

Marc-Aurèle RIVIÈRE

## Research / Data Scientist

Cognitive & Data Scientist ♦ Specialized in behavioral research and multimodal HMI  
♦ Currently working as a research engineer designing, developing, and evaluating assistive devices for the blind, within AR environments ♦ Proficient R programmer.

## Work experience

### Research Engineer

LITIS Rouen, France / 2021

- ♦ Design & develop a VR/AR platform in Unity to evaluate and train non-visual navigation for Visually Impaired People (VIP). Navigation-relevant information is collected using motion tracking systems and provided to the user through custom audio-tactile wearable interfaces.
- ♦ Evaluate the impact of the information provided on navigational performance.

### Graduate Teaching Fellow

University of Rouen Rouen, France / 2017 - 2020

Gave lectures & practicals on Web Development, Python programming, GUI design in Java (Swing), Image Processing in Python, and Intro to ML/DL models for Computer Vision

### Engineering Internship

SKERI San Francisco / 2018 - 2019

Worked on an indoor localization solution using Visual Inertial Odometry, particle filtering, object detection, and real-time video streaming (Python/Flask, Swift)

### Research Internship

LPNC & GIPSA-Lab Grenoble, France / 2016

- ♦ Developed an audio interface converting depth images into sound (C++/Qt)
- ♦ Evaluated audio-feedback based shape recognition in blindfolded participants

## Education

### PhD - Cognitive Neurosciences (unfinished - COVID)

Normandy University Rouen, France / 2017 - 2020

Design, implement, and evaluate a wearable haptic interface to help Visually Impaired People navigate autonomously, based on spatial cognition & perception models

### Student Entrepreneurship program

PEPITE Rouen, France / 2018 - 2019

Project management, KPI, Business plan, Branding, IP, A/B testing

### MSc. - Cognitive Neurosciences

PHELMA - Grenoble INP Grenoble, France / 2015 - 2016

Bayesian modeling ♦ Vision, Attention, Language, and Memory models ♦ Deep Learning

### MSc. - Social & Organisational Psychology

University of Strasbourg Strasbourg, France / 2013 - 2015

Recruitment, Skill assessment, Occupational Health, Work Ergonomics

## R&D projects

### ACCESSPACE

- ♦ Designed a wearable vibrotactile belt for haptic-based navigation for VIP
- ♦ Developed wearable camera-based solutions for indoor localization and mapping

### TETMOST & NAV-VIR

- ♦ Participated in the design of an interactive haptic tablet to display simplified images
- ♦ Developed an application to display images and maps through this tablet (Java/Arduino)

## Data Science projects

### Immunohistochemistry data analysis

- ♦ Processed and analyzed immunohistochemistry data with generalized multilevel models
- ♦ Automated technical reports & documentation generation for those analyses (accessible [here](#))

### Genomics data analysis (RT-qPCR)

- ♦ Processed and analyzed RT-qPCR data using multilevel models (*ongoing*)
- ♦ Created an [interactive web application](#) (Shiny) to facilitate data exploration for team members



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🏠 France

📅 32 years old

🔗 <https://ma-riviere.me>

## Languages

French - Native

English - Bilingual

Spanish - A2

Norwegian - A2

## Assets

Inquisitive | Autonomous | Assertive | Creative | Adaptable

## Training & Certificates

- ♦ Google Data Analyst (*ongoing*)
- ♦ Cognitive Modeling ([CMAH'21](#))
- ♦ Data Science School ([DS3'21](#))
- ♦ Neuromatch Academy ([NMA'20](#))
- ♦ Probabilistic AI School ([ProbAI'19](#))
- ♦ Computer Vision School ([ICVSS'17](#))

## Conference Talks

- ♦ RUNN 2019 (Caen, FR)
- ♦ CJCSC 2019 (Paris, FR)
- ♦ ICCHP 2018 (Linz, Austria)
- ♦ HANDICAP 2018 (Paris, FR)

## Conference Posters

- ♦ NER 2019 (San Francisco, USA)
- ♦ RUNN 2019 (Caen, FR)
- ♦ CRD 2019 (Caen, FR)
- ♦ French-Polish Research & Innovation forum 2017 (Warsaw, PO)

## Invited Talks

- ♦ Burgundy University (Dijon, FR)
- ♦ Politechnika Łódzka (Łódź, PL)
- ♦ SKERI (San Francisco, USA)
- ♦ French-Norwegian PhD Day (Trondheim, NO)

## Technical skills

### Data Science

Data wrangling (Tidyverse, data.table, arrow) ♦ Database (DuckDB, PostgreSQL) ♦ Web Scraping ♦ Visualizations (ggplot) ♦ Dashboards (Shiny) ♦ Publishing (Quarto, R Markdown)

### Statistics & Machine Learning

Bayesian Generalized Multilevel Location-Scale-Shape models ♦ Generalized Additive Models ♦ Survival Analysis ♦ IRT ♦ ARIMA ♦ HMM ♦ Mixtures ♦ Power Analysis

### Web Development

JAM-Stack (Quarto, Hugo) ♦ Back-End API (NodeJS, Flask, plumber) ♦ Shiny ♦ Flutter

### Computer Vision & Robotics

Image Processing ♦ Feature detection ♦ Segmentation ♦ Odometry ♦ SLAM

## Transferable skills

### Behavioral Research

- ♦ Behavioral experiments (Psychophysics, Eye-tracking, Motion-tracking, VR/AR)
- ♦ Statistical & Computational modeling

### Scientific Communication

- ♦ Co-organized the IHAW'20 international conference (*canceled due to COVID*)
- ♦ Organized a University-funded 2-day conference for PhD Students (JED 2017)
- ♦ Initiated & participated in several international collaborations (USA, Italy, Poland)
- ♦ Engaged in several public dissemination events (in exhibits & schools, or in the press)

### R&D Project Management

- ♦ Created & wrote a 600k€ research grant proposal (ANR project "SAM-Guide", 2021)
- ♦ Participated in ethics applications & Data Management Plan (GDPR)
- ♦ Recruited & supervised multiple interns from various fields

## Publications (journal)

Faugloire, E., Lejeune, L., **Rivière, M.-A.**, & Mantel, B. (2022). Spatiotemporal influences on the recognition of two-dimensional vibrotactile patterns on the abdomen. *Journal of Experimental Psychology: Applied*, 28(3), 606–628. <https://doi.org/10.1037/xap0000404>

## Publications (proceedings)

Coughlan, J.M., Biggs, B., **Rivière, M.-A.**, Shen, H. (2020). An Audio-Based 3D Spatial Guidance AR System for Blind Users. In Miesenberger, K., Manduchi, R., Covarrubias Rodriguez, M., Peñáz, P. (Eds.), *Lecture Notes in Computer Science* (Vol. 12376, pp. 475–484). Springer Int. Publishing. [https://doi.org/10.1007/978-3-030-58796-3\\_55](https://doi.org/10.1007/978-3-030-58796-3_55)

Souradi, A., Lecomte, C., Romeo, K., Gay, S., **Rivière, M.-A.**, El Moataz, A., & Pissaloux, E. (2020). Towards the Tactile Discovery of Cultural Heritage with Multi-approach Segmentation. In A. El Moataz, D. Mammass, A. Mansouri, & F. Nouboud (Eds.), *Image and Signal Processing* (Vol. 12119, pp. 14–23). Springer Int. Publishing. [https://doi.org/10.1007/978-3-030-51935-3\\_2](https://doi.org/10.1007/978-3-030-51935-3_2)

**Rivière, M.-A.**, Gay, S., Romeo, K., Pissaloux, E., Bujacz, M., Skulimowski, P., & Strumillo, P. (2019). NAV-VIR: An audio-tactile virtual environment to assist visually impaired people. *Proceedings of the 9th International IEEE/EMBS Conference on Neural Engineering*, 1038–1041. <https://doi.org/10.1109/NER.2019.8717086>

**Rivière, M.-A.**, Gay, S., Pissaloux, E. (2018). TactiBelt: Integrating Spatial Cognition and Mobility Theories into the Design of a Novel Orientation and Mobility Assistive Device for the Blind. In Miesenberger, K., Kouroupetroglou, G. (Eds.), *Lecture Notes in Computer Science* (Vol. 10897, pp. 110–113). Springer Int. Publishing. [https://doi.org/10.1007/978-3-319-94274-2\\_16](https://doi.org/10.1007/978-3-319-94274-2_16)

Gay, S., **Rivière, M.-A.**, Pissaloux, E. (2018). Towards Haptic Surface Devices with Force Feedback for Visually Impaired People. In Miesenberger, K., Kouroupetroglou, G. (Eds.), *Lecture Notes in Computer Science* (Vol. 10897, pp. 258–266). Springer Int. Publishing. [https://doi.org/10.1007/978-3-319-94274-2\\_36](https://doi.org/10.1007/978-3-319-94274-2_36)

## Programming Skills

### R

Tidyverse, data.table, arrow, brms, Stanverse, glmmTMB, afex, mgcv, Easystats, emmeans, ggplot, gt

### Python

Tidypolars, skimage, OpenCV, flask, plotnine

### Java

Swing, JAXB

### C#

Unity, LINQ

### JavaScript

NodeJS, Socket.io, Observable

### HTML & CSS

Bootstrap

### SQL

DuckDB, PostgreSQL

### Stan

### C / C++

## Frameworks & Tools

### Scientific Publishing

Quarto, R Markdown, LaTeX

### Git / SVN

### Shiny

### Unity

OpenMaze, Steam Audio

### OpenCV

### Flutter

### Arduino

### SPSS

### IDE

- ♦ RStudio, VS Code, PyCharm, IntelliJ
- ♦ Unity Editor, Android Studio
- ♦ G. Colab, Jupyter, RStudio Cloud