



# Topics

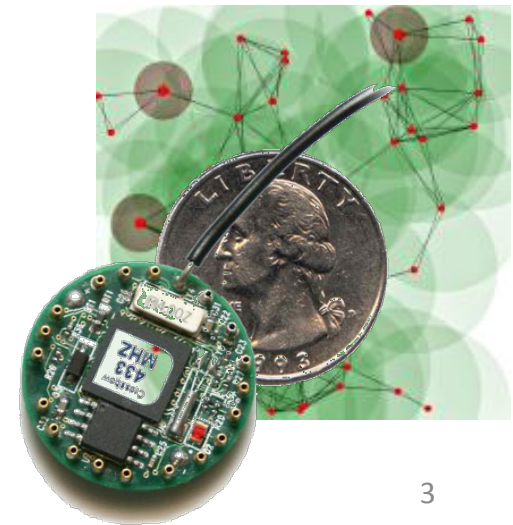
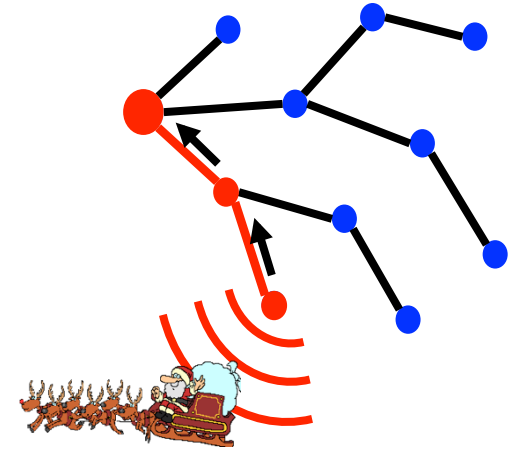
Olaf Landsiedel

# Overview

- Topic 1:
  - Wireless Sensor Networks:  
Applications, Use Cases and Vision
- Topic 2:
  - Social Sensing and Crowdsourcing

# Introduction: Wireless Sensor Networks

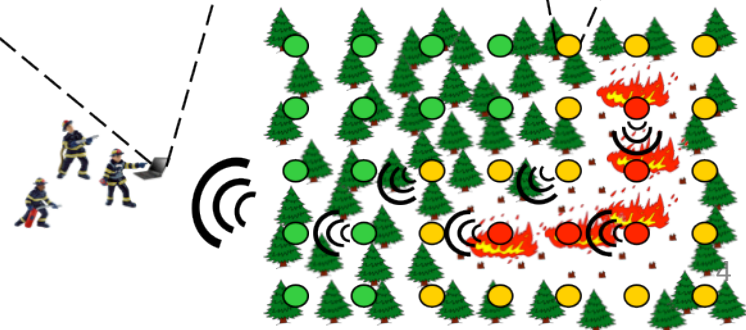
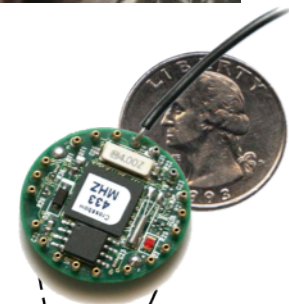
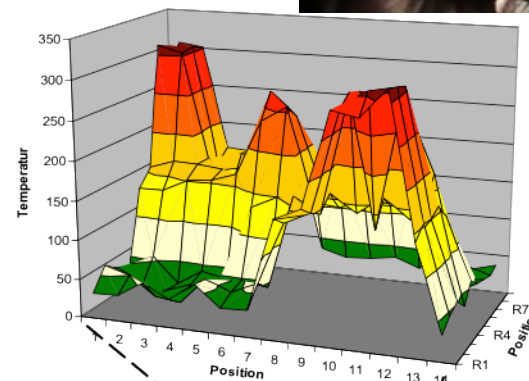
- What is a Wireless Sensor Network?
  - Wireless network of
    - Small, embedded computing devices
  - Embedded into the environment
    - Sense and interact with the surroundings
- WSNs are key building blocks
  - For our networked society
    - Smart meters, smart buildings, ...
    - Cyber Physical System (CPS)
    - Internet of Things (IoT)
    - Machine-To-Machine (M2M)



# Topic 1: WSNs

## Applications, Use Cases and Vision

- What are wireless sensor networks?
- What can we do with them?
- Challenges for application development?
- Relation to the Internet of Things etc.



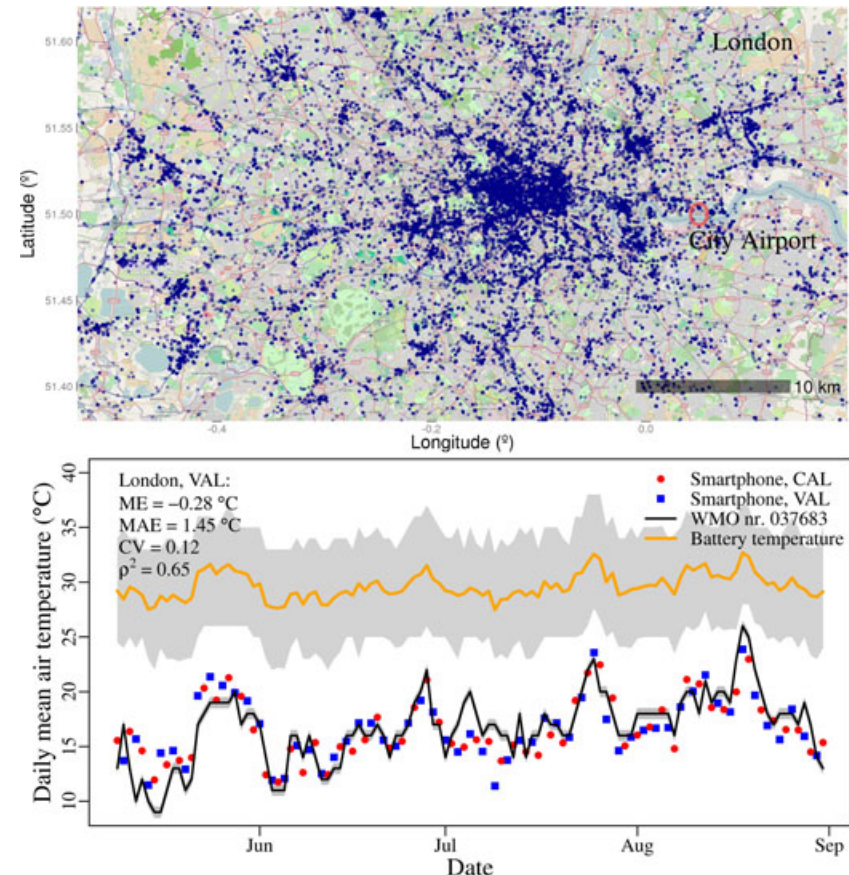
# Papers: Wireless Sensor Networks: Applications, Use Cases and Vision

- “Sensor network algorithms and applications”, Niki Trigoni and Bhaskar Krishnamachar, Philos. Trans. A. (Math Phys Eng Sci), 2012  
(<http://rsta.royalsocietypublishing.org/content/370/1958/5.full.pdf+html>)
- Sensing data centres for energy efficiency”, Jie Liu and Andreas Terzis, Philos. Trans. A. (Math Phys Eng Sci), 2012  
(<http://rsta.royalsocietypublishing.org/content/370/1958/136.full.pdf+html>)
- Deploying a Wireless Sensor Network on an Active Volcano”: Geoff Werner-Allen; Konrad Lorincz; Mario Ruiz; Omar Marcillo; Jeffrey B. Johnson; Jonathan Lees; Matt Welsh, IEEE Internet Computing, 2006  
(<http://www.eecs.harvard.edu/~mdw/papers/volcano-ieeeic06.pdf>)
- "Sensor network-based countersniper system. Simon, Gyula, et al. Proceedings of the 2nd international conference on Embedded networked sensor systems. ACM, 2004. (  
[http://www.isis.vanderbilt.edu/sites/default/files/Simon\\_G\\_11\\_3\\_2004\\_Sensor\\_Net.pdf](http://www.isis.vanderbilt.edu/sites/default/files/Simon_G_11_3_2004_Sensor_Net.pdf))

# Topic 2

## Social Sensing and Crowdsourcing

- People, their smart phones, and social media are a big “sensor”
  - What are people doing
  - Where?
  - What are people thinking?
- Problem
  - Who is telling the truth?
  - Privacy?
- Approach
  - Identify “trusted” sources
  - Aggregate many sources



# Papers: Social Sensing and Crowdsourcing

- "On Truth Discovery in Social Sensing: A Maximum Likelihood Estimation Approach", Dong Wang, Hieu Le, Lance Kaplan, Tarek Abdelzaher, In Proc. 11th ACM/IEEE Conference on Information Processing in Sensor Networks (IPSN), April 2012.  
(<https://www.ideals.illinois.edu/bitstream/handle/2142/25815/Factfinders.pdf?sequence=2>)
- "Mobiscopes for human spaces", T. Abdelzaher et al.. IEEE Pervasive Computing, 6(2):20–29, 2007  
([http://research.microsoft.com/pubs/77862/kansal\\_pervasive2007.pdf](http://research.microsoft.com/pubs/77862/kansal_pervasive2007.pdf))
- "CarTel: a distributed mobile sensor computing system", B. Hull et al.. In SenSys'06, 2006.  
(<http://db.csail.mit.edu/pubs/fp02-hull.pdf>)
- "Crowdsourcing urban air temperatures from smartphone battery temperatures", Overeem, A., J. C. R. Robinson, H. Leijnse, G. J. Steeneveld, B. K. P. Horn, and R. Uijlenhoet, Geophys. Res. Lett., 40, 2013  
(<http://onlinelibrary.wiley.com/doi/10.1002/grl.50786/pdf>)

# Background Required

- For both topics
  - Courses in distributed systems and / or embedded systems



# Thanks!

- Questions,...