··· Alexander J. Dimoff ···

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Education

PhD: Nuclear Physics. S-Process Nucleosynthesis in and from AGB Stars — *Frankfurt + Heidelberg, DE*
Goethe University Frankfurt IAP / Max Planck Institute for Astronomy — *Anticipated: August 2025*
- Advisors: Prof. Dr. Camilla J. Hansen, Dr. Richard J. Stancliffe, Priv. Doz. Dr. Tanja Heftrich
- Research: Nucleosynthesis, orbital dynamics, stellar evolution, nuclear experiments
- Expected graduation: Fall. 2025

MS: Astronomy. Apsidal Motion in Eclipsing Binaries — *San Diego, CA USA*
San Diego State University — *2019 - 2021*
- Advisor: Prof. Dr. Jerome Orosz
- Research: Eclipsing binaries, orbital dynamics

BS: Astrophysics. Oxygen Isotope Fractionation in the Solar Nebula — *University Park, PA USA*
Pennsylvania State University — *2013 - 2017*
- Advisor: Evan Pugh Prof. Dr. James Kasting
- Research: Nebular chemistry, planet formation
- Minors in Physics, German Language & Culture

Relevant Experience & Awards

PhD Researcher — *Frankfurt / Heidelberg, DE*
Goethe university Frankfurt IAP / Max Planck Institute for Astronomy — *2022-2025*
- Full-time research pursuing a PhD in nuclear astrophysics. Collecting, reducing, and analyzing high-resolution spectra for stellar parameters, abundances, and radial velocities. Constructing RV database of chemically peculiar stars. Modeling stellar accretion mechanisms in binary systems. Experimentally determining nuclear formation rates and interaction cross sections for key nuclear species.

Master's Researcher — *San Deigo, CA USA*
San Deigo State University — *2020-2021*
- Part-time and full-time research as a master's student pursuing a Master's Degree in astronomy. Modeling apsidal motion and orbital dynamics in massive eclipsing binary stars to investigate stellar interior structures and evolutionary phases.

Undergraduate Research Assistant — *University Park, PA USA*
Pennsylvania State University — *2017-2019*
- Part-time undergraduate and full-time post-baccalaureate researcher. Modeling equilibrium and kinetic chemistry with molecular condensation of oxygen isotope bearing species in stellar nebulae and extended stellar atmospheres to investigate isotope fractionation mechanisms.

William and Nhung Booth Scholarship — *San Diego, CA USA*
San Diego State University — *2021*
- Awarded for scholastic achievement in SDSU's graduate program.

Ruth and Clifford Smith Astronomy Fellowship — *San Diego, CA USA*
San Diego State University — *2020*
- Awarded for scholastic achievement in SDSU's graduate program.

Reginal F. Bueller Endowment Scholarship — *San Diego, CA USA*
San Diego State University — *2020*
- Awarded for service to the astronomy community on behalf of the SDSU Astronomy Department.

William F. Lucas SDAA Endowment Scholarship — *San Diego, CA USA*
San Diego State University — *2020*
- Awarded for academic achievement and pursuing a career in astronomy.

Awona W. Harrington Astronomy Scholarship — *San Diego, CA USA*
San Diego State University — *2020*
- Awarded for service and professional promise.

NASA Pennsylvania Space Grant *University Park, PA USA*
Pennsylvania State University *2017*
• Awarded for academic achievement and pursuing a career in science, technology, engineering, and math.

Teaching Experience

2024	**Master's Student Co-Supervision**, Orbital dynamics and exoplanet eclipses, investigating limb-darkening laws for high-metallicity solar-like stars using the ELC code.	*GUF, Frankfurt, DE*
2022-2024	**Teaching Assistant**, (2 semesters): Astronomy I, Astronomy II. Hosted tutorial sessions and lectures.	*GUF, Frankfurt, DE*
2021	**Teaching Associate**, Astro 101 lecture course, including office hours.	*SDSU, San Diego, CA USA*
2020-2021	**Teaching Associate**, (3 semesters): Astro 109 laboratory course, including office hours.	*SDSU, San Diego, CA USA*
2020	**Flexible Course Design Institute for Graduate Students**, Certification in flexible and accessible course design.	*SDSU, San Diego, CA USA*
2018-2019	**Teaching Assistant**, (3 semesters): German 1, 2, 201 courses	*PSU, University Park, PA USA*

Observation Proposals

Nordic Optical Telescope, PI - 9 nights, P66+67, Sept 2022 - Sept 2023; Co-PI 2 nights, P69, Jan 2024.
MPG 2.2m Telescope, PI - 40 nights, P110, P111, P112, P113, P114, P115.
Rozhen Astronomical Observatory IANAO, PI - 32 nights, ChETEC-INFRA Calls 3,6,7,9,11.
Moletai Astronomical Observatory, PI - 35 nights, ChETEC-INFRA Calls 1,3,4,5,6,7,8,10,11,13.
Ondrejov Astronomical Observatory, PI - 36 nights, ChETEC-INFRA Calls 1,3,5,6,7,8,10,11,13.

Relevant Skills

Programming/Script languages, Python, FORTRAN, Bash, Julia
Tools, Git, JuPyter, OpenMP/MPI, vim, LaTeX, TOPCAT, ADQL/SQL
Libraries, numpy, matplotlib, astropy, scipy, scikit-learn, multiprocessing, matplotlib, plotly, pandas,
Methods, MCMC, Maximum Likelihood, Nested Sampling, Bayesian Analysis, Cross-Correlation

Personal Development

Since 2022	**Max Planck International Research School (IMPRS)**, PhD Student at MPIA
2023	**Galaxies and Cosmology Department MPIA Retreat**, Organizer and Event Coordinator
2022-2024	**Max Planck Institute for Astronomy**, Max Planck Society External Student Representative. Liaison for communication with MPIA and MPG administrations. Attended PhDnet general assembly meetings.
Since 2023	**Max Planck Institute for Astronomy**, Sustainability Committee Member. Attend monthly meetings and projects including improving bike infrastructure and enhancing conservation areas.
2024	**Between the Lines: A Stellar Spectroscopy Workshop**, ESO Santiago, Chile (hybrid participant)
2024	**ECR Astronuclear School on ELEMENTS**, Goethe University Frankfurt, Frankfurt am Main, Germany
2023	**18th Russbach Winter School**, Russbach am Pass Gschütt, Austria
2022	**Ondrejov Observing School**, Astronomical Institute of the Czech Republic, Ondrejov, Czech Republic
2022	**NPA-X Summer School**, CERN, Geneva, Switzerland
Since 2022	**Merendella Organizer**, Max Planck Institute for Astronomy
2022 - 2024	**MPIA Half-Marathon Team**, Heidelberg, Germany
2024	**MPIA Heidelbergman Triathlon Team**, Heidelbeg, Germany

Selected Presentations and Posters

Contributed Presentations at International Scientific Meetings and Conferences

2025. Modeling the Progenitors of Low-Mass Post-Accretion Binaries. Invited ESO Presentation: Vitacura, Región Metropolitana, Chile

2024. Modeling Binary Accretion from Abundances and Orbits. Nuclear Physics and Astrophysics XI: Dresden, Germany

2024. Tracing Carbon from AGB Stars through Binary Accretion Models. Astrophysical Origins of Carbon: NAOJ, Tokyo, Japan

2024. S-Process Nucleosynthesis in and from AGB Stars. IAP Freitagsseminar: Goethe University Frankfurt, Frankfurt, Germany

2024. High-Resolution Observations of S-Process Elements in AGB Stars. XIV Torino AGB Workshop: INAF, Frascati, Italy

2023. S-Process Nucleosynthesis in and from AGB Stars. San Diego State University, San Diego, CA USA

2023. s- and i-Process Nucleosynthesis from AGB Stars. i-Process Workshop: Limassol, Cyprus

2023. S-Process Nucleosynthesis in and from AGB Stars. 18th Russbach School on Nuclear Astrophysics: Russbach am Pass Gschütt, Austria

2022. Observing and Analyzing s-Process Enhanced Stars. Ondrejov Observing School: Astronomical Institute of the Czech Republic, Ondrejov, Czech Republic

2022. Spectral Observations of s-Process Enhanced Stars: Radial Velocities and Abundances. ChETEC-INFRA 2nd General Assembly, University of Padova, Padova, Italy

Outreach Talks

2023. *('Non-Binary' Stellar Evolution and Nucleosynthesis)* Out-erSpace: MPIA & HDA Heidelberg, Germany

Publications

Published

Dimoff, A.J.; Orosz, J.A. 2023. *Modelling Apsidal Motion in Eclipsing Binaries using ELC*. The Astronomical Journal. AJ

Dimoff, A.J.; Hansen, C.J.; Stancliffe R.J.; Kubatova, B.; Stateva I.; Kucinskas, A.; Dobrovolskas, V. 2024. *S-Process Nucleosynthesis in Chemically Peculiar Binaries*. Astronomy & Astrophysics. A&A

In Review

Dimoff, A.J.;Stancliffe R.J.; Hansen, C.J.; Taylor, H. 2025. *Simulating Binary Mass Transfer Through the Lens of the s-Process*. (Manuscript available upon request.)

Seeburger, R.; Rix, H.W.; El-Badry, K.; Müller-Horn, J.; **Dimoff, A.**; Henneco, J.; Villasenor, J. 2025. *The Physical Properties of Post Mass-Transfer Binaries*.

In Prep

Dimoff, A.J.; Heftrich, T.; Hansen, C.J.; Stancliffe R.J.; Sokolovic, D. *Experimentally Measuring Interaction Cross Sections of $^{208}\mathrm{Pb}$ and Formation Rates of $^{209}\mathrm{Pb}$ at Astrophysical Energies*.

Dimoff, A.J.; Hansen, C.J.; Stancliffe R.J.; Van Eck, S.; Cristallo, S. *Comparing AGB Abundances with Yields from Rotating Magnetic Models*.

Dimoff, A.J.; Orosz, J.A. *Probing the Interior Structures of Massive Binaries with Apsidal Motion*.

Pietrow, A.; **Dimoff, A.J.**; Baratella, M. *Quantitative Abundance Differences between Disk Center and Full-Disk Spectra*.