ISP Faculty Engagement

Washington University in St. Louis
Institute for School Partnership

Washington University in St. Louis
INSTITUTE FOR SCHOOL PARTNERSHIP

Connecting·Inspiring·Empowering

A message from ISP Executive Director Victoria L. May,

The Institute for School Partnership is committed to equality of education and joy of learning. The Broader Impact program amplifies the capacity of our university community to be good neighbors and strong partners in strengthening the fabric of schools in our region. Together, we can harness the energy and talent of the Washington University community to address our most pressing educational challenges.

The ISP provides campus-wide support for faculty to develop outreach opportunities with St. Louis area K-12 schools. Through the ISP, you can have a meaningful impact on campus and beyond. In this booklet, we have captured the stories of several of the WashU faculty making a difference in the schools. Connect with us and we can help identify the best engagement for you, and turn your passion into action. We look forward to meeting with you and co-designing a program to share your enthusiasm and area of scholarship.

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Bringing cutting edge research to K-12 classrooms

"If research outcomes do not benefit our society, their impact is severely limited. So as an engineer I'm always thinking about how to translate research findings into applications which can change our lives, and that means engaging the interest of many other people."

Research should not be isolated to the laboratory.
At least that is what Young-Shin Jun, professor of energy, environmental & chemical engineering in the School of Engineering & Applied Science, believes.

When she first arrived at WashU, she wanted her research to have an impact beyond academic circles, but she wasn't quite sure how to make it happen. That changed once she met with ISP executive director Victoria May. What began as a few meetings quickly catalyzed into a powerful partnership between Jun's lab and the local K-12 education community. Jun brought in middle school teacher Megan Edwards and ISP's associate director Rachel Ruggirello to work with her research team. Together, they were able to translate cutting-edge research into hands-on science activities for middle school students.

Jun has worked with over 80 teachers, impacting roughly 2,000 students through various programs, workshops and lectures. In April of 2016, Jun and Edwards, along with Ruggirello, presented their work at the National Science Teachers Association (NSTA) conference, reaching teachers from across the country.

Promoting equality in STEM education

"I created a culturally responsive mathematics curriculum that incorporates racial pride, ethnic identity and self-esteem. All of these assets I scientifically tested to help African American girls see themselves as participants in the STEM process."

Sheretta Butler-Barnes' research shows student achievement and confidence increase when STEM instruction is connected to both a student's lived experience and cultural heritage. That's why she has integrated history into the learning, introducing students to African American scientists such as Katherine Johnson, the NASA physicist and mathematician who helped put a man on the moon.

Through her work with the Girls Inc. Eureka! program she exposes middle and high school girls of color to an intensive STEM-based curriculum. Butler-Barnes, assistant professor of social work at the Brown School, and her husband, David Barnes, a math educator and PhD candidate in math education at Washington University, helped develop the program's culturally responsive mathematics curriculum.

"You don' teach them differently - math is math - but what you can do is tell them stories of people like them who have made strides in male-dominated fields," Butler-Barnes says. "You can't be what you don't see."

Study after study shows teachers call on boys more than girls, and that societal forces discourage women from pursuing STEM studies. The result: women, especially African American women, are underrepresented in high-paying STEM jobs.

The Girls Inc. Eureka! program serves over 50 African American girls in the St. Louis area. Participants spend their first two summers at the University of Missouri-St. Louis and Maryville University, respectively, before arriving at Washington University. Students are placed in paid STEM-related internships for the final two summers.

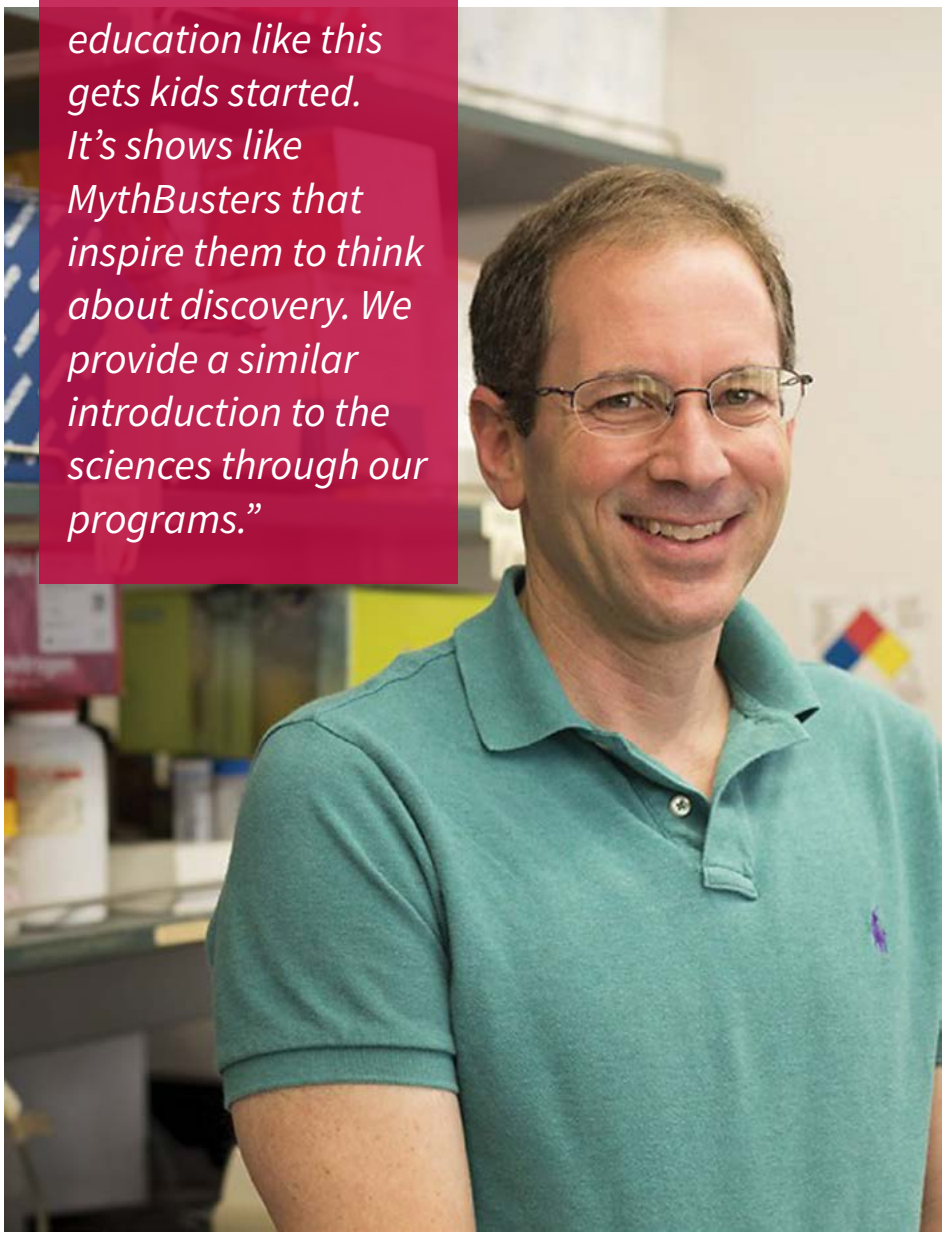
Building the neuroscience pipeline in St. Louis

He always knew that he wanted to be a scientist, but more specifically he dreamed of becoming a scuba-diving scientist. And after graduating from Duke University, Erik Herzog, professor of biology in Arts and Sciences, took his first job as a professional scuba diver working on mud crabs in North Carolina. "It wasn't glamorous, diving in muddy rivers," he says, "but I loved that I was using my education to help understand this mysterious underwater world."

Gradually his interests and research focused on neuroscience. When he came to WashU, Herzog knew he wanted his research to extend beyond the walls of the university. Working alongside the ISP as one of its faculty fellows, Herzog spearheaded an initiative to create a neuroscience pipeline for schools in the area to open opportunities for students to engage with science.

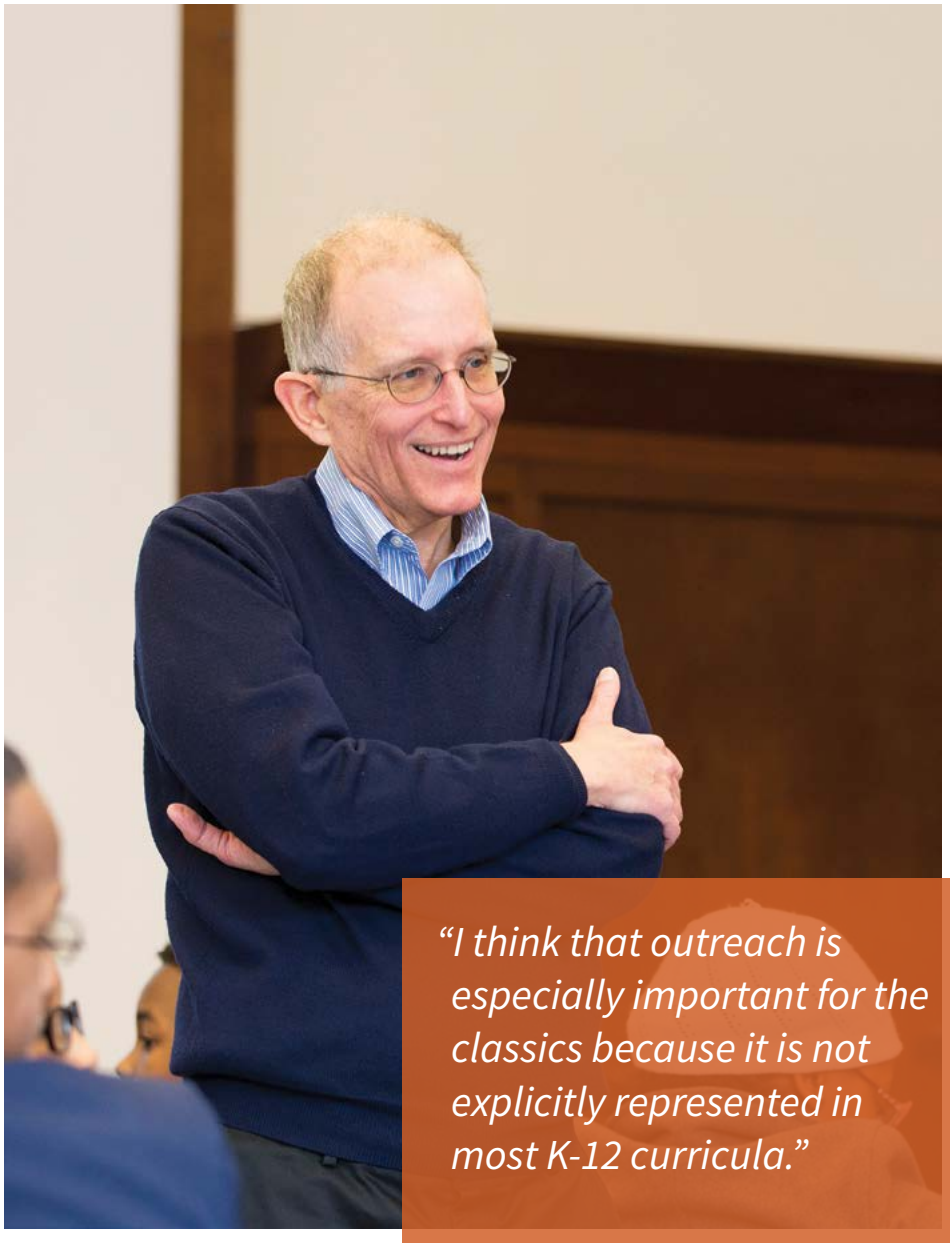
As co-director of the Neuroscience Graduate Program at WashU, Herzog encourages his students to engage with the community through the annual Amazing Brain Carnival - held twice a year at the Saint Louis Science Center. At this event, graduate students present their neuroscience research in fun and engaging ways to visitors of all ages. Additionally, he helps run the St. Louis Area Brain Bee, a spelling-bee style competition that tests high school students in their knowledge of neuroscience.

"Those of us who have chosen science as a career, recognize it as a really fun job," Herzog says. "We recognize that we can make a difference in people's lives and how things are done around our communities and our country, and I want to be able to share that message with students."



"Informal science education like this gets kids started. It's shows like MythBusters that inspire them to think about discovery. We provide a similar introduction to the sciences through our programs."

Connecting with schools to experience the classics



"I think that outreach is especially important for the classics because it is not explicitly represented in most K-12 curricula."

For many professors at Washington University, the passion they have for their field of endeavor started at a young age. A simple experience along the way sparked their interest and that interest stuck. Professor Timothy Moore , the John and Penelope Biggs Distinguished Professor of Classics and director of undergraduate studies in the Department of Classics in Arts & Sciences, says that middle school is that optimum time to capture the interest of students. That is why Moore and several of his PhD students, spent a March morning with a group of students from KIPP Triumph in St. Louis to teach them about their area of expertise: Greek and Roman culture.

"It seemed to me that they were enchanted by the experience," Moore says.

Throughout the morning, the students wiggled with excitement as they listened and learned about the heroes and monsters of Greek mythology. When Moore asked if the students could name the father of the gods, hands shot up, dancing in the air and begging to be called on. Moore says that the classics are so important because they teach skills like language and critical thinking that can be widely applied, but that often students miss out on having these experiences.

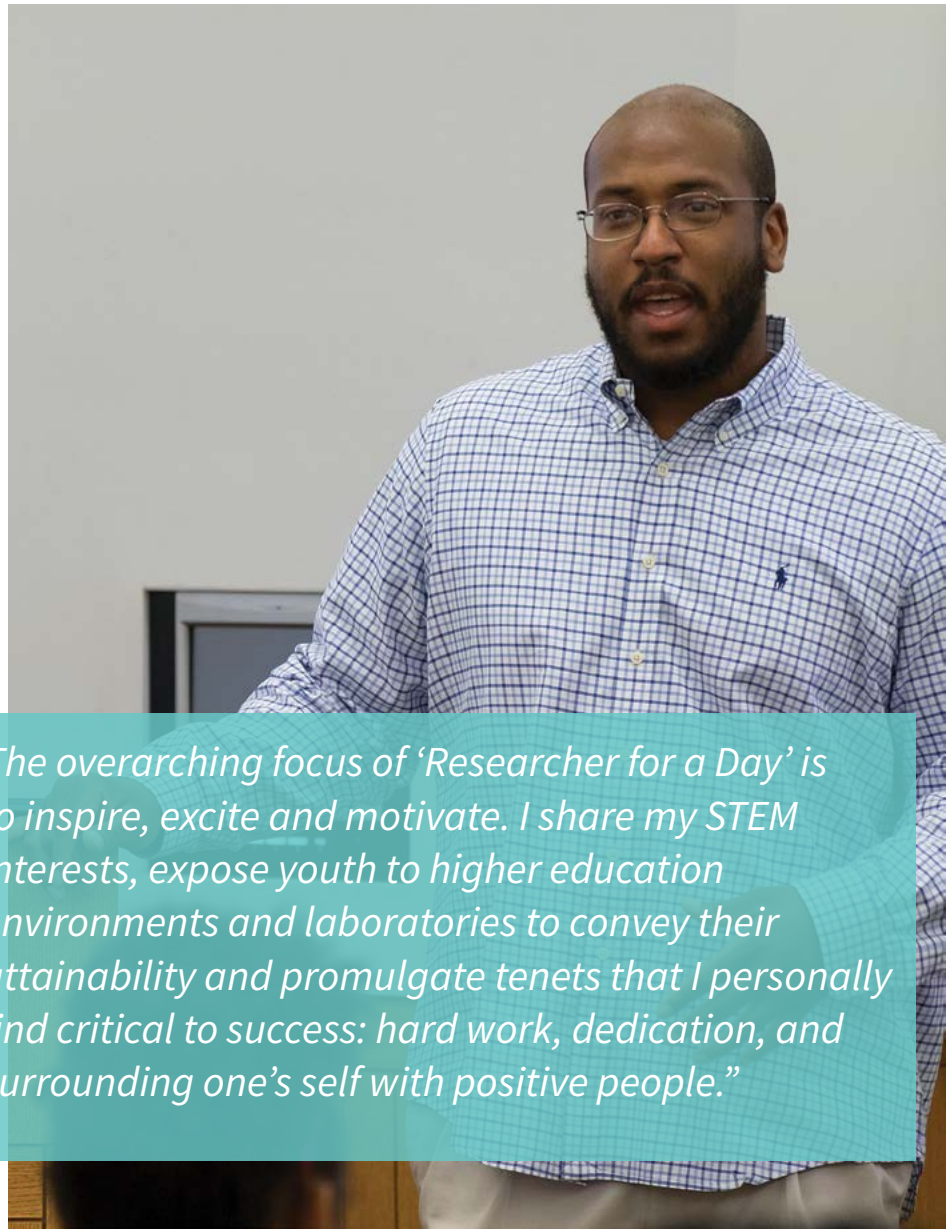
"Greek and Roman cultures have something to offer everyone," Moore says. "However, underserved students are the least likely to get this exposure." This belief is what motivated Moore to search for opportunities to partner with local schools and led to his initial connection with the ISP.

Nurturing the next generation of scientists

STEM degrees are the degrees of the 21st century.
That's one of the driving forces behind Marcus Foston's involvement with nurturing the next generation of scientists. In particular, he's interested in increasing STEM education opportunities for minorities. As part of his work, Foston, assistant professor of energy, environmental & chemical engineering in the School of Engineering and Applied Science, hosts 'Researcher for a Day' events in his lab for local middle school students. Most recently he has hosted students from Hawthorn Leadership School for Girls, and KIPP Inspire Academy.

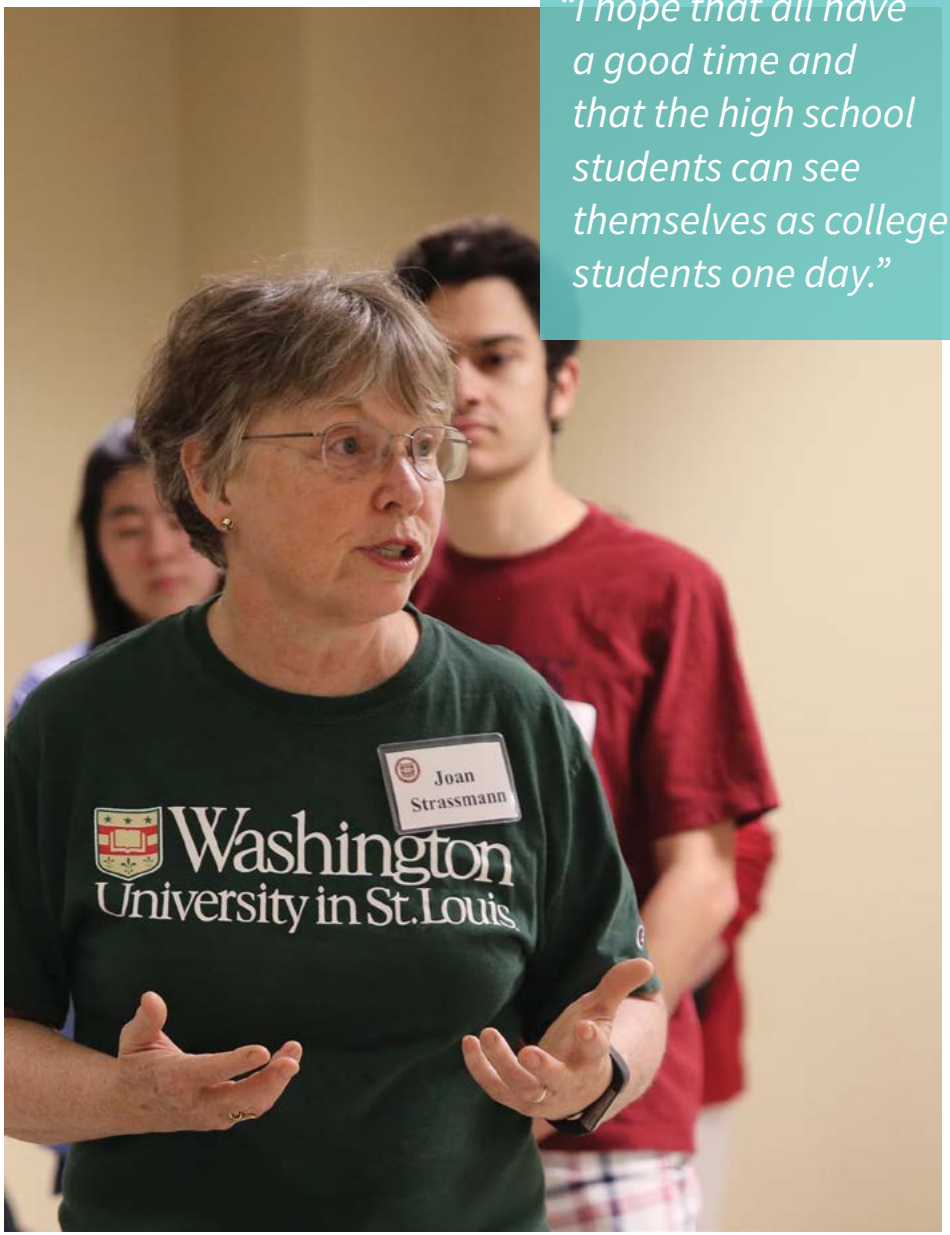
"Often, underrepresented students are not given the opportunity to engage with STEM subjects early enough, in a way that is inspiring, exciting and hands-on," Foston explains. "Even more importantly, our socio-economically disadvantaged youth are more discouraged than ever. They feel that going to school is not the most viable route to success and that they have no place engaging in STEM subjects or pursing goals of higher education."

During the 'Researcher for a Day' event, students learn how to properly use basic lab equipment, use the scientific method to answer questions and to graph sets of data. Foston also encourages the students' career aspirations. In addition, college is discussed and they learn what is required to attend a four-year college for engineering.



"The overarching focus of 'Researcher for a Day' is to inspire, excite and motivate. I share my STEM interests, expose youth to higher education environments and laboratories to convey their attainability and promulgate tenets that I personally find critical to success: hard work, dedication, and surrounding one's self with positive people."

Fun and games in the name of science education



"I hope that all have a good time and that the high school students can see themselves as college students one day."

On a Saturday in November for the past several years Joan Strassmann has been in a classroom on the Danforth Campus, surrounded by a gaggle of high school students. This annual Animal Behavior and Evolution Day event is her brainchild. It's a lot of fun and games in the name of science education.

"They say you learn best by teaching, and this activity illustrates this," says Strassmann, the Charles Rebstock Professor of Biology in Arts & Sciences and an ISP Faculty Fellow.

She charges the undergraduates in her Behavioral Ecology course with creating engaging hands-on activities to learn about evolutionary topics ranging from parenthood to mating to natural selection. The event has proven very successful. In addition to engaging undergraduates in the course content, the day gives high school students a glimpse into college level content. Strassmann says that the experience allows many students to see college as something attainable.

"It's a Saturday morning and people are tired," explains Erica Ryu, a senior majoring in biochemistry who helped lead a lesson that highlighted sex allocation and local resource competition. "They've been to school all week. Our aim is to provide a fun, interactive activity for them to enjoy. You gain more out of that. I like talking to people, educating them and making them excited about science. It's important to me that people understand science and get excited about it!"

Inspiring high school students through evolutionary biology

Teenagers in torn jeans and hoodies are informing the body of scientific knowledge in classrooms across the region thanks to the educational outreach of Kenneth Olsen, professor of biology in Arts & Sciences.

The ISP supported effort that turns high school students into scientists is called the Clover Project. It documents white clover's production of cyanide and offers students the opportunity to study Mendelian genetics, population genetics, natural selection and the effects of plant herbivory. Thousands of students in hundreds of biology classes have contributed to its database.

"They're generating real data for a real research project," Olsen explains. "And they're doing this with clover plants found in their lawns and on school grounds."

The Clover Project fulfills numerous education requirements and encourages students to take science seriously. Students know their results are informing real research to be published in a scientific journal.

In addition, through a collaborative effort between the ISP, the Olsen Lab, and St. Louis area high school biology teachers, his research into the genetics of red rice is being developed as a training tool for teaching about the genetics of adaptation and the impact of weedy species in agricultural contexts.

"By exposing them to exciting, hands-on experiments, we are awakening their curiosity about the natural world. Once they start asking questions, they see the world in a different way. And they want to find the answers."

Connecting K-12 students with the arts

Washington University has a long standing relationship with surrounding schools, inviting them to take part in the various cultural and artistic presentations happening on campus. For years now, WashU's Performing Arts Department has invited students and teachers to the Edison Theatre to attend performances, and after shows they are invited to participate in a master class taught by the likes of David Marchant, professor of the practice in dance or Joanna Dee Das, assistant professor of dance.

"Everybody deserves access to the arts," Marchant says.

For Das, sharing her love of the arts with high school students and encouraging their creativity has always been important. As a graduate student, she taught a Saturday dance class to high school students at the Museum of the City of New York.

"It was so much fun. I look forward to any opportunity to engage with youth and encourage them to express themselves," she says.

Many of the youth invited to campus for field trip experiences and exposure to college life are from high-needs urban schools.

Building a school culture of trust and respect

Rowhea Elmesky's work brought her to a local high school closely tied to the Washington University community. In fact, University City High School sits only two and half miles north of the Danforth Campus. The high school is rich in diversity. Socially, culturally, and socioeconomically, the school is a snapshot of the melting pot that surrounds it. However, in a school setting, as in many situations in life, the merging of diverse communities can bring challenges.

The ISP connected Elmesky, an associate professor in the Department of Education in Arts & Sciences, with two administrators in the School District of University City. They wanted her expertise in creating practical solutions that would lead to real change in the school's culture and disciplinary practices.

The undergraduates in Elmesky's Educational Studies Capstone course held self-advocacy workshops for the high school students, teaching them essential communication skills including active listening, compromising, rebutting ideas, and knowing one's audience.

What began as a passionate conversation about school culture with three individuals quickly rippled throughout the school, igniting students, teachers, and administrators to take action.

"I didn't want to create research that would just sit in a book for years until a school administrator happened to read it and tried to implement it."

"These girls inspire me because I see myself in them. They are my reflection. I am excited for them because I see the excitement in them."
- Sheretta Butler-Barnes

"This is real-world learning, following principles that go back to John Dewey and before, that school should be like real life as much as possible. But it could not happen without the help of the ISP. We need high school students to teach. We need rooms to teach in. We need permission slips signed and directions given."
- Joan Strassmann

"This competition grows every year and I'm impressed with the knowledge these high schoolers demonstrate. I love seeing so many young people excited about learning."
-Erik Herzog about the St. Louis Area Brain Bee

"As an African American male working in STEM research at one of the top academic institutions in the country, I have a unique position to share my experiences and connect with minority and underrepresented students on a personal level."
– Marcus Foston

"This experience reaffirms my love of dance and love of working with youth."
- Joanna Dee Das

ISP Faculty Engagement

Being part of the WashU community

means giving back.

An average of 60 faculty members participate in ISP activities each year as part of their research, service and broader impact efforts.

A lecture. A workshop. One hour. A whole semester. No matter your time commitment, you can make a difference. There are many ways to get involved. You could:

- Host a teacher in your lab for the summer
- Host a student group on campus
- Teach a semester long course
- Provide expertise in curriculum development
- Be a guest speaker at a teacher workshop
- Offer a summer research experience for a high school student

Enhance your WashU experience by connecting with your community through the Institute for School Partnership's Broader Impact program.

Contact us today. We look forward to working with you!

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