DE RIDDER DAVID

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WORK EXPERIENCE

University of Geneva & HUG
Senior Research associate *Geneva, Switzerland — November 2022 - ...*

· Leading a national-scale evaluation of integrative healthcare cost-effectiveness, analysing 5 years of insurance claims data in partnership with Groupe Mutuel. Employing space-time modelling, causal inference and spatial statistics in Python and R.
· Led a large COVID-19 project in collaboration with the EPFL and the CHUV, underlining air pollution's role at detailed spatial scale, while offering insights into epidemic trends and diffusion dynamics using spatially explicit machine learning, Google Earth Engine and remote sensing.

Réseau Delta
Data scientist *Geneva, Switzerland — Feb 2019 - ...*

· Built an online digital platform that integrated real-time data analytics, statistical analyses, and data visualizations using Python, Streamlit and Heroku.
· Implementing diverse machine learning techniques for patient classification and profiling, utilizing health insurance claims data covering over 250,000 patients and 1,000 physicians to enhance quality and benchmark performance within the Delta healthcare network.
· Led the integration of GIS and spatial analyses into the information process and decision making of the Réseau Delta.

University of Geneva, EPFL & HUG
Postdoctoral researcher *Geneva, Switzerland — July 2021 - October 2022*

· Successfully secured funding (150,000 CHF) from the Leenards foundation for an innovative, national-scale evaluation of integrative healthcare effectiveness involving over 10 million healthcare insurance claims.
· Spearheaded a consulting project analyzing citizen subsidies in the canton of Vaud, including identifying recipients, assessing regional disparities in utilization, and creating scenarios to optimize social service center locations.
· Led a mandated project for the breast cancer screening program in the canton of Geneva, identifying regional disparities in screening participation and providing insights into the determinants of participation, resulting in recommendations for program improvement.

University of Geneva, EPFL & HUG Prof Idris Guessous & Dr Stéphane Joost
PhD student in Life Sciences - Digital Health & Genomics *Geneva, Switzerland — Apr 2018 - June 2021*

· Thesis title : "*Geospatial approaches for precision public health*"
· Authored and published three articles based on geospatial analyses of health risk factors and their determinants allowing for targeted and informed public health interventions.
· Published two articles during the COVID-19 pandemic demonstrating the potential of geospatial approaches in enhancing epidemiological surveillance by accurately identifying high incidence areas and assessing the risk of syndemic in economically disadvantaged regions.
· Collaborated with a multidisciplinary team of public health experts, software engineers, and designers to develop @choum, a digital health app for symptom reporting and early outbreak detection through geospatial analyses.
· Consulted for the Canton of Geneva's Health Department (DGS) during the COVID-19 vaccination campaign, successfully identifying high-risk groups to enhance the DGS's vaccination strategy optimization.

· Conducted a comprehensive territorial health diagnosis for the commune of Plan-les-Ouates (Geneva, CH) to evaluate the socio-sanitary landscape and inform future planning aligned with demographic trends.

HUG - Municipality of Plan-les-Ouates Prof Idris Guessous & Dr Stéphane Joost
Research scientist *Geneva, Switzerland — Apr 2018 - Jan 2019*

· Led the analyses, writing and presentation of a mandated project for the municipality of Plan-les-Ouates to assess the current and future healthcare needs of the local population.
· Conducted comprehensive demographic, socioeconomic, and environmental assessments of the municipality using multiple statistical and spatial analyses to inform evidence-based recommendations for the design and construction of a new healthcare center.
· Collaborated with stakeholders to prioritize key healthcare practices and services to be included in the new healthcare center, resulting in a patient-centered facility that meets the needs of the community.

Harvard Medical School — Dana Farber Cancer Institute Prof Marc Vidal
Bioinformatics technician *Boston (MA), USA — Mar 2016 - Nov 2017*

· Programmed and implemented various quality controls for the human interactome project "HuRI" (published in Nature in 2020).
· Conducted diverse data analyses including protein network analyses, community detection, DNA sequencing, ... and data management using Python, R and SQL.

Harvard Medical School — Dana Farber Cancer Institute Prof Marc Vidal
Master Thesis *Boston (MA), USA — Feb 2015 - Sep 2015*

· *Study of interactome network perturbations underlying human disease.* Master Thesis conducted in Prof Marc Vidal's lab at Harvard Medical School.

Pasteur Institute — Free University Brussels (ULB) Prof. Michel J. Penninckx
Bachelor thesis *Brussels, Belgium — Oct 2012 - June 2013*

· *The potential of Cerrena unicolor laccase immobilized on mesoporous silica beads for removal of organic micropollutants in wastewaters.* Bachelor thesis conducted at the Pasteur Institute (Brussels) and the Faculty of Chemical Engineering

EDUCATION

PhD in Life Sciences - Genomics and Digital Health *2018-2021*
Prof Guessous and Dr Joost, University of Geneva, Switzerland
MSc in Bioengineering *2013-2015*
Gembloux Agro Bio Tech, University of Liège, Belgium
Erasmus Student Exchange - MSc in Bioengineering *2014-2014*
Universtat Politecnica de Valencia, Spain
BSc in Bioengineering *2010-2013*
Free University of Brussels, Belgium

CERTIFICATES

SSPH+ Certificate in Public Health *2018-2021*
Swiss School of Public Health, Switzerland
Causal Diagrams: Draw Your Assumptions Before Your Conclusions *2020*
Harvard (edX)
Innovation, Entrepreneurship and Business Transformation *2016*
Harvard Extension School, Cambridge (MA), USA
Computer Science and Programming Using Python *2016*
Massachusetts Institute of Technology (edX)

Psychology of Negotiation *2015*
University of Louvain (edX)

TECHNICAL SKILLS

Programming	Python, R, Git, Jupyter, Visual Studio Code, PyCharm
Data Science	Pandas, Numpy, Scikit-learn, TensorFlow, XGBoost, SHAP
Spatial Data Science	GeoPandas, GDAL, PySal, Rasterio, Fiona, Shapely
GIS	QGIS, ArcGIS, GeoDa, MGWR, SaTScan
Data Visualisation	Matplotlib, ggplot, Seaborn, Plotly, Altair
Web App Development	Streamlit, Dash, Django, Heroku
Generative AI	GPT APIs, OpenAI, integration with Python scripts
Other softwares	Cytoscape, Gephi, Office Suite, Adobe Lightroom, Inkscape
Languages	French (Native), English (C2), Spanish (B1), Dutch (B1)

GRANTS

SantéIntégra 2022
Investigator on a project funded by the Leenaards Foundation to explore the impact of integrative medicine usage on health outcomes and healthcare costs. *150,000 CHF*

@choum 2021
Investigator on a project funded by the Private Foundation of the Geneva University Hospitals, UBS and UBP to develop a digital health tool for symptom reporting and early outbreak detection through geospatial analyses. *250,000 CHF*

FELLOWSHIPS

Erasmus+ Mobility 2015
Fellowship to conduct a master thesis at Harvard Medical School *3,600 EUR*

Erasmus+ Mobility 2014
Fellowship to study at the Universitat Politècnica de València *2,400 EUR*

TEACHING

Obesity and spatial analysis November, 2023
Lecturer *Faculty of Medicine, UNIGE*

Spatial socioeconomic vulnerability index June, 2023
Invited Lecturer - Certificate of Advanced Studies in Urbanism *UNIGE, Switzerland*

Geospatial Approaches for Precision Public Health September, 2021
Invited Lecturer - Master of Advanced Studies in Public Health *UNIGE, Switzerland*

Graduate course - Exploratory Data Analysis and Geovisualization Sep. 2019 to Jan. 2020
Co-instructor (Main instructor: Dr Stéphane Joost (EPFL) *ENAC, EPFL*

SELECTED MEDIA COVERAGE

Léman Bleu March, 2021
@choum, l'appli qui flaire les clusters

20min February, 2021
Le virus se propage via les foyers de contamination

RTS January, 2021
Une application pour identifier les foyers de Covid-19 près de chez soi

RTS January, 2021
Un virus dans la ville

20min January, 2021
Le Covid frappe plus durement les quartiers pauvres

ZEIT January, 2021
Das Leiden der anderen

RTS January, 2021
L'application Atchoum permet une détection précoce du coronavirus.

RTS - 36.9º October, 2020
Dis-moi où tu vis et je te dirai comment tu vas

VOLUNTEERING & OUTREACH

Réseau Delta - Delta Echos September 2023 - Present
Data Scientist *Geneva, Switzerland*

· Conducted a series of video interviews explaining data analyses related to the healthcare network practices.
· Addressed the stakes, challenges, and perspectives of the analyses to healthcare professionals, insurance professionals, and policymakers.
· Aimed to enhance understanding and engagement through clear and accessible communication.

EPFL EssentialTech 2018-2019
Spatial Data scientist *Geneva, Switzerland*

· Optimized location allocation for an innovative personal protective equipment (PPE) project with healthcare accessibility analyses using AccessMod and PySAL (Python).

Geneva language exchange 2018
Volunteer *Geneva, Switzerland*

· Instructed at weekly French language events for newly arrived expats and migrants in Geneva.

INTERESTS

Photography, biking, running, swimming, rock climbing, tennis, windsurf

SELECTED PUBLICATIONS

1. **De Ridder D**, Ladoy A, Choi Y, Jacot D, Vuilleumier S, Guessous I, Joost S, Greub G.
Environmental and geographical factors influencing the spread of SARS-CoV-2 over 2 years: a fine-scale spatiotemporal analysis.
Frontiers in Public Health 2024.
https://doi.org/10.3389/fpubh.2024.12981779
This article presents a comprehensive approach utilizing remote sensing and machine learning to analyze the environmental and geographical determinants of SARS-CoV-2 spread. It notably illustrated how air pollution at very local scales impacts virus transmission, underscoring the need to consider precise air pollution guidelines rather than regional averages. This work emphasized the importance of fine-scale environmental data in managing public health crises.

2. **De Ridder D**, Loizeau A, Sandoval J, Erhler F, Perrier M, Ritch A, Violot G, Santolini M, Tzovaras B, Stringhini S, Kaiser L, Pradeau JF, Joost S, Guessous I.
Detection of Spatiotemporal Clusters of COVID-19-Associated Symptoms and Prevention using a Participatory Surveillance App: The @choum Study Protocol.

JMIR Research Protocols 2021. https://doi.org/10.2196/30444
This paper outlined a novel approach to participatory surveillance for COVID-19, demonstrating the utility of digital health tools and participatory approaches combined with spatial cluster detection to achieve real-time disease monitoring, an area of growing importance in public health.

3. **De Ridder D**, Sandoval J, Vuilleumier N, Azman AS, Stringhini S, Kaiser L, Joost S, Guessous I. *Socioeconomically Disadvantaged Neighborhoods Face Increased Persistence of SARS-CoV-2 Clusters.* **Frontiers in Public Health** 2021. https://doi.org/10.3389/fpubh.2020.626090
This study highlighted the existence of stark socio-economic disparities in the persistence of SARS-CoV-2 clusters, underscoring the need for targeted public health interventions, which is critical for shaping effective and equitable health policies.

4. **De Ridder D**, Sandoval J, Vuilleumier N, Spechbach H, Joost S, Kaiser L, Guessous I. *Geospatial digital monitoring of COVID-19 cases at high spatiotemporal resolution.* **The Lancet Digital Health** 2020. https://doi.org/10.1016/S2589-7500(20)30139-4
This article demonstrated the application of the concept of precision public health using digital geospatial technologies to track COVID-19 spread at a very local scale.

5. **De Ridder D**, Belle FN, Marques-Vidal P, Ponte B, Bochud M, Stringhini S, Joost S, Guessous I. *Geospatial Analysis of Sodium and Potassium Intake: A Swiss Population-Based Study.* **Nutrients** 2021. https://doi.org/10.3390/nu13061798
This research provided insights into the spatial distribution of cardiovascular risk factors by utilizing geospatial analysis and modern modeling techniques to link dietary habits with the types of food environments accessible to people. This study not only mapped dietary trends but also identified potential areas for targeted public health interventions to mitigate these risk factors.

ALL PUBLICATIONS - GOOGLE SCHOLAR

Main metrics
As of July 27, 2024

- Citations : 5,889
- H index : 16
- I10 index : 19

First author *Deciphering utilization and cost patterns of integrative medicine : a 130,000 patient longitudinal data analysis.*
In preparation

First author *Space-time pattern mining of breast cancer screening in Geneva, Switzerland : A study of half a million invitations.*
In preparation

First author *Evolution of chronic diseases during the COVID-19 pandemic and its sociodemographic determinants: A longitudinal population-based study.*
In preparation

Co-author *SARS-CoV-2 invasion dynamics based on genomic and geographic data: from Alpha to Delta and Omicron*
In preparation

Co-author *Spatial dependence of non-traumatic out-of-hospital cardiac arrest in a Swiss region: A retrospective analysis.*
Resuscitation Plus 2024. https://doi.org/10.1016/j.resplu.2024.100713

First author *Environmental and geographical factors influencing the spread of SARS-CoV-2 over 2 years: a fine-scale spatiotemporal analysis.*
Frontiers in Public Health 2024. https://doi.org/10.3389/fpubh.2024.12981779

Co-author *Prevalence of and risk factors for suicidal ideation in adolescents during the COVID-19 pandemic: a cross-sectional study.*
Swiss Med. Wkly. 2024. https://doi.org/10.57187/s.3461

Co-author - NcD-RisC *Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults.*
The Lancet 2024. https://doi.org/10.1016/S0140-6736(23)02750-2

Co-author - NcD-RisC *Diminishing benefits of urban living for growth and development of school-aged children and adolescents in the 21st century.*
Nature 2023. https://doi.org/10.1038/s41586-023-05772-8

Co-author *Detection of SARS-CoV-2 infection clusters: The useful combination of spatiotemporal clustering and genomic analyses.*
Frontiers in Public Health 2022. https://doi.org/10.3389/fpubh.2022.1016169

Co-author *The neighborhood environment and its association with the spatio-temporal footprint of tobacco consumption and changes in smoking-related behaviors in a Swiss urban area.*
Health & Place 2022. https://doi.org/10.1016/j.healthplace.2022.102845

Co-author *Perception of the Communication Campaign for @choum: a Symptom Reporting App: Insights from Semi Structured Interviews.*
Studies in Health Technology and Informatics 2022. https://doi:10.3233/SHTI220568

Co-author *Risk of Reinfection After Seroconversion to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): A Population-based Propensity-score Matched Cohort Study.*
Clinical Infectious Diseases 2022. https://doi.org/10.1093/cid/ciab495

Co-author *Seroprevalence of anti-SARS-CoV-2 IgG antibodies, risk factors for infection and associated symptoms in Geneva, Switzerland: a population-based study.*
Scandinavian journal of public health 2022. https://doi.org/10.1177/14034948211048050

Co-author *Geographic footprints of life expectancy inequalities in the state of Geneva, Switzerland.*
Scientific reports 2021. https://doi.org/10.1038/s41598-021-02733-x

Co-author - NcD RisC *Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants.*
The Lancet 2021. https://doi.org/10.1016/S0140-6736(21)01330-1

First author *Geospatial Analysis of Sodium and Potassium Intake: A Swiss Population-Based Study.*
Nutrients 2021. https://doi.org/10.3390/nu13061798

Co-author *Spatial clusters of daily tobacco consumption before and after a smoke-free policy implementation.*
Health & Place 2021. https://doi.org/10.1016/J.HEALTHPLACE.2021.102616

Co-first author *Detection of Spatiotemporal Clusters of COVID-19-Associated Symptoms and Prevention using a Participatory Surveillance App: The @choum Study Protocol.*
JMIR Research Protocols 2021. https://doi.org/10.2196/30444

Co-author *Can big data be used to monitor the mental health consequences of COVID-19?.*
International Journal of Public Health 2021. https://doi.org/10.3389/ijph.2021.633451

Co-author *Serology-informed estimates of SARS-CoV-2 infection fatality risk in Geneva, Switzerland.*
The Lancet Infectious Diseases 2021. https://doi.org/10.1016/S1473-3099(20)30584-3

Co-author *Insights into household transmission of SARS-CoV-2 from a population-based serological survey.*
Nature Communications 2021. https://doi.org/10.1038/s41467-021-23733-5

Co-author - NcD RisC *Heterogeneous contributions of change in population distribution of body mass index to change in obesity and underweight.*
Elife 2021. https://doi.org/10.7554/eLife.60060

First author *Socioeconomically Disadvantaged Neighborhoods Face Increased Persistence of SARS-CoV-2 Clusters.*
Frontiers in Public Health 2021. https://doi.org/10.3389/fpubh.2020.626090

Co-author *Perceptions of immunity and vaccination certificates among the general population: a nested study within a serosurvey of anti-SARS-CoV-2 antibodies (SEROCoV-POP).*
Swiss Medical Weekly 2020. https://doi.org/10.4414/smw.2020.20398

Co-author - NcD RisC *Height and body-mass index trajectories of school-aged children and adolescents from 1985 to 2019 in 200 countries and territories: a pooled analysis of 2181 population-based studies with 65 million participants.*
The Lancet 2020. https://doi.org/10.1016/S0140-6736(20)31859-6

First author *Geospatial digital monitoring of COVID-19 cases at high spatiotemporal resolution.*
The Lancet Digital Health 2020. https://doi.org/10.1016/S2589-7500(20)30139-4

Co-author *Seroprevalence of anti-SARS-CoV-2 IgG antibodies in Geneva, Switzerland (SEROCoV-POP): a population-based study.*
The Lancet 2020. https://doi.org/10.1016/S0140-6736(20)31304-0

Co-author *A reference map of the human binary protein interactome.*
Nature 2020. https://doi.org/10.1038/s41586-020-2188-x

Co-author *GeoLaus, une étude de l'influence des caractéristiques géo-environ-nementales sur la santé.*
Praxis 2020. https://doi.org/10.1024/1661-8157/a003363

Co-author - NcD RisC *Repositioning of the global epicentre of non-optimal cholesterol.* **Nature** 2020. https://doi.org/10.1038/s41586-020-2338-1

Co-first author *Overlapping spatial clusters of sugar-sweetened beverage intake and body mass index in Geneva state, Switzerland.* **Nutrition and Diabetes** 2019. https://doi.org/10.1038/s41387-019-0102-0

Co-author *Mapping, modeling, and characterization of protein–protein interactions on a proteomic scale.* **Current Opinion in Structural Biology** 2017. https://doi.org/10.1016/j.sbi.2017.05.003

PREPRINTS

First author *Evolution of the spatial distribution of alcohol consumption following alcohol control policies: a 25-year cross-sectional study in a Swiss urban population.*
medRxiv 2022. doi.org/10.1101/2022.01.16.22269160

Co-author *Binary Interactome Models of Inner-Versus Outer-Complexome Organization.*
bioRxiv 2021. doi.org/10.1101/2021.03.16.435663.