

Laurent Jolissaint, Physicist, Engineer, PhD

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Swiss, born 22 Oct 1965, married, 3 children

Profile

Physicist (PhD) and engineer, 20 years working experience (10 years abroad). Skills :

- optical telescopes and adaptive optics systems design, characterization and commissioning
- opto-electro-mechanical systems integrated modeling and simulations
- teaching optics & laboratory at Bachelor and Master level
- scientific modeling softwares design, writing, distribution & maintenance
- control systems design, signal processing, inverse problems in optics
- management of applied R&D contracts in optical instrumentation
- familiar with grant calls procedures (Swiss NSF, Swiss CTI, US NSF)
- reviewer for optics research projects for international astronomical institutes

Professional Experience - most relevant projects

2013-now

Professor of optics at Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud (HEIG-VD), Haute Ecole Spécialisée de Suisse Occidentale (HES-SO) - University of Applied Sciences Western Switzerland

Function : Teaching optics, metrology, physics & R&D in optics

- Chief optical engineer for the Turkish National Astronomical Observatory project (Dogu Anadolu Gozlemevi, DAG). Design of the 4 m telescope optics and science instruments.
- Development of optical system telemetry-based algorithms for telescope image quality characterization & data reduction (PSF reconstruction) - contract with W.M. Keck Observatory Foundation (USA) & Gemini Observatory (USA).
- Development of a micro-endoscope for eye surgery, collaboration with Prof. de Smet, MIOS SA.

2009-2012

Working as an independent researcher in my own company : aquilaOptics - Modeling and design of optical systems and adaptive optics systems

Function : Optical engineering & research in optics

- Development of optical system telemetry-based algorithms for telescope image quality characterization & data reduction (PSF reconstruction) - contract with W.M. Keck Observatory Foundation (USA), Gemini Observatory (USA) & University of Groningen (Netherlands).
- Design of adaptive optics systems for CFH Telescope Corp. (Canada, France, USA)
- Development of a micro-endoscope for eye surgery, collaboration with Prof. de Smet, Clinique de Montchoisi, Lausanne & Prof. Zago, University of Applied Sciences Western Switzerland (HEIG-VD).

- Development of retinal images (SLO/OTC) analysis tool in collaboration with Prof. de Smet, Clinique de Montchoisi, Lausanne, and Dr. Julian, School of Medicine, Austral University, Argentina.

2007-2009

Company: University of Leiden, the Netherlands

Function: Adaptive Optics Systems Research Scientist

- Design of an astronomical adaptive optics system for observation in the thermal infrared (METIS instrument, European Extremely Large Telescope project, European Southern Observatory).
- Design of optical systems for laboratory commissioning of adaptive optics systems (ASSIST test-bench, Very Large Telescope, European Southern Observatory).
- Development of modeling tools for the design of large field-of-view adaptive optics systems (PAOLA software).

2000-2007

Company: National Research Council Canada, Herzberg Institute of Astrophysics, Canada

Function: Adaptive Optics Systems Research Scientist

- Performance prediction and science gain analysis of adaptive optics systems on several North-American extremely large telescopes projects (Thirty Meter Telescope & Very Large Optical Telescope Canada).
- Development and maintenance of an adaptive optics modeling software (software PAOLA) distributed to 60 astronomical institutes over the world.
- Development and laboratory testing of a new type of wavefront sensor (pyramid) - collaboration with the Mechanical Engineering Department of the University of Victoria, Canada.
- Organization of the 1st international workshop on astronomical adaptive optics systems performance analysis tools (point spread function reconstruction), 35 attendees, Herzberg Institute of Astrophysics, Victoria, Canada.
- Development of a method for astronomical adaptive optics systems performance analysis (point spread function reconstruction) for Shack-Hartmann based adaptive optics systems

1995-2000

Company: Centre Suisse d'Electronique et de Microtechnique & University of Geneva

Function: Research Associate

- Study of feasibility and scientific interest analysis of an adaptive optics system for the University of Geneva telescope (PhD thesis).
- Design & realization of an optical turbulence generator for laboratory commissioning of adaptive optics systems (PhD thesis).
- Study & realization of a new type of wavefront sensor for astronomical telescopes - curvature sensing, (Master thesis).

Teaching Experience

Teaching optics at HEIG-VD (Switzerland) - Bachelor, Master level	2012-now
Teaching adaptive optics at the Universities of Leiden & Delft (Netherlands) - Bachelor, Master level	2007
Teaching optics and adaptive optics at the University of Victoria (Canada) - Master, PhD level	2004
Managing Master thesis projects in optics at the University of Victoria (Canada)	2003-2008

and the University of Leiden (Netherlands)

Teaching laboratory experiments in optics at the University of Geneva (Switzerland) **1995-2000**

Management Experience

R&D team management in optical engineering at HEIG-VD **2013-now**

R&D projects in the field of ophthalmic optics, MIOS SA, HEIG-VD, Switzerland **2010-now**

R&D projects in the field of astronomical adaptive optics
Gemini & Keck observatories, Hawai'i, USA **2009-now**

Managing my R&D company, aquilaOptics (looking for project and administration) **2009-2012**

Management of an instrumentation project, up to client delivery, including subcontractor
selection and acceptance tests (ASSIST project, European Southern Observatory) **2007-2009**

Contracts & Research Grants

DAG - East Anatolia Observatory (Turkey) – EUR 240'000 contract **since 2014**
for the development of the DAG 4 m telescope and the suite of astronomical instrumentation, Atatürk
University, Erzurum, Turkey

NSF - National Science Foundation (USA) – US\$ 134,000 contract **since 2012**
for the project "Adaptive Optics Point Spread Function Reconstruction for the W. M. Keck Foundation
Astronomical Observatory", partners: aquilaOptics, Keck Observatory, University of California, Caltech

CTI - Swiss Commission for Technology and Innovation, Innovation Cheque **2011**
CHF 7,500 grant for the project "Reduced Waste Micro-endoscopic System for Ophthalmic Surgery",
partners: aquilaOptics, MIOS S.A. (CH), HEIG-VD

CFHT - Canada France Hawaii Telescope Corporation (USA) – US\$ 32,000 contract **2009**
for the project "Performance modeling of IMAKA, a one degree field-of-view adaptive optics system for the
CFHT", partners: aquilaOptics, CFHT Corporation

AURA - Gemini Astronomical Observatory (USA) – US\$ 50,000 contract **2009**
for the project "Adaptive Optics Point Spread Function Reconstruction for the Gemini-North Adaptive Optics
System", partners: aquilaOptics, Gemini Observatory

CARA - W. M. Keck Foundation Astronomical Observatory (USA) – US\$ 17,000 contract **2009**
for the project "Adaptive Optics Point Spread Function Reconstruction for the W. M. Keck Telescope
Adaptive Optics System", partners: aquilaOptics, Keck Observatory

University of Groningen (The Netherlands) – EUR 41,000 contract **2009**
for the project "Adaptive Optics Point Spread Function Reconstruction for the Gemini-North Adaptive Optics
System", partners: aquilaOptics, University of Groningen

SNSF - Swiss National Science Foundation, Advanced Scientist Grant – CHF 75,000 **2002**
for the project "Estimating the Adaptive Optics Performance in Multi-conjugated Mode and Application to
the Improvement of the Angular Resolution of 10-100 meters class Astronomical Telescopes."

SNSF - Swiss National Science Foundation, Beginner Scientist Grant – CHF 50,000 **2000**
for the project "Adaptive Optics in the Era of 10-100 meters class Astronomical Telescopes: new Scientific and
Technical Challenges."

Software Applications & Operating Systems

ZEMAX, optical systems design software

IDL, MATLAB programming languages for the processing of multi-dimensional arrays

MAPLE mathematical developments software

Programming Languages: C - FORTRAN - PASCAL - MODULA2

Operating Systems: UNIX - MAC OS X

Office Work: Latex - Microsoft Office Tools - Apple Office Tools

Education

2000 PhD in physical sciences, multidisciplinary option

Adaptive optics for astronomy, control systems, image processing, University of Geneva (Switzerland)

1999 Post-graduate Course in Optics

Optics & optical design, Ecole polytechnique fédérale de Lausanne (Switzerland)

1996 Master in physics

Astrophysics and particle physics, optical instrumentation for astronomical telescopes, University of Geneva (Switzerland)

1991 Electrical engineer diploma (diplôme ETS)

Nuclear energy section, Ecole d'Ingénieurs de Genève (Switzerland)

Languages

French: fluent (mother tongue), **English:** fluent, **German & Spanish:** school level