



**Network Science Institute**  
at Northeastern University  
London



**Discipline: Network Science**  
**Northeastern University London Fully Funded PhD Scholarship**

***Complex Systems, Networks and City Data Science  
to study urban interactions and dynamics.***

Northeastern University London > Network Science

Deadline: 1 April 2024

Funded PhD Project (UK or International Students)

Funding provider: Northeastern University London (NU London)

Subject areas: Complex Systems, City Science, Computational Social Science, Network Science, Data Science, Physics

Project start date: 1 October 2024

Supervisors (\*lead):

- [Riccardo Di Clemente](#)\* (Complex Connections Lab, Network Science Institute, Northeastern University London)
- [Esteban Moro](#) (Network Science Institute, Northeastern University)
- [Jonathan Rock Rokem](#) (University of Kent)

Aligned programme of study: PhD in Network Science

Mode of study: Full-time

### **About the Complex Connections Lab**

The [Complex Connections Lab](#) is a research laboratory based at Northeastern University London dedicated to studying the complex social connections that govern human behaviour and interactions in cities and online. The Lab focuses on the study of the digital traces we left behind to capture human behaviour and social dynamics through the lens of Network Science, Complexity Theory, and Data Science.

The team is made up of researchers in fields such as data science, computer science, and mathematics, that work together to develop innovative methods and tools to analyse large-



**Network Science Institute**  
at Northeastern University  
London



scale data sets and gain insights into the underlying principles of the complex connections we live within.

### **About the Network Science Institute (NetSI)**

In 2023, [NetSI established a new institute hub](#) in London, UK at Northeastern University London. The new NetSI in London was created to advance research, education, and innovation centred around network science. The hub in London will also facilitate the development and growth of collaborations and partnerships within the UK and across Europe and US. The London hub, along with others in the US, is part of the NetSI Global program which is dedicated to engaging and integrating regional network science communities and partnering with regional talent, institutions, ecosystems of innovation.

The PhD student, even though based in London, will be a member of the Network Science Institute (NetSI), which has offices in Boston MA, Portland MA, and London UK. NetSI, founded in 2014, has emerged as a world leader of multidisciplinary research communities in the field of network science. NetSI brings together expertise from diverse disciplines, from the physical, information, and social sciences, with the goal to build and expand common, synthesising methodology and theory of networks, and to apply these tools to important societal challenges.

The successful doctoral student will be connected to NetSI's vibrant community, with dozens of externally funded research programs, diverse faculty, and a uniquely skilled pool of fellow doctoral students and postdoctoral researchers across the global network.

### **About Northeastern University London**

As part of a major investment, Northeastern University London (NU London) has multiple, fully-funded PhD studentships available to accelerate its interdisciplinary research in the humanities, social sciences, and computing, maths, engineering and natural sciences. Each scholarship is fully-funded for three and a half years (UKRI rates) and includes full course fees, an annual stipend (including an additional London allowance) and associated costs, such as training.

NU London is both a UK university governed by UK higher education regulations, and the European campus of Northeastern University – a large, top-tier research intensive, Boston-based institution. Founded in 1898, Northeastern University is known for its high-impact research, aimed at solving problems across the globe. Interdisciplinarity, experiential learning, and connection to partners beyond academia are at the heart of the Northeastern University



**Network Science Institute**  
at Northeastern University  
London



ethos. Northeastern received \$230.7m of external research funding in 2022, and is the recognized leader in experience-driven lifelong learning. It has campuses across the United States and Canada (in Boston; Charlotte, North Carolina; Portland, Maine; Oakland, California; San Francisco; Seattle; Silicon Valley; Arlington, Virginia; the Massachusetts communities of Burlington and Nahant; Toronto and Vancouver). Whilst the PhD will be a UK qualification, students will have the opportunity to engage with and visit the Northeastern University network overseas as part of their London-based doctoral studies, providing a truly unique and highly sought-after dimension to their research training.

### **The Project**

The aim is to provide a multidisciplinary framework that will study urban dynamics and human interactions through the lens of the digital fingerprint of the users. Leveraging on passive collected data the PhD students will develop innovative mathematical frameworks that blend techniques from Complex Systems (CS), Machine Learning (ML) and Network Science (NS). The PhD project aims at shedding light on how the different communities interact and live in the city space providing a novel picture of the city dynamics. Our focus lies in uncovering the influence of socio-economic inequality and the structural layout of cities on the mobility patterns of diverse population groups or communities. By identifying economic resilience, the project aims to devise a framework that utilises mobility data to understand the connections between city structure, citizen interactions, businesses, and job opportunities. The candidate will have the opportunity to shape the project and proactively contribute to its development according to their background and personal interests.

#### **The ideal candidate has:**

- MSc (or equivalent) in Complex Systems, Networks, Data Science, Computational Social Science, Urban Data Science, Physics, Mathematics, Computer Science, or related subjects.
- Proficiency in programming languages relevant to research (e.g., Python, R, SQL, Julia).
- Experience with software development/maintenance tools, libraries, and frameworks (e.g., Pandas, scikit-learn, Spark, Git).
- Fluency in English, both spoken and written.
- Highly collaborative spirit, personal initiative, and genuine interest in interdisciplinary teamwork.
- Excellent personal and good communication skills.
- An inquiring mind and the desire to challenge themselves.
- Enthusiasm for interdisciplinary applied research.
- Experience of, or willingness to learn, data visualisation techniques, and vectorial image design for presentation and project websites.



**Network Science Institute**  
at Northeastern University  
London



The successful candidates will benefit from a brand-new campus on the banks of the River Thames next to Tower Bridge. This is an interdisciplinary, vibrant research environment with international collaboration and networking opportunities and dedicated research space. It will form the hub of a highly experienced, multi-institution supervisory team from NU London, Northeastern University and the University of Kent. In addition, successful candidates will benefit from the unique connection to the wider Northeastern University network in North America, providing a range of additional research opportunities and learning resources.

Shortlisted candidates will be interviewed in April 2024. Candidates are welcome to contact the NU London supervisor with informal enquiries before the application deadline:

[riccardo.diclemente@nulondon.ac.uk](mailto:riccardo.diclemente@nulondon.ac.uk))

### **Eligibility**

- Bachelor's degree in a relevant subject - 2:1 or 1st (essential)
- Master's degree in a relevant subject (optional)

### **English Language requirements:**

If applicable – IELTS 7 overall (with a score of at least 6.5 in each individual component) or equivalent.

### **Nationality**

Applications are open to UK and international students. Please indicate if you are likely to require a visa on your application. We are unable to support visa costs.

### **Funding**

This scholarship covers the full cost of tuition fees and provides an annual stipend (set at UKRI rates) with an additional London allowance, for 3.5 years. For the 2024/2025 academic year the total annual stipend is £21,237. Annual increments will be in line with UKRI rates.

### **International travel**

Students will have the opportunity to optionally travel to Northeastern University in North America to further their research training and experience.

### **How to Apply**

Please send a CV and a Covering Letter stating how you meet the requirements and why you are interested in the proposed research project by clicking on [\*\*this link\*\*](#). Please reference your application “**PHDU0224**”