Dr Gilles ORBAN DE XIVRY

08/07/2025

Space sciences, Technologies, and Astrophysics Research (STAR) Institute
Université de Liège (ULiège)
Email: gorban@uliege.be
Phone: +32 (0)4 366 9712
Birth date and place: December 28th, 1985, Uccle (Belgium)
Nationality: Belgian

Research interests

- Adaptive optics instrumentation, wavefront sensing and control techniques
- High angular and high contrast imaging from optical to mid-infrared wavelengths
- Ground and spaced-based astronomical instrumentation
- Exoplanets & disks detection and characterization
- Extragalactic science: active galactic nuclei, co-evolution of supermassive black holes and host galaxies, strong gravitational lensing

Education

2009 – 2014	**PhD** (Dr. rer. nat.) in Sciences orientation Astrophysics (*magna cum laude*), Ludwig-Maximilians-Universität München, Germany. Supervisors: Pr. R. Genzel (Nobel laureate 2020), Dr. R. Davies, Dr. S. Rabien Thesis: "The ARGOS wavefront sensor detector and computer and the black hole growths of narrow-line Seyfert 1 galaxies"
2003 – 2009	**MEng**. in Physics (*magna cum laude*), Université de Liège, Belgium
2007 – 2008	**MSc**. in Astrophysics (*cum laude*), Université Paul Sabatier & Observatoire Midi-Pyrénées, Toulouse, France
2006 – 2008	**MEng**. SUPAERO in Space Physics and Image Processing at Institut Supérieur de l'Aéronautique et de l'Espace, Toulouse, France

Positions

Oct. 2024 – present	Research logistician (scientific staff) at Université de Liège.
Sep. 2020 – Sep. 2024	Research assistant and project manager at Université de Liège
Mar. 2018 – Sep.2018	Research engineer at AMOS, Belgium (BEWARE Academia fellowship)
Mar. 2016 – Aug. 2020	Postdoctoral researcher at ULiège (BEWARE Academia fellowship)
Mar. 2014 – Mar.2016	Postdoctoral researcher at the Max-Planck-Institut für extraterrestrische Physik, Munich
Sep. 2009 – Feb. 2014	Graduate student at the Max-Planck-Institut für extraterrestrische Physik, Munich, Germany.
Sep. 2008 – Jun. 2009	Master student at Université de Liège. Supervisor: P. Magain
Mar. 2008 – May 2008	Master student at University of California of Santa Barbara, USA. Supervisors: Dr. P. Marshall and Pr. T. Treu.

Students & Postdoc (co-)supervisions

Postdoctoral researcher

2020 – 2023	Dr Jyotirmay PAUL (ULiège). Topic: SALTO adaptive optics & wavefront sensing

Graduate Students

2024 – present	Iremsu TAŞKIN (ULiège, co-supervisor with Dr. O. Absil). Topic: Deep learning for wavefront control
2023 – present	Ludo BISSOT (UCLouvain/ULiège, committee member and mentorship, supervisors: Dr. O Absil, Pr. C. Oestges). Topic: Predictive control of atmospheric turbulence for optical communications.
2019 – 2024	Maxime QUESNEL (ULiège, co-supervisor with Pr. G. Louppe and Dr. O. Absil). Topic: Machine learning for focal-plane wavefront sensing.

Master Theses

2024 – 2025	Aurore MARTIN (ULiège, co-supervisor with Dr. O: Absil). Topic: Observation of the solar system with METIS
2023 – 2024	Cédric SERET (ULiège, co-supervisor with Dr. O. Absil). Topic: Laboratory validation of dual-polarisation wavefront control with the vortex coronagraph
2018 – 2019	Pierre-Olivier VANBERG (ULiège, co-supervisor with Dr. O. Absil and Pr. G. Louppe). Topic: Machine learning for image-based wavefront sensing
2017 – 2018	Tom ISTAZ (ULiège, co-supervisor with Dr. O. Absil and Dr. V. Moreau). Topic: Implementation of an adaptive optics real-time control system based on a GPU for a 4-m class telescope
2017 – 2018	Alex BOLYN (HELMO Gramme/Belgium). Topic: Design of an electronic device measuring latencies in an adaptive optics system

Master Internships

Feb. - June 2025	Eileen JOVENIN (UTBM/France). Topic: Reinforcement learning for wavefront control
Summer 2023	Mikael GEORGES (ESCPI/France, co-supervisor with Dr. O. Absil). Topic: Reinforcement learning for dark hole in high-contrast imaging
Spring 2023	Yash SARASWAT (IIT Karaghpur/India). Topic: Implementation of a closed-loop CNN-based wavefront correction for high-contrast imaging
Summer 2018	Rebecca ZHANG (Caltech, co-supervisor with Dr. O. Absil). Topic: Zernike Wavefront sensing on the VODCA test bench
Spring 2012	Katerine DE KLEER (UC Berkeley/USA). Topic: Wavefront sensor detector control software

▪ Teaching experience

2018 – present	Co-lecturer for the course of O. Absil on "Atmospheric and adaptive optics" (ULiège).
Feb. 2017	Observation internship at Calern Observatory (4 nights). Co-supervision of 9 master students (ULiège).

▪ Major Funding & awards

2024 – present	Co-promotor of an individual FNRS (FRIA-funded) fellowship
2023 – present	Service contract with AMOS for the "Medium Sized Optical Communications Antenna (MOCA)" project (funding: 40k€).
2018 – 2023	Co-I of a Skywin research project from the Walloon region on "Smart Adaptive optics and Laser guide star for medium Telescopes and Optical communications (SALTO)" (PI: AMOS, Co-PI: O. Absil, ULiège contribution: 1.06 M€).
2017 – 2018	BEWARE Academia postdoctoral fellowship from the Walloon Region on "Adaptive optics for all" (ULiège, 220k€).
2014 – present	220+hr of awarded telescope time as co-I (incl. 4.4h as PI) on the Very Large Telescope instruments ERIS, NEAR, VISIR, SINFONI, XSHOOTER, and on the Hubble Space Telescope.

▪ Community Services

Scientific collaborations and consortia

2021 – present	Member of the ESO ELT working group on high-contrast imaging.
2020 – present	Local Project Manager for the ELT/METIS instrument (PI: B. Brandl).
2016 – 2018	Member of the VORTEX project, developing vortex coronagraphs for high-contrast imaging (PI: O. Absil).
2015 – 2021	Member of the LLAMA (Luminous Local AGN with Matched Analogues) project (PI: R. Davies).
2009 – 2019	Member of the LBT/ARGOS instrument, the ground-layer laser guided adaptive optics system for the Large Binocular Telescope (PI: S. Rabien).

Laboratory and technical activities

2018 – present	Management of the computing server of the STAR/PSILab research group (ULiège).
2018 – present	Management of the optical laboratory Vortex Optical Demonstrator for Coronagraphic Applications (VODCA) testbench (ULiège).

Astronomical instrument commissioning

2022 – present	VLT/ERIS commissioning. Participation to 2 commissioning runs (20+ nights), including one at Paranal Observatory (Chile), and several technical nights.

2014 – 2016	LBT/ARGOS (Arizona) commissioning with approximately 100 days on site.

Referee activities

Journals	Appl. Opt. • Astron. Astroph. • Astron. J. • Astrophys. J. • JATIS • J. Opt. Soc. Am. A • Light: advanced manufacturing
Conference	NeurIPS 2020 workshop on "Machine learning and the Physical Sciences"
Dissertations	- 4 PhD theses (ULiège, UCLouvain) - 9 Master theses in astrophysics and engineering (ULiège, UCLouvain, HELMO Gramme)
Funding agency	STFC UK Research and Innovation

Conferences

Organization	- Adaptive Optics for Extremely Large Telescope 8th, Valparaiso, Chile, November 2025 (scientific organizing committee) - METIS consortium meeting #17, Liège, September 2023 (main organizer) - 2nd international vortex workshop, Liège 2023 (local organizing committee)

University

2020 – 2024	Representative of the temporary scientific staff of the STAR research

▪ Publications

In summary, my track record is: 40 refereed publications (7 as first or second author), 45 international conference proceedings (16 as first or second author). My h-index is 26 and the number of citations is 2.391 (Google Scholar, see my profile here). A complete list of my publications is available here (ORBI repository of ULiège). Below is listed a representative selection.

▪ Major technical reports

In my different instrumentation projects, I have produced 20+ technical reports as first author (and many more as co-author). Below is listed a representative selection (as first, and generally single, author).

1) *METIS instrument*
   - "Real-time Non-Common Path Aberrations control development plan", v1-0, 12/06/2023
   - "Phase Sorting Interferometry design & performance analysis", v1-0, 28/07/2022, METIS Final Design Review

2) *SALTO demonstrator*
   - "SALTO Adaptive Optics Optical Design", v0.3, 30/11/2020
   - "SALTO Adaptive Optics Control and Calibration", v0.1, 29/05/2019

3) *AO4ALL project*
   - "Adaptive Optics System Study For SALTO", 19th October 2018
   - "Phase A Study for the 3.6m DOT Telescope", v1.0, 13th July 2017
   - "Adaptive Optics Error Budget", v1.0, 13th July 2017

4) *ARGOS instrument*
   - "Wavefront Sensor Detector and Slope Computer Designs", v1.1, 01/03/2010, ARGOS Final Design Review

▪ International conferences and contributions

Participation to 30+ international conferences or workshops. 16 oral contributions and 9 posters. Below are listed the international conferences with my oral contributions.

July 2024	2024 Sagan Summer Workshop, Advances in Direct Imaging: From Young Jupiters to Habitable Earths, Pasadena, USA. Invited talk: The ELT METIS instrument
Jun. 2024	SPIE conference series, Adaptive Optics IX, Yokohama, Japon. Talk: The VLT/ERIS vortex coronagraph: design, pointing control, and on-sky performance
Oct 2023	2nd international vortex workshop, Liège, Belgium. Talks: - "VODCA status & outlook"

	- “Non-common path aberrations with the vortex: METIS, ERIS, and theory”
Jun. 2023	Adaptive optics for Extremely Large Telescope 7, Avignon, France. Talk: “Non-common path aberrations strategy for the METIS High Contrast Imaging Modes”
Oct. 2022	Wavefront Sensing in the VLT/ELT era, Porto, Portugal. Talk: “Non-common path aberrations strategy for the METIS High Contrast Imaging Modes”
Jul. 2022	Adaptive Optics Systems VIII (SPIE Astronomical Telescopes + Instrumentation), Montreal, Canada. Talks: - “SALTO demonstrator: From concept to on-sky commissioning”. - (On behalf of P. Pathak) “Lessons learned from the NEAR experiment and prospects for the upcoming mid-IR HCI instruments”. - (On behalf of O. Absil, invited talk) “Impact of water vapor seeing on Mid-infrared high-contrast imaging at ELT scale”.
Dec. 2021	Wavefront Sensing in the VLT/ELT era VI, Valparaiso, Chile and hybrid online mode. Invited talk: “Focal-plane wavefront sensing using deep learning: review & perspectives”.
Oct. 2020	Wavefront Sensing in the VLT/ELT era / Adaptive Optics workshop week II, online. Talk: “Focal-plane wavefront sensing using machine learning”.
Oct. 2019	Wavefront Sensing in the VLT/ELT era IV, Firenze, Italy. Talk: “Focal plane wavefront measurement with CNN”.
Oct 2018	2nd Belgo-Indian Network for Astronomy & Astrophysics (BINA) workshop. Talk: “A sharp future for the 3.6-m DOT? The power of adaptive optics for medium size telescopes”.
Mar. 2018	Adaptive Optics workshop week, Durham, United Kingdom. Talk: “LGS tip-tilt determination: revisiting spatial correlation techniques and other ideas”.
Aug. 2016	1st international vortex workshop, Pasadena, USA. Talk: “PSF sharpening & post-coronagraphic focal sensing”.
Sep. 2015	Adaptive Optics for Extremely Large Telescope 4, Lake Arrowhead, USA. Talk: “First results of the ground-layer adaptive optics system ARGOS”.
May 2015	Adaptive Optics data processing workshop. Talk: “Commissioning progresses & first on-sky closed-loop of the GLAO system ARGOS”.
Nov. 2012	Nuclei of Seyfert galaxies and QSOs – Central engine & conditions of star formation, Köln, Germany. Talk: “Secular evolution of NLS1 galaxies and the growth of their black holes”.
Apr. 2011	Narrow-Line Seyfert 1 Galaxies and their Place in the Universe, Milan, Italy. Talk: “Past and Present Secular Evolution in the Host Galaxies of NLS1s”.

Invited seminar at ETH Zurich (Switzertland), European Southern Observatory (Garching, ESO)