Intro to P1+P2+Masterseminar Computer Science (CS) + Mediainformatics (MI) + Business informatics (BI)

Torsten Möller

Outline

- The idea

- Requirements

- Expectations

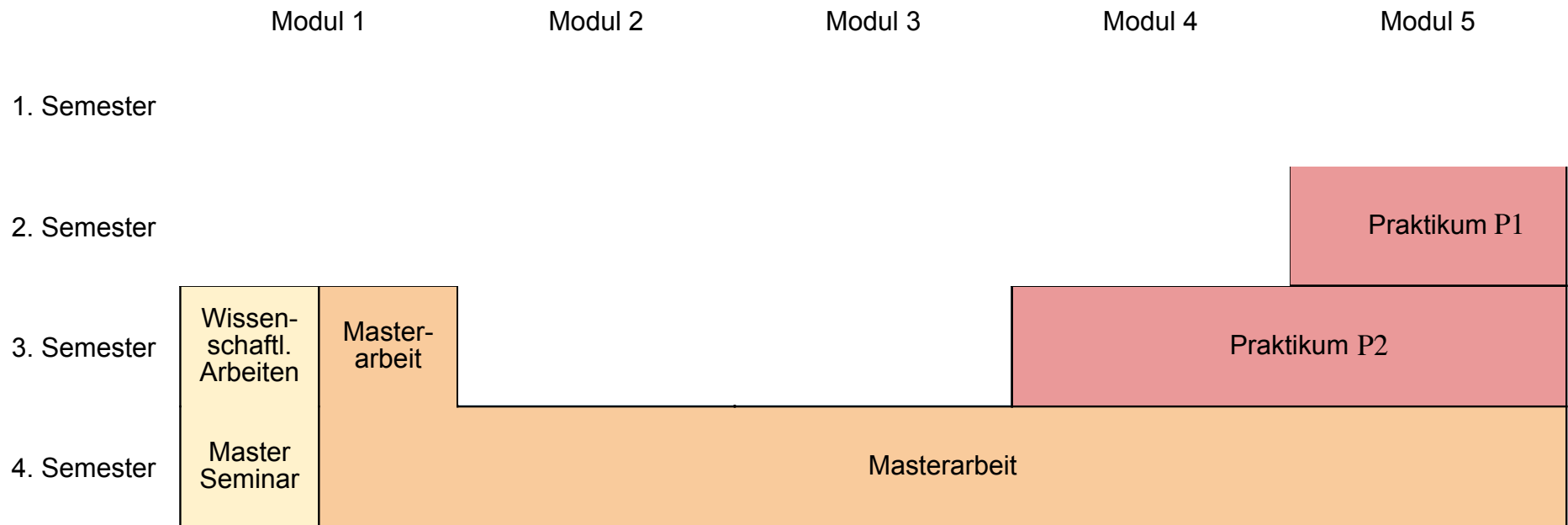- Timeline

- How to find a topic

The Idea

There are three stages in your Master / for your scientific contributions:

- 2nd semester: 6 ECTS practicum
- 3rd semester: 12 ECTS practicum
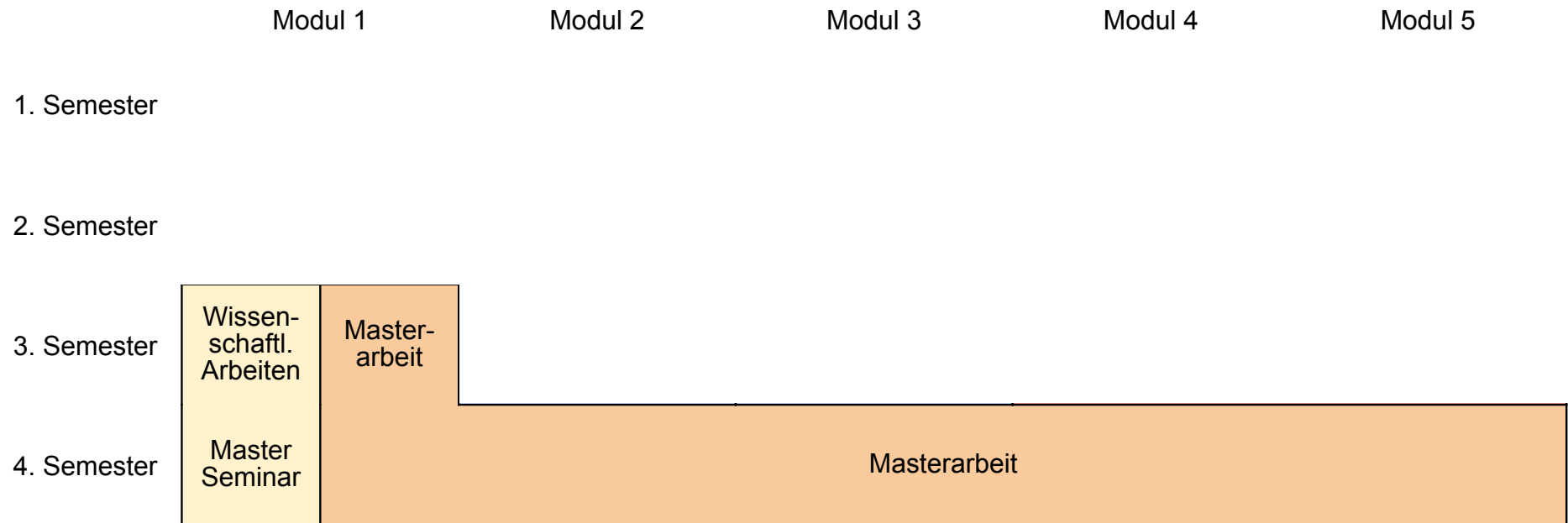- 3rd+4th semester: 30 ECTS Master thesis + 3 ECTS Masterseminar

We offer help

- Practice P1+P2: help in finding a topic

- VU Academic research and writing: solidifying the scientific approach

- Masterseminar: solidifying + communicating the topic

The idea — CS + MI

	Modul 1	Modul 2	Modul 3	Modul 4	Modul 5
1. Semester					
2. Semester					Praktikum P1
3. Semester	Wissen-schaftl. Arbeiten / Master-arbeit			Praktikum P2	
4. Semester	Master Seminar	Masterarbeit			

The idea — BI

	Modul 1	Modul 2	Modul 3	Modul 4	Modul 5
1. Semester					
2. Semester					
3. Semester	Wissen-schaftl. Arbeiten / Master-arbeit				
4. Semester	Master Seminar / Masterarbeit				

The idea — V1

- *Master topic comes from P2 and P2 builds on P1*

However

- if P1 didn't work, there is a chance to switch topics for P2

- in **extreme** cases, P2 didn't work either, there is a chance to switch topics for the thesis

The idea — V2

- P1 + P2 allow you to get "your feet wet" on different topics in different research labs. It helps to expose you to different research approaches.

However

- by the time you choose your thesis topic you need to be all prepared to do great work!

The idea — Masterseminar

- Here you are writing a survey paper on the topic you have chosen. This will become your literature review chapter for your thesis.

- you will review (in a conference system) the survey papers of your peers

- you will present your survey paper in a conference style setting

- Instead of a survey paper, you can also opt for writing a research proposal

Requirements

- P1+P2: you are supposed to put what you learned in the previous courses into practice by developing a software tool

- Thesis: you are supposed to tackle the state-of-the-art in a well defined research topic

Requirements

- Master seminar: you are supposed to present your thesis topic to your peers to get early feedback and to become aware of related work / what others are doing

Formal requirements

	CS	MI	BI
P1	18 ECTS from a cluster	18 ECTS from CG or MM	NA
P2	P1	P1	NA
Master-seminar	P1, ASE	P1, ASE	UNF, ASE, MEM, IOP, BPM

P1/P2 Waiting List

- if you are on the waiting list — we couldn't check whether you fulfilled the requirements: please email Manfred Klaffenböck (manfred.klaffenboeck@univie.ac.at) with the subject header "requirements"

- For P1: we need a list of the 18 ECTS that you are fulfilling.

- For P2: we need to check whether you fulfilled P1

- deadline for email: Sun, Mar 04, midnight

- I will then enter you into the course.

- sorry for the inconvenience.

Req — CS

- "The topic of your thesis is born out of one of the modules of specialization."

general CS	Scientific Comp.	Data Science
• Algorithms	• Algorithms	• Algorithms
• Data Analysis	• Data Analysis	• Data Analysis
• Parallel Computing	• Parallel Computing	• Parallel Computing
• Networks	• Networking	
• Computer Graphics		
• Multimedia		
• Information Management & Systems Engineering		
• Internet Computing & Software Technology		

Req — Mediainformatics

- "The topic of your thesis is born out of one of the modules of extended Mediainformatics, Computer Graphics or Multimedia."

Req — Businessinformatics

- "Das Thema der Masterarbeit ist aus einem der Module der Pflichtmodulgruppe Wirtschaftsinformatik zu entnehmen."

  - Geschäftsprozessmanagement
  - Knowledge Engineering
  - Interoperabilität
  - Metamodellierung
  - Digitale Ökonomie
  - Sichere Digitale Wirtschaft

- PS: Wir sehen dies schon ein wenig breiter und sind dabei dies auch im Curriculum widerzuspiegeln.

Expectations

- It's work, i.e. studying is a full-time job!

  - 6 ECTS (P1) =
    150h of your time or 10h/week

  - 12 ECTS (P2) =
    300h of your time or 20h/week

  - 3 ECTS (Masterseminar) =
    75h of your time or 5h/week

  - 30 ECTS (Thesis) =
    750h of your time in a semester

Expectations

- P1+P2: find topic

  - best before the start of the semester (but not necessary)
  - latest by deadline for dropping the course

- Masterseminar: you should already have a topic and supervisor for your master thesis!

- meet at least 4 times during the semester with your supervisor

  1. in the beginning to clarify the topic
  2. after 4 weeks to clarify progress and milestones
  3. one month before end of semester to clarify progress and expectations
  4. end of the semester: to present your results

Grading

- P1: Evaluation of the entire project, the implementation of the prototype as well as the written report.

- Masterseminar:

  - 70% of the grade: quality of the survey paper (thesis proposal)

  - 10% of the grade: quality of the reviews

  - 20% of the grade: quality of the presentation

  - In order to pass the course you need to achieve at least half of the points for the paper, the reviews, and the presentation, each.

Timeline P1+P2+Masterseminar (summer)

- **Mar 18** (check / deadline for dropping the course): confirm a topic and supervisor, enter into Moodle

- **Mar 18**: if you have no topic, either drop the course or email me and I will assign you a topic

- **Mar 20**: if you didn't drop the course NOR emailed me about a topic it is too late to assign you one, you will have receive a "5" for the course

- meet with supervisor at least twice in-between

- **Jun 30**: finish all requirements and have results presented

Timeline Masterseminar (summer)

- **Mar 18/20** — just like before.

- **May 6** — submission of your survey paper in the conference system (Moodle)

- **May 20** — finishing of all the assigned reviews

- **Jun 29** — presentation day

How to find a topic

General remarks

- you want to enjoy it! — what was the most fun subject thus far?

- take advantage of your strength (programming, math, design, …)

- search for it early (you don't want one assigned)

- talk to potential supervisors!

Topics … arranged by research clusters

● Computer Graphics

- Entertainment computing

- Visualization and Data Analysis

● Multimedia

- Multimedia Information Systems

- Visualization and Data Analysis

Topics … arranged by research clusters

- Algorithms

  - Data Mining
  - Theory and Applications of Algorithms

- Data Analysis

  - Data Mining
  - Visualization and Data Analysis

- Parallel Computing

  - Data Mining
  - Scientific Computing

Topics … arranged by research clusters

- Internet Computing & Software Technology

  - Software Architecture

  - Workflow Systems and Technology

- Networks

  - Cooperative Systems

  - Entertainment Computing

- Information Management & Systems Engineering

  - Software Architecture

  - Workflow Systems and Technology

Topics … arranged by research labs

Algorithms
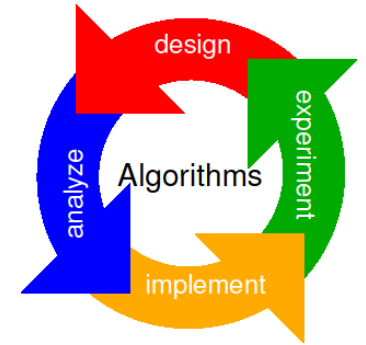
- **Combinatorial algorithms**: Graph algorithms and approximation algorithms with applications to computational biology, computer verification, and internet computing

- **Numerical algorithms**: Analysis and evaluation of numerical algorithms with a focus on specific aspects, such as efficiency, scalability, fault tolerance, or decentralization

  - Applications to data mining, deep learning, security

- **Algorithm engineering**: Implement algorithms that tackle real-world problems. Perform experiments to evaluate practical algorithm performance. Have an impact on applications. Example problems: graph {partitioning, clustering, mapping, drawing, generation, ...}

Theory and Applications of Algorithms

- URL: http://taa.cs.univie.ac.at

- Possible supervisors:

  - **Monika Henzinger**
    (monika.henzinger@univie.ac.at)
    - Possible co-supervisor ("Mitbetreuer"):
      Christian Schulz (christian.schulz@univie.ac.at)

  - **Wilfried Gansterer**
    (wilfried.gansterer@univie.ac.at)

Communications Technologies

- Communication networks are complex: reasoning about network configurations is challenging for humans!

- Consequences: bad performance, security issues, etc.

- Our vision: make computer networks self-*:

  - Self-optimizing
  - Self-repairing
  - Self-stabilizing …

- In other words, we want self-driving networks

- Our approach: using many different methodologies

  - algorithm design, formal analysis
  - Artificial intelligence
  - fuzzing

Communications Technologies

- Apply our vision to different case studies:

  - Internet
  - Internet-of-Things
  - Datacenter networks
  - Google wide-area networks
  - Wireless networks

- Interested in at least one of the following topics:

  - Design of network algorithms
  - Threat and security analysis of communication technologies
  - Fuzzing software
  - Designing new network applications

Communications Technologies

- URL: https://www.net.t-labs.tu-berlin.de/ ~stefan

- Possible supervisors:

  - Stefan Schmid (stefan_schmid@univie.ac.at)

# Cooperative Systems (COSY)

- Human-Computer Interaction (HCI)
    - Human Factors and Interaction Design of ICTs
    - Usability, Usable Security, User Research, (Participatory) ideation and iterative prototyping
    - Social Computing, Technology and the cultural domain - "Culture over IP"
    - Ubiquitous and mobile HCI
    - Computer Supported Cooperative World

- Networks and Network Security

    - Internet of Things / Internet of People
    - AAA - Authentication, Authorization, Accounting in IoT ecosystems
    - Decentralized security mechanisms (blockchain, trust, transparency, privacy)
    - (Computer) Networks --- design, operation, and use

- Selected Topics

    - opera.guru - mobile app development, server client architecture
    - User Research and Interaction Design of Chatbots
    - CoConUT - mobile field study toolkit
    - eParticipation: platforms, (mobile) apps, interaction and process design, security

Cooperative Systems (COSY)

- URL: http://cosy.cs.univie.ac.at/teaching/open-topics/

- Possible supervisors:

  - Peter Reichl (peter.reichl@univie.ac.at)

Data Mining
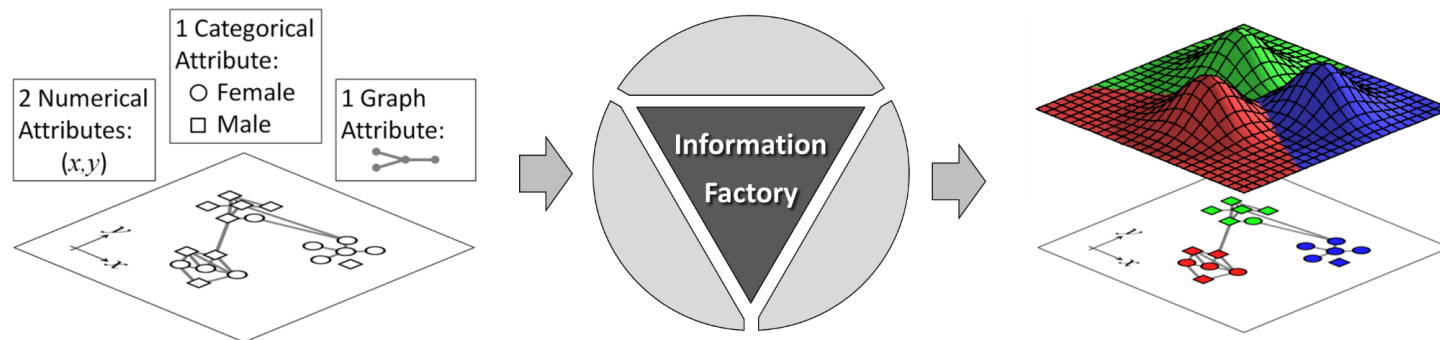
Contribute to develop techniques for extracting understandable knowledge from data.

Topic areas include:

- Heterogeneous data types,
- Information-theoretic methods,
- Noise-robust methods,
- High-performance data mining on modern hardware

Data Mining

- URL: http://dm.cs.univie.ac.at/teaching/open-topics/

- possible supervisors: Claudia Plant (claudia.plant@univie.ac.at)

  - Come to my office hour Thursdays 4-5pm, room 3.28, check out Prof. Plant's website for changes

Knowledge Engineering

- URL: http://ke.cs.univie.ac.at

- Possible supervisors:

  - Dimitris Karagiannis (dk@dke.univie.ac.at)

    - Possible co-supervisor („Mitbetreuer"): Dominik Bork (dominik.bork@univie.ac.at)

Knowledge Engineering

- Knowledge Engineering / Artificial Intelligence
  - Knowledge Engineering Foundations
  - Design and Development of Semantic Information Systems
  - Applying KE principles in Cyber-Physical Systems
  - Knowledge Management
  - Knowledge-based Robotics
  - Knowledge-Based Process Management
- Metamodeling
  - Foundations of Metamodeling
  - Design and Development of Domain-specific Conceptual Modeling Methods
  - Enterprise Architecture Management
  - Specification of metamodels and modeling languages
  - Multi-View Modeling & Consistency of Models
  - Smart Models
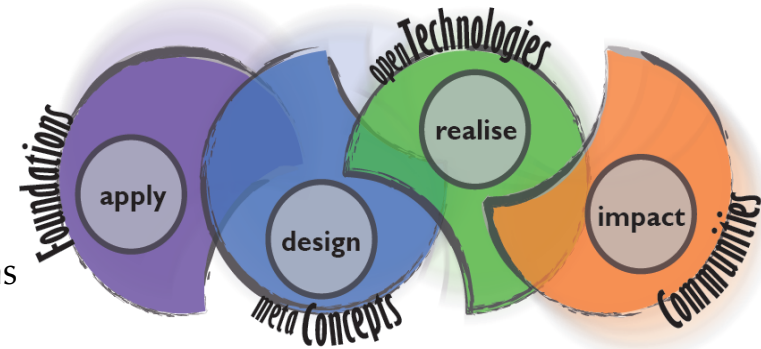
Multimedia Information Systems (MIS)

- Multimedia information systems technologies

  - Analyze, manage, store, create and compose, semantically enrich & play back multimedia content
  - Semantically smart multimedia systems
  - Blockchain technologies
  - Security topics
  - etc.

- Application Domains, e.g.

  - Content Authoring and Management Systems
  - Web Content Management
  - Robotics and IoT
  - Blockchain-based Applications

Multimedia Information Systems (MIS)

- URL for topics:
  http://bit.ly/mis_students_open-topics

- possible supervisors:

  - Wolfgang Klas (wolfgang.klas@univie.ac.at)

Software Architecture

- Possible Topics:

  - Software Design and Architecture Techniques such as Architectural Decision Making

  - Service-based systems, REST, cloud-based systems, mobile cloud

  - DevOps, Continuous Delivery / Deployment

  - Container-Technologies/-Architectures (like Docker etc.)

  - Software Ecosytems

  - Software System Modelling and Modelling Tools such as Flexible Behaviour Models, Adaptive Case Management, Abstract State Machines

  - Internet of Things Engineering

Software Architecture

- URL: http://swa.cs.univie.ac.at/teaching/open-topics/

- possible supervisors:

  - Uwe Zdun (uwe.zdun@univie.ac.at)

Visualization and Data Analysis

- focus on **Visual Data Science** — helping explain complicated algorithms to a broad set of people (typically for computational or data science)

- **Possible topics:**

  - Understanding deep neural networks
  - Understanding dimensionality reduction
  - Understanding clustering algorithms
  - Understanding classification algorithms

- **Application areas:**

  - Astronomy
  - Digital Humanities
  - Finance
  - Student data
  - Image segmentation

Visualization and Data Analysis

- URL:
  http://vda.cs.univie.ac.at/teaching/open-topics/

- possible supervisors:

  - Torsten Möller
    (torsten.moeller@univie.ac.at)

Workflow Systems and Technology

- **Workflow Systems and technologies:**
  - Process-oriented development of applications
  - Business process intelligence
  - Collaborative process networks
  - Compliance and security in process-oriented information systems
  - Scientific workflows and data management

- **Application areas:**
  - Manufacturing, Industrie 4.0
  - Health Care, Care
  - Energy, Smart Grids
  - Computational Intelligence
  - Cloud Marketplaces

Workflow Systems and Technology

- URL: http://wst.cs.univie.ac.at/research/

- possible supervisors:

  - Stefanie Rinderle-Ma (stefanie.rinderle-ma@univie.ac.at)

  - Erich Schikuta (erich.schikuta@univie.ac.at)