



Deutscher Akademischer Austauschdienst
German Academic Exchange Service



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Doctorate



Graduate School of Quantitative Biosciences Munich (QBM)

Ludwig-Maximilians-Universität München • München

Overview

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| Degree | Doctoral Degree Dr rer nat |
| In cooperation with | Technical University Munich, Helmholtz Center Munich, Max-Planck Institute for Biochemistry Munich |
| Teaching language | <ul style="list-style-type: none">English |
| Languages | Courses are held in English (100%). |
| Full-time / part-time | <ul style="list-style-type: none">full-time |
| Mode of study | 50 / 50 online and on-site |
| Programme duration | 9 semesters or more |
| Beginning | Only for doctoral programmes: any time |
| Additional information on beginning, duration and mode of study | The courses always start in spring. Depending on the topic, courses will either be held in person or online (programming courses). Compulsory "primer" (foundational) courses (programming, statistics, bioinformatics, biophysics) are planned as intensive courses (March to May). Soft skill courses (Good Scientific Practice, Presentation Skills, Scientific Writing), lecture series talks/ journal clubs, and bonus lectures will be scheduled individually throughout the year. |
| Application deadline | For current information, please visit: https://qbm.genzentrum.lmu.de/application/ |
| Tuition fees per semester in EUR | None |
| Combined Master's degree / PhD programme | No |
| Joint degree / double degree programme | No |
| Description/content | The molecular biosciences are undergoing a major paradigm shift – away from analysing individual genes and proteins to studying large molecular machines and cellular pathways, with the ultimate goal of understanding biological systems in their entirety. The study of biomolecular systems poses major methodological and conceptual challenges, centred around the need for quantitative |

approaches. This includes the development of sensitive quantitative assays for in vitro and in vivo approaches; improved measurement techniques that ideally push resolution limits to the single molecule level; statistical methods to deal with high-dimensional, often noisy, data sets; and mathematical modelling approaches that reduce the dimensionality of parameter spaces and produce mechanistically realistic, experimentally testable predictions. As a result, systems-oriented biological research is inherently an interdisciplinary undertaking, involving biochemistry/structural biology, molecular and organismal genetics, biophysics, biostatistics, bioinformatics, and theoretical physics. Recently, AI (AlphaFold, computer vision, etc.) has had a huge impact on life science, proving that this field is constantly changing.

The mission of QBM is to provide young scientists with the skills and resources to excel in this new multi-disciplinary environment. We seek to train a cohort of young scientists who, while firmly anchored in their primary disciplines, are well versed in multiple approaches and styles of thought. The goal is for the students to be comfortable communicating across traditional boundaries, especially across the divide between experiment and quantitative theory – to become, in effect, scientifically bilingual or multilingual. To this end, the school offers a structured PhD programme consisting of three components: an interdisciplinary research project jointly supervised by two PIs from different fields, a substantial programme of formal course work centred around an interdisciplinary core course that covers key problems in bioscience from multiple perspectives, and activities designed to enhance students' communication skills and their ability to succeed in the competitive profession of science.

Additional support is offered by the [GraduateCenter](#).

Course Details

Course organisation

QBM offers an integrated interdisciplinary PhD programme that consists of three main components:

1. An interdisciplinary research project that combines concepts and methods from different fields.
2. A substantial programme of formal course work with a general and an individual component:

- First year:
 - **Data analysis:** A three-day workshop designed to introduce the programming languages R, Python and Matlab to non-programmers and programmers without prior knowledge.
 - **Primer courses:** To support the work in their projects and build a stronger foundation in the disciplines outside a student's primary field of training, we offer targeted feeder courses that are specifically designed to teach relevant basics to non-specialists. Depending on their background, life science students take primers in biophysics and statistics/bioinformatics, maths/physics students take primers in life sciences and bioinformatics, and bioinformatics students take primers in biophysics and statistics.
 - **Bonus lectures** can be picked by the students depending on their interests and project-specific requirements. Students can deepen their knowledge about selected topics (e.g. Bayesian Statistics, HMMs, AI, advanced programming in Matlab or Python) in small classes of max. 10 participants.
 - **Lecture series:** QBM students suggest, invite, and host external speakers at this monthly event. The lectures on QBM-relevant topics are complemented with a journal club with the guest speaker.
- Subsequent years:
 - **QBM retreat:** This annual event brings all QBM students together in an informal scientific environment where they present their research in brief talks and posters, and attend lectures of invited speakers.
 - **Elective advanced courses:** These are based on the background and the needs of the respective thesis project, with the goal to develop skills to support the students' interdisciplinary research.

3. Further activities to enhance students' communication and other transferable skills: Workshops on scientific writing and scientific presentation as well as writing fellowship applications are offered, as are additional workshops on topics such as optimising communication, team, and leadership skills, project management, intercultural and gender awareness, and applying for jobs. These are offered as electives.

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| Certificates for specific modules are awarded | Yes |
| International elements | <ul style="list-style-type: none"> • International guest lecturers • Language training provided |
| Special promotion / funding of the programme | <ul style="list-style-type: none"> • Other (e.g. state level) |
| Course-specific, integrated German language courses | No |
| Course-specific, integrated English language courses | No |

Online learning

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| Pace of course | Mixed (e.g. fixed exam dates and duration, study content can be studied at any time) |
| Phase(s) of attendance in Germany (applies to the entire programme) | Yes, compulsory |
| Types of online learning elements | <ul style="list-style-type: none"> • Access to databases with study material |

Costs / Funding

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| Tuition fees per semester in EUR | None |
| Semester contribution | <p>Basic fee of 75 EUR + additional fee for the Deutschlandticket</p> <p>https://www.lmu.de/en/workspace-for-students/abc-study-guide/semester-ticket/index.html</p> |
| Costs of living | Living costs (including accommodation and health insurance) in Munich range from 1,000 to 1,200 EUR per month. |
| Funding opportunities within the university | Yes |
| Description of the above-mentioned funding opportunities within the university | <p>Funding opportunities include the regular PhD position (65% E13) and the QBM Travel Grant. QBM pays for German courses.</p> <p>Laptops and software will be provided by QBM.</p> <p>LMU Travel Grant, LMU Completion Grant</p> |

Requirements / Registration

Academic admission requirements

Master's degree in any relevant discipline: biochemistry, biophysics, biomedical sciences, bioinformatics, experimental and theoretical biophysics, (physical) chemistry, and applied mathematics; two letters of recommendation and a proof of English proficiency. See this link for more details: <https://qbm.genzentrum.lmu.de/application/requirements/>.

Language requirements

Applicants must provide proof of English proficiency (IELTS, TOEFL, comparable certificates, confirmation from previous academic institution, etc.).

Application deadline

For current information, please visit: <https://qbm.genzentrum.lmu.de/application/>

Submit application to

<https://qbm.genzentrum.lmu.de/application/>

Services

Accommodation

The International Office helps visiting academics, PhD students, and postdocs who are travelling to Munich for a set period of time to find accommodation.

For further information, please visit the following link:

<https://www.lmu.de/en/study/important-contacts/international-office/index.html>

Rooms in shared flats are popular on the private market and reasonably priced at 400 to 800 EUR per month if located in central parts of Munich.

<https://www.lmu.de/en/about-lmu/working-at-lmu/additional-services/lmu-gateway/new-international-doctoral-candidates/phase-1-preparing-your-move-to-munich/index.html>

Structured research and supervision

Yes

Research training / discussion

Yes

Support for international students and doctoral candidates

- Visa matters



BioSysM Building

© Gene Center Munich, picture taken by Michael Till

Join QBM and work on an innovative interdisciplinary life science project!

Our graduate school invites excellent students from all over the world and different primary disciplines that range from medical science, biology, biochemistry, engineering, bioinformatics, physics to applied mathematics, to work on an interdisciplinary PhD project in life science. Become a part of our unique research network comprising Ludwig-Maximilians-Universität München (LMU), Technical University Munich (TUM), Max-Planck Institutes (MPI) and the Helmholtz Center Munich at one of Europe's highest ranked universities.

Benefit from the inspiring spirit in our school and our individualised courses like programming and data analysis with Python, MATLAB, and R; statistics; bioinformatics; biophysics; AI; and life science taught in small classes and tailored to your PhD project. Acquire in-demand and more specialised skills in our bonus lectures and transferable skills courses that will boost your PhD project!

Submit your application by 31 July here: qbm.genzentrum.lmu.de/application



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🌐 Course website: <https://qbm.genzentrum.lmu.de/phd-program/>

📘 <https://de-de.facebook.com/lmu.muenchen/>

🐦 <https://twitter.com/munichqbm?lang=de>

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International Programmes in Germany - Database

www.daad.de/international-programmes
www.daad.de/sommerkurse

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Disclaimer

The data used for this database was collected and analysed in good faith and with due diligence. The DAAD and the Content5 AG accept no liability for the correctness of the data contained in the "International Programmes in Germany" and "Language and Short Courses in Germany".

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