Mohamed Hachaichi, Ph.D

Grenoble FR | (+33) 6 35 54 91 03 | hachaichi_mohamed@outlook.com | LinkedIn | Google Scholar

Looking for **Assistant Professor/Researcher** *position*

Research interests **Urban Dynamics : Complexity, Resilience & Ecological Transition**

SKILLS & INTERESTS

Assets	**Researcher with a strong background in linear algebra, statistics, science and programming**
Skills	Research Excellence; Critical Thinking; Problem Solving; Spatial Data Science; Interdisciplinary Expertise; Time Management; Grant Writing and Funding Acquisition; Adaptability; Publication Record
Analysis	MR-IOA, MFA, Spatial Interaction Modeling (SIM), GIS, Geomatics, Big Data Analytics

EDUCATION

Polytechnic School of Architecture and Urbanism — **Algiers, Algeria**
*PhD in Circular Urban Metabolism and Climate Change - "**Very Honorable**" rank* — **Mar 2021**

Institute of Architecture and Earth's Sciences — **Setif, Algeria**
MSc in Architecture and Urban Design — **Jun 2016**

Institute of Architecture and Earth's Sciences — **Setif, Algeria**
BSc in Architecture and Urban Planning — **Jun 2014**

HONORARY ACADEMIC POSITIONS

Network for Education and Research on Peace and Sustainability (NERPS) Fellow — **Hiroshima, Japan**
Research Fellow at NERPS, Hiroshima University, Japan — **Nov 2023 - Dec 2025**

WORK EXPERIENCE

Grenoble Alpes University — **Grenoble, France**
Assistant Professor — **Oct 2024 - Aug 2025**

• Teaching courses in ecological transitions, spatial analysis, statistics, and methodologies for preparing and analyzing spatial data.

• Instructing students on essential techniques for accurate data representation, focusing on effective and truthful data visualization, including cartographic mapping.

• Collaborating with the Pacte Laboratory on research to analyze material flows and identify actionable pathways for advancing urban transitions.

• Engaging with policymakers to address territorial material flows, promote circular economy practices in urban settings, and support sustainable urban-ecological transitions.

Grenoble Alpes University // Pacte laboratory — **Grenoble, France**
Postdoctoral Researcher — **Oct 2022 - Oct 2024**

• Conducted comprehensive material flows analysis for all French EPCI, resulting in the identification of key areas for resource optimization and waste reduction.

• Utilized advanced statistical modeling techniques to analyze data from various sources and forecast future ecological trends, providing valuable insights for urban planners and policymakers.

• Developed a modeling framework that accurately predicted material flows at the territorial level (EPCI), increasing the accuracy of resource allocation (imports/exports).

• Drafted and submitted four scientific papers to top-tier journals, showcasing research findings and innovative methodologies, potentially contributing to the advancement of knowledge in the field.

EM Normandy Business School **Caen, France**

Assistant Researcher **Nov 2021 - Jul 2022**

• Developed a comprehensive data collection strategy to gather and consolidate COVID-19-related information from multiple sources, resulting in a dataset of over 10 million records.

• Harmonized disparate data formats and structures by developing automated scripts and algorithms, enabling efficient analysis of COVID-19 trends and patterns.

• Conducted statistical analyses on a geodataset of over 1,166 regions (NUTS3) to identify significant factors impacting the spatial diffusion of the virus, leading to the development of targeted intervention strategies.

• Conducted comprehensive surveys with local authorities to gather critical data on COVID-19 impacts, resulting in a detailed understanding of the virus's spread and its effects on the community.

Stellenbosch University **Cape Town, South Africa**

PostDoc Researcher - Center Manager **Apr 2021 - Oct 2021**

• Developed a comprehensive Water-Food-Energy nexus model utilizing system dynamics methodology contributing to better understanding of the intricate relationship between these critical resources and their impacts on sustainable development of Cape Town.

• Constructed a sophisticated nexus model consisting of six interconnected subsystems: water, energy, agriculture, economy, climate and population dynamics. This holistic approach allowed for a comprehensive analysis of the complex interactions and dependencies within the system.

• Collaborated with a dedicated research team to author and publish a groundbreaking research paper introducing an innovative methodology that harnesses textual data for insights into system dynamics and the intricate relationships within the WFE nexus.

Ecole Polytechnique of Architecture and Urban Planning **Agiers, Algeria**

Researcher at the lab "cities, urban planning and sustainable development" **Oct 2017 - Mar 2021**

• Actively engaged in ground breaking research aimed at transforming urban environments into climate-friendly spaces. Contributions encompass not only comprehensive investigation but also research-related tasks such as producing, writing, and publishing impactful papers, driving knowledge dissemination and advancing sustainable urban development.

PROJECT EXPERIENCE

Spatial Data Science **Caen, France**

ESPON research funding **Nov 2021 - Jul 2022**

• Demonstrated effective project coordination by closely collaborating with Prof. Sébastien Bourdin, ensuring seamless execution of the research project. Skillfully managed communication channels, fostering productive interactions among diverse researchers from various European countries, facilitating the exchange of ideas and insights.

• Authored a meticulous technical report, showcasing strong communication skills and attention to details. Additionally, provided essential support by actively participating in kickoff meetings, aiding in the success of the project.

• Actively engaged in collaborative focus groups with local authorities, leveraging strong brainstorming abilities to contribute innovative ideas. Offered valuable support materials as needed, enhancing the effectiveness of discussions and decision-making process.

Circular Economy and Geography **Berlin, Germany**

Network research **Jan 2023 - To Date**

• Developed a comprehensive grasp of the circular economy concept from diverse regional perspectives across the globe, demonstrating a global outlook and an ability to navigate multifaceted economic models.

• Pioneered an innovative oval method that leverages machine learning and artificial intelligence techniques to comprehensively analyze and unravel the intricacies of the circular economy, showcasing a unique approach to enhancing understanding in this dynamic field.

• Successfully authored and published a paper in a prestigious top-tier journal, contributing insightful research and knowledge dissemination within the field of circular economy.

Internship at Potsdam Institut für Klimafolgenforschung **Potsdam, Germany**

Research intern **Jun 2018 - Jul 2018**

• Engaged in thorough research initiatives while proficient writing and implementing code in R, facilitating data analysis and interpretation for informed decision-making.

• Authored and successfully published a research paper focused on planetary boundaries, contributing valuable insights to the understanding and discourse surrounding planetary boundaries.

TEACHING

Institute of Urbanisme and Geography **Grenoble, France**

Lecture "Territorializing the ecological transitions" **Sep 2024 - Aug 2025**

• Developed and delivered an engaging introduction to the concept of ecological transitions, highlighting their significance in addressing climate challenges and fostering sustainable development.

• Analyzed strategies to achieve sociological transitions across French territories, emphasizing community involvement, equity, and localized approaches.

• Presented the urban metabolism framework as a diagnostic tool to understand and accelerate ecological transitions in territorial systems.

• Conducted comparative analyses of ecological transition initiatives from the Global South, evaluating their potential applicability within the French context to inspire innovative solutions.

Institute of Urbanisme and Geography **Grenoble, France**

Lecture Master 1 "Territorial Information Processing and Representation" **Sep 2023 - Oct 2023**

• Introduced students from diverse backgrounds to QGIS and Magrit, enabling them to collect, manipulate, and represent territorial information effectively.

• Assisted students in developing a critical perspective when creating spatial/territorial information to emphasize territorial issues and opportunities.

Lecture Master 1 "Territorial Observation & Diagnosis. EC Territorial Systems in Transition" **Oct 2023 - Dec 2023**

• Provided an introduction to complex systems and emphasized their relevance in understanding today's highly complex world.

• Guided students in researching, documenting, and analyzing intermunicipal projects, with a focus on decomposing the entire system into subsystems and conducting in-depth analyses of each subsystem.

Lecture Master 1 "Atelier de projet –Engineering for the Development and Planning and Territories in Transition" **Sept 2023 - Feb 2024**

• Directed students in executing professional projects aligned with client requirements for the Schéma de Cohérence Territoriale, promoting empowerment and fostering the development of technical and organizational skills through collaborative teamwork.

• Acted as a supervisor and mentor for students, ensuring that all project specifications were met and that high-quality deliverables were provided to the contractor.

Lecture Bachelors' 3UL "Geographical Information : Geomatics" **Sept 2023 - Feb 2024**

• Introduced students in Urbanism and Geography to the practical application of QGIS, basic statistics, and the process of collecting, storing, analyzing, and visualizing data.

• Encouraged students to engage in critical spatial analysis by exploring various case studies across different themes, scales, and data types.

Lecture Bachelors' 3UL "Voiries et espace public" **Mar 2023 - Apr 2023**

• Delivered a series of informative lectures at the Department of Urbanisme on the topic of "Voirie et espace public", showcasing effective pedagogical skills and contributing to the educational enrichment of students in the field.

• Developed and curated a range of engaging exercises, complemented by meticulous correction, fostering active learning and providing valuable feedback to enhance student comprehension.

Ecole Polytechnique d'Architecture et d'Urbanisme **Algiers, Algeria**

Lecture "3D modelisation of cities and urban areas" **Nov 2018 - Jun 2019**

• Instructed dynamic classes of 25 students, expertly conveying the intricacies of "3D modularization using Revit & 3ds Max", while additionally taking charge of exam preparation and grading to ensure comprehensive understanding among students.

• Demonstrated hands-on expertise by skillfully executing 3D modeling for intricate structures and shapes, highlighting proficiency in software tools. Actively participated in advanced lab work on cities, urbanism and sustainable development, and producing impactful research papers.

SCIENTIFIC PUBLICATIONS

Talandier, M., & Hachaichi, M. (2026). Mapping material dependencies and supply chain exposure: a regional resilience assessment in France. Resources, Conservation and Recycling, 226, 108691.

Talandier, M., & Hachaichi., M. (2025). From economy to ecology: Exploring territorial material flows through local economic structures. Sustainable Futures.

Hachaichi, M., & Talandier, M. (2023). Assessing the ecological performance of French territories using a spatially-nested approach. Ecological Indicators, 155, 110947.

Hachaichi, M. (2023). No City Left Behind: Building Climate Policy Bridges between the North and South. Meteorology, 2(3), 403-420.

Hachaichi, M. (2023). Unpacking the urban virtual water of the Global South: Lessons from 181 cities. Ecological Economics, 210, 107859.

Hachaichi, M., & Bourdin, S. (2023). Wheels Within Wheels: Mapping the Genealogy of Circular Economy using Machine Learning. Circular Economy and Sustainability, 1-21.

Egieya, J. M., Amidu, M. A., & Hachaichi, M. (2023). Small modular reactors: An assessment of workforce requirements and operating costs. Progress in Nuclear Energy, 159, 104632.

Hachaichi, M., & Egieya, J. (2023). Water-food-energy nexus in global cities: addressing complex urban interdependencies. Water Resources Management, 37(4), 1811-1825.

Hachaichi, M. (2022). Cities: Allocating climate change responsibilities at planetary scale. Urban Climate, 46, 101329.

Hachaichi, M. (2022). Reshaping modern urban models with the global environmental ceiling: What. When, How, and Why.

Hachaichi, M., & Baouni, T. (2021). Virtual carbon emissions in the big cities of middle-income countries. Urban Climate, 40, 100986.

Hachaichi, M., & Baouni, T. (2020). Downscaling the planetary boundaries (Pbs) framework to city scale-level: De-risking MENA region's environment future. Environmental and Sustainability Indicators, 5, 100023.

Hachaichi, M., Kazak, J. K., & Baouni, T. (2020). Evaluating City Carbon Carrying Capacity: How many people can Algiers sustain?. Algerian Journal of Environmental Science and Technology, 6(3).

Hachaichi, M., & Tahar, B. (2019). The carbon footprint model as a plea for cities towards energy transition: the case of Algiers Algeria. International Journal of Energy and Environmental Engineering, 13(4), 255-262.

SCIENTIFIC CONFERENCES

International Colloquium, 2017, Batna-Algeria, Prefiguring and designing the architectural and urban landscape from the perspective of a sustainable quality of the city of the future of the Mediterranean countries, *"Carbon carrying capacity at the service of urban planning, the case of Algiers urban ecosystem"*.

International Colloquium, 2017, Batna-Algeria, Prefiguring and designing the architectural and urban landscape from the perspective of a sustainable quality of the city of the future of the Mediterranean countries, *"Resilient landscape for man and nature, the case of the Bainem-Algiers forest ecosystem"*.

International Colloquium, 2019, Rome-Italy, Green Urbanism III, *"Algiers urban model from vulnerability to resilience: Shifting the development patterns using the carbon footprint model"*.

Global Conference on Economic Geography (GCOEG), Machine Learning Meets Economic Geography: Alternative Data and Methods for Mapping and Analyzing Geographies of Knowledge Production and Knowledge Relations, 2022, Dublin-Ireland, *"Wheels within wheels, tracking the gleam of the circular economy using machine learning"*.

5th international conference on technologies & business models for circular economy, 2022, University of Maribor Press, "*Urban Water-Food-Energy Interdependencies: Solving Urban Challenges Together"*, Mohamed Hachaichi, Jafaru Musa Egieya, Neill Goosen.

Dimitrie Cantemir International Geographical Conference – ESPON TERRCOV Workshop, 2022, Iasi-Romania, *"The spread of the COVID-19 pandemic in Europe - changing spatiotemporal patterns of pandemic indicators"*. Andris Igari, Mohamed Hachaichi.

Regional Science Association International, British and Irish Section, 2023 Early Career Colloquium, *"Building Resilience Together: Fostering Global Cooperation in Urban Climate Policy Exchange"*, 2023, Mohamed Hachaichi.

SCIENTIFIC REPORTS

ESPON technical report, (June 2022) ,*"Territorial impacts of COVID-19 and policy answers in European regions and cities"*.

Water Research Commision (April 2024), "*Development Of A Resilient Water-Energy-Agriculture Strategy Plan For The City Of Cape Town, Through Predictive Simulations*"

ENGAGING WITH STAKEHOLDERS / LOCAL AUTHORITIES

Collaborated on the research program *"Resilience of Local Economic Structures Using Flows as a Factor"*, with Prof. Magali Talandier as Principal Investigator. Presented findings to local authorities in Figeac territory, focusing on urban metabolism studies under the PTER framework. The presentation highlighted vulnerabilities within the local socioeconomic system and facilitated discussions with stakeholders to devise actionable strategies rooted in data-driven insights.

SOFTWARE DEVELOPER

Core developer of geosis, a ML-based Python package that analyzes the geography of knowledge production using text as data.

SEMINARS

Institute of Urbanisme and Geography, Grenoble Alpes University, France, *"Cities: biophilia and the anthropocene, what can be done to restore cities in a world of polycrisis?"*, 2023, Mohamed Hachaichi

Institute of Architecture and Earth's Sciences, El-Bez University Campus, Setif, Algeria, *"Artificial Intelligence (AI), cities and climate change"*, 2023, Mohamed Hachaichi.

Universitat Autònoma de Barcelona, Facultat Economia i Empresa, Departament Economia Aplicada, *"COVID-19 in European regions: Explaining disparities",* 2022, Sébastien Bourdin, Mohamed Hachaichi.

Universitat Autònoma de Barcelona, Facultat Economia i Empresa, Departament Economia Aplicada, *"Enabling more with Machine Learning (ML)"*, 2022, Mohamed Hachaichi, Sébastien Bourdin.

NVIDIA, Workshop, *"Building Transformer-Based Natural Language Processing Applications"*, 2022. Certificat here.

ORGANIZATION COMMITTEE MEMBER IN SCIENTIFIQUE EVENTS

International colloquium organized by the Cities, Urban Planning, and Sustainable Development Laboratory at EPAU *"Citizen and inhabitant participation in social and urban development: Between 'good practices' and 'political slogan'. Crossed views in the Algerian and international contexts"*, Algiers, 17-18 May 2017.

Thematic day organized by the Ecole Polytechnique d'Architecture et d'Urbanisme (EPAU) *"Use of new technologies of BIM in the process of documentation of the built environment"*, Algiers, 17-18 May 2017. Algerian Experiences" 06 Nov 2017.

JOURNAL EDITING

Section Editor, Journal of Information System and Smart City. Theme: Smart Cities & Responsible Innovation

REVIEWER

Ecological Indicators, Elsevier

Renewable & Sustainable Energy Reviews, Elsevier

Environment, Development and Sustainability, Springer-Nature

Urban Climate, Elsevier

Water Resources Management, Springer

Technology and Society Magazine - Pathways to Sustainable Development with AI

Planning Practice and Research