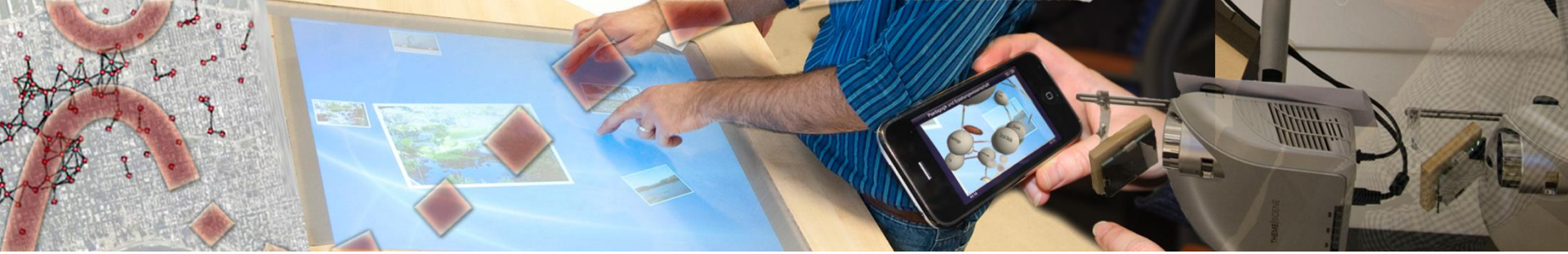

Telekooperation Seminar

3 CP, WiSe 2017

Nikolaos Alexopoulos, Rolf Egert.

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based on slides by

Dr. Leonardo Martucci and Florian Volk

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General Information

What?

- Read and analyze current scientific publications
- Topics: **Ubiquitous and Applied Computing**

How?

- Select a topic and study it
- Write a short report
- Review other reports
- Present your report

Who?

- BSc, MSc students from
  - Computer Science
  - Electrical Engineering
  - and related areas

General Information

Why?

- Introduction to a research area
- Learn to read and analyze scientific material
- Present your evaluation

Language?

- English
  - Even though your advisor might speak German, your report has to be in English

How?

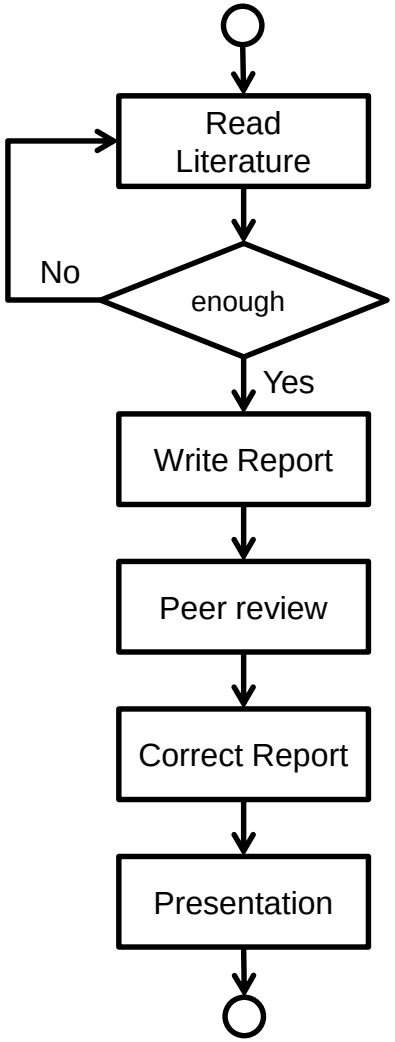
- Register in TUCaN
- Register for the Moodle course

When?

- **October 17 (now)**
  - Introduction
  - Topic presentation
  - Tutorial: Working with Literature
- October 24
  - Topic selection deadline
- November 28
  - First version of your paper
- December 5
  - Submission of review
- January 16
  - First version of your presentation
  - **Final version of your survey**
- January 30
  - Presentation of your work

- Meetings with your advisor

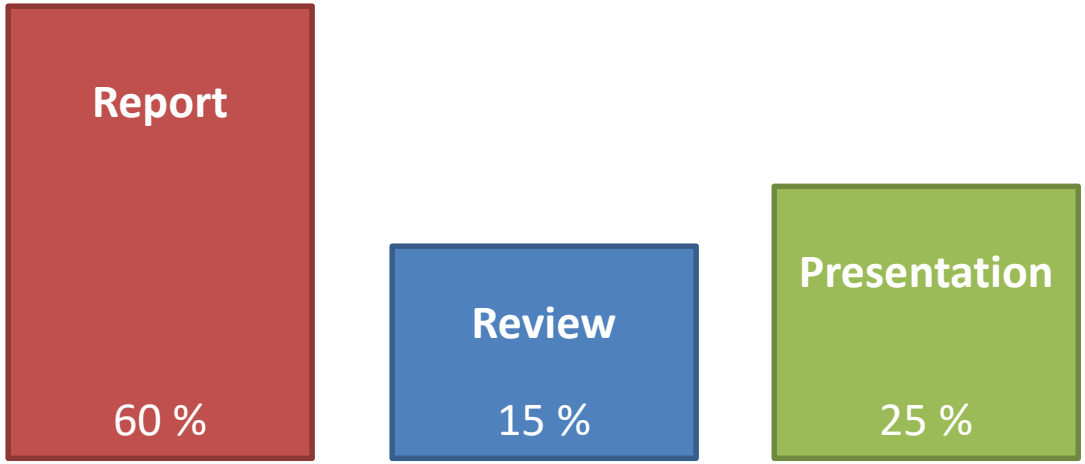
5 Steps to Success



1. Pick a topic, read the provided literature and **find more literature**
2. Write an overview or state-of-the-art survey
   - This is more than a simple paper collection!
3. Peer-Review process
   - Your report will be reviewed by a colleague and by your advisor
   - You will review a colleague‘s report
4. Correct and improve your report following the reviewer‘s comments
5. Give a presentation on your report

Evaluation and Grading

- You get **3 graded credit points** for
  - Your report: **8 - 10 pages** IEEE transactions style paper (find templates on the course web page)
  - Your peer review
  - Your presentation: 12 minutes + 5 minutes of discussion



You need to pass all parts!

Evaluation and Grading Detail

Report	Review	Presentation
- Length	- Summary	- Time management
- Structure	- Positive aspects	- Content
- *Content*	- Negative aspects	- Presentation style
- Quality of references	- Recommendations	- Structure

Report

60 %

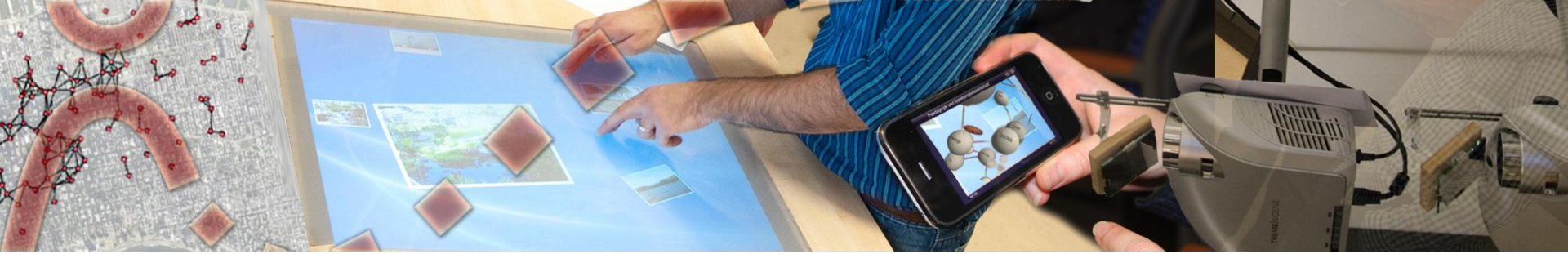
Review

15 %

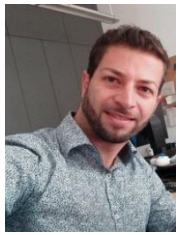
Presentation

25 %

You need to pass all parts!

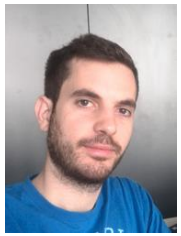


Seminar Topics









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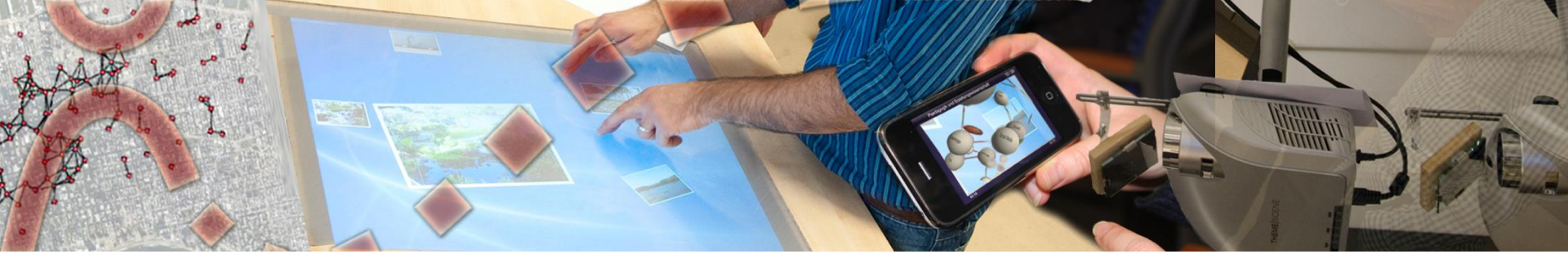

Organized crime prevention and network scanning tools (2 topics)

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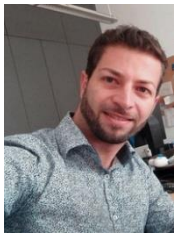

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Elaborate on effective and efficient prevention approaches and technological concepts in the context of OC and TN

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Motivation

- ***Organized Crime*** (OC) and ***Terrorist Networks*** (TN) are major threats for the European Union and its population.
- ***New technology*** opens opportunities for ***new crimes*** and research has shown that the number of ***Cyber crimes has increased.***
- As a consequence, the **technological dimensions of Organized Crime** and **Terrorist Networks** become more and more relevant.

Elaborate on effective and efficient prevention approaches and technological concepts in the context of OC and TN

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Objectives

- To identify and analysis **prevention approaches** and related **technological concepts (non-digital**: models, methodologies, techniques and; **digital solutions:** software, public security services, etc.) in the field of **Organized Crime** and **Terrorist Networks**.

Task

The specific task that needs to be accomplished consists of a ***survey*** on the *exploration*, *identification* and *comparison* of ***Prevention Approaches*** *and* ***Technological concept*** *in the context of* ***TN and OC.*** *Specifically*

- *On elaborate* on effective and efficient prevention approaches and technological concepts, which have already been developed in this field.
- This comprehensive analysis needs to provide the foundation for possible toolkits development, and policy recommendations.

Identification and Comparison of public scanning tools for network attack frequency analysis

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Motivation

- Currently in the Internet there are several ***automatic scanning tools available*** (e.g. Shodan or Censys) which first scan the whole IPv4 public address range (using various strategies) for various open ports in a typically distributed and random manner and then publish the results on the publicly accessible website.

SHODAN

censys

Problem

- This information can be later used for benign or malicious purposes.
- The main advantage for the potential attackers is that they gains reconnaissance data without ever directly contacting the targeted device.
- Additionally, they are also able to rapidly acquire the large list of potential victims if certain vulnerability is targeted.

Identification and Comparison of public scanning tools for network attack frequency analysis

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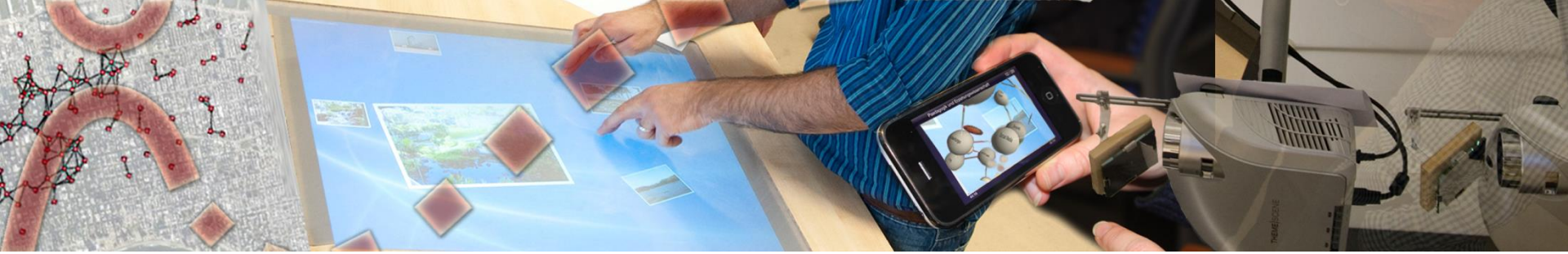
Objectives

- *To identify and analyze the available public scanning tools on network attack frequency.*

Task

The specific task to be accomplished consists of a ***survey*** on:

- the ***exploration, identification and description of the current available*** **public scanning tools on network attack frequency.**
- ***compare them by highlighting their distinguishing features*** *in terms of pro and cons and reference context*.



Human-Drone Interaction

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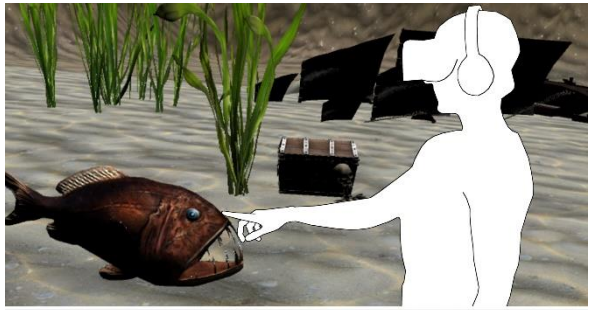
Human-Drone Interaction

- **Motivation**
  - Drones are becoming more and more ubiquitous. As for now, drones are perceived as scary or annoying. However, we believe that drones will become a daily companion of human beings, just like the mobile phone today.
- **Objectives**
  - Get an overview about an emerging topic
  - Work on something cool ☺
  - Seriously, drones are cool ☺
- **Task**
  - Literature survey about Human-Drone Interaction
  - Sketching a design space for interactions with drones



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- Cauchard, Jessica R., Kevin Y. Zhai, and James A. Landay. "Drone & me: an exploration into natural human-drone interaction." *Proceedings of the 2015 ACM international joint conference on pervasive and ubiquitous computing*. ACM, 2015.
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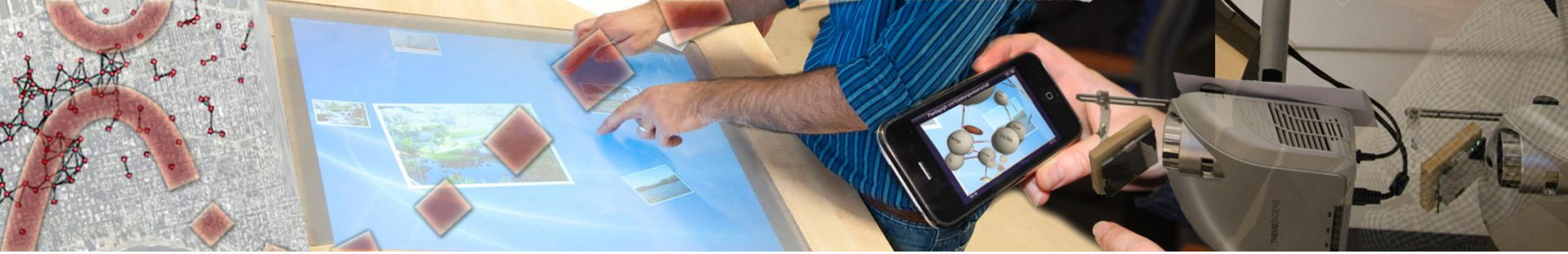

Modeling IoT devices and critical infrastructures

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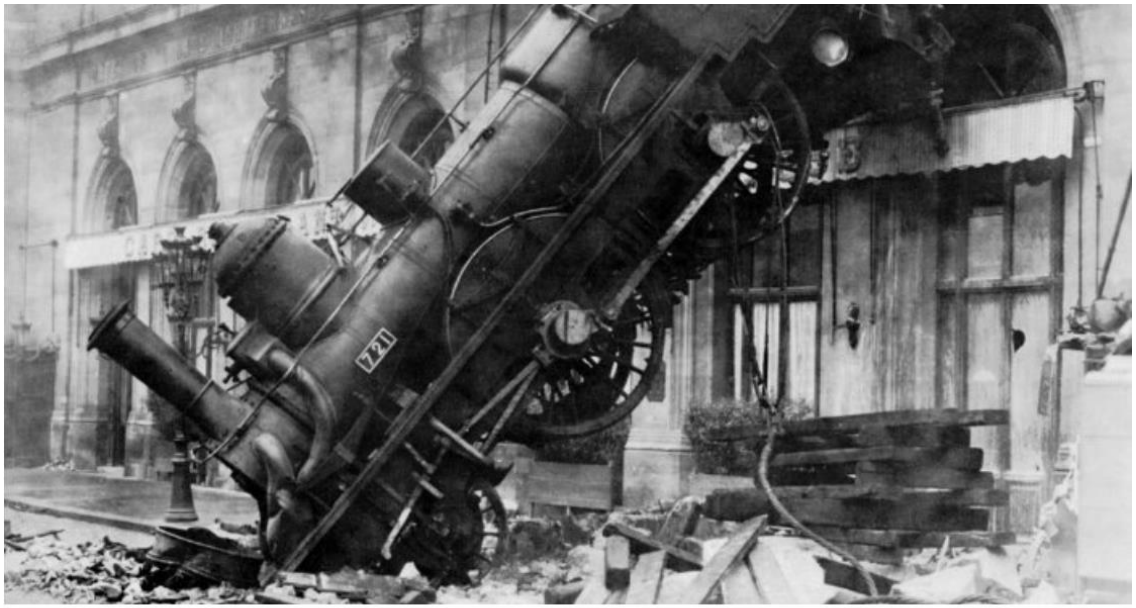
Modeling IoT Devices in Smart Home Environments



The Internet of Things: Will it Kill Us?

Published on April 7, 2016

Jim Simons, PMP | Follow
Senior Project Manager, PMP, ITIL certified

0 3 0

- Number of IoT-Devices is our daily life is increasing.
- The number of problems in the IoT domain is increasing as well…

To come up with new solutions, the problems need to be identified.

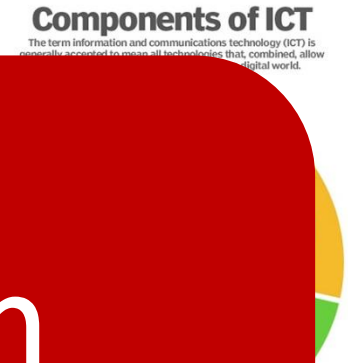
Additionally, models of IoT-Systems need to be generated to make novel solutions applicable

Modeling IoT Devices in Smart Home Environments

- **Objectives**
  - Learn about **state of the art modeling approaches for IoT-Networks in Smart Home Environments**
  - Learn about **challenges, problems and opportunities in the domain of IoT**
- **Task**
  - The specific task that needs to be accomplished, is a survey on the identification and comparison of the **state of the art modelling approaches and techniques for IoT Networks in Smart Home Environments**

Modeling Critical Infrastructures and Systems

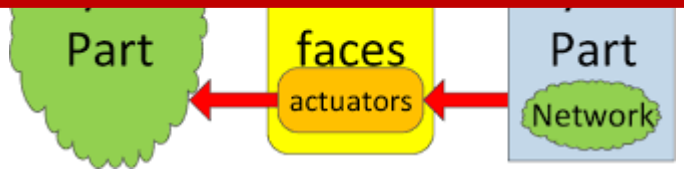
Critical Infrastructures are systems, whose continuous functionality is essential for our daily life.



Good System Model required!

Cybe

System (CPS)



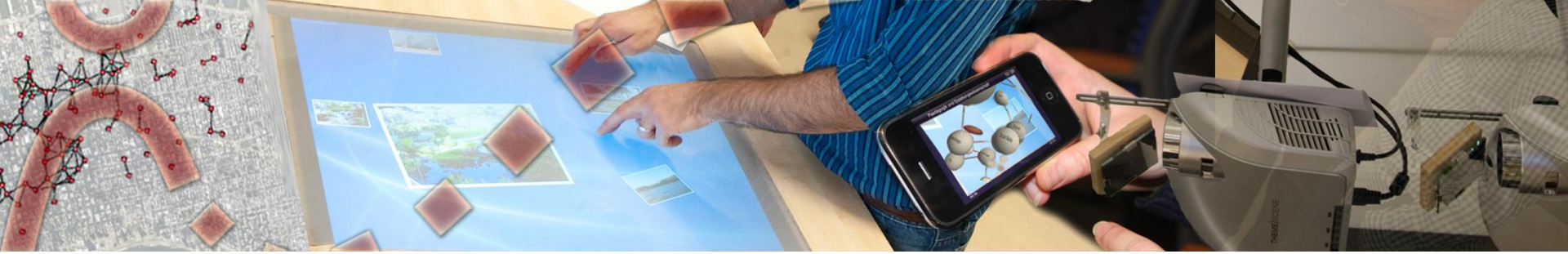
Monitoring

y CS to solve
blems in Physical
Networks

...etc

Modeling Critical Infrastructures and Systems

- **Objectives**
  - Learn about **state of the art modeling approaches for critical infrastructures**
  - Learn about **challenges, problems and opportunities in the domain of CPS**
- **Task**
  - The specific task that needs to be accomplished, is a survey on the identification and comparison of the **state of the art modelling approaches and techniques for critical infrastructures**



Explainable Machine Learning / AI

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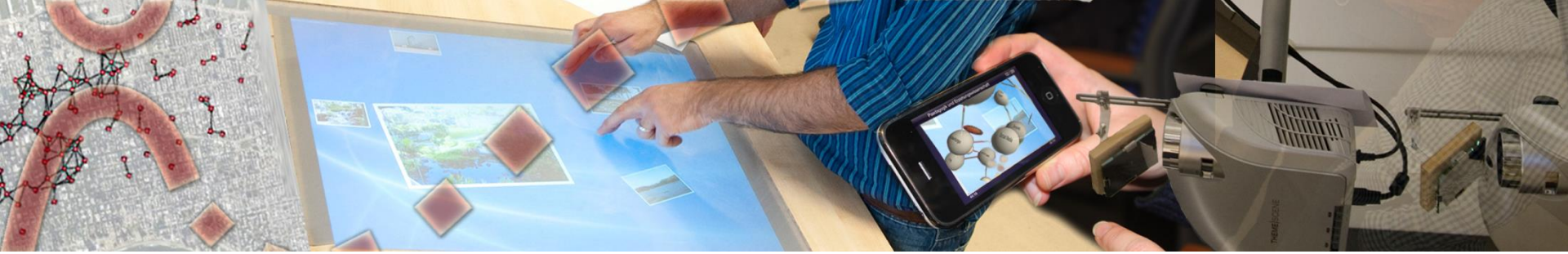
Explainable Machine Learning / AI

- **Motivation**
  - Machine Learning and Artificial Intelligence Systems are everywhere and everybody (?) rely / trusts their outcome
  - However: most ML and AI systems are a black-box
  - But why don't by explain themselves?
- **Objectives**
  - Learn about Machine Learning / AI
  - Learn about methods / approaches to explain ML and AI
- **Task**
  - The specific task that needs to be accomplished consists of a survey on the *identification* and *comparison* of:
    - **Types of explainable Machine Learning / AI**
    - **Summarize models and approaches** for explainable ML / AI



Botnets, zombies and money

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Botnets, zombies and money

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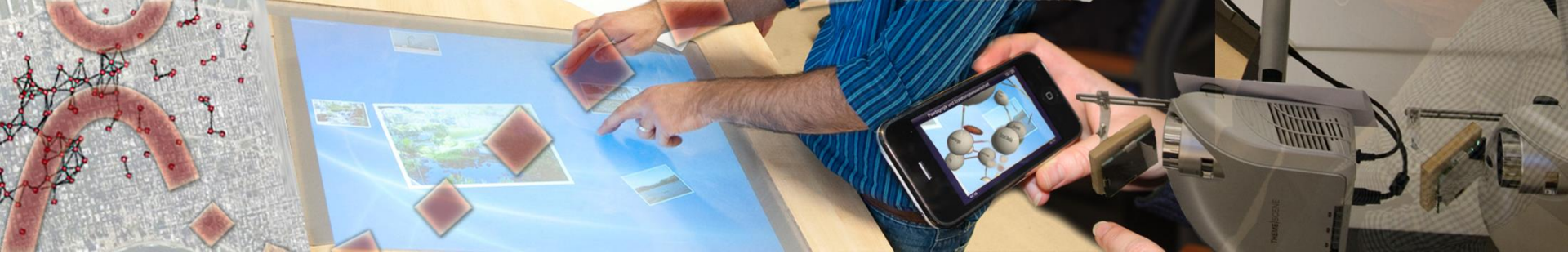
- **Motivation**
  - Botnets are bad, like really bad
  - Novel techniques to take them down are n

- **Objectives**
  - Mitigation *beyon*
  - What happens when the ec bombers attacked?
- **Task**
  - Survey: what has been done up to now?
  - Future: outline ideas for future work



Edge Computing & IoT: challenges regarding security & trust

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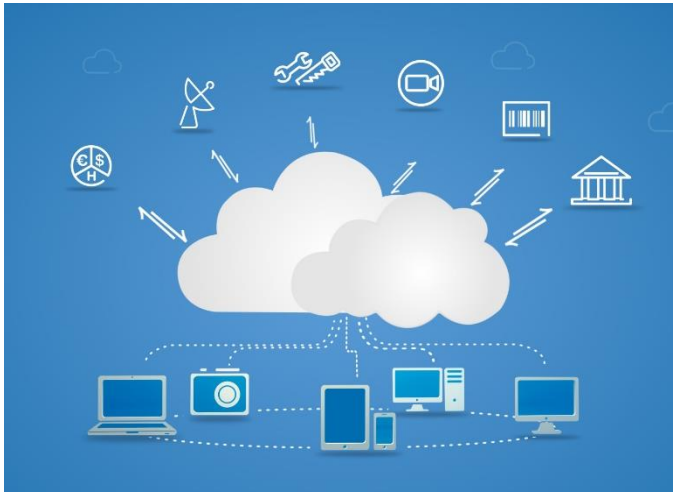
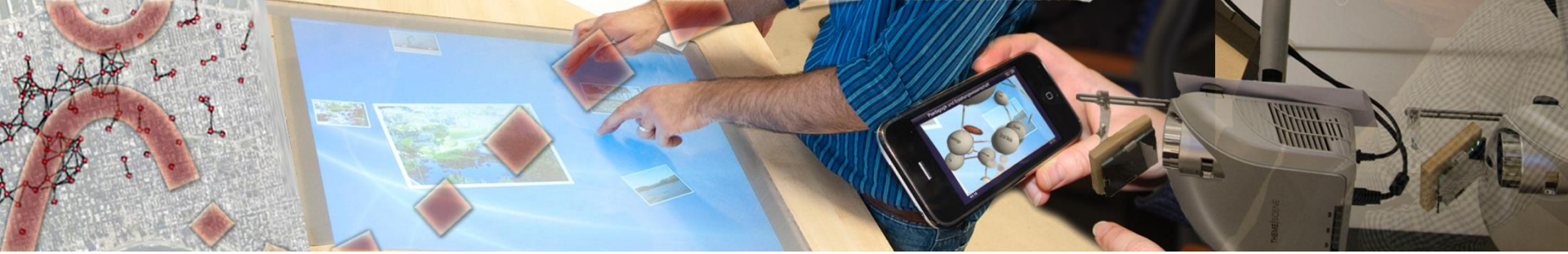
Edge Computing & IoT: challenges regarding security & trust

- **Motivation**
  - Better application performance and quality of experience
    - Faster response time between applications and devices
- **Objectives**
  - What will the student get out of this?
    - In-depth knowledge on a hot topic
    - Learn to do research & writing scientific articles
    - Opportunity of a thesis/project



- **Task**
  - A critical review on S&T challenges considering
    - Emerging technologies: Network Function Virtualization (NFV) & Internet of Things (IoT)



Decentralized authentication with the Blockchain

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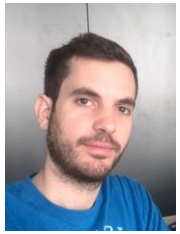

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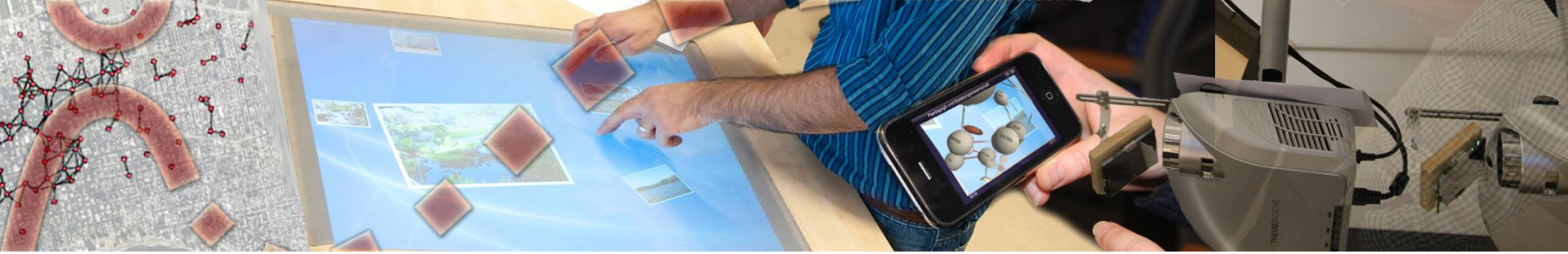
Decentralized authentication with the Blockchain

- **Motivation**
  - Auth
  - Existi ve well-docu
  - That can lead to attacks!

Decentralized authentication with the Blockchain

- **Objectives**
  - Categorize existing solutions that make use of blockchain technology for secure authentication.
  - Pinpoint their limitations.
- **Task**
  - Study papers provided by the supervisor
  - Pinpoint other related work
  - Compare different approaches
    - Identify relevant properties
    - Create a comparison table



How to work with Literature and write Scientific Material

by

Florian Volk

Carlos Garcia C.

Rolf Egert

And

Nikolaos Alexopoulos

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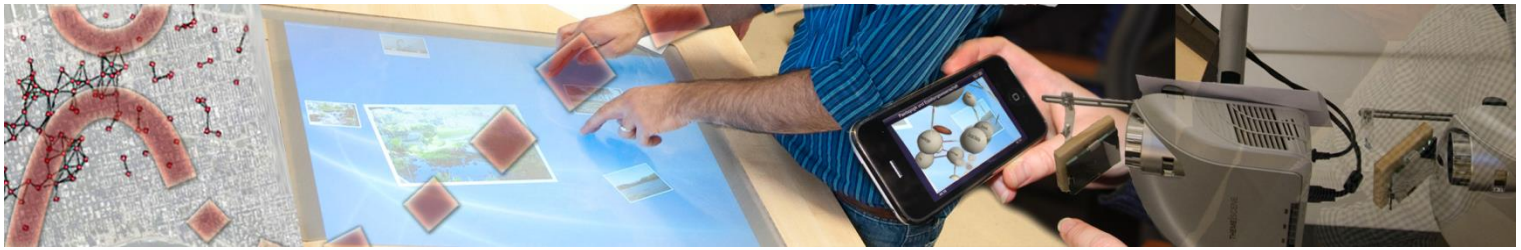


CONTENT

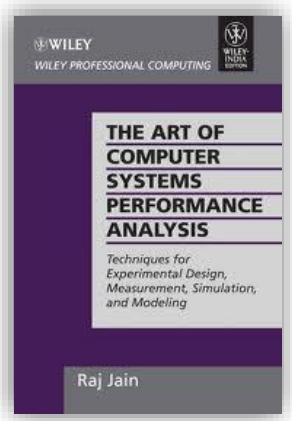
- What’s a scientific publication?
- Finding (good) references
  - Correct referencing
- Writing your own paper
- Peer-Reviews

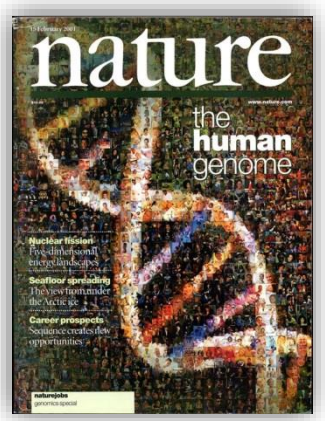
* parts of this slide set are based on material provided by Guido Rößling

What's a scientific publication?

- Scientific Publication ➡ a message
  - With scientific background
  - Offer a new *insight* of a scientific problem
    - Solution
    - Problem
    - Criticism
  - OR a survey of a research field

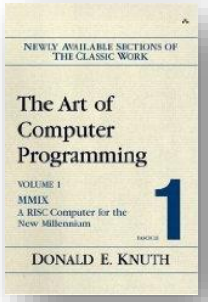
- Scientific Survey
  - Quality of the survey directly proportional to the quality of the surveyed material
  - Doing a survey is about balancing exploitation and exploration
    - Exploit: Continue digging into good literature
    - Explore: Try to find new things





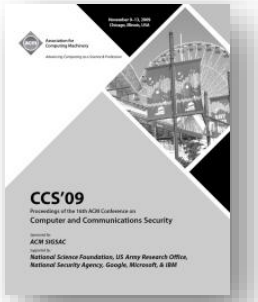
Types of Publications

- Books
  - Survey (mostly) about a topic



- Journal Articles
  - Collection of related topics into one magazine (the journal)
  - Quality mostly depends on the Journal
  - Rankings: http://www.core.edu.au/index.php/
    Good Journal → Good Article

- Conferences and Symposia
  - The most recent research achievements
  - Strict page limits
  - Papers followed by a presentation
  - Quality is usually connected to the Conference
  - Rankings: http://www.core.edu.au/index.php/
    Good Conference → Good Paper



- Workshops
  - Mostly for work in progress
  - Good for discussing new ideas

Referencing and Plagiarism

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- **Refer back to the original source of information**
  - For others to identify the foundations of your work
  - Giving credit, when credit is due

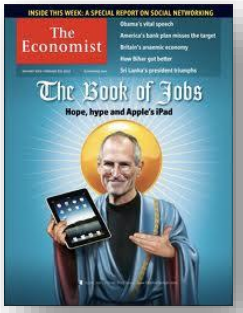
    Not doing so is REALLY bad practice, A.K.A. **plagiarism**
  - Grundregeln der wissenschaftlichen Ethik am Fachbereich Informatik

- All documents will be checked with a plagiarism checker
  - With your participation you automatically agree to this check
  - The Alpha version (first draft) of your final report will be checked and feedback will be provided to make the necessary corrections
  - Don‘t worry, if you avoid bad practices like **copy-pasting**, there should be no problem

What should I reference?

- Scientific publications
  - Articles, papers, books
- Standards
  - RFC, ITU, IEEE, W3C etc.

+ All other non-scientific sources
  - Surveys
  - Magazines
  - Reports



  - Can I reference Wikipedia?

➡ NO: no reliable (or stable) information sources

WIKIPEDIA
The Free Encyclopedia

Making scientific claims

- Every claim you make in your survey must satisfy one of the following
  - Is proven through your own results
  - Is general knowledge (e.g., most people have mobile phones)
  - Is supported by previous work (**citations**)

An unsubstantiated claim can kill a paper

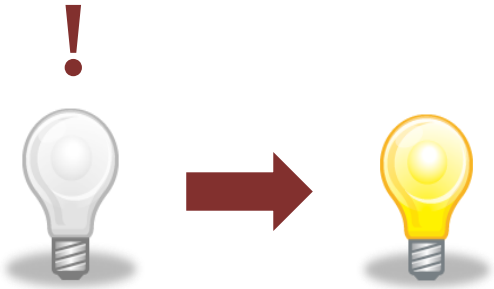
Writing a Scientific Publication

1. First, define the message
   - Objective of your publication
   - ➡ define the area of research
2. Read the related work
   - Define the work around your work
   - Finding out what has been done
3. Survey the related work
   - Evaluate differences
   - Identify trade-offs
   - Create a Storyline
4. Write your publication

- Storyline
  - What is the plot of your survey?
    - Connect each idea with the next in a sensible way
    - Find common links

1. Your Work, Your Message

- Finding the message
  - The most difficult part (!)
  - Also, the creative one
    - go beyond the state of the art
  - Communicate your message with science
    - Find the scientific foundations
    - Identify the challenges



2a. Related Work? Where? How?

- Related Work? Where?
  - For the initial literature ask your supervisor

    ➡ it will give you a broad idea about the area

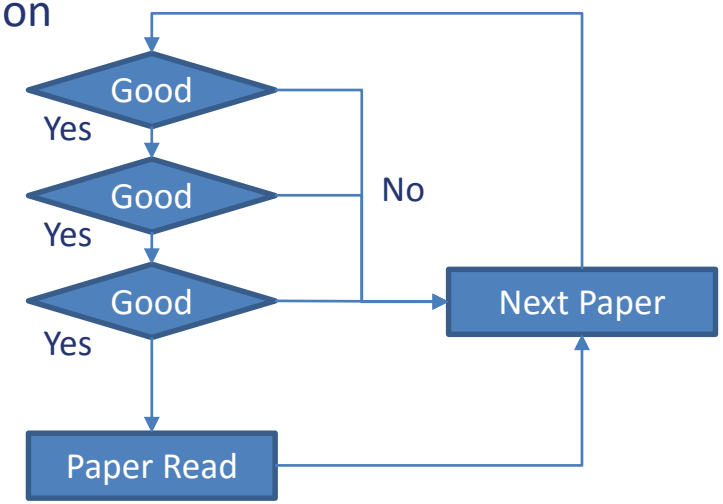
  - Check publication repositories
    - ACM Digital Lib http://portal.acm.org/portal.cfm
    - IEEE Xplore http://ieee.org/portal/site
    - **Google Scholar** **http://scholar.google.com**
    - Conference directories http://www.dblp.org/search/
    - Authors' home pages

  - Other sources from the reference lists

REPEAT

2b. Related Work and Relevance

- Related Work → ∞
  - Identify the relevant sources
  - Evaluating the importance of a publication
    1. Read the abstract
    2. Check the reference list
    3. Read the conclusions
    4. Read the rest



- Related work will
  - Compare your results against their results
  - Be used as input for a survey

3. Referencing: doing it right

- A reference looks like this:

authors

[26] L. A. Martucci, M. Kohlweiss, C. Andersson, and A. Panchenko, "Self-Certified Sybil-Free Pseudonyms," in *Proceedings of the 1st ACM Conference on Wireless Network Security (WiSec'08)*. ACM Press, Mar 31 – Apr 2 2008, pp. 154–159.

title

publisher

date

page number

how was it published (proceedings)

- there are also other reference styles
- if you use LaTeX to write your report, have a look at BibTeX.

4. Write your Publication

- Always have a good paper structure
  - Organize your ideas
  - Organize your papers

  Define it BEFORE starting to add text

  - Plan the content of each section

- Writing skills
  - No one learns without doing it
  - General Guidelines:
    - Be concise
    - Be precise

Peer-Reviews

- What to Write
  1. Short summary of the survey
  2. Strong aspects of the work
     - What did you like?
     - Anything exceptional worth mentioning?
  3. Weak aspects of the work
     - Anything wrong that caught your attention immediately?
  4. Recommended changes to be made
     - Offer suggestions to improve what you have read

→ All bullets necessary for full points

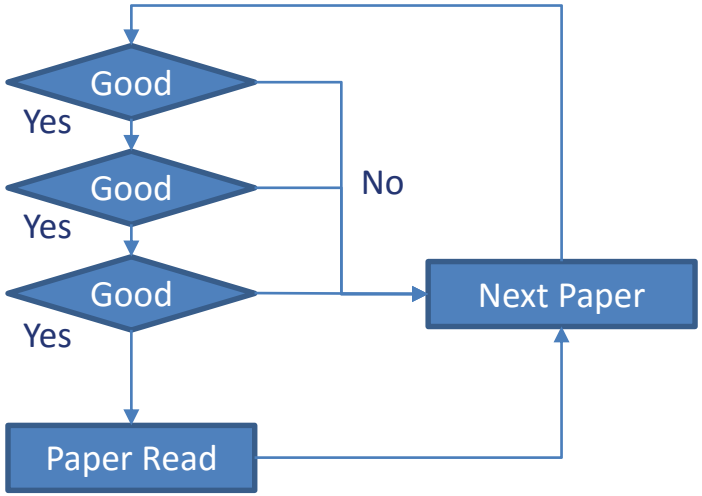
- It is NOT the reviewer's work to
  - … correct the publication
  - … point out all typo-s, grammar and spelling mistakes

Summary

- A scientific publication is a **message**; a **validated claim**

- Refer to the original source of information, **avoid plagiarism**

1. Read the abstract
2. Check the reference list
3. Read the conclusions
4. Read the rest



- The peer-review should help, not criticize

Thank you!

- Don’t forget:
  - Register in TUCaN
  - **Follow the course in moodle**