Biomedical Computing (BMC) Master’s Program at TUM

Short Overview

Welcome Event, October 16, 2017
Where is everything?

The Biomedical Computing Master’s program is distributed across several main locations at TUM and LMU.

**University Campus:**
- TUM Campus Garching, Informatics building (FMI)
- TUM City Campus (“Stammgelände”)

**University Hospitals:**
- TUM Klinikum rechts der Isar
- LMU Klinikum Innenstadt
- LMU Klinikum Großhadern
Where is everything?
TUM Campus Garching

- U-Bahn station **Garching-Forschungszentrum** (U6)
- Main location of Informatics and Mathematics department (FMI)
- Location of CAMP chair
- Also mechanical engineering and other departments
- Informatics/Mathematics library
  - Mon-Fri: 9am till 12pm
  - Sat, Sun: 10am till 3 pm
- Places to have food:
  - Bistro in FMI building
  - Student mensa
Where is everything?

TUM City Campus

- U-Bahn stations Königsplatz or Theresienstraße (U2)
- Former location of almost all TUM departments
- Informatics/Mathematics moved to Garching in 2001
- Nicely situated in Munich’s museum district
- Walking distance to city center and Englischer Garten
- Many options for having food
Where is everything?
TUM Klinikum rechts der Isar

- U-Bahn station **Max-Weber-Platz** (U4, U5)
- Main hospital of TUM
- Location of IFL lab (CAMP)
- Located close to city center
- Everyone got lost there at least once
- Don’t use main entrance, lecture halls (A-D) are easier to reach from **Einstein-Straße**
- Mensa offering decent food at reasonable prices
Where is everything?

LMU Klinikum Innenstadt / Klinikum Großhadern

Klinikum Innenstadt:
• U-Bahn station Sendlinger Tor (U3, U6)
• One of the LMU hospitals (big)
• Probably the most central of all locations

Klinikum Großhadern:
• U-Bahn station Klinikum Großhadern (U6)
• Another LMU hospital (huge)
• As far out of the city center as Garching, just in the opposite direction
Whom do I ask questions to?

BMC Team

- Stefanie Demirci
- Iro Laina
- Beatrice Lentes

- [bmc-coordination@mailnavab.in.tum.de](mailto:bmc-coordination@mailnavab.in.tum.de)
- BMC weekly office hour: Tue 1.00 – 2.00 pm (subject to change if too many collisions)
What do I study?

The Biomedical Computing Master’s program has several requirements you need to fulfill to earn your degree.

In a nutshell:

• You have to successfully complete modules worth at least 120 ECTS credits.
• Each semester you have to pass at least 30 ECTS credits.
• Last semester is reserved for your Master’s Thesis, worth 30 ECTS credits.
• **Beware the Informatics study regulations:**
  – 90 ECTS must be fulfilled at the end of semester 5
  – 120 ECTS must be fulfilled at the end of semester 6

The full regulations:

• General Academic and Examination Regulations
• Academic and Examination Regulations for the Master Program BMC
**What do I study?**

The big picture

<table>
<thead>
<tr>
<th>Compulsory Modules</th>
<th>43 Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics</td>
<td>26 Credits</td>
</tr>
<tr>
<td>Medicine</td>
<td>17 Credits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective Modules</th>
<th>49 Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imaging</td>
<td>5 or more Credits</td>
</tr>
<tr>
<td>Mathematical Methods and Scientific Computing</td>
<td>5 or more Credits</td>
</tr>
<tr>
<td>Programming and Software Engineering</td>
<td>5 or more Credits</td>
</tr>
<tr>
<td>Image Processing, Computer Vision and Pattern Recognition</td>
<td>8 or more Credits</td>
</tr>
<tr>
<td>Computer Graphics, Augmented Reality and Visualization</td>
<td>6 or more Credits</td>
</tr>
<tr>
<td>Soft Skills</td>
<td>3 or more Credits</td>
</tr>
</tbody>
</table>

**Master’s Thesis in Biomedical Computing**
30 Credits
What do I study?
Types of modules

A module can be a lecture, a practical, an exercise, a project or similar.

**Compulsory modules:**
- **Must** be taken by all students
- Examinations have to be passed

**Elective modules:**
- Choice of pre-selected modules (longer list than required modules)
- Some include a **minimum** number of credits that have to be taken
- Can be taken aside from required modules

For a list of modules visit:  
http://www.in.tum.de/fuer-studierende/master-studiengaenge/biomedical-computing/curriculum.html
What do I study?

Courses offered by the CAMP Chair

Follow:  [http://campar.in.tum.de/](http://campar.in.tum.de/)

- However, the above list is not the complete curriculum!
- There are many more possible courses offered by the Faculty of Informatics and more
What do I study?
Example: your first semester

**Required modules:**
- Cover practical and theoretical courses from Computer Science, Medicine and Imaging
- Practical: Medical Instrumentation and Computer Aided Surgery
- Lecture: Computer Aided Medical Procedures I

**Elective modules:**
- The required modules above sum up to 12 ECTS credits.
- 18 ECTS credits need to be filled with electives.
What do I study?
Schedule Example: 31 ECTS

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00-08:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08:30-09:00</td>
<td>Data Mining und Knowledge Discovery</td>
<td>Fundamental Algorithms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09:00-09:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09:30-10:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:00-10:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30-11:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00-11:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30-12:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00-12:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:30-13:00</td>
<td></td>
<td>Medical Augmented Reality</td>
<td></td>
<td>Interventional Imaging and Image Processing</td>
<td></td>
</tr>
<tr>
<td>13:00-13:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:30-14:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:00-14:30</td>
<td></td>
<td>Scientific Computing 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14:30-15:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:00-15:30</td>
<td>CAMP 1</td>
<td>Scientific Computing 1</td>
<td>CAMP 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:30-16:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:00-16:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30-17:00</td>
<td></td>
<td></td>
<td></td>
<td>Medical Augmented Reality</td>
<td></td>
</tr>
<tr>
<td>17:00-17:30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17:30-18:00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:00-18:30</td>
<td>Medical Instrumentation and Computer Aided Surgery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What do I study?
Schedule Example: Potential Continuation

• 2\textsuperscript{nd} semester (SS 2018)
  – CAMP 2
  – Imaging in Radiology, Nuclear Medicine and Radiation Therapy
  – Master Seminar
  – Parallel Programming
  – 3D Computer Vision
  – Image Guided Surgeries

\[ \Rightarrow 30 \text{ ECTS} \]
What do I study?

Schedule Example: Potential Continuation

- 3rd semester (WS 2018/19)
  - Clinical Internship
  - Medical Information Processing and Pathophysiology
  - Soft Skills (Überfachliche Grundlagen)
  - Parallel Numerics
  - Basics of Computer Vision
  - 3D Data analysis and visualization for robotics and computer graphics

⇒ 31 ECTS
What do I study?

Schedule Example: Potential Continuation

- 4th semester (SS 2019)
  - Master Thesis
What do I study?
How to register
TUMOnline
What do I study?
Seminars and Practical Courses

TUM Matching System
• Used instead of TUMOnline for applying to certain courses, e.g.:
  – Seminars (part of the compulsory modules)
  – Compulsory Clinical internship
  – (aka Project Management and Software Development for Medical Applications)
  – Elective practical courses (e.g. Machine Learning in Medical Imaging)
• Usually includes courses with limited capacity

How to apply:
• [https://matching.in.tum.de/](https://matching.in.tum.de/)
• The application period starts one semester in advance
• Attend the preliminary meeting(s)
• Multiple applications are possible (sorted by preference)
• Students are matched to one of their preferences
What do I study?

German courses

- German courses for international students:
  - All levels (A1 to C2)
  - All campuses
  - They count for credits as part of the Soft Skills module
  - Capacity is usually limited
  - First-come first-serve registration: be fast!
What do I study?
Course Schedule Selection

• Not all courses are held at Campus Garching!
  – Pay special attention to transfer time
  – Try to schedule courses at the same location

• Many courses require previous knowledge
  – CAMP II scheduled for 2\textsuperscript{nd} semester requires CAMP

• Exchange semester
  – BMC study program is unique
  – Course accreditation at TUM is very strict
  – Hard to finish BMC within 4 semesters as courses may not be offered each semester
  – We encourage students to do Master’s thesis or clinical project (internship) abroad!
What are the rules?

Full regulations:
• General Academic and Examination Regulations (English)
• Academic and Examination Regulations for the Master Program BMC (German)
• Both available online

Short version and highlights:
• Your Survival Guide booklet

Covered topics, among others:
• How does the German grading system work? (1.0: excellent until 5.0: fail)
• How do examinations work? (oral/written exams, registration, time limits, etc.)
• Can I repeat an exam? (sickness, other causes)
• List of required and elective modules
What are the rules?
Examinations

Any module is completed with an exam grade of 4.0 ("sufficient"), or better.

Required modules:
• A failed exam has to be repeated within 6 months of failure notification.
• An exam cannot be repeated to improve your grade.

Electives:
• Elective modules can be replaced with other elective modules if you fail an exam or if you are unsatisfied with your grade.
• Exams can be repeated if a retake exam is offered (may not be the case for many courses)
Where do I go next?

- BMC info:
  - [http://www.in.tum.de/en/current-students/masters-programs/biomedical-computing.html](http://www.in.tum.de/en/current-students/masters-programs/biomedical-computing.html)
  - BMC office hour
- Student Info Point (MI 00.10.013)
  - Computer access, examination issues, etc.
- BMC Facebook group
- Student Society (MI 00.06.036)
  - Meet other people, get unbureaucratic help
- TUMonline
  - Portal for lectures, schedules, exams, grades
- German language courses
- International Students Office
BMC Mentoring Program

- Senior or alumni BMC students offer their guidance and experience
- Excellent networking opportunity
- 12 Mentors available

Application
- send email to stefanie.demirci@tum.de
- first come first serve
Good Luck with your studies
and enjoy your time in Munich!