

# ComNets Facts, Achievements and Plans

Prof. Dr.-Ing. Bernhard Walke

Department of Communication Networks  
Prof. Dr. Petri Mähönen,  
RWTH Aachen University, Germany

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# Fundament: „Large Systems' Theory“

- **Model based mathematical/stochastical performance analysis of large systems, build-up from sub-systems, applying**
  - **Theory of Modelling:** How to model network elements, traffic load and services of real world systems?
  - **Queueing Theory:** Stochastic processes describe arrivals and load characteristics for interconnected server stations. The traffic performance is calculated or simulated.
  - **Theory of Scheduling:** Service disciplines are analyzed that apply static / dynamic priorities to concurrent tasks. Focus is the performance, e.g., satisfied user criterions.
  - **Theory of Simulation:** Random variable generation, statistical confidence of correlated output data, etc.
- It is „Large Systems' Theory“

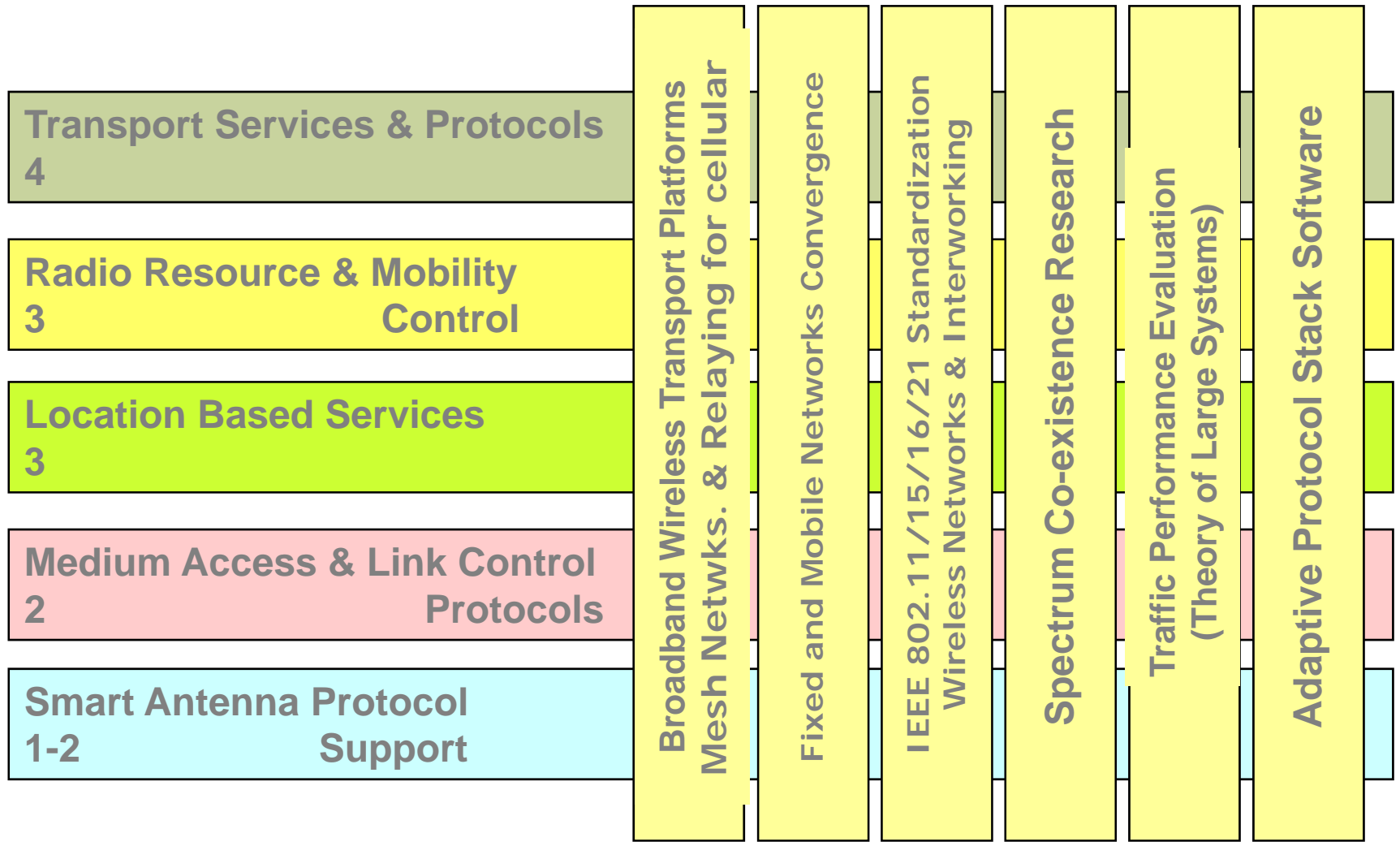
# Applications studied by Large Systems' Theory

## Performance Analysis of Wireless Systems based on Tools developed in ComNets




















- Radio Propagation and Interference Evaluation in multi-cellular Systems (RISE)
- Mapping to block error rate of
  - multi-cell interference
  - spatial multiplex transmission
- Traffic Generators: derived from real-world measurement
- Statistics evaluation methods for correlated events
- > **openWNS** containing emulated protocol stacks of all known digital wireless/mobile systems operated in typical environments
- > allows comparison of performance of cellular radio systems on application level

# Summary of ComNets Research

"We do mostly layers 2..4"



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