



Welcome to

Cluster Computing

Summer Semester 2012

TU Berlin

Jan Richling



Module: MINF-KS-PS (Parallel Systems, 6 CP)

0432 L 520 **Cluster Computing**

<i>Weekly hours</i>	<i>Day</i>	<i>Time</i>	<i>Room</i>	<i>Lecturer</i>
2 SWS L	Mo	12-14	MA 043	Richling

0432 L 596 **Parallel Programming**

<i>Weekly hours</i>	<i>Day</i>	<i>Time</i>	<i>Room</i>	<i>Lecturer</i>
2 SWS IC	Fr	10-12	MA 041	Schönherr
2 SWS IC	Wed	10-12	EN 458 Lab	Schönherr

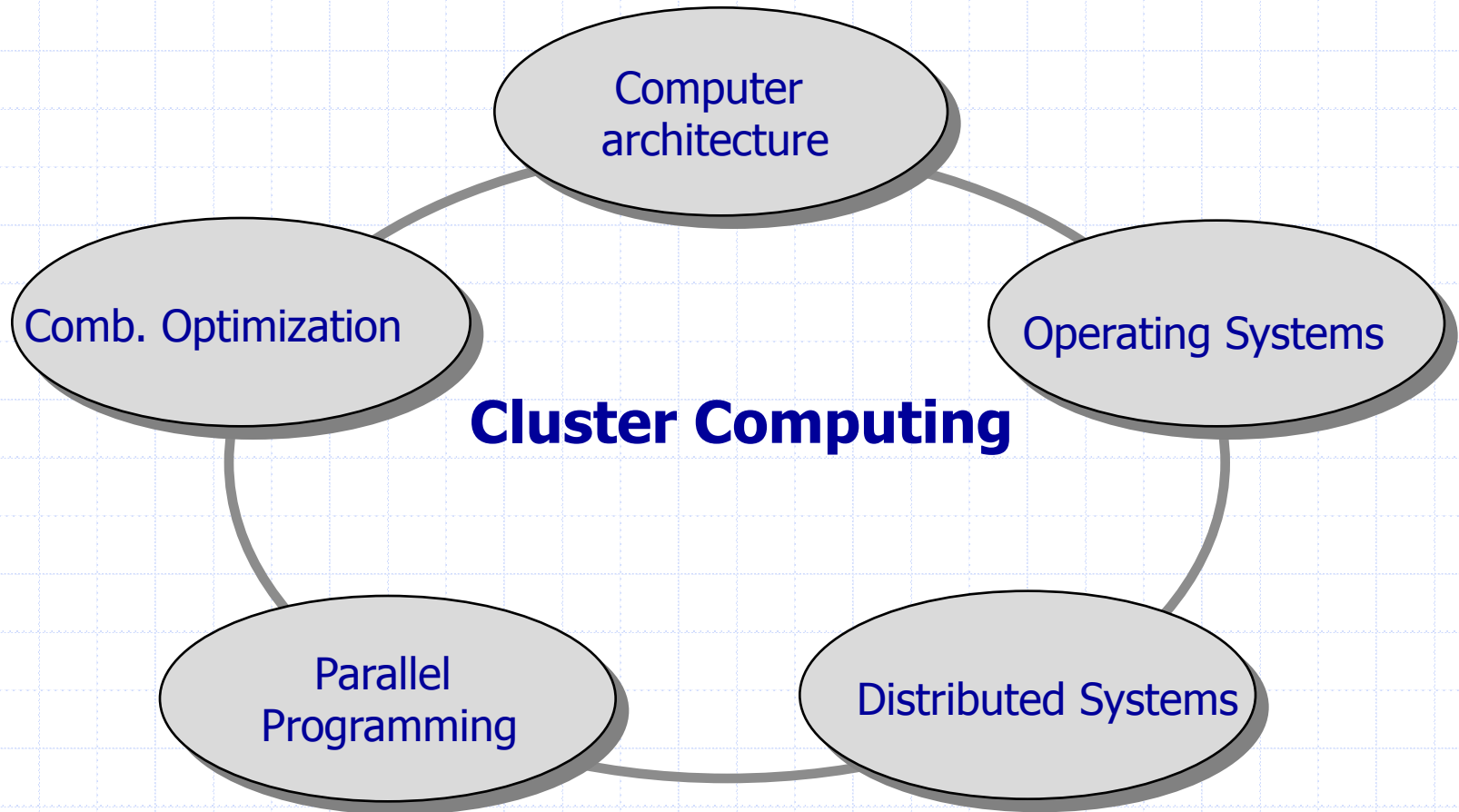
Lecturer:	Prof. Dr.-Ing. Jan Richling
Office:	EN 355
E-Mail:	jan.richling@tu-berlin.de
Consultation hours:	by appointment
Secretary:	Gabriele Wenzel (EN 353)
	email: kbs@cs.tu-berlin.de
	phone: 314-73160

Homepage of course:

<http://www.kbs.tu-berlin.de/ps>

Master's program Computer Science
(Specialization: Communic. based Systems)

Master's program Computer Engineering
(Module catalog 1: Technical Applications)



- **Architecture of parallel systems**
- **Allocation problems**
- **Mapping**
- **Partitioning**
- **Load distribution**
- **Load balancing**
- **Scheduling**
- **Performance aspects**

Students having finished this course should be able to

- **explain the specific properties of parallel systems and its operating system requirements**
- **apply elementary algorithms and mechanisms of operating system support for parallel systems**
- **assess the properties of different interconnect systems**
- **explain the basic performance measures and their relationship**

Parallel Programming

■ Lecturer: **Jan Schönherr**

Room: EN356

phone: 314-79833

E-mail: schnhrr@cs.tu-berlin.de

consultation hours: by appointment

■ Contents:

- Programming models for parallel computing
- Fundamental parallel algorithms
- Concepts of MPI, OpenMP, OpenCL
- Properties of parallel architectures
- Introduction to the cluster management software CCS

■ Hours:

- Friday, 10-12, MA 041
- Wednesday, 10-12, EN 458 (Lab)

■ Registration:

- Fill out registration form on ISIS!

Examination regulations

- Module can be finished by an oral exam covering both parts of the module, Cluster Computing and Parallel Programming.
- Successful completion of assignments in the Parallel Programming part is a prerequisite.

- **Diploma students may take**
 - a) Both parts (6 SWS)
 - b) Cluster Computing only (2 SWS)
 - c) Parallel Programming only (4 SWS)
- **In case of a) and c), successful completion of assignments (Übungsschein) is necessary.**

Erasmus exchange students

- **Exchange students may take**
 - a) Both parts (6 ECTS)
 - b) Cluster Computing only (2 ECTS)
 - c) Parallel Programming only (4 ECTS)
- **In case of a) and c), successful completion of assignments (Übungsschein) is necessary.**

- Buyya, R.: *High Performance Cluster Computing*, Vol. 1+2, Prentice Hall, 1999
- Andrews, G.A.: *Foundations of Multithreaded, Parallel, and Distributed Programming*, Addison Wesley, 2000
- Zomaya, A.: *Parallel and Distributed Computing Handbook*, McGraw Hill, 1995
- Heiss, H.-U.: *Prozessorzuteilung in Parallelrechnern*, BI-Verlag, Mannheim, 1994
- Bacon, J.: *Concurrent Systems*, 2nd ed, Addison Wesley, 1997
- Hwang, K.; Xu, Z.: *Scalable Parallel Computing: Technology, Architecture, Programming*, WCB/McGraw-Hill, 1998
- Baker, M.(ed.) *Cluster Computing White Paper*
<http://www.csm.port.ac.uk/~mab/tfcc/WhitePaper/final-paper.pdf>
- Bauke, H.; Mertens, S.: *Cluster Computing*, Springer, 2006
- Rauber, Th., Runger, G.: *Parallele und Verteilte Programmierung*, Springer, 2000
- Berman, F.; Fox, G.; Hey, A.: *Grid Computing*, John Wiley, 2003