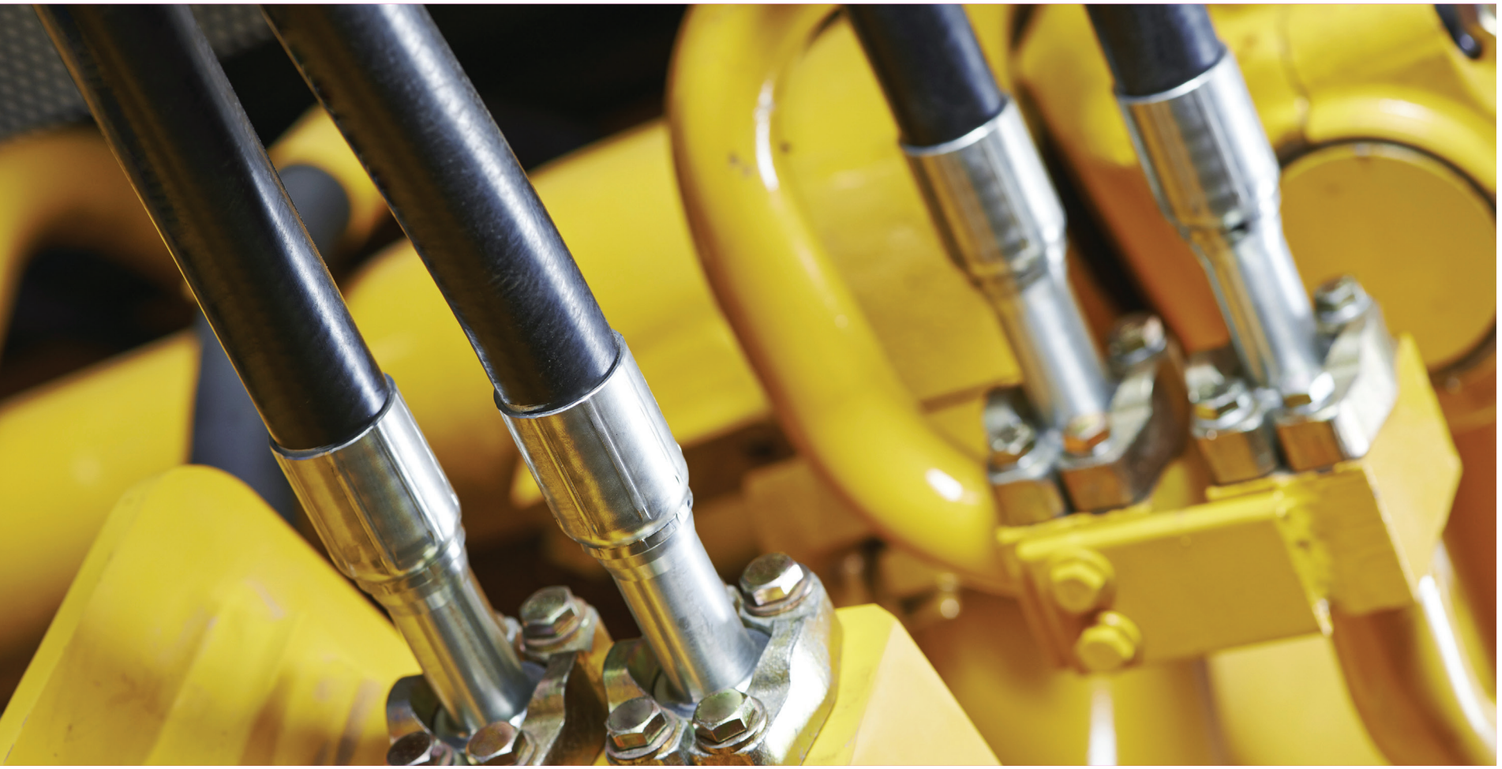
NFPA
Education and
Technology
Foundation

2018 DONOR IMPACT REPORT



OUR MISSION

In a biennial survey, members of the National Fluid Power Association (NFPA) consistently rank workforce development as the most challenging issue their companies face. This is likely because not enough technical colleges and universities are teaching fluid power to their students.

As a result, NFPA has identified growing the fluid power workforce as one of its primary strategic priorities. It is central to its mission of strengthening the fluid power industry. NFPA seeks to increase the number of educated technicians and engineers embarking on careers in fluid power.

The NFPA Education and Technology Foundation is a tax-exempt, charitable organization, affiliated with NFPA, that is dedicated to meeting this workforce development need. Through the generous support of our donors, we are:

- Creating more educated fluid power technicians, by funding student outreach and education programs, designed to create a pathway into the fluid power industry; and
- Creating more educated fluid power engineers, by funding research and education programs, designed to better engage academic faculty in the teaching of fluid power.

Because of your support, our programs are helping to change the talent pool available to our industry. More young people are aware of the fluid power industry. More 2-year technical college and 4-year university graduates have specific training in fluid power. More universities have research facilities and education programs focused on fluid power. And more partnerships between these schools and our industry are increasing access to highly talented candidates.

This is truly **our** mission—yours and ours—and it **is** working. Your donations will make sure it works for many years to come.

Best Regards,

Eric Lanke
President and CEO
NFPA Education and Technology Foundation

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OUTREACH & EDUCATION PROGRAMS BUILDING A PATHWAY INTO THE FLUID POWER INDUSTRY

MIDDLE SCHOOLS

Fluid Power Action Challenge
A design/build competition for eighth graders that introduces fluid power in a format that is both fun and engaging.

HIGH SCHOOLS

Student Career Connections
Orientation programs conducted by NFPA members to provide fluid power plant tours and activities to high school students.

Fluid Power Robotics Challenge
Scholarships awarded to high school students that effectively use fluid power in their FIRST and NRL robots.

TECH SCHOOLS

Teaching and Laboratory Grants
Money to establish teaching materials and state-of-the-art teaching laboratories that create fluid power programs at 2-year technical colleges.

FLUID POWER INDUSTRY

Fluid Power Careers Portal
An online portal where students post resumes and fluid power companies post jobs.

YOUR GIFTS AT WORK

CREATING MORE EDUCATED FLUID POWER TECHNICIANS

To create more educated technicians, the NFPA and the NFPA Foundation conduct a number of student outreach and education programs, designed to create a pathway into the fluid power industry.

Many of these programs are now being organized under our FAMTEN initiative, the Fluid Power and Applied Mechatronics Training and Employment Network. FAMTEN is a workforce development pathway that connects local technical colleges with industry partners and high school teachers. The network creates awareness and interest in fluid power and leads students along a path that leads to careers in fluid power.

FLUID POWER ACTION CHALLENGE

17,500+ STUDENTS ENGAGED THROUGH EVENTS AND CLASSROOM ACTIVITIES

The Fluid Power Action Challenge is a competition that challenges middle or high school students to solve an engineering problem using fluid power. The students work in teams to design and build a fluid power mechanism and then compete against other teams in a timed competition.

The Fluid Power Challenge has many benefits. It:

- Actively engages students in learning about fluid power.
- Gives support and resources to teachers for science and technology curriculum.
- Creates a learning environment where math and science are fun.
- Encourages students to practice teamwork, engineering, and problem-solving skills.
- Introduces students to careers in the fluid power industry.

Hundreds of individuals in NFPA member companies and education partner institutions have been involved in mentorship, classroom activities, and events related to the Fluid Power Action Challenge, which have engaged more than 17,500 students to date.

NFPA Fluid Power Action Challenge

IN TOTAL, OUR FLUID POWER ACTION CHALLENGE CHAMPIONS HAVE ORGANIZED

86 EVENTS IMPACTING 8,735 STUDENTS.

Fluid Power Action Challenge Champions

Twenty-five NFPA member companies and education partners from across the country have been recognized as Fluid Power Action Challenge Champions for their efforts in organizing and running Fluid Power Action Challenge events in their local communities. In doing so, they have not only made serious investments of both time and money, but have also helped spread information about our industry and reaped the benefits that come with connecting their organizations to the schools and science classrooms where the industry's future employees are learning fluid power for the first time.

These Fluid Power Action Challenge Champions are:

Bennett Mills Middle School
1 annual event, engaging 56 total students

Caterpillar
3 annual events, engaging 224 total students

Cleveland Community College
4 annual events, engaging 128 total students

Cooper Middle School
2 annual events, engaging 122 total students

Daman Products Company
8 annual events, engaging 696 total students

Deltrol Fluid Products
8 annual events, engaging 2,304 total students

Eisenhower Junior High
2 annual events, engaging 36 total students

FORCE America
3 annual events, engaging 200 total students

Georgia Tech University
2 annual events, engaging 136 total students

Gulliver
1 annual event, engaging 90 total students

HUSCO International & Waukesha STEM Academy
4 annual events, engaging 332 total students

Jerling Middle School
2 annual events, engaging 370 total students

Komatsu Mining Corp Group
1 annual event, engaging 24 total students

Master Pneumatic
4 annual events, engaging 560 total students

Mequon School District
1 annual event, engaging 36 total students

Micromatic
1 annual event, engaging 20 total students

Milwaukee School of Engineering
10 annual events, engaging 958 total students

Parker Hannifin
2 annual events, engaging 44 total students

Pennsylvania Small Business Education Fund
4 annual events, engaging 488 total students

Price Engineering
3 annual events, engaging 264 total students

Purdue University
4 annual events, engaging 236 total students

University of Minnesota
5 annual events, engaging 352 total students

Trition Girls Summer Camp
2 annual events, engaging 80 total students

Wojanis Supply Company
8 annual events, engaging 835 total students

Valley View Junior High School
1 annual event, engaging 144 total students

Middle school student Samantha Stack was among the 388 participants in the 2016-17 Fluid Power Action Challenge organized by Deltrol Fluid Products and hosted at Harper College in Illinois. Samantha's mother said, "Samantha had a great experience in the fluid power challenge, and that is what really made her want to become an engineer. She is hoping to study aerospace engineering in Alabama and ultimately work for NASA."

FLUID POWER ACTION CHALLENGE GRANTS

The NFPA Foundation also awards grants to middle and high schools to facilitate hydraulics and pneumatics instruction. Grant awards defray the costs related to the educational aspects of the Fluid Power Action Challenge Program — either for the fluid power kits for classroom use or for participation in the Fluid Power Action Challenge event.

TO DATE
115 SCHOOLS
HAVE USED FLUID POWER CHALLENGE MATERIALS IN THEIR CURRICULA, EXPOSING
8,768 STUDENTS
TO FLUID POWER.

FLUID POWER ROBOTICS CHALLENGE

105 SCHOLARSHIP APPLICATIONS RECEIVED THIS YEAR

The Fluid Power Robotics Challenge is a scholarship program that launched with the 2016-17 school year. In collaboration with FIRST Robotics and the National Robotics League (NRL), each year the NFPA Foundation offers one merit-based scholarship to a high school student using fluid power in their robot design. The scholarship, set at $10,000 per year for up to four years, may be utilized to study engineering at any accredited technical college or university in the United States.

The goal of the Fluid Power Robotics Challenge is to bring an awareness of fluid power options in robotics to high school students and to stimulate increased use of fluid power products in the FIRST competition. In our second year, 105 applications were received for our scholarship. This is up 28% from last year. This year, a total of 2,035 teams used fluid power in their design.

Robotics Challenge Scholarship Winner

Spencer Tiegs, the 2017 NFPA Robotics Challenge Scholarship winner, has been very busy since winning his scholarship. Not only is he attending the Milwaukee School of Engineering for mechanical engineering as part of the University Scholars Honors Program, he also continues to coach and mentor FIRST Robotics high school students and is part of the Formula Hybrid team at MSOE. Spencer recently completed an internship at HUSCO International, Inc.

STUDENT CAREER CONNECTIONS

2,200+ STUDENTS ENGAGED THROUGH COMPANY VISITS AND TOURS

Student Career Connections is a free and flexible program that helps fluid power industry professionals host area high school students at their company facility – giving the students a tour, building a fluid power classroom kit with them, and answering questions about the industry and careers. Many NFPA members coordinate these activities with the extra attention created by Manufacturing Day®.

To date, the program has given more than 2,200 students a peek into real-world fluid power applications and careers.

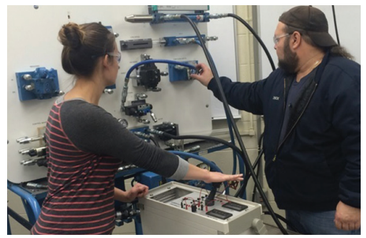
TEACHING AND LABORATORY GRANTS

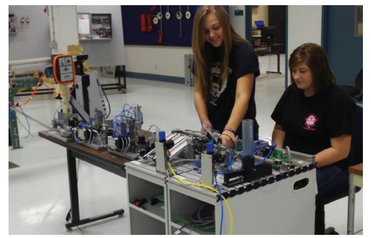
3,400+ STUDENTS TAUGHT FLUID POWER EACH YEAR AT 2-YEAR TECHNICAL SCHOOLS

Through our Fluid Power Teaching and Laboratory Grant Programs, we are helping 2-year technical schools and colleges establish the teaching materials and state-of-the-art teaching laboratories that are needed to embed fluid power into their training curriculum.

To date, 8 schools have received teaching grants and 9 schools have received laboratory grants.

In 2017-18, our teaching and laboratory grant program funds were used to support the launch of the first FAMTEN hub school at Waukesha County Technical College (WCTC). $25,000 was allocated to purchase fluid power training platforms to be used at eight high schools near WCTC. In the future, the NFPA Foundation will provide scholarships to help these high school students attend the fluid power and applied mechatronics degree program at WCTC.





Teaching Grants

Central Community College, Grand Island, NE
Cleveland Community College, Shelby, NC
Hennepin Technical College, Eden Prairie, MN
Ivy Tech Community College, Columbus, IN
Kaskaskia College, Centralia, IL
Texas State Technical College, Waco, TX
Triton College, River Grove, IL
Vernon College, Vernon, TX

Laboratory Grants

Angelina College, Lufkin, TX
Central Community College, Grand Island, NE
Cleveland Community College, Shelby, NC
Eastern Iowa Community College, Davenport, IA
Hennepin Technical College, Eden Prairie, MN
Macomb Community College, Warren, MI
Marshalltown Community College, Marshalltown, IA
South Central College, North Mankato, MN
Triton College, River Grove, IL

FLUID POWER CAREERS PORTAL

THE PLACE FOR STUDENTS AND EMPLOYERS TO FIND EACH OTHER

NFPA's Fluid Power Careers Portal is a tool designed to provide students being taught fluid power with information about job openings, employment statistics and scholarship opportunities. They can post their resumes free of charge. Companies that are at least Bronze-level donors in our Pascal Society—whose funding is critical if we are to continue the outreach and education programs that result in these fluid power candidates—can use the portal to search student resumes and post their available positions.

RESEARCH & EDUCATION PROGRAMS HELPING TO CREATE EDUCATED FLUID POWER ENGINEERS

RESEARCH PROGRAMS

Research Projects
Industry selected and guided projects, engaging academic faculty and graduate students in investigating the precompetitive research needs of the fluid power industry.

EDUCATIONAL PROGRAMS

Teaching, Laboratory, and Curriculum Grants
Grants to create and disseminate fluid power curriculum in mechanical engineering programs. Provides a pathway for funded faculty to add fluid power to their undergraduate programs.

Fluid Power Vehicle Challenge
Design/build competition that embeds in capstone design course at participating universities. Provides pathway for funded faculty to add fluid power to their undergraduate courses.

FLUID POWER INDUSTRY

Fluid Power Vehicle Challenge Community
Donor community where industry supporters review, coach and interview undergraduate students participating in Fluid Power Vehicle Challenge Program.

Fluid Power Careers Portal
An online portal where students post resumes and fluid power companies post jobs.

YOUR GIFTS AT WORK

CREATING MORE EDUCATED FLUID POWER ENGINEERS

To create more educated engineers, the NFPA, the NFPA Foundation, and their partner, the Center for Compact and Efficient Fluid Power (CCEFP), conduct a number of research and education programs, designed to better engage academic faculty in the teaching of fluid power.

NFPA's focus is increasingly on helping funded research faculty build more fluid power education into their undergraduate engineering courses. To educate these students in fluid power and produce graduates that are attractive hires for the fluid power industry, we are building a full fluid power curriculum for insertion into these and other core engineering courses. Fluid power curriculum resources developed through our programs are posted on the NFPA website for faculty from universities across the United States to access and use to teach their engineering students about fluid power.

10 PROJECTS HELPING TO GROW FLUID POWER ON UNIVERSITY CAMPUSES

CCEFP's Industry Engagement Committee is the volunteer structure tasked with selecting and guiding the research projects that will engage academic faculty and graduate students in investigating the pre-competitive research needs of the fluid power industry. Its membership includes major donors to the NFPA Foundation, including those at the Gold and Silver levels of the Pascal Society.

Over the previous ten years, the CCEFP has sponsored more than 270 such projects, which helped to add more than 100,000 square feet of fluid power laboratory space to its universities, to increase the number of fluid power advanced degrees awarded by those universities by more than 500%, and to increase the number of fluid power educators on those campuses by a factor of 10.

For the past two years, the NFPA Foundation has provided funding for 10 additional research projects, which, as determined by the CCEFP Industry Engagement Committee, were awarded as follows:

Control and Prognostic of Electro-Hydraulic Machines

Student Researcher
Riccardo Bianchi, Purdue University
Faculty Advisor
Andrea Vacca, Purdue University

This project focuses on investigating advanced electro-hydraulic techniques to optimize adaptive control, reduce application oscillations, and conduct hydraulic system diagnostics and prognostics under different operating conditions. It has investigated both hydraulic crane and wheel loader applications for controlling oscillations that occur in those types of machinery.

Controlled Stirling Power Unit

Student Researcher
Seth Thomas, Vanderbilt University
Faculty Advisor
Eric Barth, Vanderbilt University

The project addresses limitations in the current options for power supplied to mobile robots and exoskeletons through the development of a quieter, more energy-dense, compact, and portable fluid power supply using a stirling device. Such advancements would enable the use of fluid power technology in a variety of military, medical, manufacturing, and construction applications. The stirling device can use a number of highly energy-dense, flexible fuel or available heat sources to create hydraulic or pneumatic fluid power in an easily scalable design.

Efficient, Integrated, Freeform Flexible Hydraulic Actuators

Student Researcher
Jonathon Slightam, Marquette University
Faculty Advisor
Mark Nagurka, Marquette University

This project sets to advance current hydraulic actuator technology by focusing on the use of flexible fluidic actuators and the additive manufacturing methods needed to produce them. It differentiates itself from existing actuation technologies most prominently through the dramatic reduction in component and system weight that comes with producing this new actuation technology via advanced manufacturing methods, opening up many new applications to fluid power solutions.

Four-Quadrant Multi-Fluid Pump/Motor

Student Researcher
James Marschand, Purdue University
Faculty Advisor
John Lumkes, Purdue University

This project focuses on the design and simulation of digital pumps and motors for multi-fluid operation as well as evaluation of their feasibility. It has built upon existing technology and research by working toward a novel mechanical control for digital pumps and motors in pursuit of making this technology approach more feasible.

Free Piston Engine Based Off-Road Vehicles

Student Researchers
Keyan Liu and Chen Zhang, University of Minnesota
Faculty Advisor
Zongxuan Sun, University of Minnesota

This project focuses on the design, control, and testing of free piston engine pumps for off-road vehicles, a potentially transformational architecture. It has differentiated itself from existing technology approaches by controlling the hydraulic engine, in lieu of variable pumps, to generate the required pressure and flow for the vehicle's hydraulic actuation systems, including both linear and rotary motions. Solutions to improve vehicle fuel efficiency and energy storage while reducing emissions and environmental impact have also been investigated.

Hybrid MEMS Proportional Fluid Control Valve

Student Researcher
Nathan Hagstrom, University of Minnesota
Faculty Advisor
Thomas Chase, University of Minnesota

MEMS scale piezoelectric materials to create ultra-efficient miniature proportional pneumatic valves have been studied by CCEFP researchers for a number of years now, but the manufacturing challenges to overcome have proven to be quite daunting. The purpose of this project has been to accelerate the commercialization potential of this innovative approach by leveraging both MEMS-based and conventional elements in a novel "hybrid" configuration. By doing so, the resulting valve stands to not only decrease the power required to drive comparable pneumatic valves by three orders of magnitude, but also create the fastest responding pneumatic valves known.

Investigation of Noise Transmission through Pump Casing

Student Researcher
Paul Kalbfleisch, Purdue University
Faculty Advisor
Monika Ivantysynova, Purdue University

This project focuses on noise modeling techniques for swash plate type axial piston machines. The optimized models are being validated by experimental results. It will contribute to the existing body of knowledge for how noise is both generated and transmitted through fluid power components.

Portable Pneumatically Powered Orthoses

Student Researcher
Girish Krishnan, University of Illinois at Urbana-Champaign
Faculty Advisor
Elizabeth Hsiao-Wecksler, University of Illinois at Urbana-Champaign

The project focuses on the design and analysis of a soft pneumatic sleeve for arm orthosis. This is expected to contribute to orthotic control mechanisms and clinical treatment strategies, both of which are areas that have significant potential for advancements. The final design will be lighter and more compact than what is currently available and will have enhanced power and performance. In addition to making strides in orthotics, this research will also drive the use of compact fluid power technologies in other human scale devices.

Simulation, Rheology, and Efficiency of Polymer Enhanced Fluids

Student Researchers
Duval Johnson, Uma Shantini Ramasamy, University of California – Merced; Mercy Cheekolu, Pawan Panwar, Milwaukee School of Engineering
Faculty Advisors
Ashlie Martini, University of California – Merced;
Paul Michael, Milwaukee School of Engineering

This project focuses on measuring how a fluid's polymer structure affects hydraulic power transmission in pursuit of formulating more efficient hydraulic fluids. It builds upon previous research by incorporating tribometer testing, high pressure rheology studies, and molecular dynamics simulations into the research methods.

Variable AC Hydraulic Pump/Motor

Student Researchers
Mengtang Li, Vanderbilt University;
Ryan Foss, University of Minnesota
Faculty Advisors
Eric Barth, Vanderbilt University;
James Van de Ven, University of Minnesota

Hydraulic systems today can best be classified as DC, or direct flow, hydraulics. This project investigates the modeling, design, and development of AC hydraulic systems. This project builds upon the existing CCEFP variable linkage piston pump that is both compact and efficient even under low displacement operating conditions. It also greatly expands the existing body of knowledge for applying existing variable displacement pumps to alternating flow AC hydraulic circuits, including multi-actuator systems.

Other Fluid Power Research Grants

In addition to its support of the CCEFP projects, the NFPA Foundation has also funded individual pre-competitive research projects designed to connect graduate students to the study of fluid power and expand the capabilities of their host institutions to research and teach fluid power.

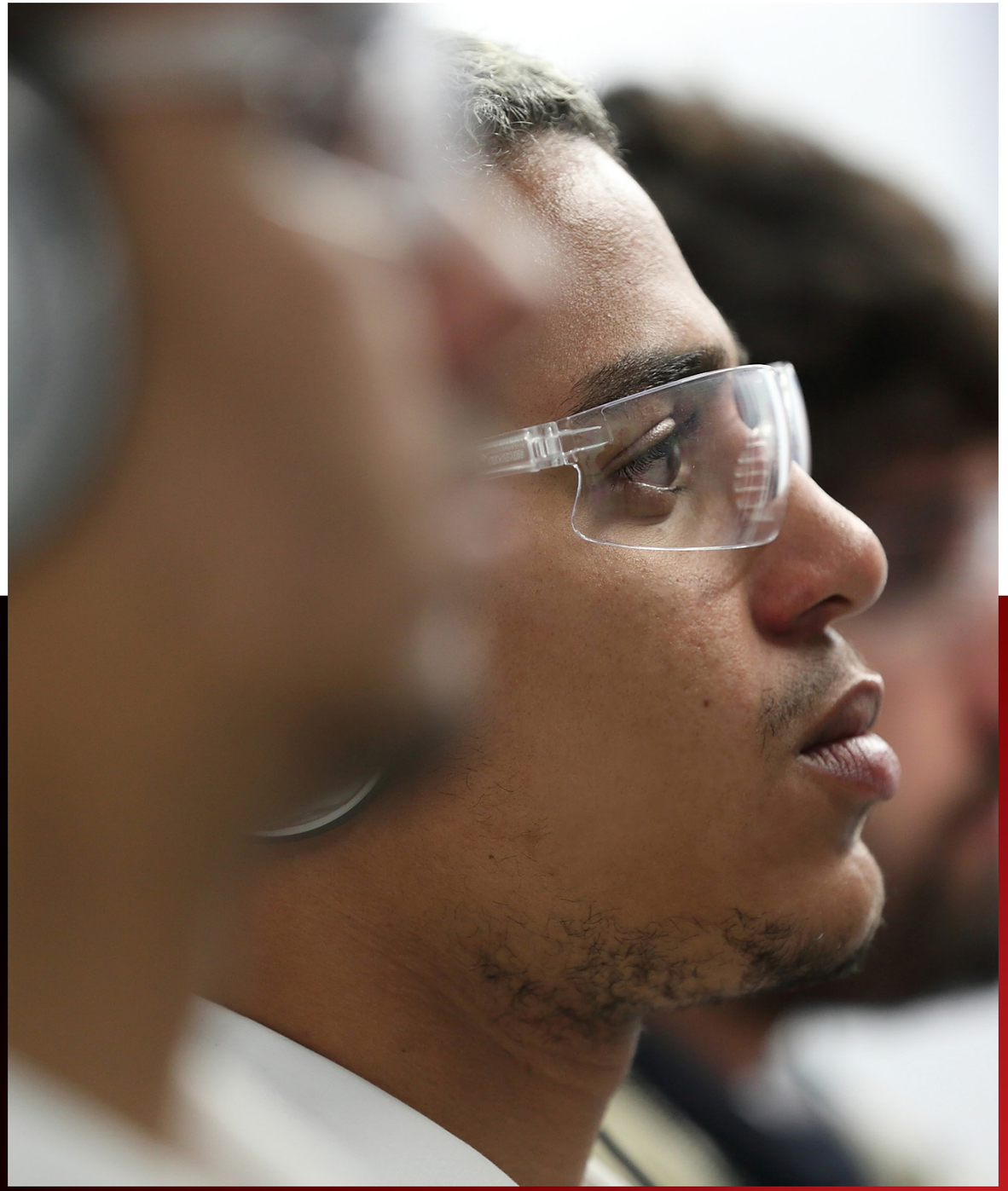
To date, 3 schools have received 4 of these research grants.

Iowa State University
- Dielectric Spectroscopic Sensor Development for Hydraulic Fluid Contaminant Detection
- An Investigation of Dielectric Spectroscopic Contamination Sensing in a Compressed Air Stream

Purdue University
- Design, Simulation and Control of Hydraulic System Topographies with Integrated Energy Recovery

Vanderbilt University
- Pneumatic Exhaust Gas Recovery

Through these research projects, the NFPA Foundation is engaging current and helping to build the careers of future academic faculty who will be in a position to teach fluid power to thousands of undergraduate engineers on their campuses.



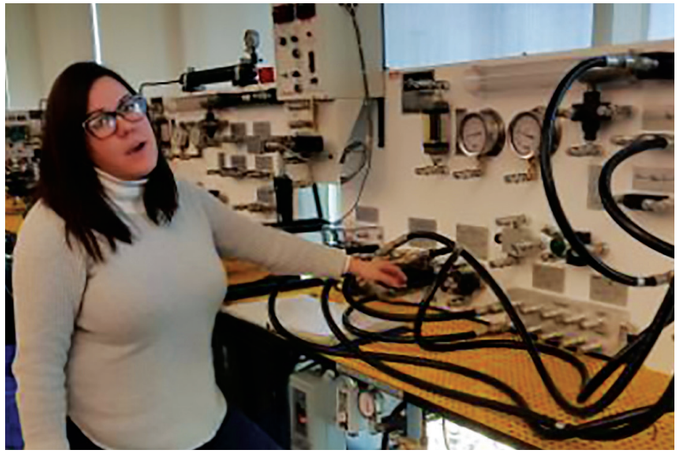
TEACHING, LABORATORY AND CURRICULUM GRANTS

7,100+ UNDERGRADUATE STUDENTS TAUGHT FLUID POWER EACH YEAR AT 4-YEAR UNIVERSITIES

Through our Fluid Power Teaching, Laboratory and Curriculum Grant Programs, we are helping the academic faculty impacted by our fluid power research projects to teach more fluid power in the university setting. These grants help to create and disseminate fluid power curriculum and provide a pathway for funded faculty to add fluid power to their undergraduate mechanical engineering programs.

Each grant creates curriculum that facilitates the teaching of fluid power to dozens or hundreds of students on each campus. At last count, NFPA's 4-year university school education partners collectively report teaching fluid power to more than 7,100 students.

TO DATE
16 SCHOOLS
HAVE RECEIVED TEACHING GRANTS
2 SCHOOLS
HAVE RECEIVED LABORATORY GRANTS, AND
3 SCHOOLS
HAVE RECEIVED CURRICULUM GRANTS.



Teaching Grants

Georgia Institute of Technology, Atlanta, GA

Illinois Institute of Technology, Chicago, IL

Iowa State University, Ames, IA

Lawrence Technological University, Southfield, MI

Marquette University, Milwaukee, WI

Massachusetts Institute of Technology, Cambridge, MA

Milwaukee School of Engineering, Milwaukee, WI

Montana State University, Bozeman, MT

Purdue University, West Lafayette, IN

Rochester Institute of Technology, Rochester, NY

University of Illinois at Chicago, Chicago, IL

University of Illinois at Urbana-Champaign, Urbana-Champaign, IL

University of Minnesota, Minneapolis, MN

Western Michigan University, Kalamazoo, MI

Western New England University, Springfield, MA

Worcester Polytechnic Institute, Worcester, MA

Laboratory Grants

Milwaukee School of Engineering, Milwaukee, WI

Western Michigan University, Kalamazoo, MI

Curriculum Grants

Lawrence Technological University, Southfield, MI

Ohio University, Athens, OH

Western Michigan University, Kalamazoo, MI

"Fluid power is a subject that I did not know much about before I started my studies in the Engineering Technology major. I feel lucky that fluid power is part of the curriculum because it provides me with an understanding about how some equipment and machinery work and it gives me an edge over some potential candidates for employment in the future."

– Marlena Silva,
Eastern Iowa Community College

FLUID POWER VEHICLE CHALLENGE COMMUNITY

CREATING CONNECTIONS TO TALENTED UNDERGRADUATE ENGINEERS

The Fluid Power Vehicle Challenge Community is the volunteer structure tasked with mentoring, coaching and judging the student teams participating in the Vehicle Challenge. Its membership includes major donors to the NFPA Foundation, including those at the Gold and Silver levels of the Pascal Society.

Eight companies sent representatives to the final event to act as competition judges and to meet the student participants in person.

- Danfoss Power Solutions
- Eaton
- FORCE America Inc.
- HUSCO International, Inc.
- HYDAC
- Iowa Fluid Power
- Parker Hannifin
- SunSource

FLUID POWER VEHICLE CHALLENGE

13 UNIVERSITY TEAMS PARTICIPATE IN 2017-18

The Fluid Power Vehicle Challenge is a unique engineering design/build competition that embeds in the capstone design course at participating universities. It strives to promote original thinking in a competitive setting by combining two technology platforms that are not normally associated with one another—human-powered vehicles and fluid power.

The first, as exemplified by the bicycle, is recognized as extremely efficient in terms of input vs. output. The second presents more of a challenge in terms of efficiency, especially at low speeds. A fluid powered vehicle, then, presents undergraduate engineers with a familiar yet challenging platform for change. By combining this unlikely pair, the Vehicle Challenge hopes to create an environment that results in uncommon connections and breakthroughs, while supporting learning and the growth of fluid power industry knowledge.

Student teams from 13 universities participated in the second year of the NFPA Vehicle Challenge:

- California Polytechnic State University, San Luis Obispo, CA
- Cleveland State University, Cleveland, OH
- Illinois Institute of Technology, Chicago, IL
- Iowa State University, Ames, IA
- Milwaukee School of Engineering, Milwaukee, WI
- Murray State University, Murray, KY
- Purdue University, West Lafayette, IN
- University of Akron, Akron, OH
- University of Cincinnati, Cincinnati, OH
- University of Illinois at Urbana-Champaign, Urbana-Champaign, IL
- University of Minnesota, Minneapolis, MN
- Western Michigan University, Kalamazoo, MI
- West Virginia University Institute of Technology, Morgantown, WV

The team from Murray State University won the overall competition, with teams from multiple universities placing competitively in the program's other award categories, including best paper/presentation, best design, best workmanship, and the program's three head-to-head competitions: a sprint race, and efficiency challenge, and an endurance challenge.

Additional support for this year's program was provided by:

- Danfoss Power Solutions, the program's final event sponsor and host
- LubeTech, the program's official fluid supplier
- Parker Hannifin
- SunSource/Eaton Corporation, the program's official parts supplier

Many student participants admitted that the Vehicle Challenge was their only exposure to fluid power in their four-year engineering curriculum, greatly underscoring the need for this program. This year, the Vehicle Challenge again achieved all four of its key objectives:

- Stimulate education in practical hydraulics, pneumatics, and sustainable energy devices for motion control.
- Provide students with experience in real world engineering under a strict timeline of designing, simulating, ordering, building, testing and demonstrating their designs.
- Stimulate innovative thinking for designing and testing potential new technologies or concepts integrated into a vehicle platform.
- Provide an industry recruitment opportunity for high potential engineering seniors by engaging directly with practitioners in the field.

NFPA Fluid Power Vehicle Challenge

STUDENT TEAMS FROM 13 UNIVERSITIES PARTICIPATED IN THE SECOND YEAR OF THE NFPA VEHICLE CHALLENGE.

Fluid Power Careers Portal

The Place for Students and Employers to Find Each Other

NFPA's Fluid Power Careers Portal is a tool designed to provide students being taught fluid power with information about job openings, employment statistics and scholarship opportunities. They can post their resumes free of charge. Companies that are at least Bronze-level donors in our Pascal Society—whose funding is critical if we are to continue the outreach and education programs that result in these fluid power candidates—can use the portal to search student resumes and post their available positions.

THE PASCAL SOCIETY

The Pascal Society is the NFPA Foundation's annual giving society that has raised more than $2.6 million for fluid power outreach, education, and research programs. Pascal Society funds support the full range of Foundation programs highlighted in this report.

Pascal Society donors combine their financial and volunteer contributions in one concerted effort, developing the resources, tools, and people needed to meet the future technology and workforce needs of the U.S. fluid power industry.

Pascal Society Donors as of **June 30, 2018**

Gold Members

Bimba Manufacturing
Danfoss Power Solutions
Enfield Technologies
Hydra-Power Systems
International Fluid Power Society
Parker Hannifin

Silver Members

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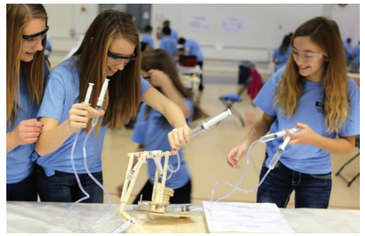
LEGACY BUILDERS

The NFPA Education and Technology Foundation extends gratitude to the many generous donors who share our mission of meeting the workforce development needs of the U.S. fluid power industry.

The following organizations have achieved Legacy Builder status—cumulative giving of $25,000 or more—as of our last recognition year, ending **April 30, 2018**.



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Quality Control Corporation

Class of 2017
Linde Hydraulics
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Proportion Air
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Class of 2016
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Bobcat Company
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HYDAC Technology Corporation/ Schroeder Industries LLC
Hydra-Power Systems, Inc.
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Netshape Technologies
Poclain Hydraulics, Inc.

Class of 2015
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Pall Corporation
Moog Inc.

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Eaton Corporation
Gates Corporation
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