As we complete the third year of Bass Connections, we are pleased to share with you this report on activities and accomplishments for 2015-2016. We have reached a juncture for reflection, having seen the successes—and challenges—of MORE THAN 130 PROJECT TEAMS, WITH MORE THAN 1,300 PARTICIPANTS ACROSS DUKE’S CAMPUS AND BEYOND. The teams have drawn on the existing strengths and interests of Duke’s faculty and students in interdisciplinary research and learning, and have experimented with new ways to build intellectual communities and conduct collaborative research.

SINCE THE INCEPTION OF THIS INNOVATIVE PROGRAM IN 2013, WE HAVE SOUGHT TO LEARN AS MUCH AS WE CAN FROM IT, CREATING A ROBUST EVALUATION FRAMEWORK THAT HAS GENERATED NUMEROUS INSIGHTS ABOUT HOW TO IMPROVE PARTICIPANTS’ EXPERIENCES AND THE EFFECTIVENESS OF TEAMS. We have learned, for example, that graduate students play pivotal roles within Bass Connections projects. Because the teams include faculty and undergraduate students, often most familiar with a lecturer-learner model, graduate students often become facilitators who serve as project managers and additional mentors for undergraduate participants. We have similarly learned that teams can assume a remarkable diversity of sizes and modes of organization. But regardless of structure, the fashioning of clear role definitions for participants has stood out as a key element in the recipe for success.

IN JUST THREE YEARS, WE ARE ALREADY SEEING THE IMPACT OF THE PROBLEM-FOCUSED, COLLABORATIVE PROJECTS IN BASS CONNECTIONS. Teams have informed government policy, engaged communities in sharing and learning and contributed to original research around problems in health, brain science, energy, "big data" and education, all broadly conceived. We have also been gratified to track the many ways that faculty and students are extending their experiences beyond the year-long project teams. Students have linked their team experiences to other signature Duke programs, like DukeEngage and Study Abroad. Bass Connections students are completing senior theses at a higher rate than other students at Duke (33% compared to 22% of the senior class as a whole). Faculty members have been inspired to develop new courses that tackle big issues through interdisciplinary approaches and collaborative assignments, or to infuse existing courses with these exciting features. Some of our themes have also constructed intensive summer experiences under the Bass Connections umbrella, such as the highly successful Data+ program in the Information, Society & Culture theme.

DURING 2015-2016, IN COLLABORATION WITH THE FACULTY LEADERSHIP OF BASS CONNECTIONS, WE SET AMBITIOUS GOALS FOR THE PROGRAM TO MEET WITHIN ITS FIRST TEN YEARS. We aim to have a diverse set of educational offerings within each theme, to engage students at all levels and, where appropriate, to see the Bass Connections model of engaged, collaborative inquiry diffuse more broadly throughout the Duke curriculum. We will be working to ensure that two-thirds of Bass Connections project teams will engage an external partner, three-quarters of all teams will have a graduate or professional student as a project manager and all teams will produce societally relevant research. We further aspire to launch one additional theme that will expand our reach across the rich domains of scholarly expertise at Duke, the focus of which will be determined through an inclusive, university-wide process.

We hope you enjoy reading about the remarkable work that Duke faculty, students and staff are accomplishing through Bass Connections, increasingly in partnership with external organizations ranging from government agencies and international NGOs to corporations and community groups. The highlighted narratives offer merely a selection of the many stories that have emerged from the past year’s impressive research and engagement. We sincerely thank those who have been involved in this innovative program so far, including the committed faculty leadership and staff of our partner university-wide institutes and initiatives, and look forward to continuing to facilitate the remarkable creativity that has become a hallmark of intellectual life at Duke.

EDWARD J. BALLEISEN
Vice Provost for Interdisciplinary Studies
eballeis@duke.edu

HALLIE KNUFFMAN
Director, Administration and Program Development
hallie.knuffman@duke.edu
Bass Connections has been, by far, the best learning experience I have had in my life.
A Distinctive New Model for Education

Having just completed its third year, Bass Connections bridges the classroom and the real world, giving students a chance to **ROLL UP THEIR SLEEVES AND TACKLE COMPLEX SOCIETAL PROBLEMS ALONGSIDE WORLD-CLASS FACULTY** from across Duke. Working in teams, students at all levels collaborate with faculty and postdocs on cutting-edge research that spans subjects and borders.

Named in honor of founding donors Anne T. and Robert M. Bass P’97, the program exemplifies Duke’s commitment to interdisciplinary research and teaching as a vital part of the university’s mission. For more than two decades, Duke has linked collaborative inquiry across disciplines to the imperative of seeking out knowledge in the service of society. **THE BASSES’ $50 MILLION GIFT HAS SPARKED A NEW APPROACH TO THE EXPLORATION OF MAJOR SOCIETAL CHALLENGES**; by including a $25 million matching challenge, the donation has inspired dozens of others to support the program.

Through initiatives like Bass Connections, Duke equips students to **GRASP THE MULTIPLE DIMENSIONS OF COMPLEX PROBLEMS AND TO TACKLE SUCH DILEMMAS WITHIN TEAMS**. The global nature of these endeavors calls for many teams to extend their research activities beyond campus.

**TO DATE, BASS CONNECTIONS TEAMS HAVE WORKED IN 23 COUNTRIES ON FIVE CONTINENTS IN ADDITION TO CITIES AND TOWNS IN THE U.S. AND RIGHT HERE IN DURHAM.**
**Vision**

**TO CREATE A DISTINCTIVE NEW MODEL FOR EDUCATION**, predicated on collaborative and interdisciplinary inquiry, that actively engages students in the exploration of big, unanswered questions about major societal challenges.

**Goal**

**TO ELEVATE THE IMPORTANCE OF EXPLORING SUCH CHALLENGES BY:**

1. Engaging faculty, undergraduate and graduate/professional students in teamwork
2. Integrating disciplinary approaches and professional practice
3. Applying knowledge, research and skills in problem-solving, with engagement from community partners

**Objectives**

1. Students at all levels **GAIN PROBLEM-CENTERED EXPERTISE AND TEAM-ORIENTED SKILLS** and use them to pursue research across disciplines that explores societal and cultural challenges.
2. Faculty members **INTEGRATE EDUCATION, RESEARCH AND OUTREACH** to explore societal and cultural challenges within specific themes.
3. Themes support and administer project teams and **DEVELOP CURRICULAR PATHWAYS** into, through and beyond teams, fostering cohesive, problem-centered education.
4. Duke administration, departments, schools and institutes make infrastructure and programmatic changes that **FACILITATE, SUSTAIN AND PROMOTE** the above objectives.

A Bass Connections team member and leader work with a community partner in Madagascar.
An annual evaluation helps Bass Connections leadership to improve the program and to understand its impact on students, faculty and the societal issues addressed through the projects.

As during our first two years, we administered an end-of-year survey in April 2016. The vast majority of students who participate in a Bass Connections project team have a positive experience, and 97% OF UNDERGRADUATE STUDENTS SAID THAT THEY WOULD RECOMMEND THE PROGRAM TO A FRIEND.

**Undergraduate**

After participating, undergraduates report that the program helped improve their skills and abilities in a range of areas, including communicating with a team, working with team members with diverse knowledge and gaining comfort in working with faculty and graduate students.

**TOP REASONS FOR PARTICIPATING**

- **77%** TO GAIN RESEARCH EXPERIENCE
- **48%** TO BE PART OF A MULTIDISCIPLINARY TEAM
- **32%** TO BE PART OF SOMETHING INNOVATIVE

**PERCENTAGE OF UNDERGRADUATE STUDENTS REPORTING A MODERATE TO GREAT IMPROVEMENT IN THEIR SKILLS IN THE FOLLOWING AREAS...**

- Communicating with a team: 89%
- Working with team members from diverse areas of knowledge: 88%
- Comfort asking questions about unfamiliar topics: 87%
- Solving complex problems: 80%
- Demonstrating leadership on a team: 80%
- Research skills: 79%
- Ability to connect academic experiences to social issues: 78%
- Developing new networking connections: 77%
- Presentation skills: 73%
- Working with external stakeholders: 69%
- Mentoring others: 50%
It’s an awesome opportunity to get involved with research.

**Graduate**

**TOP REASONS FOR PARTICIPATING**

- **42%** To gain research experience
- **40%** To be part of a multidisciplinary team
- **32%** To work closely with faculty
- **32%** To engage with a new research project

**Faculty**

Faculty are highly satisfied with their experience.

**TOP REASONS FOR PARTICIPATING**

- **58%** To mentor students in a different way
- **58%** To be part of a multidisciplinary team
- **43%** To be part of something innovative

**PERCENTAGE OF GRADUATE STUDENTS REPORTING A MODERATE TO GREAT IMPROVEMENT IN THEIR SKILLS IN THE FOLLOWING AREAS...**

<table>
<thead>
<tr>
<th>Skill</th>
<th>Percentage Improving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfort working with faculty</td>
<td>68%</td>
</tr>
<tr>
<td>Ability to connect academic experiences to social issues</td>
<td>65%</td>
</tr>
<tr>
<td>Working with team members from diverse areas of knowledge</td>
<td>62%</td>
</tr>
<tr>
<td>Developing new networking connections</td>
<td>57%</td>
</tr>
<tr>
<td>Research skills</td>
<td>52%</td>
</tr>
<tr>
<td>Mentoring others</td>
<td>51%</td>
</tr>
<tr>
<td>Communicating with a team</td>
<td>51%</td>
</tr>
<tr>
<td>Working with external stakeholders</td>
<td>46%</td>
</tr>
<tr>
<td>Solving complex problems</td>
<td>46%</td>
</tr>
<tr>
<td>Demonstrating leadership on a team</td>
<td>45%</td>
</tr>
<tr>
<td>Presentation skills</td>
<td>28%</td>
</tr>
</tbody>
</table>

**PERCENTAGE OF GRADUATE STUDENTS REPORTING A MODERATE TO GREAT IMPROVEMENT IN THEIR SKILLS IN THE FOLLOWING AREAS...**

- **92%** WOULD RECOMMEND THE PROGRAM TO OTHER FACULTY

**TO WHAT EXTENT HAS PARTICIPATING IN BASS CONNECTIONS HELPED YOU PROFESSIONALLY IN THE FOLLOWING AREAS...**

- **38%** Teaching
- **36%** Research
- **36%** Service to the external community
- **31%** Leadership experience

- **Not at all**
- **Very little**
- **Somewhat**
- **Quite a bit**
- **A great deal**
As a university-wide program, Bass Connections reaches across Duke. In 2015-2016, \textit{43 PROJECT TEAMS BROUGHT TOGETHER FACULTY, GRADUATE STUDENTS AND UNDERGRADUATES} to tackle complex societal challenges. Most of these interdisciplinary teams ran for two semesters; some had a summer component.

In the summer of 2015 there were also 12 Data+ research teams in which undergraduates and graduate student mentors explored new data-driven approaches to interdisciplinary challenges, in addition to numerous related courses and other summer experiences and curricular pathways.

### Participation in Project Teams and Data+

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Members</td>
<td>154</td>
</tr>
<tr>
<td>Graduate &amp; Professional Students</td>
<td>89</td>
</tr>
<tr>
<td>Undergraduate Students</td>
<td>259</td>
</tr>
<tr>
<td>Community Partners</td>
<td>38</td>
</tr>
</tbody>
</table>

### Bass Connections Participation by School

<table>
<thead>
<tr>
<th>School</th>
<th>Undergraduate Students</th>
<th>Graduate and Professional Students</th>
<th>Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divinity</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Fuqua</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Law</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Medicine</td>
<td>9</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>Nicholas</td>
<td>9</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Nursing</td>
<td>4</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Pratt</td>
<td>9</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>Sanford</td>
<td>5</td>
<td>14</td>
<td>26</td>
</tr>
<tr>
<td>Trinity</td>
<td>21</td>
<td>34</td>
<td>34</td>
</tr>
</tbody>
</table>

**Note:** Undergraduates counted in Nicholas and Sanford are enrolled in Trinity and are pursuing majors to which those schools make significant contributions.
EXPERIENCES Student Perspective

Courses and modules (e.g., Data Expeditions, History of Global Health)

Allied summer experiences
(e.g., Global Health Student Research Training, Data+, DukeEngage, Neurohumanities in Paris)

Capstone research experiences
(e.g., faculty-mentored research, honors theses, dissertations)

Internships, graduate or professional study, employment

BASS CONNECTIONS PROJECT TEAMS

EXPERIENCES Faculty Perspective

External funding

Seed grant
(leading to new research vistas)

New faculty collaborations

IMPACT ON TEACHING

New courses

Outreach endeavors

More engaged research

New approaches
(e.g., team-based, problem-centered)
**Student Advisory Council**

**GRADUATE CO-CHAIR**
Mercy DeMenno, Sanford School of Public Policy

**UNDERGRADUATE CO-CHAIR**
Jake Lennert, Trinity College of Arts & Sciences ’16

Carly Bandt, Trinity College of Arts & Sciences ’18
Anuhita Basavaraju, Trinity College of Arts & Sciences ’18
Erin Ji-Su Choe, Trinity College of Arts & Sciences ’17
Samip Desai, Pratt School of Engineering ’17
Sarah Diringer, Graduate School
Sharine Forbes, School of Nursing
Jemi Galani, Trinity College of Arts & Sciences ’17

Danalaxshmi Shanen Ganapathee, Trinity College of Arts & Sciences ’17
Kunal Goel, Trinity College of Arts & Sciences ’16
Anna Johns, Law School, Graduate School
Kevin Liang, Pratt School of Engineering
Helen Liu, Trinity College of Arts & Sciences ’17
Melissa Manus, Duke Global Health Institute
Alexander Merriman, Trinity College of Arts & Sciences ’17
Neelesh Moorthy, Trinity College of Arts & Sciences ’18
Meghan O’Neil, Graduate School
Joshua Rivenbark, Sanford School of Public Policy, School of Medicine
Indrani Saha, Trinity College of Arts & Sciences ’17
Aaron Towers, Graduate School
Taylor Trentadue, Trinity College of Arts & Sciences ’16
Jill Wentzell, Ph.D., Trinity College of Arts & Sciences (Postdoc)
Jennie Xu, Trinity College of Arts & Sciences ’16

---

Team members build their design for an electric vehicle

---

**2015-2016 LEADERSHIP**

**EDWARD BALLEISEN**
Vice Provost for Interdisciplinary Studies

**HALLIE KNUFFMAN**
Director for Administration and Program Development

**SARAH DWYER**
Assistant Director for Communications and Administration

**LAURA HOWES**
Associate Director for Strategy and Operations

Bass Connections is centrally housed in the university-wide Office of the Vice Provost for Interdisciplinary Studies, and has five thematic areas, each given an intellectual and administrative home within a university-wide institute or initiative. Faculty and student advisory councils play a vital role in the program’s leadership.
THEMES

**BRAIN & SOCIETY**  
Duke Institute for Brain Sciences

**INFORMATION, SOCIETY & CULTURE**  
Information Initiative at Duke

**GLOBAL HEALTH**  
Duke Global Health Institute

**EDUCATION & HUMAN DEVELOPMENT**  
Social Science Research Institute

**ENERGY**  
Energy Initiative

---

**THEME LEADERS**

<table>
<thead>
<tr>
<th>Brain &amp; Society</th>
<th>Education &amp; Human Development</th>
<th>Global Health</th>
<th>Information, Society &amp; Culture</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEBORAH JENSON</td>
<td>MARY STORY</td>
<td>LORI BENNEAR</td>
<td>ROBERT CALDERBANK</td>
<td></td>
</tr>
<tr>
<td>Trinity College</td>
<td>Trinity College of Arts &amp;</td>
<td>Nicholas</td>
<td>Trinity College of Arts &amp;</td>
<td></td>
</tr>
<tr>
<td>of Arts &amp; Sciences</td>
<td>Sciences and Sanford School of Public Policy</td>
<td>School of the Environment, Trinity</td>
<td>Sciences and Sanford</td>
<td>School of Public Policy</td>
</tr>
<tr>
<td>LEONARD WHITE</td>
<td>Development</td>
<td></td>
<td>&amp; Sciences and Pratt School of Engineering</td>
<td></td>
</tr>
<tr>
<td>School of Medicine</td>
<td></td>
<td></td>
<td>VICTORIA SZABO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HANS VAN MIEGROET</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Trinity College of Arts &amp;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sciences</td>
<td></td>
</tr>
</tbody>
</table>

---

**Faculty Advisory Council**

**CHAIR: DAVID TOOLE, DIVINITY SCHOOL**

Nicole Barnes, Trinity College of Arts & Sciences  
Martin Brooke, Pratt School of Engineering  
Nicholas Carnes, Sanford School of Public Policy  
Grainne Fitzsimons, Fuqua School of Business  
Lisa Huettel, Pratt School of Engineering  
Lisa Keister, Trinity College of Arts & Sciences  
Daniel Laskowitz, School of Medicine  
Frederick Mayer, Sanford School of Public Policy  
Marilyn Oermann, School of Nursing  
Jonathan Wiener, Law School  
Bass Connections theme leaders (please see list above)

---

**EX-OFFICIO**

Edward Balleisen, Vice Provost, Interdisciplinary Studies  
Lee Baker, Dean, Academic Affairs, Trinity College of Arts & Sciences  
John Klingensmith, Associate Dean for Academic Affairs, Graduate School  
Steve Nowicki, Dean and Vice Provost, Undergraduate Education

---

**STUDENT REPRESENTATIVES**

Tara Bansal, Trinity College of Arts & Sciences ’17,  
Undergraduate Student Representative, Duke Student Government  
Bradley Barth, Pratt School of Engineering,  
Graduate and Professional Student Council Representative
ILLUSTRATIVE PROJECT TEAMS
selected examples from 2015-2016

Community Care of Frail Elders in Cross-cultural Settings

Led by Bei Wu (School of Nursing), this project team investigated the formal and informal caregiving arrangements and needs of Chinese elders who are experiencing cognitive or physical decline. The team pursued fieldwork in Shanghai to assess the quality of care provided to dementia patients, as well as the barriers to improved care. In November 2015, team members shared findings at the Gerontological Society of America annual meeting.

Reviewing Retrospective Regulatory Review

How well do government regulations work in practice? And when government agencies look back to review the impacts of their regulations, is that process as effective as it could be?

Led by Edward Balleisen (Trinity College of Arts & Sciences), Lori Bennear (Nicholas School of the Environment) and Jonathan Wiener (Law School), this project team examined how government agencies and other bodies are conducting retrospective regulatory review. What methodologies do these reviews adopt, which regulations receive scrutiny and which impacts do reviewers assess?

Through substantive case studies at the local, national and international levels, team members examined current practices and how to improve them. The team’s objective was to create a signature Duke report on retrospective regulatory review. Team members conducted interviews in Washington with officials at several federal agencies. The forthcoming report offers recommendations for policymakers and scholars engaged in regulatory review.

We have a large group meeting every month with faculty and we have a collaboration with Chinese university hospitals. Currently we have three undergrad students; one is majoring in economics and global health, another is pre-med and computer science and the third is computer science and statistics. It’s really a fascinating experience for me. I wouldn’t exactly say I’m mentoring them although I’m a graduate student and they’re undergrads—I see them as my colleagues. They inspire me a lot.

HANZHAND XU
Ph.D. student in Nursing

Participation on the team has enriched my own research project. I have been able to share and discuss with the team the results from my dissertation research (e.g., interviews of regulators from the European Commission and the UK); to produce and compare new analyses; and to learn from the different perspectives and backgrounds of my team members.

DANIEL RIBEIRO
S.J.D. student in Law
I have a background in project management, and I saw an opportunity to bring that to the team. I was able to add experience in setting up timelines, budgets, holding people accountable and teamwork.

CHRIS DOUGHER MBA student

Energy and the Environment: Design and Innovation

What are the key challenges facing new sources of clean, affordable and reliable energy, and what are some innovative approaches to help solve those challenges? Emily M. Klein (Nicholas School of the Environment) and Josiah Knight (Pratt School of Engineering) led a project team to identify, design and prototype new energy technologies, systems or approaches. Small groups addressed trade-offs among design choices, environmental impact and economic viability. Outputs included prototypes of a human-powered water purification system and an urban electric vehicle, along with a report with recommendations on facilitating advanced materials for energy.
More than one billion people live in slums worldwide, as these forms of urban housing rapidly expand across the developing world. Yet policymakers still often ignore these places of crowded urban residential life, as do other city residents and many development scholars.

Led by Anirudh Krishna (Sanford School of Public Policy) and Erik Wibbels (Trinity College of Arts & Sciences), this project team refined a satellite-based methodology for identifying slums and slum types in Bangalore, India, and investigated how political networks and distributive politics impact the security of property rights, access to public services and human well-being. The research will be used to better identify the political networks that influence distribution of goods and services by the Indian government.

Studying the Real ‘Slums’ in Bangalore

I used to teach pretty traditional classes. My undergraduate courses are now much more applied. It made me realize how capable students are of doing research, and that it can start right away.

ERIK WIBBELS
Professor of Political Science
As part of the Data+ summer research program, undergraduates Tess Harper and Molly Rosenstein developed six interactive data applications for use in Environmental Science 101, a Duke course taught by Rebecca Vidra (Nicholas School of the Environment). Mentored by Statistical Science doctoral student Aaron Berdanier and Ecology doctoral student Matt Ross, Harper and Rosenstein created web-based apps exploring climate change, sea level rise, biodiversity, solar power, watershed hydrology and mountaintop mining. Their work on mountaintop mining contributed to a study whose findings were featured in a New York Times editorial, “How the Coal Industry Flattened the Mountains of Appalachia.”

Getting our first app up and running was really exciting. Molly and I didn’t have a strong background in computer science, and we’ve still been able to hold our own.

TESS HARPER ’15
Environmental Sciences and Spanish

Interactive Environmental Data Applications

Interactive data application on sea level rise

Elevation map of West Virginia’s Mud River watershed before and after mountaintop mining became widespread.
Faces really provide the most absorbing source of information for us as humans. We are constantly attracted to faces and we see them everywhere. Artists have always had an obsession with faces, and recently scientists have also begun grappling with this obsession. Even in a really abstract representation of a face, people still scan it like they would a face. They are looking for the same social information regardless of how abstract the work is.

SOPHIE KATZ ’17
Neuroscience

Art, Vision and the Brain

Faces fascinate us. From our earliest moments as infants, humans prefer to look at faces and face-like images. How does the brain use faces to make sense of our world, and what’s going on in the brain when we look at particular kinds of art?

Led by Elizabeth Johnson and Eleonora Lad (School of Medicine), Guillermo Sapiro (Pratt School of Engineering) and Marianne Wardle (Nasher Museum of Art), this project team organized an exhibition exploring the intersection of art and neuroscience at the Nasher Museum (March 18–July 24, 2016), produced an exhibition catalogue and led gallery talks. Team members also created an interactive demo for Brain Awareness Week at the Duke Institute for Brain Sciences.
In May 2016 Peru’s government declared a public health emergency to address the mercury pollution caused by mining along the Madre de Dios River. According to an article by Barbara Fraser in Nature, “Peru’s government used the Duke team’s latest study to determine which riverside communities should receive the emergency aid.” The Duke researchers “found high levels of mercury (above the maximum recommended by the World Health Organization) in hair samples from 40% of the Madre de Dios residents that they tested,” writes Fraser. “The Duke team has examined about 800 people living along a major highway in the region, 100 people living beside the river and 2,000 in the Amarakaeri Indigenous Reserve. Some communities in the region are closer to the gold-mining activities than others, but the 40% exposure rate held across the highway, river and reserve.”

Environmental Epidemiology in Latin America

William Pan (Nicholas School of the Environment) and colleagues have led a Bass Connections project team since 2013. Their research on the health effects of illegal gold mining in the Peruvian Amazon made an important policy impact this year.

In May 2016 Peru’s government declared a public health emergency to address the mercury pollution caused by mining along the Madre de Dios River. According to an article by Barbara Fraser in Nature, “Peru’s government used the Duke team’s latest study to determine which riverside communities should receive the emergency aid.” The Duke researchers “found high levels of mercury (above the maximum recommended by the World Health Organization) in hair samples from 40% of the Madre de Dios residents that they tested,” writes Fraser. “The Duke team has examined about 800 people living along a major highway in the region, 100 people living beside the river and 2,000 in the Amarakaeri Indigenous Reserve. Some communities in the region are closer to the gold-mining activities than others, but the 40% exposure rate held across the highway, river and reserve.”
We are really happy with our results. We had a high level of participation and the data are usable. We keep learning things that we weren’t expecting; that’s what happens with over 1,000 families participating. And we’re going into Africa, South America and India.

GUILLERMO SAPIRO
Professor of Electrical and Computer Engineering

Autism & Beyond

One exciting achievement this year was the fruit of a previous Bass Connections project team, Information, Child Mental Health and Society. Led by Helen Egger (School of Medicine and Sanford School of Public Policy) and Guillermo Sapiro (Pratt School of Engineering), the team contributed to a collaboration among researchers at Duke University and Duke Medical Center that created an Apple ResearchKit app called Autism & Beyond. “We’re honored to work with world-class medical institutions and provide them with tools to better understand diseases and ultimately help people lead healthier lives,” said Jeff Williams of Apple.

Team member Jordan Hashemi (right) demonstrates the Autism & Beyond app
Citizenship Lab: Civic Participation of Refugee Youth in Durham

How do refugee youth create a meaningful and dignified life after resettlement to the United States? How can youth civic engagement programs promote a robust sense of citizenship and improve college readiness among refugee youth? Led by Suzanne Shanahan (Trinity College of Arts & Sciences) with Nadia El-Shaarawi and William Tobin (Kenan Institute for Ethics), this project team explored such questions with 30 young refugees who attend Githens Middle School, Jordan High School and Riverside High School in Durham. As a final project, the youth created a Photovoice exhibition, Community Is and Can Be.

“
I study civic education theoretically but never would have gotten such a hands-on experience as a grad student without this.

ALEXANDRA OPREA
Ph.D. student in Political Science

Team members collaborated with the group of young refugees every week at the Kenan Institute for Ethics

Young refugees visit West Campus and interview Duke students
Bass Connections seeks to create a full problem-centered curriculum, which includes courses that highlight interdisciplinary thinking, collaborative assignments and interaction with community organizations. One such course is NEUROSCI/MUSIC 289 – Music and the Brain.

In this course, taught jointly by Scott Lindroth (Trinity College of Arts & Sciences) and Tobias Overath (Duke Institute for Brain Sciences), students explore how music affects the brain and how humans learn to create and perform music.

Scientific research is motivated by wonderment, which is fundamentally an emotional connection with a question or puzzle. Musicians dedicate their lives to the creation of wonderment and emotional engagement through a sonic utterance. The class allows me to experience music from a very different lens and perspective.

INTERDISCIPLINARY COURSES

This year Duke faculty were invited to submit proposals for course development funds to complement existing offerings in the Bass Connections themes.

These funds were awarded to four groups of faculty members whose pedagogical ideas will expand interdisciplinary curricular options for undergraduates as well as graduate and professional students. The courses are:

**MANAGING NETWORKS**

**ENGINEERING AND ANTHROPOLOGY OF BIOMEDICAL ENGINEERING DESIGN IN UGANDA**

**HISTORY OF GLOBAL HEALTH**

**INTEGRATING ENVIRONMENTAL SCIENCE AND POLICY**
Bass Connections is fast becoming a cornerstone of the Duke experience. The program amplifies Duke’s commitment to interdisciplinary education by providing structured pathways for undergraduates as well as graduate students to engage in team-based collaboration across schools and majors. For undergraduates in particular, the opportunity to work in small, innovative research teams is rare within higher education. Through Bass Connections, students are delving into complex and rewarding team-based work and taking their research further through completing a senior honors thesis, participating in a related DukeEngage summer program and many more opportunities.

The program is supported exclusively through gifts and donations to Duke, primarily from individual donors. By investing in Bass Connections, our alumni and friends play a vital role in building this transformative program to its full potential and helping to set Duke apart among top universities. And through the Bass Challenge, which matches one dollar for every two dollars contributed (a 1:2 match) of all endowment or expendable gifts to the program from $100,000 and up, donors’ impact can increase dramatically.

Donor investments are helping Duke educate a new generation of versatile leaders who are adept at working in diverse teams to solve global problems. Continued support from leadership donors will help to sustain the program’s momentum.

Together we can meet growing demand from faculty and students who are excited to be participants in a program that is transforming higher education for the 21st century.
PROJECT TEAMS THROUGHOUT THE YEAR

FALL

- PROJECT TEAMS BEGIN or continue after beginning in summer
- Faculty, graduate/professional students, postdocs propose projects for next year
- Faculty propose Data+ projects

SPRING

- PROJECT TEAMS CONTINUE
- Students apply to join next year’s project teams

SUMMER

- SOME NEW PROJECT TEAMS BEGIN
  all remaining new teams begin in fall
- Data+ summer program

Top 5 undergraduate majors represented in Bass Connections

- Psychology
- Computer Science
- Economics
- Biology
- Public Policy

THE VAST MAJORITY OF ALL PARTICIPANTS WOULD RECOMMEND THAT A PEER PARTICIPATE IN BASS CONNECTIONS

- 97% of undergraduates
- 92% of faculty team leaders
- 88% of graduate students

58% of undergraduates who participate in Bass Connections project teams also participate in study abroad, DukeEngage or DukeImmerse
Most Bass Connections project teams work with community partners outside Duke, including private companies, nonprofits, universities, school systems, hospitals and government agencies at the federal, state and local levels. **79% of teams in 2015-2016 had some form of external engagement.**

### Community partners

It is an incredibly unique experience in which you are able to work alongside fellow students and faculty members as colleagues.

I got invaluable experience mentoring undergraduates and leading them as a team. I also established new interdisciplinary collaborations that allowed me to learn new skills and new topic areas, and was important for my professional development. Finally, I hope to be publishing multiple first-author publications based on our team’s research, which will help boost my CV.

**GRADUATE STUDENT TEAM MEMBER**

Since 2013, Bass Connections project teams have engaged more than:

- **240** faculty members
- **560** undergraduate students
- **230** graduate & professional students
- **15** postdocs

33% of Bass Connections undergraduate team members complete senior theses compared to 22% of the senior class as a whole.

58% master’s students

33% Ph.D. students

9% other advanced programs such as J.D. and M.D.

The most rewarding aspect was the collaborative working environment we developed as a team and the interactions with in-country stakeholders. I learned an immeasurable amount from both my Duke and Bangladeshi colleagues and was offered a much broader lens through which to view both the problem and potential solutions.

**COURTNEY CAIOLA ’15**

Ph.D. in Nursing
2024 W. Main Street
Erwin Mill, Bay C
Durham, NC 27705
919-684-5379

bassconnections.duke.edu