

# Duke

# BASS CONNECTIONS

# 2022- 2023

## ANNUAL REPORT



Above, [Collecting Oral Histories of Environmental Racism and Injustice](#) team members march in Warren County, NC, on the 40th anniversary of the protests considered to be the birth of the environmental justice movement. (Photo: Courtesy of Cameron Oglesby)

# TEN YEARS OF IMPACT

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When Kaylin Tsukayama got married last fall, two Duke faculty members were there to celebrate with her. Professors Mark Olson and Nina Sherwood led a Bass Connections project, Neuroplicity, on which Kaylin participated for three years. She credits the experience of communicating complex scientific concepts through multimedia storytelling with helping her find her career path.

As we celebrate the 10-year anniversary of Bass Connections, we have been examining the long-term impact of the program by reaching out to our alumni and exploring research outcomes from the 830 projects supported by the program.

Like Kaylin, many alumni have shared how the program fostered lasting relationships, shaped career ambitions and equipped them with the skills to pursue their passions.

As a doctoral student in clinical psychology, Elsa Friis contributed to a project exploring global mental health. Now a senior director of research and development at a startup that deploys AI in the provision of mental health services, Elsa told us, “Because of Bass Connections, I started my career not only with concrete clinical skills but with highly marketable abilities and experience in research, app development, teamwork and leadership.”

On his way to a master’s degree in environmental management, Alex Rudee worked on a Bass Connections project that assessed how policies about the use of American forests, agricultural lands and wetlands could reduce greenhouse gas emissions. Key elements of that project have informed a new \$3.1 billion USDA program aimed at climate-smart agriculture practices. Alex is now helping Amazon meet its goal of achieving a net-zero carbon footprint by 2040.

Seeing how powerful participation on applied research teams can be for students and faculty, we continue to prioritize sharing our lessons learned across the landscape of higher education. This year we published a journal article on outcomes for students on Bass Connections teams and hosted a



“From discovering new directions, to gaining skills, to building relationships, Bass Connections was truly a life-changing experience for me.”

*Kaylin Tsukayama, B.S. in Neuroscience, 2015; Videographer and Photographer at Meredith College*



“Working with my team helped me learn to make connections and to communicate across disciplines and research areas, skills that I use every day in my work.”

*Elsa Friis, Ph.D. in Clinical Psychology, 2020; Senior Director of Research and Development at Alongside*



“The knowledge I gained in research, interviews and writing for a policy audience has been invaluable in my postgraduate career, as have the professional connections I made through my team leader, Robert Bonnie.”

*Alex Rudee, Master of Environmental Management, 2018; Senior Program Manager, Nature-Based Solutions at Amazon*

two-day symposium on collaborative, project-based learning. Symposium participants, including 120 people from more than 45 diverse institutions, exchanged ideas and formulated plans to implement on their own campuses.

As we have reflected on the remarkable success of Bass Connections in its first decade, we have also been looking ahead, continuously seeking to scale, improve and innovate. In 2022-2023, these efforts included launching a new Health Policy & Innovation theme and hosting a “pop-up” opportunity through which three project teams explored mechanisms for strengthening our democracy.

The program’s 10-year milestone also offers an opportunity to reflect on the invaluable contributions of the many faculty, staff, students and donors who supported this program from its earliest days. Your leadership helped transform an intriguing idea into a thriving program that has become a hallmark of the Duke experience. We are grateful for your partnership and look forward to embarking on our second decade with you.

*Edward J. Balleisen*  
*Vice Provost for Interdisciplinary Studies*  
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*Director, Bass Connections*  
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## Program Reach, Fall 2013–Spring 2023

Through Bass Connections, more than 5,500 members of the Duke community have engaged in 830 research projects alongside community partners from around the world. The program now boasts over 3,900 alumni.

**1,106 FACULTY & STAFF MEMBERS**

**1,275 GRADUATE & PROFESSIONAL STUDENTS**

**3,440 UNDERGRADUATE STUDENTS**

**89 POSTDOCS & TRAINING RESIDENTS**

**583 EXTERNAL COMMUNITY PARTNERS**

Figures include summer programs; community partners are based in 46 countries and 20 U.S. states



“I think the most enduring legacy of the program is that it continues to shape the lives of our alumni ... who credit [it] with helping them make a meaningful contribution to the world.”

*President Vincent E. Price at the Fortin Foundation Bass Connections Showcase, which celebrated the program’s first decade and was accompanied by a special exhibit*



“Bass Connections gave me the opportunity to delve into the intimate connection between human and environmental health, and in doing so, experience working with communities to address population health needs. Our work set me along my current path [of earning a master’s degree in public health and an M.D.]”

*Joshua Grubbs, B.A. in Chemistry and Global Health, 2018; Resident Physician at Boston Medical Center*

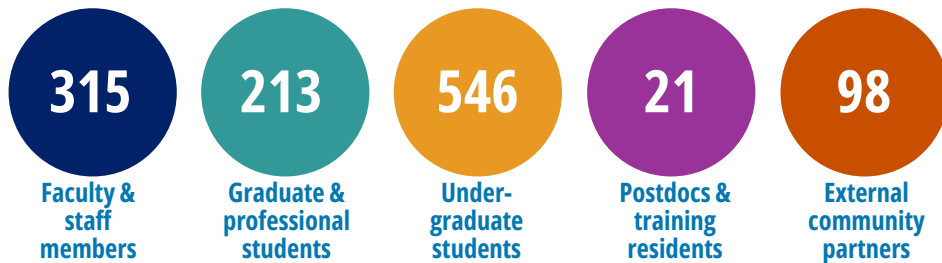


“Bass Connections allowed me to connect with amazing professors from multiple disciplines, learn how to pace my work throughout the year and gain confidence as a researcher [...]. Without this experience, I might not have realized how passionate I am about research.”

*Sydney Hunt, B.S.E. in Electrical & Computer Engineering and Computer Science, 2023; Ph.D. Student in Electrical Engineering at Stanford University*

# 2022-2023 PARTICIPATION

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Figures drawn from 55 project teams (2022-2023) and 45 summer projects (2022) and include several individuals who participated in more than one Bass Connections experience (e.g., a year-long project team and a summer program); in addition, many more students and faculty were involved in 78 one-semester Bass Connections courses.

# 2022-2023 AWARDS

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## BASS CONNECTIONS EXCELLENCE IN COLLABORATIVE LEADERSHIP AWARD

Henri Gavin (Professor, Civil & Environmental Engineering)  
Rachael Lau (Ph.D. Student, Civil & Environmental Engineering)

### Earthquake Early Warning in Kathmandu

Gavin (top row, third from left) and Lau (top row, third from right) at the Kathmandu Geohazard Early Warning Research Symposium in Nepal, March 2023 (Photo: Courtesy of Rachael Lau)



## BASS CONNECTIONS LEADERSHIP AWARD

Cameron Kim (Assistant Professor of the Practice, Biomedical Engineering)

### Synthetic Biology and Genetic Engineering for Human Health and Society

Kim (fourth from right) with team members at the iGEM competition in Paris, October 2022 (Photo: Courtesy of Cameron Kim)



## BASS CONNECTIONS AWARD FOR OUTSTANDING MENTORSHIP

Ze-Yi Han (Ph.D. Student, Biology)  
Yaning Yuan (Ph.D. Student, Biology)  
Dan Wiczynski (Postdoctoral Associate, Biology)

### Effects of Climate Change on Microbial Food Webs

Han (second from left), Yuan (third from left) and Wiczynski (fourth from left) with team members (Photo: Courtesy of the Effects of Climate Change on Microbial Food Webs team)





# 2022-2023 HIGHLIGHTS

## ENVIRONMENTAL JUSTICE, CLIMATE CHANGE AND COMMUNITY ENGAGEMENT

**How can North Carolina’s efforts to address climate change include community members’ input and take steps to reduce racial and economic inequities?**

While the state has a laudable goal of reducing carbon dioxide emissions in electric power production by more than two-thirds in the next seven years, choices about how to reach that goal can have unintended consequences. For example, using swine waste biogas to offset emissions from fossil fuels has advantages, but it could increase energy bills and create pollution hotspots in low-income communities due to antiquated waste management technology.

This team analyzed the process of stakeholder engagement during the development of North Carolina’s 2022 Carbon Plan, work that included consultation with environmental justice leaders throughout the state. Identifying missed opportunities to incorporate local voices in decision-making, the team documented their findings in a report.



Top left, pigs in a concentrated animal feeding operation in eastern North Carolina; above, team members walk on top of a covered swine waste lagoon during a site visit in August 2022 (Photos: Courtesy of Erin Fleck)



“My Bass Connections team was one of the most ... dynamic experiences I had in my time at the Nicholas School. This opportunity brought together students from all corners of the Duke community to learn and grow together in our understanding of community engagement and our shared desires to strengthen the community voice in the energy transition. I’m excited about what the team was able to accomplish together with community members from eastern North Carolina!”

*Erin Fleck, Master of Environmental Management, 2023; Field Director at Oceana*

Next, the team created a Stakeholder Participation Bill of Rights, incorporating principles and practices gleaned from discussions with environmental justice leaders, community organizers and policymakers. The Bill of Rights then informed criteria for a Stakeholder Participation Scorecard, a resource to empower community members and support facilitators in creating equitable, effective and fair mechanisms to solicit public input.

## COPING TOGETHER: REDUCING MENTAL HEALTH DISPARITIES FOR LATINX FAMILIES

What are the mental health symptoms and stressors affecting Latinx immigrant families in the U.S., and how can a community-based intervention help these families build resilience?

Since family stress has been noted as a key driver of mental health decline in Latinx immigrant families, it represents a promising area to target. Building on previous work, this team conducted four focus groups of Latinx community members to identify factors that contribute to conflict as well as positive interactions within families.

A growing body of research shows that effective mental health interventions in marginalized communities have to take social context into account. Team members identified cultural adaptations to an existing evidence-based, low-cost intervention that could benefit Latinx families. They collected feedback on their proposed adaptations through prototyping sessions with community partners.



"I'm hopeful our work will serve as an efficient and culturally competent intervention that will help Latinx families in the U.S. strengthen their bonds and gain the resilience and skills they need to reach their goals. Through this project, I was able to learn from top researchers in the mental health field, build partnerships with Latinx families that face struggles that are similar to what I have experienced as a foreign student, and design solutions to help this group thrive."

*Gonzalo Alfredo Meneses Gonzales, Master of International Development Policy, 2023; Program Officer at FHI 360*



Top left, Coping Together graphic; at right, above, Gonzales (second from left) and fellow team members at the Fortin Foundation Bass Connections Showcase in April 2023 (Photo: Les Todd); at right, below, a team dinner (Photo: Courtesy of the Coping Together team)

## SYNTHETIC BIOLOGY AND GENETIC ENGINEERING FOR HUMAN HEALTH AND SOCIETY

**How can cutting-edge synthetic biology be used to address the current limitations on treatment of brain tumors?**

The annual International Genetically Engineered Machine (iGEM) competition encourages students to explore the field of synthetic biology, which involves redesigning genetic material for innovative uses. This team entered the competition and received a silver medal for their project on glioma, the most common type of malignant tumor originating in the brain.

Since treatment of glioma is limited by the lack of a scalable, physiologically relevant model for testing therapeutics, team members designed, built and tested a versatile new drug screening platform they called NODES. Researchers can use NODES to test novel chemical compounds, while pharmaceutical companies can draw on it to verify the impacts of therapeutics before initiating clinical trials, and healthcare providers can search it for patient-specific therapy.

To explore the sociological and ethical implications of their work, team members reviewed how sexual and racial representation in sample cell lines impacts the direction of research. The team's website presents the project in detail.

Students also took part in a symposium with teams from UNC and NC State, and taught about synthetic biology to a class at the Triangle Math and Science Academy.



"I am thankful for the opportunity to participate in undergraduate-driven, interdisciplinary research. Bass Connections has been instrumental in my development as a researcher, teaching me how to plan experiments, troubleshoot experimental results and communicate scientific findings. Above all, I'm appreciative to learn and grow with some of the most talented and passionate students who have become my amazing friends."

*Jessica Shah, B.S.E. in Biomedical Engineering, 2023; Ph.D. Student in Medical Engineering and Medical Physics at Harvard-MIT Health Sciences and Technology*



Top left, team members give a presentation at the iGEM competition in Paris in October 2022; right, the team poses in the exhibition hall during the competition (Photos: Courtesy of Cameron Kim)

## EXAMINING RACIAL INEQUALITY AND REFORM THROUGH DRIVER'S LICENSE ACCESS

When Durham residents have their license suspended or revoked, how do those sanctions affect their life outcomes? And what is the city's role in helping such individuals get back on the road?

In Durham County, around 46,000 people have had their driver's license suspended or revoked. Many of these people lost their driving privileges because they failed to appear in court or were unable to pay the fines and fees associated with tickets.

Even for minor traffic violations, the consequences can be major and long-lasting. The median length of suspension is nearly 12 years.

This team cleaned, coded and synthesized data from more than 40 interviews that the previous year's team had conducted with city officials and individuals who had lost their licenses, and organized a new round of interviews. The team's work illuminated the widespread effects that losing a license has on the well-being of individuals and their families.

Next, to share their findings, team members prepared a paper for a peer-reviewed journal and made recommendations to the city for improving the Durham Expiration & Restoration (DEAR) program.



"We have approached this work from a community-based perspective, meaning that the questions are developed in collaboration with our community partners to help improve the programs that we're looking at and provide feedback to them."

*Warren Lowell, Ph.D. Student in Public Policy and Sociology*

Top left, flags of Durham, North Carolina and the United States (Photo: Wade Brooks, licensed under CC BY-NC 2.0); right, some team members in front of their poster at the Fortin Foundation Bass Connections Showcase in April 2023 (Photo: Courtesy of Adrienne Jones and Warren Lowell)





“My peers and team leaders stressed the importance of the balance between community-building and research; one could not exist well without the other. It was beautiful to see how we all came together to achieve our shared goals. This experience shaped my Duke journey because it emphasized the importance of relationships in the context of any work. I also grew in my ability to collaborate efficiently, delegate tasks, manage multiple timelines and demonstrate flexibility.”

*Jasmine Daniel, B.A. in Psychology and Global Health, 2022; Research Program Coordinator, Department of Mental Health at Johns Hopkins University*

## STRENGTHENING PARTNERSHIPS BETWEEN DURHAM PUBLIC SCHOOLS AND LOCAL UNIVERSITIES

How can universities help meet the needs of community members within and beyond public school buildings, and how can they prepare undergraduates to volunteer in Durham classrooms?

An ongoing collaboration between Duke and North Carolina Central University, this team partnered with Durham Public Schools to advance the university-assisted community schools (UACS) strategy.

UACSs bring together academics, health and social services, youth development and community engagement to help public schools address the local effects of racism and poverty.

The team identified three main areas where universities can partner with local schools to address community needs: making data accessible and easy to understand; supporting health outcomes; and contributing to anti-racist curriculum development.

In 2022-2023, team members updated and refined a data dashboard encompassing all Durham Public Schools with a physical footprint, giving parents an easy way to learn about available resources. They explored ways in which UACSs have responded to health needs in their communities and investigated possibilities to apply promising practices in Durham. And after refining the previous team’s draft of an anti-racist and culturally inclusive curriculum, they created nine modules and gathered feedback from community members.

Stemming from this work, a partnership among Duke, North Carolina Central and East Carolina universities was formalized as the Southeast Regional Coalition for University-Assisted Community Schools in September 2023.



Top left, team members at Durham’s Hayti Heritage Center; top right, during a site visit to the University of Central Florida; bottom right, at Club Boulevard Elementary School (Photos: Courtesy of Alec Greenwald)



## LABORATORY ART IN PRACTICE: BUILDING A MODEL FOR THE ART/SCIENCE LAB AT DUKE

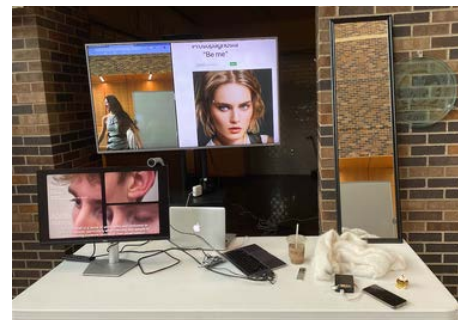
**How can scientific lab practices inform creative work and arts-based research, and vice versa?**

To explore the intersection of art and science, this team investigated different models of lab and studio practice, with a particular focus on how these models might amplify scientific inquiry and creative research.

The team produced a database of artists and labs working at this intersection, as well as the publications, galleries and cultural institutions that support them. Team members also examined historical, ethical and social descriptions of experimental practices in scientific studies, explored lab techniques such as microscopy, dissection and working with microbes, and studied works of art that incorporate instruments and practices from the life sciences.

Finally, team members developed lab-based artistic research projects, culminating in an exhibition in the French Family Science Center.

The resulting et al lab at Duke will host workshops, public lectures, exhibitions and discussions, and aims to scaffold research and creative practice at the intersection of art and science.



Top left, team members participate in a bioplastics lab (Photo: Courtesy of Mark Olson); above, Liuren Yin's project exploring prosopagnosia (Photo: Meghna Datta); below, team leader Kristen Tapson speaks with Vice Provost Ed Balleisen while team members explain the project to other guests at the Fortin Foundation Bass Connections Showcase (Photo: Les Todd)



"There is a misconception that art lacks the structure to be considered methodological and that science is too rigorous to leave enough room for true creativity. I fundamentally believe they are complementary areas of study, and this Bass Connections team dedicated to working at this intersection quickly became one of my favorite classes at Duke. I found not only a community of individuals who shared similar interests but also a supportive structure for engaging in projects that aligned with my curiosities."

*Noelle Garrick, Undergraduate Student in Computer Science and Visual Arts*



"The skills I built from working on and leading a team that seeks to transfer research and data findings from an academic setting to policy or community-based interventions are transferable skills for my future career path in health equity."

*Graduate student*

"I loved forming relationships with other undergraduate students, grad students and faculty members that I would otherwise have never met."

*Undergraduate student*

"I enjoyed learning how to conduct research and data analysis as part of a team. I had never had the opportunity to do something like it before and we were researching an issue that I cared a lot about."

*Undergraduate student*

"Working with a diverse group of people for a research project was the most meaningful [aspect of the experience]. I was able to develop skills for working on a team and to understand how I work best as both a leader and a follower. It was helpful to have perspectives from graduate students as well."

*Undergraduate student*

"By virtue of our research work with Bass Connections, we are in prime position to impact children and families through external funding opportunities and the development of future practitioners trained in the implementation of our work."

*Team leader*

"I am very grateful for the chance to work closely with students on matters of moral and social importance. It is a privilege to work with them."

*Team leader*

# 2022-2023 PROGRAM EVALUATION

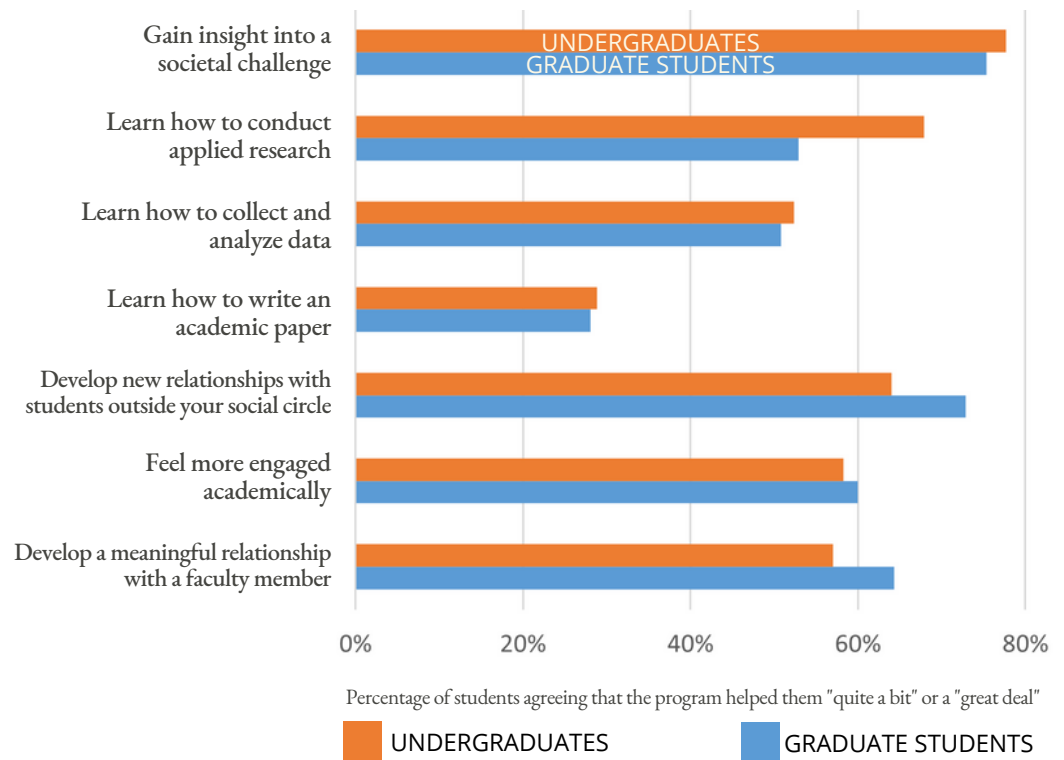
An annual evaluation explores Bass Connections' impact on team leaders and students and helps identify best practices to improve the program for future participants.

## HIGHLIGHTS FROM THIS YEAR'S REPORT

More than 90% of participants said they would recommend Bass Connections to a friend or colleague.

Students reported that the program helped them gain deeper insight into a societal challenge, learn how to conduct applied research and develop new relationships with students and faculty.

### To what extent did Bass Connections help you ...



Team leaders said they benefited from participating in Bass Connections, emphasizing the opportunity to:

1. **Develop new knowledge and expertise related to a research topic**
2. **Build new relationships with faculty and students across Duke**
3. **Generate new findings for further research**

# PROGRAM UPDATES

## NEW THEME: HEALTH POLICY & INNOVATION

A new Bass Connections theme will support teams of faculty and students in their exploration of solutions to improve health and well-being in the United States.

Administered by the Duke-Margolis Center for Health Policy, the [Health Policy & Innovation](#) theme is supported by an expendable gift from Dr. Robert J. Margolis M'71 and Lisa Margolis, matched by Bass Connections funds. It builds on a robust network of faculty, students and community partners who share a commitment to developing policies, practices and technologies that advance health in the U.S. and elsewhere.

## POP-UP THEME: DEMOCRACY & GOVERNANCE

By many measures — including freedom of the press, free and fair elections, and government transparency — democracy faces growing threats in much of the world. What solutions might bridge growing levels of political polarization and disinformation, and what policy changes can help democratic institutions live up to their ideals?

Through this one-year “pop-up” theme, Bass Connections supported [three project teams](#) in 2022-2023 that engaged in team-based research related to democracy and the challenges of sustaining strong democratic institutions in a polarized world. The teams discussed their findings in a special [event](#) hosted by [Polis: Center for Politics](#) at the Sanford School of Public Policy.

### Building on Team Experiences

In April 2023, seven student-proposed research projects received competitive grant funding from Bass Connections. Two will build on work from the Democracy & Governance pop-up theme. See all [Bass Connections Student Research Awards](#).



“The Bass Connections model facilitates the type of genuine partnerships and applied research necessary to address the complexities of the U.S. healthcare system and translate research into impact.”

*Beth Gifford, Associate Research Professor in the Sanford School of Public Policy; Duke-Margolis Core Faculty; Theme Leader, Health Policy & Innovation*



“The program offered me valuable opportunities to interact with faculty that were outside my discipline, but with whom I shared a common commitment to solving a pressing world problem.”

*Pranav Athimuthu, B.A. in Psychology and Political Science, 2023; Bass Connections: [Social Provision of Information for Effective Democratic Citizens](#)*