

# Rafael Prieto-Curiel | Curriculum

 [www.rafaelprietocuriel.com](http://www.rafaelprietocuriel.com)

## Education

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### University College London

*Doctorate degree in Applied Mathematics*

2014–2018

Mathematical models of social issues such as migration, crime, fear 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

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### Vocational.....

#### Complexity Science Hub

Vienna

*Postdoctoral Fellow*

2022-current

Modelling mobility, transport, migration, conflict and complex social systems

#### 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*

2018-2021

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/](http://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](http://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](http://www.laberintos.itam.mx).

## Publications

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### Vocational.....

- 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)
- 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. 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.....

- 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.....

- Scaling of City to City Migration, Commuting Flows and Mobility. MSc thesis co-supervisor (UCL), Qia Chen, Summer 2013
- Medidas de eficiencia y heurísticas de mejora de distribución de recursos (Measuring resources distribution and improving heuristics). BSc thesis supervisor (ITAM), Carlos Castro Correa, Summer 2013

## Languages

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**Spanish:** 100%

**English:** 100%

**French:** 40%

## Computer skills

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- R, Python, ArcGIS, Matlab

## Awards

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- Provost's Awards for Public Engagement (2017) - University College London student award nominee
- 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)
- SoBigData Research Scholarship (2017), Consiglio Nazionale delle Ricerche (CNR)
- 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 Tecnología (CONACYT)