SAMUEL HEROY

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Quantitative fellow in the federal reserve system working on a rotational quarterly basis primarily in Supervisory Modeling Teams (SMTs). Collaborative, big picture-focused team player with experience working across numerous interdisciplinary teams simultaneously to deliver analytics solutions.

EXPERIENCE

2022-

QUANTITATIVE FELLOWSHIP PROGRAM, FEDERAL RESERVE BANK OF RICHMOND

- Quantitative analyst in Pre-provision net revenue SMT (Q3 2022)
- Quantitative analyst in Wholesale credit risk SMT (Q4 2022)

2021-2022

DATA SCIENCE CONSULANT, THE WORLD BANK

- Co-developed guidance note "Cities on the Move" for strategic use of mobility data across the Bank
- Led analytics for VPU (Vice Presidential Unit) award-winning project "Refugee Monitoring for Reactive Policy" focused on Ukraine forced refugee crisis
- Developed analytics to support economic development projects in Nepal & Costa Rica
- Created an ArcGIS toolbox for road/rail valuation with specific applications in Malawi & Mozambique

2018-2022

POSTDOCTORAL RESEARCH ASSOCIATE, UNIVERSITY OF OXFORD AND UNIVERSITY COLLEGE LONDON (UCL)

- Seasoned record of research publications and media articles/blogs
- Gained research ethical approval for two projects involving safe, legal research use of mobile phone data
- Tutored Oxford BSc courses: *Short Course on Graph Theory*, *Mathematics and Data science for Development*
- Supervised two Oxford MSc theses alongside supervisor Neave O'Clery
- Collaborated with partners across 5 continents within grant program (UK Global Challenges Research Fund)
- Several research policy engagements including leading a virtual workshop on COVID-19 and inequality, as well as collaboration with the Bogotá mayor's office, and an Oxford workshop on research policy interaction
- Organizing team member for semi-annual *Oxford Summer School in Economic Networks*

2011-2013

HIGH SCHOOL MATH TEACHER, METROPOLITAN NASHVILLE PUBLIC SCHOOLS

EDUCATION

2013-2018

PHD IN APPLIED MATHEMATICS, UNIVERSITY OF NORTH CAROLINA

- Thesis: Rigidity Percolation in Disordered Fiber Systems: Theory and Applications (advisor: Peter J. Mucha)
- Instructor of record for *Modern Mathematics*, *Numerical analysis of differential equations laboratory*
- Co-wrote Army Research Office grant (awarded 750k$): "A Network science integrated feedback loop for design of multifunctional polymeric rod-like nanocomposites"
- Volunteer curriculum developer for "Girls Talk Math" (Mathematical Association of America funded camp for local high school students)

2007-2011

BA IN MATHEMATICS, DUKE UNIVERSITY

- President of Duke Red Cross (2010-11) and Vice Chair of Duke Honor Council (2009-11)

SKILLS

- Python, R, Stata, MATLAB, Gephi, SQL, ArcGIS
- Geospatial analysis, network science, data science
- Econometrics
- Version control, cloud-based platforms
- Technical and nontechnical presentations, teaching
- Policy briefs, media articles
- Data visualization
- Novel and big data

PEER REVIEWED PUBLICATIONS

1. Jones, Nicholas, Takahiro Yabe, and Samuel Heroy. Ed. Chris Oates. "Cities on the move: how analysis of human movement patterns can inform resilient, inclusive and sustainable cities. A Technical Guidance Note." *The World Bank* (2022). Publication forthcoming.
2. Buckingham, Emma and Samuel Heroy. "Characterizing assemblage networks among population groups in Early Archaic Sicily." *CAA 2018 Check Object Integrity. Proceedings of the 47th Conference on Computer Applications & Quantitative Methods in Archaeology*. Publication forthcoming.
3. Heroy, Samuel, Dane Taylor, Feng "Bill" Shi, M. Gregory Forest, and Peter J. Mucha. "Rigidity percolation in random 3D rod systems" in *Multiscale Modeling & Simulation* (2022). https://epubs.siam.org/doi/abs/10.1137/21M1401206
4. O'Clery, Neave, Samuel Heroy, François Hulot, and Mariano Beguerisse-Díaz. "Unraveling the forces underlying industrial urban agglomeration." In Handbook on Cities and Networks (Edward Elgin Publishing, 2021). https://www.e-elgar.com/shop/gbp/handbook-of-cities-and-networks-9781788114707.html
5. Heroy, Samuel, Isabella Loaiza, Alex "Sandy" Pentland, and Neave O'Clery. "COVID-19 policy analysis: labour structure dictates lockdown mobility behaviour" in *Journal of the Royal Society Interface* (2021). https://royalsocietypublishing.org/doi/abs/10.1098/rsif.2020.1035
6. Heroy, Samuel, Dane Taylor, Feng "Bill" Shi, M. Gregory Forest, and Peter J. Mucha. "Rigid graph compression: motif-based rigidity analysis for disordered fiber networks" in *Multiscale Modeling & Simulation* (2018). https://epubs.siam.org/doi/abs/10.1137/17M1157271
7. Heroy, Samuel. "Rigidity percolation in disordered fiber systems: theory and applications." PhD diss. The University of North Carolina at Chapel Hill (2018). https://cdr.lib.unc.edu/concern/dissertations/707958117

WORKING PAPERS

1. Heroy, Samuel, Isabella Loaiza, Alex Pentland, & Neave O'Clery. "Are neighbourhood amenities associated with more walking and less driving? Yes, but predominantly for the wealthy." Accepted with minor revisions at *Environment and Planning B: Urban Analytics and City Science.*
2. Heroy, Samuel, Oliver Lock, Maham Faisal Khan, & Nicholas Jones. "The urban spatial dynamics of San José, Costa Rica: case studies using smartphone mobility data." In preparation for *World Bank Policy Research Working Paper Series.*
3. Froy, Francesca, Samuel Heroy, Elvira Uyarra, and Neave O'Clery. "What drives the creation of green jobs, products and technologies in cities and regions? Insights from new research on green industrial transitions." In preparation for *Local Economy: the Journal of the Local Economy Policy Unit*.

MEDIA AND BLOGS

1. Heroy, Samuel. "OPINION: What can cities learn from Colombia's lockdown." *Thomson Reuters Foundation News 2021*. https://news.trust.org/item/20210407082722-yp3ji/ and at https://www.peak-urban.org/blog/what-can-cities-learn-colombias-lockdown
2. Heroy, Samuel, Isabella Loaiza, Alex Pentland, and Neave O'Clery. Ed. Francisco Obando. "Commute and mobility patterns evidenced from telecommunications data can inform reopening strategies after COVID-19 lockdowns" *PEAK Urban* 2020.https://www.peak-urban.org/sites/default/files/2020-10/peak_scoping-brief_commute_mobility.pdf
3. Heroy, Samuel. "What does research impact mean? A dilemma for early career researchers." *PEAK Urban* 2019. Available at https://www.peak-urban.org/blog/what-does-research-impact-mean-dilemma-early-career-researchers
4. Heroy, Samuel, Isabella Loaiza, & Alex Pentland. "Big data for understanding mass migration." *Angle Journal* 2019. Available at https://anglejournal.com/article/2019-10-big-data-for-understanding-mass-migration-trends/ and cross-posted for University of Oxford Medium at https://medium.com/oxford-university/big-data-for-understanding-mass-migration-trends-ab820109327b