Thomas Grapentin

grapentthomas@gmail.com +49 176 6344 5841 Berlin
www.linkedin.com/in/thomas-grapentin-a22024210
https://grapentt.github.io/personal-website

Profile

Mathematics MSc student at HU Berlin with a specialization in Differential Geometry & Topology. I combine a rigorous theoretical background with 4 years of professional Full Stack experience and open-source contributions to topological deep learning (TopoBench).

Education

2025 – Present

M.Sc. Mathematics
Humboldt University Berlin
Specialization: Differential Geometry/Topology

2019 – 2025
Berlin

B.Sc. Computer Science, Math and Physics
Humboldt Universität zu Berlin
Program Overview: This unique program (240 ECTS) has been offered exclusively at HU Berlin since the winter semester 2019/2020, providing students with a broad interdisciplinary foundation in mathematics, physics and computer science.

Specialization: Differential Geometry/Topology

Thesis: My thesis titled "Seiberg-Witten Theory and the Differential Topology of 4-manifolds" was written under Chris Wendl and gives an overview of 4-manifold topology and the interplay between topology and physics, particularly concepts related to understand Seiberg-Witten theory followed by a comprehensive introduction to the Seiberg-Witten Equations.

Professional Experience

01/2024 – Present
Berlin

SAP
Full Stack Developer
MCP HUB | BTP AI Unit | 01/2025–Present
Role Overview: Development of a PoC converting REST APIs (OpenAPI/OData) into MCP tools to enable enterprise system interaction for AI assistants, now advancing toward productization and Joule integration.
Technical Responsibilities:

- Architecture & Implementation: Architected and implemented the MCP client both as a standalone app with separate UI as well as micro service consumed by main UI, enabling AI-driven tool execution over enterprise APIs
- DevOps Setup: Established DevOps setup for the PoC to support rapid iteration and experimentation
- Developer Experience: Built comprehensive developer experience infrastructure including BTP service integrations (for hybrid mode), local development scripts, and technical documentation
- Full-Stack Development: Implemented full-stack features across backend services, API layers, and UI components to support tool definition, execution, and monitoring workflows

Technologies: FastAPI (Python), Java Spring Boot, TypeScript CAP, PostgreSQL, HANA, UI5, Docker, Kubernetes, Helm, GitHub Actions

SAP Build Process Automation | Build Unit | 06/2024–12/2024
Role Overview: Contributed to the production backend of SAP's enterprise process automation platform on BTP, supporting enterprise-scale workflow automation.
Technical Responsibilities:

- Backend Development: Implemented and maintained backend services using Java and Spring Boot
- API Testing: Conducted comprehensive API testing using Bruno, ensuring reliability and correct service integration across distributed components
- End-to-End Testing: Developed and maintained automated E2E tests using Selenium to validate critical user flows and system integrations
- CI/CD & Operations: Worked within established Jenkins CI/CD pipelines to support continuous delivery and stable production releases

Technologies: Java Spring Boot, Apache Tomcat, SAP BTP, Jenkins CI/CD, Bruno, Selenium

Composable Process Platform PoC | Innovation Team | 01/2024–06/2024
Role Overview: Developed an experimental platform enabling dynamic business capability composition with BPMN-style workflow orchestration.
Technical Responsibilities:

- Design-Time / Frontend: Developed user interfaces for workflow modeling and interaction using React and TypeScript, enabling intuitive composition of business processes
- Backend / Data Services: Designed and implemented backend services with Java, Spring Boot, and SAP CAP, integrating HANA for structured data management
- Run-Time / Workflow Execution: Implemented process orchestration using Temporal and EventStoreDB to support reliable, event-driven execution of dynamic workflows
- Automated Testing: Conducted frontend and backend testing with Cypress to ensure system reliability and correctness
- Cluster Management: Managed Kubernetes deployment using Helm charts, gaining hands-on experience with cloud-native orchestration

Technologies: React, TypeScript, Java, Spring Boot, SAP CAP, EventStoreDB, Temporal, Cypress, Kubernetes, Helm

Recognition: Awarded peer-to-peer certificate of appreciation for technical versatility, curiosity, and significant contributions to team development processes and experience.

02/2023 – 12/2023
Berlin

KPMG
Data Science and Advances Analytics
Project Award: *"Best of Consulting Award"* by Wirtschaftswoche for innovation in AI-driven manufacturing processes
Role Overview: Developed the world's first industrial AI-assisted Shot Peening software, designed to automate and optimize rocket tank production. Led the design and implementation of the energy inverter component, converting ML-based energy predictions into precise robot trajectories. Contributed to the development and deployment of the machine learning model using TensorFlow.
Technical Responsibilities:

- Conceptualized and implemented an efficient algorithm for the energy inverter, transforming ML energy predictions into robot trajectories using mathematical optimization and approximation algorithms
- Developed and trained ML models in TensorFlow
- Utilized Python-based geometry processing libraries to extract and generate feature sets for our machine learning model, enhancing prediction accuracy and reliability
- Developed and optimized REST APIs with caching mechanisms to seamlessly integrate software components, boosting overall performance and scalability
- Automated data analysis and visualization pipelines to deliver actionable insights, enhancing data-driven decision-making across production stages

Recognition: Peer recognition for critical contribution to the energy inverter component, instrumental to project success

01/2022 – 12/2022
Berlin

KfW Development Bank
Java Developer
Role Overview**:** Contributed to the development of internal banking software within an agile SCRUM team, focusing on enhancing operational efficiency and user experience.
Technical Responsibilities:

- Primarily engaged in back-end development while also contributing to web application development using Java Servlets.
- Migration of legacy PL/I code to modern Java, improving maintainability and performance.
- Gained hands-on experience working with mainframe systems, ensuring seamless integration with contemporary applications.
- Utilized Hibernate and XStream for effective database integration and data transformation, optimizing data handling processes.
- Implemented document generation solutions using iText and Aspose, automating workflows and improving document management.
- Collaborated with tools such as Maven, Jenkins, and Git for build management, continuous integration, and version control, enhancing the development lifecycle.

01/2022 – 02/2022

Sneakinn Laundry
Freelance Software Developer
Project Scope: Independently conceptualized and developed a Route Optimization Software in Java to streamline the delivery process for sneaker logistics.
Technical Responsibilities:

- Designed algorithms to efficiently assign pick-up and delivery locations to drivers based on the number of available drivers, utilizing graph clustering techniques.
- Implemented route coxmputation for each driver using Traveling Salesman Problem (TSP) heuristics, ensuring optimal pathfinding and minimal total delivery time.
- Employed pre-computation and iterative methods to achieve an evenly distributed workload among drivers, enhancing operational efficiency.
- Developed a Route Optimization Visualizer to illustrate key algorithms and their performance metrics, available at Route Optimization Visualizer .

06/2021 – 12/2021

Optimal Nachhilfe
Private Tutor
Courses Taught:

- *Algorithms and Data Structures 1-2 (Java):* Guided students through core concepts and practical applications.
- *Computing 1-2 (C++)*: Developed foundational programming skills and problem-solving techniques.
- *Engineering Project:* Supervised projects using TypeScript, Angular, Express.js, MongoDB, and Python, fostering hands-on experience with modern technologies.
- *Thesis Supervision***:** Mentored student on thesis, with a focus on REST APIs in Healthcare Informatics, utilizing the FHIR standard and HAPI FHIR library.
- *Mathematics:* Instructed students in Linear Algebra and Higher Mathematics 1-2, ensuring a solid mathematical foundation.
- *Physics 1:* Provided comprehensive tutoring in fundamental physics concepts.
- *Physical Chemistry:* Explained complex topics to improve student comprehension and application.

04/2021 – 06/2021

Humboldt University Berlin
Math tutor for physics students
Led the math introduction course for incoming physics students. Focus on linear algebra and differential equations.

Projects

RouteOptimization Visualizer
Built a Visualizer with javascript, visualizing key algorithms used for the RouteOptimization Software.

Blog/Website
To share my passion of mathematics, I started writing a blog that I am hosting on personal website .

TopoBench
Contributed to all categories of the *TAG-DS Topological Deep Learning Challenge* . Designed and implemented an *on-disk inductive and transductive preprocessor/dataloader* to enable learning on large-scale graphs that do not fit into memory, using topology-aware sampling strategies. Although my submission was not formally scored due to late submission, the organizers recognized the quality and relevance of my work and included my contributions in the challenge white paper.

Courses

Data Science with Python
1.0

Algorithms and Data Structures I&II
1.0 (both)

Algorithmical methods for hard optimization problems
1.3

Introduction to theoretical computer science
1.0

Differential Geometry I-IV
1.0, 1.0, 1.7, 1.0

Topology I & III
1.0 (both)