

# „Mobile Communication“ (V2Ü1)

## Summer 2008

MoCo  
for  
B-IT

Dr. Matthias Frank,

Prof. Dr. Peter Martini

Institute of Computer Science IV

University of Bonn

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### Lecture (V2)

weekly Tuesday, 10:30 - 12:00 B-IT building, Dahlmannstr.2

Tutorials (discussion of exercises) (Ü1)

(basically) bi-weekly 90 minutes – extra announcement follows

# „Mobile Communication“ (V2Ü1)

## Sommersemester 2007

MoCo  
for  
Uni Bonn  
DPOs

Dr. Matthias Frank,

Prof. Dr. Peter Martini

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e-mail: {matthew, martini}@cs.uni-bonn.de

Sprechstunde: dienstags nach der Vorlesung und nach Vereinbarung

### Vorlesung (V2)

wöchentlich Dienstag, 15:15 - 16:45 in Hörsaal A

Übung (Ü1)

i.W. alle zwei Wochen 90 Minuten Übung – gesonderte Folien hierzu

## 2 lectures: What's the Difference ?

Basically, we offer 2 lectures

- at different times
- in different rooms
- with the same contents (... maybe even the same jokes ...)

**the same as  
with "DC & IT"  
in WS 07/08**

### The lecture in the B-IT building

- starts on Tuesday, April 08
- primarily addresses students of media informatics (Master)

### The lecture in Römerstr.

- starts on Tuesday, April 08
- primarily addresses students of Computer Science ("Hauptdiplom")

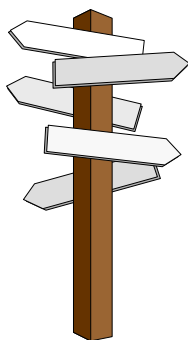
### Announcement on tutorials (+ assignment sheets) separately:

- first assignment sheet appears Apr 08 or 09
- tutorials start on Tuesday, April 15 (B-IT + Römerstr., one each)

Both lectures (+ tutorials) will be strictly synchronized. So, - as an option - it is possible to go to the lecture at B-IT and the tutorial at Römerstr., or vice versa or in other combinations.

## 0. Important information about this lecture

### Note:



**Some information in this chapter in German.  
For general information, also see Chapter 0  
of "DC & IT" (WS2007/2008).**

This chapter is supposed

- to tell you **a little bit about us** and our activities in **research and teaching**,
- to tell you a little bit about our **information on the WWW**,
- to tell you what it means and will mean to **be active in our lectures, seminars and practical exercises**.

**This presentation is not supposed to replace personal advice!**

**Please feel free to arrange a meeting for personal consulting.**

Easiest way: Send an e-mail to [matthew@cs.uni-bonn.de](mailto:matthew@cs.uni-bonn.de)

## The Institute of Computer Science IV at the Univ. of Bonn

<b>Head:</b>	Prof. Dr. Peter Martini
<b>Secretary:</b>	Julia Kouchaki, Erika Müller-Hilckmann
<b>Professors:</b>	Prof. Dr. Peter Martini Prof. Dr. Pedro José Marrón Prof. Dr. Christoph Strelen (retired March 2006)
<b>Working groups:</b>	<p><b>“Communication Systems“</b> (Head: Prof. Dr. Peter Martini)</p> <p><b>“Sensor Networks &amp; Pervasive Computing“</b> (Head: Prof. Dr. Pedro José Marrón)</p>
<b>Contact:</b>	University of Bonn, Institute of Computer Science IV Roemerstr. 164, 53117 Bonn Tel: 0228/73-4118; Fax: 0228/73-4571 e-mail: <a href="mailto:office4@cs.uni-bonn.de">office4@cs.uni-bonn.de</a> WWW: <a href="http://www.cs.uni-bonn.de/IV/">http://www.cs.uni-bonn.de/IV/</a>

## The Group “Communication Systems“

### Head:

Prof. Dr. Peter Martini

### Our areas of special interest in research and teaching:

Ad Hoc Networks for Disaster Areas:	Dipl.-Inform. Nils Aschenbruck
Viola – Optical Testbed:	Dipl.-Inform. Christoph Barz
Routing in large ISP Networks:	Dipl.-Inform. Uli Bornhauser
Mobile / Wireless Communication :	Dr.rer.nat. Matthias Frank
Mobile Communication:	Dipl.-Inform. Christoph Fuchs
Intrusion Detection:	Dipl.-Inform. Elmar Gerhards-Padilla
Network Security:	Dipl.-Math. Felix Govaers
Software Defined Radio:	Dipl.-Inform. Felix Leder
Network Management:	Dipl.-Inform. Wolfgang Moll
Discrete - Event Simulation:	Dipl.-Inform. Patrick Peschlow
Viola – Optical Testbed :	Dipl.-Inform. Markus Pilz
Performance Engineering:	Dipl.-Inform. Lukas Pustina
Performance Engineering:	Dipl.-Inform. Simon Schwarzer
High-Speed Optical Networks:	Dr.rer.nat. Christian de Waal
Grid Computing:	M.Sc. Alexander Willner

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Communication and Distributed Systems

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**Head of Department**  
Prof. Dr. Peter Martini

**Professors**

- Prof. Dr. Peter Martini
- Prof. Dr. Pedro José Marrón
- Prof. Dr. Christoph Strelen (em)

**Secretary office hours**

- Monday to Thursday: 9 a.m. to 5 p.m.
- Friday: 9 a.m. to 4:30 p.m.

**Events**

IEEE LCN, 14-17 October 2008

IEEE LCN  
Local Computer  
Networks Conference  
[more]

IEEE LCN Workshop on Network  
Security  
IEEE LCN  
WNS  
[more]

**Work Groups**

CS<sup>100</sup> Communication Systems  
(Prof. Dr. Peter Martini)

SPNC Sensor Networks and  
Pervasive Computing  
(Prof. Dr. Pedro José  
Marrón)

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old web pages and  
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University of Bonn

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Communication and Distributed Systems

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- About us + On the way to us + Our cooperation-based Teaching and Research
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- Teaching
- Computer support

University of Bonn / Computer Science (Dep. I, II, III, IV, V, VI)

22.08.97 - toe4@informatik.uni-bonn.de / 19.07.06 - felde@informatik.uni-bonn.de

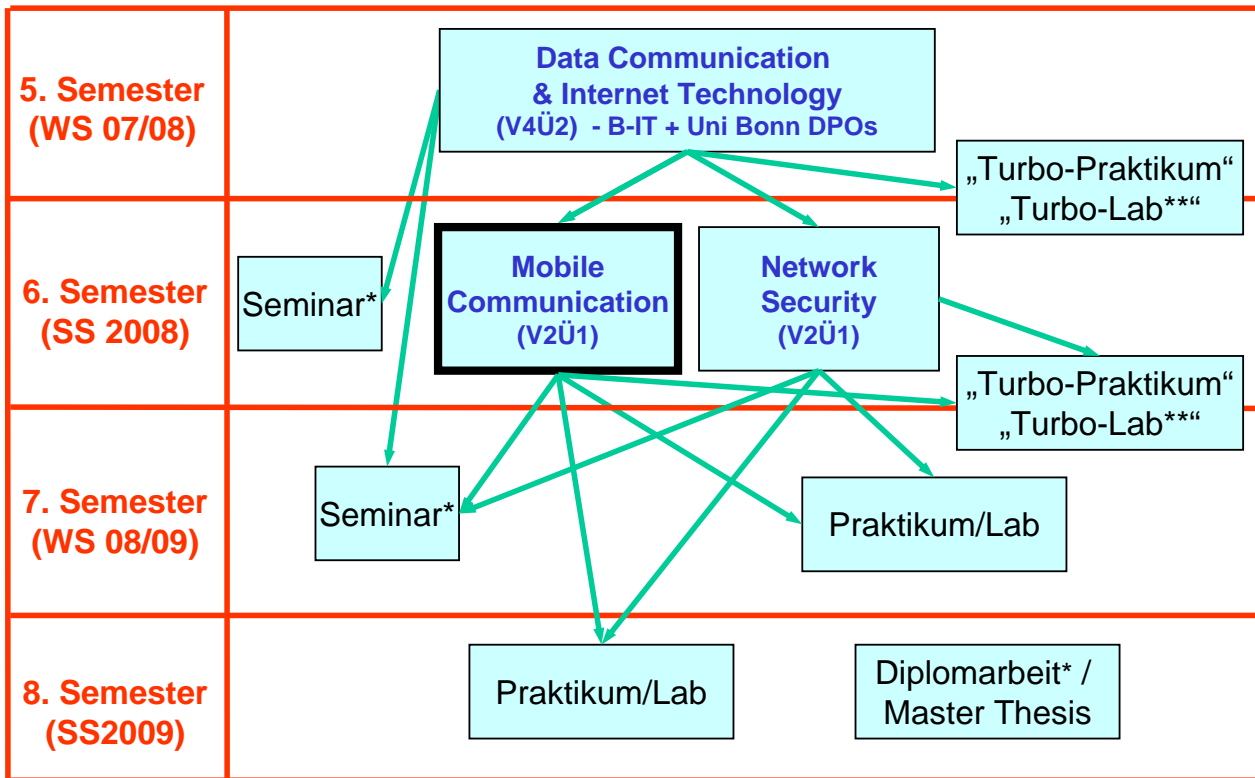
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Abt. I, II, III, IV, V, VI

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# Teaching Activities of our Group

current path  
(now = Summer Term 2008)

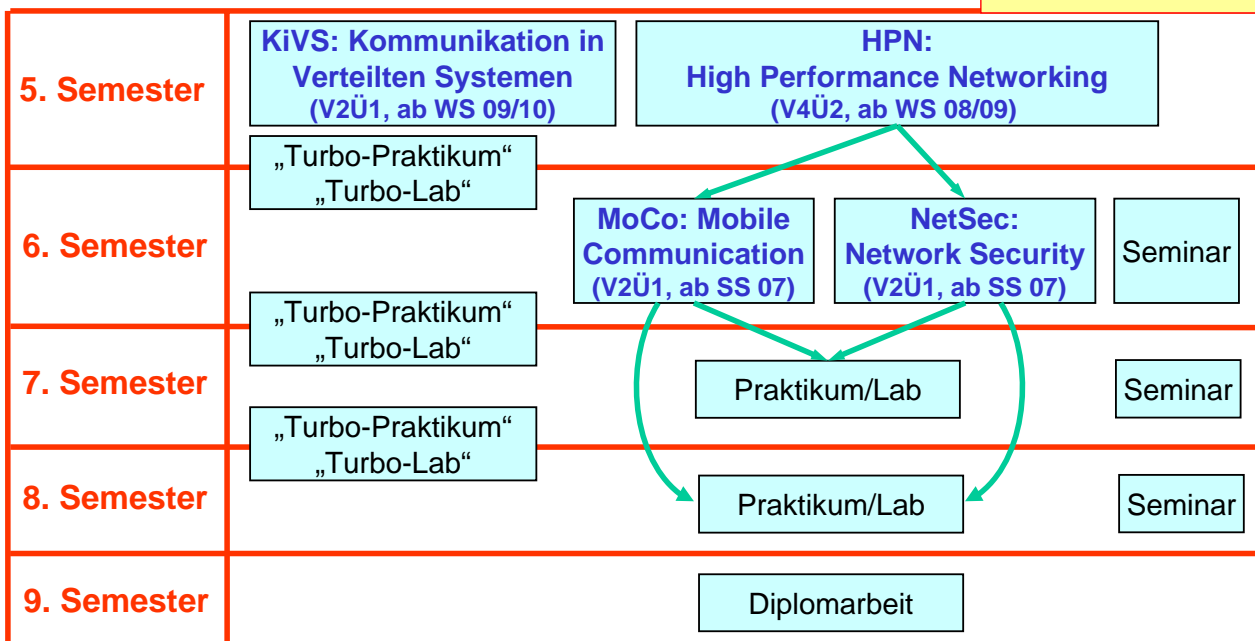


\*Seminars for students of computer science only

\*\*\*"Turbo-Lab" for students of computer science only

# Lehre AG Martini im Hauptstudium Informatik (Diplom)

future path  
for German DPOs



- Im Regelfall kein Zugang zu MoCo oder NetSec ohne erfolgreiche Teilnahme an HPN.
- HPN setzt KiVS (inhaltlich, aber nicht formal) als bekannt voraus.
- HPN und KiVS können parallel gehört werden.
- Teilnahme an Praktika nur bei erfolgreicher Teilnahme an HPN und (MoCo oder NetSec).
- Im Regelfall wird für Diplomarbeiten die erfolgreiche Teilnahme an einem unserer Hauptstudiums-Praktika vorausgesetzt.

## Looking back: “Datacomm & Internet Techn.” (WS 07/08)

(aka “Rechnernetze I”)

0. Important information about this lecture
1. The Internet – Overview and Philosophy
2. Protocols and Architecture
3. Error Control
4. Flow Control and Congestion Control
5. Addressing and Routing
6. Quality of Service and Network Operation

DPO 2003:  
Wahlpflicht-  
bereich B1  
(8 LP)

The knowledge about contents of “Datacomm & Internet Techn.” (WS07/08) or “Rechnernetze I” (WS 2006/2007) is prerequisite for this lecture “Mobile Communication”.

## “Mobile Communication“ (German DPO 2003: “Bereich B, Wahlfach”)

V2Ü1 - lecture 2 hours per week, exercises 2 hours every 2nd week, SS 2008

### Intended audience:

- successful participants of lecture „DC & IT“ or „Rechnernetze I“

DPO 2003:  
Wahlvorlesung  
Bereich B  
(4 LP)

### Topics overview:

- Mobility across networks: Mobile IP
- Wireless Communication Basics
- Wireless Technologies:
  - Personal area: Bluetooth
  - Local area: Wireless LAN
- Cellular phone networks
  - GSM, HSCSD, GPRS, EDGE
- 3rd generation mobile communication
  - UMTS, IMS
- The future of mobile communication
  - Ad hoc & sensor networks

## „Network Security“ (German DPO 2003: “Bereich B, Wahlfach”)

V2Ü1 - lecture 2 hours per week, exercises 2 hours every 2nd week, SS 2008

### Intended audience:

- successful participants of lecture „Rechnernetze I“

DPO 2003:  
Wahlvorlesung  
Bereich B  
(4 LP)

### Learning the Technologies:

- Motivation
  - Security in the Internet, Known Attacks, Social Engineering
- Threats in Communication Networks
  - Denial of Service, Buffer Overflow, Worms, Trojan horses
- Network Security Fundamentals
  - Layer 2 Attacks, Network Management, Network Design
- Safeguards
  - Cryptography, PGP, SSL/TSL, IPsec, RADIUS, WLAN
- Network Security Analysis
  - Firewall, DMZ, Intrusion Detection, Tools
- Security Policies and Standards
  - ISO and related standards, VoIP Security, Best Practices

### Content overview as of SS 2007

-

**see first lecture on  
Thursday 10.04.  
15.15h Hörsaal A  
(Römerstr.)**

**both B-IT + DPOs**

## History/Evolution of lecture “Mobile Communication”

- SS 2008      Lecture “**Mobile Communication**” (V2Ü1) – as SS 2007
- SS 2007      Lecture “**Mobile Communication**” (new: V2Ü1)  
(contents mainly the same as SS 2006 2nd part “Rechnernetze II”)

**Participants of past lecture(s) “Rechnernetze II”  
cannot use V2Ü1 “Mobile Communication” for  
their exams!**

- SS 2006      Lecture “Rechnernetze II” (V4Ü2)  
Chapter 5 **Mobile Communication** (2nd half of semester)

... same in SS 2005, 2004

- SS 2003      Lecture “Rechnernetze II” (V4Ü2)  
Chapter 5 Mobile Communication (2nd half of semester)

- SS 2002      Lecture “**Mobilkommunikation**” (V4Ü2 full semester)

- SS 2001      Lecture “Mobilkommunikation” (V4Ü2 full semester)

- SS 2000      Lecture “**Kommunikationsprotokolle & mobile Vernetzung II** (KoMoVe)”

- WS 1999/2000      Lecture “Kommunikationsprotokolle & mobile Vernetzung I (KoMoVe)”

# Overview lecture “Mobile Communication” (SS 2008)

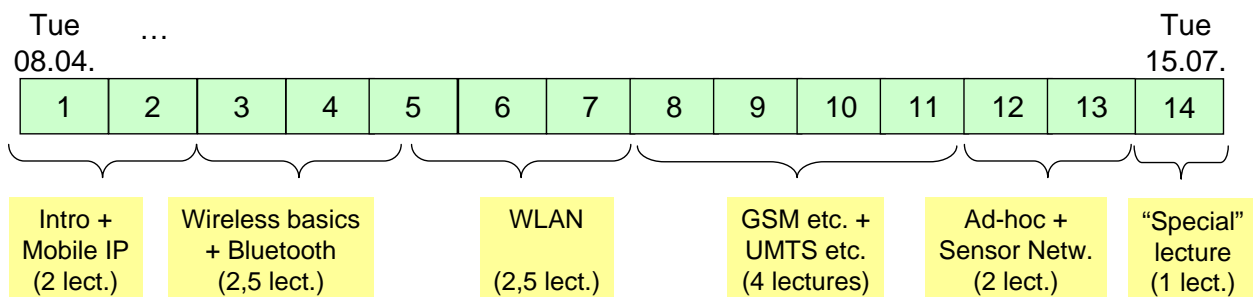
1. Introduction
2. Mobility across networks: Mobile IP
3. Wireless Communication Basics
4. Wireless Personal Area Network: Bluetooth
5. Wireless Local Area Network: WLAN
6. Cellular phone network: GSM, HSCSD, GPRS, EDGE
7. Third generation mobile communication: UMTS, IMS
8. Ad-hoc & Sensor Networks

Several slides in this chapter are very much **based on Jochen Schiller’s work**.  
The copyright of these slides - marked “**JS**” in the upper right corner - is with Jochen Schiller.

Further information on Prof. Schiller’s work, including his excellent books, is available at  
<http://www.jochenschiller.de>

## Time Table Mobile Communication + “Specials”

The following graph shows the intended general structure of the lecture  
(slight changes are possible):



**Chapter 8**  
**Ad hoc & Sensor Networks**  
**by Dr. Michael Gerharz**  
**FGAN/FKIE**  
**(former member of our group)**



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Institut für Informatik IV  
Prof. Martini

## Veranstaltungskritiken

Semester	Lehrveranstaltung (Vorlesung, Praktikum)	Fragebogen (Muster)	Präsentation der Ergebnisse	
			HTML	Postscript / PDF (Folien je Seite)
SS 2007	Data Communication, Internet Technology and Mobile Devices Praktikum (Lab)	EvaSys Fragebogen Typ THA72, RWTH Aachen	-	<a href="#">PDF</a>
	Informatik II	<a href="#">Fragebogenmuster</a>	-	<a href="#">PDF (2)</a>
	Mobile Communication	<a href="#">Fragebogenmuster</a>	-	<a href="#">PDF (2)</a>
	Network Security	<a href="#">Fragebogenmuster</a>	-	<a href="#">PDF (2)</a>
WS 2006/2007	Rechnernetze I (Data Communication and Internet Technology)	<a href="#">Fragebogenmuster</a>	-	<a href="#">PDF (2)</a>
SS 2006	Data Communication, Internet Technology and Mobile Devices Praktikum (Lab)	EvaSys Fragebogen Typ THA74, RWTH Aachen	-	<a href="#">PDF</a>
	Advanced Topic in Data Communication and Internet Technology	EvaSys Fragebogen Typ THA80, RWTH Aachen	-	<a href="#">PDF</a>
	Rechnernetze II (Advanced Topic in Data Communication and Internet Technology)	<a href="#">Muster</a>	-	<a href="#">PDF (2)</a>

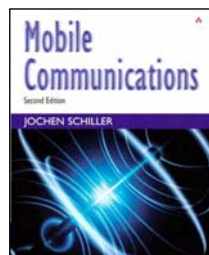
## Books and Online Information

The Internet offers a lot of information on different aspects of the Internet. URLs explicitly mentioned here:

- <http://www.ietf.org> Internet Engineering Task Force
- <http://www.ieee.org> Institute of Electrical and Electronics Engineers
- <http://www.acm.org> The Association for Computing Machinery
- <http://www.3gpp.org> 3rd Generation Partnership Project (3GPP)

### Selected books :

- R. Jain, "The Art of Computer Systems Performance Analysis", Wiley, 1991
- Jochen Schiller, "Mobile Communications", Addison-Wesley, 2003



Additional references are included in the slides.

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**Universität Bonn**  
Institut für Informatik IV  
Prof. Dr. Peter Martini

## Studienberatung für Informatik

(letzte Änderungen am 23.01.2008)

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Kurzübersicht: [Hauptseite](#) - [Wegweiser Infoquellen](#) - [FAQ Info-Studium](#) - [Veranstungsverzeichnis Informatik](#) - [Studiengebühren](#) - [Studiengangwechsel zur Informatik](#) - [Auslandsaufenthalt](#)

Bitte runterblättern für Aktuelles, wichtige Termine, weitere Informationsübersicht!

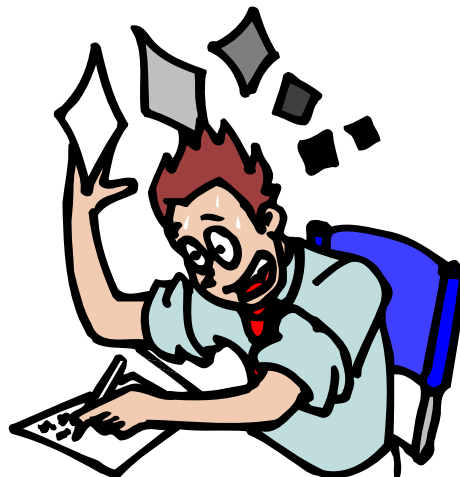
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## ... everything is stated on the slides ??

The PDF version of the **slides available online cannot replace personal notes !!**

**Add personal notes to the printed slides !**

You will be more than happy to have these personal notes when preparing for oral examinations\*.



\*It is important to learn how to make appropriate personal notes. This skill is definitely required in many seminars in the process of life-long learning.