Computational Science and Engineering (CSE)

A brief presentation

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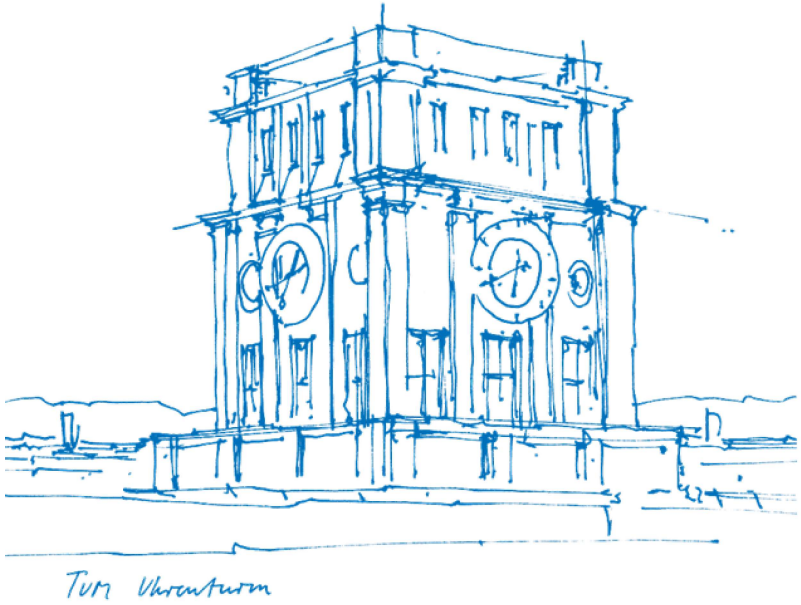
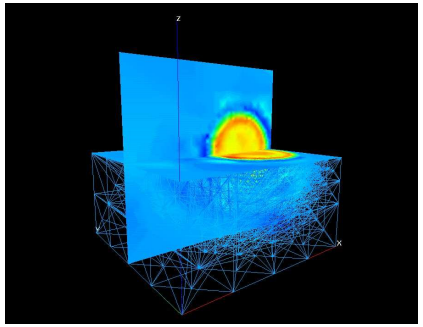
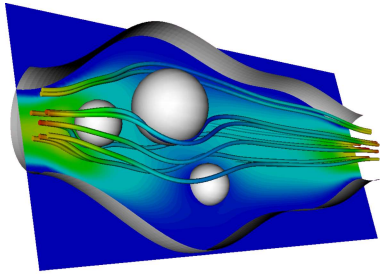
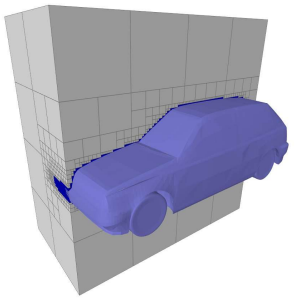


What is Computational Science and Engineering?







Computational Science and Engineering

- multi-disciplinary field
- computer-based modelling and simulation
- studying scientific phenomena and engineering designs

Your skills

- computer science
- applied mathematics
- expert in respective application $\rightarrow$ target group not IN, but MSE (and others)!

About Computational Science and Engineering at TUM

International Master's Program

- all lectures and material in English
- students with very international background
- Established in 2001 at TUM

Multi-disciplinary cooperation of seven departments

- Computer Science
- Mathematics
- Civil Engineering
- Mechanical Engineering
- Electrical Engineering
- Physics
- Chemistry

Curriculum Overview: Required Subjects

Section A: Computer Science (10 ECTS)

- Advanced Programming
- Parallel Programming

Section C: Scientific Computing (31 ECTS)

- Scientific Computing I + II
- Scientific Computing Lab
- Advanced Practical Course Computational Science and Engineering
- CSE Seminar Scientific Computing

Master Thesis (30 ECTS)

- 6 months
- university or industry

Curriculum Overview: Elective Subjects Pt. I

Section A: Computer Science (min. 10 ECTS)

- Advanced Computer Architecture
- Visual Data Analytics
- Fundamental Algorithms
- Patterns in Software Engineering

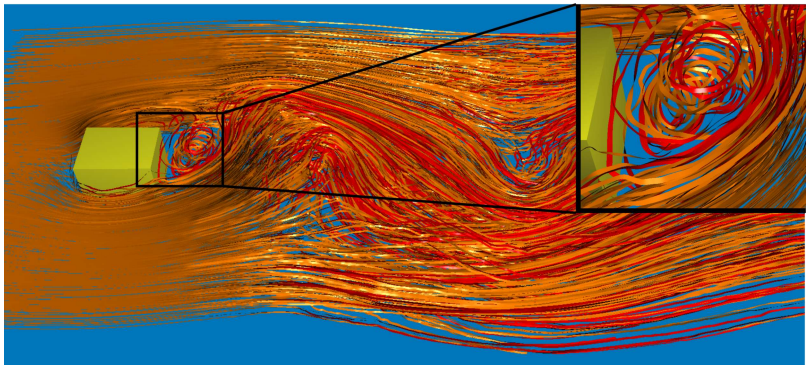
Section B: Applied Mathematics (min. 16 ECTS)

- Numerical Analysis I + II
- Numerical Algorithms for High Performance Computing

Curriculum Overview: Elective Subjects Pt. II

Section D & E: Methods and Applications (min. 8 from Section D)

- Computational Mechanics
- Computational Fluid Dynamics
- Mathematics in Bioscience
- Computational Physics
- Computational Electronics
- Computational Chemistry
- Algorithms in Scientific Computing
- Finite Elements
- High Performance Computing
- Computational Visualisation
- Driven Simulation and Computing
- ...



Application – Eligibility

Modules in 5th and 6th semester Engineering Science MSE

- no required modules for CSE, but your transcript should match
- see MSE Mustercurricula[1]
- see Teaching at SCCS [2] for courses at our chair

Seminar and practical courses at Informatics (not only CSE)

- *Pay attention about the deadlines!* (see `http://docmatching.in.tum.de`)
- often already kickoff events in the previous semester exist
- winter kickoffs start on 30.06-13.07(!)
- good to practice programming (C++) and teamwork (version control)

[1] `https://wiki.tum.de/display/edschooloffice/B.Sc.+Engineering+Science` for guidance
[2] `https://www.cs.cit.tum.de/sccs/lehre`

Application – Formalities

Documents

- Language certificate (recommendation: English Thesis)
- no GRE required
- no VPD required
- some more documents, but better check our webpage/application guide, when it is time[3]

Deadline

- CSE starts only in WS; no part-time possible
- Application opens on ~~Jan~~ Feb 1st
- Application closes on May 31st

[3] https://www.cit.tum.de/fileadmin/w00byx/cit/_my_direct_uploads/appguide.pdf

Application – EFV1&2 [4]

EFV1

15pts	grade (1pt for every 0.1 better than 2.5)
10pts	math
10pts	programming
20pts	fit of program & curriculum
25pts	CV & motivation
80pts	

EFV2

- necessary, if $\geq$ 40, but $<$ 55 points
- answer open question from EFV1, often motivation or skills

[4] Updated as of 2024.

Further information & facts

Coordinators (Chair of Scientific Computing, TUM)

- Tobias Neckel
- Kislaya Ravi
- Hayden Liu Weng
- Qunsheng Huang

Application process

- Currently approx. **750** applications per year
- **100 - 150** admissions per year
- **60 - 80** students starting each year

→ don't be afraid!

More information

- CSE website: `www.cse.tum.de`
- BGCE website: `www.bgce.de`
- contact me: `coordinators@cse.tum.de`

It’s not only about studying!