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 on a haptic tablet (Java)

Data Science projects

Immunohistochemistry analysis
♦ Processed and analyzed immunohistochemistry data with generalized multilevel models
♦ Automated technical reports & documentation generation for those analyses (accessible here)

[Ongoing] Q-PCR Genomics
♦ Processed and analyzed Q-PCR data using Bayesian generalized multilevel models
♦ Created an interactive web application (Shiny) to facilitate data exploration for team members

✉ marc.aurele.riviere@gmail.com
⌂ 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) ◈ Dashbords (Shiny) ◈ Publishing (Quarto, R Markdown)

Statistics & Machine Learning

Bayesian Generalized Multilevel Models ◈ 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 (Exhibits, Schools, Press)

R&D Project Management

♦ Designed & wrote a 600k€ research grant proposal (project SAM-Guide, ANR 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., Peňáz, 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

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

Riviere, 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

Riviere, 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

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

Programming Skills

R

Tidyverse, data.table, *Tidymodels*, 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

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