

Nadine Barth

PhD Candidate in Aerospace Engineering at the University of Tokyo



ABOUT ME

I am a researcher specializing in Hall thrusters and electric propulsion systems. My work focuses on improving thruster efficiency and performance through plasma physics, computational modeling, and magnetic field design. I am developing a high-density Hall thruster to enable the use of alternative propellants such as krypton and argon, reducing dependence on xenon, which is rare and expensive. My approach combines numerical and experimental methods to address both scaling and operational challenges.

CONTACT

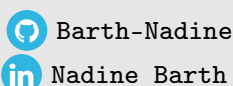
Nadine Barth
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SPECIALIZATION

Space Engineering • Electrical Propulsion • Hall Thruster
• Numerical Simulation • PIC
• DSMC • Thermal Simulation

INTERESTS

Paragliding • Hiking
• Camping • Ski/Snowboard
• Drone flying • Karaoke
• Trampolin • Dance
(Choreography)



WORK EXPERIENCE

Aug 2023 –
Mar 2024

Research assistant (Full time)

INSTITUTE OF SPACE SYSTEMS (IRS) · Stuttgart 📍

Conducted kinetic DSMC simulations of a specular ABEP intake using the PICLas plasma code to assess performance under varying solar activity and intake geometries, and to evaluate the applicability of the hyperthermal flow assumption in Very Low Earth Orbit



Mar 2020 –
Sep 2022

Student assistant (Part time)

DLR E.V. (GERMAN AEROSPACE CENTER) · Stuttgart 📍

Developed Python-based data interfaces and GitLab CI test routines for converting simulation data between Permas and VMAP formats, facilitating cross-platform structural analysis workflows
Published at: GitHub: PermasVmap Converter



May 2020 –
Jul 2023

Operational Management

Drone instructor

Drone pilot (Temporary employment)

TBCOPTERS GMBH, STUTTGART · Stuttgart 📍

Operation Management: Delegated drone pilots, coordinated equipment logistics, and secured flight permits.
Drone instructor: Trained new drone pilots in UAV operation.
Drone pilot: Spreading of trichogramma for biological pest control over corn fields with drones (seasonal June/July)



Apr 2018 –
Mar 2019

Internship, Bachelor thesis (Part time)

MTU AERO ENGINES AG · Munich 📍

Assessed full lifecycle costs of turbine components – including development, operation, maintenance, and end-of-life disposal – to identify dominant cost drivers and support design trade-offs in aeroengine development. Conducted thesis work on the implementation and analysis of a three-stream turbine heat management concept in a FORTRAN-based performance tool, to evaluate whether integrating a heat exchanger in the outer bypass stream could enhance efficiency.



Oct 2017 –
Feb 2018

Student assistant (Part time)

INSTITUTE OF AIRCRAFT PROPULSION (ILA) · Stuttgart 📍

Served as a tutor for 'Construction Elements II', providing student monitoring and evaluating assignments.



Jun 2016 –
Sep 2017

Student assistant (Part time)

PORSCHE AG, WEISSACH · Weissach 📍

Supported the Engine Assembly department by assisting in technical project workflows and data-driven evaluations.



ENGAGEMENT

Oct 2015 –
Sep 2022

Volunteer supervision of robotics group

AEROSPACELAB · Herrenberg 📍

Mentored students in LEGO EV3 robotics and Arduino basics at AEROSPACE Lab Herrenberg. Also representing the Lab at STEM outreach events.



Oct 2018 –
Sep 2022

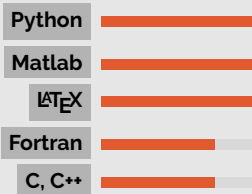
Trampolin trainer

UNIVERSITY SPORTS GROUP · Stuttgart 📍

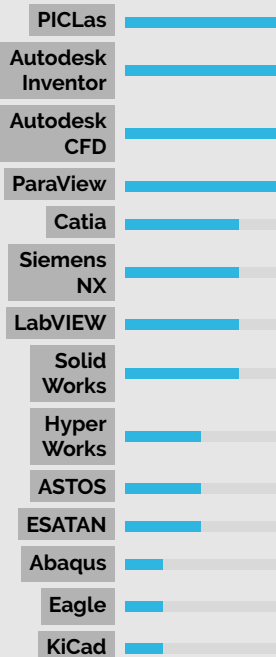
Trampoline trainer for the University of Stuttgart's Unisport program. Led practices and organized team competition participation.



PROGRAMMING



SIMULATION



LANGUAGES

German	C2	●	●	●	●
English	C2	●	●	●	●
Japanese	N4	●	●	●	●
Spanish	A2	●	●	●	●

ACHIEVEMENTS

- 2024 MEXT Scholarship
- 2022 PROMOS Scholarship for exchange
- 2022 Hermann Reissner Scholarship for exchange
- 2022 Selected as exchange student at the University of Tokyo
- 2022 Won student challenge "Space Station Design Workshop"
- 2021 Won student challenge "Small satellite Design Seminar"
- 2015 Invited panelist alongside Apollo astronaut Al Worden

EDUCATION

Oct 2024 – Sep 2027	PhD Candidate – Komurasaki & Koizumi Laboratory · The University of Tokyo	
Apr 2024 – Sep 2024	Research Student – Komurasaki & Koizumi Laboratory · The University of Tokyo	
Oct 2022 – Apr 2023	Exchange Student – Komurasaki & Koizumi Laboratory MASTER'S THESIS RESEARCH CONDUCTED DURING EXCHANGE. · The University of Tokyo	
Jun 2022 – Jul 2022	Participant at the International Space Weather Camp GERMAN AEROSPACE CENTER · DLR Neustrelitz	
Apr 2020 – Apr 2023	Master of Science — Aerospace Engineering CUMULATIVE GRADE: 1.4 ("VERY GOOD"), EQ. TO US GPA 3.8 SPECIALIZATION: SPACE ENGINEERING, NUMERICAL SIMULATIONS · University of Stuttgart	
Oct 2015 – Nov 2019	Bachelor of Science — Aerospace Engineering CUMULATIVE GRADE: 2.1 ("GOOD"), EQ. TO US GPA 3.3 · University of Stuttgart	

PUBLICATIONS

2026	Barth N. et al.	PICLas-based Intake Simulation Activities for the development of an ABEP Specular Intake – RGD Conference Proceedings.
2026	Satpathy D. et al.	Impact of reverse flow induced by a sawtooth anode on the performance of an argon Hall thruster – J. Appl. Phys.
2026	Lee J. et al.	Numerical analysis of rarefied gas flow dominated by wall reflection in a straight channel – Vacuum
2025	Barth N. et al.	Solar Activity Dependency of a Specular Intake for an ABEP System – in Journal of Electric Propulsion.
2025	Satpathy D. et al.	Experimental investigation on ionization length required for efficient operation of argon Hall thrusters – Transactions of the Japan society for aeronautical and space sciences, 68(1), 12-18.
2022	Srama R. et al.	Feasibility studies for a dust observatory between earth and the asteroid belt – Acta Astronautica, 199, 36–44.
2022	Acker D. et al.	DIANA-Dedicated Infrastructure and Architecture for Near-Earth Astronautics – International Conference on Environmental Systems.
2022	Barth N. et al.	Converter: PermasVmap – published tool for converting finite-element models and results. GitHub: PermasVmap Converter

CONFERENCE CONTRIBUTIONS AS FIRST AUTHOR

Sep 2025	IEPC	Magnetohydrodynamic scaling method for High-Density Plasma Hall Thruster Operation
Mar 2025	AJCPP	Magnetohydrodynamic Analysis of High Mass Flow Rate-Induced High-Density Plasma Hall Thruster Operation.
Jul 2024	IEPC	Solar Activity Dependency of a Specular Intake for an ABEP System
Jun 2024	RGD	PICLas-based Intake Simulation Activities for the development of an ABEP Specular Intake