

# COLUMBIA GLOBAL CENTERS | MUMBAI



ANNUAL REPORT 2018 - 2019

COLUMBIA GLOBAL CENTERS | MUMBAI

ANNUAL REPORT | SEPTEMBER 2018 - AUGUST 2019



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“The most pressing issues we are grappling with today – increasing political polarization, accelerating climate change, deepening inequality – are inherently global in nature. Understanding their impact, and formulating intelligent responses, is impossible without sustained engagement in and with the world. This is precisely why the Columbia Global Centers were created ten years ago – to be deeply responsive to and integrated with issues of local, regional, and global significance. By allowing us to learn from and with the world, the Centers advance knowledge and its exchange, helping us to study significant questions and address the most urgent global challenges.”

**SAFWAN M. MASRI**

*Executive Vice President for Global Centers and Global Development at Columbia University*



## MESSAGE FROM THE DIRECTOR

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As India and the world grapple with the consequences of environmental degradation and climate change, as well as major shifts in pluralism and democracy, questions around what research and education mean, and what shape next generation knowledge must take, become even more critical. At the Columbia Global Center | Mumbai, we remain committed to the vision of building academic bridges for a better future.

During September 2018-August 2019, the period that is covered in this report, environmental sustainability emerged as one key focus across the Center's programmatic areas. We initiated a long-term project on urban biodiversity in New Delhi and supported cutting-edge faculty initiatives on water and clean air. Multiple research programs addressed the links between health and environment, our innovation and entrepreneurship program mentored startups working on environmental solutions for urban workplaces, and we laid the ground for a new seminar series on climate change to build capacity among science faculty in Mumbai's colleges.

The year also saw our programs becoming more targeted and impactful, even as we continued to build public awareness and disseminate research by Columbia University and regional experts through lectures, panels, seminars, and other events. Institutional partnerships set into place with Columbia University's Mailman School of Public Health and the School of Engineering enabled us to commence work on multi-year projects that hold the promise of delivering real world solutions on the ground.

In addition to increased collaboration with faculty to develop research projects in India, the number of students participating in our programs grew to more than 200. Partnerships with academic institutions in the region also intensified as did our outreach and engagement with private sector entities, government agencies, and civil society organizations.

None of this would have been possible without the unwavering belief expressed in us by our Advisory Board and donors. We are also thankful to the Faculty Advisory Committee for their enthusiastic engagement with the Center.

Our team has expanded considerably in number and diversity. As visitors frequently join us, our conversations over lunch are lively and creative. The green canopy and sea views from our office reinforce hope and beauty amidst the urban jungle.

It has been a highly productive year, all in all! I hope you enjoy reading about it in this report!

**Ravina Aggarwal**

Director, Columbia Global Centers | Mumbai



## ADVISORY BOARD

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### **SANJEEV BIKHCHANDANI**

Founder and Executive Vice Chairman of Info Edge India Ltd.

### **RAJASHREE BIRLA**

Chairperson of Aditya Birla Foundation and Director of Aditya Birla Group of Companies

### **PIROJSHA GODREJ**

Executive Chairman of Godrej Properties Limited

### **RUBAL JAIN**

Managing Director of Safexpress Private Limited

### **UDAY KOTAK**

Managing Director and CEO of Kotak Mahindra Bank

### **MANOJ MENDA**

Corporate Chairman of RMZ Corporation

### **MANJUL PAHWA**

Director of Ralson India Limited

### **VIKRAM PANDIT**

Chairman and CEO of Orogen Capital, and a former Trustee of the University

### **SHARAD SANGHI**

Founder, CEO and Managing Director of Netmagic Solutions Private Limited

### **VAISHALI NIGAM SINHA**

Chief CSR, Sustainability and Communications Officer of ReNew Power

### **RATAN TATA**

Chairman Emeritus of Tata Sons

### **SUDHANSHU VATS**

Group CEO of Viacom 18 Media Private Limited

## FACULTY ADVISORY COMMITTEE

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### **GITA V JOHAR, Chair**

Professor of Business, Columbia Business School

### **KADAMBARI BAXI**

Professor of Professional Practice in Architecture, Barnard College

### **AKEEL BILGRAMI**

Sidney Morgenbesser Professor of Philosophy, Department of Philosophy

### **PARTHA CHATTERJEE**

Professor, Department of Anthropology and Middle Eastern, South Asian and African Studies

### **MADHABI CHATTERJI**

Professor of Measurement, Evaluation and Education, Teachers College

### **RUTH S DEFRIES**

University Professor, Department of Ecology, Evolution and Environmental Biology

### **VISHAKHA N DESAI**

Senior Advisor for Global Affairs; Adjunct Professor, School International & Public Affairs

### **LYNN P FREEDMAN**

Professor of Population and Family Health, Columbia University Medical Center

### **UPMANU LALL**

Alan and Carol Silberstein Professor of Engineering; Director of the Columbia Water Center

### **REINHOLD MARTIN**

Professor, Graduate School of Architecture, Planning, and Preservation

### **DEBASHREE MUKHERJI**

Assistant Professor, Middle Eastern, South Asian and African Studies

### **ANUPAMA RAO**

Associate Professor of History, Barnard College

### **ADAM SOBEL**

Professor, Lamont-Doherty Earth Observatory and The Fu Foundation School of Engineering and Applied Sciences

### **GAURI VISHWANATHAN**

Class of 1933 Professor of English and Comparative Literature; Director of the South Asia Institute



# WHAT WE DO

## THEMATIC AREAS



**Environmental Sustainability**



**Education and Culture**



**Health and Medicine**



**Innovation and Entrepreneurship**

## ACTIVITIES

### Public Engagement

Dissemination of academic knowledge to relevant audiences through public lectures, panels, creative programs, policy workshops, training programs, and publications

### Research Projects

Development and management of impactful & interdisciplinary research projects in partnership with faculty at Columbia University and regional experts and institutions

### Student Programs

Opportunities for course-work, design studios, study tours, internships, and information sessions for strengthening Columbia University's global learning mission

## STAKEHOLDERS

**Columbia Community**

**Academic Institutions and Experts**

**Civil Society**

**Government Agencies**

**Private Sector**

# PUBLIC PROGRAMS

The Center designed, organized and participated in 25 panel discussions, symposiums, public lectures, and workshops that provided critical inputs to research questions and enabled expert knowledge to reach targeted stakeholders as well as broader publics. The following list of events includes programs that were held at the Center from September 2018 to August 2019, and also specifies external venues, co-organizers, and institutions who invited us to present our work.



**Nutrition Guidelines in Pediatric Cancer Treatment**  
September 4-5, 2018 | [Workshop](#)

Co-organizer:  
[Elena Ladas](#), Associate Professor, Department of Pediatrics, Columbia University Irving Medical Center

**Building Sustainable Workspaces**  
September 6, 2018 | [Panel Discussion](#)

Panelists:  
[Pirojsha Godrej](#), Executive Chairman, Godrej Properties  
[Shom A. Hinduja](#), President of Alternative Energy and Sustainability, Hinduja Group  
[Aparna Piralal Raje](#), Author and Columnist, Mint  
[Sharad Sanghi](#), Managing Director and CEO, Netmagic  
Venue: CoWrks Worli, Mumbai

**Strengthening Research on Nutrition in India**  
September 7, 2018 | [Symposium](#)

Presenters:  
[Shweta Khandelwal](#), Associate Professor, Public Health Foundation of India  
[Elena Ladas](#), Associate Professor, Department of Pediatrics, Columbia University Irving Medical Center  
[Jagmeet Madan](#), Principal and Professor, Sir Vithaldas Thackersey College of Home Science, SNDT Women's University  
[Purnima Menon](#), Senior Research Fellow, International Food Policy Research Initiatives, New Delhi

**Aging, Generational Solidarity and Mental Health**  
October 8, 2018 | [Workshop](#)

Co-organizer:  
[Kavita Sivaramakrishnan](#), Associate Professor, Mailman School of Public Health, Columbia University

**Aging and the Making of a Demographic Crisis**  
October 8, 2018 | [Public Lecture/Panel](#)

[Kavita Sivaramakrishnan](#), Associate Professor, Mailman School of Public Health, Columbia University  
Panelists:  
[Perianayagam Arokiasamy](#), Professor and Head, Department of Development Studies, International Institute of Population Sciences  
[Mohan Rao](#), Professor (retd.), Centre of Social Medicine and Community Health, Jawaharlal Nehru University, New Delhi

**Rivers of Resilience: The Center's Work on Water**  
November 30, 2018 | [Presentation](#)

[Ravina Aggarwal](#), Director, Columbia Global Centers | Mumbai  
Organizer: University of Pittsburgh  
Venue: Hanifl Center for Outdoor Education and Environmental Study, Mussoorie

**From Killer Roads to Humane Highways: Infrastructure and Connectivity for Wildlife**  
December 12, 2018 | [Film/ Presentations](#)  
[Ruth DeFries](#), Denning Family University Professor of Sustainable Development, Columbia University  
[Krithi K. Karanth](#), Chief Conservation Scientist, Centre for Wildlife Studies

**Civilization Rides the River**  
December 14, 2018 | [Panel Discussion](#)

Panelists:  
[Anthony Acciavatti](#), Adjunct Assistant Professor, Graduate School of Architecture, Planning and Preservation, Columbia University  
[Moin Mir](#), Writer  
[Ahdaf Soueif](#), Author  
Moderator: [Ravina Aggarwal](#), Director, Columbia Global Centers | Mumbai  
Organizer: Times Lit Fest Mumbai  
Venue: Mehboob Studios, Mumbai

**Shaping the Future of Construction**  
January 7, 2019 | [Public Lecture](#)

[Ibrahim Odeh](#), Founding Director, Global Leaders in Construction Management, Department of Civil Engineering and Engineering Mechanics, Columbia University

**The Many Sides of a Roti: Cereals and their Impact on Environment and Nutrition**

January 15, 2019 | [Public Lecture](#)  
[Ruth DeFries](#), Denning Family University Professor of Sustainable Development, Columbia University

**Speeding up Solvency: Bankruptcy Reform in India**  
January 17, 2019 | [Conference](#)

Organizer: [Jerome A Chazen](#), Institute for Global Business, Columbia Business School  
Venue: Trident Hotel, Mumbai

**Health, Politics and the Imagination in Colonial and Contemporary India**

February 18-19, 2019 | [Symposium](#)  
Co-organizer:  
[Rishi Goyal](#), Assistant Professor, Department of Emergency Medicine, Columbia University  
Presenters:  
[Rakhi Ghoshal](#), Independent Social Science Consultant  
[Amar Jesani](#), Independent Consultant in Bioethics and Public Health  
[Sunil Pandya](#), Neurosurgeon, Jaslok Hospital and Research Centre  
[Gayathri Prabhu](#), Chair in Indian Literature, Manipal Academy of Higher Education  
[Krittika Sharma](#), Innovation Researcher and Behavior Architect  
[Sunita Simon](#), Professor and Head, Department of Medical Ethics, St. John's Medical College, Bengaluru  
[Satendra Singh](#), Associate Professor, University College of Medical Sciences, Delhi

**The Body as a Manuscript: Science Fiction and Medical Humanities**

February 18, 2019 | [Public Conversation](#)  
[Rishi Goyal](#), Assistant Professor, Department of Emergency Medicine, Columbia University  
[Manjula Padmanabham](#), Author

**Developing Effective Strategies for Managing Marine Ecosystems in a Changing Climate**  
February 20-21, 2019 | [Conference](#)

Co-organizer:  
[Joaquim Goes](#), Professor, Lamont-Doherty Earth Observatory, Columbia University  
Panelists:  
[Prakash Chauhan](#), Director, Indian Institute of Remote Sensing, Dehradun  
[Dale Kiefer](#), Professor of Biological Science, University of Southern California, USA  
[Arun Inamdar](#), Professor of Climate Studies, Indian Institute of Technology-Bombay  
[V.V. Singh](#), Principal Scientist, Central Marine Fisheries Research Institute, Mumbai  
[Girish Prabhu Matondkar](#), Scientist, National Institute of Oceanography, Goa  
[M.M. Shirdanker](#), Professor and Head, College of Fisheries, Ratnagiri  
[Nikhil Anand](#), Associate Professor of Anthropology, University of Pennsylvania

**Shifting Power Dynamics in the Middle East: Prospects for Democracy and Pluralism**

February 22, 2019 | [Public Lecture](#)  
[Safwan Masri](#), Executive Vice President, Global Centers and Global Development, Columbia University

**The Exposome: Measuring Complex Exposures on a Global Scale**

March 4, 2019 | [Public Lecture](#)  
[Gary Miller](#), Vice Dean, Research Strategy and Innovation, Mailman School of Public Health, Columbia University

**Nutrition Guidelines in Pediatric Cancer Treatment**  
April 15, 2019 | [Workshop](#)

Co-organizer:  
[Elena Ladas](#), Associate Professor, Department of Pediatrics, Columbia University Irving Medical Center

**Public Health: A Bridge between Science and Society**  
April 24, 2019 | [Public Lecture](#)

[K Srinath Reddy](#), President, Public Health Foundation of India  
Venue: Columbia Mailman School of Public Health, New York  
Project: Yusuf Hamied Fellowship Program

**Gender Justice on Campus: Towards an Inclusive University**

May 2, 2019 | [Public Lecture/Panel](#)  
Panelists:  
[Gita Chadha](#), Department of Sociology, University of Mumbai  
[Leena Pujari](#), Associate Professor and Head, Department of Sociology, K.C. College  
[Nandita Shah](#), Co-founder and Co-director, Akshara Centre

**Urban Works Innovation Challenge: Demo Day**  
May 27, 2019 | [Presentations](#)

[Ravina Aggarwal](#), Director, Columbia Global Centers | Mumbai  
[Patricia J. Culligan](#), Professor, The Fu Foundation School of Engineering and Applied Science, Columbia University  
[Nruthya Madappa](#), Managing Partner, The CoWrks Foundry  
[Daniel Steingart](#), Associate Professor, Departments of Earth and Environmental Engineering and Chemical Engineering, Columbia University  
Project: Urban Works Innovation Challenge  
Venue: CoWrks, Bengaluru

**Battery Life: Tracing Successes and Failures in Energy Storage**

May 30, 2019 | [Public Lecture](#)  
[Daniel Steingart](#), Associate Professor, Departments of Earth and Environmental Engineering and Chemical Engineering, Columbia University

**Incubating Technology Solutions: Perspectives on India's Innovation Ecosystem**

June 25, 2019 | [Panel Discussion](#)  
Panelists:  
[Pratap Raju](#), Founder, PR Climate Studio  
[Sunita Singh](#), Executive Vice President, Global Initiatives, Wadhvani Foundation

**Women, Work, and the Web: From Exclusion to Opportunity**

June 28, 2019 | [Symposium](#)  
Presenters:  
[Antony Alex](#), Co-founder, Rainmaker  
[Karla Bookman](#), Founder, The Swaddle  
[Sairee Chahal](#), Founder and CEO, Sheroes  
[Gunjan Khandelwal](#), General Manager, ThoughtWorks India  
[Anu Madgavkar](#), Partner, McKinsey Global Institute  
[Anjali Sheno](#)i, Program Coordinator, Centre for Communication and Development Studies

**Mumbai's Natural Heritage: Enhancing Public Engagement**

July 12, 2019 | [Symposium](#)  
Presenters:  
[Laxmikant Deshpande](#), Manager, Mangroves Program, Godrej  
[Haripriya Gundimeda](#), Professor of Economics, Indian Institute of Technology-Bombay  
[Raju Kasambe](#), Curator, Bombay Natural History Society  
[Farmeen Mistry](#), Manager, Education and Outreach, World Wildlife Fund  
[Rashneeh N. Pardiwala](#), Founder Director, Centre for Environmental Research and Education  
[V. Shubhalaxmi](#), Founder Director, iNaturewatch Foundation

**Witness to History: Fieldwork and Ethics at the Margins**  
August 8, 2019 | [Seminar](#)

[Ravina Aggarwal](#), Director, Columbia Global Centers | Mumbai  
Partners: South Asia Institute, Columbia University, Mumbai History Teachers Academy

# STUDENT PROGRAMS

The Mumbai Center promotes learning and information activities for Columbia students through a set of academic programs, internships, study tours, and information sessions. By facilitating expert and peer engagement to gain practical insights into diverse locales and ecosystems, the Center creates opportunities for strengthening Columbia University's global learning mission. Student programs in 2018-2019 included:



## Columbia Experience Overseas

The Center hosted an orientation session for Columbia undergraduate students as part of the Columbia Experience Overseas (CEO) program that is organized in collaboration with the Center for Career Education at Columbia. This longstanding summer program offers students high quality internships in private sector and non-profit organizations in areas such as education, health and banking in Mumbai. Students gain work experience through immersing themselves in new environs and connecting with Columbia alumni.



## Practicum for Nursing Students

Twelve students visited India as part of the School of Nursing's Office of Global Initiatives program, which placed them in an intensive six-week practicum program on patients with infectious diseases at the Bel-Air Hospital in Panchgani and St. Philomena's Hospital in Bengaluru. The Center organized an orientation session with expert speakers on the challenges of healthcare in India and the work being done to address equitable access to care. Students learned about a holistic, drug-resistant tuberculosis project run by Médecins Sans Frontières in a presentation that emphasized patient-centric models of care with nursing at their core.

"I am not the same person, or the same nurse, I was before I went to India."

- Maher Benham, Nursing student



## Business Students' Study Visit

The Center hosted students from the Chazen Institute's Global Study Tour to India for a presentation by Mumbai Tiffin Box Suppliers Association where they learned about the organization's unique history, daily operations, and plans for expansion. The study tour offers students a firsthand experience of business cultures of various countries and a chance to meet with leading executives and officials while visiting businesses, factories, and cultural sites.

## Urban Works Seminar

The Center developed and implemented an intensive seminar from January 7-16, 2019, as part of its Urban Works project, for three teams of 13 Columbia students working on solutions for environmentally sustainable urban workplaces in India. The seminar featured workshops by the Director of Entrepreneurship and four faculty mentors from Columbia University's Fu Foundation School of Engineering and Applied Science. Students also benefited from interacting with five startup teams from India, and from master classes by environmental experts and sustainable industry leaders. Field visits enabled them to engage firsthand and understand the dynamics of sustainability protocols at play in the business world. The seminar concluded with a round of student presentations with feedback on how to further customize their design solutions for India.



## Welcome and Send-off Receptions

The Center organized and hosted welcome and send-off receptions for newly admitted undergraduate and graduate Columbia students in partnership with the Columbia Alumni Association of India. The welcome reception gave accepted undergraduate students the opportunity to meet with peers and alumni and learn more about the Columbia experience and life in New York. More than 80 attendees at this year's send-off reception interacted with alumni, and networked with other students.



## Information Sessions

Given the deep interest among Indian students for applying to Columbia, the Center organized information sessions in partnership with the School of General Studies and the Department of Statistics. The sessions gave interested students, parents, professors, counselors and working professionals the opportunity to learn more about academic programs, extra-curricular activities, student life, and professional opportunities, along with information about Columbia's distinguished faculty and global alumni network.





# RESEARCH PROJECTS



The Center develops, manages, and supports innovative research initiatives with faculty at Columbia University. The Center supported eight faculty projects in 2018-19. Listed in the order below, four projects were supported by the President's Global Innovation Fund, three by the Yusuf Hamied Fellowship Program, and one by the Aditya Birla Group.

## **Political Economy of Water and Environmental Sustainability in India**

Inadequate water supply ranks among the most pressing challenges facing poor citizens in developing countries. Uptake of formalized, municipally provided water services is often meager, with citizens instead opting to rely on private, informal, or illegal water-service provisioning that burdens local ecosystems. The Center supports Nikhar Gaikwad, Assistant Professor of Political Science, to study the determinants of citizen preferences and constraints regarding access to water and public services through a series of surveys and field studies in India.

## **Hypoxic Events, Harmful Algal Bloom Outbreaks, and Fish Mortality**

Of the many oceanic ecosystems experiencing anthropogenic and climate-driven changes worldwide, the Arabian Sea stands out as one of the most extreme. Led by Professor Joaquim Goes, Department of Earth and Environmental Sciences and the Lamont Doherty Earth Observatory, and Helga do Rosario Gomes, this project examines how early detection and forecasting solutions can be derived for mitigating the harmful effects of hypoxic events, harmful algal bloom, and fish mortality on the West Coast of India.

## **Generativity in Deprived Urban Contexts**

Societies around the world are growing older rapidly. There is evidence that older adults engage with and seek to support younger generations, and that such engagement will enhance the capabilities of the young and well-being of the old. The Center supported a research project by Kavita Sivaramakrishnan, Associate Professor, Sociomedical Sciences and History, Mailman School of Public Health, that interrogates the notion of 'generativity' in low-income areas in Mumbai.

## **The Health Effects of Biomass Exposure**

Under the PGIF grant awarded to Jeanine D'Armiento, Associate Professor of Medicine, Vagelos College of Physicians and Surgeons, the Center facilitates lectures, workshops and collaborative research. The aim is to bring together scholars, students, public officials and scientists from multiple fields to inquire into the direct effects of biomass on the lung. The project is expected to expand into cardiovascular diseases and pediatric illnesses.

## **The Role of Environmental Exposures and Breast Cancer in Women**

This project, led by Mary Beth Terry, Professor, and Jasmine McDonald, Assistant Professor, both in the Department of Environmental Health Sciences at the Mailman School of Public Health, is an epidemiological study on the intersection of air pollution, polycyclic aromatic hydrocarbon exposure, and breast cancer within India.

## **Advancing Nutritional Policy in India through a Pediatric Oncology Framework**

This project by Elena Ladas, Sid and Helaine Lerner Associate Professor for Global Integrative Medicine at the Columbia University Medical Center, focuses on building capacity, training and education, and advancing nutritional research on pediatric oncology in India. It aims to set national research priorities in nutrition so as to collect the necessary data to aid in nutritional planning and policy.

## **TRIPS, Patents and Drug Prices in India**

Bhaven Sampat, Associate Professor of Health Policy and Management at the Mailman School of Public Health, empirically assesses the impact of Trade Related Intellectual Property Rights Agreements (TRIPS) on drug prices, generic competition and utilization of drugs, which can have implications for Indian and global pharmaceutical patent policy.

## **Youva Nestham Youth Empowerment Program for Sustainable Development**

The Center facilitates a multiyear research-based initiative undertaken by Yanis Ben Amor, Executive Director of the Center for Sustainable Development. This community-based research project strives to demonstrate that a suite of social, financial, and educational empowerment interventions improves psychosocial well-being, school attendance and job skills of 10-16 year-old girls and boys in rural Telangana, South India.



Research workshop for drafting Nutritional Guidelines on September 4, 2018

# KEY STATISTICS

## ENGAGEMENT WITH THE COLUMBIA COMMUNITY

Faculty	Administrative Heads	Students	Alumni
64	32	209	158

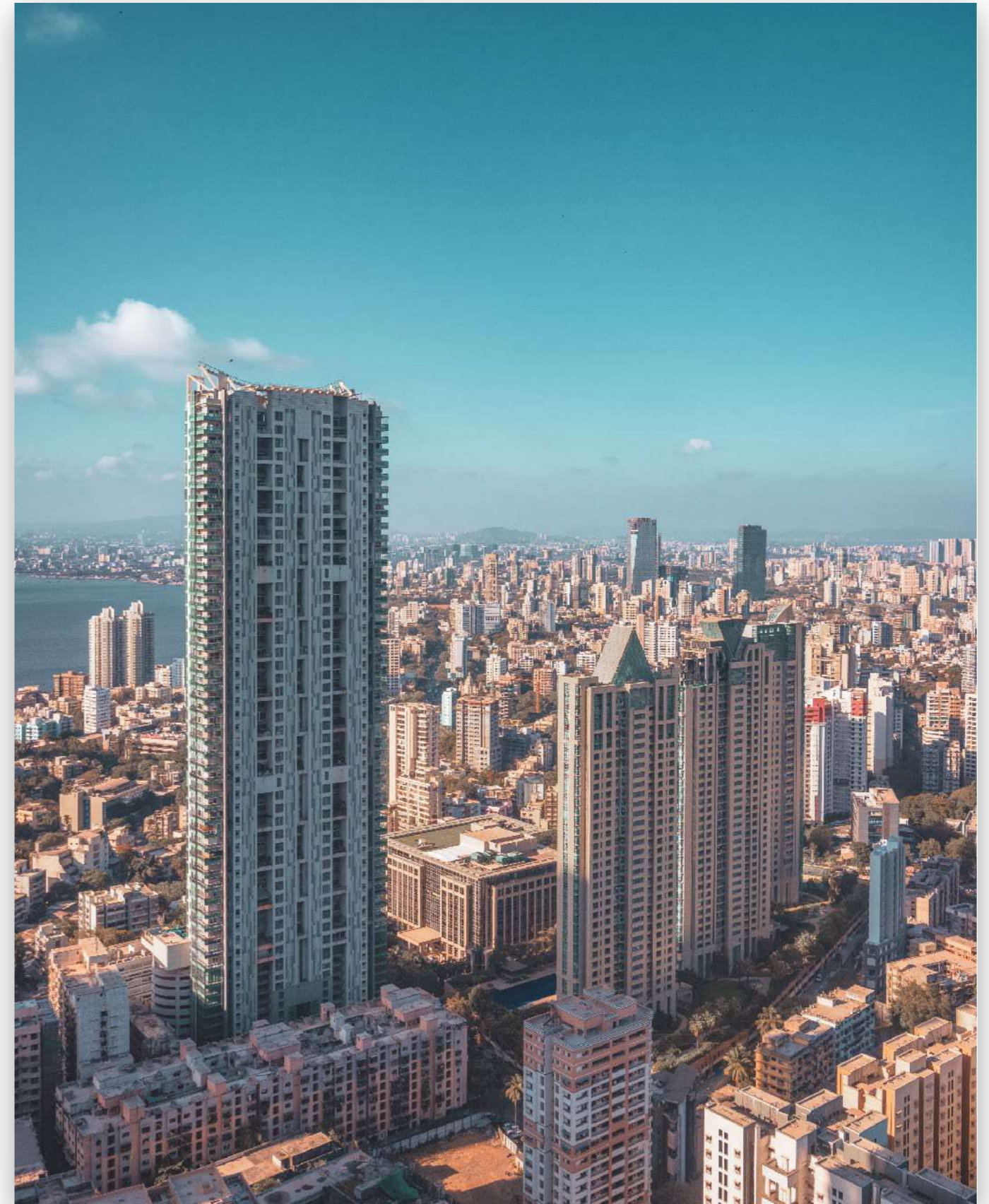
- |  |  |
|--|--|
| Barnard College  | Graduate School of General Studies         |
| Columbia Business School                                   | Mailman School of Public Health            |
| Columbia College   | School of International and Public Affairs |
| Columbia Law School  | School of Nursing                          |
| Data Science Institute                                     | School of Professional Studies             |
| Earth Institute  | South Asia Institute                       |
| Fu Foundation of Engineering and Applied Science           | Teachers College                           |
| Graduate School of Architecture, Planning and Preservation | Vagelos College of Physicians and Surgeons |
| Graduate School of Arts and Sciences                       |  |

## PUBLIC ENGAGEMENT

Types Of Organizations	Organizations Represented
Academic Institutions	78
Civil Society Organizations	48
Government Agencies	19
Private Sector	148

Individuals	Number of Individuals
Program Participants	1134
Subscribers	5100

# PROGRAM HIGHLIGHTS



## Innovation and Entrepreneurship

# MENTORING SOCIAL IMPACT STARTUPS

Can software save the environment? Five undergraduate students from Columbia University who participated in the Urban Works Innovation Challenge (UWIC), believe it can! They are combining artificial intelligence with human ingenuity to explore a solution for waste management in India.

Ishaan Chandratreya, Raghav Mecheri, Ajit Akole, James Bollas, and Ketan Jog from Columbia's class of 2022, most of them engineering students, attended an information session and workshop about UWIC on campus during the fall semester of 2018. Focused on supporting solutions for environmental problems in India's urban workplaces, UWIC is a collaborative effort between the Columbia Global Centers | Mumbai and the Fu Foundation School of Engineering and Applied Sciences, in partnership with The CoWrks Foundry and the RMZ Foundation.

The problem they chose to address was that of waste segregation. The city of Mumbai alone generates approximately 7,000 metric tons of waste every day and this comes in multiple forms: biodegradables, recyclables, debris, and silt. Effective processing of each type of waste faces one critical hurdle – segregation. Currently, much of the waste accumulated in Indian cities is segregated elsewhere, known as secondary segregation, and large quantities of mixed waste continues to flood landfill sites in suburban areas. But what if segregating at source, in homes, factories, and offices, were easier, accurate, and more efficient?

The five students realized the potential of automating the process of trash segregation and thus, BinIt was born. The group applied to be a part of the inaugural cohort of the challenge and qualified as one of the three student team finalists. They traveled to Mumbai in January 2019 to attend a two-week seminar organized by the Center and to jump-start their market research.



Members of the BinIt team with Urban Works mentors and awardees

They discovered the magnitude of the problem after experiencing a 1,000 metric-ton integrated solid waste processing facility in Mumbai and this caused a seminal shift in their outlook: the realization that this is a social and environmental problem too, not one of just robotics or A.I. alone.

Another outcome, following field visits, was their improved understanding of waste segregation processes employed by major corporations in India. According to Ketan Jog, *"Just being there in person, soaking it all in, and understanding how waste segregation truly works on a ground level really helped us comprehend the scale of what we were trying to achieve, and definitely helped drive us forward."*

BinIt emerged as the standout winners of the student track of the UrbanWorks Challenge. They were subsequently invited by Urban Works to travel to Bengaluru in late May where they participated in a demo day. As the team honed their pitch, their hands-on research also resulted in them pivoting from a business-to-consumer to a business-to-business model. BinIt had started out as an intelligent trash-can that used computer vision and robotics to automatically sort waste into different categories, with a world-leading trash-classification accuracy rate of over 90%. Their initial business model involved manufacturing and retailing consumer facing bins. BinIt today aims to work towards manufacturing and selling both user-facing bins, as well as large scale conveyor belt waste automation systems directly to large corporations across Asia. This helps balance the human and machine aspects of their innovation, making it more suitable to the Indian market where a large informal sector handles and sorts waste on a daily basis.

Thanks to the Urban Works opportunity and the progress made by the team on their venture over the course of the academic year, BinIt was also announced as the winner of the Undergraduate Track of the Columbia Venture Competition in 2019, Columbia University's premier startup pitch competition. The team is now working towards launching a proof-of-concept with a few corporate partners across India and the United States, and all five of its members are excited to see what the future holds.

## URBAN WORKS: KEY OUTCOMES

- Over 50 startup and 70 student applications were received for the challenge; 8 teams were supported for solutions addressing urban sustainability.
- Over 10 interdisciplinary public programs (workshops, panel discussions, and seminars) focusing on sustainability and innovation in urban India were organized in Mumbai, Bengaluru, and Delhi with over 440 participants.
- Over 25 training sessions were organized for the winning teams led by various experts based in India.
- Academic institutions such as IIT Bombay, Tata Institute of Fundamental Research, government bodies such as the Maharashtra State Innovation Society, Quality Council of India, civil society organizations such as International Energy Forum (IEF), Center of Environmental Research and Education (CERE) and private organizations such as K Raheja Corp, and Reliance Life Science participated in public events.
- Leading media publications such as *The Hindu Business Line*, *The Deccan Herald*, *Hindustan Times*, *The Economic Times* and online portals such as the *Inside Outside Magazine* and *Architects and Interiors India* covered the launch of the Challenge and programs held.

## Urban Works Activities

### Supporting Sustainable Solutions

For the inaugural Urban Works Innovation Challenge of 2018-2019, passionate young professionals and entrepreneurs as well as students were invited to improve environmental sustainability in Indian workplaces by integrating sustainable resource-use and waste/pollution reduction, green technologies and infrastructure, and energy-efficiency in their solution designs. After a competitive process, solutions proposed by three student teams from Columbia University were selected, together with five startups from India who received Rs. 1.2 crores in financial support and mentorship.

### Enlisting Expert Faculty and Advisors

The project addressed the mentorship gap for startups and social impact technology developers by recruiting key members of the Columbia Engineering faculty as advisors, including Professors Patricia Culligan, Ioannis Kymissis, Vijay Modi, and Faye McNeill, and Director of Entrepreneurship, Ivy Schultz, with generous support from the Dean of Engineering, Mary Boyce. The program also saw the inclusion of Advisors from Columbia's network, including Sharad Sanghi, Managing Director and CEO of Netmagic Solutions, Pirojsha Godrej, Executive Chairman of Godrej Properties, Shom Hinduja, President-Alternative Energy and Sustainability at the Hinduja Group, and, writer Aparna Piramal Raje.

### Curriculum Development and Training

The Center held an intensive seminar for the student teams and startups. It provided intellectual inputs to understand the Indian

context and helped develop and execute a rigorous curriculum in consultation with the Engineering faculty, including field visits, customer discovery meetings, and expert speakers. The five startup teams from India continued to participate in a six-month curriculum with the CoWrks Foundry, with support from the Center.

### Public Outreach

The project increased public awareness for environmental sustainability in Indian workplaces by organizing expert panels and disseminating related outputs through print and social media platforms. It brought international visibility to the future of work in India and encouraged experts and student teams to focus their design-thinking on the country. The Center hosted a panel on incubators in India's innovation ecosystem to identify what has worked and what needs to be done to make technology incubators more effective in tackling the challenges of urban India. It also convened a workshop to understand the impact of digital technology on the participation of women in India's workforce to address the barriers associated with women's participation in the digital space and showcase positive initiatives to foster gender balance. In May 2019, the Center partnered with the CoWrks Foundry to organize a demonstration day in Bengaluru, where six of the winning startups pitched their solutions for environmentally sustainable workplaces in front of an audience of social investors, academics, entrepreneurs, non-profit organizations, and other stakeholders committed to strengthening the startup ecosystem in India.



Urban Works Advisors speaking at a panel on September 6, 2018

## URBAN WORKS 2018-2019 AWARDEES

### Student teams

**BinIt**, for designing a recycling station that uses elements of machine learning as well as mechanical sorting to sort out waste by using sensors. This innovation enables accurate waste segregation and reduces human handling. Corporate workspaces can install these bins for effective waste management.

**Mossy**, for their Modular Moss Tower, a sensor based mobile air cleaning device that uses a combination of the Internet of Things and natural plant filtration. This device can be installed in workspaces to help absorb harmful gases and regulate humidity for improving internal air quality and managing workplace health hazards.

**Modular Workspaces**, for a modular system that can re-purpose terraces on commercial buildings and fit them with solar panels, greenery, and water harvesting features. This ready to assemble pop-up workspace solution can be installed in dense urban areas, where employees work in small, enclosed office spaces.

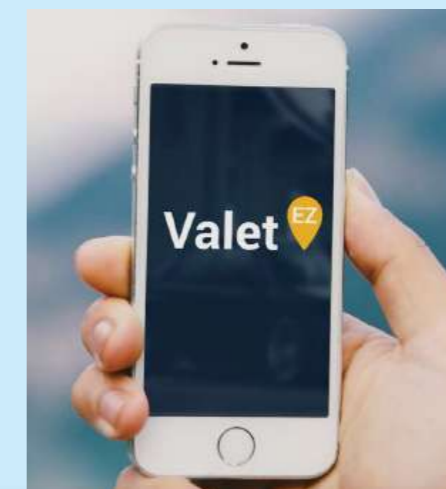
### Startups

**Inphlox Water Systems**, for their 'Indra' solution that focuses on the treatment of waste water and the purification of industrial and chemical effluents by using advanced automation and analytics. The treated waste water is then recycled and reused, making it affordable and measurable. Indra works in residential, commercial and industrial settings to address the environmental problems of water scarcity and high energy consumption.

**ValetEZ Services**, for their smart parking platform that is currently operating in more than 130 locations and helping these workplaces manage their parking lots in ways that are more efficient and effectively utilize available parking infrastructure. It addresses the problems of over-building and vehicular emissions as well as saves fuel. The adoption of this technology enables employees and visitors to make payments and find parking in a reliable and efficient way.

**Hexpressions Megatech**, for a new construction material and process involving composite-paper honeycomb panels. By applying this to wall spaces, furniture systems, and other workspace infrastructure, the company aims to promote green buildings that are not only sustainable but also durable, affordable, fast, flexible, and modular. The use of honeycomb panels can help reduce the world's carbon footprint by reducing the dependency on damaging construction materials.

**Synappra Technologies**, for a hybrid edge computing device that provides predictive intelligence for improving the performance of workplace assets. It reduces energy costs and wastage and improves air quality through efficient control and management of heating, ventilation, air conditioning, and lighting in buildings.



**Innovation Experience**, for their bio-waste processing technology called 'Suchita' that offers a decentralized waste management solution that converts wet waste into organic manure in just a few hours. The solution addresses the problem of waste that is produced on a daily basis, thus reducing the need for disposal and transport of waste.

"Urban Works gave us the opportunity to interact with academics, practitioners, and subject matter experts in areas like urban tech, workspaces, and innovation, which helped us shape our tech and business strategy."

- Prashant Chandrasekaran, ValetEZ



Dr. Yusuf Hamied attends a lecture by Professor Gary Miller at the Center on March 4, 2019

## Health and Medicine RESEARCHING CRITICAL HEALTH ISSUES

Ambient air pollution in India is a severe health hazard, contributing to nearly one million premature deaths annually. The country also bears a large burden of the world's malnutrition and obesity problems, exacerbated by the effects of climate change on food security.

These health challenges formed a seminal part of the research and dissemination activities undertaken by the Mumbai Center with Columbia University faculty in 2018-2019. The field of Environment and Health is a major thematic focus of the Dr. Yusuf Hamied Fellowships Program, in addition to Access to Treatment and Population and Family Health. The program is a collaborative initiative between the Center and the Mailman School of Public Health, awarded annually for three Columbia research projects focusing on India and to three faculty members in Indian educational institutions for short-term residencies at the Mailman School. The principal goal of the program is to develop a robust public health research network, stimulate new collaborations, especially in areas that have critical gaps in health research, and produce scientific publications in public health that will shape future research and policy priorities.

According to Gary Miller, Vice Dean for Research Strategy and Innovation at Columbia Mailman, "I am certain that this initiative will evolve into a series of outstanding research projects that will be mutually beneficial to India and the U.S." Professor Miller delivered the 2019 Yusuf Hamied Distinguished Lecture at the Center on the topic of environmental determinants of global health. He demonstrated how the study of the human genome and genetics has now been expanded by the study of the 'exposome', a new and complex set of diagnostic measures for environmental influences.

The inaugural Columbia Mailman Hamied Distinguished Lecture on campus was given by K. Srinath Reddy, President of the Public Health Foundation of India, in which he posited that public health is the bridge to understand and solve some of the biggest challenges in India and the world.

## YUSUF HAMIED FELLOWS 2018-2019

### Mailman School of Public Health



**Bhaven Sampat**  
Associate Professor, Health Policy and Management  
*Trade Related Intellectual Property Rights Agreements (TRIPS), Patents and Drug Prices in India*



**Elena Ladas**  
Sid and Helaine Lerner Associate Professor for Global Integrative Medicine  
*Advancing Nutritional Policy in India through a Pediatric Oncology Framework*



**Mary Beth Terry**  
Professor, Department of Environmental Health Sciences



**Jasmine McDonald**  
Assistant Professor, Department of Environmental Health Sciences  
*The Role of Environmental Exposures and Breast Cancer and Other Chronic Diseases in Women*

### Indian Institutions



**Aditi Roy**  
Research Scientist, Public Health Foundation of India  
*Childhood Development and the Health Impact of Air Pollution in India*



**Habib H. Farooqui**  
Associate Professor, Public Health Foundation of India  
*Impact of National Pharmaceutical Pricing Policy on Utilization and Affordability of Essential Medicines*



**Surinder K.P. Jaswal**  
Deputy Director (Research), Professor, Tata Institute of Social Sciences, Mumbai  
*Climate Change and Health and Health Hazards Related to Urban, Low-Income Settlements*

## Nutritional Guidelines for Pediatric Cancer

An estimated 50,000 new cases of pediatric cancer are detected in India every year. Of these, almost 85% are diagnosed with malnutrition with a survival rate of only 20%. Given the large load of pediatric cancer cases within the country coupled with high levels of malnutrition, standardization of nutrition protocols is a prerequisite to successful treatment and survival outcomes.

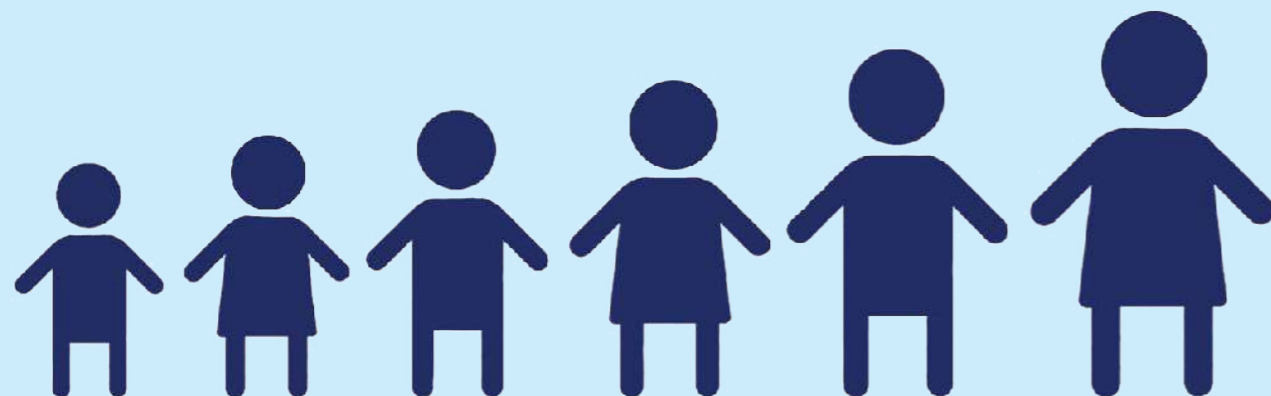
A standardized supportive toolkit for practitioners and the first ever Indian guidelines for nutritional management of children and adolescents with cancer are being developed by Professor Elena Ladas at the Columbia University Medical Center, in collaboration with the International Society of Pediatric Oncology, the International Initiative for Pediatrics and Nutrition, and the Columbia Global Centers | Mumbai.

Professor. Ladas is one of the recipients of the Yusuf Hamied Fellowship Program of 2018-2019. The Center hosted two workshops as part of her project in September 2018 and April 2019, with stakeholders from the fields of pediatric oncology, nutrition, civil society, and academia.

A steering committee was formed to review existing literature on South Asia. Data of over 6000 children under the age group of 6 to 17 years was collated. Accordingly, the Committee drafted a plan of action for clinician outreach, anthropometric assessment for children above 5 years of age, dietary requirements, and patient/parent education. One of its recommendations was to target various states across India to undertake trainings, with particular emphasis on online training. It also identified education materials for parents and caregivers as an action point and has started developing pilot materials for field testing before larger dissemination. A follow-up workshop with the expert group is scheduled for April 2020, where the guidelines will be officially launched, together with the inaugural training course for nurses, nutritionists and oncologists.

According to Professor Ladas, *“The pilot model of nutritional care being implemented in India will act as a regional center of nutritional excellence with plans of expansion throughout the global pediatric and cancer community.”*

IN INDIA, **50,000** CHILDREN ARE  
DIAGNOSED WITH **CANCER** ANNUALLY



Sunder Nursery © Aga Khan Trust for Culture

## Environmental Sustainability CONSERVING URBAN BIODIVERSITY

India's rich natural heritage is facing immense challenges as the country rapidly urbanizes. Studies demonstrate that cities with nature reserves regenerate ecosystems, motivate citizens towards sustainable behavior, and have a positive impact on pollution and health hazards.

Responding to the urgency of spreading awareness about green spaces and conserving urban biodiversity, Columbia Global Centers | Mumbai launched an exciting initiative. In 2019, the Center entered into a project partnership with the Aga Khan Trust for Culture (AKTC) in India to develop educational and outreach programs aimed at enabling Sunder Nursery, located in the heart of the country's capital city, to grow into a world-class urban park.

Sunder Nursery is considered to be 'New Delhi's Central Park' and is significant for its Mughal monuments and floral and faunal diversity. AKTC has led the conservation of the larger project area that contains the park as well as the iconic Humayun's tomb monument. The organization's pioneering multi-pronged approach involves working with several government agencies and undertaking urban projects that equally emphasize the objectives of heritage conservation, environmental impact, and socio-cultural betterment of local communities.

The Center's partnership with AKTC will generate online and offline educational and resource materials, curated outreach programs, documentation initiatives, and internships for students. To announce this partnership, the Center organized a public event entitled "City of Haze, Gardens of Beauty: Reimagining Nature in Urban India" at Columbia University in New York in September 2019 for an interdisciplinary audience of faculty, students, and alumni.

Ruth DeFries, Chair of the Center's Faculty Advisory Committee and Professor of Ecology and Sustainable Development, participated in the event and emphasized that with careful planning and political will, we can live in harmony with nature and balance the demands of development and conservation.

Professor DeFries, who has worked extensively on land transformation in India, had earlier presented her work at the Center through an interactive discussion and screening of a documentary film on wildlife protection entitled "From Killer Roads to Humane Highways" together with Krithi Karanth from the Centre of Wildlife Studies in Bengaluru.

The Center also organized symposiums in Mumbai and New Delhi to provide a learning forum for showcasing best practices for addressing policy gaps and promoting 'nature-centric' public engagement in urban areas. These consultations elicited concrete ideas for focusing efforts and saw enthusiastic participation from experts from leading organizations in India such as the World Wildlife Fund, Bombay Natural History Society, Godrej Mangroves, and IIT Bombay.

The Center's larger initiative on conserving biodiversity exemplifies its commitment to developing programs and partnerships that deepen the experiential, educational and inspirational impact of green reserves for local visitors and citizens worldwide.



Ratish Nanda, CEO of the Aga Khan Trust for Culture in India, at Columbia University on September 10, 2019

## KEY FEATURES

30 acres of a biodiversity zone

80 and more species of birds

280 species of native trees

A special zone for butterflies

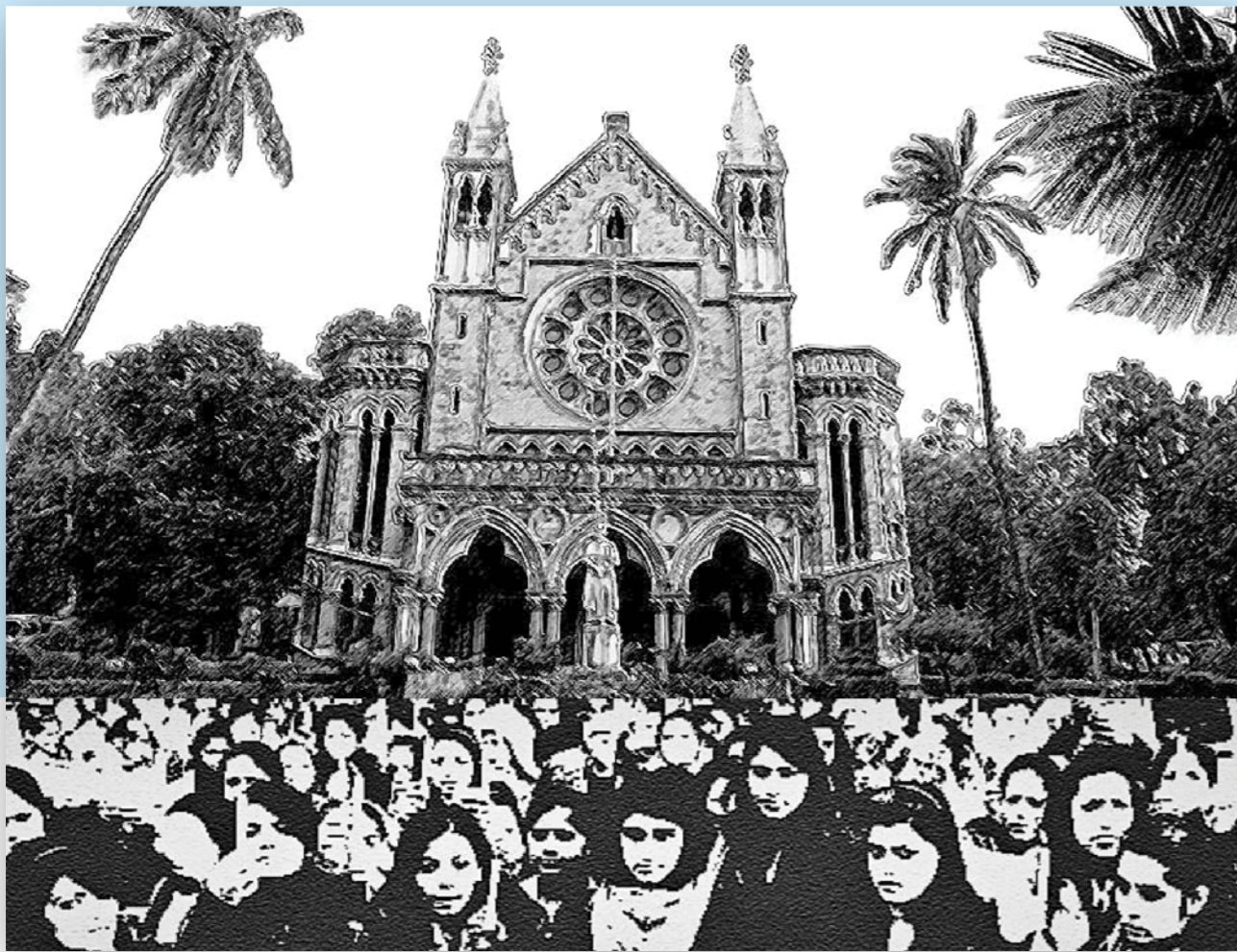
Peacock enclosure

Diverse aquatic bodies

15 cultural monuments from the Mughal period

"We are very excited about the partnership with Columbia Global Centers to both help achieve project objectives and create new knowledge with field teams and academics working together."

- Ratish Nanda, CEO of the Aga Khan Trust for Culture in India



## Education, Culture, and Knowledge STRENGTHENING HIGHER EDUCATION

With the largest youth population in the world, India's higher education institutions registered an increase of 800,000 students between 2018- 2019, according to a Government of India report. Amidst this exponential growth, a proliferating network of institutions are expanding their academic mandates and scope of work to better equip students to embrace the challenges of a globalizing world. In the state of Maharashtra, for instance, a number of colleges are gaining autonomy under the University of Mumbai, leading to a new focus on research and curriculum design.

To build capacity, share knowledge and resources, and serve as a learning platform for research and teaching, the Center launched an initiative on Strengthening Higher Education. This initiative builds on the public outreach lectures, panels, and symposiums that were already being conducted by the Center, benefiting faculty and students from several educational institutions in the country.

Partnering with the South Asia Institute at Columbia University and the Mumbai College Teachers' Academy, the Center inaugurated a 'Historical Methods Seminar Series,' a six-part series that showcases cutting-edge research methodologies and interdisciplinary approaches to the study of history. The series was launched on August 8, 2019, with a session led by the Center's Director, Dr. Ravina Aggarwal, that provided insights on ethnography as a method of historical knowledge production. Faculty from nine colleges participated.

In addition to capacity-building seminar programs, the Center also serves as a space for developing and deliberating new field areas and interdisciplinary approaches. To this effect, we supported a project by Rishi Goyal, Assistant Professor of Medicine at the Columbia University Medical Center, who received a President's Global Innovation Fund to contribute to the emerging field of Medical Humanities in India by building a network that could share expertise and lay the groundwork for future collaboration. The project addresses the need for integrating a humanities perspective into medical pedagogy to institutionalize sensitized, self-reflective and patient-centric caregiving systems and practices.



College faculty participating in the first Historical Methods seminar led by Dr. Ravina Aggarwal



Scene from a theater workshop at the Medical Humanities symposium on February 18-19, 2019



The Center's Higher Education initiative also develops programs on areas of systemic concern that affect the sector. One such issue that is relevant to campuses globally is the matter of safeguarding values of gender inclusion and safety in college and university campuses. Female students constitute almost half of the total students enrolled in higher education institutions in India. Yet gender-based discrimination, harassment and violence persists rampantly.

In order to explore current frameworks for building gender-just universities and colleges in India, the Center organized a lecture and panel discussion on May 2, 2019. The program showcased the University Grants Commission-instituted Women's Development Cells and other organizational and curricular interventions that work on gender safety and promote gender sensitization in higher education. The panel featured Dr. Nandita Shah from the Akshara Centre, Dr. Leena Pujari from K.C. College, and Dr. Gita Chadha, Chairperson of Mumbai University's Women's Development Cell that sets the agenda for more than 750 affiliate colleges in the region.

As questions around the #MeToo movement in India have raised awareness, the panel saw lively engagement from a diverse audience that sought clarity and debated issues of justice. This program was informed by initiatives at Columbia's Office of University Life that is mandated with creating resources for student wellness and inclusion.

Given Columbia's experience and achievements in the field, and commitment to learning from global practices, impactful programs on Higher Education will continue to be a key concentration of the Center's work in the future.



"Columbia's Mumbai Center and the South Asia Institute together promote and facilitate collaborative engagement of the University's faculty, students, and alumni in addressing global challenges."

- Professor Gauri Viswanathan, Director,

**South Asia Institute**  
Columbia University

## COLUMBIA GLOBAL CENTERS | MUMBAI TEAM



**DIRECTOR**  
RAVINA AGGARWAL



**ADMINISTRATION MANAGER**  
EMELIA DUBHASHI



**SENIOR PROGRAM OFFICER**  
ADITYA PETWAL



**SENIOR PROGRAM OFFICER**  
SANCHIT WARAY



**PROGRAM OFFICER**  
TULIKA TRIPATHI



**FINANCE OFFICER**  
MANOJ SUTIHAR



**PROGRAM COORDINATOR**  
BRENDA LUISA  
MARBANIANG



**COMMUNICATIONS  
COORDINATOR**  
AMBIKA CHANDRA



**EXECUTIVE ASSISTANT**  
SHAMA KAMAT

*\*Team members for 2018-19 included Priyanka Agrawal, Bhami Vora, and Tanika Godbole.*



“The network of Columbia Global Centers that now span the world are promoting teaching, research, public outreach, and local and regional engagement in Jordan, Turkey, Tunisia, Kenya, Brazil, Chile, China, India and France. Through their extraordinary contributions to our University community, the Centers are fulfilling their promise, individually and collectively, and making Columbia a global university for the 21st century.”

**LEE C. BOLLINGER**  
*President | Columbia University*

