Loïc **Tetrel**

Senior Data Science Engineer · - Medical Imaging
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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) — *Montréal, CANADA*
M. A. Sc. in Electrical Engineering, graduated with honors — *Sept. 2014 - Aug. 2016*

Lyon INSA (National Institute of Applied Sciences of Lyon) — *Lyon, FRANCE*
M. Eng. in Electrical Engineering — *Sept. 2012 - Aug. 2016*

IUT (University Institutes of Technology) Lyon 1 — *Lyon, FRANCE*
Technical degree in Industrial Engineering and Maintenance, graduated with honors — *Sept. 2010 - Jun. 2012*

Skills

Low-level programming	`Bash`, `C`, `Golang`, `C++11` (`OpenCV`, `Ceres`, `Boost`, `Eigen`), `CUDA`, `Assembly`
High-level programming	`Python` (`NumPy`, `Matplotlib`, `PyTorch`, `TensorFlow`), `MATLAB` (statistical and ML toolbox)
Softwares	`SLURM`, `Git`, `Docker`, `Jupyter`, `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`
  - Data organization and maintenance for SIMEXP (`bash`)
  - NeuroLibre [2] administrator: Compute cluster and backend APIs to build/publish submissions (`Openstack`, `Kubernetes/Binderhub`)
- 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 distorsion 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)

* References available upon request.

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 (`Bash`)
- AI applied to subtitle synchronization and video game bots (`TensorFlow`, `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 and Asia (Thailand)

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

* References available upon request.