

# FG INET: Intelligent Networks

An-Institut Deutsche Telekom Laboratories

**Prof. Anja Feldmann, Ph.D.**

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<http://www.net.t-labs.tu-berlin.de/>

# INET: Research Group

## ❑ Location

- Telefunkenhochhaus, 16. Stock

## ❑ Office hours

- Tuesday 12:30 – 13:00
- After the lecture or per e-mail

## ❑ Contact

- Best per e-mail 😊

## ❑ Teaching contact

- Fabian Schneider

## ❑ Web site

<http://www.net.t-labs.tu-berlin.de/>

# T-Labs

- ❑ Institute at TU Berlin funded by Deutsche Telekom AG
- ❑ Co-locates researchers from TU Berlin and project managers of Deutsche Telekom
- ❑ Two parts
  - Strategic research
    - 4 Research Groups + 30 Researchers + 40 Ph.D. students so far: INET, Quality and Usability (QU Lab), Security in Telecommunications (SecT)
  - Innovation development
    - Project work, e.g., IP-TV, Overarching AAA

# Research interests

- ❑ Internet in general
- ❑ Clean slate network architectures
- ❑ Traffic measurement and characterization
- ❑ Wireless mesh networks
- ❑ Peer to peer and social networks
- ❑ Network security, e.g., intrusion detection

# Çiğdem Şengül, Ph.D.

## □ Biography:

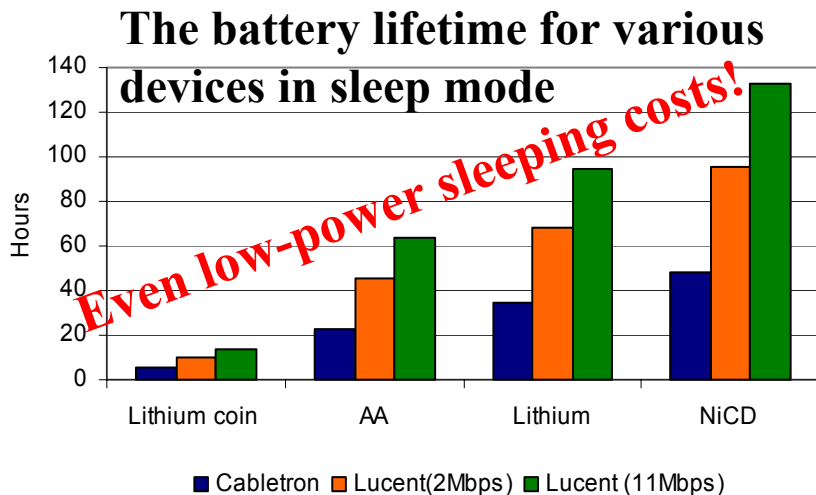
- Control and Computer Engineering @ Tech. Uni. Istanbul, Turkey
- Computer Science @ Uni. Of Illinois Urbana-Champaign, USA  
(MS/PhD advisor: Robin Kravets)
- Distributed Systems and Networking @ INRIA, France  
(Postdoc in ASAP led by Anne-Marie Kermarrec)
- Networking @ Deutsche Telekom Laboratories  
(Senior Research Scientist)

## □ Research Interests:

- Adaptive operation in self-organized networks  
(mobile, sensor, delay-tolerant, peer-to-peer, ..)
- Energy management in wireless networks
- Routing, topology management, cross-layer design  
(mac/routing/transport)

# Wireless Networks: Energy management

- ❑ Communication “any time, anywhere” is becoming a reality but at what cost?
- ❑ Can we reduce the cost of being “on all the time” for both
  - Users – Phones, PDAs ...
  - Infrastructure – Wireless APs, sensors ...



- ❑ How can we support increasing communication demands but lower energy consumption?
  - Adaptive models and self-organization (e.g., local detection and reaction to varying traffic and energy conditions; turn off a device, if traffic load is currently low)
- ❑ How can we evaluate different approaches in a realistic manner?
  - BOWL (Berlin Open Wireless Lab) Network – <http://bowl.net.t-labs.tu-berlin.de>

# Gregor Maier

## □ Biography:

- Informatik (Diplom) @ TU München
- Research Assistant / PhD candidate @ TU Berlin

## □ Research Interests:

- Network Security (Network Intrusion Detection Systems, TimeMachine)
- Network Measurements

# Example of a research topic: Evaluating the benefits of re-routing

## □ Scenarios

- P2P systems
- Community networks
- Traffic engineering via traffic redistribution
- Wide area migration of virtual machines
- ...



# Example: Peer-to-Peer networks

❑ Can ISPs and P2P users cooperate?

❑ Goal:

- Improved performance for users
- Enable traffic control for ISP

❑ Idea:

- **ISPs: offer oracle that provides network distance info**
- **P2P: use oracle to build P2P neighborhoods**

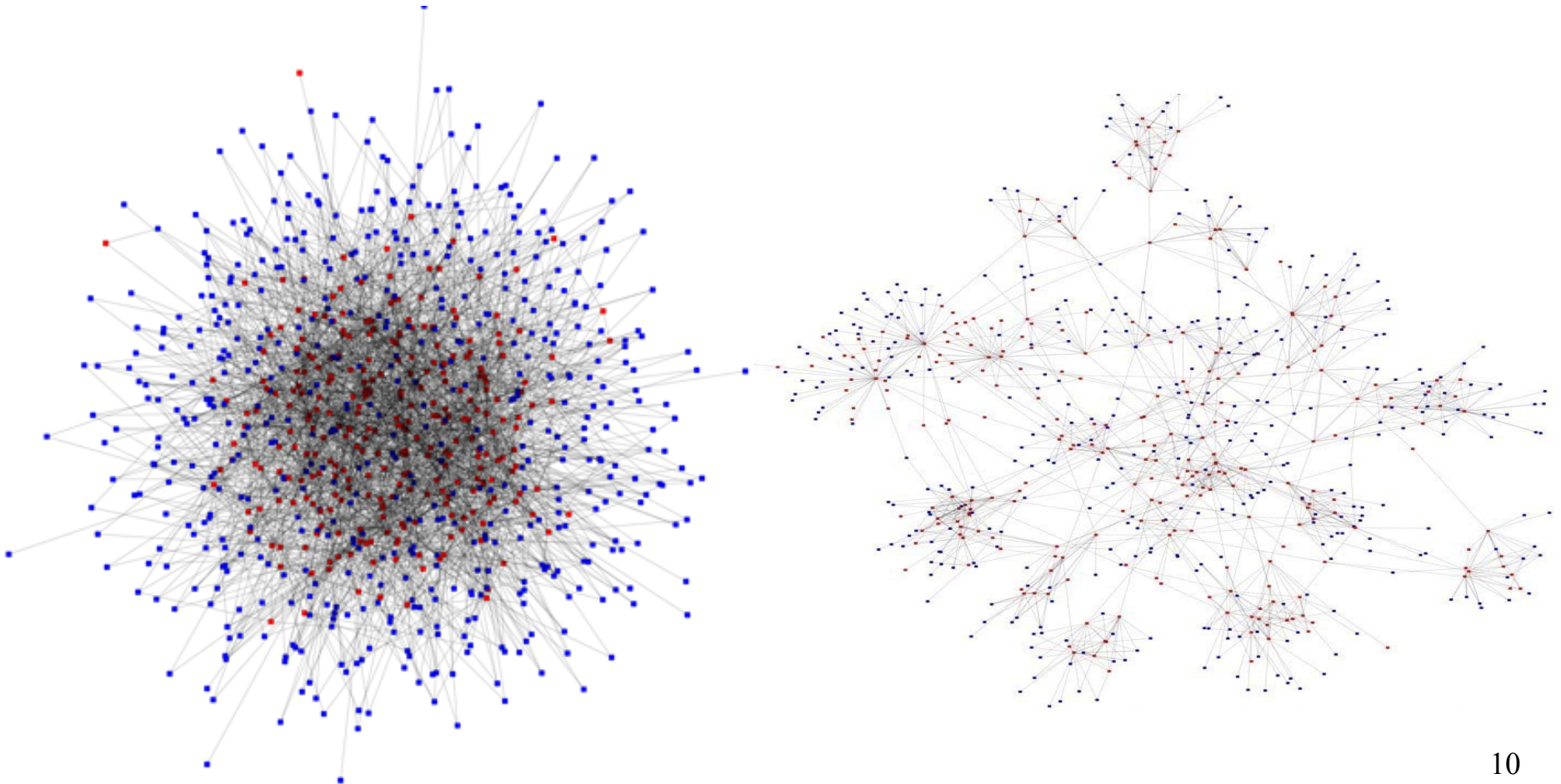
❑ P2P oracle concept:

- Service of AS / ISP
- Input: list of possible dst IP addr. and src IP addr
- Output: ranked list of dst IP addr.  
e.g. according to distances between src IP and dst IPs

# Benefits of P2P oracle for topology

□ without oracle

□ with oracle



# Teaching

- ❑ Lectures (Vorlesungen)
- ❑ Seminars (Seminare)
- ❑ Lab course (Praktika)
- ❑ Projects (Projekte)
- ❑ Theses (Diplom / Master / Bachelor)
  
- ❑ PGT: Project Group Meeting  
(Doktorandenseminar)

# Lectures

- ❑ Network protocols and architectures (VL+UE)
  - How does the Internet work ....
  - Base for all other INET classes
  
- ❑ Internet Routing (VL)
- ❑ Internet Security (VL)
- ❑ Internet Measurement (VL)

# Seminars

- Network architectures
  - Emphasising:
    - Internet Routing
    - **Internet Security**
    - Internet Measurement
  - Topic: Current research papers
  - Task:
    - Summary paper + presentation
    - Participation in discussion during the seminar
  - Typically en block after the end of term

# Lab courses

- Hands on exercises

- **Mesh Lab**

- Understanding various wireless concepts (e.g., interference, MAC layer, multi-hop routing)  
Experiments with mesh routers in the BOWL indoor network

- Router Lab

- Configuring and managing networks
- Internet experiments in a Lab

# Projects and Theses

## □ Topic:

- See Web pages
- Talk to members of INET
- Suggest your own topic

## □ Work flow:

- Literature/background search
- Presentation of idea at students' talks series (20 minutes 😊)
- Execution of idea / preparation of thesis document
- Presentation of results at students' talks (20 minutes)