

# Gavin Rolls

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## EDUCATION

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### Northeastern University London

October 2024 - Present

*Ph.D. Network Science*

- PhD Student in the Complex Connections Lab at the Network Science Institute, Northeastern University London
- **Subject Areas:** Complex Systems, Network Science, Urban Dynamics, Urban Morphology, Inequality and Segregation, Data Science, Physics
- **Supervisors:** Dr. Riccardo Di Clemente, Dr. Esteban Moro

### University College London

September 2023 - September 2024

*MSc. Urban Spatial Science*

*Mark: Distinction (71.84%)*

- Student in the Bartlett Centre for Advanced Spatial Analysis
- **Notable Coursework:** Remote Sensing, GIS, Spatial Applications with Big Data, Urban Modelling and Simulation, Quantitative Methods for Spatial Data Science, Urban Systems Theory
- **Thesis:** Predicting Micro-Scale Employment Geographies with Points of Interest (Thesis Mark: Distinction)

### Georgia Institute of Technology

August 2019 - May 2023

*B.S. Computer Science*

*GPA: 3.91 (First Class Honours) / Major GPA: 4.0*

- Graduated Highest Honours with Concentrations in Human Computer Interaction and Information Internetworks
- **Awards:** Stamps President's Scholar – Georgia Tech's premier full-ride merit scholarship. 40 selected from 20,000 applicants. Selected based on the pillars of scholarship, leadership, progress, and service
- **Notable Coursework:** Database Systems, Computer Architecture, Computer Networking, Computer Org. & Programming, Design & Analysis of Algorithms, Statistics & Applications, Applied Combinatorics, Info Visualisation

## SKILLS

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### Spatial Science:

- Experience in spatial analysis with Python (SciPy, NumPy, Matplotlib, Pandas, GeoPandas, scikit-learn, AutoML), R (tidyverse, sp, sf, ggplot2, terra, spatstat), QGIS, Google Earth Engine, (Spatial) SQL, Javascript (D3.js)

### General Computing:

- Python, R, Java, JavaScript, HTML, CSS, Typescript, Angular, SQL, Cypress, React Native, Excel, C, C++, MATLAB

### Development & Presentation Tools:

- GitHub, Git, IntelliJ, Jira, Confluence, Bitbucket, Agile Development, Jupyter, Jenkins, Quarto, L<sup>A</sup>T<sub>E</sub>X

### Speaking & Presentation:

- Extensive experience in extemporaneous speaking and debate – Member of Outstanding Distinction of the U.S. National Debate Association, 1st ranked Lincoln-Douglas debater in Colorado
- Led Agile development team of 6 as Scrum Master
- Lectured as teaching leader (GT 1801) and assistant lecturer (INTA 3232)

## WORK EXPERIENCE

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### Georgia Tech Japan Program in Sustainable Development

May 2023

*Assistant Lecturer and Module Leader*

*Kobe, Japan*

- Delivered lectures on geospatial analysis and remote sensing for urban boundary delineation in *INTA 3232 – Smart & Sustainable Megaregion*. Taught 25 students from multiple U.S. universities at Kobe University
- Created lecture material to teach the fundamentals of geospatial analysis in QGIS and Earth Engine with a focus on the VIIRS sensor platform and non-remotely sensed raster datasets, and conducted GIS exercises to apply taught skills

### Sustainable Megaregions Research Project

February 2021 - May 2023

*Undergraduate Research Assistant*

*Atlanta, Georgia*

- Delineated boundaries of established and emerging megaregions using NASA VIIRS and DMSP datasets in Google Earth Engine
- Designed and coded a data-first megaregions delineation tool with Earth Engine. Used the approach to perform a global search
- Analyzed and aggregated 400+ papers as part of a comprehensive literature review of megaregion literature

### MessageGears

May 2022 - August 2022

*Software Engineering Intern*

*Atlanta, Georgia*

- Worked as a full stack developer on MessageGears' email marketing web app
- Created and implemented novel user interface elements using TypeScript and Angular and Improved application interface with SQL backend using REST API calls
- Wrote unit tests, view tests, and Cypress tests to improve testing coverage across the testing stack

### Paul Easton Basketball

May 2020 - August 2020

*Frontend Developer*

*Denver, Colorado*

- Used React Native/React Navigation to design and build a cross-platform mobile app for Basketball trainers to upload and review customer footage

## PROJECTS

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### Simulating the London Underground

February 2024 - April 2024

*Sole creator*

- Wrote a paper modelling the London Underground which used a modified version of Dijkstra's shortest path algorithm and origin/destination data from Transport for London to estimate commuter flows on each link and identify the most important stations on the system. Paper (with GitHub link) Hosted at <https://gavinrolls.com/londonunderground.html>

### Crowd-sourcing Career Development

February 2022 - March 2022

*Co-creator*

- Wrote a qualitative, human-subjects research paper investigating participants from the Reddit community *r/CSCareerQuestions*
- Investigated how design choices have shaped the community and the different participant archetypes it attracts and how community membership evolves through the legitimate peripheral participation (LPP) framework

### Visualising Mass Shootings in the U.S.

November 2021

*Co-creator*

- Created an interactive graphic of injuries and casualties from mass shootings in the U.S. using D3.js. Hosted at <https://gavinrolls.com/MassShootings/shootings.html>

### Chess Engine

May 2021 - July 2021

*Sole creator*

- Created a chess engine and game visualization with Java. Selected moves with an alpha-beta pruning minimax search algorithm

## PUBLICATIONS

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**Co-Author** - Woodall et al. (2023) The Megaregion – Forms, Functions, and Potential? A Literature Review and Proposal for Advancing Research. *International Journal of Urban Sciences* 28:1, pp. 82-104.  
<https://doi.org/10.1080/12265934.2023.2189156>

**(Pending Review) Co-Author** - Challenges in Using Satellite Data for Social Science, An Exploratory Case Study

## EXTRACURRICULARS

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**Georgia Tech Tour Guide** January 2021 - May 2023

*Lead Guide*

*Atlanta, Georgia*

- Assisted prospective students and families in their college process by providing campus tours as an ambassador to the Institute
- Fall 2022 Tour Guide of the semester – selected to model tour procedure to new guides

**Georgia Tech Transport & Infrastructure Committee** August 2020 - May 2023

*Member*

*Atlanta, Georgia*

- Advanced student interests in transportation by lobbying for improved bus service and cycling accessibility on campus

**Stamp's Scholars - Special Topics** August 2021 - December 2021

*Teaching Leader*

*Atlanta, Georgia*

- Assistant instructor for GT 1801, an orientation course for first year President's Scholars at Georgia Tech

**Personal Sport** 2015 - Present

*Amateur Ultra-Distance Cyclist, Runner, & Triathlete*

- Passionate amateur endurance athlete - completed self supported ultra-marathons and ultra-cycling events
- Participated in the 2022 Ironman Triathlon World Championships (3.8km swim, 180km bike, 42.2km run), U.S. Collegiate Triathlon National Championships, and UK Collegiate Duathlon National Championships
- Cycled 4,500km from Naples, IT to Edinburgh, UK (excluding English Channel) to cross Europe by bicycle