Leonhard KELLERER
MSc Aerospace

- github.com/lKellr
- lkellr.github.io/LeosProjectArchive
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- Buschingstraße 63, 81677, München
- Born 17th March 1998 (27 years) in Munich

I have experience in implementing [matrix-free CutFEM] finite-element methods in deal.ii.

I am especially interested by bringing my skills together in the development of advanced high-order schemes for fluid dynamics. (intersection of my skills) - solving adavanced physics porblems

SKILLS

Programming Languages	**Python** (NumPy, JAX, Matplotlib, SciPy, Cantera), **C++**, MATLAB
Frameworks	deal.II
CFD/Software	git, OpenFOAM

EDUCATION

2021–2025	Master of Science in Aerospace at Technical University of Munich
	❭ Graduated with the final grade 1.3
2022–2023	Erasmus exchange to the University of Liège, Belgium
2017–2021	Bachelor of Science in Mechanical Engineering at Technical University of Munich
	❭ Graduated with the final grade 2.0
2016	German Abitur

THESES

A HIGH-ORDER MATRIX-FREE CUTFEM APPROACH FOR PARABOLIC TWO-PHASE PROBLEMS WITH MOVING INTERFACES   2024–2025

Master's Thesis, Advisors : Maximilian Bergbauer, M.Sc. and Andreas Koch, M.Sc.

`FEM` `C++` `deal.ii` `git`

INVESTIGATION OF REACTING SHOCK-BUBBLE INTERACTIONS IN JAX-FLUIDS   2022

Term Paper, Advisor : Deniz A. Bezgin, M.Sc.
Establishment of the reactive flow submodule for the differentiable finite volume code JAX-Fluids. Application to the reactive shock-bubble interaction case.

`FV` `Python` `JAX` `JAX-Fluids` `git`

ANALYSIS OF DEEP REINFORCEMENT LEARNING STRATEGIES FOR IMPLICIT LES MODELING   2020–2021

Bachelor's Thesis, Advisor : Deniz A. Bezgin, M.Sc.
Implementation of WENO finite-volume schemes for the turbulent Burgers and Kuramoto-Sivashinsky equations. Control of stencil weights by an RL-agent to achieve an optimal implicit turbulence model.

`FV` `RL` `Python` `PyTorch`

PROFESSIONAL EXPERIENCE

March 2023 October 2023	**Research Assistant, TUM CHAIR OF AERODYNAMICS AND FLUID MECHANICS**
	Continuation of term paper project : integration of differentiable reaction kinetics into JAX-Fluids. Extension to more advanced reaction mechanisms.
	`Python` `JAX`
April 2023 July 2023	**Teaching Assistant, TUM ASSISTANT PROFESSORSHIP OF SUSTAINABLE FUTURE MOBILITY**
	Supported the practice sessions of *Thermodynamics I for Aerospace*.
April 2022 July 2022	**Teaching Assistant, TUM ASSISTANT PROFESSORSHIP OF SUSTAINABLE FUTURE MOBILITY**
	Supported the practice sessions of *Thermodynamics I for Aerospace*.
October 2021 March 2022	**Research Assistant, TUM CHAIR OF AERODYNAMICS AND FLUID MECHANICS**
	Supported the development of JAX-Fluids, including a test suite to verify the correct behavior of the code
	`Python` `JAX`

August 2017 September 2017	**Preliminary Internship, Knorr-Bremse Systeme für Schienenfahrzeuge GmbH** Technical internship in order to gain practical knowledge with respect to machining, forming, joining and dis-joining processes. Departments visited were the machining workshop for prototype manufacture, apprentice-ship workshop and service workshop, brake test and service air supply.
June 2017 August 2017	**Preliminary Internship, BMW AG** Technical internship in the departments for concept car manufacture, bodywork, joining processes, assembly, component testing and additive manufacturing.

🖥 Projects

ODEsolvers 2025

🔗 *https://github.com/lKellr/ODEsolvers*

Python implementations of several solvers for ODEs. Main focus is on extrapolation methods, but (embedded) Runge-Kutta and multistep methods are available to provide efficiency comparisons.

`Python` `git`

Deep learning in the context of multiphase flows 2019/2020

Project seminar

Training of a neural network to find cut-cell properties from level-set data.

`Python` `git`

Machine components 3d printing project 2019

Voluntary project

Design and manufacture of a SL-sintered planetary gearbox and winch.

🌐 Languages

German	● ● ● ● ●
English	● ● ● ● ●
French	● ● ○ ○ ○
Swedish	● ○ ○ ○ ○

❝ References

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