# Loïc **Tetrel**


Senior Data Scientist · Medical Imaging

*France (Isere) / Remote*

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*With **8+ years** of experience building **computer vision** 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

Open source computer vision, medical imaging, distributed and GPU computing, 3D reconstruction and rendering, image and volume registration, sensor tracking, computer science.

## Education

**ÉTS (École de technologie supérieure) Montréal / McGill** — *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

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|---|---|
| **Low-level programming** | `Bash`, `C++20` (`OpenCV`, `ONNXruntime`, `ITK/VTK`, `Eigen`, `Ceres`), `CUDA`, `Assembly` |
| **High-level programming** | `Python3` (`NumPy`, `Matplotlib`, `MONAI`, `PyTorch`), `MATLAB` (statistical and ML toolbox) |
| **Softwares** | `CMake`, `3D Slicer`, `ParaView`, `NVIDIA Omniverse`, `Blender`, `SLURM`, `Git`, `Jupyter`, `FFmpeg`, `Docker` LaTeX |
| **Operating systems** | `Ubuntu` 18, `Windows` 10 |
| **Languages** | French (mother tongue), English (professional, TOEIC 925), Polish (fluent) |

## Work Experience

**Kitware SAS, Computer Vision team** — *Lyon, FRANCE*

Lead Data Scientist*: Open-source medical AI and computer vision — *Nov. 2022 - Present*

- Generic Computer Vision. `https://gitlab.kitware.com/keu-computervision`
  - Leading open-source projects for AutoML (LightningHydraDetection) and large scale 3D annotation (ParaLabel). (`PyTorch`, `VTK`, `CMake`)
  - Low-powered underwater object detection with IFREMER (`ONNXruntime`, `PyTorch`, `CMake`)
  - CT 3D registration for geology (`ITK`, `CMake`)
  - Trainings for industry and previous ML teacher at EPITA Lyon
- Medical Computer Vision.
  - 3D reconstruction from Multi-View Stereo and NeRF (`OpenCV`, `PyTorch`)
  - Low Intensity Focused Ultrasound with OpenWater `https://github.com/OpenwaterHealth/OpenLIFU-python` (`3DSlicer`)
  - CT/PET whole body segmentation with MedUni Wien `https://github.com/ENHANCE-PET` [*paper to come*] (`Pytorch, MONAI`)
  - Digital twin for endoscopy (`NVIDIA Omniverse`)
- Business development and marketing.
  - Writing technical proposals for customers and academics grant collaborations
  - Conference attendance with stand exhibitions (MICCAI24, ICCV23) and various B2B events

**SIMEXP lab, CRIUGM - University of Montreal** — *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`)
  - Graph convolution for brain-state annotation with Intel [5] (`Nilearn`, `SLURM`, `PyTorch`)
  - Fast and accurate fMRI registration with quaternions using convolutional neural network [4] (`TensorFlow`)
- 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 the lab (`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 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 [6]: 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 [7] (`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/`
- Kodi/Jellyfin media server with custom tool for subtitle synchronization (`Bash`, `FFmpeg`, `TensorFlow`)
- Video games tools and bots (`Python`)

**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`)

## Publications


[1] Yohan Chatelain, **Loïc Tetrel**, Christopher J. Markiewicz, Mathias Goncalves, Gregory Kiar, et al. “A Numerical Variability Approach to Results Stability Tests and Its Application to Neuroimaging”. In: *IEEE Transactions on Computers* 74.1 (2025), pp. 200–209.

[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] **Loïc Tetrel**. “Estimation de la trajectoire d’une sonde ultrasonore pour l’échographie 3D main-libre sans capteur de position”. MA thesis. École de technologie supérieure, 2016.

[7] **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, geopolitics, reading books (fantasy, science-fiction), playing music