



Loïc Tetrel

DATA SCIENCE ENGINEER · MEDICAL IMAGING

France (Auvergne-Rhône-Alpes) / Remote

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*With 5+ years of experience building **data science** projects in medical imaging for both **industry** and **academia**, my main goal is always to deliver high quality work. I define myself as **curious** and **autonomous**.*

Professional profile

MRI, ultrasound, open source, machine learning, distributed training, statistics, GPU computing, image/volume registration, 3D reconstruction and rendering, tracking, camera optics, computer science.

Education

ÉTS (École de technologie supérieure) Montréal (including McGill courses)

M. A. SC. IN ELECTRICAL ENGINEERING, GRADUATED WITH HONORS

[Montréal, CANADA](#)

Sept. 2014 - Aug. 2016

Lyon INSA (National Institute of Applied Sciences of Lyon)

M. ENG. IN ELECTRICAL ENGINEERING

[Lyon, FRANCE](#)

Sept. 2012 - Aug. 2016

IUT (University Institutes of Technology) Lyon 1

TECHNICAL DEGREE IN INDUSTRIAL ENGINEERING AND MAINTENANCE, GRADUATED WITH HONORS

[Lyon, FRANCE](#)

Sept. 2010 - Jun. 2012

Skills

| | |
|-------------------------------|---|
| Low-level programming | Bash, C, C++11 (OpenCV, Ceres, Boost, Eigen), Golang, CUDA, Assembly |
| High-level programming | Python3 (NumPy, Matplotlib, PyTorch, TensorFlow), MATLAB (statistical and ML toolbox) |
| Softwares | SLURM, Git, Docker, Jupyter, FFmpeg, GNU Make, Kubernetes, Openstack, \LaTeX , Blender, 3D slicer |
| Operating systems | Ubuntu 18, Windows 10 |
| Languages | French (mother tongue), English (professional, TOEIC 925), Polish (fluent) |

Work Experience

SIMEXP lab, CRIUGM - University of Montreal

[Remote / Montréal \(QC\), CANADA](#)

DATA SCIENCE ENGINEER*: NEUROIMAGING RESEARCH

Nov. 2018 - May 2022

- Software tools for neuroimaging. <https://github.com/SIMEXP>
HPC scalable fMRI preprocessing and quality-control on BIDS datasets [3] (**fMRIPrep**, **Datalad**, **SLURM**)
fMRIPrep Long-Term Support and reproducibility testing [1] (**Datalad**, **SLURM**)
- Machine learning. <https://github.com/courtois-neuromod>
Graph convolution network package for fMRI data: feature preprocessing, training, evaluation and testing/visualization (**Nilearn**, **PyTorch**).
Fast and accurate fMRI registration with quaternions using convolutional neural network [4] (**TensorFlow**)
Benchmarking distributed training applied to brain-state annotation [5, 6] (Intel collaboration) and SoundNet using HEAR (**PyTorch**, **SLURM**)
- Research data platforms. <https://github.com/neurolibre>
NeuroLibre [2] administrator: Compute cluster and backend APIs to build/publish submissions (**Openstack**, **Kubernetes**/**Binderhub**)
Data organization, user documentation and maintenance for SIMEXP (**bash**)
- Upstream contributions (**TensorFlow**, **Nilearn**, **Binderhub**), oral presentations and hackaton trainer (MAIN, OHBM)

Straumann Group, Digital Business Unit

[Montréal \(QC\), CANADA](#)

COMPUTER VISION DEVELOPER*: 3D SOLUTIONS FOR DIGITAL DENTISTRY.

Dec. 2016 - Oct. 2018

- 3D reconstruction algorithms
State of the art research on stereoscopy using phase-shift model (**C++**, **Ceres**, **Eigen**)
Optical calibration and distortion correction (**OpenCV**, **Ceres**, **NumPy**)
Metrology reports and software documentation
Conception of a virtual scanner for software experimentation and hardware validation (**Blender**)
- Conferences attendance (CVPR 2018, Agile Tour 2017), open days for recruiting interns (Concordia, Polytechnique, McGill)

LATIS, ÉTS Montréal

[Montréal \(QC\), CANADA](#)

RESEARCH ASSISTANT*: GRAPH-BASED ESTIMATION OF PROBE TRAJECTORY FOR SENSORLESS FREEHAND 3D US.

Jan. 2015 - Nov. 2016

- Calibration of optical and electromagnetic probes for freehand 3D US (**C++**, **3D slicer**/**PLUS**, **Make**)
- Master thesis [7]: Sensorless image reconstruction for ultrasound
Image registration from echographic sequence using speckle-decorrelation (**C**, **Make**)
Trajectory estimation by a directed graph with gaussian process uncertainty and Lie Algebra [8] (**Matlab**, **C++**, **Boost**)
- Conferences attendance (REPARTI 2016, MICCAI/MLMI 2016)

Thales Group, Thales Air Systems

Limours, FRANCE

INTERN* : FAST INITIALIZATION OF CARTESIAN TRACK USING FM BAND

Feb. 2014 - Aug. 2014

- Track initialization in cartesian coordinates with range measurements, using a custom non-linear filter and statistical methods (**MATLAB**)
- Validation on aircraft records (**MATLAB**, **C++**, **Eigen**)

Relevant Projects

- Computer science blog (**Jupyter**, **HTML**) <https://ltetrel.github.io/>
- Co-funder of bitprobe *, bitcoin price forecasting using blockchain features (**TensorFlow**)
- Kodi/Jellyfin media server with custom tool for subtitle synchronization (**Bash**, **FFmpeg**, **TensorFlow**)
- Video games tools and bots (**Python**, **Golang**)
- PCB design of a detection system for an autonomous robot (**C**, **Altium**)

McGill, ÉTS Montréal

Montréal (QC), CANADA

2014 - 2016

- Registration of MRI and CT images using Gaussian Process interpolation with uncertainty (**Matlab**)
- GPU implementation of sobel filtering on Nvidia GTX (**C**, **CUDA**)
- Automatic classification and prediction models for early Parkinson disease from SPECT imaging (**Matlab**)

Volunteer Experience

Big Band ÉTS

Montréal (QC), CANADA

GUITARIST AND EVENT COORDINATOR

Sept. 2015 - Aug. 2016

ClubElek (Lyon INSA)

Lyon, FRANCE

BEGINNER TEAM MANAGER

Sept. 2012 - Jun. 2013

- Coordinator assistant for InnoRobo Lyon 2013.

Awards

Mar, 2016 **Grant**, Bourse interne ÉTS : merit scholarship for graduate students (3.000 CAD).

Montréal (QC), CANADA

May, 2015 **24h de l'innovation: 1st place**, Mobile app to teach science for children.

Montréal (QC), CANADA

Aug, 2014 **Explora'sup grant**, Regional merit scholarship for undergraduate students (2.000 EUR).

Lyon, FRANCE

May, 2013 **Eurobot: qualification phase**, International robotic contest with autonomous robots.

La Ferté B., FRANCE

Publications

- [1] Yohan Chatelain, **Loïc Tetrel**, Christopher J. Markiewicz, Gregory Kiar, Oscar Esteban, et al. "Testing the long-term reproducibility of fMRIprep results". In: 2022. Poster presented at OHBM 2022, Glasgow, Scotland.
- [2] Agah Karakuzu, Elizabeth DuPre, **Loïc Tetrel**, Patrick Bermudez, Mathieu Boudreau, et al. "NeuroLibre : A preprint server for full-fledged reproducible neuroscience". 2022. Poster presented at OHBM 2020, Online.
- [3] Désirée Lussier, Natasha Clarke, Hao-Ting Wang, Arnaud Boré, **Loïc Tetrel**, et al. "Standardized preprocessed derivatives for the Comprehensive Assessment of Neurodegeneration and Dementia (COMPASS-ND) Study". In: *Alzheimer's & Dementia* None.None, Supplement (2022). Alzheimer's Association International Conference 2022, None. Poster presented at AAIC 2022, San Diego, CA.
- [4] **Loïc Tetrel** and Pierre Bellec. "Fast and accurate EPI spatial normalization using convolutional neural network". In: 2021. Poster presented at OHBM 2021, Online.
- [5] Yu Zhang, **Loïc Tetrel**, Bertrand Thirion, and Pierre Bellec. "Functional annotation of human cognitive states using deep graph convolution". In: *NeuroImage* 231 (2021), p. 117847.
- [6] Yu Zhang, **Loïc Tetrel**, and Pierre Bellec. "Benchmarking 3d-CNN models for brain decoding on CPU servers". In: 2019. Poster presented at MAIN 2019, Montreal, Canada.
- [7] **Loïc Tetrel**. "Estimation de la trajectoire d'une sonde ultrasonore pour l'échographie 3D main-libre sans capteur de position". PhD thesis. École de technologie supérieure, 2016.
- [8] **Loïc Tetrel**, Hacène Chebrek, and Catherine Laporte. "Learning for Graph-Based Sensorless Freehand 3D Ultrasound". In: *Machine Learning in Medical Imaging*. Ed. by Li Wang, Ehsan Adeli, Qian Wang, Yinghuan Shi, and Heung-Il Suk. Springer. Cham: Springer International Publishing, 2016, pp. 205–212.

Interests

Travels Europe, USA, Canada, Thailand, Morocco

Hobbies Video games, IT, politics, reading books (fantasy, science-fiction), playing music (rock, jazz)