GABRIELE UMBRIACO

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EDUCATION

Ph.D. in Astronomy at the University of Padua (2019)
Thesis Title: Exoplanets through Extreme Optics: from PLATO to SHARK-NIR
Supervisor: Prof. Giampaolo Piotto, Department of Physics and Astronomy (University of Padua) Prof. Roberto Ragazzoni, INAF - Astronomical Observatory of Padua Dr. Jacopo Farinato, INAF - Astronomical Observatory of Padua

Bachelor's Degree in Astronomy at the University of Padua (2016)
Thesis Title: Optical Alignment of the VST Telescope (VLT Survey Telescope)

Scientific High School Diploma at "Giorgione" State Classical Lyceum (1991)

ACADEMIC CAREER

2023-present: Fixed-term Researcher RTD/A at Alma Mater Studiorum - University of Bologna, Department of Physics and Astronomy "Augusto Righi" Research activity within the MORFEO project (Multi-conjugate Adaptive Optics Relay For ELT Observations)

TEACHING ACTIVITY

At the University of Bologna, I conducted the Physics course (Module 2) for the Bachelor's Degree in Geological Sciences in 2022/23. In 2023/24, I will teach the Astronomical Optics course for the Bachelor's Degree in Astronomy. From 2016 to 2022, I completed 333 hours of integrated teaching contracts at the University of Padua. In this context, I am designated as a "specialist in the field" in the Applied Optics course for the three-year degree in Astronomy;

• 42 hours in the teaching of "Astrophysics Laboratory 1" of the Master's Degree in Astronomy in the 1st semester of the academic years 2016/2017, 2017/18, 2018/19;

• 136 hours in the teaching of "Applied Optics" of the Bachelor's Degree in Astronomy in the 2nd semester of the academic years 2016/2017, 2017/18, 2018/19, 2019/2020, 2020/2021;

• 75 hours in the teaching (in English) of "Astrophysics Laboratory 1" of the Master's Degree in Astrophysics and Cosmology in the 1st semester of the academic years 2019/2020, 2020/2021, 2021/2022, 2022/2023;

• 40 hours in the teaching of Physics 1 for Engineering Degrees in the 2nd semester of the academic year 2020/2021;

• 40 hours in the teaching of Physics 1 for Engineering Degrees in the 2nd semester of the academic year 2019/2020. I have supervised several undergraduate, master's, and doctoral theses.

In 2019, I implemented the "remote laboratory 3.0" project, which allowed laboratory courses to continue during the COVID period, expanding possibilities even in the post-COVID period by:

• conducting dual optical laboratory teaching;

• updating laboratory experiences for remote device use through VPN connections for data acquisition and device manipulation (optical fibers, piezoelectric motors, cameras, and ignition controls).

SCIENTIFIC ACTIVITY

I have participated and been involved in various international research programs, which I list briefly:

• 2018-present, Alignment, Integration, and Commissioning (2022/23) of the SHARK-NIR coronagraph mounted on the Large Binocular Telescope (INAF-LBTO Arizona). I participated in the integration phase in a clean room, including the infrared image sensor, for which I used high vacuum and liquid nitrogen cryostats. I am involved in the commissioning and pre-commissioning phases at the LBT telescope;

• 2016-18, Study of the optical alignment of the prototype of the Telescope Optical Unit of the PLATO space telescope (55-degree field of view). During this period, I designed, realized, and validated the alignment procedure both at room temperature and at flight temperature (-80°C), working also at Leonardo S.p.A. laboratories, particularly in clean rooms with cryostats and high vacuum systems (WP-AIV Assembly Integration & Verification);

• 2016, Optical fiber coupling of the Iqueye instrument for ultra-fast photometry at the Galileo telescope of the Asiago Astrophysical Observatory for intensity interferometry observations simultaneously with Aqueye+ mounted on the Copernico telescope of Cima Ekar, exploiting the 3.4 km distance between the two telescopes;

• 2010-present, New all-sky camera for mesosphere monitoring installed at the Asiago Astronomical Observatory, Cima Ekar, in collaboration with the Center for Space Physics at Boston University;

• 2010-present, participation in the PRISMA-INFA network (First Italian Network for Systematic Meteor and Atmosphere Surveillance) with the ITV03 camera installed in Asiago;

• 2010-2011, Unpaid Associate at ESO Paranal Observatory for the Commissioning of the VST telescope (INAF-ESO Chile). I played a role in the optical alignment of the Very Large Telescope Survey Telescope (VST) in Paranal (Chile) at the European Southern Observatory. I was part of the team dedicated to the mechanical integration and optical alignment of the telescope, active optics of the telescope, autoguiding system, and also participated in the commissioning phase with several periods at Cerro Paranal, up to the first light of the telescope;

• 2008, New instrument for measuring the angular momentum of photons at the Galileo telescope of the Asiago Astrophysical Observatory;

• 2008, New Museum of Astronomy Instruments (10th museum of the University of Padua) and management of donations to the museum (ancient clocks and telescopes for outreach);

• 2007, Reconstruction of the optics laboratory of the Asiago Astrophysical Observatory (2 optical benches);

• 2001-2023, New optics laboratory, Padua site, with 6 damped optical benches measuring 2000x1000mm for the Astronomy degree courses, 1 optical bench measuring 2000x1000mm for research activities equipped with a 4D Technology Phasecam 4030 interferometer, two deformable lenses, and numerous optical sensors.

AWARDS AND RECOGNITIONS

2018 - Recognition of enrollment expenses in the International School Space Optics Instrument Design & Technologies ESA-SOIDT for an expense of €3000.

OTHER ACTIVITIES

2000-2023: Laboratory Technician CAT. D/1 at the University of Padua (Department of Physics and Astronomy "Galileo Galilei")

Activities at the Padua site, Optics Laboratory
Summary: Responsible for the optics laboratory of the Department of Physics and Astronomy, which deals with the construction of interferometers for educational purposes, the construction of small instruments for data acquisition at the telescope, and the characterization of opto-mechanical components of larger instruments. It is equipped with 5 stabilized optical benches and an independent research laboratory. In this capacity, I have carried out activities for both teaching and research purposes. I have also been responsible for the technological and digital facilities in the classrooms and their updates.

Activities at the Asiago site, Asiago Astrophysical Observatory
Summary: The Asiago Astrophysical Observatory, founded in 1942, has a telescope with a 1.22m diameter mirror. At the Observatory, I carried out spectroscopic and photometric observation sessions and assisted in research activities, especially in the design, installation, and use of new optical instruments. This activity has produced scientific articles of which I am the author and co-author, which have also undergone review.

Activities at the Asiago site, Museum of Astronomicy Instruments
Summary: The Museum of Astronomy Instruments in Asiago collects the scientific instruments used in over 80 years of activity of the Asiago Astrophysical Observatory of the University of Padua, consisting of a collection of over 150 pieces, most of which are optical instruments. My expertise in optics was requested for cataloging and inventorying the instruments, and I had the privilege of being involved in the museum's creation from the very beginning. I curated the first museum exhibition with two service assignments. After the museum's opening, I continued to work there continuously, handling dissemination, cataloging, preservation, and use activities. In this role, I managed Civil Service Volunteers for over 12 years, from designing the selection announcement to serving as the Local Project Manager.