



Mobile & Enterprise Computing (MEC)/ SocialCars Research Training Group

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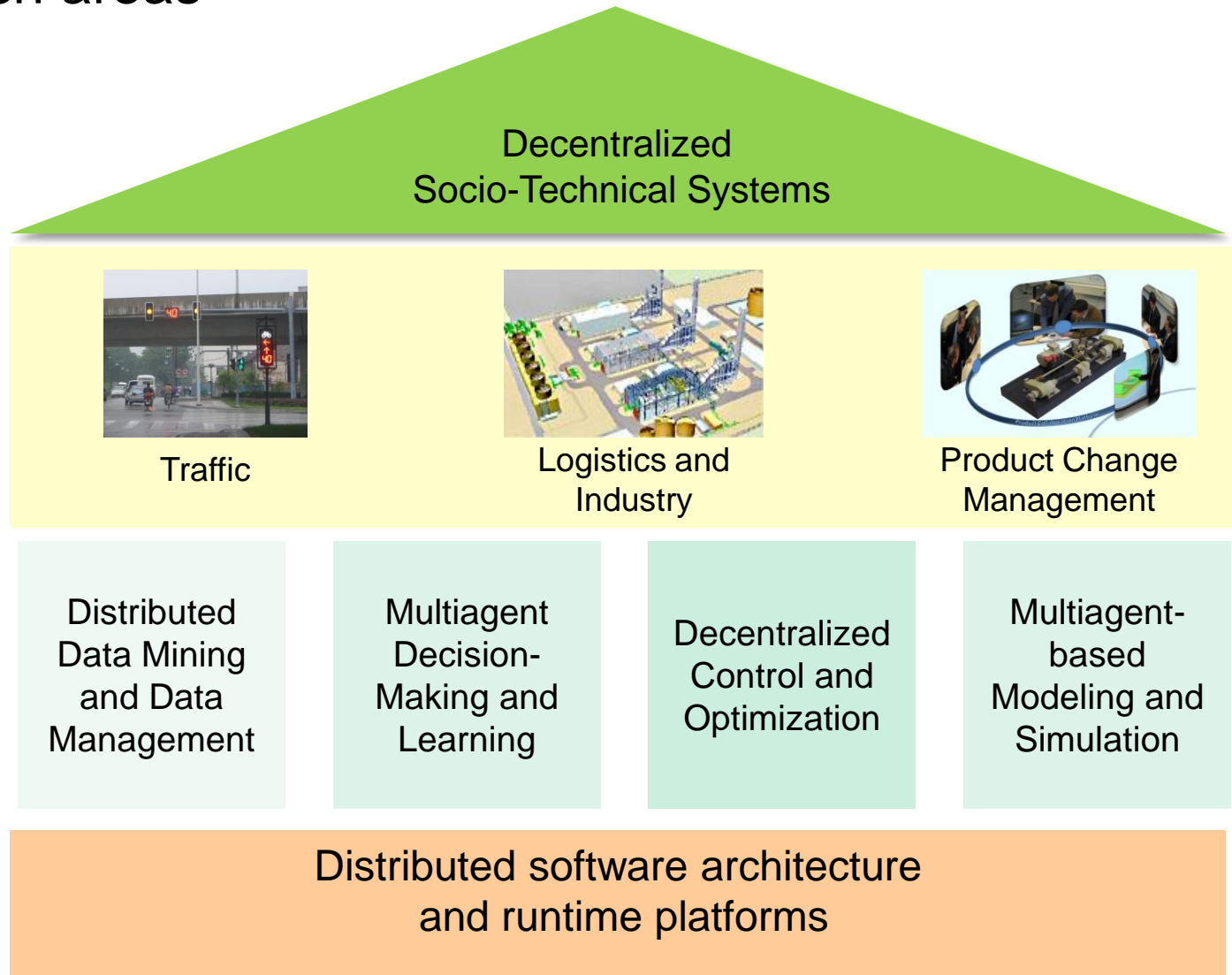
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Mobile & Enterprise Computing Lab @ TUC



Research areas



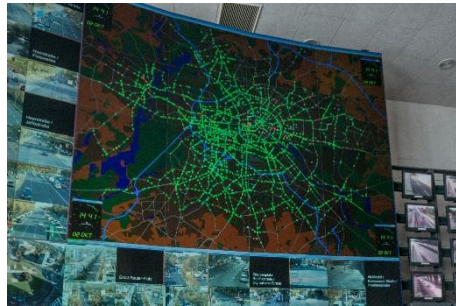
Mobility-related research interests at MEC

- Multiagent-based modeling, simulation, and engineering of large-scale socio-technical systems
- Interacting (autonomous) vehicles: Intelligent services and decentralized coordination
- Macro- and meso-level impact of smart mobility services and assistance functions

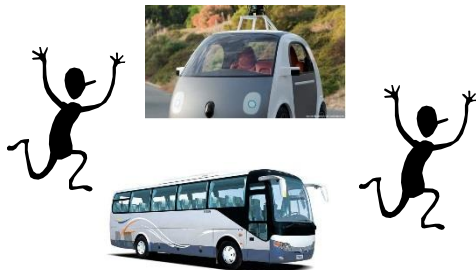
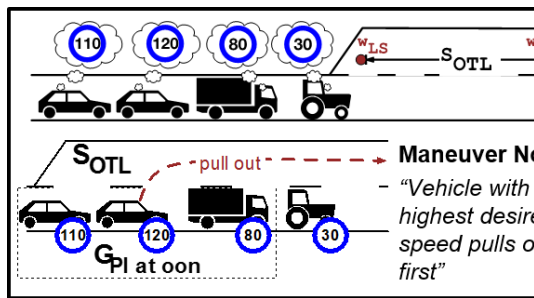
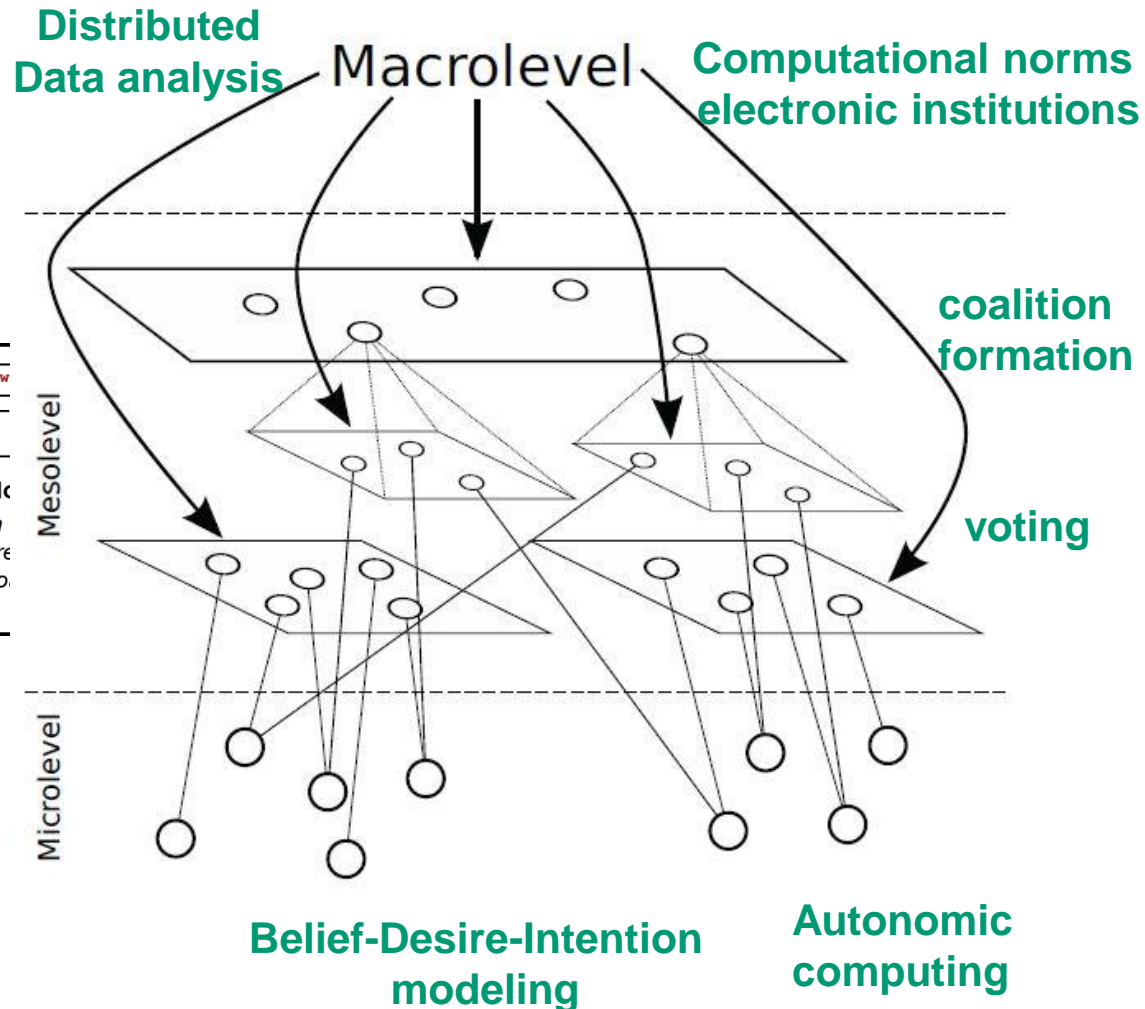
Multiagent-based modeling and simulation of large-scale socio-technical systems

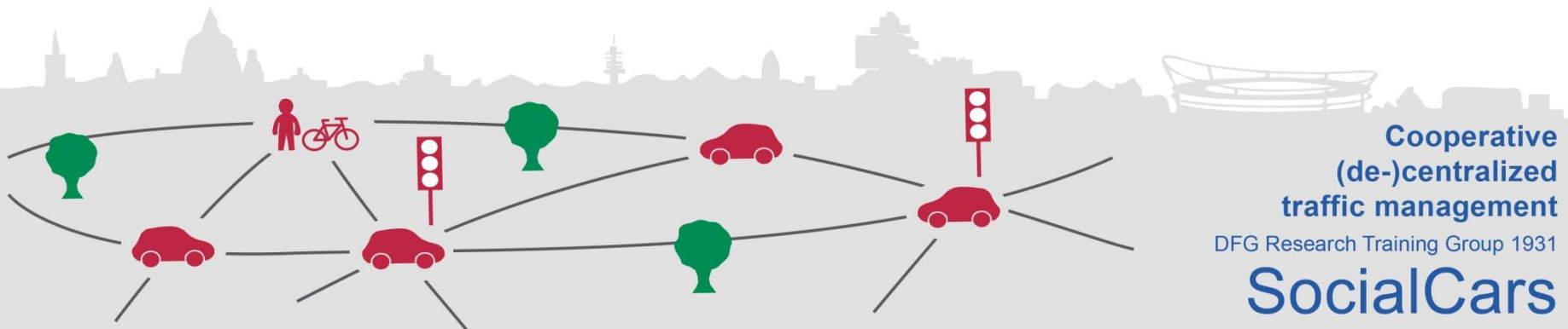
- Socio-technical systems → traffic / smart city
 - multiple stakeholders (conflicts, coordination)
 - system lifetime >> technology lifetime: governance?
 - self-adaptation & self-evolution: autonomic features
 - Human / organization is part of system
- Research goals
 - Fine grained, microscopic modeling of human-like behaviour (intelligent agents) and organizations (multiagent systems)
 - Make resulting models scale up to LARGE systems!
- Research vehicles
 - Platforms (AIMSUN, SUMO, MATSim, Repast, Jason, Jack, Jadex, Mason, SeSaMe, ...) and datasets (HUGE ISSUE!)
 - Experimental agent-based simulation platform MECSIM
<https://mecdev.rz-housing.tu-clausthal.de/jenkins/job/MecSim/>

Macro- and meso-level impact of smart mobility services and assistance functions [Sanderson et al., 2012]



[12]





Cooperative
(de-)centralized
traffic management

DFG Research Training Group 1931

SocialCars

Interacting (autonomous) vehicles: Intelligent services and decentralized coordination

- How to design next generation mobility assistance services?
 - Requirements at micro-level / autonomy
 - Coordination methods at meso-level
 - Objective functions and means of regulation at macro-level
 - Centralized vs decentralized architectures?
 - Using information strategically?

- Examples
 - Passing lane assistance
 - Collective route choice assistant
 - Advanced intersection assistance
 - Cooperative parking search assistance



SocialCars – Cooperative (de-)centralized traffic management

Research Training Group funded by German Research Foundation (DFG)

Period: 04/2014 – 09/2018

Institute of Transportation and Urban Engineering

*Prof. Dr.-Ing. Bernhard Friedrich
(Speaker)*

Business Information Systems Engineering

Prof. Dr. Dirk C. Mattfeld

Department of Traffic and Engineering Psychology

Prof. Dr. Mark Vollrath

Department of Informatics

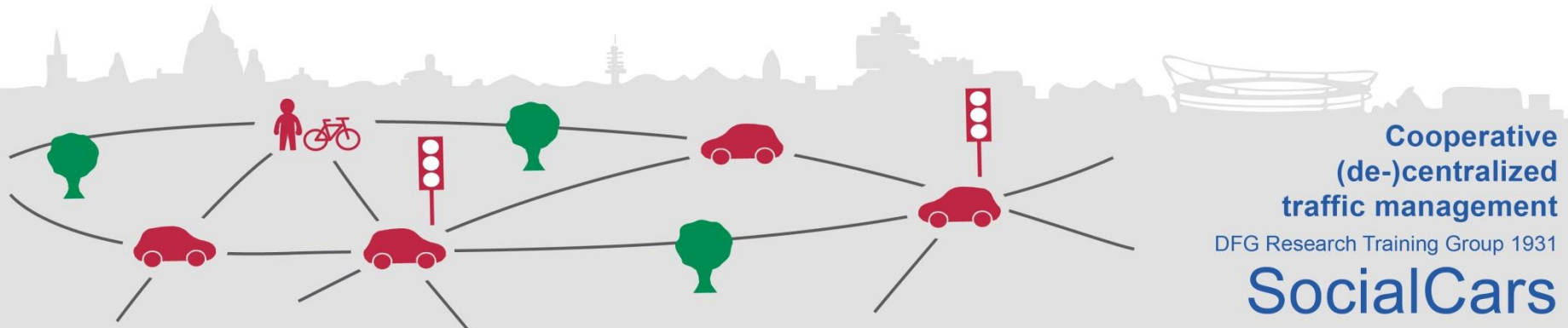
*Prof. Dr. Jörg P. Müller
(Vice speaker)*

Institute of Communications Technology

Prof. Dr.-Ing. Markus Fidler

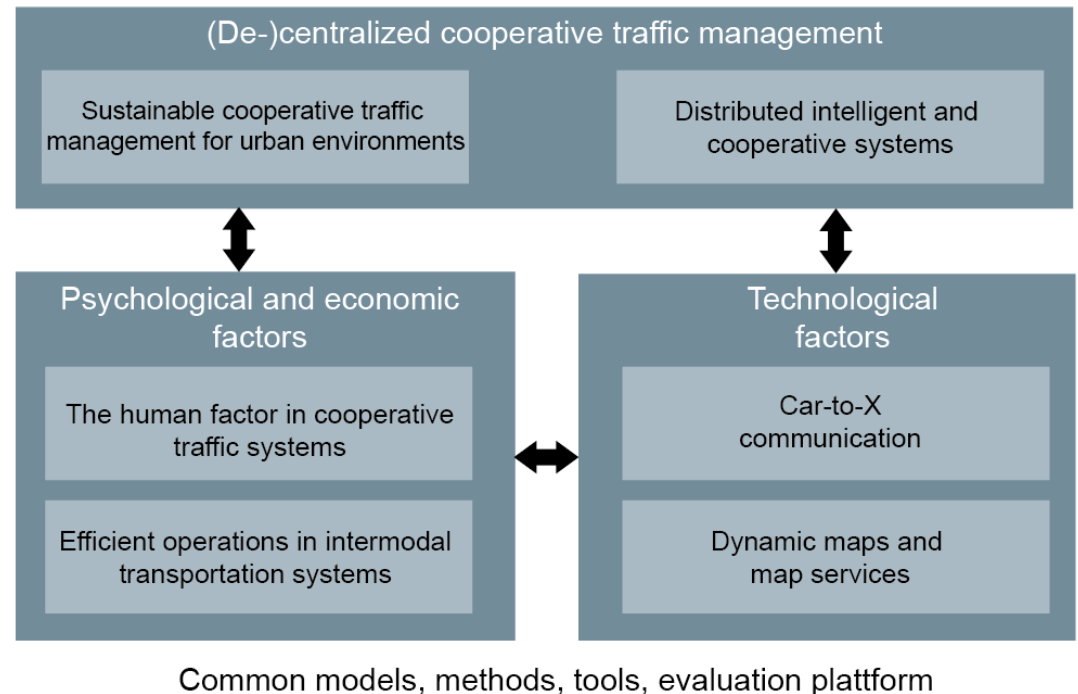
Institute of Cartography and Geoinformatics

Prof. Dr.-Ing. Monika Sester



Research Objective and Research Profile

- Improve future road traffic using cooperative approaches
- Analyze interactions between
 - central supervision (system-optimal)
 - decentral actions (user-optimal)
- Developing dynamic models considering central and decentral factors



Team members

- 6 Professors
- 12 Doctoral Researchers
- 1 PostDoc
- 1 Coordinator

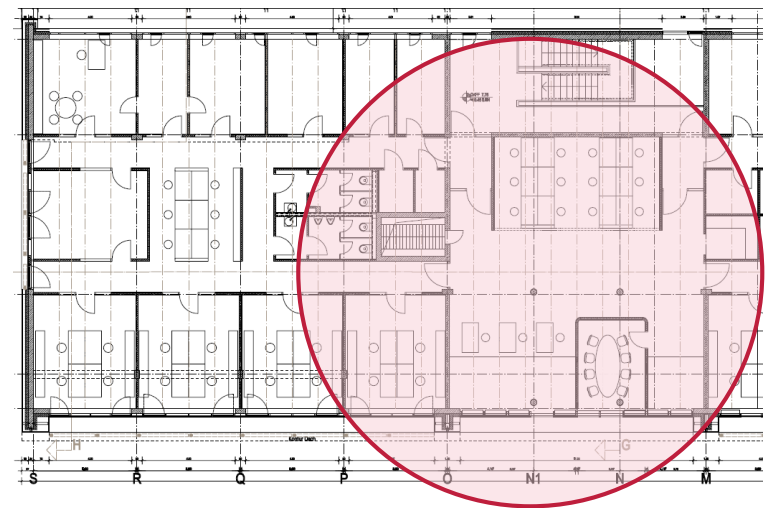
Further associated:

- 16 Doctoral Researchers
- 3 PostDocs
- Numerous student researchers

Central workplace:



Automotive Research Center
at Braunschweig → Campus



Research Training Group 1931 SocialCars



Visit us at:

www.socialcars.org