Sébastien Tourbier, PhD

Scientist with 10+ years of experience

PROFILE

Data scientist, reproducibility enthusiast, with 10+ years of experience in the development of algorithms and processing pipelines for medical image analysis in industry and academia.

Extensive knowledge in Image Processing, Neuroscience, and Software development. Proven track record of delivering success in management and leadership roles. Working efficiently in agile, dynamic and fast-paced environments.

French | 35y old | C permit

AREAS OF EXPERTISE

- Big Data
- Neuroimaging
- Medical image computing
- Reproducible pipelines
- Software development
- Optimization algorithms

SOFT SKILLS

- Analytical thinker
- Excellent coordinator
- Team player
- Fast learner
- Strong leadership
- Organizational skills

CONTACT

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Github profile

Linkedin profile

PUBLICATIONS

Google Scholar profile

ORCID profile

ResearchGate profile

WORK EXPERIENCE

Scientist (Postdoctoral fellow) — Mar '17 – ongoing

Connectomics Lab - Lausanne University Hospital, Lausanne, CH

- Lead developer of three highly portable, reusable and reproducible image processing pipeline softwares (MIAL Super-Resolution Toolkit 2, Multi-scale Brain Parcellator and Connectome Mapper 3), written in Python, empowered by Nipype, encapsulated in a software container image and released as BIDS-Apps. Employed PEP8 standard and modern software development life cycle practices to guarantee a code of high quality, and a transparent and robust development.

  Python | Nipype | Docker | Git/GitHub | CircleCI | coverage.py | PEP8 | Sphinx/read-the-docs
- Responsible for large-scale data processing on CHUV HPC infrastructure

  SLURM | Singularity
- Coordinator and trainer of best practices for neuroimaging data management in the Brain Communication Pathways Sinergia Consortium and in the NCCR Synapsy adopting to the Brain Imaging Data Structure (BIDS) standard.
- Co-supervision of PhD students.

Research Associate (PhD) — Oct '12 - Oct '16

Medical Image Analysis Laboratory, Lausanne University Hospital, Lausanne, CH

- Developed advanced image processing methods (Brain localization and extraction, bias field correction, intensity normalization, rigid and diffeormorphic registration, super-resolution reconstruction, segmentation) to improve fetal brain MRI images.
- All algorithms and methods necessary to perform the whole image reconstruction pipeline have been implemented in the C++ Medical Image Analysis Laboratory Super-Resolution Toolkit (MIALSRTK), publicly available at https://github.com/Medical-Image-Analysis-Laboratory/mialsuperresolutiontoolkit.

  Git/GitHub | C++/CMake | ITK | VTK | Docker | TravisCI | Doxygen

Research Associate — Jan '15 - Aug '15

Computational Radiology Laboratory, Harvard Medical School, Boston, MA

- Process high-field fetal brain MRI and work on the automatization of brain extraction in the pipeline for super-resolution fetal brain MRI.

  Git/GitHub | C++/CMake | ITK | VTK

Research Assistant (M.Sc. Thesis) and R&D Engineer — Feb '11 – June '12

Bracco Suisse S.A. – Research Center, Geneva, CH

- Designed, prototyped and validated image processing systems (optimized downsampling, automatic segmentation, post-processing) for carotid plaque tracking in dynamic contrast-enhanced ultrasound modality in Matlab.
- Created an ultrasound tissue simulator based on physical principles for validation.
- Ported algorithms to C# / C++, the development environment of *VueBox™*, a quantification software tool.
- Experienced with memory / performance profiling, optimized numerical library (Intel MKL), CPU parallelization and GPU programming.
- Developed a website in support to commercialization of *VueBox™*.

  Matlab | Matlab | C# | C++ | ITK | Intel MKL | CUDA | CSS | HTML | PHP | Javascript | SQL

Research Assistant — Jun '10 – Aug '10

Nestlé Research Center (Digestive Heath Group) & EPFL (LTS5), Lausanne, CH

- Integrated Matlab-based methods in a standalone application with GUI, wrote HTML documentation and User's guide.

  Matlab
- Responsible for image acquisition guidelines.
- Participated in a seminar to present the application developed to other research groups.

EDUCATION

Oct '12 - Oct '16

PhD in life sciences (Electrical engineering)

University of Lausanne (UNIL) — Lausanne, CH

- Thesis: Novel Processing Methods for Improved Fetal Brain MRI
- Relevant courses:
  - A Network Tour of Data Science
  - Advanced Biomedical Imaging Methods and Instrumentation

Aug '15

Medical Image Computing Summer School

University College London (UCL) — London, UK

Feb '09 - Sep '11

M. Sc. in Communication System (Signal and image processing specialization)

Swiss Federal Institute of Technology (EPFL) — Lausanne, CH

- Thesis: Atherosclerotic Carotid Plaque Segmentation in Contrast-Enhanced Ultrasound Clips
- Relevant courses:
  - Foundations of Imaging Science
  - Image Processing
  - Statistical Signal Processing
  - Neural networks
  - Pattern Classification and Machine Learning
  - Biomedical Signal Processing
  - Biomedical sensors
  - Statistics for Genomic Data Analysis

Sep '08 - Jan '09

Intensive English and Internship Courses

EF International Language Schools — Vancouver, B.C.

Oct '05 - Jul '08

B. Sc. in Communication Systems

Swiss Federal Institute of Technology (EPFL) — Lausanne, CH

Relevant courses:

- Computer graphics
- Computer programming
- Computer Networks
- Distributed Systems
- Information Systems
- Signal Processing for digital communications
- Physics
- Stochastic models

CO-CURRICULAR

- Member of the Neuroimaging research pipelines working group of the OHBM Sustainability & Environmental Action Special Interest Group.
- Contributor to open-source projects such as Brain Imaging Data Structure and eddymotion.
- Scientific event co-organizer (Brainhack Open Geneva '19, Brain Dynamics on the Connectome Summer School '21).
- Principal investigator of multiple brainhack projects (Brainhack Open Geneva '19, Brainhack Global Geneva '19, Brainhack OHBM '20, Brainhack Global Geneva '21).

AWARDS AND GRANTS

- ReproNim/INCF 2019-2020 Training Fellow.
  See https://www.repronim.org/fellowship.html for more details.
- PhD-mobility grant from the Swiss National Science Foundation to visit for 6 months the computational radiology laboratory in Boston.

SELECTED TALKS

- "Slice-by-slice intensity inhomogeneity correction from a globally-estimated bias field for fetal MRI reconstruction", Swiss congress of radiology '18
- Invited speaker at the Computational Magnetic Resonance Brain Imaging Summer School '19 of the European ITN Translational Brain Imaging Network (TRABIT)
- "Automatic brain extraction in fetal MRI using multi-atlas-based segmentation", SPIE Medical Imaging '15

PROGRAMMING SKILLS

Python/Matlab	5+ yrs
C++/CMake	4+ yrs
Linux Shell	5+ yrs
HTML/CSS	3+ yrs
LaTeX	10+ yrs

SOFTWARES/TOOLS

Versioning — 10+ yrs
git/github, datalad

Continuous integration — 5+ yrs
circleci, travisci, coverage.py, pytest

Visualization — 5+ yrs
matplotlib, plotnine, seaborn

Data handling/image analysis — 4+ yrs
numpy, pandas, nipype, itk, scipy

Neuroimaging softwares — 4+ yrs
ants, dipy, mrtrix3, freesurfer, fsl, afni, python-mne

Neuroimaging standards — 4+ yrs
dicom/nifti, bids, bids-apps

Software container — 4+ yrs
docker, singularity

Machine learning / DL — 3+ yrs
scikit-learn/nilearn, pytorch, tensorflow

High performance computing — 3+ yrs
slurm

OPERATING SYSTEMS

Linux / Mac	10+ yrs
Windows	10+ yrs

LANGUAGES

French	Native
English	Fluent
German	B1 Level