NANDINI IYER

Data Science Researcher
Mobility Analytics

+44 7936 641728
na.iyer@northeastern.edu
London, England
github.com/nandini10
linkedin.com/nandiniiyer

SUMMARY

Data science researcher currently exploring spatial inequalities and urban systems through large-scale data analysis and NLP methods. Previous experience building recommendation systems in production environments and analysing millions of research publications to understand how academic mobility impacts institutional productivity. Have applied ML techniques across diverse domains, from understanding movement patterns and classifying housing characteristics to predicting user preferences. Skilled at extracting meaningful insights from complex datasets and communicating findings to both technical and non-technical stakeholders.

TECHNICAL SKILLS

Languages: Python, SQL, R, JavaScript, HTML, CSS

ML/Analytics: scikit-learn (familiar with XGBoost, Random Forests, LSTM), Word2Vec, pytorch, polars, NetworkX, graph-tool

Infrastructure: Git, Snowflake, PySpark, AWS (EC2/RDS), Docker, MongoDB

Geospatial: H3, osmnx, UrbanAccess, r5r, scikit-mobility, GEE

Visualisation: Tableau, Plotly, D3.js, React

EDUCATION

09/2020 - 04/2024 **PhD in Computer Science** — **University of Exeter, England, United Kingdom**

Specialised in transportation network analysis, socio-demographic inequality spatial data science.

- Analysed spatial inequalities in US public transportation systems, identifying how transit infrastructure constrains low-income residents' access to employment opportunities and services
- Developed comprehensive framework for measuring housing insecurity beyond traditional affordability metrics, revealing correlation between precarious housing situations and longer commute times to high-opportunity employment areas
- Created open-source clustering methodology to identify vulnerable neighbourhoods, providing tools for data-driven urban planning and transit optimisation
- Implemented comparative transit modelling using multiple platforms (UrbanAccess for detailed route analysis, r5r for accessibility measurement), evaluating different algorithmic approaches for travel time estimation
- Presented findings at international conferences (NetSci, IC2S2, CompleNet) and published 2 journal papers centering on mobility, socioeconomic inequality, and accessibility

08/2016 - 12/2019 **Bachelor of Science in Computer Science** — **University of Illinois at Urbana-Champaign, United States of America**

- Graduated in 3.5 years with specialisation in Intelligence and Big Data
- Key courses: Machine Learning, Data Structures, Algorithms, Natural Language Processing, Distributed Systems
- Built distributed file systems and mobile applications, gaining hands-on development experience

EXPERIENCE

04/2024 – present **Postdoctoral Research Assistant** — **Network Science Institute, Northeastern University London**

- Won **NetMob 2024 Data Challenge ($25k data value)** for comparative framework analysing mobility inequality in rural and urban areas across Colombia, Mexico, and India
- Built interactive website to communicate findings from rural-urban mobility inequality research through accessible visualisations
- **Analysed ULEZ policy impact** by comparing routing patterns before/after implementation using location-based services (LBS) data, identifying affected trajectories and quantifying behavioral adaptations to inform urban policy evaluation
- **Created NLP-based approach to mobility analysis**, treating movement trajectories as semantic sequences to identify how neighbourhood function shifts throughout the day and providing crucial insights for understanding and anticipating functional access disparities
- **Partnered with Cuebiq** to evaluate and validate new data products for mobility research applications, including assessing efficacy of ad campaigns.
- **Led technical infrastructure development at NETSI London**, building computational resources (disk setup, data storage, user authentication, GPU integration) and creating comprehensive documentation to provide server access for all researchers
- Actively mentoring 3+ undergraduate and PhD students on diverse projects spanning historical transit evolution analysis and urban vulnerability assessment
- Founded and lead recurring PhD-postdoc knowledge exchange meetings at NETSI London, fostering collaborative research environment
- Successfully organised CCS 2024 Young Researchers Warm-up event, managing end-to-end coordination for emerging scholars

02/2019 – 12/2019 **Software Engineering Intern** **Synchrony Financial**

- Developed recommendation system for clients suggesting both complementary and substitutive products using topic modelling (Latent Dirichlet Allocation) and link prediction
- Combined content-based and collaborative filtering to handle cold start scenarios when facing new products or users.
- Created API hosted on Amazon EC2 to efficiently serve recommendations
- Developed webcam eye-tracker gathering quantitative data to assess design efficacy of advertisements
- Presented findings to clients demonstrating improved product discovery metrics

05/2018 – 08/2018 **Data Science Research Intern** **Florida Institute of Technology (REU)**

- Analysed 30+ years of Computer Science publication data to map academic mobility networks and their impact on institutional research productivity
- Applied Stochastic Block Models to identify collaboration communities and Latent Dirichlet Allocation for topic modelling, revealing misalignment between author-provided ACM categories and actual paper content
- Discovered stable network properties despite exponential growth in CS publications, providing insights into preferential attachment and institutional prestige dynamics
- Built robust entity resolution pipeline processing thousands of author names and institution variants, handling data quality issues in heterogeneous academic databases
- Implemented network centrality measures (betweenness, eigenvector, PageRank) to identify key "bridge" researchers facilitating knowledge transfer between institutions
- Created interactive visualisations using Vega and plot.ly to communicate findings about institutional productivity
- Published findings in peer-reviewed conference proceedings showing how affiliation exchanges affect research output

08/2018 – 02/2019 **HCI Research Assistant** **University of Illinois at Urbana-Champaign**

- Used iterative design practices to study information scent patterns in social media control settings, analysing user decision-making paths
- Evaluated privacy setting norms using mixed-methods approach to understand how different user cohorts (both online and in-person) experience platforms based on perceived privacy control levels
- Contributed to developing website testing framework for measuring how perceived control affects user engagement and platform usage patterns

06/2015 – 08/2015 **Research Intern** **University of California, Santa Cruz**

- Developed Python tools to analyse exoplanet spectra, detecting chemical signatures (CO, CH) across wavelengths
- Automated processing of large-scale spectroscopic datasets for pattern detection
- Research recognised as **semifinalist in 2015 Siemens Competition**

RELEVANT PROJECTS

NLP on Movement Trajectories: Applied Word2Vec to treat mobility sequences as semantic data, identifying patterns in how neighborhood functions shift throughout the day. Explored how mobility patterns align with functional land use to better understand the mechanisms of socio-temporal segregation.
Interactive Data Visualisations: Built interactive website showing mobility inequality across Colombia, Mexico, and India. Developed visualisation platform comparing universities' temporal publication patterns against field averages, identifying which institutions led or lagged with respect to overall research trends.
Policy Impact Analysis: Analysed routing changes before/after London's ULEZ implementation using mobile phone location data. Processed millions of trajectories to identify affected routes and quantify behavioral adaptations.
Research Publication Analysis: Parsed millions of academic papers to understand how researcher mobility between institutions affects scientific productivity. Built data cleaning pipeline with entity resolution for author/institution disambiguation.
Recommendation System: Developed product recommendation system using LDA and link prediction for Synchrony Financial. Created API on AWS EC2 to serve recommendations handling cold-start scenarios.

PUBLICATIONS & RECOGNITION

AWARDS

NetMob 2024 Data Challenge Winner ($25k data value): Best paper for mobility analysis across 3 countries

PUBLISHED

Iyer, N., Menezes, R. and Barbosa, H., 2024. Mobility and transit segregation in urban spaces. Environment and Planning B: Urban Analytics and City Science, 51(7), pp.1496-1512. DOI.

Iyer, N., Menezes, R. and Barbosa, H., 2024. The role of transport systems in housing insecurity: a mobility-based analysis. EPJ Data Science, 13(1), p.49. DOI.

CONFERENCE PAPERS

Iyer, N., Menezes, R. and Barbosa, H., 2024, April. Public Transit Inequality in the Context of the Built Environment. In International Conference on Complex Networks(pp. 203-218). Cham: Springer Nature Switzerland.

Iyer, N., Menezes, R. and Barbosa, H., 2023, March. Network Entropy as a Measure of Socioeconomic Segregation in Residential and Employment Landscapes. In International Workshop on Complex Networks (pp. 26-37). Cham: Springer Nature Switzerland.

Faustino, J., **Iyer, N.**, Mendonza, J. and Menezes, R., 2020, February. Characterizing the dynamics of academic affiliations: a network science approach. In Complex Networks XI: Proceedings of the 11th Conference on Complex Networks CompleNet 2020 (pp. 393-404). Cham: Springer International Publishing.

UNDER REVIEW

Iyer, N., Luca, M. and Di Clemente, R.,2025. Understanding Urban-Rural Disparities in Mobility Inefficiency for Colombia, Mexico, and India. ArXiv preprint available. Under Review at Nature Cities.

IN PROGRESS

Iyer, N., Luca, M., Langle-Chimal, O., González, M. C., and Di Clemente, R. Urban semantic: human mobility reveals dynamic land use functions

CONFERENCE PRESENTATIONS

21 presentations across 8 major conferences (2020-2025): NetSci (2), IC2S2 (2), CCS (3), CompleNet (5), NetMob (5), NetSciX, NetSciUK, Digital Footprints

2 Invited Talks: Graz University of Technology (2025), Data Beers Exeter (2025)

Guest Lecturer: Northeastern University London (January 2026) - "Human Mobility Applications" lecture for Complexity in Social Systems module

Award-winning: NetMob 2024 Data Challenge Winner - Best Paper Award

Special formats: AI UK Demonstration (2025), 1 poster presentation, 2 invited workshop attendances