

# Dr. Juste Raimbault

## Positions

- Starting Apr. 2021 **Research Fellow**, *Institute for Global Prosperity, UCL, London, UK.*  
*Agent-based modeling informal job markets in Lebanon*
- Since January 2019 **Research Fellow**, *CASA, UCL, London, UK.*  
*Coupling land-use transport interaction models with microsimulation models*
- 2018 **Post-doctoral Researcher**, *Complex Systems Institute - UPS CNRS 3611 ISC-PIF, Paris, France.*  
*Extending methods to explore spatial simulation models*

## Education

- 2015–2018 **PhD in Geography**, *Géographie-cités (UMR 8504 CNRS) / LVMT (UMR-T 9403 IFSTTAR).*  
*Characterizing and Modeling the Co-evolution of Transportation Networks and Territories*
- June 2016 **SFI Complex Systems Summer School**, *Santa Fe Institute.*
- 2012–2014 **MSc Complex Systems Science**, *Ecole Polytechnique (Ingénieur Diplômé).*
- 2013–2014 **MSc Urbanism, Environment, Transportation**, *Ecole Nationale des Ponts et Chaussées.*
- 2010–2012 **BSc**, *Ecole Polytechnique.*

## Journal papers

- Raimbault J., Denis E., Pumain D. (2020). Empowering Urban Governance through Urban Science: Multi-Scale Dynamics of Urban Systems Worldwide. *Sustainability*, 12, 5954. DOI:10.3390/su12155954
- Raimbault J., Broere J., Somveille M., Serna J.M., Strombom E. Moore C., Sugar L., Zhu B. (2020). A spatial agent based model for simulating and optimizing networked eco-industrial systems. *Resources Conservation and Recycling*, 155, 104538. DOI:10.1016/j.resconrec.2019.104538
- Bergeaud, A. & Raimbault, J. (2020). An Empirical Analysis of the Spatial Variability of Fuel Prices in the United States. *Transportation Research Part A: Policy and Practice*, 132, 131-143. DOI:10.1016/j.tra.2019.10.016
- Raimbault, J. (2020). Indirect evidence of network effects in a system of cities. *Environment and Planning B: Urban Analytics and City Science*, 47(1), 138-155. DOI:10.1177/2399808318774335
- Raimbault, J. (2019). Second-order Control of Complex Systems with Correlated Synthetic Data. *Complex Adaptive Systems Modeling*, 7(4). DOI:10.1186/s40294-019-0065-y
- Raimbault, J. (2019). Multi-dimensional Urban Network Percolation. *Journal of Interdisciplinary Methodologies and Issues in Science*, 5(5). DOI:10.18713/JIMIS-180719-5-5
- Raimbault J., Cottineau C., Le Texier M., Le Nechet F. & Reuillon R. (2019). Space Matters: extending sensitivity analysis to initial spatial conditions in geosimulation models. *Journal of Artificial Societies and Social Simulation*, 22(4), 10. DOI:10.18564/jasss.4136
- Raimbault J., Chasset P.-O., Cottineau C., Commenges A., Kosmopoulos C., Pumain D. & Banos A. (2019). Empowering open science with reflexive and spatialised indicators. *Environment and Planning B: Urban Analytics and City Science*, 2399808319870816. DOI:10.1177/2399808319870816
- Raimbault, J. (2019). Exploration of an interdisciplinary scientific landscape. *Scientometrics*, 119(2), 617-641. DOI:10.1007/s11192-019-03090-3
- Raimbault, J. (2018). Calibration of a density-based model of urban morphogenesis. *PloS one*, 13(9), e0203516. DOI:10.1371/journal.pone.0203516
- Bergeaud, A., Potiron, Y., & Raimbault, J. (2017). Classifying patents based on their semantic content. *PloS one*, 12(4), e0176310. DOI:10.1371/journal.pone.0176310

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## Book chapters

- Raimbault, J. & Pumain, D. (2021). Spatial dynamics of complex urban systems within an evolutionary theory frame, forthcoming in *Handbook Entropy, Complexity, Spatial Dynamics: The rebirth of theory*, Reggiani, A., ed., Edward Elgar. [arXiv:2010.1489](#)
- Raimbault, J. (2021). Hierarchy and co-evolution processes in urban systems, forthcoming in *Centralities and Hierarchy of Networks and Territories*, Fen-Chong J., ed., ISTE Editions. [arXiv:2001.11989](#)
- Raimbault, J. (2021). Models for the co-evolution of cities and networks, *Handbook on Cities and Networks*, Rozenblat C., Neal Z., eds., Edward Elgar. In press. [arXiv:1804.09430](#)
- Pumain D., & Raimbault J. (2020) Perspectives on Urban Theories. In: *Pumain D. (ed.), Theories and Models of Urbanization* (pp. 303-330). *Lecture Notes in Morphogenesis*. Springer, Cham. [DOI:10.1007/978-3-030-36656-8\\_16](#)
- Raimbault, J. (2020). Unveiling co-evolutionary patterns in systems of cities : systematic exploration of the SimpopNet model. In *Pumain D. (ed.), Theories and Models of Urbanization* (pp. 261-278). *Lecture Notes in Morphogenesis*. Springer, Cham. [DOI:10.1007/978-3-030-36656-8\\_14](#)
- Raimbault, J. (2020). Relating complexities for the reflexive study of complex systems. In *Pumain D. (ed.), Theories and Models of Urbanization* (pp. 27-41). *Lecture Notes in Morphogenesis*. Springer, Cham. [DOI:10.1007/978-3-030-36656-8\\_3](#)
- Raimbault, J., & Pumain, D. (2019). Methods for Exploring Simulation Models. In *Pumain D. (ed.), Geographical Modeling* (pp. 125-150). Wiley Online Library. [DOI:10.1002/9781119687290.ch5](#)
- Raimbault, J. (2019). An urban morphogenesis model capturing interactions between networks and territories. In *D'Acci L. (ed.), The Mathematics of Urban Morphology* (pp. 383-409). Birkhauser, Cham. [DOI:10.1007/978-3-030-12381-9\\_17](#)
- Raimbault, J. (2019). Evolving accessibility landscapes: mutations of transportation networks in China. In *Aveline N. (ed.), Pathways of Sustainable Development across China: the Cases of Hangzhou, Datong and Zhuhai* (pp. 89-108). Imago Editor, [ISBN:978-88-94384-71-0](#)

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## Conference papers

- Raimbault, J. (2020). A model of urban evolution based on innovation diffusion. *The 2020 Conference on Artificial Life*. [DOI:10.1162/isal\\_a\\_00283](#)
- Raimbault, J., Perret, J. & Reuillon, R. (2020). A scala library for spatial sensitivity analysis. *GISRUK 2020 Proceedings*. [arXiv:2007.10667](#) ; [Editor](#)
- Raimbault, J. & Perret, J. (2019). Generating urban morphologies at large scales. *The 2019 Conference on Artificial Life 2019 NO. 31*, 179-186. [DOI:10.1162/isal\\_a\\_00159](#)
- Raimbault, J. (2017). An applied knowledge framework to study complex systems, *Complex Systems Design & Management* (pp.31-45). [arXiv:1706.09244](#)
- Raimbault, J. (2017). Identification de causalités dans des données spatio-temporelles, *Sageo 2017 Proceedings*. [arXiv:1709.08684](#) ([English translation](#))
- Raimbault, J. (2017). A Discrepancy-Based Framework to Compare Robustness Between Multi-attribute Evaluations. In *Complex Systems Design & Management* (pp. 141-154), Springer. [DOI:10.1007/978-3-319-49103-5\\_11](#)
- Raimbault, J. (2017). Investigating the empirical existence of static user equilibrium. *Transportation Research Procedia*, 22, 450-458. [DOI:10.1016/j.trpro.2017.03.053](#)
- Raimbault, J. (2017). Models coupling urban growth and transportation network growth: An algorithmic systematic review approach. *Plurimondi*, (17), *ECTQG 2015 Proceedings*. [ISSN:2420-921X](#)
- Raimbault, J. (2014). User-Based Solutions for Increasing Level of Service in Bike-Sharing Transportation Systems. In *Complex Systems Design & Management* (pp. 31-44), Springer. [DOI:10.1007/978-3-319-11617-4\\_3](#) **Best Student Paper Award at CSDM 2014.**
- Raimbault, J., Banos, A. & Doursat, R. (2014) A Hybrid Network/Grid Model of Urban Morphogenesis and Optimization. *Proceedings of the 4th International Conference on Complex Systems and Applications (ICCSA 2014)*, June 23-26, 2014, Université de Normandie, Le Havre, France; M. A. Aziz-Alaoui, C. Bertelle, X. Z. Liu, D. Olivier, eds.: pp. 51-60. [arXiv:1612.08552](#) ; [Editor](#)

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## Communications

A co-evolution agent-based model for systems of cities and transportation networks integrating top-down governance through game theory, *Conference on Complex Systems 2020, Dec. 2020*. DOI:10.5281/zenodo.4419177

Raimbault J. & Zdanowska N. (2020). A generative model for urban firm networks, *NetSci 2020, Rome, Sept 2020*.

Worldwide estimation of parameters for a simple reaction-diffusion model of urban growth, *International Land-use Symposium 2019, Paris, Dec 2019*. HAL:halshs-02406539

A multi-scalar model for systems of cities, *Conference on Complex Systems 2019, Singapore, Oct. 2019*. HAL:halshs-02351722

A meta-analysis of models for interactions between transportation networks and territories. *European Colloquium on Theoretical and Quantitative Geography, Mondorf, Luxembourg, Sep 2019*. HAL:halshs-02284848

Raimbault J., Denis E., Pumain D. (2019). An evolutionary theory for the spatial dynamics of urban systems worldwide. *European Colloquium on Theoretical and Quantitative Geography, Mondorf, Luxembourg, Sep 2019*. HAL:halshs-02284897

Vanhoof M., Godoy-Lorite A., Murcio R., Iacopini I., Zdanowska N., Raimbault J., Milton R., Arcaute E., Batty M. (2019). Using Foursquare data to reveal spatial and temporal patterns in London. *NetMob 2019, Oxford, United Kingdom, Jul 2019*. HAL:halshs-02284843

De l'endogénéité des hiérarchies dans les systèmes territoriaux complexes. *Journée Des jeunes chercheurs de l'Institut de Géographie : Compter, classer, catégoriser, Paris, Apr. 2019*. HAL:halshs-02089520

Towards multi-scalar models for the co-evolution of transportation networks and territories. *Theo Quant 2019, Université de Franche-Comté, Besancon, Feb 2019*. HAL:halshs-02013006

Des systèmes naturels aux systèmes urbains: génération de réseaux de transport optimaux par modèle slime-mould, *poster at Biomim'expo 2018, Paris, Oct. 2018*. HAL:halshs-01904499

Raimbault, J. (2018). Modélisation des interactions entre réseaux de transport et territoires : une approche par la co-évolution. *Journée d'étude Pacte-Citeres, Grenoble, Nov. 2018*. HAL:halshs-01933916

A multi-dimensional percolation approach to characterize sustainable mega-city regions, *MARAMI 2018, Avignon, Oct. 2018*. HAL:halshs-01898864

A systematic comparison of interaction models for systems of cities, *Conference on Complex Systems 2018, Thessaloniki, Sept. 2018*. HAL:halshs-01880492

Extracting knowledge from simulation models: trends and perspectives from the viewpoint of quantitative geography, *Conference on Complex Systems 2018, Thessaloniki, Sept. 2018*. HAL:halshs-01882389

Multi-modeling the morphogenesis of transportation networks. In *Artificial Life Conference Proceedings (pp. 382-383)*. Tokyo, July 2018. DOI:10.1162/isal\_a\_00073

Modeling Urban Morphogenesis: towards an integration of territories and networks, *GoPro 2017, Lyon, Dec. 2017*. HAL:hal-01808480

Complexity, Complexities and Complex Knowledge, *Geodiversity International Workshop, Paris, October 2017*. HAL:halshs-01632331

Modeling the Co-evolution of Urban Form and Transportation Networks, *Conference on Complex Systems 2017, Cancun, Sept. 2017*. HAL:halshs-01590624

Raimbault J. & Baffi S. (2017). Structural Segregation: Assessing the impact of South African Apartheid on Underlying Dynamics of Interactions between Networks and Territories, *ECTQG 2017, York, Sept. 2017* HAL:halshs-01584914

Invisible Bridges ? Scientific landscapes around similar objects studied from Economics and Geography perspectives, *ECTQG 2017, York, Sept. 2017* HAL:halshs-01584894

Raimbault, J. & Bergeaud, A. (2017). The Cost of Transportation: Spatial Analysis of Fuel Prices in the US, *EWGT 2017, Budapest, Sept. 2017* HAL:halshs-01582909

Cottineau C., Raimbault J., Le Texier M., Le Néchet F. & Reuillon R. (2017). Initial spatial conditions in simulation models: the missing leg of sensitivity analyses?, *Geocomputation 2017, Leeds, Sept. 2017* HAL:halshs-01841272

A macro-scale model of co-evolution for cities and transportation networks, *Medium International Conference, Guangzhou, June 2017* HAL:halshs-01863229

- Losavio C. & Raimbault J. (2017). Agent-based Modeling of Migrant Workers Residential Dynamics within a Mega-city Region: the Case of Pearl River Delta, China, *Urban China Development International Conference, London, May 2017* [HAL:halshs-01666887](#)
- Co-construire Modèles, Etudes Empiriques et Théories en Géographie Théorique et Quantitative: le cas des Interactions entre Réseaux et Territoires. *Treizièmes Rencontres de ThéoQuant, Besançon, May 2017* [HAL:halshs-01525448](#)
- Un Cadre de Connaissances pour une Géographie Intégrée. *Journée des jeunes chercheurs de l'Institut de Géographie de Paris, Paris, April 2017* [HAL:halshs-01505084](#)
- Towards a Theory of Co-evolutive Networked Territorial Systems: Insights from Transportation Governance Modeling in Pearl River Delta, China. *Medium Seminar-Urban Sustainable Development in Zhuhai, Guangzhou, December 2016* [HAL:halshs-01422484](#)
- Models of growth for system of cities : Back to the simple, *Conference on Complex Systems 2016, Amsterdam, Sep 2016*. [HAL:halshs-01370274](#)
- Raimbault J., Bergeaud A. and Potiron Y. (2016). Investigating Patterns of Technological Innovation. *Conference on Complex Systems 2016, Amsterdam, Sep 2016*. [HAL:halshs-01370528](#)
- For a Cautious Use of Big Data and Computation. *Royal Geographical Society - Annual Conference 2016 - Session : Geocomputation, the Next 20 Years (1), London, Aug 2016*. [HAL:halshs-01358440](#)
- Indirect Bibliometrics by Complex Network Analysis. *20e Anniversaire de Cybergeographie, Paris, May 2016*. [HAL:halshs-01328058](#)
- Raimbault, J. & Serra, H. (2016). Game-based Tools as Media to Transmit Freshwater Ecology Concepts, *poster corner at SETAC 2016, Nantes, May 2016*. [HAL:halshs-01322860](#)
- Raimbault, J. (2016). Génération de données Synthétiques corrélées, *Actes des Journées de Rochebrune, January 2016*. [HAL:halshs-01514415](#)
- Le Nechet, F. & Raimbault, J. (2015). Modeling the emergence of metropolitan transport authority in a polycentric urban region, *ECTQG 2015, Bari, Sept. 2015*. [HAL:halshs-01272236](#)
- Hybrid Modeling of a Bike-Sharing Transportation System, *poster at ICCSS 2015, Helsinki, June 2015*. [HAL:halshs-01330627](#)
- Raimbault, J. & Gonzales, J. (2015). Application de la Morphogénèse de Réseaux Biologiques à la Conception Optimale d'Infrastructures de Transport, *poster presented at Rencontres du Labex Dynamite, Paris, May 2015*. [HAL:halshs-01860296](#)

## Working Papers

- Raimbault, J. (2020). A systematic review and meta-analysis of models coupling transportation networks with territories. [arXiv:2012.13367](#)
- Raimbault, J. (2020). A comparison of simple models for urban morphogenesis. [arXiv:2008.13277](#)
- Raimbault, J., Zdanowska, N. & Arcaute, E. (2020). Modeling growth of urban firm networks. [arXiv:2009.05528](#)
- Raimbault, J. (2020). An agent-based model of interdisciplinary interactions in science. [arXiv:2006.16399](#)
- Raimbault, J. (2020). Cities as they could be: Artificial Life and Urban Systems. [arXiv:2002.12926](#)
- Raimbault, J. & Le Nechet, F. (2018). Closing the loop: Introducing Endogenous Transport Provision in a LUTI Model. *Under review for Journal of Transport Geography*.
- Raimbault, J. (2019). Space and complexities of territorial systems. [arXiv:1901.09869](#)
- Raimbault, J. (2019). Modeling interactions between transportation networks and territories: a co-evolution approach. [arXiv:1902.04802](#)
- Raimbault, J. (2018). Co-evolution and morphogenetic systems. [arXiv:1803.11457](#)
- Raimbault, J. (2018). Reconciling complexities: for a stronger integration of approaches to socio-technical systems. [arXiv:1805.10195](#)

## Grants and Awards

- MITI CNRS** projects on climate change (LIMMS, MJF, ISC-PIF collaboration), 30k€(2021-2022)
- DAFNI UKCRIC Champion grant**, Research fellow grant, 39k GBP (2020-2021) (<https://dafni.ac.uk/dafni-champions-2-2/>)
- MEDIUM mobility grant**, Young Researcher mobility grant for China, MEDIUM project (2016-2017).

**PhD grant**, *allocation doctorale AMX* for three years from Graduate School, Ecole Polytechnique (2015-2018).

**Best Student Paper Award** at Conference CSD&M, Paris, December 2014.

## Teaching

- Sept. 2020 ExModelo summer school on simulation models
- Spring 2020 Master thesis supervision (2 students), Smart Cities and Urban Analytics Msc, UCL
- Feb. 2020 **Teaching Assistant (5h)**, UCL, Urban Simulation.
- June 2019 ExModelo summer school on simulation models, organized by ISC-PIF and OpenMOLE team
- 2018/2019 **Lecture Modeling mobility (4x3h)**, *Ecole des Ponts et Chaussées*, Champs-sur-Marne.
- 2018 **Lecture big data in transportation studies (2x2h)**, *Ecole des Ponts et Chaussées*, Champs-sur-Marne.
- Spring 2017 **Teaching Assistant (64h)**, *Université Paris 7*, Paris, France.  
Teaching Assistant: *Statistics and Cartography*, *Spatial Analysis* and *Professionalization for Geographers*.
- Feb. 2016 **Lecture Geography and Big Data (3h)**, *Université Paris 1 Sorbonne*, Paris, France.
- Fall 2015 **Teaching Assistant (64h)**, *Université Paris 7*, Paris, France.  
Teaching Assistant: *Introduction to Geography* and *Introduction to GIS*.

## Reviewing

- Since 2020 Topic editor for Land (ISSN 2073-445X)
- 2020 Member of the program committee of the ACM SIGSIM PADS Conference
- since 2019 Reviewing for *Scientific Reports* (1), *Sustainability* (6), *International Journal of Geographical Information* (1), *Environment and Planning B* (1), *Scientometrics* (3), *Energies* (1), *Applied Spatial Analysis and Policy* (1)
- since 2018 Reviewing for *Ecological Modeling* (1), *Entropy* (1)
- since 2017 Reviewing for *PLoS ONE* (4)
- since 2015 Reviewing for *Cybergeog* (14)

## Scientific Activity

- Oct. 2019 CCS 2019. Satellite organisation: *New methods and epistemologies to explore simulation models - II*
- Sept. 2019 ECTQG 2019. Special session organisation: *Geosimulation models exploration methods*
- 2018 Participation in the CNRS experimental project “*Incubator for scientific mediation*”
- Sept. 2018 CCS 2018. Satellite organisation: *New methods and epistemologies to explore simulation models*
- Sept. 2017 ECTQG 2017. Session organisation: *Bridges between Economics and Geography*
- June 2017 Medium Conference 2017. Session organisation: *Spatio-temporal Behavior in Complex Urban Systems*

## Computer skills

OS	Unix (OSX, Ubuntu, CentOS)	Scripts	Shell, AppleScript
Programming	JAVA, Python, Scala, C/C++, OCaml	Typography	LaTeX, API OO.org, ScalaTex
Web	php, XHTML, CSS, AJAX	Database	MySQL, MongoDB, PostgreSQL
Scientific	R, NetLogo, Gama, OpenMole, Scilab, Matlab, Gephi	GIS	QGIS, PostGIS, TransCAD, Qcad

## Languages

**French**, *Native*

**German**, *Fluent, European Baccalaureate*

**English**, *Fluent*

**Mandarin**, *Notions, level HSK3*