



Duke UNIVERSITY **BASS CONNECTIONS**

2017-2018 Annual Report

MESSAGE FROM LEADERSHIP



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Five years have passed since **Anne and Robert Bass provided the transformative gift** that enabled Duke to create Bass Connections. Since then, more than 2,000 undergraduates, graduate students, faculty, and staff have engaged in over 300 team-based, interdisciplinary research projects. These teams have **tackled societal challenges around the world**, ranging from the health needs of refugees in Durham, to strategies for using American forests and wetlands as carbon sinks, to higher education access in Brazil. Countless others have been exposed to collaborative, interdisciplinary inquiry through innovative courses affiliated with the program.

Bass Connections has become a hallmark of the Duke experience. Many incoming students identify the program as a key reason to attend the university, and our annual evaluations attest to its impact on undergraduates' identification of academic passions. Graduate students who participate gain leadership and research experience in a team-based environment – important skills for careers inside and outside academia. For faculty, Bass Connections advances research agendas and provides exposure to innovative approaches to teaching.

We continue to learn from the extensive experimentation in the program. In 2015, our Information, Society & Culture theme launched **Data+** – a remarkably successful 10-week summer research experience in which student teams use data science to address tough interdisciplinary questions. Drawing on the Data+ model, in 2017 we launched **Story+**, a parallel summer program run by the Franklin Humanities Institute that immerses interdisciplinary teams in humanities research and public storytelling. Story+ teams have created digital exhibits, produced short documentary films, designed teaching and research modules, and documented the stories of diverse communities. Already sinking roots at Duke, Story+ is inspiring new campus and community partners to engage students in collaborative research around humanistic inquiry.

Building linkages across all our schools and interdisciplinary units, Bass Connections depends on partnership. In the past year, we have placed greater emphasis on embedding key elements of our model in core courses. There are now 37 semester-long classes affiliated with Bass Connections, each infused with interdisciplinary, team-based learning. This ongoing pedagogical conversation has sparked the redesign of gateway courses and the incorporation of interdisciplinary lab experiences into curricula across campus.

As Bass Connections has matured, we increasingly field inquiries from educational institutions looking to learn about our approach to **collaborative, interdisciplinary, problem-centered inquiry**. We also have begun to experiment with how to connect students and faculty from other universities (especially those close by) to work on our research teams.

Bass Connections' growth and integration into the Duke curriculum means that we now face crucial questions about the program's scale and reach. Given increasing demand from students and faculty, **we aspire to expand capacity over the next decade**, so that opportunities for collaborative research remain open to all corners of the university, and we can build new partnerships with community organizations both in our own neighborhood and further afield.

As the program continues to evolve, we want to thank those who have made the first five years of Bass Connections so fruitful. We are inspired by the enduring **creativity and commitment of our faculty, students, staff, and donors**, and grateful to all those whose ideas and hard work have helped establish this vital approach to integrating collaborative research, innovative education, and engaged dialogue with the world beyond the university.

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THE BASS CONNECTIONS MODEL

Bass Connections bridges the classroom and the world beyond the university campus, giving students from all of Duke's schools a chance to tackle complex societal problems alongside our superb faculty.

We support research teams that draw on perspectives and methods from multiple disciplines, as well as robust engagement with communities, stakeholders, and decision-makers.

Named in honor of founding donors Anne T. and Robert M. Bass P'97, the program exemplifies Duke's commitment to interdisciplinary investigation. The Basses' \$50 million gift sparked a new approach to integrating research, education, and civic engagement within the university; by including a \$25 million matching challenge, their donation has already inspired more than 60 donors to support this innovative program.



Our vision

is to create a distinctive new model for education, predicated on collaborative, interdisciplinary inquiry, that actively engages students in the exploration of big, unanswered questions about major societal challenges.

Integration of Research, Teaching, and Engagement

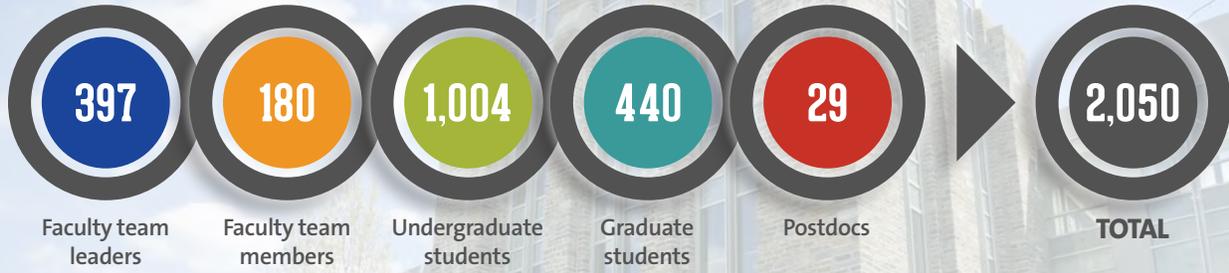
Through year-long **project teams**, students and faculty engage in interdisciplinary, collaborative research that explores complex societal issues; some teams add a summer component.

Numerous **one-semester courses** feature collaborative assignments and interaction with external partners around applied, interdisciplinary problems.

In four intensive **summer programs** (Data+, Story+, Student Research Training, Summer Neuroscience Program), students spend six to ten weeks immersed in mentored research with a Bass Connections approach.

Involvement of Faculty and Students at All Levels

NUMBER OF PARTICIPANTS FALL 2013 THROUGH SPRING 2018

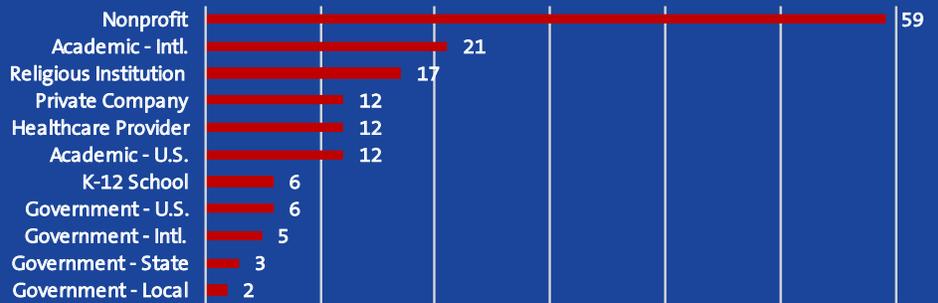


External Partners

Most teams work with community partners outside Duke, including nonprofits, universities, school systems, hospitals, government agencies, and private companies. Teams have worked with **155 partners in 31 countries on five continents** in addition to cities and towns around the U.S., the Carolinas, and right here in Durham.

Includes project teams and summer programs

TYPES OF EXTERNAL PARTNERS





Themes

The program's **five thematic areas** connect related project teams, courses, summer programs, and other collaborative research experiences. Each theme is hosted by one of Duke's interdisciplinary institutes and initiatives.



DUKE INSTITUTE FOR
BRAIN SCIENCES



INFORMATION
INITIATIVE AT DUKE



DUKE GLOBAL
HEALTH INSTITUTE



SOCIAL SCIENCE
RESEARCH INSTITUTE



ENERGY
INITIATIVE

Enabled by several special funding opportunities, the Energy theme expanded its intellectual reach and became the **Energy & Environment** theme.



BASS CONNECTIONS OPEN

For faculty whose research falls outside the ambit of the existing themes, Bass Connections Open provides a new way to participate. This year, faculty had the chance to propose projects for 2018-2019 that **align with the Bass Connections model** but not specifically with one of the five themes. These nine projects were selected:

- America's Sacred Spaces
- Building Duke: The Architectural History of Duke Campus from 1924 to the Present
- Cheating, Gaming and Rule Fixing: Challenges for Ethics across the Adversarial Professions
- Expressive Writing for Resilience in Adult Pediatric Oncology Survivors and Their Caregivers
- Moral Economy of Markets: Constituting and Resisting Relations of Power
- Patients' Journey to Medication Adherence
- Prevention of Sexual Misconduct on University Campuses
- Project Vox: Recovering the World of Women Philosophers in Early Modern Europe
- Sowers and Reapers: Gardening in an Era of Change

Impact

Many participants **take their research further through grants and other opportunities** within Duke and beyond. Faculty increasingly see year-long research teams as seed grants that can catalyze important research avenues and new collaborations.

For some students, the **experience of engaged interdisciplinary research** has confirmed initial intellectual directions and career aspirations. For others, participation has opened up entirely new paths.

In a growing number of instances, **team outputs have shaped decision-making** by government agencies, NGOs, or private firms, whether with regard to public health in Peru or autism therapy in local elementary schools.

Team outcomes take a wide variety of forms, such as:

- Journal articles and book chapters
- Conference presentations
- Proposals for external grants
- Reports with study findings and recommendations
- Apps
- Museum exhibitions and catalogues
- Prototypes
- Public performances and talks
- Theses and dissertations

Outcomes of 2017-2018 project teams to date

Among the **42 project teams** reporting on their 2017-2018 activities, faculty leaders shared a wide range of outcomes. Recognizing that many teams continue their research across multiple years, we will track outcomes for several years after these projects have concluded.

Outcome Type		Number of 2017-2018 Teams Reporting
Peer-reviewed papers and publications	Submitted/in progress	21
	Published	5
Conference presentations		14
Data collection for future use		11
Grants	Submitted/in progress	6
	Awarded	6
Educational materials/training for external community group		8
Product or prototype		6
Website		6
Media coverage		3
Hosted conference or convening		4
Community outreach		4
Other self-published materials		2
Policy report or report with recommendations to specific group		3
Scientific model/formula/algorithm		3
Direct delivery of a good or service		1
Video		1
Performance		1

Sharing the Model

Bass Connections aspires to develop a new approach to active learning and applied research, refine that approach through ongoing evaluation, and see it spread to other educational institutions. Eager to share insights gleaned over the past five years, we have engaged with leaders at more than 20 educational institutions to share the Bass Connections model. Some of these include:

High Schools

North Carolina School of Science and Mathematics

Community Colleges

Durham Technical Community College (Dean of Arts & Sciences)
Northwest Michigan College

Universities

U.S.

Arizona State University
Concordia University Wisconsin
North Carolina Central University
Texas A&M University
University of Denver
University of Iowa

University of Maryland, Baltimore County
William & Mary

International

Durham University, U.K.
Technical University of Munich
University College Dublin
Vrije Universiteit Brussel

2017-2018 PARTICIPATION

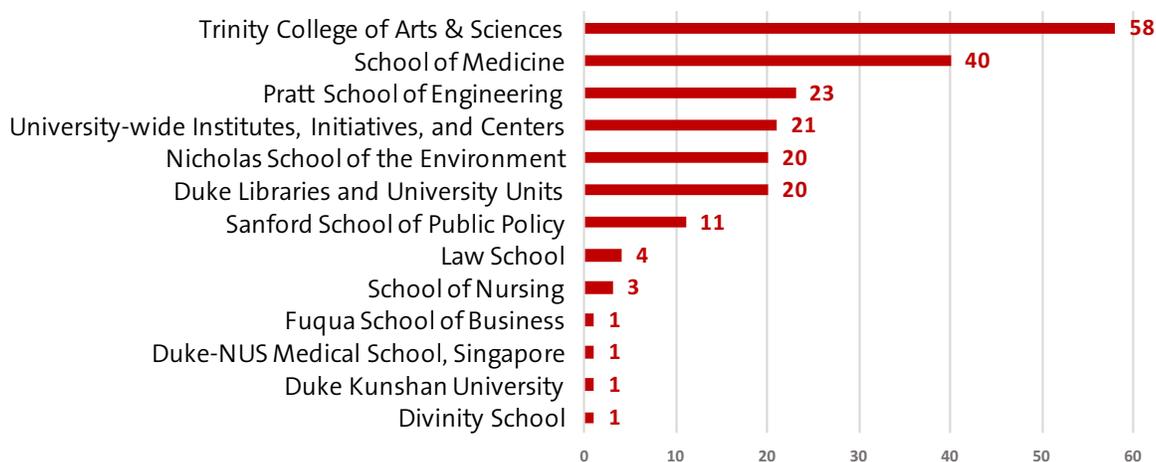
In 2017-18, **49 project teams** brought together faculty, graduate students, undergraduates, and external partners to tackle specific problems over the entire academic year. There were also numerous **semester-long courses**, as well as **36 team-based summer research projects**.

Twelve students (two graduate students, three undergraduates working individually, and two groups of undergraduates) received **Bass Connections Follow-on Student Research Awards** to pursue seven faculty-mentored projects. Three pairs of faculty members received **Bass Connections Course Development Grants** to organize new courses or to modify existing ones.

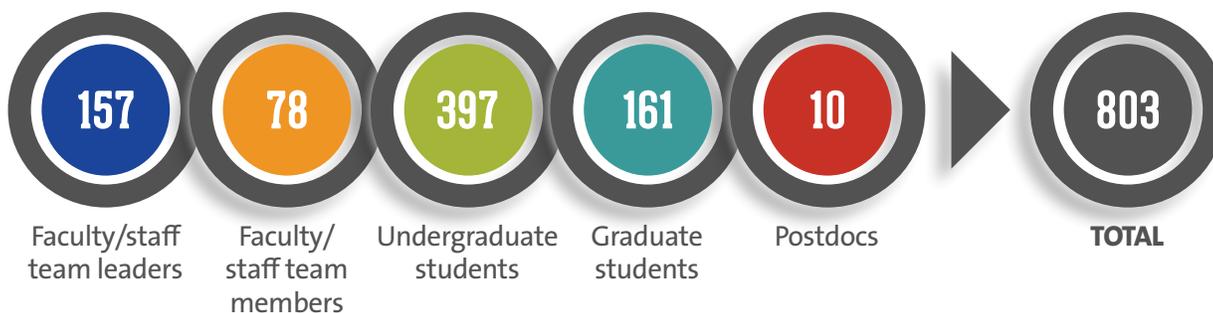
Participation across Duke

Includes 2017-2018 project teams and 2017 summer programs; figures include several individuals who participated in more than one Bass Connections experience (e.g., a year-long project team and a summer program) in 2017-2018

FACULTY AND STAFF PARTICIPATION BY SCHOOL



NUMBER OF PARTICIPANTS IN 2017-2018



Engagement with Communities beyond Duke

- **90% of the 2017-2018 team leaders** who responded to the end-of-year survey reported that their team engaged externally in some way, including having an external client or community partner, collecting data from participants outside of Duke, and consulting external organizations for guidance.
- **Each 2017 Data+, Story+, and Student Research Training team** had a partner, sponsor, or client.
- **29 project teams** had one or more formal community partners or clients, totaling 94 external affiliates.



Leadership

EDWARD BALLEISEN | Vice Provost for Interdisciplinary Studies
LAURA HOWES | Director, Bass Connections
SARAH DWYER | Director of Communications, Interdisciplinary Studies
MEGHAN O'NEIL | Graduate Student Intern, Bass Connections

FACULTY ADVISORY COUNCIL

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RAVI BELLAMKONDA, Biomedical Engineering
RACHEL BREWSTER, Law
MARTIN BROOKE, Electrical & Computer Engineering
NICHOLAS CARNES, Public Policy
GEOFFREY GINSBURG, Medicine
LISA KEISTER, Sociology
CHARLES NUNN, Evolutionary Anthropology
DAVID TOOLE, Theology, Ethics, Global Health
DANIEL VERMEER, Business Administration

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BRADLEY FEIGER, Graduate and Professional Student Council Representative

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DAVID BOYD, Global Health
ROBERT CALDERBANK, Computer Science
ANNA GASSMAN-PINES, Public Policy
THOMAS NECHYBA, Economics
WALTER SINNOTT-ARMSTRONG, Practical Ethics & Philosophy
MARY STORY, Community Health & Family Medicine
VICTORIA SZABO, Art, Art History & Visual Studies
LEONARD WHITE, Neurology

Ex-Officio

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JOHN KLINGENSMITH, Associate Dean for Academic Affairs, Graduate School
STEVE NOWICKI, Dean and Vice Provost, Undergraduate Education
ARLIE PETTERS, Dean, Academic Affairs, Trinity College of Arts & Sciences

STUDENT ADVISORY COUNCIL

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TEMINIOLUWA AJAYI, M.D.
VIJOLI CERMAK, M.B.S.
HANNAH CUNNINGHAM, M.D.
MARAM ELNAGHEEB, Political Science '20
KELSEY GRAYWILL, Neuroscience '18
JOSHUA GRUBBS, Chemistry & Global Health '18
GRAHAM HOLT, Ph.D., Computational Biology
JENNIFER HUH, Computer Science '20
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KATIE KANTER, Neuroscience '18
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KEDEST MATHEWOS, Economics & Global Health '20
CHRISTINE O'CONNELL, Neuroscience '19
EMILY RAINS, Ph.D., Public Policy
SARAH RAPAPORT, Neuroscience '18
APOORVA SAHAY, M.E.M.

2017-2018 SELECTED HIGHLIGHTS

The following examples provide just a hint of the richness of collaborative inquiry among faculty and students across Duke.

Brain & Society project team North Carolina's Opioid Crisis

In the U.S., drug overdoses now account for more accidental deaths than car crashes. One project team, **Stemming the Opiate Epidemic through Education and Outreach**, explored the extent of the crisis in Durham and throughout the state.

The team's research on heroin use, published in the *North Carolina Medical Journal*, shows that the number of opioid overdose deaths in the state increased by nearly 800 percent between 1999 and 2016. Findings at the county level suggest how officials could allocate resources toward the communities most in need.

Team members also published an article in *Nurse Educator*, wrote opinion pieces for *The Hill* and the *Durham Herald Sun*, appeared on a local radio show, and took part in the Health and Human Services Opioid Symposium and Code-a-Thon in Washington. This research depended on extensive partnerships with advocacy organizations, first responders, and the medical community.

In conjunction with Alliance Behavioral Healthcare and Duke Health, the team also organized four Mental Health First Aid training sessions for undergraduate, nursing, and medical students. Over 100 members of the campus community are now certified.



Bass Connections has allowed me to be a part of an interdisciplinary team, encompassing the perspectives from which you can tackle the opioid epidemic. We have done work that has been very local - reaching as far as Duke's campus - and we've also completed projects that can affect the entire state.

KATIE KANTER '18

TEAM LEADERS

Andrew Muzyk | Psychiatry & Behavioral Sciences, School of Medicine

Nicole Schramm-Sapyta | Duke Institute for Brain Sciences

Mental Health: A First Responder's Perspective

Durham CIT Collaborative



Global Health project team **Refugees' Health Needs in Durham**

Amid intensifying political controversies over immigration, resettled refugees continue to need help with life's basics as they adapt to radically different social and cultural environments. Durham received about 14% of the 3,000 families resettled to North Carolina between July 2015 and June 2016. The influx overwhelmed local health providers, which team leader Emily Esmaili, a pediatrician at the Lincoln Community Health Center in East Durham, experienced firsthand.

In response, the **Addressing Global Health Needs among Refugee Children and Families in Durham County** team surveyed refugees and aid agencies to identify ways to reduce health disparities. In addition to producing a brochure in multiple languages that provides key information about resources, the team made recommendations for improving efficiency of care by streamlining services, expanding the number of available interpreters in healthcare settings, and increasing collaboration among refugee resettlement agencies and medical providers.

Team members shared findings at the National Refugee Health Conference in Portland. Faculty team leader Deborah Reisinger will continue the work through a course in which students will create informational videos for refugee populations.



I was looking for something to bring my learning out of the classroom. It has been really



rewarding to work with faculty, graduate students, and other undergrads. To engage in the classroom and then work on this real-world problem was very insightful for me.

PRANAV GANAPATHY '20

TEAM LEADERS

Emily Esmaili | Pediatrics, School of Medicine

Kathryn Whetten | Sanford School of Public Policy

Nathan Thielman | Infectious Diseases, School of Medicine

Deborah Reisinger | Romance Studies, Trinity College of Arts & Sciences



Information, Society & Culture project team

Economics of Durham's Arts Scene

Has the recent rise of creative industries in Durham led to overall economic growth and community well-being? How can we best measure such impacts?

Creative Industries and the Urban Environment examined the relationship between urban development and cultural production in specific contemporary and historical contexts, then zoomed in to focus on Durham.

Team members collected and analyzed data on the economic impact of the so-called creative class, as defined by urbanist Richard Florida. Digging into housing values, labor economics, the impact of Spanish-speaking communities, the role of tolerance and diversity in economic development, and other topics, they produced five working papers that are being compiled into a published volume of articles. To share findings with the community, they have begun planning a local exhibition in partnership with Durham city government.



Giving to Bass Connections enabled us to support a growing university-wide program that brings together Duke's great strengths in research and education while also delivering meaningful outcomes in local and global communities.

ELIZABETH T'81, L'85 AND JAMES T'81 SCHIFF P'14, P'22

This project, along with six other projects, was supported by the Schiff Bass Connections Fund to support Bass Connections projects that connect broadly to the humanities. The Schiffs also support the Schiff Education, Research, and Engagement Fund for Bass Connections through the Sanford School of Public Policy.

TEAM LEADERS

Hans van Miegroet and Fiene Leunissen | Art, Art History & Visual Studies, Trinity College of Arts & Sciences

Eric Monson | Duke Libraries

In Brazil, higher education enrollment has nearly tripled since 2000. A strong quota system and government financial support have revolutionized the racial and class composition in the for-profit private sector and the better-quality tuition-free public university system.

Rio de Janeiro's poor urban periphery – known as the Baixada Fluminense – has the country's highest concentration of young people. Located in this region, the new Multidisciplinary Institute of the Federal Rural University of Rio de Janeiro is a source of hope for this racially and socially stigmatized community. **The Cost of Opportunity** team began in 2016 in collaboration with faculty, graduate students, and undergraduates at the Multidisciplinary Institute.

Through joint fieldwork, the Duke and Brazil team members conducted research directed toward fostering social mobility in the region. They interviewed students and faculty, carried out surveys, led focus groups, and produced a 27-minute documentary. The emphasis for the film was on the cost, in many senses of the word, of pursuing higher education on the part of local young people and their parents. Brazilian students have taken up this cause and turned it into a movement in support of greater higher education access.

Three doctoral dissertations have emerged out of the project, and undergraduate Chloe Ricks received the 2018 International Comparative Studies Honors Thesis Prize for her work on poverty, racial discrimination, and education in the Mississippi Delta and the Baixada Fluminense.

TEAM LEADERS

John French | History, Trinity College of Arts & Sciences

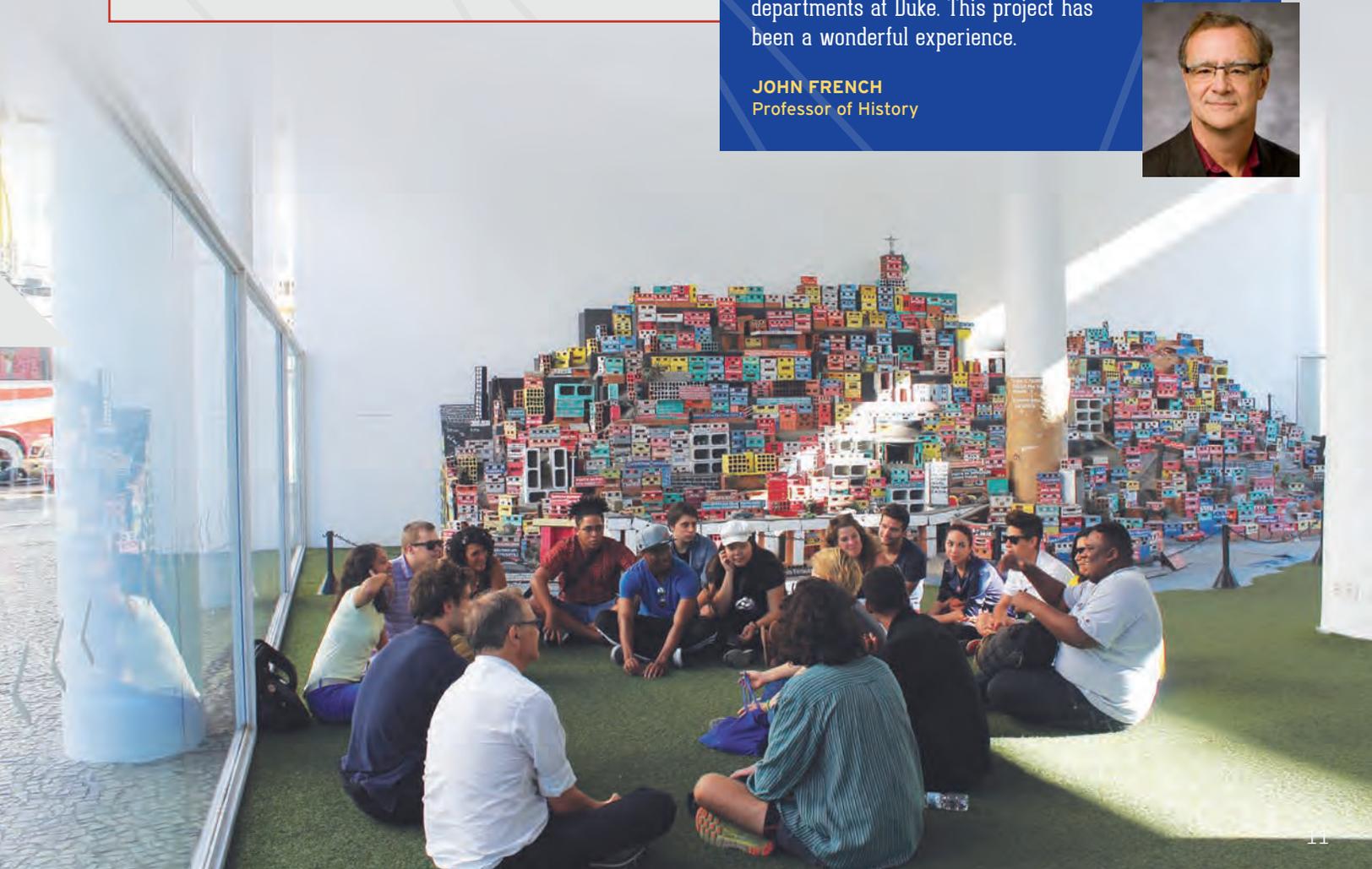
Katya Wesolowski | Cultural Anthropology, Trinity College of Arts & Sciences

Marcos De Almeida Rangel | Sanford School of Public Policy



One of the things that has been the most exciting has been student engagement. This is especially true on the part of the three graduate students who have impacted our research direction. We have also seen involvement from additional departments at Duke. This project has been a wonderful experience.

JOHN FRENCH
Professor of History



Energy & Environment project team **Self-driving Vehicles in North Carolina**

As autonomous vehicles move closer to joining our roadways in substantial numbers, state and federal governments are considering how to develop safety regulations for this new technology.

North Carolina is one of ten states to have a federally-recognized proving ground for testing autonomous vehicles, located on 13 miles of Interstate 540 in Raleigh. The **Governance and Adaptive Regulation of Transformational Technologies in Transportation** team analyzed trends in state governance across the country and applied lessons learned to North Carolina.

Team members prepared two white papers on state-level regulation and a proposal for the use of the proving ground, and compiled a set of policy recommendations for the North Carolina Department of Transportation.

Students also shared team findings at the State Energy Conference in Raleigh, where they received honorable mention for their poster. Environmental Management student Soli Shin completed a related master's project, and all three faculty leaders will continue to collaborate on research into this issue.



The great thing about studying energy at Duke is the variety of out-of-classroom opportunities, including significant industry exposure. I am confident that my education and experiences are preparing me to make a true impact in the energy sector.

LEAH LOUIS-PRESCOTT
Master of Environmental Management '18

TEAM LEADERS

Lori Benneer | Environmental Economics & Policy, Nicholas School of the Environment
Michael Clamann | Mechanical Engineering & Materials Science, Pratt School of Engineering
Jonathan Wiener | Law School

Education & Human Development course **Evaluating Health Innovation**

Launched in 2018, the Social Science Research Lab offers a new way for undergraduates to engage in project-based learning about social science methods and their application to societal problems.

The pilot course was conducted in partnership with the Duke Institute for Health Innovation (DIHI). Students learned about topical issues related to healthcare administration and innovation, engaged with Duke Health guest speakers, and explored techniques and practices in research and evaluation.

Working in teams, students developed research and evaluation proposals for three DIHI projects: predicting cardiogenic shock; utilizing patient-reported outcomes; and addressing provider burnout. The teams presented their work to stakeholders at the end of the year.

The 13 students, who represented a range of class years and majors, provided overwhelmingly positive feedback regarding the course. Through independent studies, four students will continue to work with one of the partners to implement the evaluation plans.

COURSE LEADERS

Jessica Sperling | Social Science Research Institute
Will Ellaissi | Duke Institute for Health Innovation



The opportunity to work with a real-life partner is very valuable and is something that I have talked about in cover letters and job interviews already.

STUDENT PARTICIPANT



Story+

In Summer 2017, Duke piloted a new six-week summer program called Story+, sponsored by the Franklin Humanities Institute and Bass Connections in partnership with Versatile Humanists at Duke.

Guided by graduate mentors, five teams of undergraduate students used a variety of qualitative, humanities-based techniques to communicate research findings through effective storytelling. Each team had a community or faculty sponsor:



- A Pope Wrote a Dictionary: You Figure Out How** | Joshua Sosin, Associate Professor of Classical Studies
- Race and Ethnicity in Advertising** | Jacqueline Reid Wachholz and Joshua Larkin Rowley, Duke Libraries
- RTI International 60th Anniversary Commemoration** | Jacqueline Olich, Director of University Collaborations, RTI International
- Suckers and Swindlers in American History** | Edward Balleisen, Vice Provost for Interdisciplinary Studies
- Talking Wages: The Impact of Fight for 15 on the Political Discourse of Minimum Wage Fights** | Allan Freyer, Workers' Rights Project, NC Justice Center



Some teams created websites and interactive story visualizations, while others combined qualitative and quantitative analysis to produce substantive policy recommendations. The experience honed collaboration skills among students from diverse disciplines, including Classics, English, History, Philosophy, Evolutionary Anthropology, Political Science, and Sociology, among others.

On the end-of-program evaluation survey, all 14 undergraduates indicated that they would recommend Story+ to peers. The program doubled in size for Summer 2018, with 30 undergraduates and 12 graduate mentors working on 10 projects.

Story+ summer project

Race and Ethnicity in Advertising

Duke's Hartman Center for Sales, Advertising & Marketing History has a renowned collection of archival materials, some of which highlight racial disparities in the world of marketing, as well as advertising campaigns directed toward particular racial and ethnic groups.

Mentored by a doctoral student, three undergraduates conducted extensive research in these collections, created a digital guide to relevant materials for other researchers, and curated three digital exhibits aimed at both academic and public audiences.

Black Is Beautiful describes how recent advertising has depicted African Americans; **Marketing to Minorities** explores the techniques U.S. marketers used to target people of color from the 1950s to 1990s; and **Closing the Gap** highlights minority representation in the marketing profession.



I wanted to conduct research that would help me hone skills in visual and data analysis. I really enjoyed the process of going through the archives and formulating my own answers to research questions, and the experience solidified my interest in pursuing research opportunities at Duke that actively sought to explore visual culture.



JESSICA CHEN '20

TEAM SPONSORS

Jacqueline Reid Wachholz and Joshua Larkin Rowley | Duke Libraries



Data+ summer project **Durham Traffic Accidents**

At four roadside sites around Durham, white-painted bicycles memorialize cyclists killed in accidents. The **Ghost Bikes** team used these memorials as a starting point for an exploration of traffic safety and shared urban spaces.

Mentored by a doctoral student, two undergraduates analyzed and mapped pedestrian, bicycle, and motor vehicle data from more than 20 sources provided by Durham’s Department of Transportation. After extensive data cleaning and consultation with city planners, they created an app that allows users to view and interact with crash maps, seeing how crashes vary according to time of day, weather conditions, and sociodemographic factors.

The team made data-driven policy recommendations to their community partners, including: installation of more crosswalks on two-way streets where mid-block crossings are common, since most pedestrians struck by cars were in the travel lane; and the remodeling of high-density crash streets to incorporate median islands, bike lanes, and/or crosswalks, since the majority of crashes occur on two-way, undivided streets.

It was incredibly productive for young students to learn about how you set parameters around a research problem and decide, ‘This is what I’m going to do, and this is what I may want to do but I can’t do it now’ [in the ten-week program]. That’s a skill that all researchers have to use.

HARRIS SOLOMON
Assistant Professor of Cultural Anthropology and Global Health

TEAM LEADERS
Harris Solomon | Cultural Anthropology, Trinity College of Arts & Sciences
Collin Mueller | Sociology, Trinity College of Arts & Sciences



Student Research Training summer project **Vision and Health Disparities in Honduras**

Four undergraduates spent two months working with community partner Clínica Esperanza on the island of Roatán, Honduras. The primary purpose of this project, **Saving Sight**, was to provide free eye exams at local schools and distribute glasses to the students.

The team reached 2,700 students in 20 schools. The vast majority had never received an eye exam before. The team also recorded each student’s height and weight and conducted a survey with questions about family eye history and risk factors for developing myopia.

Roatán has a significant population with glaucoma, which can lead to blindness. Working at the clinic, the team screened 100 adult patients and assessed risk factors for myopia and glaucoma in the wider community.



TEAM LEADER
Dennis Clements | Infectious Diseases, School of Medicine

“La Colonia is a community of squatter families, mostly young immigrants from the mainland. Clínica Esperanza is the primary healthcare provider for this underserved community, and it lives up to the name *esperanza* – for many, it is their primary provider of hope. All people should be afforded the right to the highest standards of health, and I am grateful for the opportunity to help deliver on that mandate.”

JESSE MANGOLD '19

EXAMPLES OF CONTINUED IMPACT FROM EARLIER TEAMS

Information, Society & Culture project team

Autism in Young Children

A Bass Connections team took part in an important collaboration among researchers at Duke University and Duke Medical Center. Launched in 2015, a free autism screening app invited the public to take part in a study to screen young children for signs of autism.

Using the app, parents completed consent forms and survey questions, and then used their phone's camera to record their children's reactions while they watch videos designed to elicit autism risk behaviors, such as patterns of emotion and attention, on the device's screen.

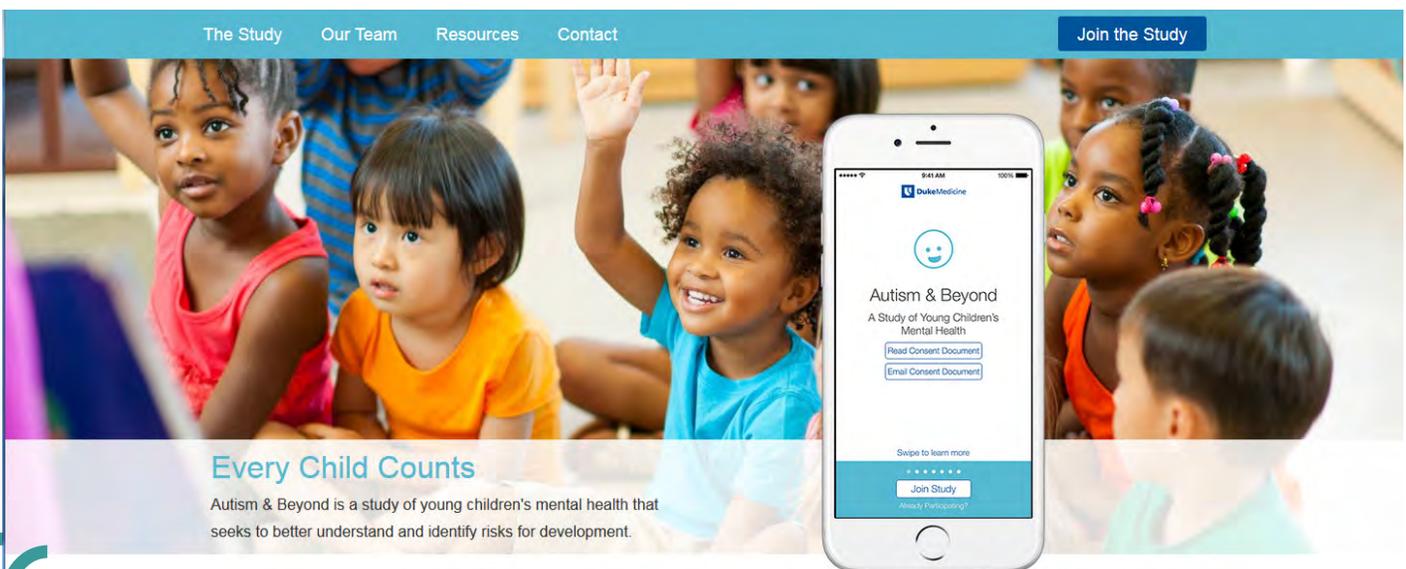
A 2018 Duke study found that the app is easy to use, welcomed by caregivers, and produced reliable scientific data. These findings point the way to broader, easier access to screening for autism and other neurodevelopmental disorders.

TEAM LEADERS

Geraldine Dawson and **Helen Egger** | Psychiatry & Behavioral Sciences, School of Medicine
Guillermo Sapiro | Electrical & Computer Engineering, Pratt School of Engineering

In one year, thousands of people downloaded the app, and 1,756 families with children aged one to six years participated in the study. Parents completed 5,618 surveys and uploaded 4,441 videos. Usable data were collected on 88% of the uploaded videos, demonstrating the feasibility of this type of tool for observing and coding behavior in natural environments.

In 2017, Duke received a related five-year \$12.5 million grant from the National Institutes of Health to study connections between autism and attention deficit and hyperactivity disorder (ADHD). The grant will allow Duke researchers to validate a new version of the app for autism and ADHD screening.



Every Child Counts

Autism & Beyond is a study of young children's mental health that seeks to better understand and identify risks for development.

When I arrived at Duke, I wanted to develop relationships with people across campus, not just in the School of Medicine. [In this project] we partnered with folks from Engineering and Duke Primary Care; we had a medical student, and undergrads and grad students from Computer Science and Engineering as well as Psychology and Neuroscience, and we implemented the app in a primary care setting. This led to several published papers. We've developed a new screening app, and we'll be validating this with an NIH grant.

GERALDINE DAWSON

Professor of Psychiatry & Behavioral Sciences | Director, Duke Center for Autism & Brain Development



History, Justice, and Memory

Most universities have yet to engage in a deep examination and public acknowledgement of their complex histories. What stories are missing?

In the 1920s, Horace Trumbauer's Philadelphia architectural firm drafted ambitious plans for the new Duke campus. African-American architect Julian Abele was the chief designer, but his vision remained little appreciated for nearly a century. In 2016, Duke named the main quad of West Campus in Abele's honor and provided further recognition through a year-long series of events.

Informed by the academic field of memory studies, a Bass Connections team explored Duke and Durham archives and mapped historical sites such as statues, plaques, buildings, and portraits. They collected previously untold stories and built a story bank with information on such topics as student protests and notable alumni of color. The team found that of 327 sites on Duke's campus, over half celebrate white men, while only 25 honor people of color.

In 2018, the team shared recommendations in a 100-page report, "Activating History for Justice at Duke." Three undergraduates also published an opinion piece in the *Durham Herald Sun*.

Duke's administration plans to engage with these issues, and the project's website is already receiving new submissions to its story bank.



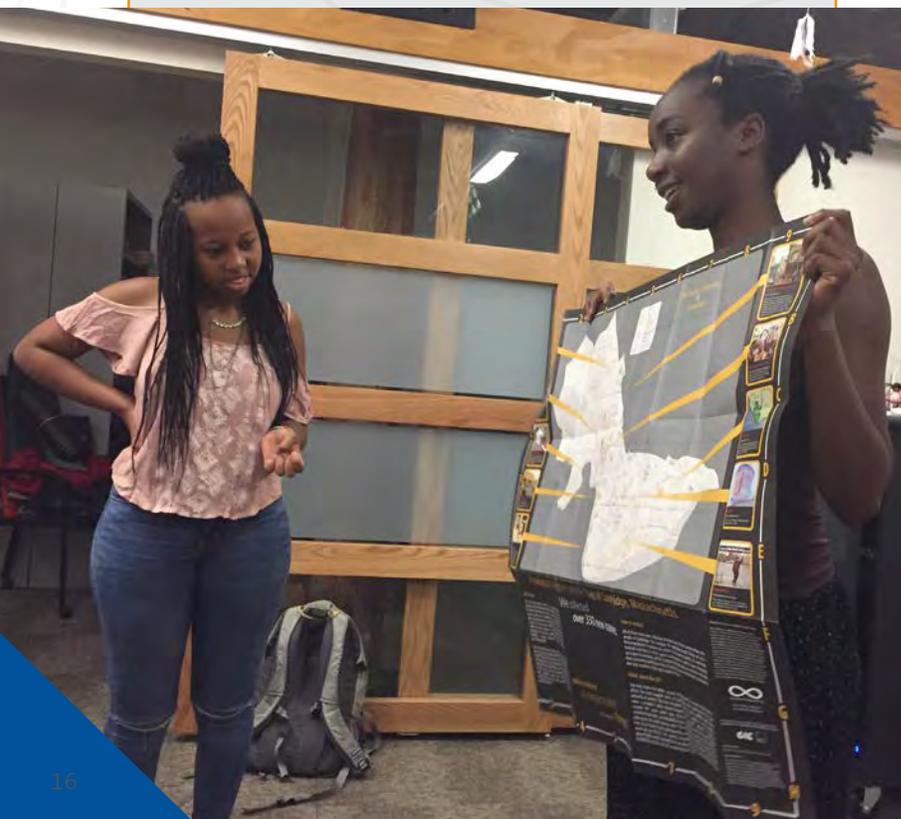
The [Activating History for Justice at Duke] report is a great example of how programs like Bass Connections can have impact beyond the classroom. The report is thoughtful and offers multiple avenues for future discussion; the recommendations will be given serious consideration.

SALLY KORNBLOTH
Provost of Duke University



TEAM LEADER

Robin Kirk | Cultural Anthropology, Trinity College of Arts & Sciences



Curricular and Co-curricular Innovations within Duke's Schools and Interdisciplinary Units

Supported by more than 30 gifts totaling over \$52M, Bass Connections is partnering with Duke schools to **spread collaborative inquiry throughout the university**. Examples include a proliferation of lab-style team-based courses, new topical foci for integrating faculty research and student experiences, and a new online journal for undergraduates to showcase and reflect on their original research.



School/Unit



Partnership



Highlights

School/Unit	Partnership	Highlights
Pratt School of Engineering	Grand Challenge Scholars	Research grants to Pratt undergraduates to pursue mentored research on topics related to Bass Connections themes
	New Curricular Gateways	New team-based courses on design thinking and data analysis
Trinity College of Arts & Sciences	Visible Thinking	New online journal to showcase undergraduate research, including outputs from Bass Connections teams
	Directors of Academic Engagement (DAEs)	Expanded number of academic advisors, who help undergraduates navigate Duke's interdisciplinary opportunities, including Bass Connections
Sanford School of Public Policy	Democracy Lab	Semester-long course organized around team-based research into issues involving democratic politics
Nicholas School of the Environment	Biodiversity Conservation Initiative	Year-long Bass Connections teams focused on biodiversity conservation, often in partnership with the World Wildlife Fund
Nicholas Institute for Environmental Policy Solutions, Energy Initiative, Sanford School, Nicholas School	Energy Access Project	New program focused on sustainable ways to meet energy needs of world's most disadvantaged communities through Bass Connections teams, courses, and faculty research
Franklin Humanities Institute, Duke University Libraries	Story+	New six-week summer program supports research by mini-teams of undergraduates, mentored by doctoral students, on projects in applied humanities

Redesign of Gateway Courses, Pratt School of Engineering

To extend the creativity and collaborative skills of its undergraduates, Duke's Pratt School of Engineering is transforming its gateway courses for first- and second-year students. The goal is to give all Pratt students early exposure to project- and problem-based experiences as well as coursework in data science and applied computing.

The new first-year program kicked off in Fall 2017 with a hands-on design course in a new 5,000-square-foot space known as the Design Pod. Working in semester-long project teams, students tackled specific needs articulated by community clients, which included Duke Gardens, the North Carolina Museum of Life & Science, and the Duke Center for Nursing Discovery, among others.

One team created a more realistic simulation device for proper intravenous injection for use by Duke nursing students. The "arm" contains veins under a lifelike material with a texture comparable to human skin.

Ann Saterbak (Biomedical Engineering) led the pilot course with Sophia Santillan (Mechanical Engineering & Materials Science). Each team benefited from the technical mentorship of a faculty member with relevant expertise.

Learning engineering concepts through the completion of a project offers a sneak peek into what a career in engineering could actually look like, which is not only enjoyable and fun, but can be insightful for freshmen unsure if they want to pursue engineering. I would absolutely recommend the course to other first-years! It's definitely solidified my decision to go into engineering.

MARY GOONERATNE '21



SCHOOL SPOTLIGHT: DUKE LAW

Faculty from all of Duke's schools engage in Bass Connections, finding new avenues to collaborate with faculty and students from other schools on a range of research questions. Since 2013, 16 Law faculty have participated in the program, including eight faculty who have served on more than one team. Thirteen Law students, including two S.J.D. and 11 J.D. students, have taken part. Here are four examples of their involvement.

North Carolina Medicaid Reform

This 2016-2017 project team drew on Duke's expertise in law, public policy, medicine, nursing, and business to craft a Medicaid reform proposal that fits the constraints and demands of North Carolina politics. In April 2017, the team submitted its report to North Carolina policymakers and citizens and hosted a presentation and discussion in Raleigh. Under Law Professor Barak Richman's guidance, four undergraduates received a 2017-2018 Bass Connections Follow-on Student Research Award to identify health policy patterns and develop county-level case studies detailing the challenges in North Carolina healthcare. The smaller group has submitted its findings to the Department of Health and Human Services as the state seeks to improve rural access to healthcare and other Medicaid reform.

One undergraduate team member, Kushal Kadakia, won a Truman Scholarship and the Duke Faculty Scholar Award this year, and graduate student team member Madhu Vulimiri (M.P.P. '18) accepted a position as senior Medicaid strategist at the North Carolina Department of Health and Human Services.



The healthcare policy world has been criticized for being insular, and its resistance to voices outside medicine has been blamed for many of its shortcomings. As an economist and a lawyer, I'm an outsider myself, but I knew that a deeply interdisciplinary team could develop a creative list of Medicaid reforms that a traditional medicine-oriented team could not.

BARAK RICHMAN
Edgar P. and Elizabeth C. Bartlett
Professor of Law

Retrospective Regulatory Review

In 2015-2016, a Bass Connections project team studied the emerging efforts of government agencies throughout the world to evaluate the actual impacts of their regulatory policies. Through substantive case studies at the local, national, and international levels, team members examined current practices and how to improve them. They conducted interviews in Washington with officials at several federal agencies and prepared a report on retrospective regulatory review.

Team member Daniel Ribeiro attended Duke Law as an S.J.D. student while on leave from Brazil's Ministério Público (a fourth branch of government that can challenge government officials who do not live up to legal requirements). He completed a dissertation on adaptive regulatory impact assessment and coauthored a related article in the *Journal of Land Use & Environmental Law*.



Back in Brazil, my experience with Bass Connections is informing how I am building and leading teams of researchers and policy analysts at the Ministério Público. And I can't have enough of the amazing opportunity of doing cutting-edge applied research! I am discussing participation in a future Bass Connections project, now as a member of my institution in Brazil and as a postdoctoral researcher from there.

DANIEL RIBEIRO, S.J.D. '18

Animal Waste Management

Agriculture has to be part of the conversation around climate change. Law Clinical Professor Michelle Nowlin and colleagues led a 2016-2017 project team to amplify the discussion around agriculture's effects on global health and the environment.

The team examined animal husbandry in five countries and did field research on North Carolina farms. By studying policy abroad and practice at home, faculty and students developed a website that provides a comprehensive overview of sustainable animal waste management practices and healthier meat production processes.



These students are morally courageous. They were not just looking at PowerPoint slides or images on Google Earth. Confronting this out in the field - in its totality - allowed us to have a shared experience, identify solutions, and create meaningful impact.

MICHELLE NOWLIN

Clinical Professor and Supervising Attorney at the Environmental Law and Policy Clinic

Government Responses to Crises

A deep-sea oil well has a blowout. A tsunami leads to meltdowns at a nuclear power plant. A bubble in the subprime mortgage market triggers a global financial crisis. What happens next?

A new book incorporating crucial research from a 2014-2015 Bass Connections project team examines how such crises reshape law and regulation, and how governments can learn from disaster.

Policy Shock: Recalibrating Risk and Regulation after Oil Spills, Nuclear Accidents and Financial Crises (Cambridge University Press, 2017)

was edited by team leaders Edward Balleisen, Lori Benneer, Kimberly Krawiec, and Jonathan Wiener. Students contributed to a key chapter in the book, drawing on their research on disaster investigation bodies, such as the National Transportation Safety Board and the Chemical Safety Board in the U.S., and examples from other countries, such as the Dutch Safety Board.



People often point to crisis events as leading to major regulatory action. And yet there was a need for research on how that actually occurs, and on the variety of different types of regulatory change that have followed crisis events.

JONATHAN WIENER | William R. and Thomas L. Perkins Professor of Law

PROGRAM EVALUATION

An annual evaluation helps Bass Connections leadership strengthen the program and better understand its impact on students, faculty, and the societal issues addressed through the projects. All data reported below is based on survey respondent data. The average response rate across all survey populations is 37%.



Highlights from the 2017-2018 Survey

TOP FIVE AREAS OF IMPROVEMENT REPORTED BY UNDERGRADUATE AND GRADUATE STUDENTS

UNDERGRADUATE STUDENTS

1. Communicating with a team
2. Working with team members from diverse areas of knowledge
3. Comfort working with faculty
4. Organizing and managing projects
5. Demonstrating leadership on a team

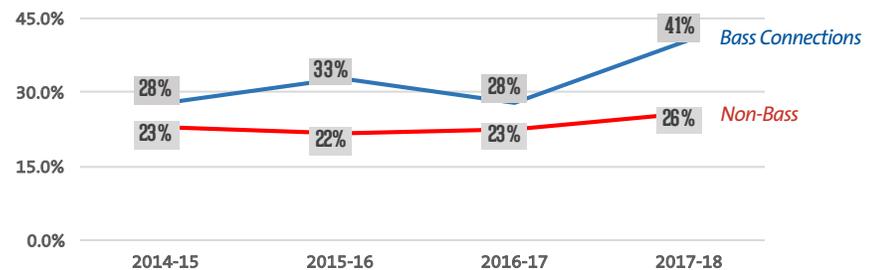
GRADUATE STUDENTS

1. Ability to connect my academic experiences to broader social issues
2. Working with team members from diverse areas of knowledge
3. Communicating with a team
4. Research skills
5. Solving complex problems

Spurring Undergraduate Research

Many Bass Connections students take their research further, completing a thesis related to their team experience or becoming inspired to pursue research in new area. Among the graduating class of 2018, **41% of students who had participated in Bass Connections completed a thesis**, compared to 26% of the total senior class.

THESIS COMPLETION RATES



Integrating Teaching and Research for Faculty

Faculty report benefiting from the opportunity to mentor students while furthering their own research. Team leaders also emphasized the value of interdisciplinary collaboration, learning from other faculty members' areas of expertise to enrich their understanding of the topic.

Leaders noted a wide range of outcomes, including peer-reviewed publications; external grant applications seeded by their team's research; data collection; conference presentations; public policy reports and recommendations; various prototypes and products; educational materials and trainings for community groups; and scientific models, formulas, and algorithms.

Bass Connections has been transformative. It has provided a mechanism for the Duke community to work on important and interesting projects through a format/vision that is innovative and beneficial to the entire Duke and broader community.

FACULTY MEMBER

The opportunity to study a global health issue through chemistry promised to unite my own disciplines in a meaningful way. My teammates with backgrounds in biology and psychology helped build a better understanding of mercury's flow through the food chain and how human behavior and motivations shape dietary habits. The close collaboration across disciplines has been a formative experience.

JOSHUA GRUBBS '18

Project team: *Environmental Epidemiology in Latin America*

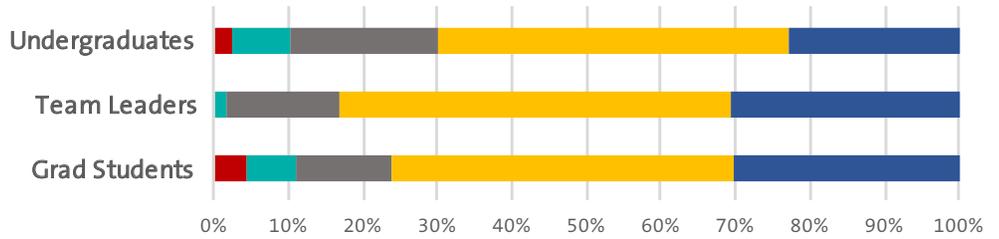
Honors thesis: *Evaluation of a Dietary Intervention for Chronic Methylmercury Exposure among Communities in Madre de Dios, Peru*



Satisfaction

Overall, how satisfied are you with your Bass Connections team experience?

Not at all satisfied
Slightly satisfied
Somewhat satisfied
Very satisfied
Extremely satisfied



of **team leaders** would recommend the program to a colleague



of **graduate students** would recommend the program to a friend



of **undergraduate students** would recommend the program to a friend

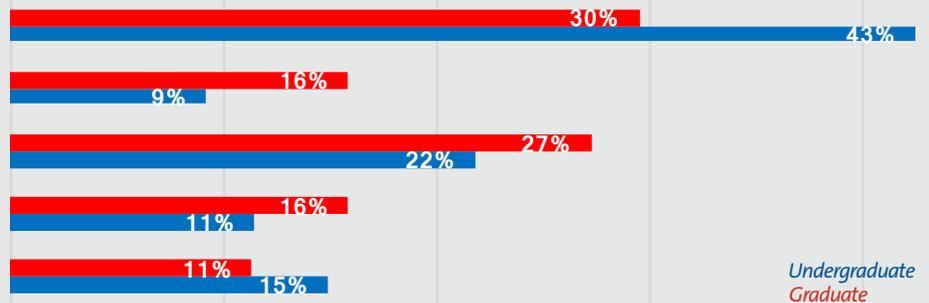
85% of undergraduates said that Bass Connections provided something unique to their learning experience at Duke by “a great deal” (40%) or “quite a bit” (45%).

Understanding What's Most Valuable

Bass Connections is a multifaceted program. This year's evaluation sought to better understand what students value most about the program.

Bass Connections includes many facets. Which of these attributes have you found most meaningful?

- All of these things work together in a meaningful way that is hard to separate
- The opportunity to work across levels (i.e., with faculty and other student levels)
- The opportunity to conduct research in an applied setting
- The opportunity to work across disciplines
- The opportunity to conduct research in a team-based environment

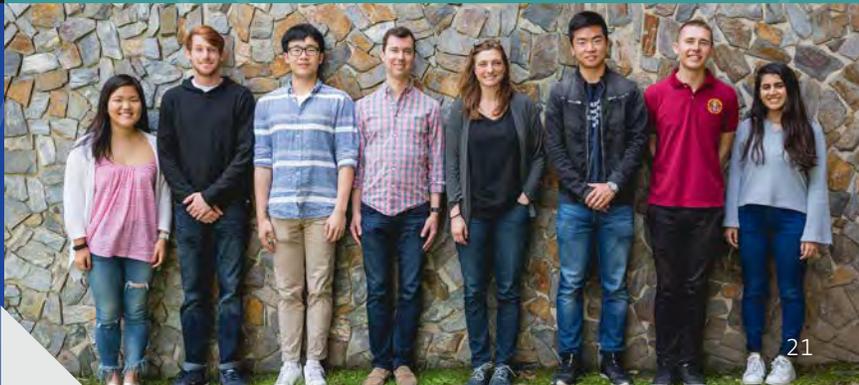


It was a fantastic opportunity to work in a group setting and develop leadership skills. Bass Connections exemplifies what Duke does so well: providing opportunities for students to work collaboratively across disciplines and levels of experience and education.

GRADUATE STUDENT

Bass Connections allowed me to explore my two passions in music and medicine in a well-integrated research project. I loved working on a small team with people I had never met before and learning to bond and work collaboratively.

UNDERGRADUATE STUDENT



FUNDING

As of June 30, 2018, Bass Connections raised **\$93.6M** toward its goal of \$100M. Generous support from donors has created 83 funds to support:



SPURRING INTERDISCIPLINARY RESEARCH ON PRESSING GLOBAL CHALLENGES

Conservation and Environmental Education

Passionate about supporting **biodiversity conservation**, Jeff and Laurie Ubben made a \$5 million gift to Duke's Nicholas School of the Environment and a companion gift of \$20 million to the World Wildlife Fund (WWF), in support of wildlife conservation programs at WWF and environmental research and education at Duke.

\$500,000 of the Nicholas School fund has been matched through Bass Connections to support year-long project teams led by Nicholas School faculty focused on biodiversity conservation. In Fall 2017, 13 groups of faculty submitted proposals for this special funding opportunity in conjunction with partners at WWF.

The first three funded projects deploy ocean evidence gap maps to target conservation efforts; use drones to monitor and evaluate the health of coastal ecosystems; and analyze the role that African forest elephants play in seed dispersal and forecasting ecological changes resulting from reduction of elephant populations.

Jeff and Laurie Ubben are both alumni of Duke, and Jeff is a member of Duke's Board of Trustees.

Bass Connections provided a unique opportunity for us to make a gift that would support several institutional priorities at once - experiential learning for students, faculty research, and the application of research to help global communities.

JEFFREY T'83 AND LAURIE T'84 UBBEN P'15, P'19



Bass Connections is a distinctive new model for education and research focused on exploring and solving major societal challenges through interdisciplinary research, teaching, and community engagement. Supporting Bass Connections gave us the opportunity to leverage multiple parts of the university – Duke Health, undergraduate education, faculty in Duke’s professional schools – as well as community partners to create a learning agenda focused on optimal development in children from prenatal to age five.

LAURENE SPERLING
T’78, P’13, P’14

Innovations in Early Childhood Development

A new initiative at Duke takes a holistic approach to helping babies and young children get the best possible start in life. **All Babies and Children Thrive (ABC Thrive)** was established by a \$2 million gift from Duke alumna and trustee Laurene Meir Sperling and her husband, Scott M. Sperling, through the Sperling Family Charitable Foundation. The Bass Connections Challenge will add \$1 million in matching funds for a total of \$3 million.

Leveraging the innovative research, education, clinical care, and outreach capabilities of Duke University and Duke Health, the initiative promotes optimal development in children from prenatal to age five.

Priority areas include prenatal and early childhood health and wellness; community outreach; and applied technology to achieve scale, with data analytics in each of these domains guiding the research.

In Spring 2018, ABC Thrive awarded seed grants to three interdisciplinary teams of faculty. Corresponding Bass Connections projects and interdisciplinary courses will provide opportunities for students to explore these issues.

Energy Needs of the World’s Poor

This year, Duke launched the **Energy Access Project** to develop new, collaborative ways to meet the energy needs of some of the world’s most disadvantaged communities, without exacerbating climate change.

Jim Rogers and his wife, M.A. Rogers, established the project with a \$1.5 million gift. The Bass Connections Challenge will add \$750,000 in matching funds for a total of \$2.25 million to support the project’s goal of accelerating deployment of sustainable energy and empowering the world through expanded energy access.

Next year, two Bass Connections project teams will begin tackling this challenge by using a “ground-up” approach to better understand the economic, political, geographic, and cultural challenges to energy access in East Africa, and by using satellite imagery to create an energy infrastructure map of the world.

Rogers served as a Rubenstein Fellow at Duke and has led a Bass Connections project to explore renewable off-grid electricity solutions for rural populations.

Key Duke collaborators in the Energy Access Project include the Nicholas Institute for Environmental Policy Solutions, the Duke University Energy Initiative, the Sanford School of Public Policy, Bass Connections, and the Nicholas School of the Environment.



Based on my experiences at Duke, I am confident that our investment in the faculty and students of the university will generate scalable solutions bringing power to people around the world.

JIM ROGERS
Former CEO and Chairman of the Board, Duke Energy





BASS CONNECTIONS SHOWCASE AND AWARDS

On April 18, students from the 2017-2018 project teams shared their research highlights with the community at the second annual Bass Connections Showcase.

Approximately 500 people—including Duke faculty, staff, and students, as well as representatives from community partners, officials from the City of Durham, and senior leaders from UNC Chapel Hill, NC State, NC Central, and Durham Tech—took part in the event.

President Vincent E. Price gave opening remarks, in which he commended the teams for building bridges across disciplines and schools and helping redefine higher education for the 21st century.



Grants and Awards

FOLLOW-ON STUDENT RESEARCH AWARDS FOR 2018-2019

Lillian Blanchard '19, Sahil Sandhu '20, Jacqueline Xu '19
Global Alliance on Disability and Health Innovation (GANDHI)

Linh Bui '20, Rob Steilberg '18, Kate Watkins '19
mHealth for Better Routine Immunization Data in Honduras

Caitlin Grant '19 and Shayal Vashisth '19 | Exercise as a Therapy for Cognitive Aging and Alzheimer's Disease

Travis Knoll (Ph.D. in History)
The Cost of Opportunity? Higher Education in the Baixada Fluminense

Chinemerem Nwosu '19 | Interventions Improving Neurosurgery Patient Outcomes in Uganda

Tony Pham (M.Sc. in Global Health) | Global Mental Health Program

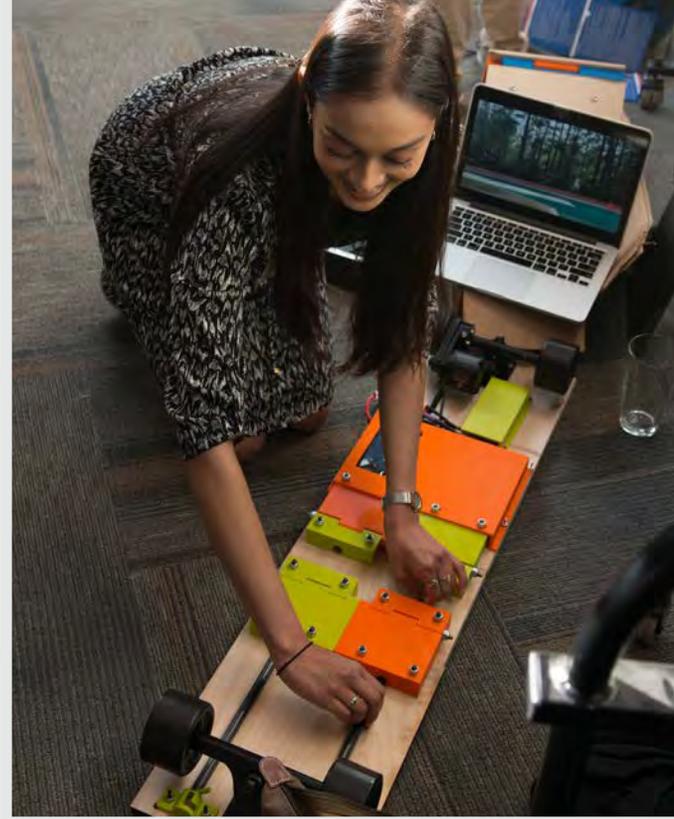
Emily Rains (Ph.D. in Public Policy) | Studying the Real "Slums" in Bangalore, Patna and Jaipur

Samantha Sadler '19 | Interventions Improving Neurosurgery Patient Outcomes in Uganda

Poster Awards

JUDGES' SELECTION
Addressing Global Health Needs among Refugee Children and Families in Durham County

AUDIENCE CHOICE
Blue Devil Resistome Project
Pocket Colposcope



OUTSTANDING MENTORSHIP

Sarah Barton (Th.D.) | Global Alliance on Disability and Health Innovation (GANDHI)

Sara Maurer (Ph.D. in Psychology & Neuroscience) | Exercise as a Therapy for Cognitive Aging and Alzheimer's Disease

Brian Wong (M.E.M.) | Energy Data Analytics Lab

Talks

Creative Industries and the Urban Environment
Jonathan Chapman '18 and Laura Ritchie, M.A. in Liberal Studies

Governing Automated Vehicles: North Carolina and Beyond
Soli Shin, M.E.M., and Sarah Sibley '19

Stemming the Opiate Epidemic through Education and Outreach
Katie Kanter '18 and Madeline Thornton '18

Social Change through Music: Amplifying and Empowering Youth Voice
Andie Carroll '20 and Olivia Neely '20

Building Capacity for Surveillance and Diagnosis of Respiratory Viruses in Sarawak, Malaysia
Kerry Mallinson '19 and Rick Tsao '20

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