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Dr. Juste Raimbault

Positions

algorithm

CPGE, Lycée Henri IV, Paris, France.

2007 - 2010

Since Jan. 2022	Chargé de Recherche du Développement Durable, LASTIG, Univ Gustave Eiffel, IGN-ENSG, Saint-Mandé, France. Validation of spatial simulation models, Land-use transport interactions, Urban morphogenesis
Apr. 2021–Dec. 2021	Research Fellow , <i>Institute for Global Prosperity</i> , <i>UCL</i> , London, UK. Agent-based modeling informal job markets in Lebanon
Jan. 2019–Oct. 2021	Research Fellow , CASA, UCL, London, UK. Coupling land-use transport interaction models with microsimulation models, Scientific workflow systems and modular transport models
Mar. 2018–Aug. 2019	Post-doctoral Researcher , Complex Systems Institute - UPS CNRS 3611 ISC-PIF, Paris, France. Extending methods to explore spatial simulation models
Feb. 2015–Feb. 2018	Doctorant Contractuel chargé d'enseignement, Université Paris 7 Denis Diderot, UFR GHSS, Paris, France.
Sep. 2014–Jan. 2015	Researcher, L2 Technologies, Paris, France. Machine learning and complex network analysis for real-time trend detection in financial data
Sep. 2010–Aug.	Elève Officier, Ecole Polytechnique, Palaiseau, France.

2010–Aug. 2014						
	Education					
Feb. 2015–Feb. 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, supervised by Arnaud Banos and Florent Le Néchet.					
June 2016	SFI Complex Systems Summer School, Santa Fe Institute.					
2012–2014	MSc Complex Systems Science, Ecole Polytechnique (Ingénieur Diplômé). Agent-based modeling, Evidence-based methods from Therapeutic Evaluation, Theoretical Analysis of Physical Complex Systems, Epistemology, Complex Networks, Datamining, Signal Processing Dissertation: Complex Network Analysis for Real-time Trend Detection in a Financial System					
2013–2014	MSc Urbanism, Environment, Transportation, Ecole Nationale des Ponts et Chaussée. Analysis of Territorial Systems, Management and design of Transportation Systems, Urbanism, History of Urbanism, Urban Economics Dissertations: Application of Evidence-based Methods in Urban Planning and Architecture (M1); Discrete Choice Models for Bike-sharing Transportation Systems (M2)					
2010-2012	BSc, Ecole Polytechnique. Multidisciplinary scientific formation (mathematics, computer science, applied mathematics, physics, mechanics, biology, economics) Research internship in Machine Learning and Artificial Intelligence: Design and implementation of a matching					

Journal papers

Raimbault, J. & Le Néchet, F. (2021). Introducing endogenous transport provision in a LUTI model to explore polycentric governance systems. *Journal of Transport Geography*, 94, 103115. DOI:10.1016/j.jtrangeo.2021.103115

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:110.18713/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

Book chapters

Raimbault, J. (2022). 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. & Pumain, D. (2021). Spatial dynamics of complex urban systems within an evolutionary theory frame, *Handbook Entropy, Complexity, Spatial Dynamics: The rebirth of theory, Reggiani, A., ed., Edward Elgar.* DOI:10.4337/9781839100598.00019

Raimbault, J. (2021). Modeling the co-evolution of cities and networks. In *Rozenblat C.*, *Neal Z.* (eds.), *Handbook on Cities and Networks* (pp. 166–193). Edward Elgar. DOI:10.4337/9781788114714

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

Conference papers

Nacer-Weill A., Yang C., Barbet T. & Raimbault J. (2021). An agent-based model for modal shift in public transport. *Transportation Research Procedia*, EWGT2021. arXiv:2107.11399

Raimbault, J. (2021). Integrating and validating urban simulation models. French Regional Conference on Complex Systems 2021. arXiv:2105.13490

Raimbault, J. & Batty., M. (2021). Estimating public transport congestion in UK urban areas with open transport models. GISRUK 2021 Proceedings. DOI:10.5281/zenodo.4670012

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. DOI:10.5281/zenodo.1006677

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

Communications

Raimbault J., Broere J., Somveille M., Serna J.M., Strombom E. Moore C., Sugar L. & Zhu B. (2021). Agent-based models of industrial symbiosis networks. *Future Days 2021, Paris, November 2021.*

Morphogenesis, evolution and co-evolution of cities, Poster at Conference on Complex Systems 2021, Lyon, October 2021.

Building simulation models coupling territorial and network dynamics at the interface of disciplines and scales, *Spatial Data Science*, *Lausanne*, *June 2021*.

Raimbault J. & Batty M. (2021). Building and validating modular urban transportation models using scientific workflow systems, *Applied Urban Modeling Global Workshop*, *Cambridge*, *Jan. 2021*.

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, Geodivercity 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 Cybergeo, 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 comparison of simple models for urban morphogenesis. In revision for PLOS ONE~arXiv:2008.13277

Raimbault, J., Zdanowska, N. & Arcaute, E. (2020). Modeling growth of urban firm networks. In revision for PLOS ONE arXiv:2009.05528

Raimbault, J. (2021). Trade-offs between sustainable development goals in systems of cities. Submitted to Journal of Urban Management arXiv:2111.1554

Raimbault, J. (2021). Strong coupling between scales in a multi-scalar model of urban dynamics. arXiv:2101.12725

Raimbault, J. (2021). Urban sprawl and evolution of accessibility profiles in Chinese cities. arXiv:2112.14319

Raimbault, J. (2021). Complementarity of generative models for road networks. arXiv:2109.15206

Raimbault, J. (2021). An interdisciplinary bibliometric analysis of models for land-use and transport interactions. arXiv:2102.13501

Raimbault, J. (2021). A multiscale model of urban morphogenesis. arXiv:2103.17241

Raimbault, J. (2021). Simulating urban dynamics and international governance of infrastructure projects. arXiv:2108.13915

Raimbault, J. (2020). Cities as they could be: Artificial Life and Urban Systems. arXiv:2002.12926

Raimbault, J. (2020). A systematic review and meta-analysis of models coupling transportation networks with territories. arXiv:2012.13367

Raimbault, J. (2020). An agent-based model of interdisciplinary interactions in science. arXiv:2006.16399

Raimbault, J. (2019). Modeling interactions between transportation networks and territories: a co-evolution approach. arXiv:1902.04802

Raimbault, J. (2019). Space and complexities of territorial systems. arXiv:1901.09869

Raimbault, J. (2018). Co-evolution and morphogenetic systems. arXiv:1803.11457

Raimbault, J. (2018). Reconciling complexities: for a stronger integration of approaches to sociotechnical 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.

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- Dec. 2021 **Lecture Modeling mobility (2x3h)**, Ecole des Ponts et Chaussées, Champs-sur-Marne.

 Master TRADD, Cours OACMO
- June 2021 ExModelo summer school on simulation models III
- April 2021 **Urban Simulation (2x3h Lecture, 2x3h Practical)**, *UTSEUS*, Shanghai (online). Cycle Ingénieur première année
- Spring 2021 Master thesis supervision (2 students), Smart Cities and Urban Analytics Msc and MRes, UCL
 - Dec. 2020 Lecture Modeling mobility (2x3h), Ecole des Ponts et Chaussées, Champs-sur-Marne.

 Master TRADD, Cours OACMO
- Sept. 2020 ExModelo summer school on simulation models II
- Spring 2020 Master thesis supervision (2 students), Smart Cities and Urban Analytics Msc, UCL
- April 2020 Urban Simulation (2x3h Lecture, 2x3h Practical), UTSEUS, Shanghai (online). Cycle Ingénieur première année
- Feb. 2020 **Teaching Assistant (5h)**, UCL, Urban Simulation.
 - 2019 Lecture Modeling mobility (2x3h), Ecole des Ponts et Chaussées, Champs-sur-Marne.

 Master TRADD, Cours OACMO
- June 2019 **ExModelo summer school on simulation models**, Organised by ISC-PIF and OpenMOLE team. Lecture 5h, Practicals 2h
 - 2018 Lecture Modeling mobility (2x3h), Ecole des Ponts et Chaussées, Champs-sur-Marne.

 Master TRADD, Cours OACMO
 - 2018 Lecture big data in transportation studies (2x2h), Ecole des Ponts et Chaussées, Champs-sur-Marne.

 Master TRADD
- 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 2021 Reviewing for European Physical Letters (1)
 - 2021 Member of the program committee of the French Regional Conference on Complex Systems 2021
 - 2021 $\,$ Member of the program committee of the ACM SIGSIM PADS Conference
- since 2020 Reviewing for Journal of Transport and Land Use (1)
- 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 (2), Scientometrics (3), Energies (1), Applied Spatial Analysis and Policy (1)
- since 2018 Reviewing for Ecological Modeling (1), Entropy (1)
- since 2017 Reviewing for $PLoS \ ONE \ (5)$
- since 2015 Reviewing for Cybergeo (14)

Scientific Activity

- Nov. 2021 ECTQG 2021. Special session organisation: Exploration and validation of spatial simulation models
- 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

Haskell

Web php, XHTML, CSS, AJAX Database MySQL, MongoDB, PostgreSQL

Scientific R, NetLogo, Gama, OpenMole, Scilab, Mat-GIS QGIS, PostGIS, TransCAD, Ocad

lab, Gephi

Languages

French, Native English, Fluent

German, Fluent, European Baccalaureate Mandarin, Notions, level HSK3