A BHEF CASE STUDY

DEVELOPING A DIVERSE REGIONAL ENGINEERING TALENT ECOSYSTEM

JOINT ENGINEERING LEADERSHIP DEVELOPMENT PROGRAM

The Boeing–Washington University
Joint Engineering Leadership Development Program

BHEF BUSINESS-HIGHER EDUCATION FORUM®

Creating Solutions. Inspiring Action.®

ABOUT BHEF

The Business-Higher Education Forum (BHEF) is the nation's oldest membership organization of Fortune 500 CEOs, college and university presidents, and other leaders dedicated to the creation of a highly skilled future workforce. BHEF members collaborate and form strategic partnerships to build new undergraduate pathways; improve alignment between higher education and the workforce; and produce a diverse, highly skilled talent pool to meet demand in emerging fields.

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INTRODUCTION

AS THE NATION'S OLDEST MEMBERSHIP ORGANIZATION of Fortune 500 CEOs, college and university presidents, and other leaders, the Business-Higher Education Forum (BHEF) and its members form strategic partnerships to build new undergraduate pathways; improve alignment between higher education and the workforce; and produce a diverse, highly skilled talent pool to meet demand in emerging fields.

Through the collaboration of its business and academic partners, BHEF launched the National Higher Education and Workforce Initiative (HEWI) to support business-higher education partnerships that co-design innovative community college and university pathways to careers, as well as maximize work-based learning for students to increase transfers, degree attainment, and connections to living-wage jobs.

This case study examines how BHEF members, Washington University in St. Louis (Washington University) and The Boeing Company (Boeing), are collaborating with St. Louis Community College (STLCC) and the University of Missouri in St. Louis (UMSL) to develop a diverse regional engineering talent ecosystem.

This program can provide insights and implications for stakeholders in government, business, and higher education on developing a workforce that meets today's engineering skills needs, as well as one that can serve as a model for other fields.

This case study builds upon BHEF's work to create new undergraduate pathways in high-skill, high-demand fields. As part of HEWI, BHEF received a five-year grant from the National Science Foundation to develop validated, evidence-based models for effective, strategic, and sustainable industry engagement with higher education to increase the persistence of science, technology, engineering, and mathematics (STEM) students, particularly among women and underrepresented minorities. BHEF catalyzed five partnerships focused on improving persistence and transfer of community college students by engaging business to serve as the change agent in the development of new STEM undergraduate pathways. This case study focuses on one of these partnerships—led by Boeing and Washington University.

HIGHLIGHTED STRATEGIES

- Minimize structural barriers to opportunity for students
- Develop a multidimensional program that impacts students personally and professionally
- Create work-based learning opportunities for engineers
- Increase the diversity of a region's engineering talent pool
- Scale programmatic success
- Invest in unique public–private partnerships to engage in talent development
- Better align government, business, and higher education to develop a regional talent ecosystem

PROGRAM OVERVIEW

THE JOINT ENGINEERING LEADERSHIP DEVELOPMENT PROGRAM (JELDP) provides a pathway to bachelor's degrees in civil, electrical, and mechanical engineering to nontraditional students and directly benefits the St. Louis region's economic development. This program, which is funded in part by BHEF's National Science Foundation (NSF) grant, is led by Boeing and Washington University and includes STLCC and UMSL. JELDP minimizes structural barriers to opportunity by offering students access to a pathway into the engineering profession that begins in a local community college or UMSL and leads them through Washington University into competitive positions at companies like Boeing. This multidimensional program incorporates high-impact practices and work-based learning opportunities—such as internships, experiential learning, and capstone projects—to holistically develop students both personally and professionally as engineers.

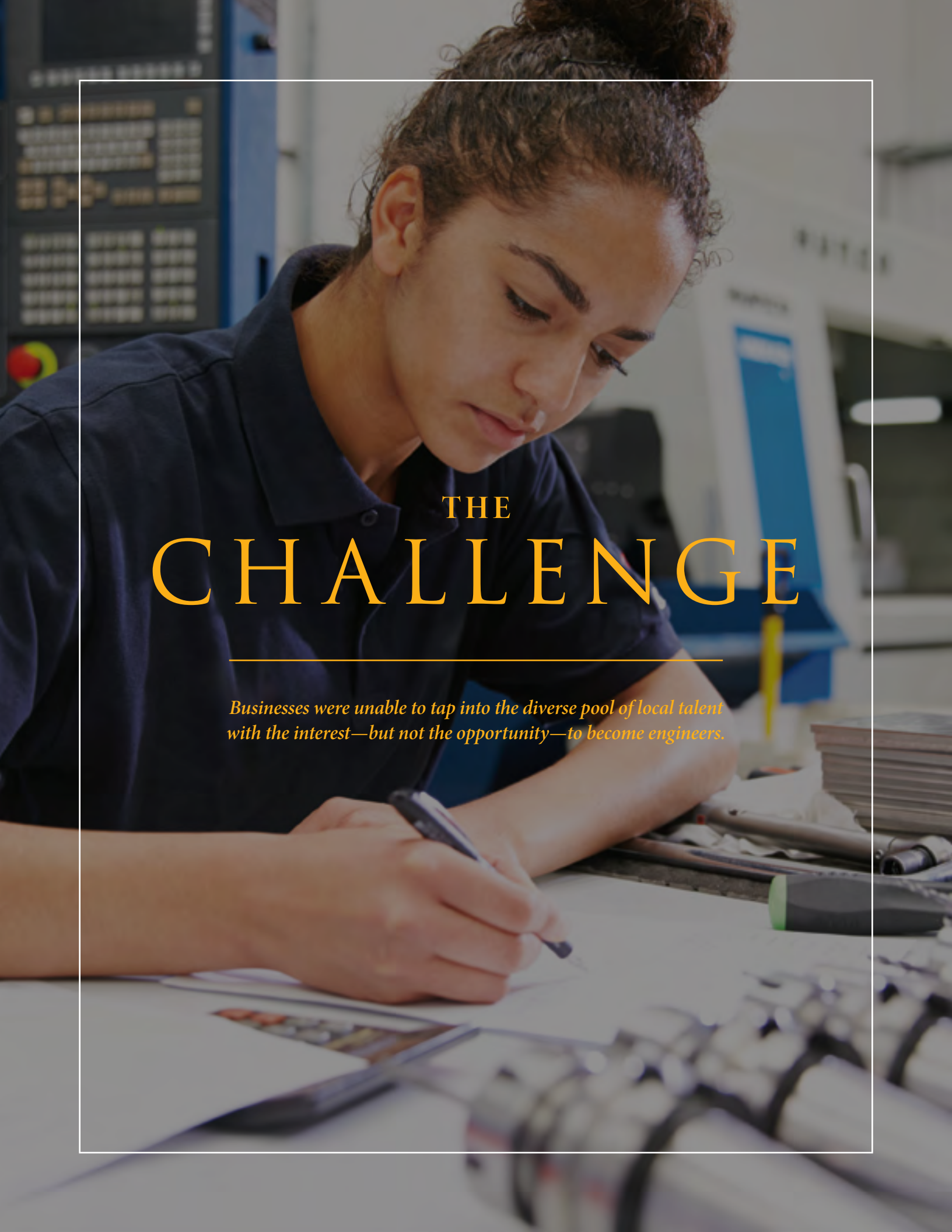
> "The St. Louis region can only continue to grow and succeed through innovative partnerships between the business community and its higher education and research institutions, both public and private."
>
> **MARK WRIGHTON** / CHANCELLOR / WASHINGTON UNIVERSITY IN ST. LOUIS

THE JOINT ENGINEERING LEADERSHIP DEVELOPMENT PROGRAM'S EDUCATION TO CAREER PATHWAY

HIGH-IMPACT INDUSTRY-ENRICHED INTERVENTIONS
to Increase College and Career Readiness and Success

- Co-Designed Curriculum
- Internships
- Cohort Learning
- Mentoring
- Capstone Projects
- Seminar Courses

Note: Students in the University of Missouri-St. Louis/Washington University Joint Undergraduate Engineering Program receive bachelor of science degrees in civil, electrical, and mechanical engineering.



THE CHALLENGE

Businesses were unable to tap into the diverse pool of local talent with the interest—but not the opportunity—to become engineers.

THE PARTNERSHIP BETWEEN BOEING AND WASHINGTON UNIVERSITY was motivated by a pressing workforce need in the St. Louis region: Businesses needed additional engineers to meet high demand, but many individuals from St. Louis and surrounding communities had no clear pathway for entering the profession. The only accredited engineering bachelor's programs in the region were offered out of state or through private universities whose high tuition costs and selective admission process effectively excluded prospective students with financial need. Several public universities in Missouri offered more affordable engineering programs, but their locations in other parts of the state rendered them out of reach for nontraditional students with personal or professional obligations in St. Louis.

Furthermore, many prospective students were unable to meet the basic admissions requirements for bachelor's programs in engineering because some public high schools in the St. Louis region did not offer a critical prerequisite: calculus. Due to these barriers in the educational pathway for the engineering profession, businesses were unable to tap into the diverse pool of local talent with the interest—but not the opportunity—to become engineers.

> "We are facing into a period where we need talented people in what some might consider staggering numbers. For example, **30 percent of our employees could retire tomorrow, and 50 percent will be retirement eligible in the next four years**. This program will pay off as we continue to hire qualified graduates from its ranks."
>
> **SHELLEY LAVENDER** / SENIOR VICE PRESIDENT OF STRIKE, SURVEILLANCE AND MOBILITY / ST. LOUIS SENIOR EXECUTIVE OF BOEING DEFENSE, SPACE & SECURITY / THE BOEING COMPANY

THE SOLUTION

Prepare students to launch thriving engineering careers and develop a pool of exceptional local engineering talent.

WASHINGTON UNIVERSITY AND UMSL partnered in 1993 to form the Joint Undergraduate Engineering Program, which provides local students with access to Washington University's engineering program for about the same tuition at UMSL. The program has awarded more than 900 bachelor of science degrees in civil, electrical, and mechanical engineering, and about 75 percent of program alumni have remained in the St. Louis area, where they are in high demand.

Most students begin the program by completing two years of foundational coursework at either UMSL or a local community college before transitioning to Washington University, where they complete their upper-division engineering courses. Students originate primarily from seven community colleges: Jefferson College, Southwestern Illinois College, St. Charles Community College, and STLCC's four campuses, including Florissant Valley, Forest Park, Meramec, and Wildwood. The program reaches into some of the most distressed communities in St. Louis and offers a pathway into engineering education and careers to students who would have limited or no access to such opportunities, especially women, veterans, and underrepresented groups. The most difficult transition for students in the program is from the community college to the upper-division curriculum. The program focuses on supporting students through this difficult transition, providing them with an undergraduate experience that is as seamless as possible.

Boeing is among the largest employers in the St. Louis region. The company has a long-standing relationship with Washington University and is the largest employer of alumni from the Joint Undergraduate Engineering Program. A 2013 BHEF grant from NSF allowed Boeing and Washington University to build upon their historically strong relationship by formally launching JELDP in 2015. This program focuses on developing the leadership potential of a special cohort of students in the Joint Undergraduate Engineering Program. Through an array of enriched learning opportunities, the program provides students with hands-on experience and helps them build relationships that strengthen their understanding of and connection to the engineering profession. The program prepares students to launch thriving engineering careers and also meets a critical business need for Boeing by developing a pool of exceptional local engineering talent that represents the diversity of St. Louis and surrounding communities.

> "The students who complete this program will be equipped with the skills and abilities to be successful in whatever careers they pursue. And while we certainly hope students will pursue jobs at Boeing, we understand some will pursue careers in other industries. However, with a majority of these students remaining in the region after graduation, we realize it's a win-win proposition. **Our company and our region will thrive with contributions from this skilled workforce.**"
>
> **MATT DANIELS** / SENIOR MANAGER, EDUCATION RELATIONS / THE BOEING COMPANY

THE SOLUTION

Some elements of JELDP, such as scholarships and internships, targeted a subset of students in the Joint Undergraduate Engineering Program, but academic leaders and experts from Boeing also collaborated to introduce several changes in the program's required curriculum that are impacting all students. These changes were driven by a holistic understanding of what the program's diverse student population needs in order to succeed as engineers: not only technical expertise but also confidence that they belong in the engineering profession. Now when students begin their upper-division coursework at Washington University, they are required to enroll in a new one-credit seminar called engineering studio that serves as a kind of first-year experience to support their transition.

In engineering studio, students engage with practicing engineers—including adjunct faculty and visiting experts—in conversations about such topics as ethics, leadership, and diversity that help connect traditional coursework to real-world engineering. Students also participate in reflective exercises to explore their personal strengths and their motivations for pursuing careers in engineering. These

Consistent with BHEF's U.S. STEM Undergraduate Model[1], which found that multidimensional programs are significantly more effective for STEM student retention than discrete interventions, **JELDP is comprised of the following focus areas**:

Seminar courses designed to foster meaningful connections to the engineering profession

A mentoring program that pairs students with practicing engineers from Boeing

A part-time internship program that enables students to gain work experience during the day and continue with their coursework in the evenings

Scholarships that make it possible for students to graduate with little or no debt

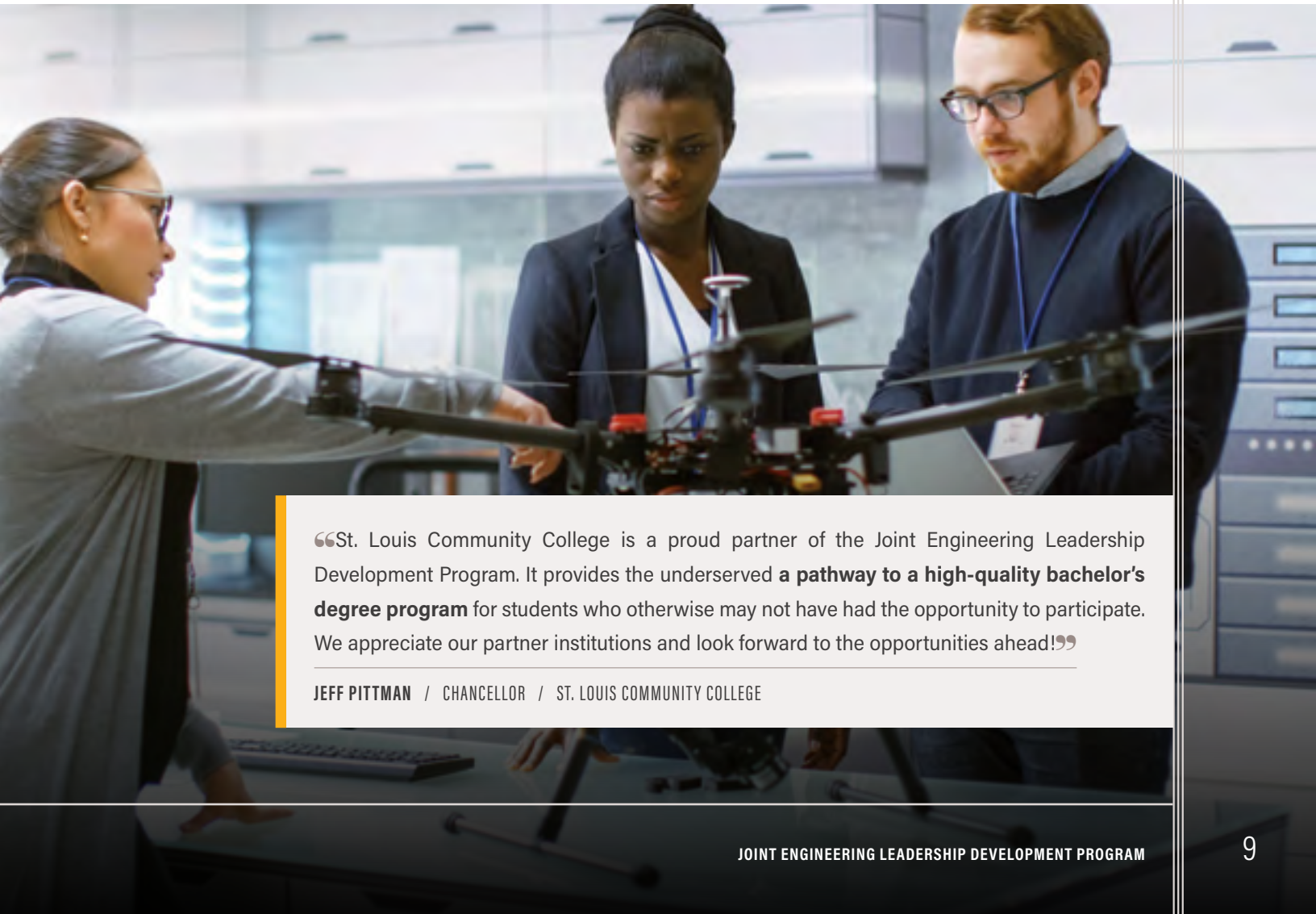
Capstone projects that challenge students to engage in applied problem solving and practice working in teams

1 Business-Higher Education Forum. (2013), *The U.S. STEM Undergraduate Model: Applying System Dynamics to Help Meet President Obama's Goals for One Million STEM Graduates and the U.S. Navy's Civilian STEM Workforce Needs.* Washington, DC. Available here: *http://www.bhef.com/publications/us-stem-undergraduate-model-applying-system-dynamics-help-meet-president-obamas-goals*

THE SOLUTION

exercises encourage students to develop professional identities that are grounded in an understanding of how their unique strengths and interests fit into the field of engineering. To build on themes established in engineering studio, Washington University modified the curriculum in its existing senior seminar course, adding modules that deepen connections to the real world and help students develop career plans that reflect their emerging professional identities.

Boeing's engagement with academic partners to develop and support JELDP has involved considerable investment of corporate resources, both human and financial. The company's engineering professionals have shared their time and expertise in a variety of ways: collaborating on the design of the new curriculum, serving as adjunct faculty for engineering studio and senior seminar courses, and coaching students one-on-one through mentoring and internship programs that are exclusively available to students in JELDP. In addition to investing significant human resources, Boeing also pledged a seven-figure gift over five years, including $100,000 per year in scholarship support for students in the program.

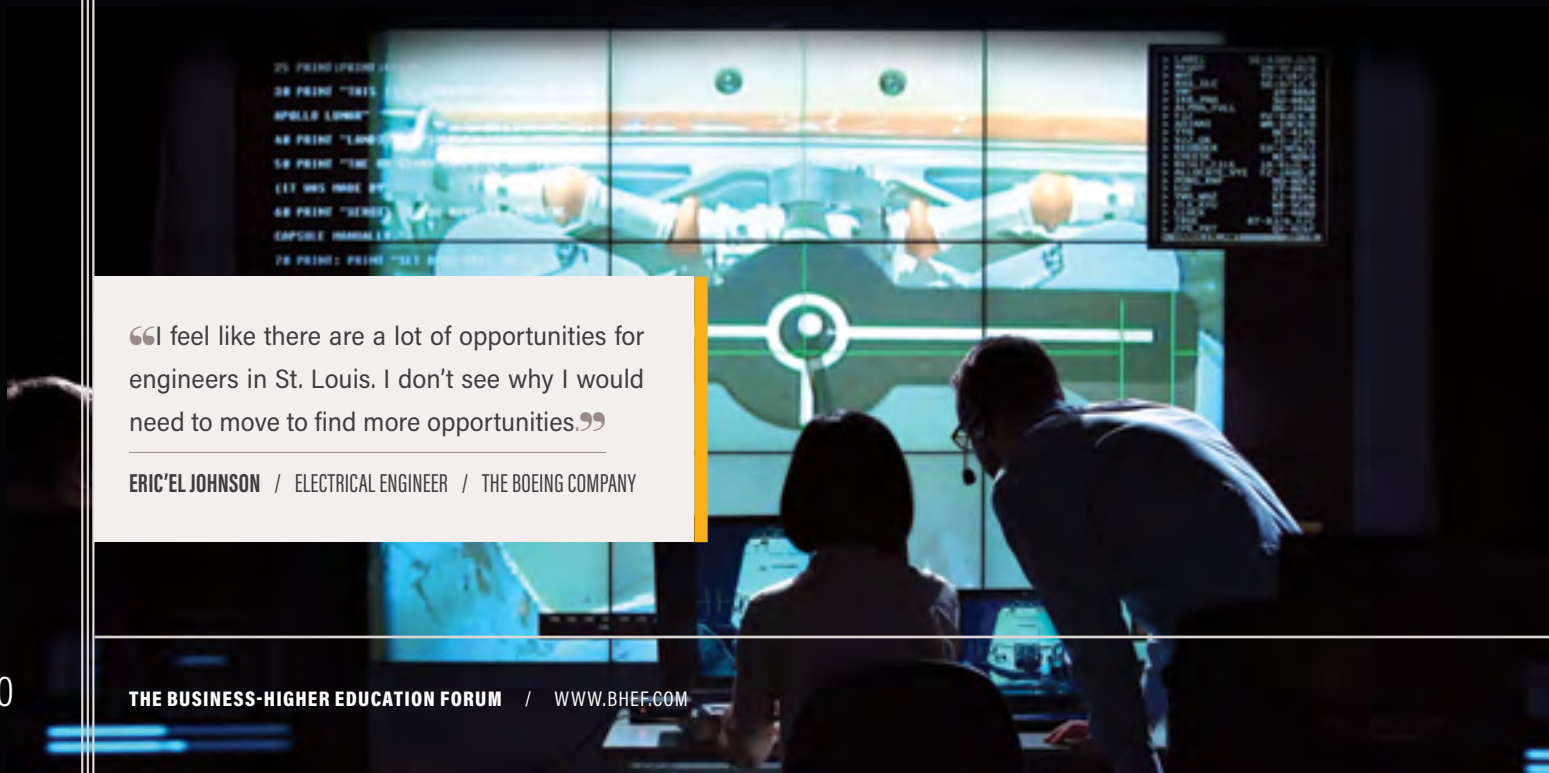


> "St. Louis Community College is a proud partner of the Joint Engineering Leadership Development Program. It provides the underserved **a pathway to a high-quality bachelor's degree program** for students who otherwise may not have had the opportunity to participate. We appreciate our partner institutions and look forward to the opportunities ahead!"
>
> **JEFF PITTMAN** / CHANCELLOR / ST. LOUIS COMMUNITY COLLEGE

PROMOTING WORK-BASED LEARNING

JELDP'S FOCUS ON PREPARING STUDENTS from diverse backgrounds for success in the engineering profession has inspired program innovations that also address a broader challenge in engineering education. For many students, traditional engineering coursework feels disconnected from real-world engineering practice and irrelevant to their professional development. Students' most engaging, meaningful learning experiences often take place outside the classroom in internships, co-ops, and extracurricular activities that present opportunities for applied problem-solving, but many nontraditional students find it impossible to participate in these out-of-class learning experiences because of competing demands on their time. To ensure that all students in JELDP have access to meaningful opportunities for experiential learning and professional development, the program has adopted strategies that challenge the traditional model of engineering education and blur the boundary between the classroom and the professional world.

Typically, at other colleges and universities, engineering students alternate between full-time coursework and full-time work experience, either through summer internships or semester-long co-ops. In contrast, the structure and philosophy of the Joint Undergraduate Engineering Program allow—and encourage—students to divide their time between coursework and work experience year-round. Unlike traditional engineering programs, all courses in the Joint Undergraduate Engineering Program are held in the evenings to accommodate students' work schedules. This unconventional approach to engineering education created a unique opportunity for Boeing to create a part-time engineering internship program modeled closely after an existing part-time business internship program. Through the internship program, JELDP students engage in high-quality experiential learning while working alongside Boeing's engineering leaders during the day and then spend their evenings in the classroom. This approach helps students recognize connections between their coursework and the real world that enhance learning in both contexts. Students who continuously work in the field also realize considerable benefits: They are positioned for better jobs when they finish the program, and they graduate with little or no debt.



> "I feel like there are a lot of opportunities for engineers in St. Louis. I don't see why I would need to move to find more opportunities."
>
> **ERIC'EL JOHNSON** / ELECTRICAL ENGINEER / THE BOEING COMPANY

STUDENT PROFILE

ERIC'EL JOHNSON GREW UP IN A FAMILY THAT STRUGGLED to make ends meet but never lost hope that a better life was possible. Johnson's mother worked long shifts to support her three daughters but also made time to attend college classes and inspired her daughters to dream big about their futures. Johnson was determined to earn a college degree of her own, and she promised that her mother would not have to pay for it. She was initially drawn to the Joint Undergraduate Engineering Program by her long-standing interests in math and science. Studying in St. Louis meant that she could live on campus and be immersed in college life but still be just a short drive away from her tight-knit family. Johnson's mind was made up when she learned that she would also be awarded a full scholarship, which would enable her to keep her promise to her mother.

ERIC'EL JOHNSON

When Johnson entered the Joint Undergraduate Engineering Program at UMSL in fall 2012, she was matched with a peer mentor who helped connect her to an internship opportunity at Boeing. That internship, during the summer after her freshman year, would become her first of three internships at Boeing. Through careful planning and hard work, Johnson transitioned to Washington University ahead of schedule, in the spring semester of her sophomore year. She was excited to be at an elite engineering school, where the classes were small and challenging and where she had opportunities to work with advanced technology and to learn from adjunct faculty who were practicing engineers. Taking all of her courses in the evenings allowed Johnson to spend her days taking advantage of the many internship and research opportunities available through Washington University. She also made time to share her experiences with more than 150 freshmen in the engineering program by the time she graduated. When Johnson earned her degree in May 2016, Boeing hired her as an electrical engineer.

Since joining Boeing full-time, Johnson has continued to pursue her passion for mentoring others. She volunteers with the company's outreach efforts in the local public schools, helping create opportunities for young people in the community to discover engineering. Johnson has also maintained a strong connection to the Joint Undergraduate Engineering Program. She plans to serve as a mentor for future JELDP cohorts—sharing her experience as a Boeing employee to help prepare students for life after college—and she aspires to eventually serve as an adjunct instructor in the program. Johnson also feels deeply connected to Boeing and hopes to continue working for the company long-term. She is currently studying for her master's degree in electrical engineering, with financial support from Boeing.

INSIGHTS

FOCUS PARTNERSHIPS ON DEVELOPING A SUSTAINABLE REGIONAL TALENT ECOSYSTEM

The partnership of a four-year public university, four-year private university, community college, and an employer all focused on developing a regional talent ecosystem with support from state and federal government is unique. Each partner aligned on key objectives to address a regional need for diverse talent and focused on big-picture results. Building a pool of local engineering talent will not only benefit existing companies, but it also has the potential to attract new firms to the St. Louis area, creating a positive feedback loop that will increase demand for engineers and other technical professionals.

ENGAGE WITH EXTERNAL ENTITIES AND DEVELOP INFRASTRUCTURE TO SUPPORT AND SCALE ONGOING PARTNERSHIP EFFORTS

From the beginning, organizations external to this partnership have shaped its trajectory. BHEF served a critical role in bringing the partners together, facilitating communication and collaboration. Applying for a grant from the National Science Foundation encouraged partner organizations to make concrete commitments, and the resulting funding enabled them to persist in their collaboration and expand the scope of JELDP.

The partner organizations also developed internal infrastructure that has been essential to their collaboration. The partners committed valuable human resources toward the development of JELDP, with each organization identifying key individuals to serve as liaisons. These liaisons formed a cross-organizational team, which has worked together to develop the program and see it mature, while at the same time building collegial relationships that will sustain this partnership for many years to come.

CAPITALIZE ON EXISTING BUSINESS-HIGHER EDUCATION RELATIONSHIPS TO EXPAND PARTNERSHIPS TO OTHER EDUCATIONAL PARTNERS

Many companies have highly prescribed practices for how and where they recruit talent, and they have difficulty finding diverse candidates in their usual academic talent pools. The JELDP program provided Boeing and Washington University, which already had an established hiring partnership, with an opportunity to expand that partnership to include transfers from STLCC into the UMSL/Washington University Joint Undergraduate Engineering Program. By capitalizing on their existing relationships, companies like Boeing can more easily expand their talent recruitment strategies, opening their doors to individuals from diverse educational beginnings who have proven themselves by earning degrees from Washington University's engineering program.

USE PARTNERSHIP DEVELOPMENT AS A CATALYST FOR ALIGNING INTERNAL PRIORITIES AND PRACTICES WITH PROGRAM GOALS

Both Boeing and Washington University benefited from changed internal practices and priorities through the JELDP program. At Boeing, the program sparked internal discussions on their human-resource strategies, which typically recruit from selected academic institutions, about the need to recruit and retain engineers from diverse backgrounds and institutional sources, particularly those who began their academic work at two-year colleges. Because of its importance to the company's leadership, Boeing has also been able to accelerate their hiring initiatives through the program. At Washington University, the program's success catalyzed meetings with other potential business partners to expand and replicate the program elsewhere.

DEVELOP PROGRAMS WITH A STUDENT-FIRST MENTALITY

Nontraditional students come to higher education with a complex set of needs, and program design should thoughtfully address those needs by using a student-first mentality. This partnership includes educators with deep experience working with the targeted student population, and key features of the program reflect their expertise. Substantially reduced tuition for upper-division engineering courses and the growing scholarship program speak to students' financial concerns. Sensitivity to the competing demands on students' time informed the decision to offer all program courses in the evenings. Importantly, JELDP also recognizes the considerable strengths that students bring to the program. For example, many come from educationally underserved backgrounds, from high schools that did not even offer calculus, a prerequisite for engineering bachelor's programs. Even so, these students were driven by their interest in engineering, and they overcame many obstacles before beginning JELDP. The program's curriculum helps students reflect on the character strengths that have enabled their success as students and that will help them thrive in the engineering profession.

BUILD HIGH-IMPACT PRACTICES INTO PROGRAM DESIGN

High-impact practices are a specific set of educational strategies—such as internships, experiential learning opportunities, and first-year experiences—shown through research to substantially benefit undergraduate student engagement, learning, and retention. In traditional engineering programs, high-impact practices are typically found outside of the classroom in extracurricular activities or work-based learning. Unfortunately, nontraditional students are less likely to participate in these optional, out-of-class experiences because of other demands on their time. To ensure that all students in JELDP have access to high-impact practices, the program designers embedded these practices in the required curriculum, thereby increasing the odds that every student will graduate with an engineering degree.

> "We need to be holistic in how we think about the graduates of the program. Yes, they need to know their technical material, but they also need to be prepared to succeed in the engineering profession. That means that they have to understand how they as individuals fit into that profession. Boeing's involvement has been catalyzed by BHEF. Through scholarships, mentorships, internships, and broad engagement with our program, Boeing supports all aspects of the development of our students."
>
> **JODY O'SULLIVAN** / DEAN / UMSL/WU JOINT UNDERGRADUATE ENGINEERING PROGRAM / WASHINGTON UNIVERSITY IN ST. LOUIS

IMPLICATIONS

LEADERSHIP BY BUSINESS, HIGHER EDUCATION, AND POLICYMAKERS IS AN ESSENTIAL CATALYST

This partnership would not exist—and certainly would not be so successful—without the initiative and enthusiastic support of senior leadership at each organization. The presidents and chancellors are champions for developing an ecosystem of diverse engineering talent and have identified this vision as a connecting point for their organizations' missions and strategic goals. Business leaders can be compelling advocates, persuading policymakers to support partnerships that meet pressing workforce needs and contribute to the long-term economic and social vitality of their region.

POLICYMAKERS MUST ENSURE THAT PUBLIC INSTITUTIONS HAVE THE RESOURCES TO MEET EVOLVING MIDDLE- AND HIGH-SKILL WORKFORCE DEMANDS AND THAT ACCESS IS AFFORDABLE TO STUDENTS

Vertically integrated talent ecosystems depend on both public and private higher education institutions. Public institutions require adequate public resources to remain healthy and dynamic partners in supporting the ecosystem. One of the central concerns for JELDP moving forward is how to keep the program affordable for all students. In recent years, the state legislature in Missouri—as in many other states—has cut back its appropriations to public higher education. Those cuts have significantly impacted the budgets at UMSL and the community colleges, which are critical access points for students from diverse backgrounds. If promising students lose access to the pipeline, the state will also lose the benefits associated with expanding its talent ecosystem of well-compensated engineers and technicians. Significant investments by Washington University and Boeing along with its partnerships with UMSL and the community colleges have helped reduce tuition and have provided scholarship support to help meet students' financial needs. However, to ensure the long-term sustainability of programs like JELDP—and to drive economic development in the state—partners must urge policymakers to prioritize investment in public higher education.

BUSINESSES NEED TO GROW LOCAL TALENT AND PROMOTE DIVERSITY BY CHOOSING THE RIGHT EDUCATIONAL PARTNERS IN ORDER TO ENSURE REGIONAL ECONOMIC GROWTH

Developing a vertically integrated ecosystem of engineering talent in the St. Louis region is a complex enterprise. Local businesses need diverse, well-prepared engineers. At the same time, the ecosystem cannot thrive on engineers alone. Companies also need skilled technicians to support engineering projects, as well as factory workers trained in advanced manufacturing. No single institution of higher education can be responsible for building such a complex ecosystem; instead, a coalition is required. In St. Louis, UMSL and STLCC serve as on-ramps that provide students with access to diverse pathways into the engineering field. Those on-ramps will lead some students into JELDP, but they will lead others to discover life-changing opportunities in technical and certificate programs. All of these educational pathways hold value for students, for businesses, and for the region, and this diversity of pathways is made possible through the coordinated efforts of multiple institutions with a shared commitment to changing the landscape of opportunity in their community.

HIGHER EDUCATION MUST CREATE PARTNERSHIPS THAT TAP NEW TALENT POOLS AND BUILD HIGH-DEMAND SKILLS FOR THE REGIONAL ECONOMY

Academic leaders worked closely with business partners to understand the needs of local employers and to develop a strategy that leveraged the unique strengths of each partner institution to meet those needs. While UMSL and STLCC could provide entry points to engineering education for students from diverse backgrounds, Washington University could launch students into the profession by connecting them to the network of employers that recruits from its elite engineering program. To translate this concept into practice, the partner institutions have worked together for decades to ensure that students have a seamless undergraduate experience as they transition from UMSL or a community college to Washington University. Academic leaders meet regularly to discuss curriculum alignment and engage their business partners in an ongoing dialogue about how to support all students in the program.

EARLY RETURNS

JELDP PROVIDES PROMISING STUDENTS FROM ST. LOUIS and surrounding communities with resources and opportunities that clear a pathway to rewarding careers in engineering. In this academic year (2017–2018), the program expects to award scholarships to sixteen students and to provide more than a dozen students with opportunities to work one-on-one with Boeing's practicing engineers. Approximately eight students will be paired with mentors, and Boeing's goal is for at least five to be placed in part-time internships. The first JELDP cohort will graduate in spring 2018, and the members of the graduating class will represent backgrounds that are much more diverse than would be found in most engineering programs. Boeing and many other local companies—including POWER Engineers, which hires almost exclusively from the JELDP program—anticipate recruiting from JELDP's pool of engineering talent for many years to come.

Beyond JELDP's immediate impacts—creating life-altering opportunities for individuals and meeting an urgent business need for Boeing—the program's effects are also reverberating as students share their experiences with friends, family members, and neighbors. Through intentional outreach in public schools and informal conversations, students who have benefitted from JELDP serve as unofficial ambassadors for the program and as inspiring role models for younger students from their communities.

Washington University and Boeing are taking steps to build on JELDP's early successes. The partners are creating a new hands-on learning space where small teams of engineering students will engage in research and design projects. To provide students with additional experiential learning opportunities, Boeing is developing capstone projects and competitions that will ask students to respond to real design challenges that Boeing is trying to solve. Boeing also plans to expand its part-time internship program to bring more students on board.

To more fully understand JELDP's impact, the partners are developing assessment instruments to evaluate the program. For Washington University, evidence of a successful program model and partnership with Boeing has provided proof points to approach other local companies, such as Emerson Electric Company, Nidec Motor Corporation, and Ameren Corporation, about joining JELDP, scaling up the program, and creating more opportunities for students.

> "This is an example of how to enhance cooperation between institutions. We developed our relationship with Washington University through this engineering program, and it has helped stimulate other kinds of cooperation. There are spin-off benefits of this partnership."
>
> **THOMAS GEORGE** / CHANCELLOR / UNIVERSITY OF MISSOURI-ST. LOUIS

ABOUT THE BOEING COMPANY

The Boeing Company (Boeing) is the world's largest aerospace company and leading manufacturer of commercial jetliners and defense, space, and security systems. A top U.S. exporter, the company supports airlines and U.S. and allied government customers in 150 countries. Boeing products and tailored services include commercial and military aircraft, satellites, weapons, electronic and defense systems, launch systems, advanced information and communication systems, and performance-based logistics and training.

ABOUT ST. LOUIS COMMUNITY COLLEGE

St. Louis Community College (STLCC) is the largest community college district in Missouri and one of the largest in the United States. Local voters approved by a two-to-one margin the formation of the Junior College District of St. Louis-St. Louis County in April 1962. It was the first district in the United States to simultaneously construct three campuses. The $47.2 million bond issue approved in 1965 was the largest in the history of U.S. community college development at that time. More than one-half the households in the St. Louis area include at least one person who has attended STLCC.

ABOUT UNIVERSITY OF MISSOURI-ST. LOUIS

With nearly 17,000 students, University of Missouri-St. Louis (UMSL) is the largest public research university in eastern Missouri. It provides excellent learning experiences and leadership opportunities to a diverse student body whose influence on the region upon graduation is immense. UMSL is spread across 470 acres in suburban St. Louis County. It has a mix of modern and historic academic buildings as well as a variety of student residence halls, condominiums, and apartments. It is the perfect setting for students to gain unique insights from outstanding faculty and work experience from internships at companies and organizations found only in this world-class metropolitan region. While UMSL graduates can be found in all 50 states and 63 countries, their greatest impact is felt right here in St. Louis. More than 68,000 UMSL alumni call the St. Louis region home. They drive the region's economy and contribute mightily to its social well-being.

ABOUT WASHINGTON UNIVERSITY IN ST. LOUIS

Washington University in St. Louis, a medium-sized, independent university, is dedicated to challenging its faculty and students alike to seek new knowledge and greater understanding of an ever-changing, multicultural world. The university is counted among the world's leaders in teaching and research. The university has played an integral role in the history and continuing growth of St. Louis and benefits in turn from the wide array of social, cultural, and recreational opportunities offered by the metropolitan area to its more than 2.8 million residents. Washington University's mission is to discover and disseminate knowledge and to protect the freedom of inquiry through research, teaching, and learning.

ACKNOWLEDGEMENTS

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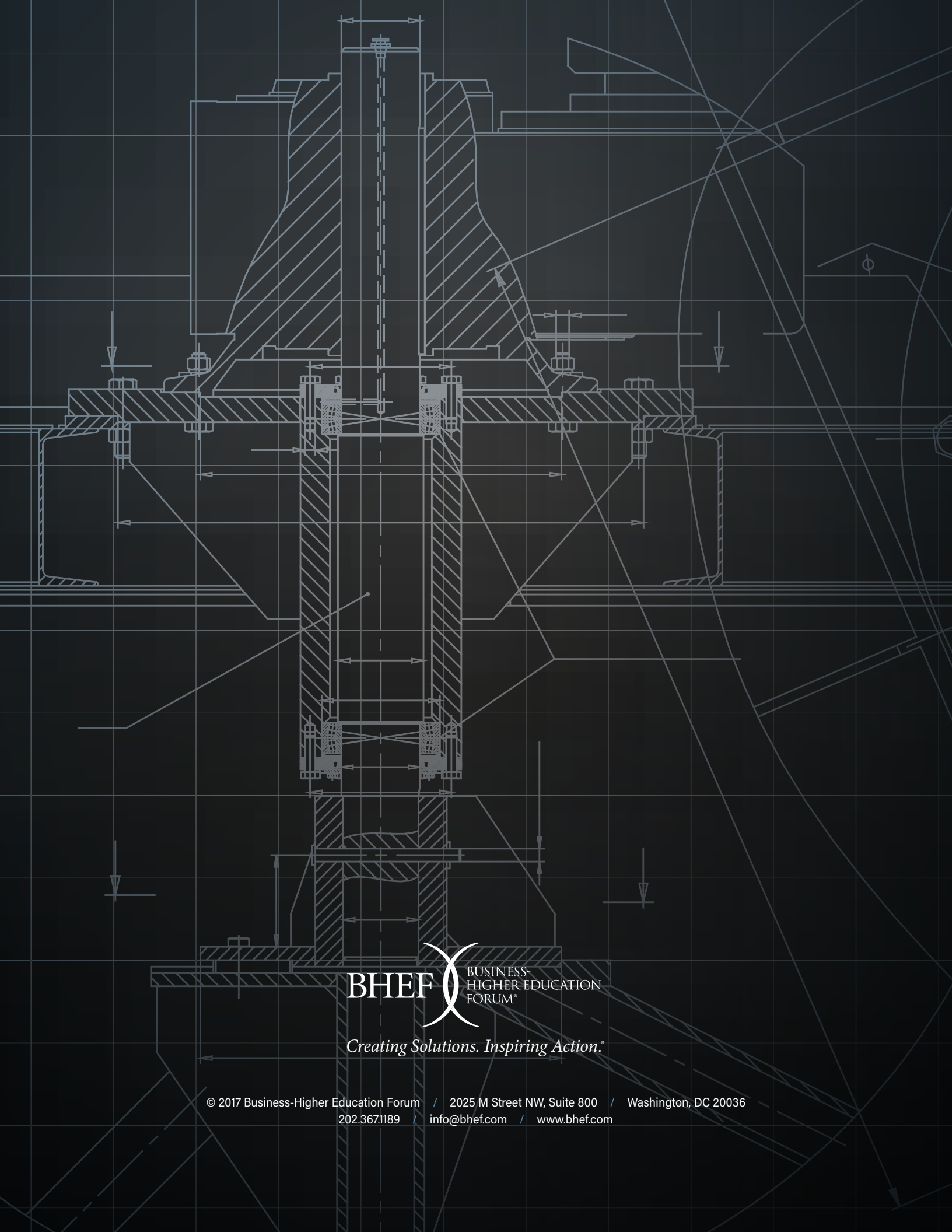
PROGRAM CONTACT

Dr. Joseph A. O'Sullivan
Samuel C. Sachs Professor of Electrical Engineering
Dean, UMSL/WU Joint Undergraduate Engineering Program
Preston M. Green Department of Electrical and Systems Engineering
jao@wustl.edu

PROGRAM WEBSITE

www.umsl.edu/divisions/engineering



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 / 2025 M Street NW, Suite 800 / Washington, DC 20036
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