

THE HARVARD COLLEGE UNDERGRADUATE RESEARCH ASSOCIATION

MISSION:

To increase the presence of undergraduate research by fostering an interdisciplinary research community and developing projects that enrich the undergraduate research experience.



HCURA

HARVARD COLLEGE UNDERGRADUATE RESEARCH ASSOCIATION

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The National Collegiate Research Conference (NCRC) is a forum to promote collaboration.

*We connect future researchers
with their peers and specialists
in their fields of interest.*

NCRC provides undergraduate researchers across all disciplines with a platform for sharing their work. As a result of our past experience with hosting local undergraduate research symposia, the Harvard College Undergraduate Research Association (HCURA) strongly believes in the ability of undergraduates to make meaningful and significant contributions through research. NCRC serves as a medium not only to share these contributions, but also to generate a sense of pride and identity in the undergraduate research community.

We maintain that collaboration with researchers from all backgrounds—university faculty, graduate school students, policymakers, experts from industry, and entrepreneurs—can have a profound impact on young and talented aspiring researchers. NCRC seeks to provide undergraduate participants with a forum to collaborate and learn about research from myriad backgrounds.

WELCOME FROM THE *CO-PRESIDENTS*

On behalf of the staff, members, and executive board of the Harvard College Undergraduate Research Association (HCURA), welcome to the ninth annual National Collegiate Research Conference (NCRC) and to Harvard University!

The challenges facing our world today are great, but the desire for the production of knowledge and for the advancement of social reality has never been more compelling. Our generation stands at the precipice of a century uniquely marked by its pursuit of technological, socio-humanistic, and scientific networks, and as the arc of learning in higher education grows increasingly conscious of institutional and cultural-political circumstance, the presence of undergraduate students in research, scholarship, and innovation expands at an ever quickening pace. At the same time, the traditional lines of demarcation between disciplines have begun to blur as researchers become more attuned to the advantages and limitations within and across individual fields of study.

Born out of a distinct awareness of these underlying needs and norms, the mission of the Harvard College Undergraduate Research Association has been, for the last decade, to advance undergraduate access to and involvement in research, so that we, as some of the youngest minds in the scholastic community, can also partake in the processes of scholarly discovery, innovation, interpretation, and discourse.

Since its establishment in 2012, the National Collegiate Research Conference has represented the apical culmination of our objective and vision. In annually convening NCRC, we strive to promote a national—and now international—platform for conversations converging from multiple perspectives and grounded in myriad intellectual trajectories and genealogies. Our goal is to enrich the undergraduate research experience around the world by providing an opportunity to connect motivated students from various institutions with one another, in the hope that sharing, discussion, and engagement will further advance and compel each and every individual in his or her own scholastic pursuits.

NCRC provides the opportunity to hear from some of the world's most distinguished scholars, policymakers, writers, educators, and theorists, to attend panels, workshop, and career fairs, and to receive valuable feedback and advising through our poster competition and mentoring roundtables. It is our hope that with this diverse and creative programming, NCRC catalyzes important interactions that inspire undergraduates to continue their research and engagement in the production of knowledge.

WELCOME FROM THE *CO-PRESIDENTS*

In the past six years, NCRC has successfully brought together hundreds of undergraduates from over 90 universities. This number continues to grow each year as our conference gains momentum and recognition, and we are pleased that in the past two years, undergraduate students at several other prominent institutions have also begun similar conference initiatives. NCRC 2015 marked the first year that we were joined by undergraduate researchers from outside the United States, and this year, we welcome our most intellectually diverse group of conference participants to date.

As the first undergraduate-run, national, interdisciplinary research conference, we continue to pride ourselves on being completely student-run, and the three days ahead of you are the product of the tireless efforts, enormous dedication, and sustained enthusiasm of our executive board, members, and staff, who have worked unremittingly over the past year to prepare for this conference, as well as of the continued support from our numerous faculty advisors, collaborators, and financial sponsors. Without them, NCRC 2020 could not have been possible.

We thank you for joining us at Harvard this January for NCRC 2020, and look forward to meeting you. Please don't hesitate to stop by and introduce yourself to us during the conference. We hope you find the three days ahead to be fulfilling and illuminating, as we celebrate such an expansive undergraduate research community.

With our best wishes,



Gabriela Pelayo

Leon Yang & Gaby Pelayo

Co-Presidents, 2019-2020

Harvard College Undergraduate Research Association

ABOUT HCURA

The Harvard College Undergraduate Research Association (HCURA) was founded in 2007 upon the mission of building an interdisciplinary research community among undergraduates. Now at the twelfth year anniversary of our founding, we are thrilled with how the undergraduate research community has expanded in the past decade and optimistic for the future.

Our goal to increase the scope and visibility of Harvard undergraduate research in all disciplines is the focus of our many on-campus initiatives, including the Graduate Student Mentoring Program, where graduate students mentor undergraduates interested in research; the Visitas Research Symposium, which showcases research by experienced Harvard students to admitted high school seniors; and new projects such as Research Week in the fall, which introduces research opportunities to freshmen through panels, socials, and workshops; the Harvard Science Research Conference (HSRC), a two-day conference started in 2015 for exceptional high school students interested in STEM research; and *Brevia*, our general readership publication for short articles that present nontechnical treatments of cutting-edge research. This year, we piloted our High School Mentorship Program, which brings Harvard's undergraduate researchers into local high schools to mentor young aspiring scientists.

Every January, we host our flagship event, the National Collegiate Research Conference (NCRC), at Harvard as an extension of our vision to provide the best platform for undergraduates from across the nation to share their research. NCRC features distinguished speakers, panelists, and students, along with workshops and mentoring sessions that highlight important issues in undergraduate research and several opportunities for participants to present their own research through our plenary sessions and poster competition. Through NCRC, we hope, ultimately, to further sustain interest in and access to undergraduate research as well as to foster a community of undergraduate scholars.



NATIONAL COLLEGIATE
RESEARCH CONFERENCE



HARVARD COLLEGE UNDERGRADUATE
RESEARCH ASSOCIATION

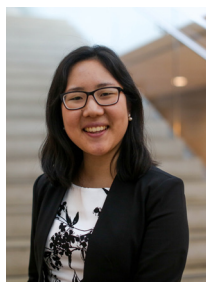
NCRC 2020
CONFERENCE DIRECTORS



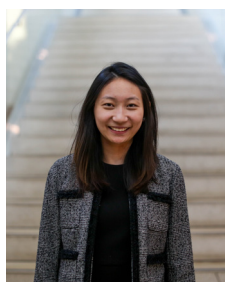
Leon Yang
Co-President
Harvard College, '21



Gaby Pelayo
Co-President
Harvard College, '21



Anne Lheem
Vice-President
Harvard College, '21



Sophia Tang
Chief of Internal Relations
Harvard College, '21



Sreekar Mantena
Co-Director of
Programming
Harvard College, '22



Alyssa Klee
Co-Director of
Programming
Harvard College, '22



Jonathan Garzon
Co-Director of
Programming
Harvard College, '21

CONFERENCE **PROGRAM AND SCHEDULE**

DAY 1: January 24th (Friday)

9:00-10:20 AM	Registration & Breakfast	<i>NW Labs Atrium</i>
10:30-10:50 AM	Welcome & Opening Remarks	<i>NW Labs B103</i>
11:00 -11:50 AM	Keynote: Isaac Kohane	<i>NW Labs B103</i>
12:00 PM-12:50 PM	Workshop/Panel I	<i>See Workshop/Panel for Location</i>
1:00-1:50 PM	Lunch	<i>NW Labs Atrium</i>
2:00-2:50 PM	Keynote: Heather Boushey	<i>NW Labs B103</i>
3:00-3:20 PM	Plenary Session I	<i>See Plenary Schedule for Location</i>
3:30-4:20 PM	Keynote: George Church	<i>NW Labs B103</i>
4:30-4:50 PM	Plenary Session II	<i>See Plenary Schedule for Location</i>
5:00-5:20 PM	Plenary Session III	<i>See Plenary Schedule for Location</i>
8:00-10:00 PM	Cocktail Reception/Meet & Greet	<i>Grendel's Den</i>

DAY 2: January 25th (Saturday)

9:00-9:50 AM	Breakfast	<i>NW Labs Atrium</i>
10:00-10:50 AM	Fireside Chat with Emery Brown	<i>NW Labs B103</i>
11:00 -11:50 AM	Workshop/Panel II	<i>See Workshop/Panel for Location</i>
12:00-12:50 PM	Keynote: Jeremy Berg	<i>NW Labs B103</i>

CONFERENCE **PROGRAM AND SCHEDULE**

1:00-1:50 PM	Lunch (sponsored by Catenion)	<i>NW Labs Atrium</i>
2:00-2:50 PM	Workshop/Panel III	<i>See Workshop/Panel for Location</i>
3:00-3:50 PM	Research Dialogues	<i>NW Labs Atrium</i>
4:00-4:50 PM	Keynote: Claudia Goldin	<i>NW Labs B103</i>
5:00-5:50 PM	Peer Review Workshop	<i>NW Labs Atrium</i>

DAY 3: January 26th (Sunday)

9:00-9:50 AM	Breakfast	<i>NW Labs Atrium</i>
10:00-10:50 AM	Keynote: Suzanne Blier	<i>NW Labs B103</i>
11:00 AM-12:20 PM	Poster Session I	<i>NW Labs Atrium</i>
12:30-1:20 PM	Lunch	<i>NW Labs Atrium</i>
1:30-2:50 PM	Poster Session II	<i>NW Labs Atrium</i>
3:00-3:20 PM	Coffee Break	<i>NW Labs Atrium</i>
3:30-4:50 PM	Poster Session III	<i>NW Labs Atrium</i>
5:00-5:50 PM	Keynote: Cass Sunstein	<i>NW Labs B103</i>
6:00-7:00 PM	Break	
7:00 - 9:00 PM	Gala Dinner/Awards Ceremony	<i>NW Labs Atrium</i>

ISAAC KOHANE



Dr. Isaac Kohane, MD, PhD is the inaugural Chair of the Department of Biomedical Informatics at Harvard Medical School. He develops and applies computational techniques to address disease at multiple scales: From whole healthcare systems as “living laboratories” to the functional genomics of neurodevelopment with a focus on autism.

Dr. Kohane has published over 200 papers in the medical literature and authored a widely used book on Microarrays for an Integrative Genomics. He has been elected to multiple honor societies including the American Society for Clinical Investigation, the American College of Medical Informatics, and the Institute of Medicine. He leads a doctoral program in genomics and bioinformatics at the Division of Health Sciences and Technology at Harvard and MIT. He is also a practicing pediatric endocrinologist and father of three energetic children.

HEATHER BOUSHEY

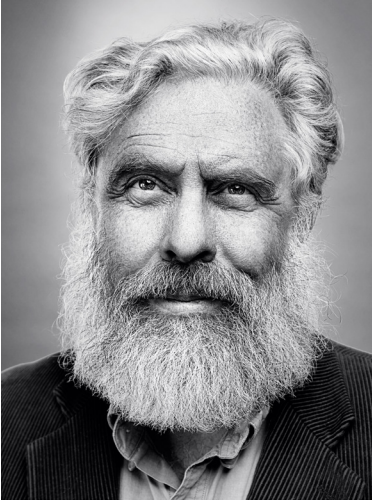
Heather Boushey is the President & CEO and co-founder of the Washington Center for Equitable Growth, which was launched in 2013. She is one of the nation's most influential voices on economic policy and a leading economist who focuses on the intersection between economic inequality, growth, and public policy. Her latest book, *Unbound:*



How Economic Inequality Constricts Our Economy and What We Can Do About It (Harvard University Press), which was called “outstanding” and “piercing” by reviewers, was on the Financial Times list of best economics books of 2019. She is also the author of *Finding Time: The Economics of Work-Life Conflict*, and co-edited a volume of 22 essays about how to integrate inequality into economic thinking called *After Piketty: The Agenda for Economics and Inequality*.

The New York Times has called Boushey one of the “most vibrant voices in the field,” and Politico twice named her one of the top 50 “thinkers, doers and visionaries transforming American politics.” Boushey writes regularly for popular media, including The New York Times, The Atlantic, and Democracy Journal, and she makes frequent television appearances on Bloomberg, MSNBC, CNBC, and PBS. She previously served as chief economist for Secretary of State Hillary Clinton’s 2016 presidential transition team and as an economist for the Center for American Progress, and the Joint Economic Committee of the U.S. Congress.

GEORGE CHURCH



Dr. George Church is the Robert Winthrop Professor of Genetics at Harvard Medical School and Director of PersonalGenomes.org, which provides the world's only open-access information on human Genomic, Environmental & Trait data (GET). His 1984 Harvard PhD included the first methods for direct genome sequencing, molecular multiplexing & barcoding. These led to the first genome sequence in 1994 .

His innovations have contributed to nearly all “next generation” DNA sequencing methods and companies. This plus his lab’s work on chip-DNA-synthesis, gene editing and stem cell engineering resulted in founding additional application-based companies spanning fields of medical diagnostics & synthetic biology/therapeutics.

He has also pioneered new privacy, biosafety, ELSI, environmental & biosecurity policies. He is director of an IARPA BRAIN Project and NIH Center for Excellence in Genomic Science. His honors include election to NAS & NAE & Franklin Bower Laureate for Achievement in Science. He has founded more than 14 biotech companies, and has coauthored 514 papers, 143 patent publications & one book (Regenesis).

CONFERENCE KEYNOTE
SPEAKER ON SATURDAY

EMERY BROWN

Dr. Emery N. Brown is the Warren M. Zapol Professor of Anaesthesia at Harvard Medical School and an anesthesiologist at Massachusetts General Hospital (MGH). Dr. Brown received his B.A. (magna cum laude) in Applied Mathematics from Harvard College, his M.A. and Ph.D. in statistics from Harvard University, and his M.D. from Harvard Medical School. Dr. Brown is the only person to hold endowed professorships at both Harvard and MIT.



Dr. Brown is an anesthesiologist-statistician whose experimental research has made important contributions towards understanding the neuroscience of how anesthetics act in the brain to create the states of general anesthesia. In particular, his work has shown that highly structures oscillation maintained by the anesthetic drugs are a primary mechanism through which anesthetics create the altered arousal states of general anesthesia. His statistics research has developed signal processing algorithms to help understand how the brain represents and transmits information.

Dr. Brown served on President Obama's BRAIN Initiative Working Group, and is the first African American, the first statistician, and the first anesthesiologist to be elected to all three branches of the National Academies of Sciences, Engineering, and Medicine.

CONFERENCE KEYNOTE
SPEAKER ON SATURDAY

JEREMY BERG



Dr. Jeremy M. Berg, PhD, is associate senior vice chancellor for science strategy and planning, health sciences, and professor of computational and systems biology in Pitt's School of Medicine. Dr. Berg works to advance the University's position as a biomedical research leader. In July 2016, he was named editor-in-chief of *Science* magazine and the *Science* family of journals.

Dr. Berg was the founding director of Pitt's Institute for Precision Medicine, which he oversaw from 2013–16.

Launched by Pitt and UPMC, the institute applies genetics, genomics, and research in other areas to advance evidence-based medicine and treatments tailored to individual patients, often through genetics and DNA analysis.

Dr. Berg's research into the structures and functions of biological molecules has elucidated how zinc-containing proteins bind to DNA or RNA and regulate gene activity. As a bioinorganic chemist, Dr. Berg investigates biomolecule interaction inside cells using experimental and computational methods.

CONFERENCE KEYNOTE
SPEAKER ON SATURDAY

CLAUDIA GOLDIN

Dr. Claudia Goldin is the Henry Lee Professor of Economics at Harvard University and was the director of the NBER's Development of the American Economy program from 1989 to 2017. Goldin is an economic historian and a labor economist.



Her research covers a wide range of topics, including the female labor force, immigration, income inequality, technological change, education, and the economic gender gap.

Most of her research interprets the present through the lens of the past and explores the origins of current issues of concern. Her research is currently focused on college women's aspirations for and achievement of career and family. She recently completed a project and an edited volume on the increase of women's employment in their mature and older years.

Goldin is best known for her historical work on women in the U.S. economy. Her most influential papers in that area have concerned the history of women's quest for career and family, coeducation in higher education, the impact of the "pill" on women's career and marriage decisions, women's surnames after marriage as a social indicator, the reasons why women are now the majority of undergraduates and the new lifecycle of women's employment.

SUZANNE BLIER



Dr. Suzanne Preston Blier is an historian of African art and architecture in both the History of Art and Architecture and African and African American Studies Departments at Harvard. She also is a member of the Institute for Quantitative Social Science. Her most recent book projects are *Picasso's Demoiselles: The True Origins of a Modern Art Masterpiece* (Duke University Press 2019) and forthcoming *1325: How Medieval Africa Made the World Modern* (Yale University Press 2021).

Other recent works include: *The Image of the Black in African and Asian Art* (co-edited with David Bindman and Henry Louis Gates, Jr (2017 Harvard University Press). A 2015 book, *Art and Risk in Ancient Yoruba: Ife History, Power and Identity c.1300* (Cambridge University Press) won the 2016 Prose Prize in Art History and Criticism. Her first book *The Anatomy of Architecture: Ontology and Metaphor in Batammaliba Architectural Expression* (Cambridge University press; paperback, Chicago University Press, 1987) won the Arnold Rubin Prize. Her second book, *African Vodun: Art, Psychology, and Power* (1995) received the Charles Rufus Morey Prize. Other books include: *African Royal Art: The Majesty of Form* (1998 Choice Book Award), *Butabu: Adobe Architecture in West Africa* (2004 NY Times, Holiday Selection), and *Art of the Senses: Masterpieces from the William and Bertha*

CASS SUNSTEIN

Cass R. Sunstein is currently the Robert Walmsley University Professor at Harvard. From 2009 to 2012, he was Administrator of the White House Office of Information and Regulatory Affairs. He is the founder and director of the Program on Behavioral Economics and Public Policy at Harvard Law School.



Mr. Sunstein has testified before congressional committees on many subjects, and he has been involved in constitution-making and law reform activities in a number of nations. He has been called “the pre-eminent legal scholar of our time -- the most wide-ranging, the most prolific, the most cited and the most influential”.

Mr. Sunstein is author of many articles and books, including *Republic.com* (2001), *Risk and Reason* (2002), *Why Societies Need Dissent* (2003), *The Second Bill of Rights* (2004), *Laws of Fear: Beyond the Precautionary Principle* (2005), *Worst-Case Scenarios* (2001), *Nudge: Improving Decisions about Health, Wealth, and Happiness* (with Richard H. Thaler, 2008), *Simpler: The Future of Government* (2013) and most recently *Why Nudge?* (2014) and *Conspiracy Theories and Other Dangerous Ideas* (2014). He is now working on group decisionmaking and various projects on the idea of liberty.

CONFERENCE **PANELS AND WORKSHOPS**

WORKSHOP/PANEL I

Workshop: Approaching Data Science, NW Labs B103

Leo Celi, MD, MPH, MSc

Dr. Celi is the Clinical Research Director and Principal Research Scientist at the MIT Laboratory of Computational Physiology, where he applies data to clinical research. He is the Founder and Co-Director of MIT Sana, an organization aimed at utilizing information technology to improve health outcomes. He is the Course Director of two MIT courses focusing on global health informatics and the analysis of health records. He is a staff physician at Beth Israel Deaconess Medical Center and a part-time Associate Professor of Medicine at Harvard Medical School. Dr. Celi earned his MD at the University of the Philippines, his MSc in Biomedical Informatics at MIT, and his MPH in Clinical Effectiveness at the Harvard University School of Public Health.

Panel: Entrepreneurship, NW Labs B101

Khalid Shah, MS, PhD

Dr. Shah is an Associate Professor of Harvard Medical School and a Principal Faculty member at the Harvard Stem Cell Institute. At Brigham and Women's Hospital, he is also Vice Chair of Research in the Department of Neurosurgery, Director of the Center for Stem Cell Therapeutics and Imaging, and Director of the Center for Excellence in Biomedicine. Dr. Shah's research develops clinically translatable models of brain tumors and stem cell therapies for cancer, particularly brain tumors. The potential of developing novel cancer therapies by him and his team has been recognized by many cancer alliances and associations. Technologies from his laboratory have led to the foundation of AMASA Therapeutics, which focuses on the clinical translation of therapeutic stem cells in cancer patients.

Will Sanchez, MEng, PhD

Dr. Sanchez is a technology entrepreneur, an Entrepreneur in Residence at the Martin Trust Center for MIT Entrepreneurship, and a Lecturer at the MIT Sloan School of Management. He is also a Venture Partner at Thundermark Capital, a venture capital firm investing in early-stage deep-tech startups pursuing fundamental breakthroughs in science and engineering. Prior to teaching at MIT, Dr. Sanchez co-founded CoolChip Technologies, Inc., a hardware company specializing in electronics cooling technologies. While a graduate researcher and instructor at MIT, he co-founded Vecarius, Inc., a start-up addressing energy efficiency in commercial and military applications. Dr. Sanchez earned B.Sc., M.Eng., and Ph.D. degrees from MIT.

Workshop: Research in the Humanities, NW Labs B108

Dan Bertwell

Mr. Bertwell is the Graduate Program Coordinator for the Harvard University Department of History. Having worked at Harvard since 2008, he has extensive experience as the primary departmental contact for graduate students in the History PhD program. He received his Bachelor's Degree in history from the University of Rhode Island and a Master's Degree in modern American history from the University of Southern Florida.

WORKSHOP/PANEL I (cont.)

María Luisa Parra-Velasco, PhD

María Luisa Parra-Velasco is the Founder and Director of the Harvard Multilingual Family Resource Center in addition to a Senior Preceptor of Spanish at Harvard, where she teaches some of the largest Spanish classes the school has to offer. Prior to coming to Harvard, Dr. Parra-Velasco was the coordinator of the Home-School Connection Program at the Eliot-Pearson Department of Child Development at Tufts University and a post-doctoral research fellow at Stanford University School of Education, where she worked with East Palo Alto public schools in formulating and researching bilingual development through an ecological theoretical model. Dr. Parra-Velasco has fifteen years of teaching and research experience in the fields of Second Language Acquisition and Child Bilingual Development.

Panel: Research and its Real World Impact: Public Service, Global Good, and Activism, NW Labs B100

Flavia Peréa, PhD

Flavia Peréa is the founding Director of the Mindich Program in Engaged Scholarship and teaches Social Studies at Harvard College. As Director of the Mindich Program, she works across the Harvard community to stimulate community-collaborative curricular innovations and develop civically-engaged experiential learning experiences for students. She teaches the inquiry-based, community-collaborative seminar course Urban Health and Community Change: Planning Action with Local Stakeholders in partnership with the City of Somerville and the Cambridge Health Alliance, Somerville Community Health Agenda.

Sarthak Das, PhD

Sarthak Das is a Senior Advisor at the Harvard Global Health Institute in addition to a Research Scientist in the Harvard T.H. Chan Dean's Office. Prior to joining HGHI, he served as Chief of Policy & Public Sector Partnerships at Partners in Health, where he led efforts to formulate sustainable public sector programs with partner Ministries of Health and key bi- and multilateral entities such as the Global Fund, USAID, and at the UN. He has worked with communities and government leaders in Cambodia, Haiti, India, Indonesia, Liberia, Laos, Malawi, Papua New Guinea, and Sierra Leone in work focused on the urban and rural poor and advancing health equity. Dr. Das has over twenty years of experience as both public health scientist and development practitioner. He received a joint A.B. in Social Anthropology and Sanskrit/Indian Studies from Harvard College, a Master of Public Health from Yale University, and a Doctorate in Public Health from the University of North Carolina, Chapel Hill.

Michaela Thompson, PhD

Michaela Thompson is the Environmental Science & Public Policy Concentration Preceptor for Harvard University, where she works closely with students and research advisors for environmental science research and theses. Dr. Thompson was previously the Giorgio Ruffolo Post-doctoral Research Fellow in Sustainability Science at the Harvard Kennedy School. Her research focuses on long-term environmental histories of marine spaces, with the aim of promoting the sustainable management of marine resources. In particular, she studies the dynamics of fisheries management, focusing on the incorporation of fishing communities into research and policy decisions. Her research has spanned four continents and three oceans.

CONFERENCE **PANELS AND WORKSHOPS**

WORKSHOP/PANEL II: Saturday, 11 AM

Panel: Diversity in Research, NW Labs B108

Kathleen Coleman, PhD

Professor Coleman received her Bachelor's Degree with Distinction in Latin from the University of Cape Town, her Honors Bachelor's Degree (Special) from the University of Rhodesia (now Zimbabwe), and her D. Phil from Lady Margaret Hall, University of Oxford. Born and raised in Zimbabwe, she has previously taught at the University of Cape Town and at Trinity College, Dublin. She is currently the James Loeb Professor of the Classics at Harvard University, as well as the Department Chair of the Harvard University Department of the Classics. Professor Coleman's work primarily focuses on Latin literature and Classical civilization, and she has supervised several doctoral dissertations on those topics.

Laura Lewis

Laura Lewis is a graduate student at Harvard University in the Department of Human Evolutionary Biology. She is broadly interested in the evolution of primate social cognition and is fascinated by the evolution of social influence on attention and preferences, long-term social memory, and language comprehension. She leverages eye-tracking methods with chimpanzees and bonobos living in zoos around the world in order to probe their social cognition and hypothesize about the selective pressures that have led to humans' robust socio-cognitive abilities.

Panel: Industry vs Academia, NW Labs B103

Karen Dynan, PhD

Karen Dynan is a Professor of the Practice in the Economics Department of Harvard University and a nonresident senior fellow at the Peterson Institute for International Economics. Dr. Dynan was previously the Assistant Secretary for Economic Policy and Chief Economist at the U.S. Department of the Treasury. She also was the Vice President and Co-director of the Economic Studies program at the Brookings Institution. Her research focuses on macroeconomic policy, with a focus on consumer behavior and household finances. She received her Ph.D. in economics from Harvard University and her A.B. from Brown University.

Mike Serrano-Wu, PhD

Mike Serrano-Wu is a biotech investor and entrepreneur based out of Cambridge with Sprout BioVentures and 3 Point Bio. Dr. Serrano-Wu previously worked as the director of Medicinal Chemistry at the Broad Institute and as a senior research investigator at the Novartis Institutes for Biomedical Research and at Bristol-Myers Squibb. His passion is making sure that no disease is left incurable, and to that end, he has discovered an all-oral treatment for Hepatitis C as well as treatments for metabolic disorders and other diseases previously thought to be "undruggable." He currently works as an investor to bring to the forefront and refine the best innovations in drug design from across the world. He received his Ph.D. and A.B. from Harvard University.

WORKSHOPS/PANEL II (cont.)

Workshop: Presenting Research, NW Labs B101

Christopher Kabacinski

Christopher Kabacinski is the administrative coordinator in the Office of Undergraduate Research and Fellowships. He supports URAF's day-to-day activities and programs, including the Harvard Summer Undergraduate Research Village (HSURV). Additionally, he assists with URAF's financial transactions and manages the building at 77 Dunster Street. Before joining the URAF team, Chris worked as program coordinator in the Multi-Regional Clinical Trials Center of Brigham and Women's Hospital and Harvard. He has also worked at Health Story Collaborative and at Post Road magazine. He received his Bachelor of Arts in English with a minor in medical humanities, health, and culture from Boston College. Chris is currently a part-time student in the master's program in Higher Education at the Harvard Graduate School of Education.

Workshop: Starting your own Research Publication, NW Labs B100

Nkazi Nchinda, Editor-In-Chief of Brevia

Brevia is the official publication of the Harvard Undergraduate Research Association, a forum for science, culture, and other big ideas. It is committed to bringing all disciplines of research out of the ivory tower and into the discourse of the interested public. In this workshop, learn more about the publication and how to start a magazine publication at your school.

Nkazi is a junior from Wisconsin currently living in Leverett House. As a biomedical engineering major, he conducts microbiology research to discover novel organisms. He also minors in sociology and is interested in increasing the accessibility of medical devices. Outside of the classroom, Nkazi serves as Co-Editor in Chief for Brevia and works with Engineers Without Borders. In his free time, he enjoys taking photos in Boston and baking Bon Appetit recipes.

CONFERENCE **PANELS AND WORKSHOPS**

WORKSHOPS/PANEL III: Saturday, 2pm

Panel: Medical & Graduate School, NW Labs B103

Dusica Bajic, MD, PhD

Dr. Bajic received her MD from the Medical School of the University of Belgrade, Serbia, and her PhD from the Department of Pharmacology at the University of Illinois at Chicago, Illinois. Her postdoctoral training then consisted of a Postdoctoral Fellowship at the Department of Anatomy and Cell Biology at the University of Illinois at Chicago, Anesthesia Residency training at Yale New Haven Hospital, as well as a Pediatric Anesthesia Fellowship at Boston Children's Hospital at Harvard University. As of 2008, she works at Boston Children's Hospital as a board-certified anesthesiologist and researcher.

Valentina Toll Villagra

Ms. Toll Villagra received her Bachelor's Degree in Mechanical Engineering from Boston University, and afterwards worked for two years at Amazon as a Startup Project Manager in Austin, Texas. She is currently an MS/MBA candidate (Class of 2020) in the Engineering Sciences joint degree program between Harvard Business School and the Harvard John A. Paulson School of Engineering and Applied Sciences. She is also Co-Founder of AllSpice, a software startup that enables digital collaboration and analytics for electrical engineering teams.

Walter Chen, MD, PhD

Dr. Chen received his MD from Harvard Medical School and his Ph.D in Biology from MIT as part of the Harvard-MIT MD-PhD program in addition to a B.A from Princeton University. Dr. Chen is currently completing a residency in pediatrics at Boston Children's Hospital and Harvard Medical School. For his graduate studies, Dr. Chen's dissertation research focused on the mechanisms and implications of mitochondrial metabolism and dysfunction through utilizing the screening and profiling of mitochondrial metabolites, in addition to cancer genetics.

WORKSHOPS/PANEL III (cont.)

Workshop: Life and Time Management, NW Labs B101

Logan McCarty, PhD

Logan McCarty is the Director of Science Education and teaches undergraduate students in both Physics and Chemical & Chemical Biology at Harvard University. As the Director of Science Education, Dr. McCarty oversees efforts to improve undergraduate teaching and learning across the physical sciences in addition to working with Directors of Undergraduate Studies in the various departments of the Harvard Division of Science. Director McCarty received his Bachelor's in Chemistry and his PhD in Chemistry at Harvard University.

Judith Zola, MBA

Judith Zola is the Director of Learning and Development at Boston Children's Hospital, where she has provided leadership to a team of learning and development consultants and technical trainers from throughout BCH and other Boston hospitals. Director Zola is responsible for the management and oversight of enterprise-wide learning program implementation including communication, marketing and coordinating and has delivered learning and professional skills workshops at the National HR Healthcare Conference, Harvard Medical School, and Sodexo. She received her Master's in Business Administration from Babson College in addition to her Bachelor's in Music from Vassar College.

WORKSHOPS/PANEL III (cont.)

Workshop: Ethics in a Changing World, NW Labs B108

Jeantine E. Lunshof, PhD

Dr. Lunshof is a philosopher and ethicist at the Harvard Wyss Institute for Biologically inspired Engineering and a Lecturer at Harvard Medical School, Department of Global Health and Social Medicine on behalf of the Harvard Center for Bioethics. She is also an Assistant Professor with the Department of Genetics, University Medical Center Groningen, at the University of Groningen, Netherlands. At Harvard Medical School, Dr. Lunshof is a longstanding collaborator with the Center for Excellence in Genomic Science: CGEO - Center for Genomically Engineered Organs as well as the Church Lab on ethics. Jeantine conducts her philosophical and ethical work as a full-time ethicist on the workforce of the lab. She developed the model of 'Collaborative Ethics' that she is advancing across the field of biologically inspired engineering at the Wyss Institute.

Friday, January 24th

Session I: 2:00 PM - 2:20 PM

Yuan Lee: Physics, MIT

*Hybrid Quantum Networks for High-Fidelity Entanglement Distribution
(NW Labs B101)*

Isabella Osuna: Biochemistry and Cell Biology, Rice University

*Inhibition of STAT3 GOF
(NW Labs B103)*

Kathy Liu: Materials Science & Engineering, Stanford University

*Harnessing chiral self-assembly for helical mesogenic actuators
(NW Labs B108)*

Sainiteesh Maddineni: Bioengineering, Stanford University

*Developing Novel Checkpoint Inhibitor Antibodies for Cancer Immunotherapy
(NW Labs B100)*

Friday, January 24th

Session II: 2:30 PM - 2:50 PM

Brian Femminella: Intelligence and Cyber Operations, The University of Southern California

The Soldier's Soundstage: Creating a Handheld Tool for Countering PTSD
(NW Labs B101)

Sara Pohland: Electrical Engineering, University of Maryland, College Park

Haptic Feedback of Soft Tissue for Robotic Surgical Applications
(NW Labs B103)

Daniel Krajovic: Chemical Engineering, University of Rochester

Leveraging the Interactions between Cells and Photovoltaic Nanomaterials to Address Heart Tissue's Inability to Self-Repair
(NW Labs B108)

Sadia Chowdhury: Biochemistry, CUNY Hunter College

Does Placental Acute or Chronic Inflammation Impact Placental Efficiency in Term Newborns in a Low Risk Community Setting?

(NW Labs B100)

CONFERENCE
PLENARY SESSIONS: SCHEDULE

Friday, January 24th

Session III: 3:00 PM - 3:20 PM

Shinya Kondo: Mechanical Engineering, Columbia University
Comparison of Turbulence Models for Flow Simulations Behind an Actuator Disk
(NW Labs B101)

Saniya Soni: Psychology, Drexel University
Learned Helplessness as a Predictor of Depression among Asian American Undergraduates
(NW Labs B103)

Veronica Backer-Peral: History, Loyola Marymount University
The Clash of Extremism: The Spanish Civil War in Public History
(NW Labs B108)

Madeleine Kline: Chemistry & Biology, MIT
SHERLOCK-Based HIV Drug Resistance Test
(NW Labs B100)

CONFERENCE

PLENARY SESSIONS: SPEAKERS

Shinya Kondo

Mechanical Engineering, Columbia University, Class of 2020

Shinya is a senior at Columbia University studying mechanical engineering. His main research interests are fluid mechanics, turbulence and computational fluid dynamics. He is currently a lead investigator in Professor Marco Giometto's Turbulence Research Group at Columbia University. He currently researches different methods to resolve the wind flow around a porous disk. His first project is using the RANS operator to investigate the effects of an applied pressure gradient, and his second project is formulating a new analytical model based on the WKB approximation method. He hopes to attend graduate school this fall to further his research to resolve fluid flows around complex and shape deforming objects and hopes to apply his research to advance bio-inspired design. Outside his research, he is a diver for Columbia's Swimming and Diving team and also enjoys folding origami, knitting and playing the piano.

Saniya Soni

Psychology, Drexel University, Class of 2021

Saniya Soni is a junior psychology student at Drexel University interested in mental health advocacy and reform. She has presented her research at the Stanford Undergraduate Conference, the National Conference for Undergraduate Research, and the 31st Association for Psychological Sciences Annual Conference. She is a student ambassador for the Jed Foundation, a non-profit focused on suicide prevention and mental health education across the United States.

Veronica Backer-Peral

History, Computer Science, Film Production Loyola Marymount University, Class of 2022

Veronica Backer-Peral is a sophomore at Loyola Marymount University and an advocate for interdisciplinary research and learning, as seen in her three majors - history, computer science, and film production. She is a member of the Clinton Global Initiative University, a student journalist for the LA Loyolan and LMU Election 2020 team, and a big fan of the Spanish soccer league, Game of Thrones (seasons 1-7), and flying trapeze. In the future, Veronica hopes to use her experience in historical/political research and computer programming to continue to study many of the pressing problems that the world faces today.

Madeleine Kline

Chemistry and Biology, Massachusetts Institute of Technology, Class of 2020

Madeleine C. Kline is a senior at MIT studying chemistry, biology, and Spanish. In the summer of 2017, Maddy worked for an infectious disease specialist in Santiago, Chile and became fascinated by the antibiotic resistance crisis. She has a continued interest in antimicrobial resistance and microbial dynamics. Maddy joined the lab of James J. Collins at MIT in the fall of 2017, and continues to work on cutting-edge, low-cost diagnostics under his supervision. After a trip to South Africa with the Ragon Institute in 2019 to learn about the HIV epidemic, she began working on HIV diagnostics. Maddy is interested in health equity and research that is aimed at helping underserved populations.

Yuan Lee

Chemistry and Biology, Massachusetts Institute of Technology, Class of 2021

Yuan Lee is a junior at MIT, majoring in physics and EECS (electrical engineering and computer science). He works in the Quantum Photonics Group of the Research Laboratory of Electronics under the guidance of Professor Dirk Englund. He is currently studying quantum network architectures for quantum communication and computation. He has also worked on projects in microbial ecology and applied machine learning. Yuan is interested in science communication and STEM outreach, and has helped to organize the MIT THINK Scholars Program and the Harvard Physics Circle.

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PLENARY SESSIONS: SPEAKERS

Isabelle Osuna

Biochemistry and Cell Biology, Rice University, Class of 2021

Isabella Osuna is in her third year at Rice University studying Biochemistry and Cell Biology. After matriculation, she was accepted into the Sustaining Excellence in Research Scholars Program which provides a stipend for research. Soon after, she joined the Vogel Laboratory at Texas Children's Hospital, which studies rare genetic immune diseases to advance understanding of cytokine signaling pathways in health and in autoimmune disease. Specifically, Isabella has been working on a project to expand the pool of treatment options available to patients with a rare autoimmune disease known as STAT3 gain-of-function (GOF). In addition to her benchwork, Isabella has the unique opportunity to study STAT3 GOF further in clinic, where she has been able to examine and interact with these patients. This combination of bench research to bedside care sparked a passion and led Isabella to take on a second project focused on another rare immune disease, COPA syndrome. Isabella has demonstrated her commitment to biomedical research inside the Texas Medical Center and on the Rice campus, where she is currently a teaching assistant for the experimental biosciences laboratory course. As a junior, she was awarded acceptance into the Rice Undergraduate Scholars Program to help guide her pursuit of an academic research career. Additionally, Isabella serves as a Rice Health Advisor, Peer Academic Advisor, Peer Research Advisor, and takes part in the Rice Program Council. In the summer, Isabella enjoys traveling internationally with Volunteers Around the World where she helps provide free health care at mobile clinics in rural communities.

Kathy Liu

Materials Science & Engineering, Stanford University Class of 2021

Kathy is a junior studying Materials Science & Engineering at Stanford University. Originally from Salt Lake City, Utah, she grew up with a fascination for the natural world, which has translated as a common theme inspiring many of her research projects. She first began researching sugar-based solid polymer electrolytes for next-generation rechargeable batteries and materials for perovskite solar cells. At Stanford, she has been developing skin-inspired electronics that are stretchable and biodegradable, as well as tissue-like conductive materials for interfacing with the body. For her plenary talk, she will be presenting on research she conducted at the Eindhoven University of Technology (TU/e) in Eindhoven, the Netherlands on harnessing chiral polymer self-assembly to achieve macromolecular helical actuation in polymer films that can curl in response to heat or light. Kathy is a strong proponent for minority and female empowerment in STEM fields, having received invaluable mentorship from strong female role models. She is devoted to mentoring younger students in leadership and STEM training and advocating on behalf of minority inclusion. When not in the lab, she can be found training and performing hip-hop/urban dance with her dance teams, skiing, leading suicide prevention workshops, or making mediocre music.

Sainiteesh Maddineni

Bioengineering, Stanford University, Class of 2021

Sai is a junior at Stanford studying Bioengineering. For the past two and a half years, he has been working with Prof. Jennifer Cochran to better understand immune checkpoint proteins, which are involved in slowing down immune responses in the body. Using this knowledge of checkpoint proteins, Sai also works on engineering effective therapies targeted against these proteins. Since immune checkpoint proteins are strongly involved in cancer, engineered checkpoint blockade therapies can be potent treatments for certain types of cancer. Sai is very interested in the fields of immunotherapy and medtech and hopes to one day design novel therapeutics and devices as an academic physician. Outside of class and the lab, Sai loves to spend his free time playing basketball, watching Christopher Nolan movies, and going to cafés with friends.

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PLENARY SESSIONS: SPEAKERS

Brian Femminella

Intelligence and Cyber Operations, The University of Southern California, Class of 2022

Brian A. Femminella is from Long Island, New York and is a sophomore at the University of Southern California. Brian studies both Political Science and Intelligence & Cyber Operations. He is an active member of USC's CybOrg, Phi Delta Theta, Blackstonian's Law Honor Society, and has earned several accolades from his work within these organizations. Brian is an Army ROTC Cadet, where he started his service in Fort Jackson, South Carolina in 2017 and is presently the leader of his ROTC battalion's Ranger Challenge team. He is a sociology and psychology researcher at the USC Institute for Creative Technologies and the USC Thornton School of Music in a joint study analyzing the effects of Music Therapy on PTSD. Along with his research, he has interned at White Sands Missile Range, New Mexico, Cadet Command at Fort Knox, Kentucky, and is now working for the Majority Whip at the House of Representatives. After he graduates, Brian plans to attend law school and continue with his career as an officer in the United States Army.

Sara Pohland

Electrical Engineering, University of Maryland, College Park, Class of 2020

Sara Pohland is a senior electrical engineering major at the University of Maryland, College Park. Her research project is on tactile feedback for robotic assisted surgery, and she is broadly interested in the application of fields of optimization, controls, probabilistic modeling, and statistics to issues of societal significance. Upon graduation, she intends to pursue a PhD program in electrical engineering and computer science.

Daniel Krojovic

Chemical engineering, University of Rochester, Class of 2020

Daniel Krajovic is a senior chemical engineering major at the University of Rochester (UR). He chose to attend UR after being admitted to medical school as an incoming first year through the Rochester Early Medical Scholars Program and began as an intended biochemistry major. By the end of his first year, however, he switched into chemical engineering, finding a better fit for his scientific passions and learning preferences. During Daniel's first semester as an engineering student, under the supervision of Professor Mitchell Anthamatten, he took the lead role on a research project targeting improved sustainability in shape-memory polymers and is preparing to submit a first-author publication on his work. For his summer activities, Daniel has taken elective coursework at UR to deepen his foundation in biology, completed a summer internship with Covestro (formerly Bayer MaterialScience; a world-leading polymer supplier), furthered his work in polymers, and explored pulsed-laser ablation in liquids as a new route for Li-ion nanoelectrode fabrication as a summer research fellow at Caltech under Professor Kimberly See. Through multiple positions as a workshop leader and a teaching assistant, Daniel has discovered a passion for student-centered instruction. He has published two papers on the interface of gender and students' experience in small-group education and ultimately seeks to use his pedagogical training toward the goal of professorship. For his next step, he intends to enroll in a chemical engineering PhD program in the coming fall and join a research group investigating the chemistry of sustainable functional materials.

Sodia Chowdhury

Biochemistry, CUNY Hunter College, Class of 2020

Sadia Firoza Chowdhury is a Yalow Scholar senior attending CUNY Hunter College and is majoring in biochemistry. An aspiring clinician-scientist, she researches at New York Presbyterian- Brooklyn Methodist Hospital and Placental Analytics about how heavy metal exposure causes sex-specific effects on the placental function. This affects the metabolic profile of the offspring and ultimately increases their chances of being obese. Advocating for the improvement of physician-patient

CONFERENCE **POSTER SESSIONS: JUDGES**

We appreciate the kind efforts of our judges, composed of graduate students, postdoctoral fellows, research associates, individuals from industry, and faculty, most of whom are affiliated with the various departments, institutes, and schools of Harvard University. Please note that due to advance printing, this list may not be a complete list of all judges: we apologize if there have been any omissions.

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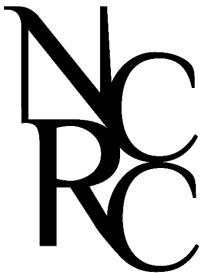
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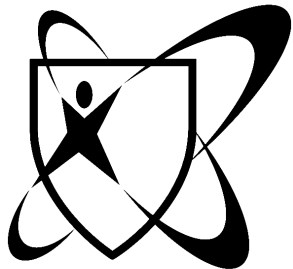
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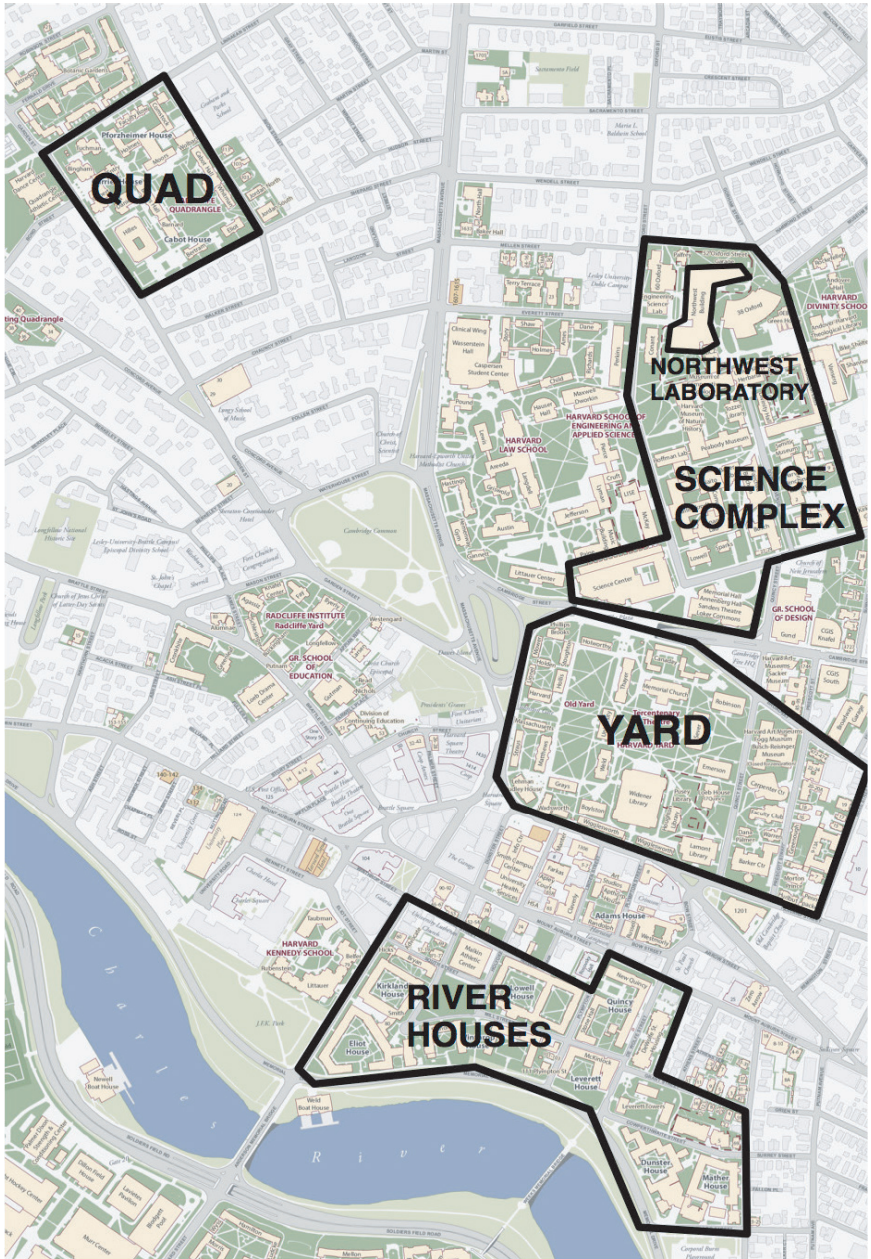


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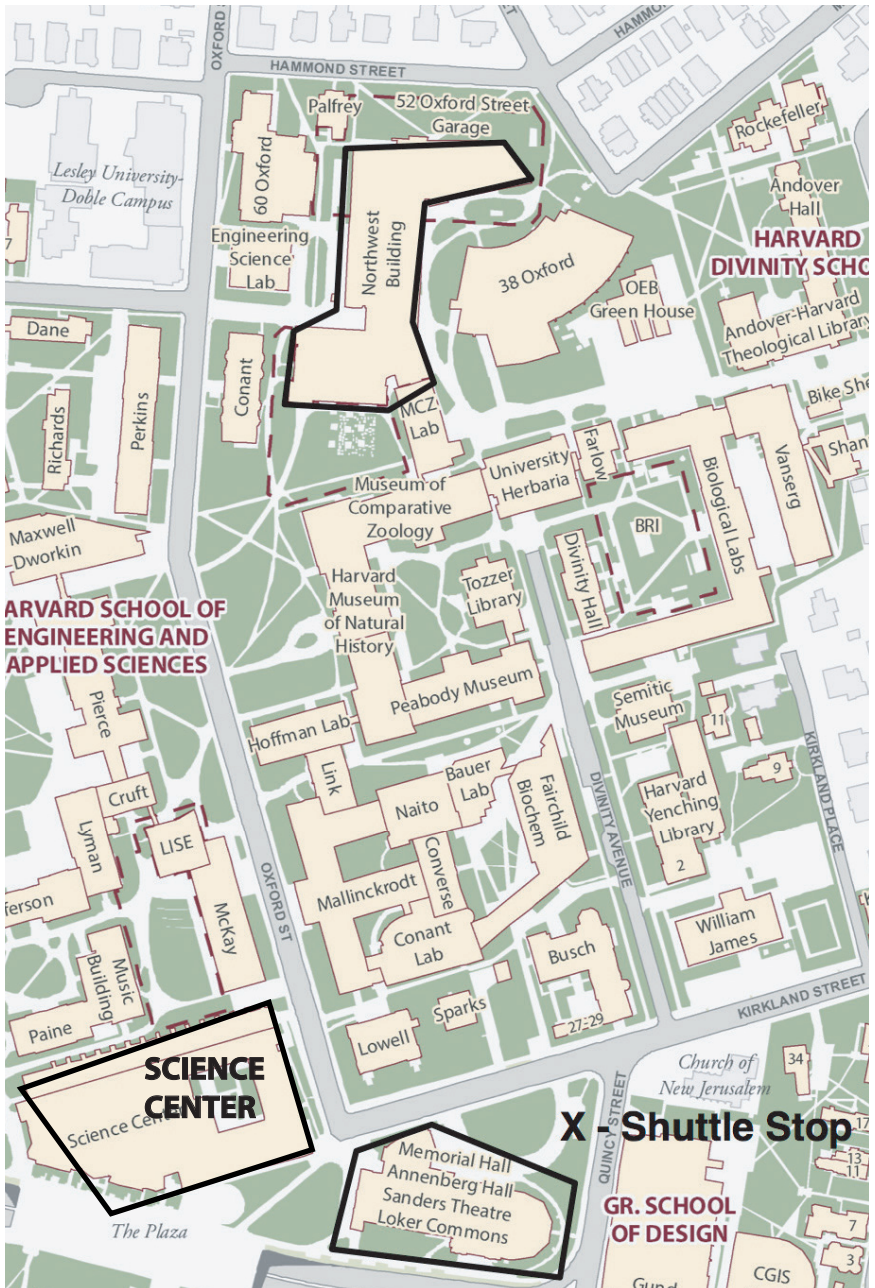


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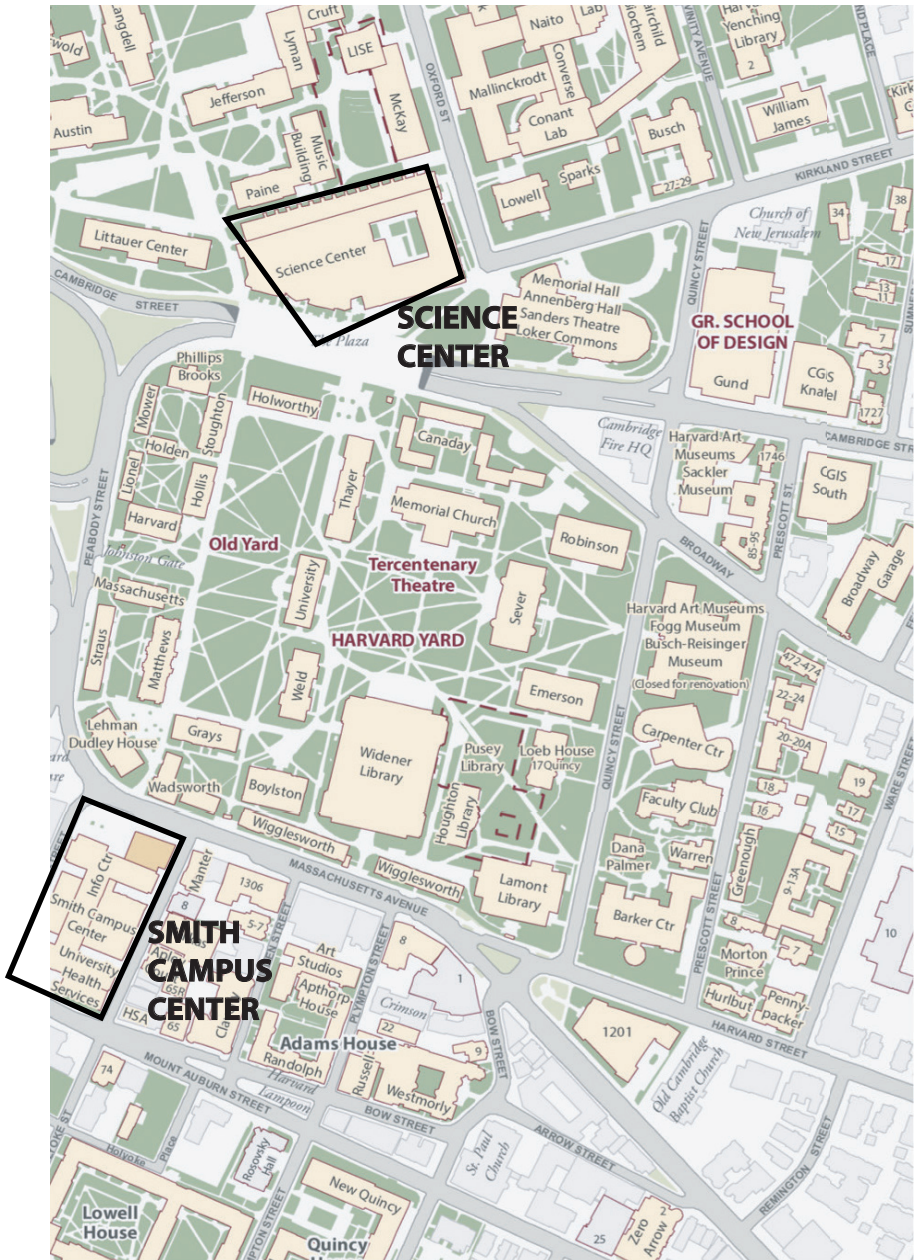
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89 Winthrop Street

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