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, data science and machine learning. Has operated in the fields of academic research, healthcare, electro-domestic and entertainment industry. Strong experience in the development of both open source and commercial software. *Keywords:* applied mathematics, artificial intelligence, image processing, computer vision, medical image analysis, machine learning, deep learning, statistics, Python, C.

Key Skills

DATA SCIENCE: In-depth knowledge of statistics, computer vision, medical image analysis, traditional machine learning and deep learning.

SCIENTIFIC COMPUTING: Over ten years experience in Python programming using 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.

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

Career Summary

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

- Developing computer vision and machine learning algorithms for reconstruction of high-fidelity digital humans from photos.

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

- Developed embedded object recognition and tracking algorithms for smart domestic appliances using traditional computer vision and deep learning (VUXHub and Artisan applications demonstrated at IFA Berlin, 2017–18).

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

- Led algorithmic development of the *MorphoBox* Siemens prototype for brain morphometry using anatomical MRI to help radiological reading for patients with suspected neurodegeneration.
- Contributed a number of clinical validation studies of brain morphometry in collaboration with neurologists and radiologists, via statistical analysis and data mining techniques, in Alzheimer's disease and other dementia, mild cognitive impairment, multiple sclerosis, migraine, anorexia, ...

- Co-supervised three PhD students and two MSc students.
- Main organizer of annual Siemens/CHUV *brain imaging* workshops in Lausanne, Switzerland, 2012–2016.

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

- Developed advanced algorithms for image processing and statistical analysis of functional, anatomical and diffusion-weighted MRI data (population analysis, spatio-temporal image registration, real-time imaging).
- French ANR-funded project management: PI (Karametria project, statistical analysis of brain structures, budget: 620 K€, 2009–2011), team leader (NIBB project, studying language in infants via functional neuroimaging, 2006–2009).
- Active contributor to the NiPy software library (Neuroimaging in Python, `www.nipy.org`) from 2006.
- Main supervisor of two PhD students and four MSc students.
- Academic Guest at Computer Vision Laboratory, Swiss Federal Institute of Technology Zurich (ETHZ), Switzerland, 2009–2011.

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

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

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

- Developed plane trajectory simulator using stochastic process models.

Education

PhD, Engineering Science (1997–2001) | French National Research Institute (INRIA) & University of Nice-Sophia Antipolis, France

- Development of multimodal image registration algorithms, with applications in radiotherapy, image-guided surgery and neuroscience. 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 (now CentraleSupelec, University Paris-Saclay), France

- Third year specialization in Applied Mathematics.

Additional information

Languages: Native French, fluent English, basic Italian & Portuguese.

IT skills:
- Programming languages: Python, C, C++, Matlab, R.
- Long-term experience with scientific Python pacakges (numpy, scipy, pylab).
- CV/AI Python packages: skimage, PIL, opencv, sklearn, pytorch, tensorflow, keras.
- C/Python integration via Cython.
- Version control software: git, svn, perforce.
- Agile workflow (mainly Scrum) using JIRA & Confluence.
- Reporting: LaTeX, MS Office, OpenOffice, LibreOffice, Google Docs.

Publications:
- 115 scholarly publications. Full list: `http://orcid.org/0000-0002-4821-6893`.
- Google scholar statistics: 6602 citations, h-index: 33, i10-index: 66 (July 2021).
- 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, ...).
- Long-time scientific journal reviewing experience (IEEE Trans. Medical Imaging, Medical Image Analysis, NeuroImage, IEEE Trans. PAMI, IEEE Trans. Signal Processing, Frontiers in Neuroscience, ...).

References: Available on request.