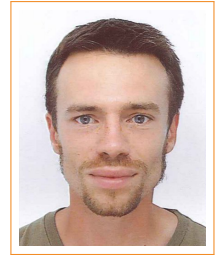


# Pierre Dérian

## Curriculum Vitae

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Age 34, French citizenship



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

## Experience

- since 2018 **Research Engineer**, *CEA Tech DGDO*, 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 **5<sup>th</sup> 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 analysis (*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.  
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). Application to aerosol lidar data.
- 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, PyTorch/Torchvision (advanced), Keras/Tensorflow, Deepstream (notions).
- 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** *Con conversationally fluent.*

## Selected Publications

Exhaustive list: [pierrederian.net/publications.html](http://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.* 144.710 (2018), pages 251–260.
- Hamada, M., **P. Dérian**, C. F. Mauzey, and S. D. Mayor. “Optimization of the cross-correlation algorithm for two-component wind field estimation from single aerosol lidar data and comparison with Doppler lidar”. In: *J. Atmos. Ocean. Technol.* 33 (2016), pages 81–101.
- Mayor, S. D., **P. Dérian**, C. F. Mauzey, S. M. Spuler, P. Ponsardin, J. Pruitt, D. Ramsey, and N. S. Higdon. “Comparison of an analog direct detection and a micropulse aerosol lidar at 1.5- $\mu\text{m}$  wavelength for wind field observations—with first results over the ocean”. In: *J. Appl. Remote Sens.* 10.1 (2016), page 016031.
- 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.