Norman Foster Institute
on Sustainable Cities

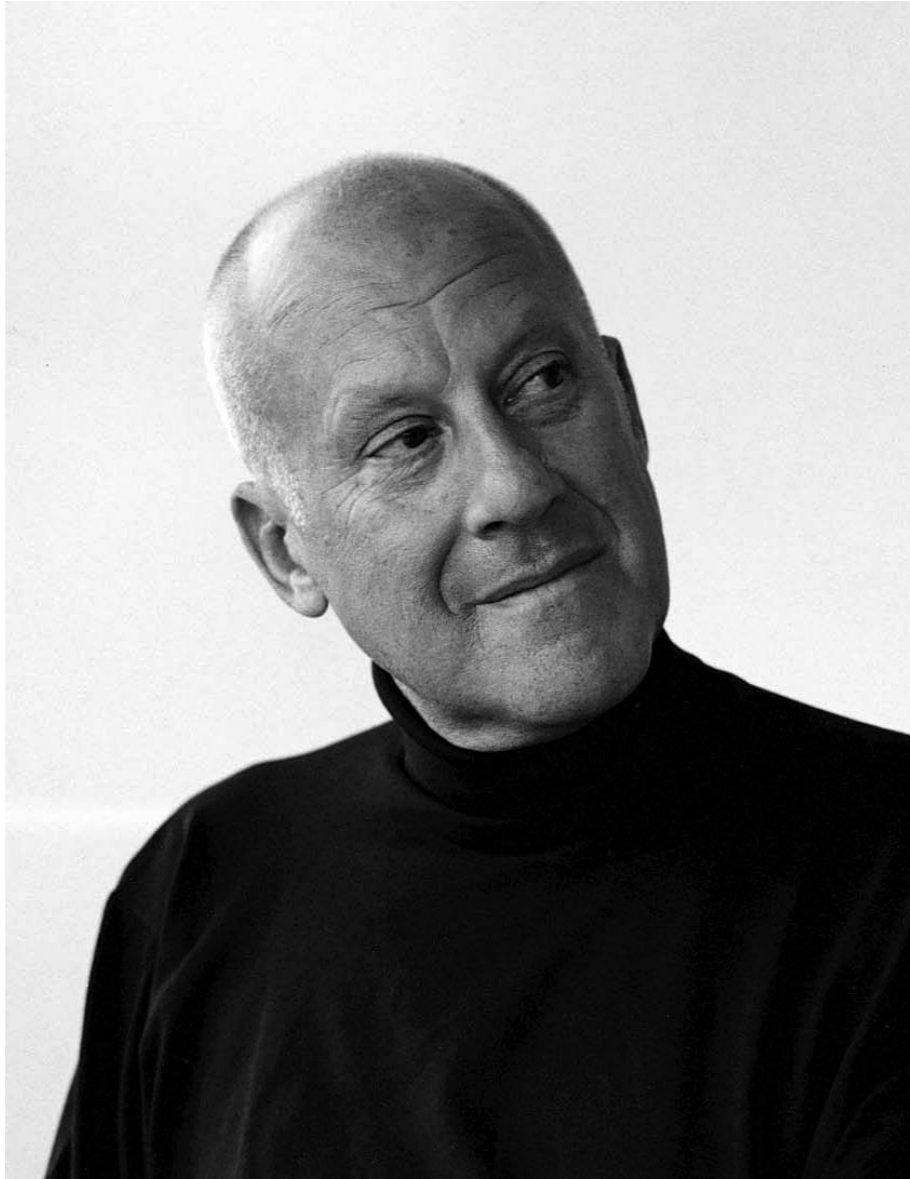# Programme Breakdown

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01
Introduction
by Norman Foster

01.

Introduction
by Norman Foster

Norman Foster
NFI Co-Director
President of the Norman Foster Foundation
Founder and Executive Chairman of Foster + Partners

The future of our society is the future of our cities—they are our greatest invention.

This institute, in a time of climate change, is addressed to those who wish, through practice or education, to improve the quality of life in cities worldwide. In that spirit, the course will combine practical on-site experience with academic input from the foundation's network of international experts. These range from university professors to property developers.

The course begins with tools and skills that can be used to address wide-ranging issues of cities, such as leadership, advocacy, communication, presentation, diagramming, mapping and the understanding and interpretation of data. These could be applicable to cities from Asia, the Middle East, South and North America to Africa, Europe and Oceania, as well as informal settlements and suburbia.

The curriculum then narrows down to three pilot cities that scholars will visit to engage directly with their planners and managers. For study purposes, neighbourhoods have been selected in each city to raise awareness of the issues that affect the living standards for those who live or visit there.

Typical issues include carbon footprints, density, mix of uses, equality and affordability, walkability, place-making, townscape and landscape, public and private transport, politics and economics, energy, recycling, consultation, interest groups and decision making.

Several of these many issues will be distilled to create a small number of well-defined project assignments which will be addressed by the scholars working on site and in the studio, either in teams or individually. In this multidisciplinary approach, the scholars will use the most up-to-date digital tools in the quest to improve a sustainable quality of life.

In this first edition of the course, the pilot cities will be European, although the methodical approach will be adaptable to other kinds of cities. Towards the end of the year, the scholars will present their findings to the city administration with an emphasis on advocacy and presentation skills. The lessons from these real-life experiences will be documented by film and other media, culminating in a public event. On the basis that historically cities learn from each other, it will be important for the scholars to explore the relevance of their conclusions in the wider context of global cities.

The course is like an hourglass; starting wide in its scope, then narrowing down to focus on tangible issues that can be quantified and addressed, and finally, opening up to a wider debate.

02
About the NFI

02.

About the NFI

The creation of the Norman Foster Institute (NFI) follows from the success of the Norman Foster Foundation's (NFF) programme of workshops, which have been running since its launch in 2017, bringing together experts from academia, practice and consulting to engage with top graduates from around the world.

The programmes of the institute will link to the Sustainable Development Goals (SDGs) of the United Nations, which has recognised the NFF as one of its Centres of Excellence.

The first NFI initiative will be a one-year Programme on Sustainable Cities. Time will be divided between classroom, studio and on-site experience within pilot neighbourhoods and with city planners and administrators.

Language
English

Campus
Madrid, Spain

Length
1 year

Mode of Study
Full time

Format
In person

Dates
Jan-Dec 2024

Aimed at

This programme is intended for unconventional thinkers seeking a holistic approach to the future design and management of cities.

It is open to all graduate and postgraduate scholars, as well as professionals in the fields of Anthropology, Architecture, Arts, Computer Science, Construction, Data Analytics, Design, Economics, Engineering, Environment, Geography, History, Law, Mathematics, Public Policy, Sociology, Transportation, Urbanism and other related disciplines.

International Certification

The NFI will provide a certificate of completion for the Programme on Sustainable Cities, signed by the Co-directors Norman Foster, President of the Norman Foster Foundation and Advocate to the United Nations Forum of Mayors, and Kent Larson, Director of the City Science group at the Massachusetts Institute of Technology (MIT) Media Lab.
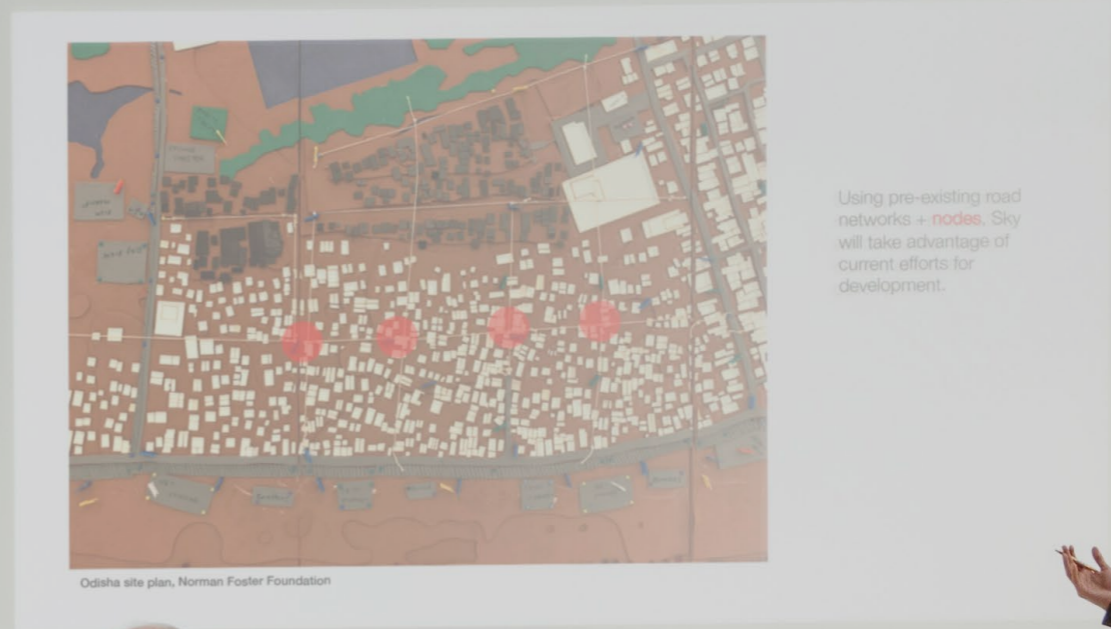
Programme Features

- *Learning*. Scholars will train using advanced tools which are applicable to diverse types of global cities.

- *Network*. Scholars will be introduced to the Norman Foster Foundation's network of experts, practitioners, civic leaders and alumni.

- *On-site experience*. Scholars will focus and work on three European cities, although the techniques used will have a wider application beyond Europe. They will engage directly with city leaders, administrators and communities.

Scholarships

To further foster diversity within its programme, the NFI awards partial and full scholarships to talented applicants in need of financial support, based on merit, distinctive competencies, background and/or academic excellence.

03
Programme
Summary

Norman Foster Institute
NFI on Sustainable Cities

03.

Programme Summary

36 weeks

| Stage I Foundations 4 weeks | A global, in-depth study of the history, governance, ethics and metrics of sustainability in cities. |

| Stage II Transformations 14 weeks | A high-level vision of transformation challenges and opportunities for sustainable cities. |

● **Transformation Challenges**

The scholars identify key transformation challenges for the pilot cities.

● **Pilot City Visits**

The scholars visit the pilot cities and workshop with the city representatives.

| Stage III Interventions 18 weeks | A project-based testing of implementation strategies adapted to the pilot neighbourhoods. |

● **Project Development**

Scholars develop proposals for interventions and test their implementation through technical workshops with experts.

● **Final Presentations & Film Screening**

Presentation of the students' proposals to the cities' mayors and representatives.

Objectives

The main focus of the NFI Programme on Sustainable Cities is to train scholars from different disciplines in the sustainable development of cities with strategies for the future. Scholars will explore how to:

● Understand strategies for measuring the environmental, social and economic performance of a city, its buildings and infrastructure.

● Study the history of different kinds of cities, including informal settlements and suburbia.

● Know mechanisms for governance and transformation of communities.

● Lay out clear environmental strategies to tackle climate change impact, such as the goal to limit CO_2 emissions to 2.5 tons per person, per year in cities.

● Incorporate the Sustainable Development Goals (SDGs) into local sustainability and climate action plans.

● Explore challenges and opportunities that address density, walkability, mobility, diversity, affordability and social equity issues.

● Experience hands-on field work and community engagement.

● Propose urban strategies focusing on neighbourhoods.

● Develop communication, presentation, leadership and advocacy skills.

● Use advanced simulation tools to test their implementation strategies.

● Combine human-centred and data-driven design in projects and relate them to a global context.

Structure

The 36-week programme consists of three stages—*Foundations*, *Transformations* and *Interventions*, with time divided between classrooms, cities and studios.

● *Foundations* consists of an in-depth study of the concepts and processes necessary to understand a city, from history and governance to the ethics and metrics that define sustainable cities. Special emphasis will be placed on understanding the 'importance of a place', building upon concepts such as 'townscape/cityscape' as well as different strategies of urban space making.

● *Transformations* provides an understanding of the challenges and opportunities for transformation in each city. It studies six of the layers at which a city could be defined: Climate & Natural Environments, Networks & Mobility, Planning & Building, Resources & Energy, Economy & Social Activity and Culture & the Arts.

● *Interventions* enables ideas that reduce embodied and operational emissions to improve public health and create a new vision for community. This stage is dedicated to testing a range of strategies for sustainable improvement in each field for the pilot neighbourhoods.

The NFI Lab

As part of its programme, the NFI has an innovative laboratory that supports the scholars in the development of sustainability strategies for the pilot cities. The NFI Lab brings together recent technologies such as artificial intelligence, machine learning, augmented reality and interactive interfaces together with data-driven and evidence-based design methods to allow students to explore, test and evaluate their interventions.

The lab will be continuously developing data models for the pilot cities, mapping the critical layers of transformation and allowing students to question the digital twins of the cities on an interactive dashboard. This could be described as a 'control room' for the cities. The lab's software will be developed as an open-source and open-access framework that will be continuously growing alongside the work of the institute. It will be accessible to users outside the programme, serving as a publicly accessible toolkit for sustainable cities' interventions.

04
Structure

04.

Structure
Foundations

Stage I – Foundations

The first four weeks of the programme consist of an in-depth study of the concepts and processes necessary to understand a city. Through seminars by experts followed by brainstorming and round-table debate with the academic body on relevant themes and pilot cities, scholars will engage with the foundations of a city.

Skills Courses

Each week there will be classes that teach the methods that students will need to address the topic of the week.
The three skills courses that will be given throughout this stage are:

Sustainable Policies Framework	Historical Research Methods	Leadership Skills
Sustainable Development Goals Green building standards EU taxonomy	Archives and sources Cartography Global history	Governance Ethical boundaries Participatory processes

- Opening and programme breakdown.
- Keynote lectures.
- Pilot cities introduction and assignment.

- Climate change law framework.
- Sustainable Development Goals.
- Urbanisation and sustainable urban development at the local, national and global level.
- Urban metrics, data-driven measurements.

- Global history of cities and planning.
- Post-colonial perspective on urban morphology.
- Ecological impacts and technology in urban history.
- Cities, health and pandemics through history.

- Public policies.
- City management.
- Informal settlements overview.
- Civil rights and discrimination.

Introduction

The introduction week will be devoted to an introduction to the programme with keynote lectures from the co-directors and academic council. Scholars will be introduced to and trained in communication and presentation skills. They will be assigned to their cities and groups, and begin to document the programme through film and other media.

Sustainability & Frameworks

Scholars will be introduced to the criteria of sustainability and will develop a critical perspective on sustainable frameworks and acquire a more nuanced approach to them. They will identify the characteristics of diverse kinds of cities and debate global urbanisation in a time of climate change.

History & Technology

Scholars will gain awareness of the history and diversity of urban settlements across different continents. They will learn how to read both old and contemporary cartography to be able to assess sustainable urban heritage policies and practices.

Governance & Ethics

This section starts with a comprehensive study of the role of public policies, private interests and city management from an ethical perspective. The role of politics will be examined in issues of equality, especially related to the provision and distribution of affordable housing. The issue of informal settlements will be covered—their evolution and strategies for their transformation. For broad application, specialist contributors will explore the processes of consultation in a bottom-up approach compared with traditional models from the past.

Norman Foster Institute
on Sustainable Cities

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Structure
Transformations

Stage II – Transformations

12 Weeks + 2 Weeks of Visits

The second stage of the programme will last for twelve weeks and will be devoted to the layers of transformations of the city, essential skills and project development work. This stage will culminate with preparation and visits to the pilot cities with a focus on neighbourhoods. Scholars will study and debate these issues to create a small number of well-defined project assignments in the form of challenges and opportunities for neighbourhoods in each city.

Seminars present the six key layers at which a city can be interrogated. Each layer will have a duration of two weeks in which the scholars will identify key transformation challenges for the pilot cities.

- **Climate & Natural Environments** will address issues of climatology, ecosystems, water and environmental politics to set frameworks on climate, topography, vegetation, carbon footprint and living systems.

- **Networks & Mobility** will address issues around the complexity and balance of transportation systems, mobility and human behaviour patterns in urban areas. This will open discussion on matters such as hubs, public/private transport, walkability or borders.

- **Planning & Buildings** will address issues of bottom-up developments, housing, health and regenerative architecture in order to focus on master plans, density, affordability, townscape and place-making.

- **Resources & Energy** will address issues of energy, water governance, circular economy and food production in order to introduce subjects such as grids, recycling and upcycling, waste management and sanitation.

- **Culture & the Arts** will address issues of public art, art in the city, arts and the sciences and art communities in order to challenge matters of tourism, historic neighbourhoods, mix of uses and digitisation.

- **Economy & Social Activity** will address issues of urban economics, politics, demographics and catalytic communities and social services in order to tackle questions of equality, diversity, circular economy and interest groups.

- **Pilot city visits.** Scholars will visit the pilot cities and workshop with the city representatives. Field work plays a central role in the project development, overcoming distances between planning and site, proposal and inhabitants, intervention and stakeholders. Visits include:

  - Transformation, challenges, presentation and feedback.
  - Experience and field work within pilot neighbourhoods: observing, walking, interviewing, recording, collecting and filming.
  - Community engagement and development of outreach skills.
  - Identification of neighbourhoods to study and create improvements.

Skills Courses

Throughout Stage II, skills courses will teach technical skills that scholars will need to develop their future projects. The three skills courses that will be given throughout this stage for twelve consecutive weeks are:

Urban Analytics I	Research & Communication	Innovation & Entrepreneurship
QGIS	Research methodologies & ethics	Business models
Python	Archives & sources	Fundraising
Data preparation	Dissemination & publishing	Feasibility & benchmarks
Data modelling	Presenting	Scaling up
Machine leaning	Mapping theory & graphics	Incubators & accelerators

![Norman Foster Institute on Sustainable Cities](NFI logo)

04.

Structure
Interventions

Stage III – Interventions

12 Weeks + 6 weeks of Project Development

The third stage of the programme will focus on the development of project proposals for pilot neighbourhoods and testing strategies for improvement through hands-on technical workshops and skills courses. Focusing on tangible solutions for the issues studied in the previous stage, the scholars will develop, test and quantify the impact of their proposals, opening up to a wider debate. **Technical Workshops** will have a duration of two weeks each and will be devoted to the six key layers.

Skills Courses

Stage III courses target technical skills and tools that scholars will use to develop and test their project proposals.
The three skills courses that will be given throughout this stage for twelve consecutive weeks are:

- **Climate Analysis & Nature-based Solutions** workshops will focus on microclimate modelling and simulation, thermal comfort, extreme weather events and flooding models, as well as modelling nature-based solutions, green buildings frameworks and biodiversity analyses.

- **Networks, Graphs & Transport Models** workshops will focus on street networks and weighted graphs, accessibility, walkability and traffic modelling and simulation, as well as space syntax methodologies and agent-based multimodal transport models.

- **Computational Planning & Land Use Models** workshops will focus on parametric, generative and performance-driven urban design models as well as land use change models and density optimisation methods.

- **Energy Models & Life Cycle Analysis** workshops will focus on urban energy models and grids, emissions modelling and positive energy districts frameworks, as well as life cycle analysis, water and waste management and circular economy models.

- **Media & Engagement** workshops will focus on interactive spaces, urban art interventions, large scale installations and inclusive art, as well as mixed-reality models and metaverse discourses..

- **Socioeconomic & Demographic Models** workshops will focus on socioeconomic models, spatial growth modelling, spatial economics and attractiveness calculators, as well as spatial welfare analysis and models of diversity and inclusion.

Project Development and Presentations to the Mayors

Through technical workshops oriented towards testing proposed strategies for sustainable improvement at each layer, strategies will be selected for implementation in each pilot neighbourhood.

Scholars will present their projects to the mayors or civic leaders representing the three selected cities.

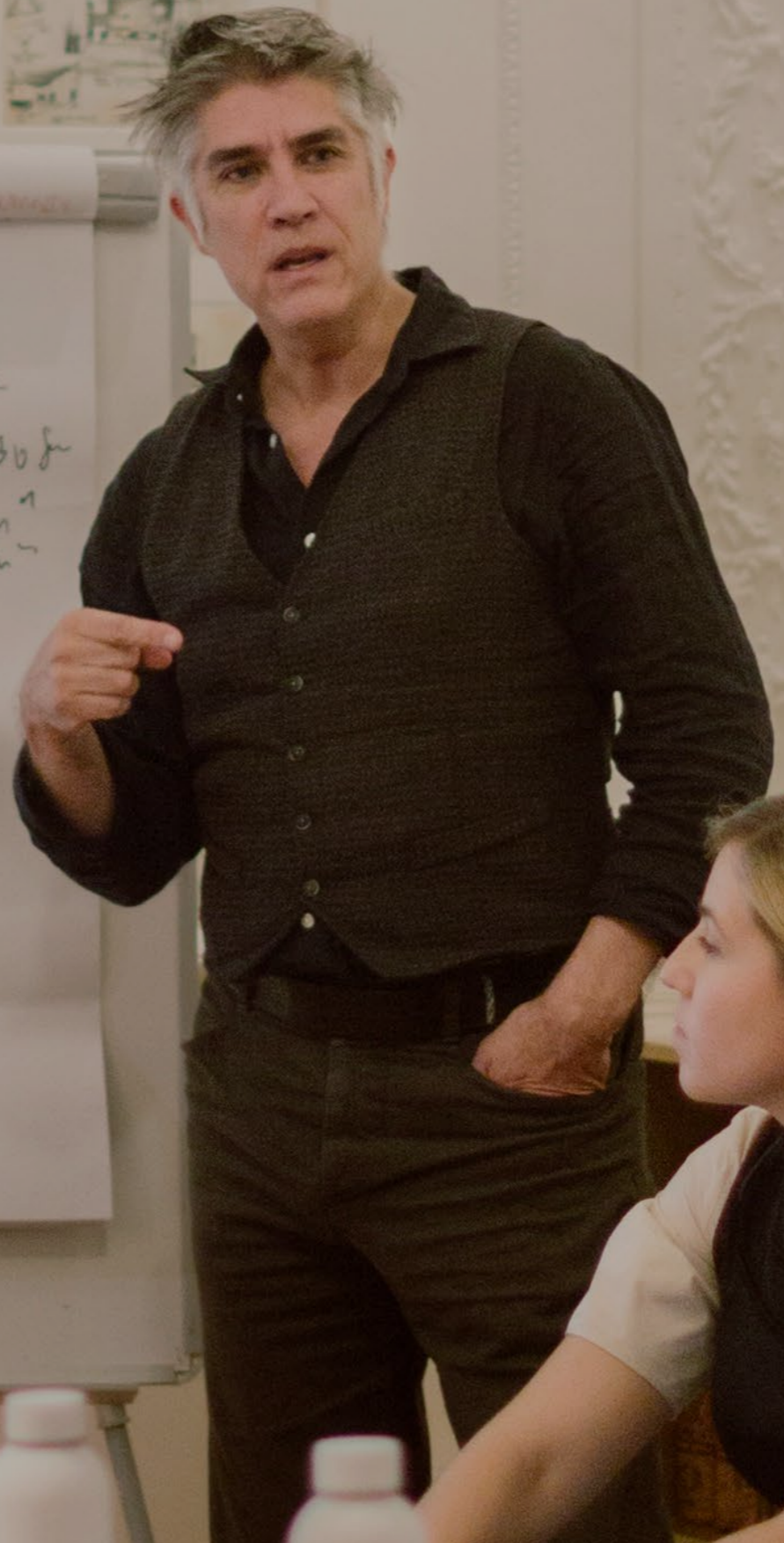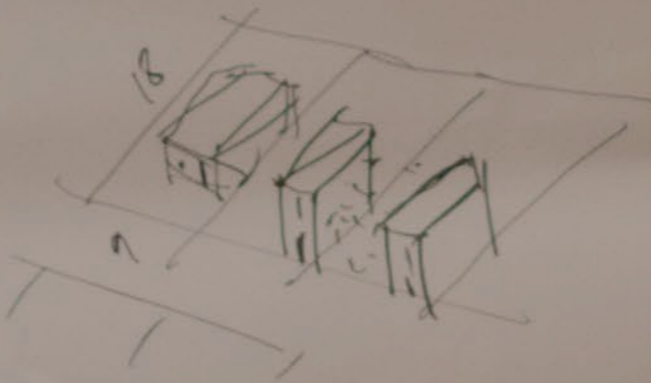| Urban Analytics II	Leadership & Project Planning	Engagement & Outreach
Network analysis Statistical aggregations Data mining Data visualisation Augmented reality	Team management Risk taking and decision making Collaborative project planning Agile project development	Stakeholder outreach Public participation Crowdfunding Social media management Marketing and promotion

05
Faculty

05.

Academic Council

Norman Foster | NFI Co-Director
Founder and Executive Chairman, Foster + Partners, London, United Kingdom;
President, Norman Foster Foundation, Madrid, Spain; Advocate to the United Nations Forum of Mayors

Edgar Pieterse | NFI Provost
Founding Director, African Centre for Cities (ACC), University of Cape Town, Cape Town, South Africa

Dava Newman | NFI Honorary Dean
Director, Massachusetts Institute of Technology (MIT) Media Lab, Cambridge, MA, United States

Kent Larson| NFI Co-Director
Director, City Science Group, Massachusetts Institute of Technology (MIT) Media Lab, Cambridge, MA, United States

Alejandro Aravena
Executive Director, ELEMENTAL; ELEMENTAL Copec Chair, Universidad Católica de Chile, Santiago, Chile

Deborah Berke
Dean, School of Architecture, Yale University, New Haven, CT, United States

Vishaan Chakrabarti
Founder and Creative Director, Practice for Architecture and Urbanism (PAU), New York, NY, United States

Beatriz Corredor
Chairwoman, Redeia; Former Ministry of Housing, Madrid, Spain

Óscar Fanjul
Vice Chairman, Ferrovial; Former Chairman and CEO, Repsol, Madrid, Spain

Elena Foster
Founder and CEO, Ivorypress; Vice President, the Norman Foster Foundation, Madrid, Spain

Ian Goldin
Director, Oxford Martin Research Programme, University of Oxford, Oxford, United Kingdom

Francis Kéré
Founder of Kéré Architecture and Kéré Foundation, Berlin, Germany

05.

Programme Chairs

Joseph G. Allen
Director, Healthy Buildings Program, T. H. Chan School of Public Health, Harvard University, Cambridge, MA, United States

Luis M. A. Bettencourt
Inaugural Director, Mansueto Institute for Urban Innovation, University of Chicago, Chicago, IL, United States

Frédérick Bordry
CERN Honorary Member, Special Advisor to the CERN; DG and Former CERN Director for Accelerators and Technology, Meyrin, Switzerland

Laila Iskandar
Former Minister of State; Co-Founder, CID CONSULTING, Cairo, Egypt

Mitchell Joachim
Co-Founder, Terreform ONE, New York, NY, United States

Sarah Kenderdine
Professor of Digital Museology, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

Peter B. de Menocal
President and Director, Woods Hole Oceanographic Institution (WHOI), Falmouth, MA, United States

Gil (Guillermo) Penalosa
Founder and Chair, 8 80 Cities and Cities for Everyone, Toronto, ON, Canada

Stuart Smith
Director, Arup, Berlin, Germany; Board Member, Holcim Foundation, Zurich, Switzerland

Tim Stonor
Managing Director, Space Syntax, London, United Kingdom

Hans Ulrich Obrist
Artistic Director, Serpentine Galleries, London, United Kingdom

Maria Vassilakou
Former Vice Mayor; Founder of Vienna Solutions, Vienna, Austria

06
Calendar

06.

Calendar

2024

2024	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Module	
	01.01	02.01	03.01	04.01	05.01	06.01	07.01		
	08.01	09.01	10.01	11.01	12.01	13.01	14.01		
	15.01	16.01	17.01	18.01	19.01	20.01	21.01		
Week 1	22.01	23.01	24.01	25.01	26.01	27.01	28.01	Introduction	S I-Foundations
Week 2	29.01	30.01	31.01	01.02	02.02	03.02	04.02	Sustainability & Frameworks	
Week 3	05.02	06.02	07.02	08.02	09.02	10.02	11.02	History & Technology	
Week 4	12.02	13.02	14.02	15.02	16.02	17.02	18.02	Governance & Ethics	
Week 5	19.02	20.02	21.02	22.02	23.02	24.02	25.02	Climate & Natural Environments	S II-Transformations
Week 6	26.02	27.02	28.02	29.02	01.03	02.03	03.03		
Week 7	04.03	05.03	06.03	07.03	08.03	09.03	10.03	Networks & Mobility	
Week 8	11.03	12.03	13.03	14.03	15.03	16.03	17.03		
Week 9	18.03	19.03	20.03	21.03	22.03	23.03	24.03	Buildings & Planning	
Break	25.03	26.03	27.03	28.03 Public Holiday	29.03 Public Holiday	30.03	31.03		
Week 10	01.04	02.04	03.04	04.04	05.04	06.04	07.04	Buildings & Planning	S II-Transformations
Week 11	08.04	09.04	10.04	11.04	12.04	13.04	14.04	Resources & Energy	
Week 12	15.04	16.04	17.04	18.04	19.04	20.04	21.04		
Week 13	22.04	23.04	24.04	25.04	26.04	27.04	28.04		
Week 14	29.04	30.04	01.05 Public Holiday	02.05 Public Holiday	03.5	04.05	05.05	Culture & the Arts	
Week 15	06.05	07.05	08.05	09.05	10.05	11.05	12.05	Economy & Social Activity	
Week 16	13.05	14.05	15.05	16.05	17.05	18.07	19.05		
Week 17	20.05 Visit preparation	21.05	22.05	23.05	24.05	25.05	26.05	Visit to 3 Cities	
Week 18	27.05	28.05	29.05	30.05	31.05	01.06	02.06	Visit to 3 Cities	
Week 19	03.06	04.06	05.06	06.06	07.06	08.06	09.06	Climate Analysis & Nature-based Solut.	S III –Interventions
Week 20	10.06	11.06	12.06	13.06	14.06	15.06	16.06	Networks, Graphs & Transport Models	
Week 21	17.06	18.06	19.06	20.06	21.06	22.06	23.06	Comput. Planning & Land Use Models	
Week 22	24.06	25.06	26.06	27.06	28.06	29.06	30.06	Energy Models & Life Cycle Analysis	

Week

Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Module	
Week 23	01.07	02.07	03.07	04.07	05.07	06.07	07.07	Media & Engagement	S III–Int.
Week 24	08.07	09.07	10.07	11.07	12.07	13.07	14.07	Socio-economic & Demographic Models	
Week 25	15.07	16.07	17.07	18.07	19.07	20.07	21.07		Project Develop.
Week 26	22.07	23.07	24.07	25.07	26.07	27.07	28.07		
Break	29.07	30.07	31.07	01.08	02.08	03.08	04.08		
Break	05.08	06.08	07.08	08.08	09.08	10.08	11.08		
Break	12.08	13.08	14.08	15.08	16.08	17.08	18.08		
Break	19.08	20.08	21.08	22.08	23.08	24.08	25.08		
Break	26.08	27.08	28.08	29.08	30.08	31.08	01.09		
Week 27	02.09	03.09	04.09	05.09	06.09	07.09	08.09	Climate Analysis & Nature-based Solut.	S III–Interventions
Week 28	09.09	10.09	11.09	12.09	13.09	14.09	15.09	Networks, Graphs & Transport Models	
Week 29	16.09	17.09	18.09	19.09	20.09	21.09	22.09	Comput. Planning & Land Use Models	
Week 30	23.09	24.09	25.09	26.09	27.09	28.09	29.09	Energy Models & Life Cycle Analysis	
Week 31	30.09	01.10	02.10	03.10	04.10	05.10	06.10	Media & Engagement	
Week 32	07.10	08.10	09.10	10.10	11.10	12.10	13.10	Socioeconomic & Demographic Models	
Week 33	14.10	15.10	16.10	17.10	18.10	19.10	20.10		Project Develop.
Week 34	21.10	22.10	23.10	24.10	25.10	26.10	27.10		
Week 35	28.10	29.10	30.10	31.10	01.11 Public Holiday	02.11	03.11		
Week 36	04.11	05.11	06.11	07.11	08.11	09.11	10.11	Presentation to the Mayors and Closing Act	
	11.11	12.11	13.11	14.11	15.11	16.11	17.11		
	18.11	19.11	20.11	21.11	22.11	23.11	24.11		
	25.11	26.11	27.11	28.11	29.11	30.11	01.12		
	02.12	03.12	04.12	05.12	06.12	07.12	08.12		
	09.12	10.12	11.12	12.12	13.12	14.12	15.12		
	16.12	17.12	18.12	19.12	20.12	21.12	22.12		
	23.12	24.12	25.12	26.12	27.12	28.12	29.12		

Norman Foster Institute on Sustainable Cities

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Norman Foster Institute
on Sustainable Cities

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