M. Sc. Program Computational Mechanics

TUM Master‘s Days

Munich, 23 March 2026

Agenda

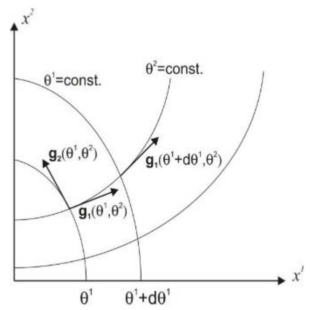
- Key Facts
- Structure and Layout
- Numbers
- Requirements, Application & What to Expect
- Your Questions
- Contacts

Key Facts

Key Facts

- Founded in 2000, international degree program
- Target group: Bachelor graduates with a focus on mechanical engineering, civil engineering, computer science and applied mathematics
- Interdepartmental consecutive Master of the TUM School of Engineering and Design
- Full time program - 4 semesters with 120 credits in total
- Intake only in the winter semester
- All lectures in English
- Degree: Master of Science (M.Sc.)

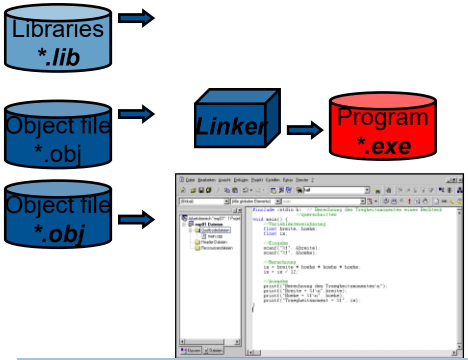
Study Content



$$\mu u^i\big|_j^{\,j} + (\lambda+\mu) u^j\big|_j^{\,i} - \rho \ddot{u}^i = 0$$

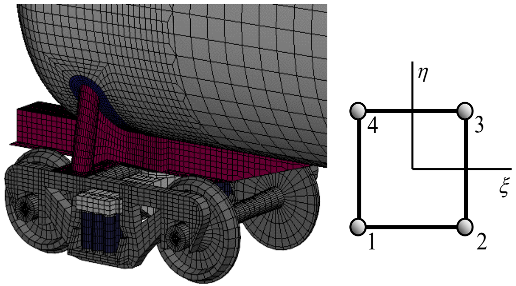
Derivation of differential equations for the description of mechanical systems

Solution of technical problems using numerical methods



Implementation in software

$$\mathbf{K} = \int_{-1}^{1}\int_{-1}^{1} t\,\mathbf{B}^T \cdot \mathbf{C} \cdot \mathbf{B}\,|J|\,\mathrm{d}\xi\,\mathrm{d}\eta$$



Numerical solution methods

New Chances

- Teaching the necessary skills in the field of simulation of mechanical problems and development of numerical methods
- Interface between classical mechanical or civil engineer, and software development
- Career opportunities in a dynamically developing branch of industry
- Leading position in one of the established engineering professions

Fields of Activity

- Simulation and numerical analysis in classical engineering disciplines
- Software development for the solution of problems in fluid and structural analysis
- Development of new analysis tools
- Relevant in all engineering disciplines

Structure and Layout

Main Chairs in Program Design

Chair of Structural Mechanics

Prof. Dr.-Ing. Gerhard Müller

Chair of Computational Modeling and Simulation

vacant

Professorship for Computational Solid Mechanics

Prof. Dr.-Ing. habil. Fabian Duddeck

Chair of Hydromechanics

Prof. Dr.-Ing. habil. Michael Manhart

Chair of Structural Analysis and Dynamics

Prof. Dr.-Ing. Roland Wüchner

Engineering Risk Analysis Group

Prof. Dr.-Ing. Daniel Straub

Curriculum

1. semester

- 6 CP Continuum Mechanics
- 6 CP Advanced Fluid Mechanics
- 6 CP Finite Element Method
- 6 CP Computational Material Modeling 1
- 6 CP Computation in Engineering 1

2. and 3. semester

50 CP Electives of various competence fields

Of which at least 12 CP from the catalog *Modeling & Mechanics*

Of which at least 10 CP from the catalog *Data, Uncertainty & Computing*

- Computational Modeling and Simulation
- Computational Mechanics
- Engineering Risk Analysis
- Structural Analysis
- Structural Mechanics
- Hydromechanics
- Others
- Individual electives (max. 12 CP)

5 CP general education electives

10 CP Software Lab in Computational Mechanics

Mobility window

4. semester

30 CP Master‘s Thesis

90 CP | 30 CP

→ Further info and details on homepage

Curriculum (core electives 2./3. semester)

- 3 CP Advanced Finite Element Method
- 6 CP Computational Fluid Dynamics
- 6 CP Computational Material Modeling 2
- 6 CP Structural Dynamics
- 3 CP Theory of Plates
- 3 CP Theory of Shells

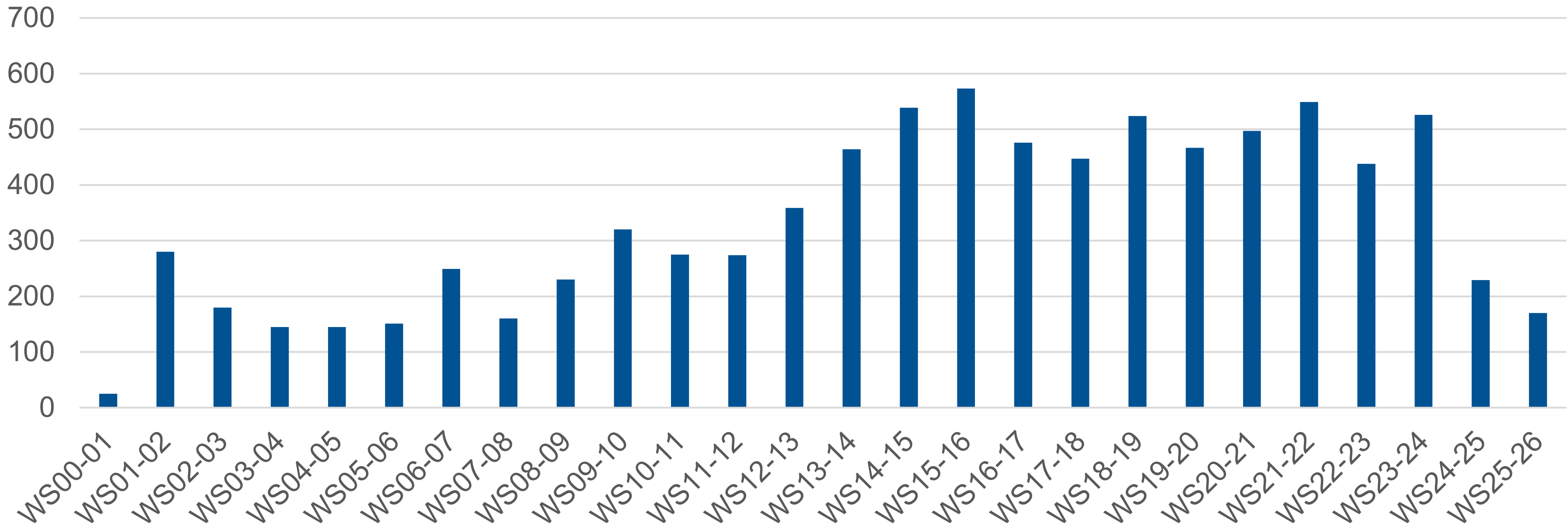
At least 12 CP from the catalog *Modeling & Mechanics*

At least 10 CP from the catalog *Data, Uncertainty & Computation*

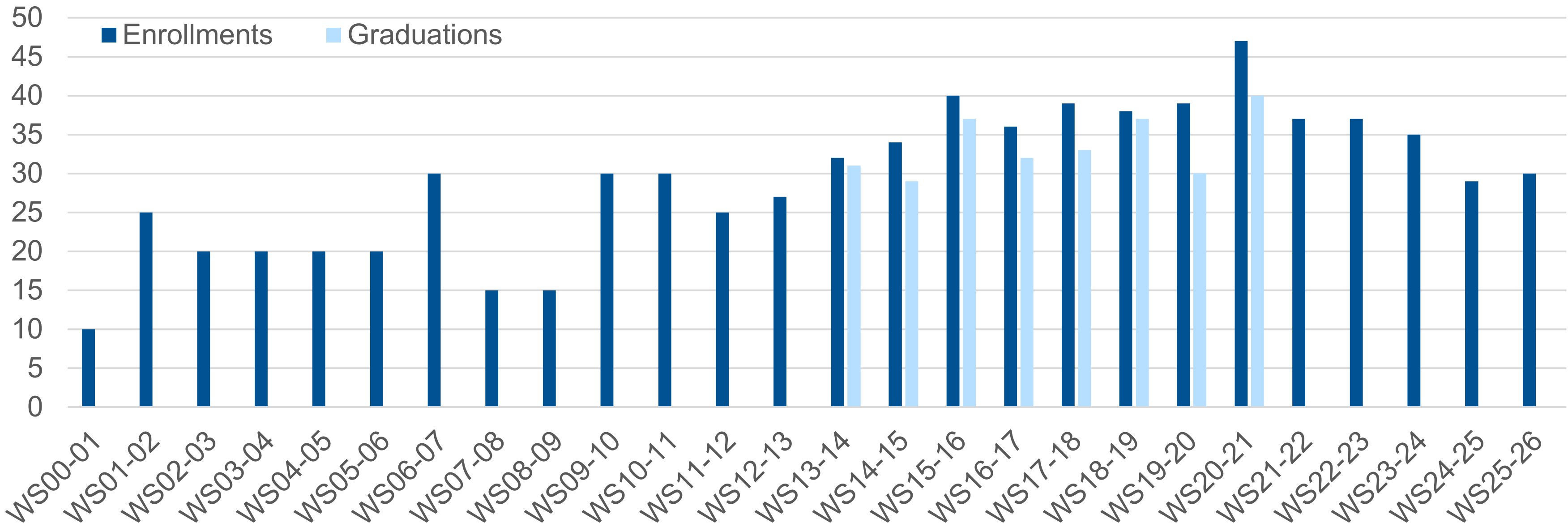
- 5 CP Advanced Parallel Computing
- 6 CP Artificial Intelligence in Computational Mechanics
- 5 CP Introduction to Functional Analysis
- 6 CP Optimization
- 6 CP Stochastic Finite Element Method

Numbers

Applications

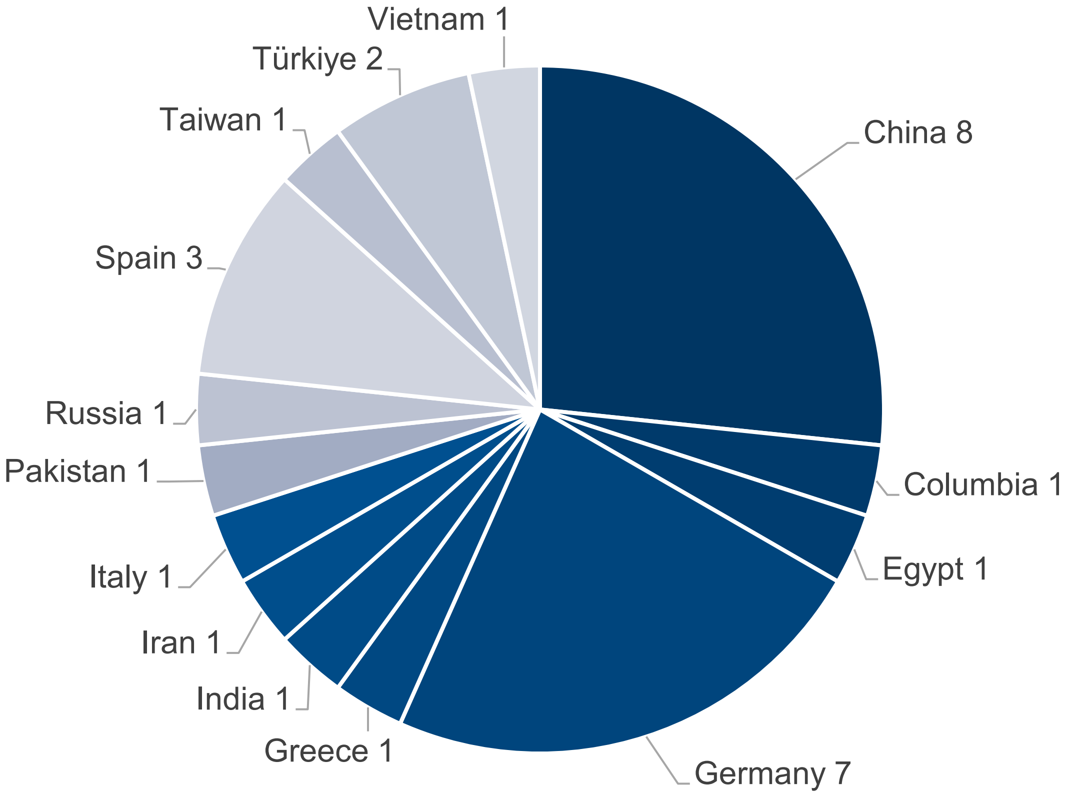


Enrollments and Graduations



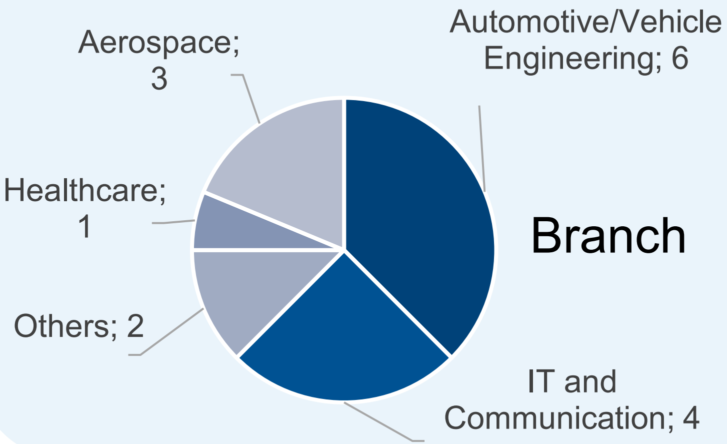
Nationalities I

WS 25/26

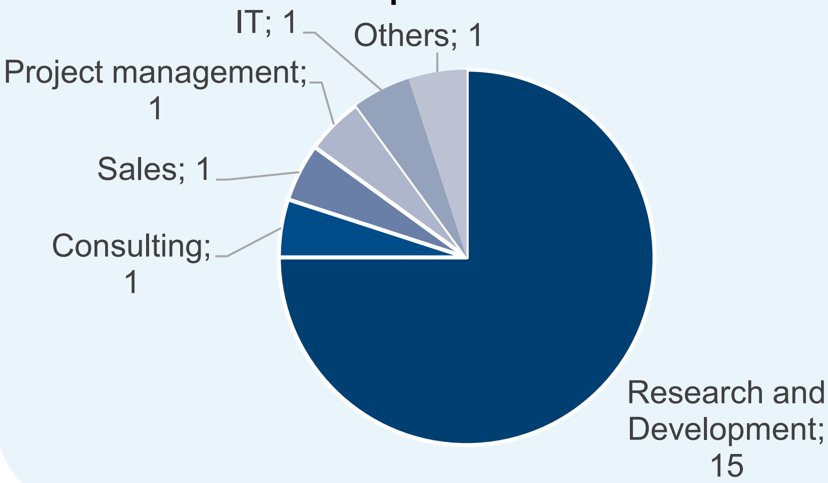


Career I

Graduate Poll 2023



Branch



Further study-specific areas:

- Structural Analysis
- Software development

Requirements, Application & What to Expect

→ Further info and details on homepage

Requirements

Above average Bachelor's degree

Sound knowledge of mathematics & mechanics (fluid & structural mechanics)

Fundamental knowledge in informatics

English language proficiency

- TOEFL (IBT ≥ 88)
- IELTS (≥ 6,5)
- CAE, CPE (A,B,C)
- Bachelor's in English

→ Pass Aptitude Assessment

Aptitude Assessment

Two stage procedure

Submission of

- Transcript
- CV
- Letter of Motivation
- Essay
- Letter of Reference

First stage: assessment of application in first stage: up to 100 points

- < 65 points: rejection
- ≥ 65 points, < 75 points: interview
- ≥ 75 points: admission

Second stage: interview

- < 90 points: rejection
- ≥ 90 points: admission

Related Programs at TUM

Computational Science and Engineering

TUM School of Computation, Information and Technology

Mathematics in Science and Engineering

TUM School of Computation, Information and Technology

Applied and Engineering Physics

TUM School of Natural Sciences, Department of Physics

Materials Science and Engineering

TUM School of Engineering and Design

→ Further info and details on TUM-webpage

Tuition Fees

No tuition fees for students

- from Germany, the EEA (EU + Iceland, Liechtenstein and Norway) and some more
- who have acquired their Bachelor’s or higher education in the German education system

Tuition fees: 6,000 € per semester

Various scholarships and exemptions

- Deadline for Application: 31 May 2026

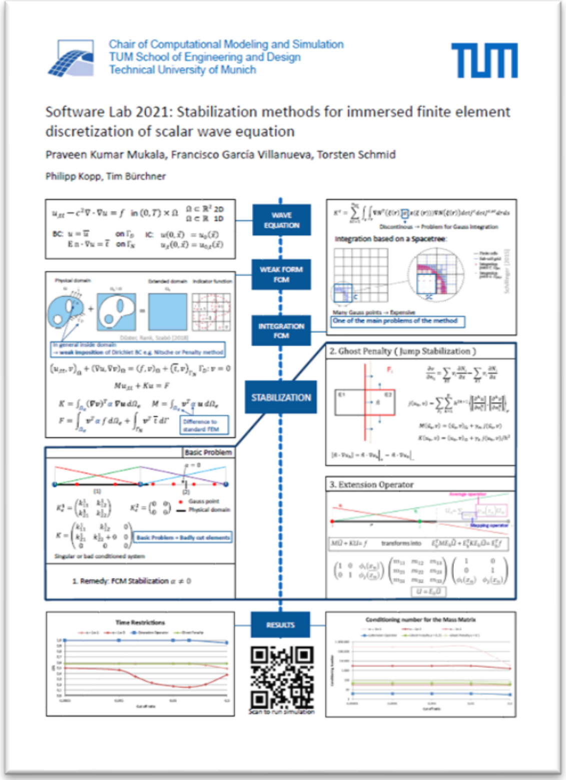
What to expect

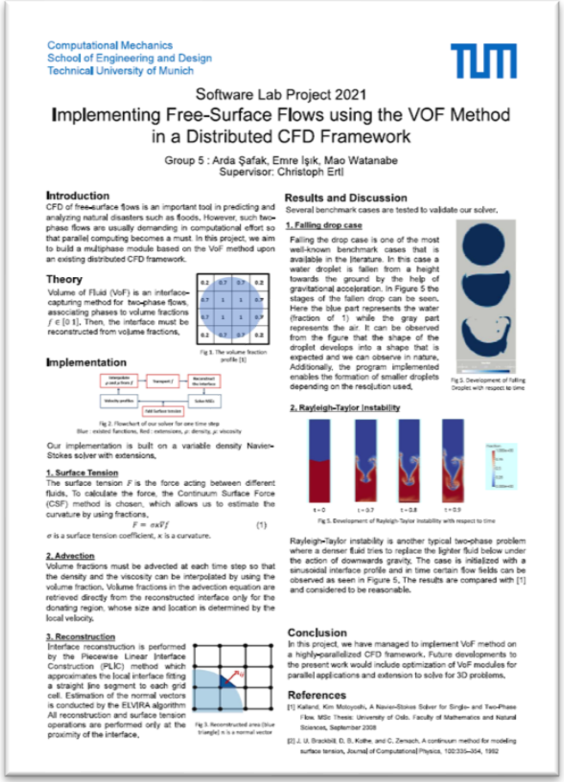
- Interdisciplinary & intercultural teaching and studying
- Onboarding at beginning of studies: welCoMe week & C++ introduction
- Project work: Software Lab in Computational Mechanics
- Care and support in small groups
- Individualizable curricula through "individual electives”

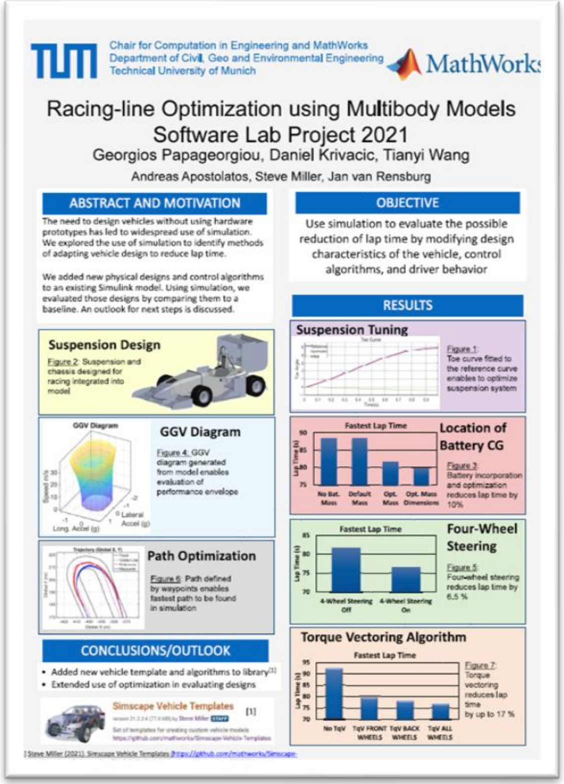
Software Lab in Computational Mechanics

- Implementation of a mechanical/engineering problem into a software solution
- Projects from academic and industrial background
- Simulation of team-oriented and hands-on software development
- Work in small groups (3-4 students)

Software Lab







Your Questions

Organization and Teaching

- What are specific applications, simulation programs that are used and taught at TUM in terms of Computational Mechanics?

Aptitude Assessment

- How to Apply for a Master’s Degree
- What are the prerequisites?
- Details about Aptitude Assesment and Additional Exams

Related to Internships / Exchange / Scholarships

- What scholarship opportunities are available for Industrial engineering specialization Masters programmes?
- Internship opportunities, Teacher's assistant at research as a student

Further Questions

Further Information and Contact

Sebastian Resch-Schopper, M. Sc.

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Links

https://www.tum.de/en/studies/fees-and-financial-aid/scholarships/tum-scholarships

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Thank your your interest!

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