

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

TUD Master Course (Molecular Bioengineering):

**Cellular Machines (WS 2011)**

(2 SWS Lecture, 2 SWS Seminar)

TUD Master Course (Nanobiophysics):

**optional: Cellular Machines: Molecular Motors (WS 2011)**

(2 SWS Lecture)

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

<u>LECTURERS:</u>	Stefan Diez	diez@bcube-dresden.de	463-43010
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### Course Information:

- all information including lecture notes (always updated after the lecture) at [https://intranet.biotec.tu-dresden.de/students/lectures\\_html](https://intranet.biotec.tu-dresden.de/students/lectures_html)
- General information also at <http://www.mpi-cbg.de/~diez/CellMach2011WSGen.pdf>
- List of Referates also at <http://www.mpi-cbg.de/~diez/CellMach2011WSRef>
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### 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 – the better grade from both semesters*  
*20% lab participation and protocol (already completed in October 2011)*
- TUD Master Course (Nanobiophysics):  
*100% oral examination (15-20 min in the weeks after the lecture period)*

### Referates (for Master Students from Molecular Bioengineering and Nanobiophysics):

- 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/CellMach2011WSRef>) about 2 weeks before the presentation is due (login: cellular and password: machines2010). The subjects, which are accompanied by 1 or more publications (also to be found online) will be named REF<sub>xy</sub> where xx = 03 ... 09 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 but not mandatory. 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 with 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.**
- **NEW:** We will aim to prepare the lecture handouts before the lectures, check on the BIOTEC Intranet after 12pm on Monday before the lecture.
- **NEW:** Due to the often extremely low attendance during the summer semester, we will (unfortunately) have to record the attendance. Of the 8 seminars (25 Oct – 13 Dec) 7 must be attended. If unavoidable an absence can be compensated for by attending an additional relevant scientific talk and writing a short summary there-of.
- **NEW:** Out of the referates discussed during the seminars, one per week will be relevant for the examination. You will be informed during the last lecture, which papers these will be.
- Although not presenting talks themselves, the NanoBioPhysics students are welcome to stay during the seminars and participate in the discussions.

**Lecture Topics (changes possible):**

#	Date	Topic (Order may change)	Seminars
1	11.10.	Introduction (Stefan)	
2	18.10.	Kinesin-1 (Joe Howard)	
2	25.10.	Actin, cell motility (Ewa Paluch)	REF03A, REF03B, REF03C
4	1.11.	Other transport motors (Stefan)	REF04A, REF04B, REF04C
5	8.11.	Diffusion + Friction on MTs (Erik)	REF05A, REF05B, REF05C
6	15.11.	Microtubule Dynamics (Chris Gell)	REF06A, REF06B, REF06C
7	22.11.	Sliding filaments / Dynein (Wim Walter)	REF07A, REF07B, REF07C
8	29.11.	Mitosis + Meiosis (Iva Tolic)	REF08A, REF08B, REF08C
9	6.12.	Motor Theory (Stephan Grill)	REF09A, REF09B, REF09C
10	13.12.	Muscle (Stefan/NN)	wrap up and questions
11	20.12.	Nanotec with motors (Stefan)	Glühwein
		Examinations and Labcourses	