

# On the Importance of Interdisciplinary Research for Informatics Careers

Gregor Engels ([engels@upb.de](mailto:engels@upb.de))

Paderborn University

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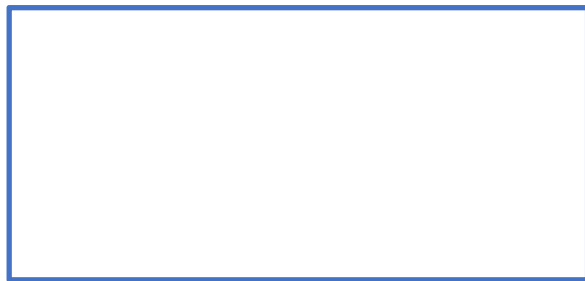
# On the Importance of Interdisciplinary Research for Informatics Careers

academic vs industrial careers

Why this difference?

# Smart Cyber-Physical Social Systems

Which disciplines are needed and involved to develop those systems?



# Smart Cyber-Physical Social Systems

Which disciplines are needed and involved to develop those systems?

## Informatics

- Software Engineering
- Programming Languages
- Operating Systems
- Database Systems
- Networks
- Artificial Intelligence
- Security
- ...



## Economics

- Business Models
- Business Processes
- Organizational Models
- Supply Chains
- Taxation
- Legal Regulations
- ...

## Engineering

- Mechanical Engineering
- Electrical Engineering
- Automotive Engineering
- ...

## Sociology

- Digital Society
- Role of Humans
- Diversity
- ...

## Psychology

- Healthiness
- Well-being
- Work-life Balance
- ...

## Humanities

- Ethics
- Sustainability
- Digital Responsibility
- ...

# Disciplinarity

## Types of Cooperation

Examples?

- **Mono-disciplinarity**

- working within one discipline with colleagues from the same discipline

- **Multi-disciplinarity**

- working on separated discipline-oriented research questions in a team with colleagues from different disciplines

- **Inter-disciplinarity**

- working on a joint research question with aspects from different disciplines with colleagues from different disciplines

- **Trans-disciplinarity**

- working on translating and transferring topics from one or several disciplines into application areas

# Disciplinarity

## Types of Cooperation

### Examples?

- **Mono-disciplinarity**

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Uncertainty handling in ML applications

- **Multi-disciplinarity**

- working on separated discipline-oriented research questions in a team with colleagues from different disciplines

Uncertainty handling in medical ML applications / Impact of uncertainties on decisions in medical treatment

- **Inter-disciplinarity**

- working on a joint research question with aspects from different disciplines with colleagues from different disciplines

Improving quality of decisions in medical treatment in case of uncertainties in used ML applications.

- **Trans-disciplinarity**

- working on translating and transferring topics from one or several disciplines into application areas

Developing a novel app for medical doctors which indicates level of uncertainty in proposed treatments.

# Concrete Examples of Interdisciplinary Work

interdisciplinary work within (!) informatics

## Software Engineering

Model-based software development

Models as an abstract description of software

Models as instances of Meta-Models (e.g. UML)

## Database Systems

Data Models as conceptual means to structure a database  
(e.g. Relational Model, Entity-Relationship-Model, ...)

Database Schemata as instances of Data Models

Let's change the model!



Let's change the schema!

Let's change the meta model!



Let's change the model!

Why do these problems  
within informatics  
exist?

# Concrete Examples of Interdisciplinary Work

## Understanding the Future of Work



Working  
Place  
Profile



Personal  
Profile

Aspects of  
Working at Home

Activity  
Profile



Leadership  
Profile



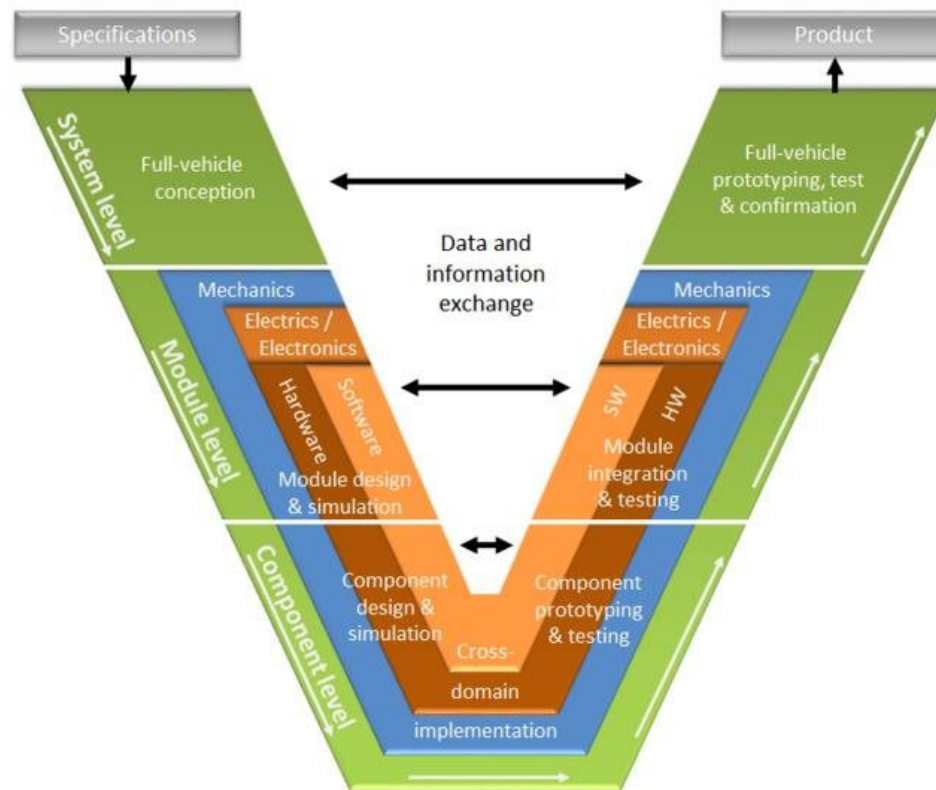
Why is interdisciplinary work useful in this context?



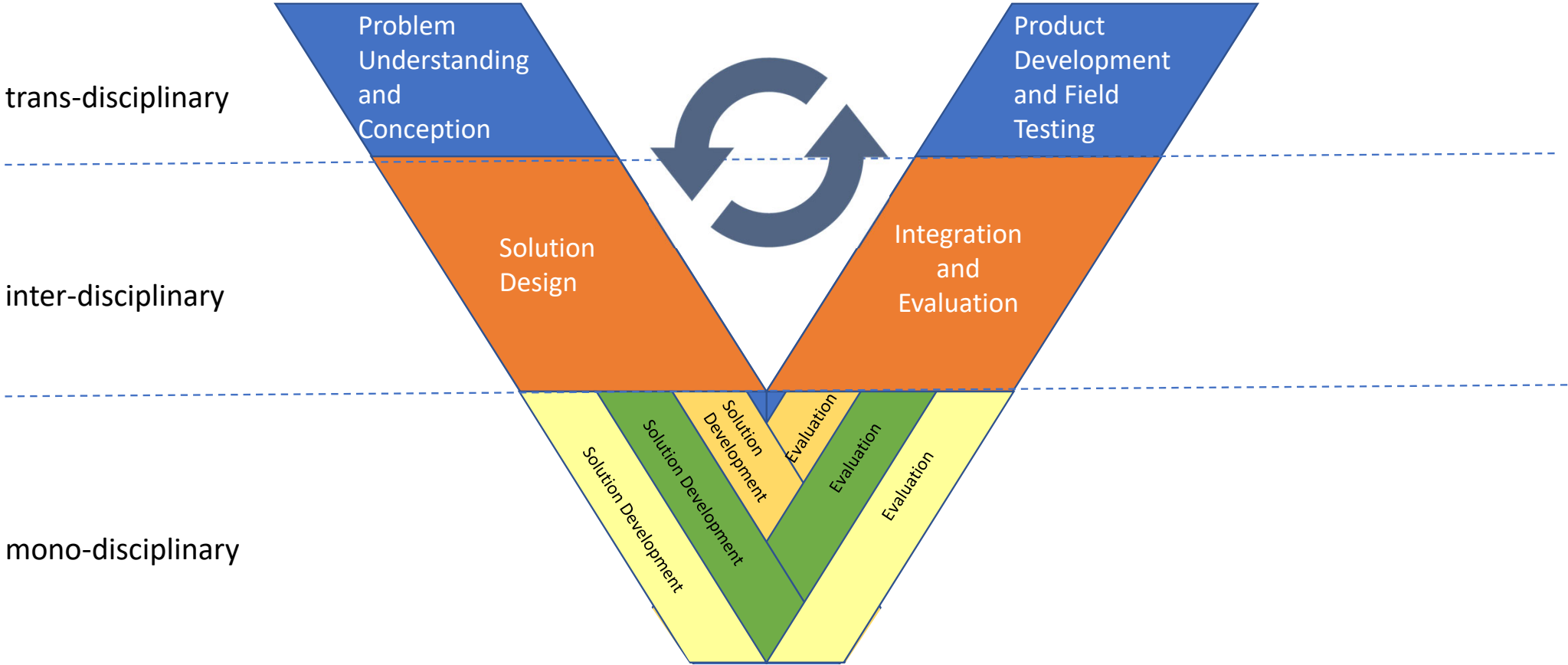
# Best Practices

- Decide for yourself whether you aim at mono-disciplinary or inter-disciplinary research work
- In case of inter-disciplinary research work
  - be aware of the others
  - be open to other research methods (constructive, analytical, ...)
  - ask for cooperative PhD supervision
  - ask for joint offices (at least part-time)
  - go for inter-disciplinary as well as mono-disciplinary publications
  - be aware that A/A\* publication possibilities mainly for mono-disciplinary work
  - align with mono-disciplinary PhD regulations

# Systems Engineering Life Cycle



# Mono-, Inter-, Transdisciplinary Research Work



**Questions?**  
**Comments?**  
**Experiences?**  
**Best Practices?**