**Eray Genç - DoB 27$^{th}$ April 1998**


CONTACT INFORMATION

German Centre for Cosmological Lensing (GCCL)
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PROFILE SUMMARY

Astrophysicist with a strong background in extracting weak signals from noisy survey data through advanced statistical modelling, systematics mitigation, and simulation-based pipeline development. Innovative and result-oriented, with a focus on creative problem solving, programming expertise, and forward-thinking approaches to scientific challenges. Well suited for teamwork and international collaboration, and eager to apply this expertise to planetary missions, such as EnVision, by bridging scientific objectives with spacecraft constraints in a mission-driven environment.

REFERENCES

- **Dr. Angus H. Wright:** GCCL Fellow / awright@astro.rub.de / Astronomiches Institut, Ruhr-Universität Bochum, Universitätsstr. 150, 44780 Bochum, NRW, Germany / +49 176 879 354 16
- **Prof. Hendrik Hildebrandt:** Dean of Physics and Astronomy, GCCL Director / hendrik@astro.rub.de / Astronomiches Institut, Ruhr-Universität Bochum, Universitätsstr. 150, 44780 Bochum, NRW, Germany / +49 234 32 24019
- **Prof. Peter Schneider:** Professor of Astrophysics / peter@astro.uni-bonn.de / Argelander-Institut für Astronomie, Universität Bonn, Auf dem Hügel 71, 53121 Bonn, NRW, Germany / +49 228 73 3671

ACADEMIC WEBSITES

- **OrcID:** https://orcid.org/0009-0005-2479-8832
- **LinkedIn:** https://www.linkedin.com/in/eray-genç-0929a0104/

SCIENTIFIC AND OPERATIONAL FOCUS AREAS

- Mitigation of observational biases (e.g., blending, photometric uncertainties) in multi-band data.
- Data reduction, and photometric and morphologic analysis of NIR imaging data.
- Development and optimisation of image- and catalogue-based pipelines to manage instrumental systematics and maximise scientific return.
- Statistical signal extraction from noisy, low-SNR data, particularly in large-scale surveys and operationally constrained environments.
- Application of Bayesian inference and cross-correlation techniques for weak signal enhancement and structural analysis.
- Simulation-based modelling of systematics to support mission planning and data validation strategies.
- Design of automated, scalable data workflows supporting reproducibility and efficiency in science operations.
- As future work: enhancement of subsurface feature detection through cross-correlation and stacking of multi-pass radargrams.
- Integration of multi-band, multi-instrument datasets to extract physical parameters from astrophysical and planetary systems.

EDUCATION

**Ruhr-Universität Bochum**, Bochum, Germany

PhD, Astrophysics (October 2022- present)

- Thesis Title: Exploring dust transport in dark matter halos of galaxies with weak-lensing surveys
- Supervisors:
  Dr. Angus H. Wright
  Prof. Hendrik Hildebrandt
  Prof. Dominik J. Bomans
- Area of Study: Observational cosmology, circumgalactic dust extinction

**Universität Bonn**, Bonn, Germany

MSc, Astrophysics (Graduated September 2022)

- Thesis Title: Quantifying the effects of blended galaxies on cosmic shear
- Supervisor: Prof. Peter Schneider
- Supervisor: Prof. Hendrik Hildebrandt
- Area of Study: Observational cosmology, Weak-lensing

**Universität Heidelberg**, Heidelberg, Germany

BSc, Physics (Graduated August 2020)

- Thesis Title: Near-infrared data reduction and analysis of radio galaxy hosts at different redshifts
- Supervisors:
  Prof. Jochen Heidt
  Prof. Andreas Koch-Hansen
- Area of Study: Near-infrared data reduction, Radio galaxies

## Work Experience

**German Centre for Cosmological Lensing**, Ruhr-Universität Bochum, Bochum, Germany

I developed and applied a novel methodology to extract the weak signal of circumgalactic dust extinction from noisy weak lensing survey data (KiDS DR4). This involved disentangling the achromatic gravitational lensing magnification signal from chromatic dust extinction effects across multiple photometric bands. I validated the entire pipeline using simulations and real data, carefully accounting for systematic uncertainties such as galaxy clustering, redshift overlap, and instrumental limitations. This project strengthened my ability to design, test, and implement end-to-end data analysis workflows tailored to maximise scientific output from complex, noise-dominated observations.

**Argelander-Institut für Astronomie**, Universität Bonn, Bonn, Germany
The impact of detection bias from blended galaxies on cosmic shear measurementsis investigated, which is an understudied but significant systematic. I developed a detection probability model sensitive to flux ratios and angular separations, and integrated it into shear correlation calculations by assigning detection-based weights. This work strengthened my skills in systematic modelling, data analysis, and optimising scientific output under observational constraints.

**Argelander-Institut für Astronomie**, Universität Bonn, Bonn, Germany
During a three-month internship, I investigated the impact of magnification on galaxy–galaxy lensing signals by comparing theoretical predictions with simulation outputs. This project expanded my programming experience through hands-on work with C++ and strengthened my understanding of lensing systematics and data interpretation.

**Landessternwarte**, Universität Heidelberg, Heidelberg, Germany
I conducted photometric and morphological analysis of near-infrared imaging data from the Large Binocular Telescope, focusing on host galaxies of radio galaxies across a broad redshift range (0.2–4.4). This work involved independent data reduction, image processing, and structural modeling using tools like IRAF and GALFIT, strengthening my practical experience with real observational data and instrumentation limitations. It provided an early foundation in handling complex datasets and extracting robust scientific insights—skills directly relevant to science operations planning.

## Academic Experience

**Grants** **2024 to Present**

- SFB1491 Travel Grant for a one month research visit at Boston University and Center for Astrophysics, Harvard& Smithsonian (EUR 4500; 2024)
- SFB1491 Travel Grant for Aspen Dust Conference (EUR 1500; 2024)
- DFG Collaborative Research Centre 1491: "Cosmic Interacting Matters" (PhD researcher, Project F6; 2022-2026)

**Teaching Experience** **2021 to Present**

- Physics Laboratory for Biology Students (in German), BSc lab course tutor, Ruhr-Universität Bochum, Germany, 2024
- Cosmology (in English), MSc lecture tutor, Universität Bonn, Germany, 2021–2022
- Einführung in die extragalaktische Astronomie (in German), BSc lecture tutor, Universität Bonn, Germany, 2021–2022

**Outreach & Community Engagement**

- Collaborative Research Centre 1491: "Cosmic Interacting Matters", Social media manager, Bochum, Germany (2023–Present)
- Autonomes Schwulenreferat-RUB, LGBTQ+ group at Ruhr-Universität Bochum, member supporting diversity and inclusion events (2023–Present)
- DOPPLERS, nationwide physics competition, co-organiser, Heidelberg, Germany (2019)
- Meet Your Prof, organiser, Heidelberg, Germany (2018-2019)

## Technical Skills: Computing

Comprehensive understanding of, and proficiency in, the use of a variety of programming languages; in particular **Python**, and to varying extents: bash, C++, SQL.

Extensive experience with using astronomical software, including but not limited to (alphabetical): GALFIT, GALSIM, IRAF, Source Extractor, and TOPCAT.

Intimate knowledge of Linux, Macintosh, and Microsoft operating systems, and a large variety of cross platform propriety (Office, IDL) and open source (bash, git, LaTeX, Python) languages and software. Extensive experience in the writing, distribution, and management of astronomical software.

## Additional Training

- SFB1491: Subconscious Bias Training, 'Becoming an Active Ally', training in diversity, equity, and inclusion. (June 2025)
- SFB1491: Subconscious Bias Training, 'Recognising the Implicit Bias', training in diversity, equity, and inclusion. (November 2023)
- CMAS $1^*$ Open Water Scuba Diving Certification. (August 2023)
- IAPS4SPACE Workshop: Intensive physics and space skills programme focused on transferable skills (communication, teamwork, problem solving). Included a team-based simulation analysing the Space Shuttle Columbia disaster from the perspective of different

NASA departments. (November 2019)

## Presentations

### Invited Talks

1. 'Exploring dust transport in the dark matter halos across stellar mass bins with weak-lensing surveys', General Assembly of SFB1491, Dortmund, Germany, February 2025
2. 'Cosmology with large-scale surveys', General Assembly of SFB1491, Bochum, Germany, June 2024
3. 'Exploring dust transport in dark matter halos of galaxies using weak-lensing surveys', Aspen Center for Physics, Aspen, USA, March 2024
4. 'Measurement of circumgalactic dust extinction on KiDS-DR4', General Assembly of SFB1491, Dortmund, Germany, November 2023

### Poster Presentation

1. 'Exploring dust transport in the dark matter halos across stellar mass bins with weak-lensing surveys', 11th PhD Colloquium, Bochum, Germany, May 2025
2. 'Measurement of circumgalactic dust extinction on KiDS-DR4', COSMO'24, Kyoto, Japan, October 2024

## Awards

Bonn-Cologne Graduate School of Physics and Astronomy

- **Honours Certificate** (September 2022)
  Awarded upon completion of the Master's program with honours distinction, recognizing outstanding academic performance and research achievements.

TUBITAK, Turkey

- **TUBITAK Undergraduate Science Scholarship** (2016)
  Awarded to students ranked among the top 5000 nationwide in the university entrance exam and admitted to a faculty of Natural Sciences, in recognition of academic excellence and potential in science.