

**Master Molecular Life Sciences –
Microbiology, Biotechnology and Biochemistry**



MSc/PhD Program

**Molecular Life Sciences -
Microbiology, Biotechnology and Biochemistry**

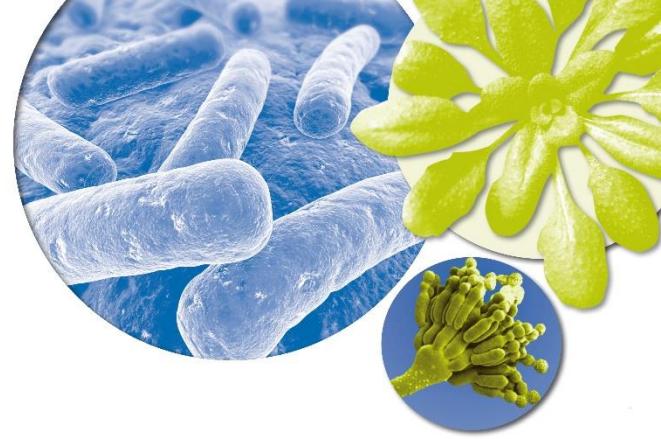
Prof. Dr. Stefanie Pöggeler

[spoegge@gwdg.de](mailto:sSpoegge@gwdg.de)



UNIVERSITÄT
GÖTTINGEN

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Key feature:

Research-oriented Studies

Primary Model Organisms:

Microorganisms (single cell, multicellular)



Plant-Microbe Interactions

Plants

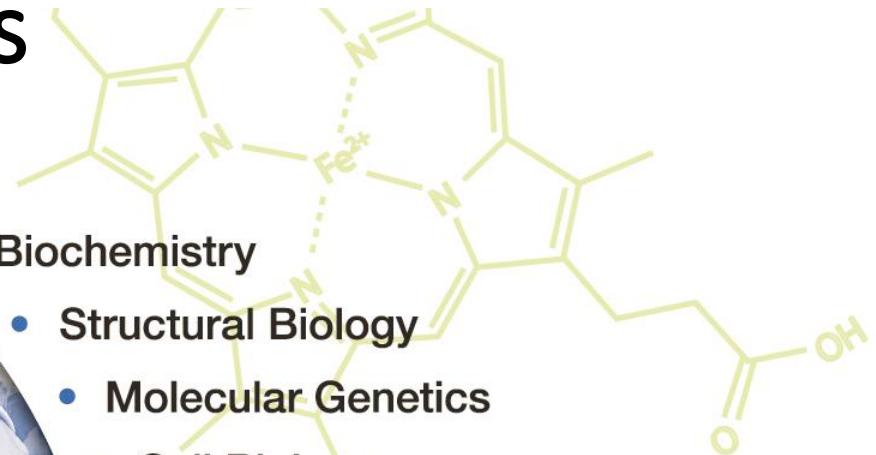
Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



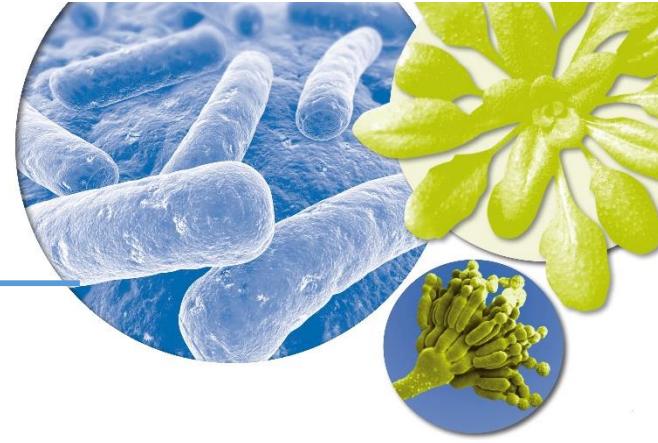
Subjects



- Biochemistry
- Structural Biology
- Molecular Genetics
- Cell Biology
- Microbiology
- Biotechnology
- Plant Molecular Biology
- Plant-Microbe Interactions
- Chemical Biology
- -Omics
- Biophysics
- Bioinformatics



Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Key features

- from BSc to MSc in 2 years (4 semesters)
- consistent focused program
- 120 credits according to the European Credit Transfer System (ECTS)
 - program limited to 48 students
 - English as main teaching language
- practical training in small groups with state of the art equipment
 - inspiring international research environment
 - complementary training (“soft skills”)
- direct access to the PhD programs of the faculty for excellent students

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Basic structure

module	number	structure and options		c/ module	c total
core module	3	lecture + seminar/tutorial + methods course	choice of 7 different modules	12	36

Seven Core Modules

- "General and Applied Microbiology"
- "Molecular Genetics & Microbial Cell Biology"
- „Applied Bioinformatics in Molecular Bioscience“
- "Enzyme Catalysis and Chemical Biology"
- "Cell & Molecular Biology of Plant-Microbe Interactions"
- "Structural Biochemistry"
- "Biochemistry & Biophysics"

WS

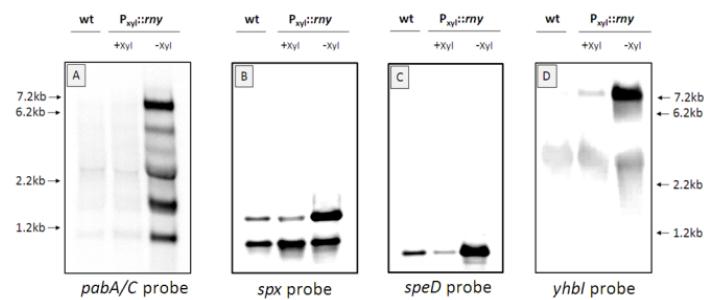
„M.Bio.101 General & Applied Microbiology“



Prof. Jörg Stülke

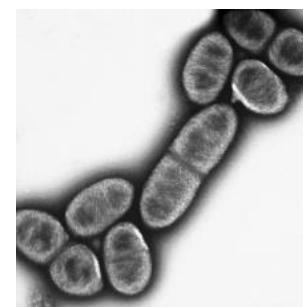
Metabolic and
Regulatory
Patterns in Bacterial
Cells

Regulated protein-RNA
Interaction



PD Dr. Michael Hoppert

Biomineral formation
Terrestrial microalgal
biofilms



Prof. Rolf Daniel
PD Dr. Heiko Liesegang

(Meta)genomics

Applied Microbiology
Synthetic Microbiology

Genes and enzymes
for biotechnology



Biotech
Mik
GenoMik
Network Centre Göttingen

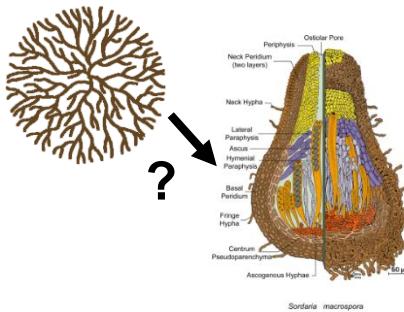
GenoMik

„M.Bio.102 Molecular Genetics & Microbial Cell Biology“



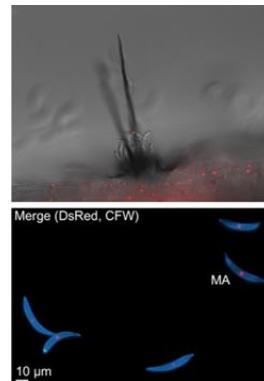
Prof. Stefanie Pöggeler

Fruiting-body
Development in
Filamentous Ascomycetes



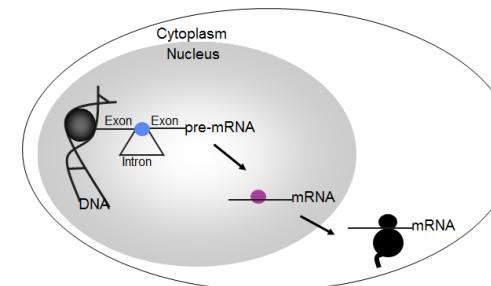
Dr. Daniela Nordzieke

Plant infection by
Colletotrichum graminicola



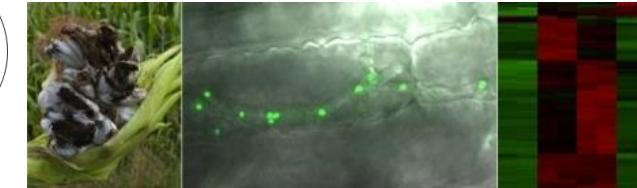
Prof. Heike Krebber

Nucleocytoplasmic
Transport



Prof. Kai Heimel

Unfolded Protein Response
in Filamentous Fungi



„M.Bio.105 Applied Bioinformatics in Molecular Bioscience“



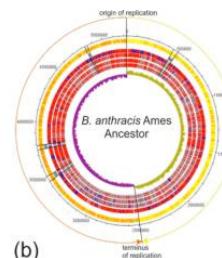
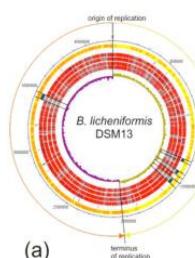
Prof. Rolf Daniel



PD Dr. Heiko Liesegang

Handling of programs, bioinformatic tools and databases with respect to data-driven Omics-based research

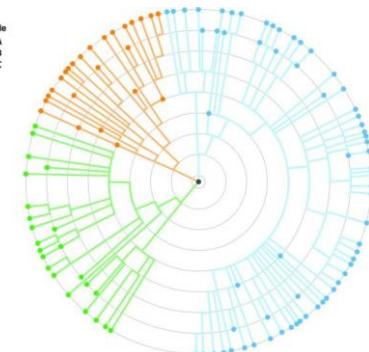
- Application of bioinformatic approaches in molecular phylogeny, evolution, genome dynamics und (meta)Omics
- Bioinformatic analysis of RNAs and proteins
- Identification of motifs and genes
- Generation and analysis of metabolic models and networks



(a)

(b)

Clade
A
B
C



„M.Bio 108 Enzyme Catalysis & Chemical Biology“



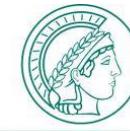
Jun.-Prof. Nadja Simeth
PhotoBioOrgChemistry



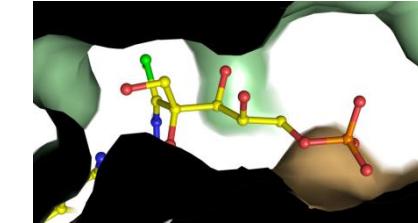
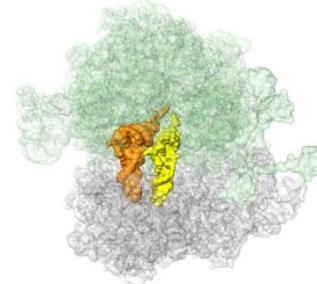
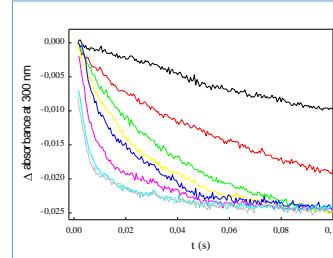
Prof. Kai Tittmann
Reaction mechanisms of thiamin-dependent enzymes and flavoenzymes



Prof. Marina Rodnina
Kinetics of Bacterial Translation

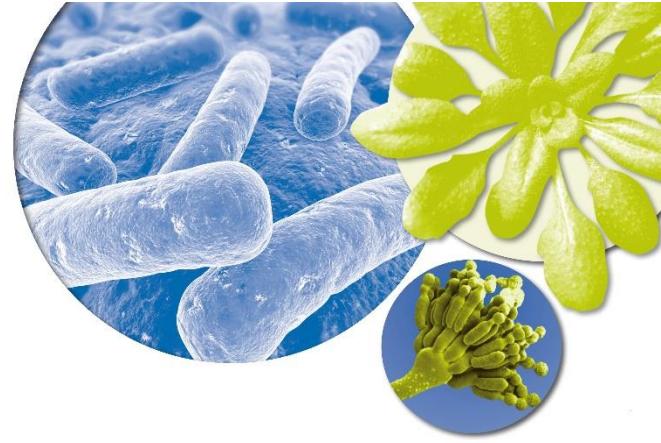


MPI for Multidisciplinary Science



- Reaction mechanisms of enzymes and macromolecular machines
- Kinetics and thermodynamics of biochemical reactions
- Synthesis of biooligomers and ligands, attachment of labels to peptides and proteins
- Chemical model systems of enzymes

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"Biochemistry & Biophysics"

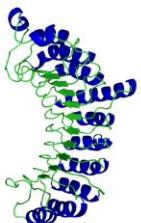
ss

„M.Bio.104 Cell & Molecular Biology of Plant-Microbe Interactions“



Prof. Volker Lipka

Signal perception &
dynamic cellular defence
in plant innate immunity



Dr. Thomas Spallek

Plant Biotic Interactions

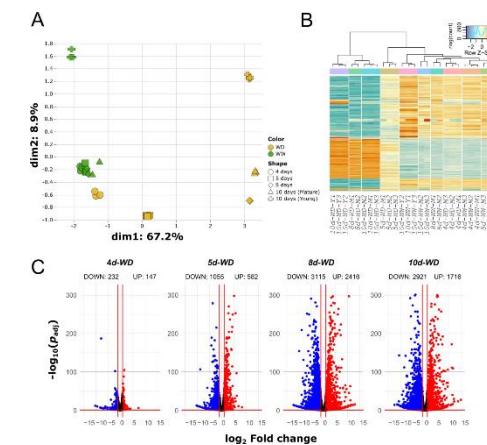


Phtheirospermum japonicum
(hemiparasitic plant)
Model to study plant parasitism



Prof. Dr. Salma Balazadeh

Molecular Stress Physiology



„M.Bio.107 Biochemistry & Biophysics“



Prof. Ivo Feussner

Biochemical analysis of carbohydrates, lipids, proteins and nucleic acids (HPLC / GC / GCMS / UPLCMS / ESIMS)
Plant biotechnology for production of renewable resources



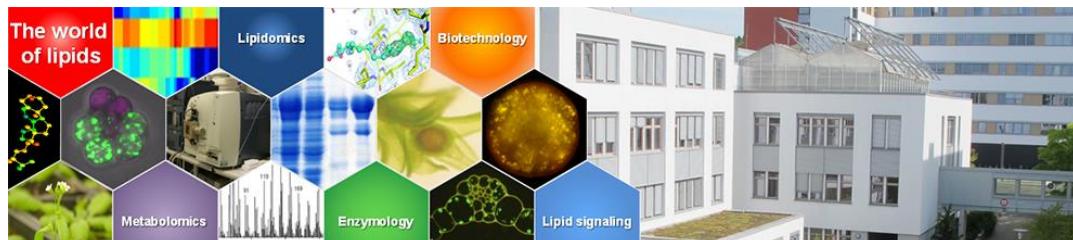
Prof. Claudia Steinem



Prof. Andreas Janshoff

Spectroscopy of biomolecules (fluorescence, FT-IR, CD, UV/Vis), optical microscopy, scanning probe techniques

- Plant primary and secondary metabolism → Metabolomics
- Lipid metabolism, enzymes of lipid metabolism and lipids as signal molecules
 - Modern biophysical methods for analysis of biomolecules
- Molecular biochemistry and biophysics of different classes of biomolecules
 - Functional analysis of membrane proteins



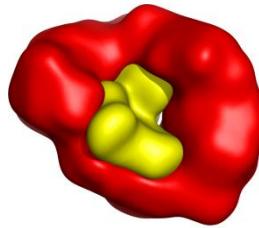
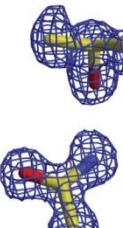
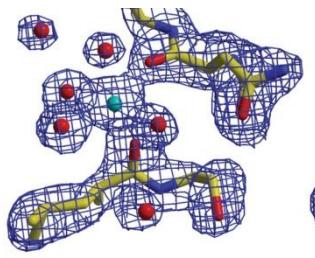
„M.Bio.106 Structural Biochemistry“



Prof. Ralf Ficner

Molecular structural biology

RNA processing & transport



Structure-function relationship
Protein-Protein interaction
Protein-RNA-DNA recognition

Structure-based drug design

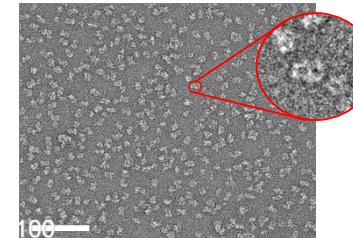
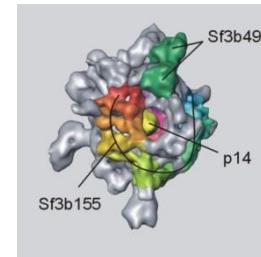


MAX-PLANCK-GESELLSCHAFT

MPI for Multidisciplinary Science

Prof. Holger Stark

3D Electron Cryomicroscopy



Methods in Structural Biology
X-ray crystallography
NMR spectroscopy
Electron Microscopy
Computational Methods

Profile module (12C)



(flexibility option)

module	number	structure and options		C/module	C total
core module	3	lecture + seminar/tutorial + methods course	choice of 7 different modules	12	36
profile module	1	additional core module MLS core module DNB, MSc Chemistry interdisciplinary courses*		12	12

* permission of examination board required

examples for approved external profile modules:

University Uppsala, **Sweden**

University of Queensland, Brisbane, **Australia**

Sanford Burnham Medical Research Institute, San Diego, **USA**

Donnelly Center, Toronto, **Canada**

Sainsbury Laboratory, Norwich, **United Kingdom**

University of Exeter, **United Kingdom**

University of Aberdeen, **United Kingdom**

Massey University, **New Zealand**

Module M.MM.101 "Biomolecules and Pathogens" of Master program "**Molecular Medicine**" in **Göttingen**

Internships in departments of the **MPI for Multidisciplinary Science, Göttingen**

Internship in pharmaceutical or chemistry industry:

Henkel AG & Co, **Düsseldorf**, Bayer Crop Science, **Monheim**, DSM Nutritional Products, **Basel**, BASF, **Ludwigshafen**

Key Competence Module (2-12C)



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core module	3	lecture + seminar/tutorial + methods course	choice of 7 different modules	12	36
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key competence module		course offer cross faculty, ZESS course offer MLS, Chemistry, DNB, BEE interdisciplinary courses*		2-12	12

e.g.

language courses

German language courses (6 C) for students with fair language skills (B1)

„Industry excursions“

MLS = Master „Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry“

DNB = Master "Developmental, Neural, and Behavioral Biology"

BEE = Master "Biodiversity and Ecology"

ZESS = "Zentrale Einrichtung für Sprach- und Schlüsselkompetenzen," (e.g. language courses)

Master Programme (M.Bio.150)
Key Competence Module “Industry excursion” (3C)“



- 3 days excursion: WS semester break
- visit of companies which hire molecular biologists/biochemists
- get an insight into the job of molecular biologist/biochemist in the industry

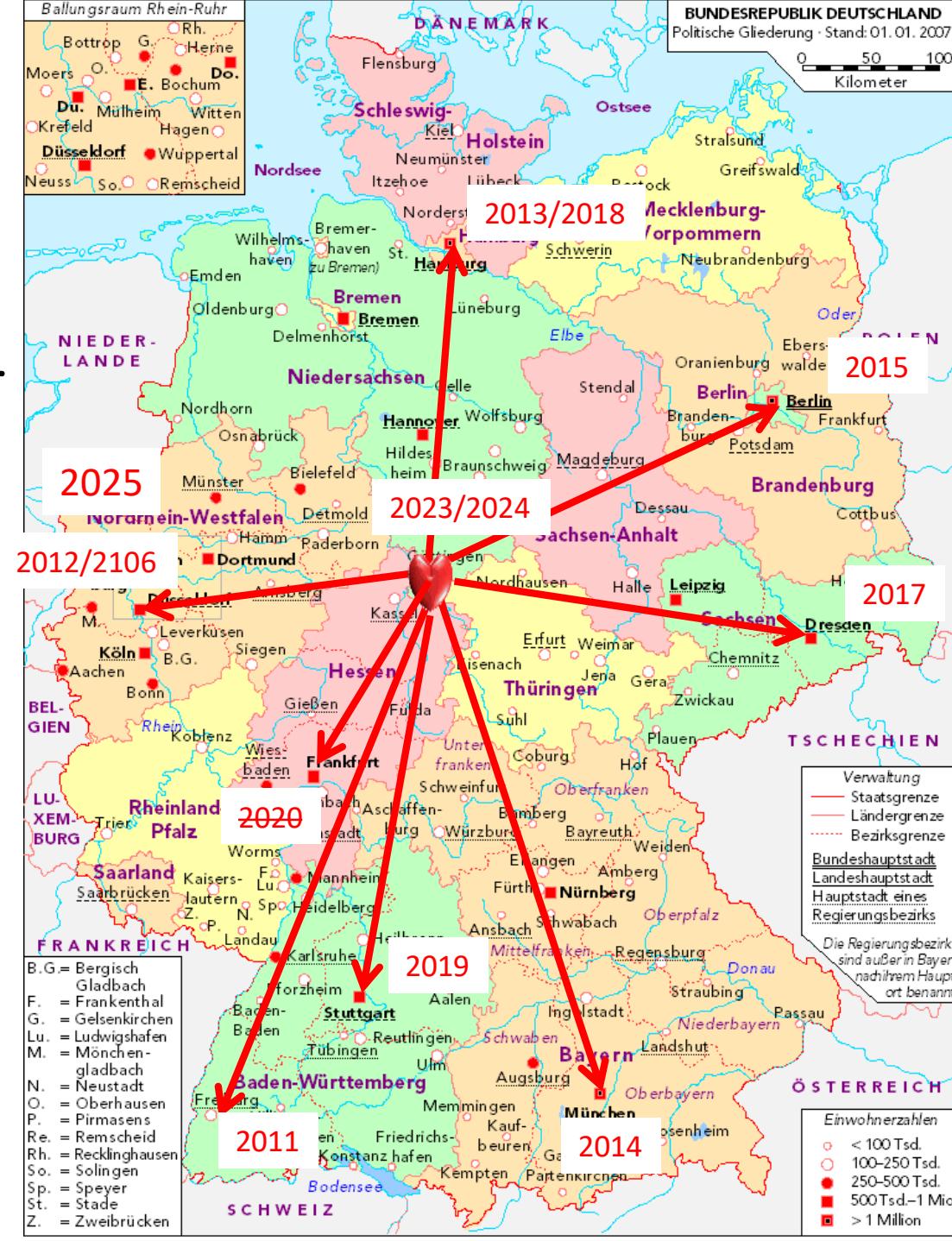
Master Programme (M.Bio.149)
Key Competence Module
“Planing and organization of Industry excursions (3C)“

- selection and contact of the companies
- travel organization: bus operators, youth hostal etc.

Admission requirements: participation in the core module M.Bio.102
“Molecular Genetics and Microbial Cell Biology“

West
North
South
East
South-East

2021
2022



Industry excursion 2025

Düsseldorf Area



Pharmaceutical company
Charles River, Kaarst
Development and delivery of
advanced drug therapies



Pharmaceutical company
Miltenyi, Bergisch Gladbach

Technologies, workflows, and raw
materials for a variety of cell
manufacturing procedures.



More than 70 companies from the
production research and service
sector, Leverkusen



Traditional brewery
in Düsseldorf's Altstadt

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key competence module		course offer cross faculty, ZESS course offer MLS, Chemistry, DNB, BEE interdisciplinary courses*		2-12	12
advanced module	1	7 weeks lab course I		12	30
	1	7 weeks lab course II		12	
	1	scientific project management		6	
Master thesis (26 weeks)				30	

Master Molecular Life Sciences – Microbiology, Biotechnology and Biochemistry



Curriculum

Basic structure

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Master thesis (26 weeks)					30

* Permission of examination board required

MLS = Master Molecular Life Sciences: Microbiology , Biotechnology and Biochemistry

DNB = Master Developmental, Neural and Behavioral Biology

BEE = Master Biodiversity, Ecology and Evolution

ZESS = Zentrale Einrichtung für Sprach- und Schlüsselkompetenzen

exemplary study plan	
core I	12
core II	12
key competence	6

profile	
core III	12
key competence	6

advanced I	
advanced II	12
scientific project management	6

Master thesis	
	30

PhD (GAUSS)

Timetable winter term



Winter term	week	Lecture period														Lecture-free period				
		1	2	3	4	5	6	7	8	Xmas-break	9	10	11	12	13	14				
		27 Oct -28 Nov 2025				1 Dec 2025 - 16 Jan 2026 (christmas break 22 Dec - 02 Jan)						19 Jan - 20 Feb 2026								
block		M.Bio.101 General and applied microbiology						M.Bio.102 Molecular genetics and microbial cell biology						M.Bio.108 Enzyme catalysis and biological chemistry			M.Bio.150 Industry excursion			
														M.Bio.105 Applied bioinformatics in molecular biosciences						
weekly	free time slot for other faculties' lectures (Fri, 08:15-09:45)																			
	M.Bio 146 Applied methods of bioscience M.Bio 149 Planning and organization of industry excursions						by arrangement by arrangement													

Timetable summer term



Time/ Weekday	Monday	Tuesday	Wednesday	Thursday	Friday
8 - 9	M.Bio.107/147 Biochemistry and Biophysics (lecture)	M.Bio.104/144 Plant-microbe-IA (lecture)	Plant-microbe-IA (lecture)	M.Bio.107/147 Biochemistry and Biophysics (lecture/tutorial)	Structural Biochemistry (lecture/seminar)
9 - 10			Plant-microbe-IA (seminar)		
10 - 11					
11 - 12			M.Bio.106/156 Structural Biochemistry (lecture)		

April		May		June		July		August	
1 Sa	1 Mo	1 Do	1 Sa	1 Di					
2 So	2 Di	2 Fr	2 So	2 Mi					
3 Mo	3 Mi	3 Sa	3 Mo	3 Do					
4 Di	4 Do	4 So	4 Di	4 Fr					
5 Mi	5 Fr	5 Mo	5 Mi	5 Sa					
6 Do	6 Sa	6 Di	6 Do	6 So					
7 Fr	7 So	7 Mi	7 Fr	7 Mo					
8 Sa	8 Mo	8 Do	8 Sa	8 Di					
9 So	9 Di	9 Fr	9 So	9 Mi					
10 Mo	10 Mi	10 Sa	10 Mo	10 Do					
11 Di	11 Do	11 So	11 Di	11 Fr					
12 Mi	12 Fr	12 Mo	12 Mi	12 Sa					
13 Do	13 Sa	13 Di	13 Do	13 So					
14 Fr	14 So	14 Mi	14 Fr	14 Mo					
15 Sa	15 Mo	15 Do	15 Sa	15 Di					
16 So	16 Di	16 Fr	16 So	16 Mi					
17 Mo	17 Mi	17 Sa	17 Mo	17 Do					
18 Di	18 Do	18 So	18 Di	18 Fr					
19 Mi	19 Fr	19 Mo	19 Mi	19 Sa					
20 Do	20 Sa	20 Di	20 Do	20 So					
21 Fr	21 So	21 Mi	21 Fr	21 Mo					
22 Sa	22 Mo	22 Do	22 Sa	22 Di					
23 So	23 Di	23 Fr	23 So	23 Mi					
24 Mo	24 Mi	24 Sa	24 Mo	24 Do					
25 Di	25 Do	25 So	25 Di	25 Fr					
26 Mi	26 Fr	26 Mo	26 Mi	26 Sa					
27 Do	27 Sa	27 Di	27 Do	27 So					
28 Fr	28 So	28 Mi	28 Fr	28 Mo					
29 Sa	29 Mo	29 Do	29 Sa	29 Di					
30 So	30 Di	30 Fr	30 So	30 Mi					
31 Mi			31 Mo	31 Do					

block methods courses

M.Bio.104
Cellular and molecular biology of plant-microbe interactions

M.Bio.107
Biochemistry or Biophysics

M.Bio.108
Structural Biochemistry



Welcome to Göttingen!