Rafael Prieto-Curiel | Curriculum

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Education

University College London
Doctorate degree in Applied Mathematics *2014–2018*
Mathematical models of crime, fear, migration and road accidents

University College London
Masters in Statistics *2013–2014*
Spatial statistics, simulation

Instituto Tecnológico Autónomo de México (ITAM)
Degree in Applied Mathematics *2004–2009*

Experience

Vocational

Complexity Science Hub **Vienna**
Faculty Member *2022-current*
Principal Investigator of Societies Moving (migration). Principal Investigator of Cities Moving (mobility).

World Bank (WB) **Washington, D.C.**
Consultant *2023-current*
Consultant for the Global Solutions Water

Organisation for Economic Co-operation and Development (OECD) **Paris**
Consultant *2015-current*
Consultant for the Sahel and West Africa Club (SWAC). Spatial interaction models, food economy, migration, science of cities, data and big data.

Aleph **Mexico City**
Scientific advisor *2018-current*
Scientific advisor for crime, and mobility data.

University of Oxford / EAFIT / UCL **Oxford / Medellín / London**
Postdoctoral Research Assistant *2018-2022*
PEAK Urban at the Mathematical Institute and the Centre for Advanced Spatial Analysis - Complex systems and data modelling for urban development

Emergency Attention Centre **Mexico City**
Director in Strategic Analysis *2010-2013*
(Centro de Atención a Emergencias y Protección Ciudadana de la Ciudad de México) Crime prediction models. Policing and police strategy design. Police allocation and resources optimisation. Evaluation models and systems.

Consultoría Passel **Mexico City**
Executive Consultant *2009*
Finance analysis. Image analysis.

Science Communication

Punto Decimal Mx - General science communication media outlet **London**
Founder and Editorial Director *2016-current*
On-line science communication website. Available on-line www.puntodecimal.mx/

Chalkdust – Mathematics magazine **London**
Founder and Editorial Director *2015-2018*
Six editions published with 18,700 copies printed. Available on-line www.chalkdustmagazine.com .

Laberintos e Infinitos – Mathematics magazine   **Mexico City**
Editorial Director   *2008-2009*
Four editions published with 10,000 copies printed. Available on-line `www.laberintos.itam.mx`.

Publications

Vocational...

- Prieto-Curiel, R., & Ospina, J.P. (2024). The ABC of mobility. Environment International 185 (2024): 108541.

- Prieto-Curiel, R., and Borja-Vega, C. The Influence of Urban Morphology on Water Scarcity. arXiv preprint arXiv:2402.06676 (2024).

- Dyer, GMC, and others. Exploring the nexus of urban form, transport, environment and health in large-scale urban studies: a state-of-the-art scoping review. Environmental Research (2024): 119324.

- Prieto-Curiel, R., Ali, O., Dervić, E., Karimi, F., Omodei, E., Stütz, R., Heiler, G., & Holovatch, Y. The diaspora model for human migration. PNAS nexus 3, no. 5 (2024), 178.

- Prieto-Curiel, R., Campedelli, G.M & Hope, A. (2023). Reducing cartel recruitment is the only way to lower violence in Mexico. Science, 381(664)

- Prieto-Curiel, R., Patino, J. E., & Anderson, B. (2023). Scaling of the morphology of African cities. Proceedings of the National Academy of Sciences, 120(9)

- Patino, J. E., Prieto-Curiel, R., & Anderson, B. (2023). Continental-scale Analysis of Urban Issues Based on Open Data: Green Spaces, Urban Form and the Future Sustainability of Cities in Africa. Territorios.

- Prieto-Curiel, R., & Kondor, D. (2023). Arguments for building The Circle and not The Line in Saudi Arabia. npj Urban Sustainability, 3(1), 35.

- Patino, .E., Prieto-Curiel, R. & Anderson, B. Análisis de problemáticas urbanas a escala continental basado en datos abiertos: espacios verdes, forma urbana y sostenibilidad futura de las ciudades en África. Territorios 49.49-Esp. (2023).

- Walther, O. J., Prieto-Curiel, R., Padron, J., & Scheuer, J. (2023). Mapping the Travel Geography of the 9/11 Network. The Professional Geographer, 1-15.

- Prieto-Curiel, R., Davis, E. & Walther, O. Detecting trends and shocks in terrorist activities. PLoS one 18.9 (2023): e0291514.

- Prieto-Curiel, R., Heo, I., Schumann, A., & Heinrigs, P. (2022). Constructing a simplified interurban road network based on crowdsourced geodata. MethodsX, 9, 101845.

- Prieto-Curiel, R., Schumann, A., Heo, I. & Heinrigs, P. (2022). Detecting cities with high intermediacy in the African urban network. Computers, Environment and Urban Systems.

- Anderson, B., Patiño, J. E. P., & Prieto-Curiel, R. (2022). Boosting African cities' resilience to climate change: The role of green spaces. West African Papers, No. 38, OECD Publishing, Paris

- Prieto-Curiel, R., González Ramírez, H., & Bishop, S. (2022). A Ubiquitous Collective Tragedy in Transport. Frontiers in Physics.

- Prieto-Curiel, R., Cabrera-Arnau, C. & Bishop, S. (2022). Scaling beyond cities. Frontiers In Physics.

- Prieto-Curiel, R., Quiñones Domínguez, M., Lora E. & O'Clery, N. (2022). Mobility between Colombian cities is predominantly repeat and return migration. Computers, Environment and Urban Systems.

- Hong, A., Baker, L., Prieto-Curiel, R., Duminy, J., Buswala, B., Guan, C. & Ravindranath, D. (2022). Reconciling big data and thick data to advance the new urban science and smart city governance. Journal of Urban Affairs.

- Prieto-Curiel, R. (2021). Weekly Crime Concentration. Journal of Quantitative Criminology, 1-28.

- Prieto-Curiel, R., González Ramírez, H., Quiñones Domínguez, M., & Orjuela Mendoza, J. P. (2021). A paradox of traffic and extra cars in a city as a collective behaviour. Royal Society Open Science, 8(6), 201808.

- Prieto-Curiel, R., Opinion Dynamics and the Inevitability of a Polarised and Homophilic Society. In Theory of Complexity-Definitions, Models, and Applications. IntechOpen (2021).
- Prieto-Curiel, R., & González Ramírez, H. (2021). Vaccination strategies against COVID-19 and the diffusion of anti-vaccination views. Scientific Reports, 11.
- Prieto-Curiel, R., Patino, J. E., Duque, J. C., & O'Clery, N. (2021). The heartbeat of the city. Plos One
- Prieto-Curiel, R., Walther, O., & O'Clery, N. (2020). Uncovering the internal structure of Boko Haram through its mobility patterns. Applied Network Science.
- Prieto-Curiel, R., Cresci, S., Muntean, C. I., & Bishop, S. (2020). Crime and its fear in social media. Palgrave Communications
- Cabrera-Arnau, C., Prieto-Curiel, R., & Bishop, S. (2020). Uncovering the behaviour of road accidents in urban areas. Royal Society Open Science.
- Prieto-Curiel, R., Cabrera Arnau, C., Torres Pinedo, M., González Ramírez, H. & Bishop, S. (2019). A continuous binning for discrete, sparse and concentrated observations. MethodsX.
- O'Clery, N., Prieto-Curiel, R. & Lora, E. (2019). Commuting times and the mobilisation of skills in emergent cities. Applied Network Science.
- Prieto-Curiel, R., Cabrera Arnau, C., Torres Pinedo, M., González Ramírez, H. & Bishop, S. (2019). Temporal and spatial analysis of the media spotlight. Computers, Environment and Urban Systems.
- Prieto-Curiel, R., González Ramírez, H. & Bishop, S. (2018). How random is the location of a road accident?, Plos One
- Prieto-Curiel, R., Pappalardo, L., Gabrielli, L. & Bishop, S. (2018) Gravity and scaling laws of city to city migration, Plos One
- Prieto-Curiel, R. & Bishop, S. (2018), Fear of crime: the impact of different distributions of victimisation, Palgrave Communications
- Prieto-Curiel, R. & Bishop, S. (2017), Modelling the fear of crime, Proceedings of the Royal Society A 473 (2203), 20170156
- Farnham, A. and others (2017). Early career researchers want Open Science. Genome biology, 18(1), 1-4.
- Prieto-Curiel, R., Collignon Delmar, S. & Bishop, S. (2017), Measuring the Distribution of Crime and Its Concentration, Journal of Quantitative Criminology, 1-29
- Prieto-Curiel, R., Heinrigs P. & Heo I. (2017), Cities and Spatial Interactions in West Africa, West African Papers, No. 5, OECD Publishing, Paris
- Prieto-Curiel, R. & Bishop, S. (2016), A metric of the difference between perception of security and victimisation rates, Crime Science, 5(1)
- Prieto-Curiel, R. & Bishop, S. (2016), A measure of the concentration of rare events, Scientific Reports, 6
- Prieto-Curiel, R. & Wilmer, S. (2016), *Muchas emergencias y aún más llamadas* Too many emergencies and even more emergency calls, Miscelánea Matemática, 59
- Prieto-Curiel, R., Wilmer, S., Iniguez S. & Escalante M. (2013), *Análisis Criminal y el uso de cámaras de seguridad en la Ciudad de México* Crime Analysis and the usage of security cameras in Mexico City. Chapter in the book *Buenas Prácticas para el Análisis Delictual en América Latina* Good practices on crime analysis in Latinamerica, published in Santiago, Chile.
- Prieto-Curiel, R. (2010), *El seno y coseno de una matriz.* Matrix sine and cosine, Miscelánea Matemática, 46

Communication

- El ABC de la movilidad (The ABC of mobility) Nexos Magazine, 2024

- Después de los abrazos y los balazos (After the hugs and the gunshots) Nexos Magazine, 2023
- El inventario de la movilidad de México (Mexico's mobility inventory) Nexos Magazine, 2023
- De cuando la televisión se humanizó (When the TV became humanized) Letras Libres, 2021
- Vacunación sin rumbo (Aimlessly vaccination) Reforma, 2021
- Vacunación: tres alertas (Three warnings about the vaccination) Reforma, 2021
- Los retos de la vacuna en México (Challenges concerning the vaccination strategy in Mexico) Reforma, 2021
- La loca resistencia a las vacunas (Why are so many people against vaccination?) Nexos Magazine, 2020
- Why we're adding Black Mathematician Month to our calendars, The Guardian, 2 October 2017
- In Conversation with Andrea Bertozzi, Chalkdust, 4, Autumn 2016
- Fractional Calculus: The Calculus of Witchcraft and Wizardry, Chalkdust, 3, Spring 2016
- ¿Por qué los delitos siempre ocurren en el mismo lugar? (Why does crime always occur in the same places?) Nexos Magazine, 2015
- In Conversation with Artur Avila, Chalkdust, 2, Autumn 2015
- Music Playlists, Facebook and Twitter, Chalkdust, 1, Spring 2015
- En redes te enredas (You got entangled in a net), Laberintos e Infinitos, 33, Autumn 2013
- Lorenz, Gini y muchos delitos (Lorenz, Gini and a lot of crimes), Laberintos e Infinitos, 28, Spring 2012
- Si te quieres volver millonario (If you want to become a millionaire), Laberintos e Infinitos, 25, Spring 2011
- Más spots, ¡menos votos! (More Spots, ¡Less Votes!, collaboration) Nexos Magazine, 380, Summer 2009
- La Ciencia detrás de un balón (The Science Behind a Ball), in collaboration with Prof Claudia Gómez Wulschner, Laberintos e Infinitos, 18, Summer 2009
- El Calendario, algo no tan uniforme ni tan universal (Calendar, Neither so Uniform nor so Universal), Laberintos e Infinitos, 15, Summer 2008
- La cuadratura del círculo (Squaring the Circle), Laberintos e Infinitos, 14, Spring 2008
- Límites geométricos (Geometric Limits), Laberintos e Infinitos, 14, Spring 2008

Others
- PhD students: Ola Ali (2022 - 2025), Carsten Källner (2024 - 2027), Andrea Vismara (2024 - 2027), Guillermo Prieto-Viertel (2024 - 2027)
- MSc students: Qia Chen (2021)
- BSc students: Carlos Castro-Correa (2013)

Grants

- MigraCapax Complex effects of migration patterns on supply capacities - Bundesministerium für Inneres (Federal Ministry of Internal Affairs) – Principal Investigator (2023–2026) [€868,000]
- SoBigData Research Scholarship Consiglio Nazionale delle Ricerche (CNR) – Principal Investigator (2017) [€3,500]

Awards

- Best Contribution (2023) - Conference on Complex Networks (CompleNet)
- Provost's Awards for Public Engagement (2017) - University College London student award nominee (UCL)
- Andrew Rosen Prize - excellence in Applied Mathematics (2016), University College London, Mathematics Department (UCL)

- Certificate with Distinction in MSc in Statistics (2014), University College London, Statistics Department (UCL)
- Certificate with Distinction in Applied Mathematics (2009), Instituto Tecnológico Autónomo de México (ITAM)
- First Place in the Research Award Ex-Itam (2009), Instituto Tecnológico Autónomo de México (ITAM)
- Honorific Mention in the Sotero Prieto Prize (2009), Sociedad Matemática Mexicana (SMM)
- First Place in the Competition "Academia – AMAI" (2008), Asociación Mexicana de Agencias de Investigación de Mercados (AMAI)

Scholarships

- Abbott (Corte) Studentship (2017), University College London, Mathematics Department (UCL)
- Mayer de Rothschild Scholarship (2017), University College London, Mathematics Department (UCL)
- Edwin Power Scholarship (2017), University College London, Mathematics Department (UCL)
- Lighthill Scholarship (2016), University College London, Mathematics Department (UCL)
- JJ Silvester Scholarship (2016), University College London, Mathematics Department (UCL)
- Sir George Jessel Scholarship (2016), University College London, Mathematics Department (UCL)
- Lighthill Scholarship (2015), University College London, Mathematics Department (UCL)
- Conacyt Scholarship (2013 - 2018), full funding, Consejo Nacional de Ciencia y Teconología (CONACYT)