Schutte
COLLEGE OF ENGINEERING
ADVANCEMENT

Michael Shearer
HONOR SOCIETY OF
PHI KAPPA PHI

Phyllis Teater
WEXNER MEDICAL CENTER

Amy Thaci
ENGINEERING CAREER
SERVICES

Cory Tressler
OFFICE OF DISTANCE EDUCATION
AND E-LEARNING



Individual Contributions

A fairly new area of support for the OHI/O Program is to solicit individual donors from alumni and the community. The program sees **potential for this revenue source to increase** by creating an alumni club, using Buckeye Funder, building on existing relationships with College Advancement, and being more visible to current faculty and staff.

Grant applications

In collaboration with the STEAM Factory and COSI After Dark, the OHI/O Program's High School I/O outreach event was recently awarded a 3-year **NSF grant of \$1.2M for Advances in STEM Learning (AISL)**. This grant funding includes a portion of salary to Prof. Nandi and to the Program Director for the three-year period while investigating two different instruction methods to teams of students by Ohio State faculty.

u.osu.edu/colearn

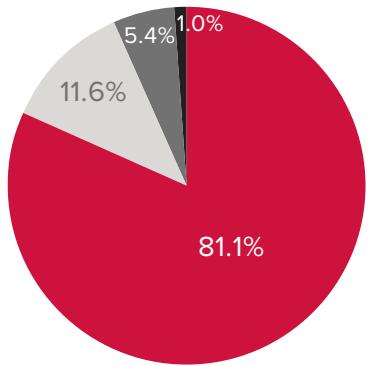
AgTech Zone (Engineering Education Dept.): ORAU funded \$4,000 to John Schrock of the Engineering Education Department **to create an experience in Agricultural Technology**. While this money went to Prof. Schrock's aquaponics project, OHI/O was the leverage for the grant and included it as an active element at HackOHI/O 2017.

Expenditures

While the College of Engineering, Department of Computer Science and Engineering, and the Department of Electrical and Computer Engineering support the Program Director salary and office resources, all other programming expenses are funded through donations.

2017-18 EXPENSES BY EVENT

- HackOHI/O
- MakeOHI/O
- HS I/O
- Sponsorships





FACULTY, STAFF AND STUDENT LEADERSHIP

Program Director

JULIA ARMSTRONG is a project and program manager, most recently working for the Harris Corporation. Her degrees of BS ECE (from Ohio State) and MS Education prime her for the mix of technology industry and working with students' learning experiences and outcomes. As a corporate recruiter and advanced development engineer, Armstrong has past experience with HackOHI/O and MakeOHI/O, bringing the industry mentor and sponsor perspective to the team.

Faculty Directors

ARNAB NANDI, CSE is one of the two co-founders of the OHI/O Program. He has a proven interest in providing learning opportunities for students in tech. He is a natural at networking and finding like-minded individuals who can leverage their resources for the betterment of the program. Nandi's research focuses on user-facing challenges in large-scale data analytics and interactive data exploration.

MERIS LONGMEIER, UNIV. LIBRARIES

RESEARCH SERVICES is one of the two co-founders of the OHI/O Program. She has brought her passion for student achievement and interest in cutting-edge technologies into her work. Longmeier continues to focus on broadening the impact of the program and engaging the larger campus community in the OHI/O events.

University Volunteers

Many faculty and staff volunteer to aid in the planning and logistics of the largest hackathon on campus. They attend weekly meetings and help mentor small groups of students. In addition to the program directors, volunteers this year included:

Angela Davis
OFFICE OF DISTANCE EDUCATION
AND E-LEARNING

Monique Bowman
OFFICE OF THE CHIEF
INFORMATION OFFICER

Jeremy Morris
COMPUTER SCIENCE AND
ENGINEERING DEPARTMENT

Jenna McGuire
TRANSLATIONAL DATA
ANALYTICS INITIATIVE

Danny Dotson
UNIVERSITY LIBRARIES

Steve Bibyk
ELECTRICAL AND COMPUTER
ENGINEERING DEPARTMENT

Amy Thaci
ENGINEERING CAREER SERVICES

Grace Buchholz
TECHHUB

Courtney Shenk
COLLEGE OF ENGINEERING
ADVANCEMENT

Chris Orban
DEPARTMENT OF PHYSICS

Student Organizing Committees

Name	Major	Committee
Matt Belz	ECE	Hardware
Courtney Campbell	CSE	Sponsorship/Outreach
Eben Carek	CSE	Website
Travis Casper	MCRP	Logistics
Tommy Delgado	CSE	Website
Emily Engle	CSE	Sponsorship
Elizabeth Gilbert	DA	Mentorship
Jeff Hensal	ECE	Event Support
Caitlyn Horn	CIS	Branding/Outreach
Rebecca Hu	CSE	Sponsorship
Tim Huang	ECE	Hardware
Anjali Kapoor	CSE	Sponsorship
Jack Killian	Physics/ CSE	Website
Dylan Kunkel	ECE	Logistics
Alvin Law	CSE	Registration
Mike Letscher	Comm Tech	Sustainability
George Li	CSE	Sponsorship/Sustainability
Ryan Liu	CSE	Logistics
Frank Meszaros	CIS	Registration
Dale Mitchell	ECE	Registration
Gabby Miguel	CSE	Website
Chris Murray	ECE	Event Support
Swarup Nayak	CSE	Sponsorship/Website/Hardware
Justin Pinsky	CSE	Logistics
Ivan Porollo	CSE	Event Support
Brittany Redmond	CSE	Event Support
Connor Rubin	ECE	Logistics
Sarah Ryherd	CIS	Mentorship
Malay Shah	CSE	Event Support
Philip Shvartsman	ECE	Event Support
Nic Siebenaller	CSE	Logistics
Kevin Unkrich	CSE	Sponsorship
Ethan Wolfe	CSE	Website/Sustainability
Kelly Wu	CSE	Judging



Industry Volunteers: Mentor and Judge Statistics

HackOHIO: 77 volunteer mentors and 60 volunteer judges, 53% work for the university in some capacity. Additionally, 3 recent alumni from the OHI/O Program volunteered to emcee the event for the weekend.

MakeOHIO: 66 volunteers registered to judge the event, 52% Ohio State alumni and 59% work for the university in some capacity. 20 of the judges were new to the OHI/O Program. In addition to the 21 industry sponsors, 22 of the judging volunteers were also interested in mentoring students.

High School I/O: 5 Ohio State students and 15 industry representatives volunteered to mentor the high school participants in their project development. They joined 17 additional volunteers from industry to judge the final products, 3 of whom were first time volunteers for the OHI/O Program.

OHI/O Partnerships Around the University

The Innovation Studio: The College of Nursing promotes innovation of health and wellness through their granting program for faculty, staff and students. In addition to The Innovation Studio sponsoring the OHI/O program, they also brought their tools and resources to the HackOHIO and MakeOHIO events. OHI/O promoted the Innovation Studio's grant program and deadlines, where OHI/O participants yielded a pipeline for Innovation Studio submissions.

TechHub Grants: Similar to The Innovation Studio, OHI/O acts as a pipeline for TechHub student project grants. TechHub supplies OHI/O with in-kind donations of HackOHIO and MakeOHIO prizes for winning teams, as well as loaned equipment at HackOHIO.

OCIO & ODEE: Angela Davis of ODEE offered many hours of support for both HackOHIO and MakeOHIO. In the spring, OHI/O directors Armstrong and Longmeier presented the benefits of a Hackathon model at Innovate Conference 2018. OHI/O student leaders Courtney Campbell and Caitlyn Horn presented the opportunities for industry representatives to engage with the OHI/O Program at CIO Day.

Center for Design and Manufacturing Excellence - John Baird gave the keynote to kickoff MakeOHIO as well as offering up a \$3,000 prize toward the development of the best idea for CDME's E3 program.

STEAM Factory: In addition to regularly gathering like minds for meet-ups, the STEAM Factory also hosted a year-end student showcase of projects which included the second annual ShowOHIO event, reducing the OHI/O Program's costs by over \$5,000 and significantly increasing attendance.

Brain Health Hack: The Department of Neuroscience hosted a pilot hackathon with 40 participants focused on improving brain health and overcoming addictions. Technology focused on virtual reality and winners were showcased at the annual Global Summit on Brain Health. OHI/O assisted in the planning committee and publicizing the event for participation.

College of Education and Human Ecology: Professor Ana-Paula Correia and advisee, Vicky Simmerman, conducted pre- and post-event surveys at HackOHIO to gauge student satisfaction and educational gains. This was a pilot year with a response rate of 35%, offering the directors insight into the technologies used and role of mentors at the event. This will be updated and repeated for HackOHIO 2018.

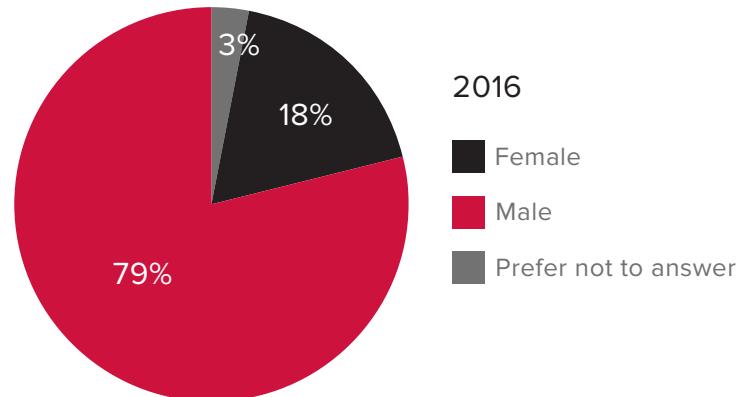
Toy Adaptation Program: This student group, under advisement by Engineering Education professor Rachel Kajfez, sponsored a table at HackOHIO and a project challenge at MakeOHIO. The challenge asked students to create a dog-treat launcher for a client with cerebral palsy. Several prototypes were built, with one being developed more fully during the summer of 2018.

Participant Statistics

HACK OHI/O

At HackOHI/O 2017, there were 667 participants representing over 55 different majors, though **73% were computer science related majors**. The other 27% represented a mix of engineering, arts and science, business and medical majors. Over 60 projects were judged on the second day of the event. Progress was made toward a growth goal of including a larger diversity of majors and more female participants.

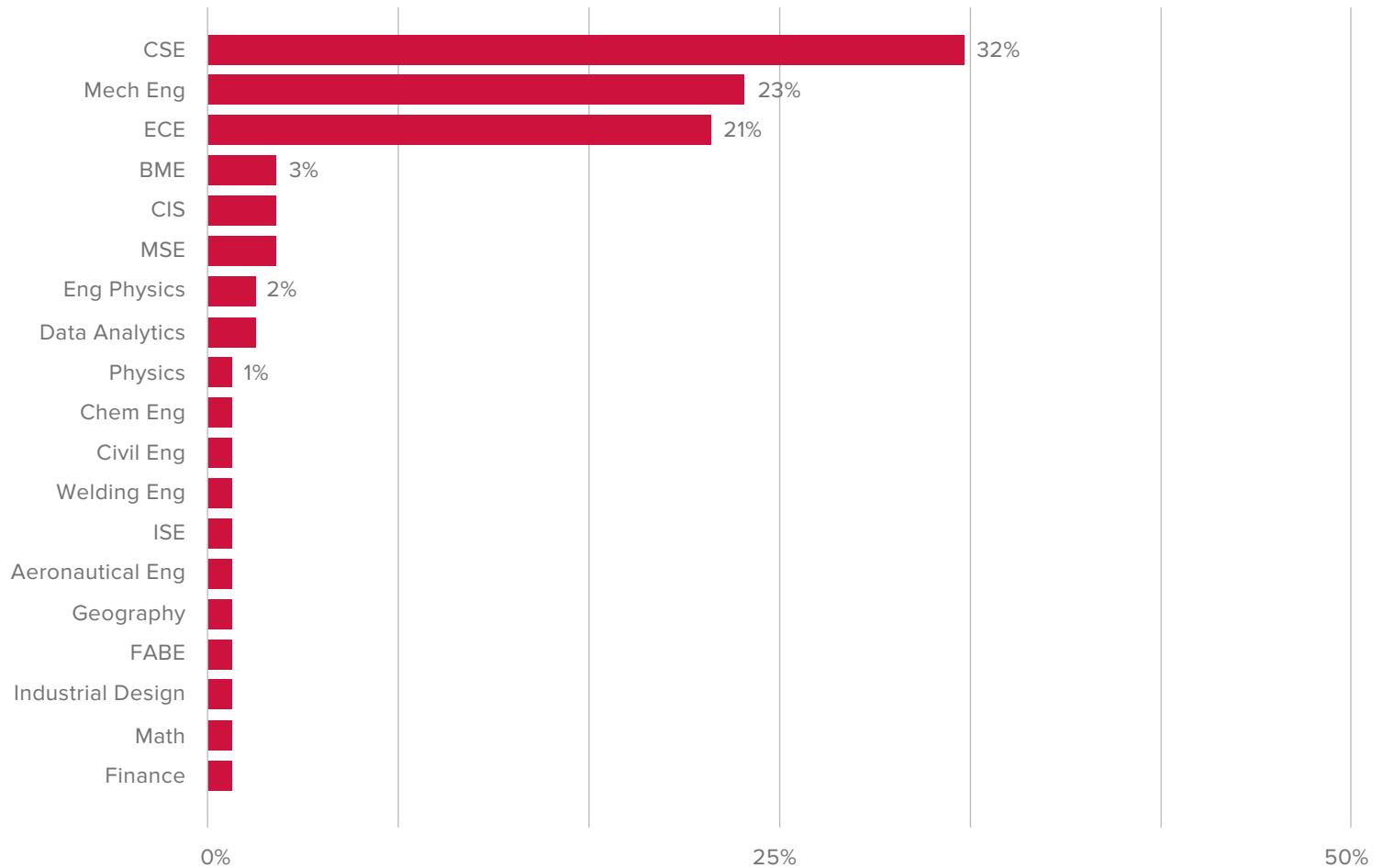
HackOHI/O Participation notes **growth of female participant ratio to 1 in 5**, increasing from 1 in 6 the prior year:



MAKE OHI/O

The largest event yet with over 150 student participants, and 99% of those being Ohio State students. There was an increase in Mechanical Engineering students this year.

2018 MAKEOHI/O PARTICIPANTS BY MAJOR





THE OHIO STATE UNIVERSITY

COLLEGE OF ENGINEERING

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