

**Cellular Machines II:  
Fundamentals and Applications of Biomolecular Mechanosystems**

TUD Master Course (Molecular Bioengineering):  
**Cellular Machines (WS 2014)**  
(2 SWS Lecture, 2 SWS Seminar)

TUD Master Course (Nanobiophysics):  
**optional: Cellular Machines: Molecular Motors (WS 2014)**  
(2 SWS Lecture)

TUD Master (Physics): Minor (Molecular Bioengineering, Cellular Machines)  
**Cellular Machines (WS 2014)**  
(2 SWS Lecture, 2 SWS Seminar)

LECTURES: Tuesdays 11.10 am - 12:40 pm, BIOTEC seminar room E05

SEMINARS: Tuesdays 1.00 pm - 2.30 pm, BIOTEC seminar room E05

PRACTICALS: already finished in October 2014

<u>LECTURERS:</u>	Stefan Diez	diez@bcube-dresden.de	463-43010
	Michael Schlierf	schlierf@bcube-dresden.de	463-43050

**Course Information:**

- all information including lecture notes (always updated after the lecture) at <https://intranet.biotec.tu-dresden.de/students/lectures.html>
- General information also at <http://www.mpi-cbg.de/~diez/CellMach2014WSGen.pdf>
- Material for referates + lecture notes also at <http://www.mpi-cbg.de/~diez/CellMachWSRef>

**Grades:**

- TUD Master Course (Molecular Bioengineering, over 2 semesters):  
*50% oral examination (20 min in the weeks after the lecture period)*  
*30% oral presentation (30 min) during the seminar*  
*20% lab participation and protocol (already finished October 2014)*
- TUD Master Course (Nanobiophysics):  
*100% oral examination (15-20 min in the weeks after the lecture period)*

**Referates (for Master Students from Molecular Bioengineering):**

- In each seminar, 3 students will each give an oral presentation on a specific subject.
- The particular subjects (related to the topic on that day) will be defined by the lecturer and online published (<http://www.mpi-cbg.de/~diez/CellMachWSRef>, together with the talk evaluation criteria) at least 2 weeks before the presentation is due. The subjects, which are accompanied by 1 or more publications (also to be found online) will be named REF<sub>xy</sub> where xx = 02 ... 12 denotes the number of the lecture and y = A, B, C denotes the sequence of the presentations during the seminar. Students can sign up for the dates of their presentations during the first seminar on hardcopy.
- Each presentation should be planned as a **20 min talk** presented with a video projector. Bring your own computer (or that of a friend/colleague) or check with the lecturer before (the latest during the

break) that your talk (brought on a USB stick or disk) plays properly! Supported file formats will be PowerPoint, KeyNote and PDF. Beware of technical problems when playing movie files on another computer! Partial usage of the black board (to explain certain aspects of the subject) is encouraged. After the talk, the presenter should lead an up to **10 min discussion** with the fellow students.

- The talk should focus on:
  - (i) Introduction to the subject / cellular machine to be presented. Here, usage of additional material like review articles or other original publications is encouraged. You may consider to look up the FIRST, the MOST IMPORTANT and the LATEST paper.
  - (ii) Presentation of the motivation + results + discussion of the findings in the specified publication(s). Be critical about the publication!
  - (iii) Own judgement of the findings in terms of: Will it be feasible in the future to apply the described cellular machine in an engineered environment (for nanotechnological, medical or other purposes)? What could such applications be? What is your own opinion?
- The discussion should focus on answering factual questions from the audience as well as on brainstorming futur(istic) applications.
- Each presenter should, at the day of the presentation: **Hand in an A4 hardcopy of the talk.**
- We will aim to prepare the lecture handouts before the lectures, check on the BIOTEC Intranet (or on <http://www.bcube-dresden.de/research-groups/diez/teaching>) on Tuesday morning before the lecture.
- Out of the referates discussed during the seminars, up to five will be relevant for the examination (MBE students). You will be informed during the last lecture before the examination, which papers these will be.
- All students who are not presenting talks themselves are welcome to stay during the seminars and participate in the discussions.

### Lecture Topics (changes possible):

#	Date	Topic (Order may change)	Seminars
1	14.10.	<b>Introduction + Microtubules</b> (Stefan Diez, B CUBE, TU Dresden)	
2	21.10.	<b>Actin Filaments and Networks</b> (Jörg Schnauss, Universität Leipzig)	
3	28.10.	<b>Microtubule Motors</b> (Stefan Diez, B CUBE, TU Dresden)	REF03A, REF03B, REF03C
4	4.11.	<b>Mitosis</b> (Jan Brugues, MPI-CBG Dresden)	REF04A, REF04B, REF04C
5	11.11.	<b>Axoneme + Intraflagellar Transport</b> (Gaia Pigino, MPI-CBG Dresden)	REF05A, REF05B, REF05C
6	18.11.	<b>Bacterial Pili</b> (Berenike Maier, Universität Köln)	REF06A, REF06B, REF06C
7	25.11.	<b>Actin Motors + Muscle</b> (Stefan Diez, B CUBE, TU Dresden)	REF07A, REF07B, REF07C
8	2.12.	<b>Intermediate Filaments</b> (Cecile Leduc, Institut Pasteur Paris)	REF08A, REF08B, REF08C
9	9.12.	<b>BIOTEC FORUM</b> (students attend the symposium)	
10	16.12.	<b>Nanotechnology Motor Proteins</b> (Stefan Diez, B CUBE, TU Dresden)	wrap up + Glühwein
		Examinations and Labcourses	