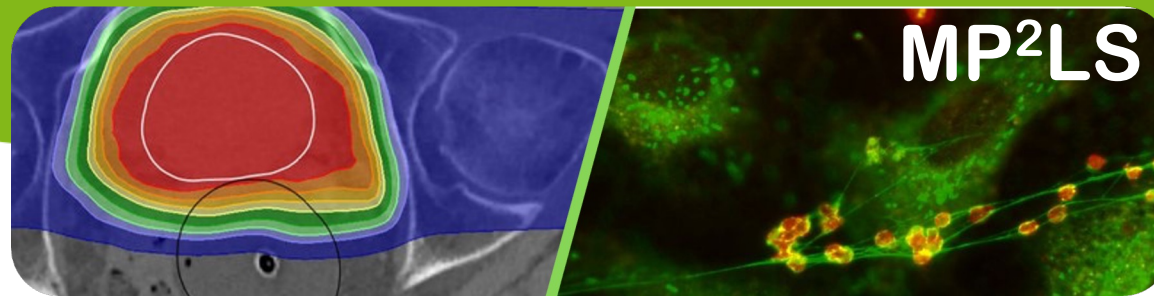


Welcome to the New Master Medical Physics and Physics of Living Systems MP²LS



Dr. Anne Bialek

Dr. Jörg Bünnemann

Prof. Armin Lühr (Track Medical Physics)

Prof. Jan Kierfeld (Dean of Physics Programs)

Prof. Benedikt Sabaß

Prof. Matthias F. Schneider (Chair of MMPPLS & Living Systems)

TU Dortmund University (Physics), October 13th 2025

TU Dortmund University

- 30.300 Students
- 325 Professors
- 17 Faculties
- Budget EUR 433 Mio.

- Largest Technology park in Germany
- – 5th in Europe
- With 300 Companies &
13.000 Employees



Alliance btw Ruhr Universities
(120.000 students, 14.000 Researchers)



tu dortmund
university

RUHR
UNIVERSITÄT
BOCHUM RUB

UNIVERSITÄT
DUISBURG
ESSEN



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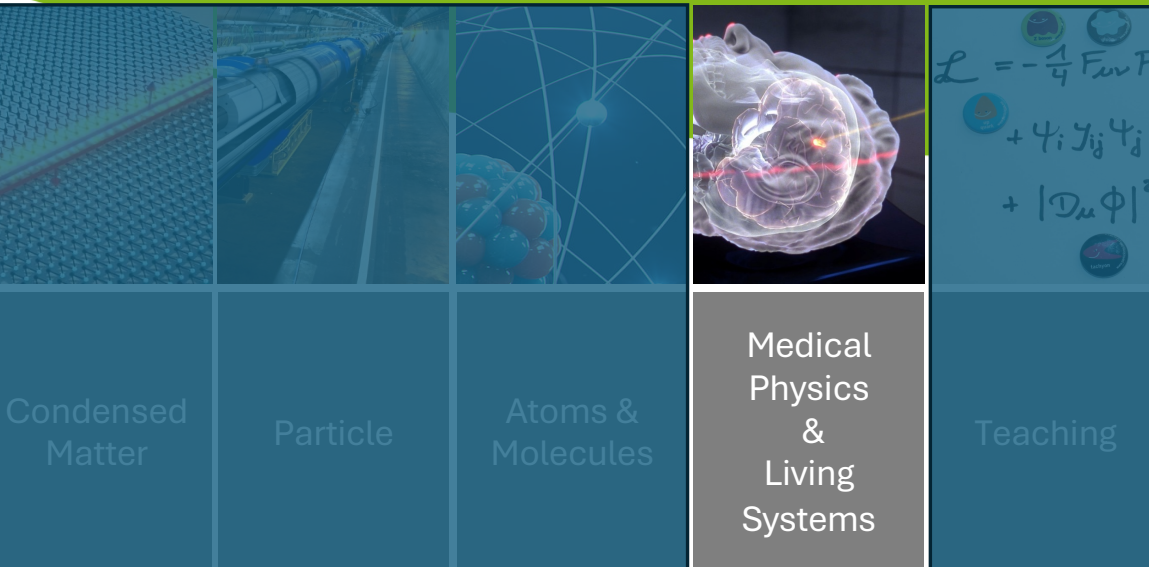
DOLCE - Dortmund Life Science Center



MAX PLANCK INSTITUTE
OF MOLECULAR PHYSIOLOGY



LEIBNIZ RESEARCH CENTRE
FOR WORKING ENVIRONMENT
AND HUMAN FACTORS



Welcome to the New Master

The (many) Faces of the Program



Prof. Matthias F. Schneider
(Chair of MMPPLS)



Prof. Jan Kierfeld
(Dean of Programs)



Prof. Metin Tolan



Prof. Igor Shapiro



Prof. Andreas Block



PD. Dr. Christian Bäumer



Prof. Armin Lühr



Prof. Benedikt Sabass



Prof. Jens Kleesieck



Prof. Jelger Risselada



Prof. Kevin Kröninger



PD Dr. Mona Ravesh



Dr. Anne Bialek
(Program
Coordination
MMPPLS)



PD Dr. Mona Ravesh



PD Dr. Jörg Bünemann
(General Academic
Advice)

Prof. Thorben Cordes (Chem)
Prof. Britta Trappmann (Chem)
Prof. Daniel Rauh (Chem)
PD. Dr. Frank Weichert (CS)
Prof. Tobias Glasmacher (CS, RUB)
Prof. Georg Schmitz (Imaging, RUB)
... many more

Welcome to the New Master

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The Idea

- gain expertise in modern health sciences incl. cutting edge AI-Medicine
- design novel tools in medical diagnostics and therapy
- adress fundamental questions on the physics of life and disease

... you choose your priority

- tradition: more than 20 years of Medical Physics
- expertise: more than 20 PIs on campus and 40 across the Ruhr alliance
- diverse program: research from radiation therapy to the principles of life
- practical applications: largest industrial campus in Germany
- international: very good exchange with USA, Europe and more
- expenses: No tuitions and inexpensive housing



Hermann von Helmholtz
1877

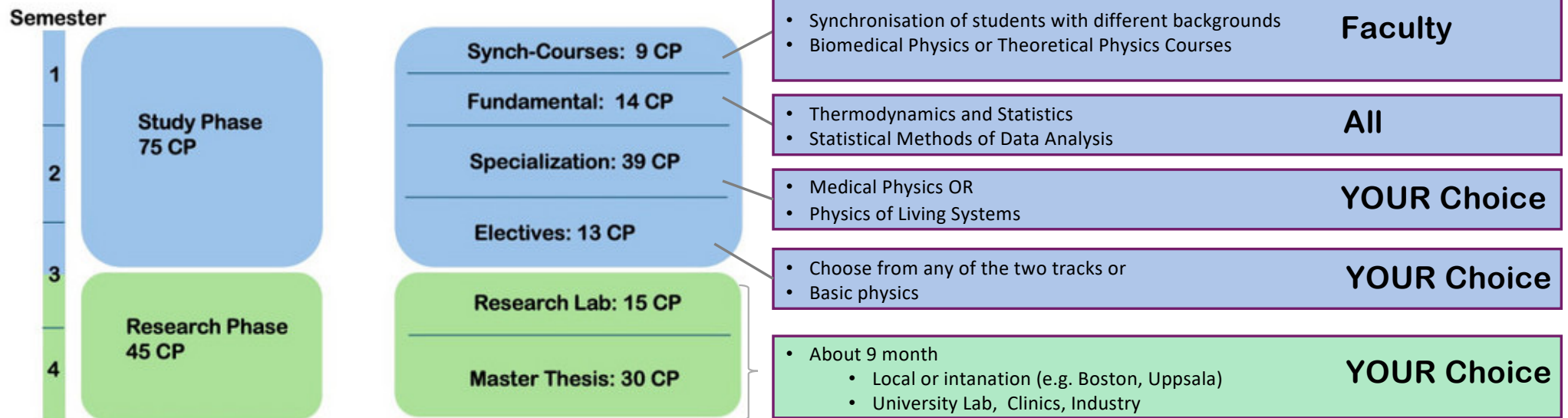
"... we have every reason to be satisfied with the success of the treatment of medicine that the scientific school has given it, and we can only recommend that the younger generation continue with* the same therapy."*

Welcome to the new Master

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The Structure

Solid Base + Personal Freedom



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The Tracks

•**Track A – Medical Physics:** Prepares students for a career as a Medical Physics Expert (MPE) in hospitals, or for work in the healthcare industry and related research. The track benefits from strong collaborations with clinics and medical research institutions.

•**Track B – Physics of Living Systems:** Focuses on applying physics to understand biological systems. Students deepen their knowledge in areas like neuroinformatics, biochemistry, and modern life science methods.

“The track decision must be finalized before registering for the Master's thesis” §18 (5)

The New Master Medical Physics and Physics of Living Systems MP²LS

The Study Plans

Bachelor in	Medical Physics	Physics	Engineering
	Study Plan 1	Study Plan 2	Study Plan 3
Synch-Courses (9 CP Mandatory)	Electives	Biomedical Physics	Theoretical Physics
Fundamentals (14 CP Mandatory)	TAS and SMD	TAS and SMD	TAS and SMD
Specialization (39 CP, with 3 mandatory)	Your Specialization Track A/B	Your Specialization Track A/B	Your Specialization Track A/B
Electives (13 CP)	Electives	Electives	Electives

TAS: Thermodynamics and Statistical Physics
 SMD: Statistical Methods of Data Analysis
 MP: Medical Physics
 PLS: Physics of Life Science

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The Tracks. Examples

Background: BioMed Eng
Track: **Medical Physics**

Table 3: Example for students with a **B. Sc. in Biomedical Engineering** (Synchronisation Course **Theoretical Physics** (WS)) studying **Track A Medical Physics**.

	Semester	Fundamentals of Thermodynamics and statistics	Track A: Medical Physics	Electives/ Synchronisation courses	Master's thesis	Total
Study Phase	1		Advanced Clinical Medical Physics 6 CP	Synch. Course Theoretical Physics 9 CP		29 CP
			Advanced Medical Imaging 6 CP			
	2	Statistical Methods of Data Analysis A 5 CP	Advanced Magnetic Resonance Imaging 6 CP	Methods of Clinical Research 5 CP		31 CP
		Thermodynamics and Statistical Physics 9 CP	Applied Proton Therapy 6 CP			
Research Phase	3		Radiation Applications in the Clinic 3 CP		Research Internship 15 CP	30 CP
			AI for Medical Applications 9 CP			
			Applied Dosimetry 3 CP			
	4				Master's thesis 30 CP	30 CP
	Sum:	14 CP	39 CP	22 CP	45 CP	120 CP

Background: BioMed Eng
Track: **Physics of Living Systems**

Table 5: Example for students with a **B. Sc. Biomed Eng** (Synchronisation Course **Theoretical Physics** (WS)) studying **Track B Physics of Living Systems**.

	Semester	Fundamentals of Thermodynamics and Statistics	Track B: Physics of Living Systems	Electives/ Synchronisation courses	Master's thesis	Total CP
Study Phase	1		Physics of Life 6 CP	Synch. Course Theoretical Physics 9 CP		30 CP
			AI in Medicine 9 CP			
	2	Thermodynamic and Statistical Physics 9 CP	Lab PLS 5 CP			29 CP
		Statistical methods of data analysis A 5 CP	System Biology 4 CP			
			Soft Matter 6 CP			
Research Phase	3		MD – Soft Matter and Biomaterials 6 CP	Current Topics in Cell Biology 4 CP	Research Internship 15 CP	32 CP
			Biomaterials 4 CP	Applied Phys in Clinical Med 3 CP		
	4				Master's thesis 30 CP	30 CP
	Sum:	14 CP	40 CP	22 CP	45 CP	121 CP

The New Master Medical Physics and Physics of Living Systems MP²LS ~~The Tracks:~~ Courses

Track A: Medical Physics

Mandatory courses	Sem.	CP
Advanced Clinical Medical Physics	WS	6 CP
Advanced Medical Imaging	WS	6 CP
AI for Medical Applications	WS	9 CP
Elective courses		
<i>Radiotherapy and Dosimetry</i>		
Radiation applications in the clinic	WS	3 CP
Modern Radiotherapy	WS	3 CP
Medical Physics and Technology in Particle Therapy	SS	3 CP
Applied Proton Therapy	SS	6 CP
TPS – Practical Course on Treatment Planning	WS + SS	6 CP
Basic radiation protection regulation for medical physics experts	SS	1 CP
Fundamentals of Detector Physics	SS	3 CP
Applied Dosimetry	WS	3 CP
<i>Medical Imaging and Machine Learning</i>		
Advanced Magnetic Resonance Imaging	SS	6 CP
Image Processing in Medicine	SS	5 CP
Ultrasound in Medicine	WS	5 CP
Applications of Machine Learning in Medical Physics	WS	3 CP

Track B: Physics of Living Systems

Mandatory courses	
Physics of life	6 CP
Lab course: Physics of Living Systems	5 CP
AI for Medical Applications	9 CP
Elective courses	
Soft Matter	6 CP
MD Simulation of Biological Materials	6 CP
Systems Biology	4 CP
Neuroinformatics	6 CP
Biomaterials	4 CP
Tissue Engineering	4 CP
Experimental Cell Biology	4 CP
Current Topics in Cell Biology	4 CP
Medicinal Chemistry 1	4 CP
Medicinal Chemistry 2	4 CP
Fundamental Immunology	4 CP
Biomolecular Modelling	4 CP

+ many more from physics, UKEssen, RUB

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How to choose your courses?

Check your “must have” courses

- Synch Courses,
- Fundamentals (TAS = Thermodynamic and Statistics / SMD = Statistical Methods of Data Analysis)
- Everybody is required to take “AI for Medical Applications”

Explore your potential focus / track

- Check what is mandatory in each track
- We recommend to explore mandatory lectures in both tracks
- Courses not mandatory in your finale choice of track, are still part of your electives

!!! SEND YOUR PLANED PROGRAM TO FACULTY FOR FEEDBACK

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How to find information?

Module Handbook:

<https://physik.tu-dortmund.de/en/study/courses-and-qualification/master-of-medical-physics/module-handbook/>

LSF:

<https://www.lsf.tu-dortmund.de/qisserver/rds?state=wtree&search=1&trex=step&root120252=195978|191518|193817&P.vx=kurz>

Moodle:

<https://moodle.tu-dortmund.de>

- Course Overview
- Search for Lectures
- Curricula Timetable
- Curricula Timetable (List)
- Lectures today
- Lectures cancelled today
- 🔑 Hide menu

Biomedical Physics - Single View

Functions: **Schedule preselected** | application currently not allowed

Page contents: [Basic Information](#) | [Dates/Times/Location](#) | [Responsible Instructor](#) | [Faculties and Departments](#) | [Structure Tree](#)

Basic Information

Type of Course	Vorlesung mit Übung	Long text	
Number	021205	Short text	
Term	WiSe 2025/26	Hours per week in term	6
Expected no. of participants		Max. participants	
Frequency	jedes Semester	Study Year	
Credits	9	Assignment	enrollment
Hyperlink			

E-Learning

 [Diese Veranstaltung verfügt über einen Moodle-Arbeitsraum](#)

Dates/Times/Location Group: [no name] 📅

	Day	Time	Frequency	Duration	Room	Room-plan	Lecturer	Status	Remarks	Cancelled on	Max. participants
📅	Mo.	12:00 bis 14:00	woch		Physik 1 und 2 - P1-02-110						
📅	Mi.	10:00 bis 12:00	woch		Physik 1 und 2 - P1-02-110						
📅	Fr.	12:00 bis 14:00	woch		Physik 1 und 2 - P1-02-110				Exercise		

Group [no name]: ☐ preselect application currently not allowed **Schedule preselected**

Responsible Instructor

Responsible Instructor	Responsibilities
------------------------	------------------

Biomedical Physics WS 25/26

Enrolment options

[Biomedical Physics WS 25/26](#) ➡

[Importierter Kurs aus dem LSF](#)

Lehrende:r: [Tom Rosenstein](#)

Lehrende:r: [Matthias Schneider](#)

✓ Self enrolment (Teilnehmer:in)

No enrolment key required.

Enrol me

The New Master Medical Physics and Physics of Living Systems MP²LS

Where & Who to go to?

- **The Homepage: MMPPLS.de**

Anne Bialek

- **Matthias F. Schneider / Armin Lühr** —> Program Content, Choice of Courses, approvals ...
- **Jörg Bünnemann** —> Course structure & regulations (exams)
- **Caroline Wortmann** —> Office of the dean
- **Fachschaft / Student Union** —> From “student-to-student” exchange