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INTER- AND TRANSDISCIPLINARY PHD PROGRAMS

GREGOR ENGELS

Challenging Scenarios of today (1)

Smart Home / Ambient Assisted Living (AAL)

Intradisciplinary Topics

- Human-computer interaction
- Cyber-Physical System
- (Domain-specific) Languages
- End-user Programming
- (Big) Data Analytics
- Visualization
- Privacy
- Software Engineering

Interdisciplinary Topics

- Psychology
- Sociology
- Medicine
- Geriatrics
- Mechanical Engineering
- Architecture

Transdisciplinary Topics

- Health Insurance
- Retail
- Banking

Challenging Scenarios of today (2)

Work 4.0 / Cognitive Assistance Systems

Intradisciplinary Topics

- Human-computer interaction
- Cyber-Physical System
- Robotics
- (Domain-specific) Languages
- End-user Programming
- AR/VR
- (Big) Data Analytics / Visualization
- Privacy
- Software Engineering

Interdisciplinary Topics

- Psychology
- Sociology
- Economics
- Medicine
- Mechanical Engineering
- Architecture

Transdisciplinary Topics

- Unions
- Health Insurance

Cognitive Assistance System

System Aspect

easy to use
adaptive
flexible
reliable

compliant
- privacy
- legal

Worker Aspect

healthy
tired
stressed

skilled
qualified
competent
experienced

Life, as we see and construct it

How to bridge this gap?

Life, as it is

We need intra-, inter- and transdisciplinary research!

Types of Research

- **intra-disciplinary:** research (methods) within a discipline
- **multi-disciplinary:** parallel, independent research of several disciplines
- **inter-disciplinary:** joint / combined research (methods) of several disciplines
- **trans-disciplinary:** transfer of research (methods / results) between disciplines (affected stakeholders)

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Graduate School
Design of Flexible Work Environments – Work 4.0

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Mechanical Engineering
Organisational Management
Educational Management
Computer Science
- **Data Science**
- **Security**
- **Software Engineering**

Universität Bielefeld

Sociology
Labor Psychology
Computer Science
- **Sensorics**
- **Robotics**
- **Neuro-Informatics**

Intra-, inter- and transdisciplinary approach

IG Metall
Nordrhein-Westfalen

TBS NRW

Energie | Impuls | OWL

it's owl

Graduate School
Design of Flexible Work Environments – Work 4.0

Intra-, inter- and transdisciplinary approach

Heterogeneity of disciplines

- Research methods
  - constructive vs. empirical
- Analysis vs. synthesis
- Top-down vs. bottom-up
- Ontologies
- Publication types
- Referencing

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Intra-, inter- and transdisciplinary approach

How to be successful - some (personal) insights

- Select colleagues and PhD students who are
  - interested in crossing boundaries
  - convinced that this is needed
  - willing to speak to researchers of other disciplines
  - willing to invest additional effort
- Take care of supporting means
  - joint glossary / ontology
  - inter- and transdisciplinary PhD supervision
  - frequent joint meetings / discussions / presentations
- Identify and work on common research topics

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digital twin of a human

networks of digital twins of humans

Intra-, inter- and transdisciplinary approach

Be aware of numerous obstacles

- additional effort
- disciplinary PhD regulations (within a faculty)
- different salaries – depending of discipline

- disciplinary rankings / metrics
- missing inter-/transdisciplinary publication means

- missing appreciation of inter-/transdisciplinary research

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Intra-, inter- and transdisciplinary approach

Discussion

What are your experiences?

What are your advices?

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The Wide Role of Informatics at Universities

Chair: Susan Eisenbach

Survey http://www.informatics-europe.org/survey/index.php/982381/