Pierre Dérian

Curriculum Vitae

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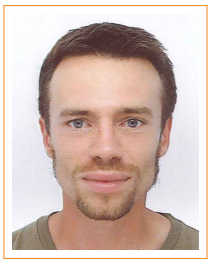

— PhD-engineer, applied mathematics —
scientific computing, signal and image processing
computer vision & fluid dynamics

Experience

since 2018 **Research Engineer**, *CEA Tech*, Nantes, France.
R&D and technology transfer from the academy towards industrial application. Computer vision, signal processing, machine learning, data analysis and visualization ...

2016–2017 **Post-doctoral Researcher**, *INRIA Rennes - Bretagne Atlantique*, France.
Study of stochastic oceanic models with Etienne Mémin (Fluminance team): "transport under location uncertainty". Design of noise models for the stochastic representation of small scales unresolved by large scale oceanic models. Implementation in the NEMO European ocean engine.

2015–2018 **Independent Researcher / consultant**, France.
Providing scientific consulting on image processing, motion estimation and lidar data analysis.

2013–2014 **Post-Doctoral Researcher**, *Atmospheric Lidar Group*, Chico, California, USA.
At the California State University, Chico under the supervision of Shane Mayor. Real-time estimation of dense 2D 2-component wind fields from aerosol backscatter lidar data (*REAL*) using computer vision techniques. Integration of my software *Typhoon*; design and implementation of the numerical aspects of the experiment (data collection and organization, processing, visualization in real-time, GPU implementations); analysis of results and documentation.

2013 **Consultant**, *Spectral Sensor Solutions (S3)*, Chico, California, USA.
Feasibility study: potential of the SAMPLE aerosol lidar for dense 2D, 2-component wind motion estimation in real time. Integration of *Typhoon* software, data analysis and documentation.

2009 **5th Year Final Project & Master Internship**, *IMFT*, Toulouse, France.
Institute of Fluid Mechanics, group EMT2. Five months, under the supervision of Marianna Brazza. *Physical analysis and numerical simulation of the buffeting around an aircraft wing at transonic speed*.

Educational Background

2009–2012 **PhD, Applied Mathematics**, *INRIA Rennes - Bretagne Atlantique*, Rennes, France.
National Institute for Research in Computer Science and Control, Fluminance team, under the supervision of Étienne Mémin. *Wavelets & Fluid Motion Estimation*: design of wavelet-based computer vision methods for fluid flows measurement and analyzis (*Typhoon* algorithm).

2009 **Master, Research in Applied Mathematics**, *IMT*, Toulouse, France.
Toulouse Mathematics Institute. Specialization in *Numerical Mathematics*.

2004–2009 **Master, Engineering in Applied Mathematics**, *INSA*, Toulouse, France.
National Institute for Applied Sciences of Toulouse, department of Mathematical & Modeling Engineering. Specialization in *Numerical Methods and Physics Modeling*.
International course ASINSA (mixed Asian/French group).

General Skills

Modeling, Numerical simulation, High performance scientific computing.

Computer vision, Image processing, Motion estimation.

Machine learning, Data analysis & visualization.

Numerical methods associated to an important background in physics.

Technical and scientific writing/communication in English and French.

Computer Vision & Image Processing

Expertise — Image registration (motion estimation): dense variational methods and sparse correlation techniques, with real-time constraints (GPU acceleration).

Contribution — *Typhoon* software: wavelet-based motion estimation for fluid flows (C++, CUDA). `http://www.pierrederian.net/typhoon.html`

Computer Skills

Languages — Python (advanced), FORTRAN, C/C++, CUDA, SQL (good command) ; HTML, Javascript (notions).

Software — Numpy/Scipy/Pandas/Matplotlib, Matlab, OpenCV (advanced), Keras (notions).
Photoshop/Gimp, Illustrator/Inkscape (advanced); LaTeX(advanced).

Systems — Development on Linux Ubuntu & Mac OS X (advanced). Version control (Git, SVN), scheduling (OAR), shell scripting, automatization and batch processing.

Languages

French — **Mother tongue**

English — **Professional Competence** — *18 months in the US (2013–14), 945/990 at TOEIC (2007).*

Spanish — **Intermediate** — *Conversationally fluent.*

Interests

Drawing, digital graphic arts – illustration, visualization (Processing), photography.

Personal interest for Earth Sciences.

Rock-climbing, hiking, surfing.

Selected Publications

Exhaustive list: pierrederian.net/publications.html

Journal Articles

Chapron, B., **P. Dérian**, E. Mémin, and V. Resseguier. "Large scale flows under location uncertainty: a consistent stochastic framework". In: *Quart. J. Roy. Meteor. Soc.* (Nov. 2017).

Dérian, **P.** and R. Almar. "Wavelet-Based Optical Flow Estimation of Instant Surface Currents From Shore-Based and UAV Videos". In: *IEEE Trans. Geosci. Remote Sens.* 55 (Oct. 2017), pages 1–8.

Dérian, **P.**, C. F. Mauzey, and S. D. Mayor. "Wavelet-based optical flow for two-component wind field estimation from single aerosol lidar data". In: *J. Atmos. Ocean. Technol.* 32 (2015), pages 1759–1778.

PhD Thesis

Dérian, **P.** "Wavelets and Fluid Motion Estimation". PhD thesis. MATISSE, Université Rennes 1, 2012.