# Alexis Roche

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French National | Married, 2 Children

## Professional Profile

Hands-on scientific team leader, graduated from École Centrale Paris, PhD in engineering science, with a specialist expertise in computer vision and machine learning. Has operated in academic research for 15 years before moving to R&D in industry (healthcare, electro-domestic, entertainment). Strong experience in the development of both open source and commercial software in Python, C, C++. *Keywords:* applied mathematics, statistics, artificial intelligence, machine learning, computer vision, medical image analysis, clinical studies, computer graphics.

## Key Skills

**STATISTICAL MODELING:** Strong experience developing model-based algorithms for statistical inference, with applications in machine learning, computer vision, computer graphics, ...

**TECHNICAL LEADERSHIP:** Proven ability to coordinate a team and manage objectives in multidisciplinary environments.

**SCIENTIFIC COMPUTING:** 15 years experience in Python programming within the NumPy/SciPy ecosystem and interfacing C language with Python.

**SCIENTIFIC WRITING:** Main author of 25 peer-reviewed scientific articles published in international journals, proceedings and books, co-author of more than 100 scholarly publications and 5 published international patents.

## Career Summary

**HEAD OF COMPUTER VISION & ARTIFICIAL INTELLIGENCE** — **2019–present**
**Didimo, Porto, Portugal**

- Leading development of algorithms for automated generation of high-fidelity digital humans from photos. *Keywords:* facial reconstruction, "deep face", animation retargetting, image enhancement.

**SENIOR COMPUTER VISION SCIENTIST** — **2017–2019**
**CoVii, Arçelik/Beko group, Porto, Portugal**

- Developed embedded algorithms for smart domestic appliances (VUXHub and Artisan intelligent oven prototypes demonstrated at IFA Berlin, 2017–18). *Keywords:* image classification, object recognition & tracking, deep learning.

**LEAD CLINICAL RESEARCH – ADVANCED CLINICAL IMAGING TECHNOLOGY** — **2011–2017**
**Siemens Healthineers / Lausanne University Hospital (CHUV), Switzerland**

- Led algorithmic development of a brain morphometry tool (released as part of the *AI-Rad Companion* Siemens solutions) to help radiological reading for patients with suspected neurodegeneration. *Keywords:* magnetic resonance imaging (MRI), brain image segmentation, machine learning for disease classification.
- Main organizer of annual Siemens/CHUV *brain imaging* workshops in Lausanne, Switzerland, 2012–2016.

**PERMANENT RESEARCHER – NEUROIMAGING INSTITUTE**
**French Atomic Commission (CEA), Paris, France** **2002–2011**

- Developed advanced algorithms for image processing and statistical analysis of brain imaging data. *Keywords:* functional, anatomical and diffusion-weighted MRI, image-based population analysis, spatio-temporal image registration, real-time imaging.
- Funded project management: principal investigator (*Karametria* – statistical analysis of brain structures, French National Research Agency project, budget: 620 K€, 2009–2011); team leader (*NIBB* – studying language in infants via functional neuroimaging, French National Research Agency project, 2006–2009).
- Active contributor to the NiPy software library (Neuroimaging in Python, `www.nipy.org`) from 2006.
- Academic Guest at Computer Vision Laboratory, Swiss Federal Institute of Technology Zurich (ETHZ), Switzerland, 2009–2011.

**POST-DOCTORAL RESEARCHER – WOLFSON MEDICAL VISION LABORATORY**
**University of Oxford, UK** **2001–2002**

- Developed advanced medical image registration algorithms.
- Consulting for Mirada Solutions Ltd (now Siemens Molecular Imaging) on image-based deformation tracking (brain, liver).

**PhD CANDIDATE – EPIDAURE PROJECT**
**French National Research Institute (INRIA), Sophia Antipolis, France** **1997–2001**

- Development of multimodal image registration algorithms, with applications in radiotherapy, image-guided surgery and neuroscience.

**CONTINGENT SCIENTIST – FRENCH NATIONAL SERVICE**
**General Directorate for Armament (DGA), Vernon, France** **1996–1997**

- Developed plane trajectory simulator using stochastic process models.

## Education

**PhD, Engineering Science (1997–2001) | University of Nice-Sophia Antipolis, France**

- With highest honor.

**MSc, Cognitive Science (1995–1996) | University Pierre & Marie Curie, Paris VI, France**

- Internship at Experimental Psychology Laboratory, National Center for Scientific Research (CNRS), Paris, France, on modeling human perception of tempo using artificial neural networks.

**Engineer Degree (equivalent MSc) (1993–1996) | Ecole Centrale Paris, France**

- Third year specialization in Applied Mathematics.

## Additional information

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| **Languages:** | Native French, fluent English, basic Italian & Portuguese. |
| **IT skills:** | • Programming languages: Python, C, C++, Matlab, R.<br>• Long-term experience with scientific Python pacakges (numpy, scipy, pylab).<br>• CV/AI Python packages: skimage, PIL, opencv, sklearn, pytorch, tensorflow, keras.<br>• C/Python integration via Cython.<br>• Version control software: git, svn, perforce.<br>• Agile workflow (mainly Scrum) using JIRA & Confluence.<br>• Reporting: LaTeX, MS Office, OpenOffice, LibreOffice, Google Docs. |
| **Publications:** | • ORCID: `http://orcid.org/0000-0002-4821-6893`.<br>• 115 scholarly publications.<br>• Google scholar statistics: 6862 citations, h-index: 33, i10-index: 68 (March 2022).<br>• 5 published international patents. 2 ongoing applications. |
| **Academic work:** | • Post-graduate teaching in computer vision and medical image analysis: about 100 hours (Ecole Centrale Paris, EPFL Lausanne, University of Nice, University of Lausanne, INSERM/CNRS continuing education, ...).<br>• Long-time scientific journal reviewing experience (IEEE Trans. Medical Imaging, Medical Image Analysis, NeuroImage, IEEE Trans. PAMI, IEEE Trans. Signal Processing, Frontiers in Neuroscience, ...).<br>• Supervision: two PhD students and four MSc students as main supervisor, three PhD students and two MSc students as co-supervisor. |
| **References:** | Available on request. |