Lukas Leonard Welzel

Boomkleverstraat 54
2623 GW Delft
Netherlands
📱 (+49) 173 8727529
✉ welzel@strw.leidenuniv.nl
🌐 www.linkedin.com/in/lukas-welzel

Education

Sep. 2021 Present	**Master in Space Engineering** ○ Systems engineering, instrumentation, miniaturization, computational physics	*Delft University of Technology*, NL

Feb. 2021 Present	**Master in Astronomy Research** ○ Thesis: *Differential Photometry for Debris Disks.* ○ Exoplanets & their atmospheres, deep learning, debris & protoplanetary disks	*Leiden University*, NL Grade: 8.5/10

Sep. 2016 Jan. 2021	**Bachelor in Aerospace Engineering** ○ Thesis: *Asteroid Deflection using Concentrated Sunlight.* ○ Minor at Iowa State University (Astronomy & Quantum Mechanics) ○ Systems Engineering, Planetary Science, Space Engineering	*Delft University of Technology*, NL Grade: 8.5/10

Aug. 2010 Aug. 2016	**Abitur** ○ Thesis: *Design of a bi-liquid rocket engine.*	*Humboldt Gymnasium Potsdam*, GER Grade: 10/10

Work Experience

Apr. 2023 Jun. 2023	**Exoplanet Atmosphere Characterization** ○ Impact of inhomogeneous datasets on comparative planetology ○ Exoplanet atmosphere retrieval ○ Robust exoplanet characterization with deep learning	*Netherlands Institute for Space Research (SRON)*

Jan. 2021 Mar. 2023	**Teaching Assistant** ○ Support of the Collaborative Design Laboratory ○ Concurrent Engineering lectures for students and staff	*Delft University of Technology*

Sep. 2019 Mar. 2020	**Systems Engineering Intern** ○ Performance & evolution analysis, mass budgeting and cost-estimation of launch vehicles ○ Identification and analysis of target orbits for active de-orbiting of space debris ○ Systems engineering and design of a upper- and kick-stage reaction control system	*Rocket Factory Augsburg*

Jul. 2015	**Engineering Intern** ○ Design of a small bi-liquid rocket engine ○ Introduction to CAD (SOLIDWORKS) and CFD (COMSOL)	*Helmholtz-Zentrum Berlin for Materials & Energy*

Nov. 2012	**Instrumentation Group Intern** ○ Testing & calibrating the fiber optics and prisms of the "Potsdam Echelle Polarimetric and Spectroscopic Instrument" (PEPSI) for the "Large Binocular Telescope"	*Leibniz-Institute for Astrophysics Potsdam*

Projects

Submission		Title	Grade	Supervisor
Aug.	2023	Deep probabilistic modelling & imaging of galaxies.	NA	Self-directed
Jul.	2023	Exoplanet Imaging Data Challenge 2023	NA	Self-directed
Jun.	2023	Ariel Machine Learning Data Challenge 2023	NA	Self-directed
Feb.	2023	Ohmic heating mechanism for hot Jupiters.	NA	Dr. Y. Miguel
Jan.	2023	Adversarially guided actor critic for hard-exploration.	8.5	Dr. A. Plaat
Dec.	2022	Model-Agnostic Meta-Learning & Prototypical Networks.	NA	Dr. J. van Rijn
Nov.	2022	Learned versatile optimizers.	8.5	Dr. J. van Rijn
Jul.	2022	Angular-spectrum method for multi-spectral light.	9.0	Dr. M. Schaller
Jul.	2022	Soft actor-critic implementation & testing.	8.5	Dr. A. Plaat
Jul.	2022	Schlieren imager design and testing.	9.0	Dr. D. Doelman
Jul.	2022	Space tug design for OSAM.	9.0	Dr. J. Guo
May	2022	Direct Imaging of Disks and Exoplanets.	9.5	Dr. M. Kenworthy
Mar.	2022	Large N-body simulations with symplectic integrators.	9.0	Dr. M. Schaller
Feb.	2022	Differential Photometry for Debris Disks.	8.5	Dr. M. Kenworthy
Dec.	2021	Thermal design & control of space radio-telescopes.	8.5	Dr. J. Bouwmeester
Jul.	2021	QWIP and T2SL Detectors for Space Applications.	NA	Dr. L. Burtscher
May	2021	Effect of planet migration on dust rings.	9.0	Dr. M. McClure
Apr.	2021	Comparing Disk Masses in Different Environments.	9.5	Dr. M. McClure
Jan.	2021	Asteroid Deflection using Concentrated Sunlight.	8.5	Dr. J. Guo
Mar.	2019	Simulated aileron response to aerodynamic loading.	7.6	Dr. van der Wal
Dec.	2018	The 55 Cancri binary system & the future of 55 Cnc f.	10	Dr. M. Marengo
Jul.	2018	Structural Response to Actuation in a Morphing Wing.	7.4	T. Yuqian ABD
Feb.	2016	Design of the bi-prop. liquid rocket engine "Anemos".	9	C. Mottl Dipl.-Ing.
Jun.	2015	Construction and testing of a solid-prop. model rocket.	10	Dr. B. Leuer

Certifications & Workshops

Date		Title	Institution
Jun.	2021	Detector Modelling Workshop (Pyxel)	ESA & ESO
Feb.	2020	First Aid & Emergency Response (bi-yearly renewed since 2012)	DLRG
Sep.	2020	Milling, Lathing & Benchworking	D:DREAM TU Delft
Aug.	2019	German rescue swimming badge (Gold, re-certification)	DLRG
Sep.	2017	Exemption from North-Korea Knowledge Embargo	UN Security Council
Jul.	2016	Emergency Response & First Aid	DLRG
Jun.	2016	Graduation award of the German Society of Physics	DPG
Mar.	2016	Federal qualification for Youth Debates 2016	Jugend debattiert
Nov.	2015	Auger-Masterclass	DESY
May	2015	Advanced Mathematics for Students	IFM/University Potsdam
Jun.	2014	DLR_School_Lab Berlin	DLR

Software & Tools

Experience	Name	Proficiency
7 years	**Python**	
	○ Deep learning: PyTorch, TensorFlow, Kornia, Pyro, GPyTorch, BoTorch, Captum	*advanced*
	○ Tensor learning: TNTorch, Tensorly, TensorNetwork, TedNet	*advanced*
	○ Astro. & ABC: VIP, PynPoint, HCIPy, TauREX, Astropy, emcee, PyMultiNest	*advanced*
	○ HPC: CuPy, CUDA C/C++ kernels	*intermediate*
	○ Other: Pyxel, astroquery/exo.MAST	*basic*

5 years	**Computer Aided Design**	
	○ CATIA V5 & V6, Siemens NX	*advanced*
	○ Fusion 360	*intermediate*
3 years	**Finite Element Modelling & Multi-physics Simulation**	
	○ Ansys Mechanical, Topology Optimization	*intermediate*
	○ COMSOL Multiphysics, Zemax OpticStudio	*basic*
	Other	
	○ LATEX, Git	*advanced*
	○ MATLAB, MS & Libre Office, Bash/Shell	*intermediate*
	○ CDP4 & COMET, MASTER/DRAMA, MESA, Java, mySQL	*basic*

Extracurriculars

Dec. 2016	**Delft Aerospace Rocket Engineering**	
Sep. 2022	**Team Lead** (Aug. 2020 - Sep. 2022)	*Bloom*
	- Leading a team of 6 students	
	- Natural disaster response & climate change resilience	
	- Developed and tested the worlds first fully biodegradable rocket engine	
	Mental Health Delegate (Nov. 2021 - Sep. 2022)	*Health Committee*
	- Fostering the (mental) well-being of over 130 students	
	Systems & Propulsion Engineer (Jul. 2020 - Sep. 2021)	*Project Sparrow*
	- Cryogenic bi-liquid engine development & testing	
	- Joint supervision of *"Design Study of an Electrically Driven Centrifugal LOX Pump"* with Ir. B. Zandbergen	
	Propulsion Engineer (Jan. 2017 - Sep. 2020)	*Cryogenic Propulsion Team*
	- Cryogenic bi-liquid engine development & testing	
	- Lead of Coax. Swirl Injector Development	
	- Lead of Test Bench Development	
Aug. 2018	**Autonomous Vehicle Engineer**	*Cardinal Space Mining*
Dec. 2018	○ Development of an autonomous moon regolith mining robot	
	○ Drive train & track design	
Nov. 2011	**Life Guard**	*German Life Saving Association*
Present	○ German Central Water Rescue & Medical Service, coast segment	
	○ Instructor (bronze, silver) (Sep. 2013 - Sep. 2014)	
	○ Swimming & life guarding competitions	

Languages

German	*native (C2)*
English	*fluent (C2)*
Dutch	*basic (A2)*