

INTERNATIONAL SUMMER SCHOOL
JULY 22ND- AUGUST 2ND, 2019 - NEW YORK



WORLD HERITAGE STUDIES



Urban resilience in a changing world: energy, safety and wellbeing challenges

NYU Tandon School of Engineering, CUSP Center, NYC

Urban environment hosts more than 60% of the total population worldwide and almost 80% is expected to live in anthropized urban areas in less than 30 years, making such environment even more vulnerable to environmental risks such as climate change forcing and seismic hazards. Urban resilience to environmental and structural risks and damages has become an urgent issue to be faced by means of tailored strategies involving the whole multidisciplinary engineering-based skills, such as structural health monitoring together with environmental and microclimate monitoring of the built environment in the indoors and outdoors. This course will bridge these key topics by means of an exhaustive comprehensive and consistent approach, giving the students the proper tools to focus on urban resiliency, structural safety and wellbeing affected by anthropogenic actions, responsible for local climate change such as urban heat islands. Acknowledged scientists from the East Coast and NYC area, research centers and public administration representatives will participate as lectures. Field visits and experimental activities in Manhattan will be carried out during the program weeks.

Full Course Program

Opening workshop on July 22nd + 2 weeks of lectures July 22nd-August 2nd, 2019

Topic 1: Wellbeing in the urban environment

Urban climate issues and outdoor wellbeing of urban population
Urban canopy, big data analysis, citizen science, mesoscale climate assessment
Mitigation strategies for urban climate change resiliency

Topic 2: Smart technologies for structural safety

Fundamentals of structural identification for SHM
Fundamentals of SHM and smart structures
Smart sensing technologies for SHM

Total number of lecturing hours: 48 in 10 days

2 outdoor visits in construction fields and urban monitoring areas

Invited lecturers:

Elie Bou Zeid (Princeton University), Simon Laflamme (IOWA State University), Mazzino Porfiri (NYU), Masoud Ghandehari (NYU CUSP), Prathap Ramamourthy (CCNY), Austin Downey (University of South Carolina), Francesco Cappa (LUISS Guido Carli), Gian Marco Revel (Politecnica delle Marche), Ryan Wang (Northeastern University), Seymour Spence (University of Michigan), Huiming Yin (Columbia University) and others

Organized by H2CU - For more info, please contact the scientific committee:

Filippo Ubertini filippo.ubertini@unipg.it (Univ. Perugia)
Massimiliano Gioffré massimiliano.gioffre@unipg.it (Univ. Perugia)
Anna Laura Pisello anna.pisello@unipg.it (Univ. Perugia)
Federica Rosso federica.rosso@uniroma1.it (Univ. Sapienza)

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Opening workshop – July 22nd, 2019 - 08:30 am – 1:30 pm

8:30 am – Welcome, greetings and registration (A.L. Pisello - UNIPG)

9:00 am - Course presentation, Logistics and final assignment (A.L. Pisello - UNIPG)

9:10 am - The Urban resilience issue from multiperspective research eyes (A.L. Pisello - UNIPG)

9:30 am - Urban resilience for cultural heritage preservation (M. Giofrè - UNIPG)

10:00 am - Urban resilience and big data analytics in New York (M. Ghandehari – NYU CUSP)

10:45 am - EU research and tech transfer toward resilient built environment (G.M. Revel – UNI
POLIMARCHE)

11:30 am - Urban resilience in dynamic systems (M. Porfiri - NYU)

12:00 pm - Urban resilience in citizen science (F. Cappa – LUISS Guido Carli)

12:30 pm - Urban resilience for structural safety and security (F. Ubertini - UNIPG)

1:00 pm - Closing remarks (F. Ubertini - UNIPG)



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SAPIENZA
UNIVERSITÀ DI ROMA



United Nations
Educational, Scientific and
Cultural Organization



UNITWIN Network in
Global Pharmacy
Education Development

Urban resilience in a changing world: energy, safety and wellbeing challenges

Weekly Program 1/2 - 20 hours

LECTURE
1

by prof. Massimiliano Giofrè (University of Perugia) July 23rd, 2019 09:00 am – 11:00 am
Fundamentals of structural identification for SHM
Case studies in ancient bridge architectures in Italy

LECTURE
2

by prof. Seymour M.J. Spence (University of Michigan) July 23rd, 2019 11:00 am – 1:00 pm
Resilience modeling of coastal communities against hurricanes

LECTURE
3

by prof. Anna Laura Pisello (University of Perugia) July 24th, 2019 09:00 am – 11:00 am
Fundamentals of urban wellbeing: Urban Heat Island and Urban Noise Island
Microclimate analysis in urban areas: cultural heritage preservation,
tourism resilience, wearable sensing techniques for citizens' active participation

LECTURE
4

by prof. Gian Marco Revel (Università Politecnica delle Marche) July 24th, 2019 11:00 am – 1:00 pm
New sensing techniques for indoor wellbeing and environmental sustainability
in the built environment: a European perspective

LECTURES
5-6

by prof. Revel (Università Politecnica delle Marche) and prof. Pisello (UNIPG) July 24th, 2019
2:00 pm – 6:00 pm Field visit to a construction site in NYC by Focchi Group (Solar Carve Tower)

LECTURE
7

by prof. Elie Bou Zeid (Princeton University) July 25th, 2019 09:00 am – 11:00 am
Urban canopy models and urban climate studies in the US
Heat waves and energy implications

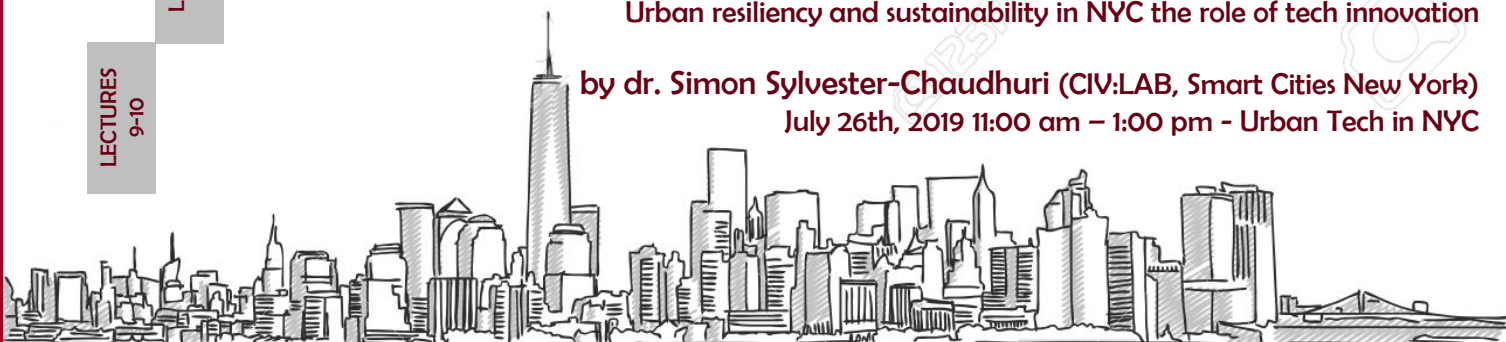
LECTURE
9

by prof. Prathap Ramamurthy (CUNY) July 25th, 2019 11:00 am – 1:00 pm
Influence of urban materials and morphology on the surface energy
budget and air quality: investigations in New York City

LECTURES
9-10

by dr. Joe Silver (Urban Future Lab / ACRE incubator) July 26th, 2019 09:00 am – 11:00 am
Urban resiliency and sustainability in NYC the role of tech innovation

by dr. Simon Sylvester-Chaudhuri (CIV:LAB, Smart Cities New York)
July 26th, 2019 11:00 am – 1:00 pm - Urban Tech in NYC





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Weekly Program 2/2 - 23 hours

by prof. Filippo Ubertini (University of Perugia) July 29th, 2019 09:00 am – 11:00 am
Fundamentals of smart sensing technologies for SHM

by prof. Huiming Yin (Columbia University) July 29th, 2019 11:00 am – 1:00 pm
Emerging Technologies and Applications of Building Integrated Photovoltaic Thermal Systems

by prof. Simon Laflamme (Iowa State University) July 29th, 2019 2:00 pm – 4:00 pm
Smart multifunctional materials and techniques for SHM of
infrastructures and wind energy systems

by prof. Austin Downey (University of South Carolina) July 29th, 2019 4:00 pm – 6:00 pm
Solutions for Mesoscale monitoring

by dr. Federica Rosso (Sapienza Università di Roma) July 30th, 2019 09:00 am – 11:00 am
Novel and traditional materials for energy retrofit and wellbeing in urban areas:
Building envelope solutions and performance analysis

by prof. Ryan Wang (Northeastern University) July 30th, 2019 11:00 am – 01:00 pm
Urban resilience: human mobility and social sustainability
in the era of climate change

by dr. Francesco Cappa (LUISS Guido Carli) July 30th, 2019 02:00 pm – 4:00 pm
The role of big data and citizen science in innovation
practice toward environmental sustainability

by dr. Federica Rosso (Sapienza Università di Roma) July 31st, 2019 09:00 am – 11:00 am
Environmental degradation of architectures due to climate change
Building conservation issues and retrofit strategies

by dr. Roberto Barone (Salini-Impregilo) July 31st, 2019 11:00 am – 1:00 pm
Urban resilient infrastructure: the experience of Copenhagen Cityringen

by dr. Anna Laura Pisello and dr. Federica Rosso July 31st, 2019 2:00 pm – 6:00 pm
Discussion around multi-sphere urban resilience
Presentation of final assignments by groups

Visits to experimental fields and construction fields (on July 24th, August 1st - 2nd around NYC area) - TBD

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Short BIOs

The scientific and organizing committee

Massimiliano Giofrè (University of Perugia)



Massimiliano Giofrè is associate professor at University of Perugia and he is chair of the graduate programs in civil engineering and building engineering and architecture. During his Ph.D. Massimiliano was visiting researcher at Cornell University (USA) and he was associate professor at Syracuse University School of Architecture (USA). His teaching interests focus on structural mechanics, computational mechanics and probability theory for earthquake engineering. His main research interests cover random structural response, structural identification and monitoring, conservation and retrofit of cultural heritage with sustainable materials, masonry structures, dynamic response of building to wind flows. His research efforts have been recognized by the best paper award in 2006 and worthy of mention paper in 2002 from the Italian Association of Wind Engineering.

Anna Laura Pisello (University of Perugia)



Anna Laura Pisello is a building engineer (Politecnico di Milano) and PhD in Energy Engineering (University of Perugia). She has been visiting researcher at Columbia University, Virginia Tech, CUNY, Lleida University. She is currently professor of environmental applied physics in Perugia and visiting research collaborator at Princeton University, with the national qualification as associate professor since 2017. She authored more than 120 papers about building physics, investigating new smart materials for the built environment, human wellbeing in the indoors and outdoors, local climate change mitigation techniques, such as urban heat island countermeasures and cultural heritage resilience and conservation. She coordinated the Environmental Applied Physics lab at UNIPG where she is engaged in conducting and driving research within the framework of a number of Horizon 2020 European funded projects starting from 2013. She has been awarded by 8 international academic recognitions in 2013-2018 and member of the New York Academy of Sciences.

Federica Rosso (Sapienza Università di Roma)



Federica Rosso is a Postdoctoral research fellow at Sapienza University of Rome, Italy, Dept. of Civil, Construction and Environmental Engineering. She received the M.Sc. in Architectural Engineering (with honors) and the PhD in Architectural and Urban Engineering. She has been visiting research scholar at New York University, Tandon School of Engineering (USA). Her research interests are related to passive strategies for the energy performance of buildings, towards Urban Heat Island mitigation; natural cool materials; intrinsic characteristics of construction materials and elements towards energy savings and outdoor comfort improvement; thermal and visual comfort; her works on these topics have appeared on international scientific journals, such as Building and Environment, Construction and Building Materials, Energy and Buildings, Renewable energy, Sustainability.

Filippo Ubertini (University of Perugia)



Born in 1982, Filippo Ubertini is a Full Professor in the Department of Civil and Environmental Engineering at University of Perugia, Italy, where he teaches Advanced Structural Design. Graduated cum laude in Civil Engineering from University of Perugia in 2005, he received his PhD in Civil Engineering from University of Pavia in 2009. He was visiting scholar at Columbia University in 2008. His research is mainly focused on structural health monitoring, with emphasis on smart nanocomposite materials and vibration-based methods and applications to earthquake engineering and cultural heritage structures. Currently, he is coordinating the research teams of University of Perugia in two Horizon 2020 projects and in two national PRIN projects. He is Editorial Board member of Shock and Vibration, Advances in Civil Engineering, Mathematical Problems in Engineering and Sensors. He has been recipient of prizes and awards.

Invited lecturer and local hosting organization

Masoud Ghandehari (New York University)



Masoud Ghandehari serves on the Faculty of Civil and Urban Engineering at the NYU Tandon School of Engineering and is an associate faculty at the NYU Center for Urban Science and Progress. He received B.Sc. at Columbia University in Civil Engineering & Applied Mechanics, M.Sc. at Mc Gill University in Civil Engineering and PhD at Northwestern University in Civil and Environmental Engineering. His research focus is on urban systems engineering and the application of advanced instrumentation and data analysis targeting the aging, health and performance of infrastructure systems. Through the application of sensing, and modeling, he works on methodologies that generate data on the interaction of physical, natural and human systems in cities. His research in optical spectroscopy, sensing, imaging, and data analytics has led to the development of applications and technologies suitable for diverse environments and multiple scales; ranging from the molecular to the urban landscape.

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Short BIOs Invited lecturers

Elie Bou Zeid (Princeton University)

Professor of Civil and Environmental Engineering and Director, Program in Environmental Engineering and Water Resources, Civil and Environmental Engineering. He got his Ph.D. in Environmental Engineering at Johns Hopkins University in 2005. Professor Bou-Zeid's research focuses on combining numerical, experimental, and analytical tools to study the basic dynamics of flow and transport in environmental systems. Boundary layer Meteorology, the study of dynamics and modeling of flow and transport in the thin (~1 km) layer of air near the earth surface, is a particular focus of his group. Most human activities and engineered systems are concentrated in this Atmospheric Boundary Layer; in addition, its dynamics are very important for surface-atmosphere couplings and for global atmospheric dynamics. He got several awards such as the E. Lawrence Keyes Jr./Emerson Electric Co. Faculty Advancement Award in 2011, the Prize of the "Fondation Latsis Internationale" for best research work at the Ecole Polytechnique Federale de Lausanne in 2009 et al.



Gian marco Revel (Università Politecnica delle Marche)

Gian Marco Revel is associate professors of mechanical measurements at University Politecnica delle Marche in Italy. He is vicerector for European research and key member of EU panels and the ECTP platform. He participates and coordinates more than 10 large multidisciplinary grants supported by EU commission about energy efficiency in buildings, indoor thermal comfort analysis and wellbeing in the built environment. He is author of more than 100 publications and several successful patents. He is the scientific consultant of FOCCHI Group, one of the larges and prestigious advanced façade companies worldwide.



Simon Laflamme (Iowa State University)

Simon Laflamme is the Waldo. W. Wegner Professor in Civil Engineering in the Department of Civil, Construction, and Environmental Engineering at Iowa State University. He holds a Courtesy Appointment in the Department of Electrical and Computer Engineering, and is an Associate Director of the Center for Nondestructive Evaluation. He received his Ph.D in Structures and Materials from the Massachusetts Institute of Technology, and was granted the Early Achievement in Research Award by Iowa State University in 2017. Simon is currently leading research efforts funded by the National Science Foundation (NSF) and Air Force Office of Scientific Research (AFOSR). He is a member of the editorial boards of Measurement Science and Technology, and Sensors. His research yielded a textbook on Structural Motion Engineering, four U.S. patents, and more than 150 articles in the areas of Structural Health Monitoring, Smart Structures and Systems, and Structural Control.



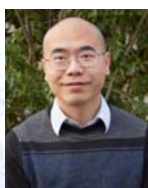
Prathap Ramamurthy (CUNY City College of New York)

Prathap Ramamurthy is an Assistant Professor at the Department of Mechanical Engineering at CUNY City College of New York. He is also an affiliated faculty at NOAA CREST center. His field of interest is in environmental fluid dynamics, particularly understanding and representing urban boundary layer processes. His lab uses both observational and numerical techniques to understand the urban environment. Prior to his appointment at CCNY, he was an associate research scholar at Princeton University. He also serves in the science committee of New York City's Urban Heat Island initiative, run by the Mayor's Office of Resiliency.



Ryan Wang (Northeastern University)

Ryan Qi Wang is an Assistant Professor in the Department of Civil and Environmental Engineering, Northeastern University and the Associate Director of Research on Social Media at the Boston Area Research Initiative (BARI). He is interested in the interplay between data science and computational social science. His research focuses on two interrelated areas: human movement perturbation under the influence of natural and manmade disasters, and mobility equality in big cities. Before joining in Northeastern, Ryan was a postdoc fellow at the Department of Sociology, Harvard University. He received my Ph.D. degree from the Department of Civil and Environmental Engineering at Virginia Tech. During his time at Virginia Tech, he was also the first Ph.D. Fellow at BioBuild, an interdisciplinary program, and a Via Teaching Fellow. He obtained his M.S. in Construction Management from Michigan State University and B.S. in Chemical Engineering from Tianjin University (China).



Roberto barone (Salini-Impregilo)

Roberto Barone is a Civil Engineer and Architect with a Master's Degree from the University of Perugia (2012). He was a visiting student at CUNY – Baruch College during his Master thesis focusing on network energy efficiency in buildings as well as thermal behavior assessment through dynamic simulation, and evaluation of derivative Inter-Building impact on indoor thermal performance. After a short collaboration at University of Perugia, he started his international work experience in various countries such as France, England, Finland and Denmark working for architectural firms with responsibilities ranging from concept design to architectural development, detail design, materials analysis and client interface. In 2014 he founded his design company, LEAD Design, which won the first prize in 2015 for the design of a new prototype Zero Energy Air Traffic Control Tower (NextTower ENAV International Competition). Since 2015 he has been working in Copenhagen as Site Manager first and on Architecture Finishes and Quality Inspector Coordination for Salini-Impregilo for the new metro line, the Cityring, which consists of 14km of railways and seventeen underground stations.



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Short BIOs: Invited lecturers

Simon Sylvester-Chaudhuri (Global Futures Group)

Simon is a Managing Partner at Global Futures Group spearheading products and programs driving urban innovation as well as the executive director of Civ:Lab, a 501(c)(3) dedicated to scaling solutions for cities globally. Simon is also a Strategic Advisor to the US Department of Commerce and the International Trade Administration on Smart Cities. Simon teaches as an Adjunct Professor at NYU's Center for Global Affairs and founded Urban Data NYC - NYC's largest smart city Meetup (+1,000 members). Simon served on the founding group of the UN's Digital Technologies for Sustainable Urbanization Network and holds an MS in Global Affairs from NYU where he was the O'Mara Energy Fellow, an MSc in International Business Economics from the Westminster Business School and a BS in Economics and Philosophy from the University of Sussex.



Joe Silver (Urban Future Lab / ACRE at NYU Tandon School of Engineering)

Joe Silver is the Director of Programs at Urban Future Lab / ACRE at NYU Tandon School of Engineering. Joe joins the Urban Future Lab from the CUNY Building Performance Lab, where he worked on measurement and verification for new technology demonstrations. He has also worked as a research consultant for the smart city consulting firm, Global Futures Group. He helps run the UrbanData.NYC meetup group and likes to play street hockey in his spare time. Joe holds a BA in Environmental Science from New York University and an MS in Urban Sustainability from the City College of New York.



Maurizio Porfiri (New York University)

Maurizio Porfiri is a Professor in the Department of Mechanical and Aerospace Engineering at New York University Tandon School of Engineering. He received M.Sc. and Ph.D. degrees in Engineering Mechanics from Virginia Tech, in 2000 and 2006; a "Laurea" in Electrical Engineering (with honors) and a Ph.D. in Theoretical and Applied Mechanics from the University of Rome "La Sapienza" and the University of Toulon (dual degree program), in 2001 and 2005, respectively. He is engaged in conducting and supervising research on dynamical systems theory, multiphysics modeling, and underwater robotics. Maurizio Porfiri is the author of more than 250 journal publications and the recipient of the National Science Foundation CAREER award. He has been included in the "Brilliant 10" list of Popular Science and his research featured in major media outlets, including CNN, NPR, Scientific American, and Discovery Channel. Other significant recognitions include invitations to the Frontiers of Engineering Symposium and the Japan-America Frontiers of Engineering Symposium organized by National Academy of Engineering; the Outstanding Young Alumnus award by the college of Engineering of Virginia Tech; the ASME Gary Anderson Early Achievement Award; the ASME DSCD Young Investigator Award; and the ASME C.D. Mote, Jr. Early Career Award.



Seymour M.J. Spence (University of Michigan)

Seymour Spence is assistant professor at University of Michigan, with a Ph.D. at University of Florence and TU Braunschweig, Germany in 2009 and a master at University of Perugia, Italy. His main research interests lie in the areas of system and component reliability and performance-based design (PBD), reliability-based design optimization (RBDO), probabilistic modeling and propagation of uncertainty, wind engineering and experimental wind tunnel testing, topology optimization, aerodynamic shape optimization, data-driven modeling and design strategies. He is member of Associate Member, American Society of Civil Engineering (ASCE), of the Italian Association of Wind Engineering (ANIV) and the Center of Research on Structural Aerodynamics and Wind Engineering (CRIACIV) at the University of Florence. He has been awarded with several international recognitions, e.g. Japan Association for Wind Engineering (JAWE) Award for Publishing, 2013, Tuition fellowship, Cornell University, graduate school, 2007, ADISU fellowship, University of Perugia, 2003 - 2005.



Francesco Cappa (LUISS Guido Carli)

Postdoctoral research fellow at LUISS Guido Carli University, Department of Business and Management. He holds a PhD in Management from LUISS Guido Carli University, and during his PhD Francesco has been visiting researcher at the New York University Tandon School of Engineering (USA), and Pace University Seidenberg School of Computer Science (USA). His main research interests are in the areas of Organization and Innovation, with a particular focus on crowd involvement (i.e. crowdsourcing, citizen science, crowdfunding). His papers have appeared in Business Horizons, Journal of Environmental Management, Journal of the Association for Information Science and Technology, Sustainability, PloS One, Energy. He was awarded the second best doctoral thesis prize during WOA Annual Conference 2018; finalist for the Best Student Paper Award at R&D Management 2016. He is the recipient of the Best Paper Award at EURAM Conference 2018.



Austin Downey (University of South Carolina)

Dr. Downey is assistant professor at the Mechanical Engineering in the College of Engineering and Computing since 2018. He got his PhD at Iowa State University after visiting periods at University of Perugia. He got several awards such as Research Excellence Award, Department of Mechanical Engineering, Iowa State University, 2018, the Best Paper Award at the 4th International Electronic Conference on Sensors and Applications (ECSA-4) in 2017, and Graduate Research Award, Department of Mechanical Engineering, Iowa State University in 2017. His research focuses on enhancing the safety and serviceability of structures through structural health monitoring and control. Topics include the investigation of algorithms enabling condition assessment, characterization of sensors, and design and development of structural control systems.



Huiming Yin (Columbia University)

Dr. Huiming Yin is an Associate Professor in the Department of Civil Engineering and Engineering Mechanics at Columbia University. His research focuses on modern structural materials and designs for energy efficient, durable infrastructure. His group has developed comprehensive research approaches to test, simulate and analyze material behavior at macro-, micro-, and nano- scales, and participated in interdisciplinary research projects covering advanced materials, mechanics, structures, green technologies, and nondestructive testing. He received the NSF CAREER Award in 2010. He founded the Pao Sustainable Engineering and Materials Laboratory, which is located at Poughkeepsie, NY, and serves the Site Director of NSF IUCRC Center for Energy Harvesting Materials and Systems.

