SPWAL Research Projects

Context and Processes for the Fall Term 2018/19

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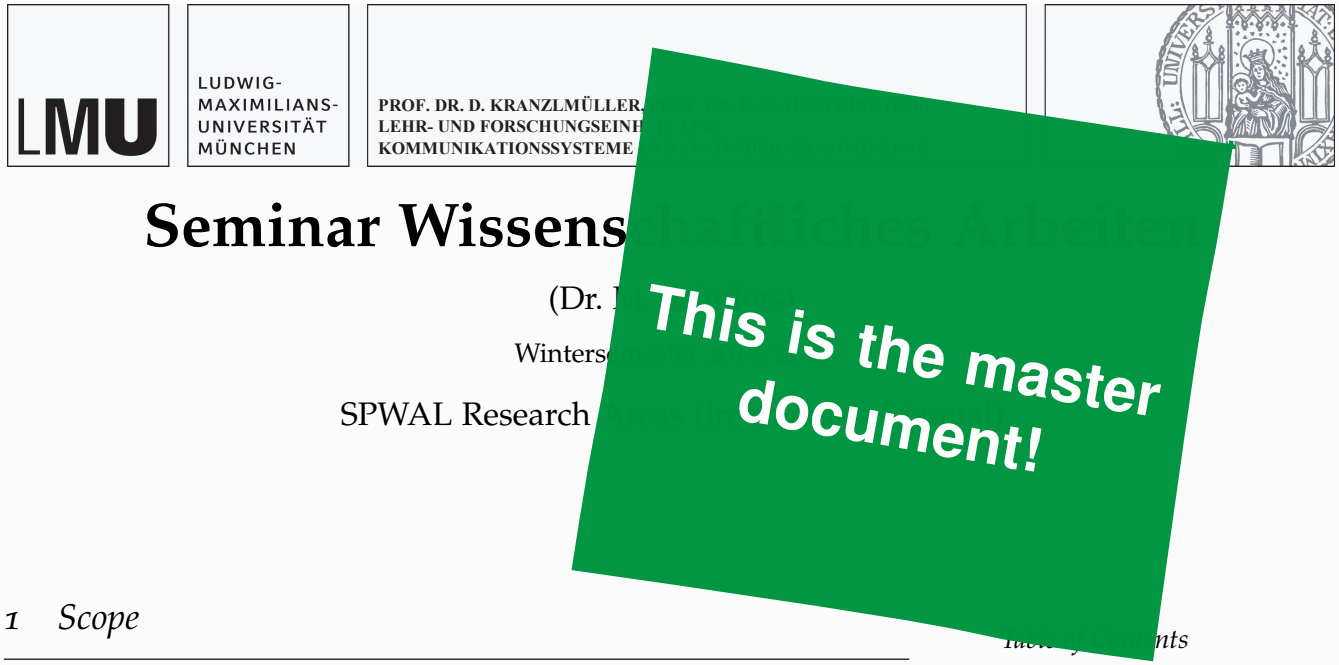
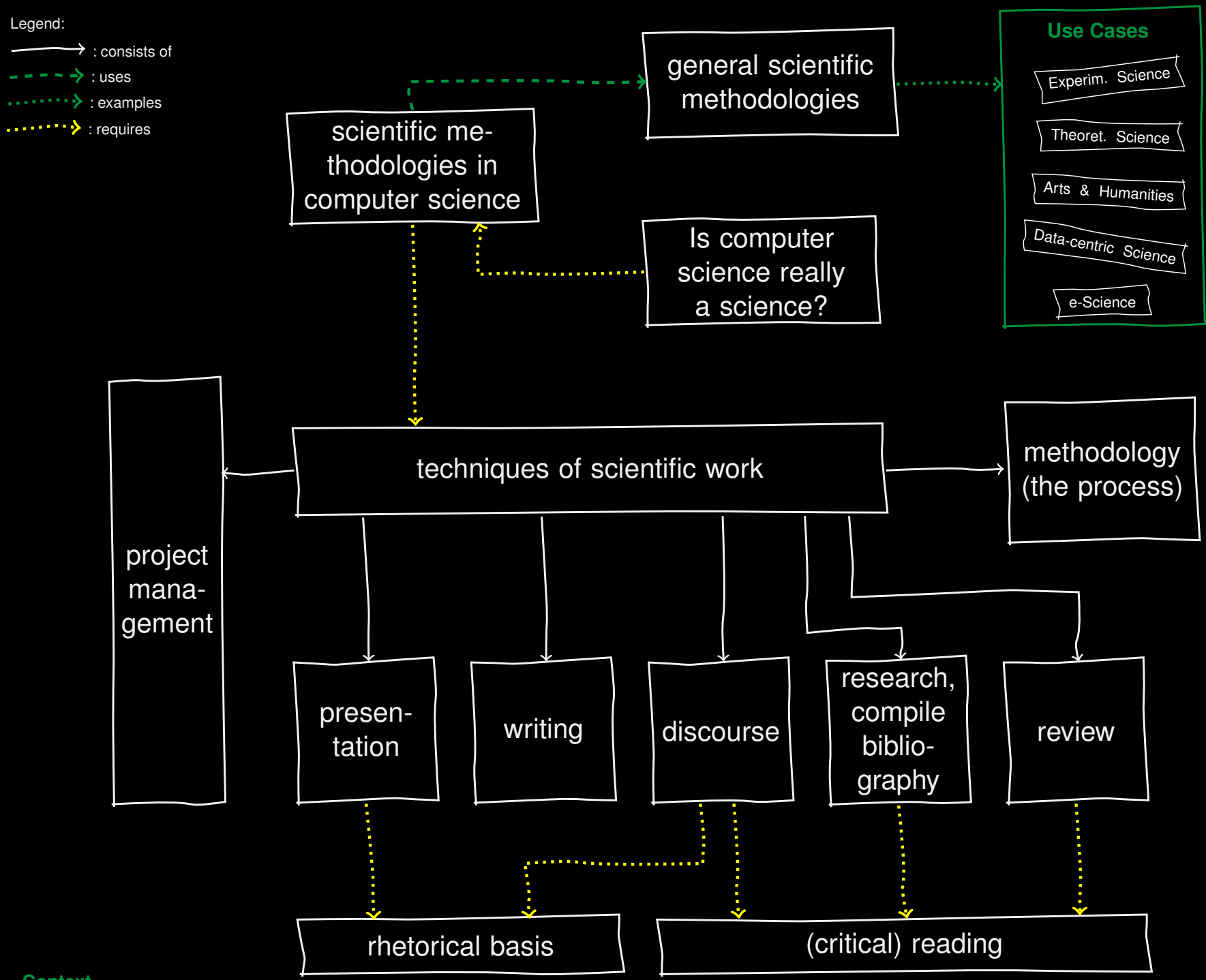
Munich Network Management Team (MNM)

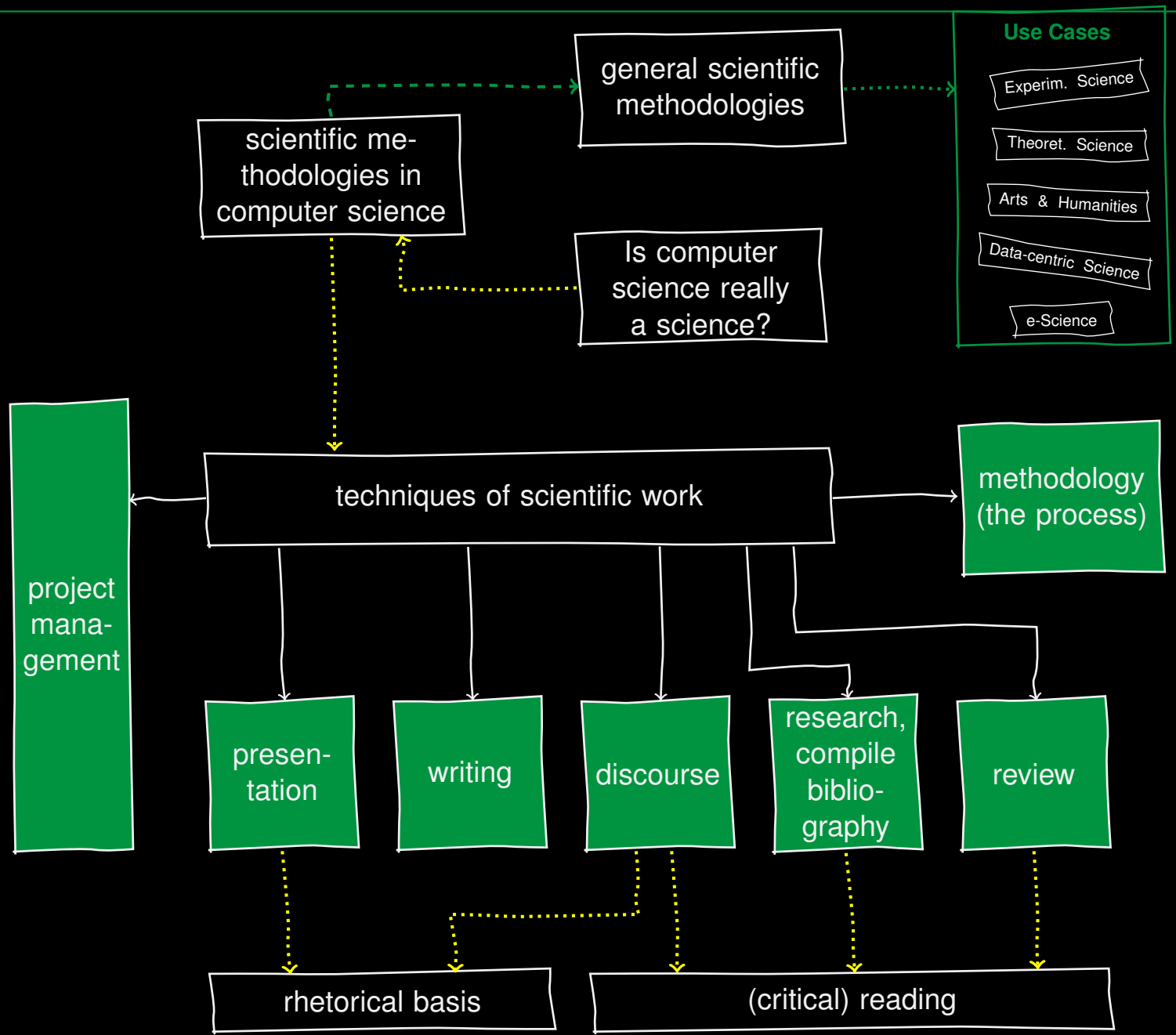
This Presentation is a Short Summary of . . .



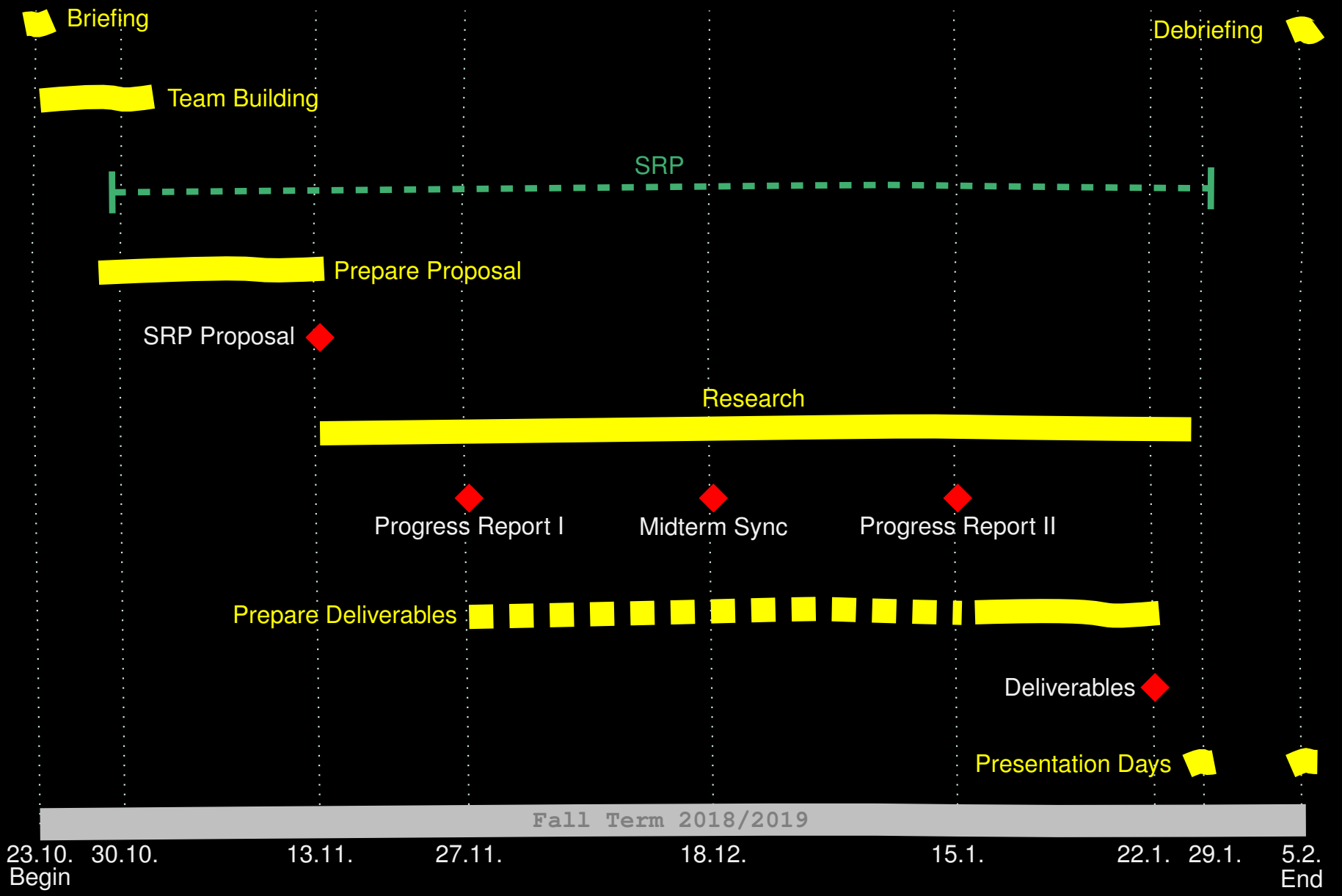
To pass SPWAL successfully, you have to participate in and contribute to an SPWAL Research Project (SRP). An SRP is defined within the scope of an SPWAL Research Area (SRA). All SRPs aim at conducting specific research studies on a topic induced by the (more general) SRA. Unless otherwise stated, SRPs result in a technical report – (more or less) suitable for a later publication – and a final presentation of the project achievements and methodologies.


Legend:
: consists of
: uses
: examples
: requires
scientific methodologies in computer science
general scientific methodologies
Use Cases
Experim. Science
Theoret. Science
Arts & Humanities
Data-centric Science
e-Science
Is computer science really a science?
techniques of scientific work
methodology (the process)
project management
presentation
writing
discourse
research, compile bibliography
review
rhetorical basis
(critical) reading

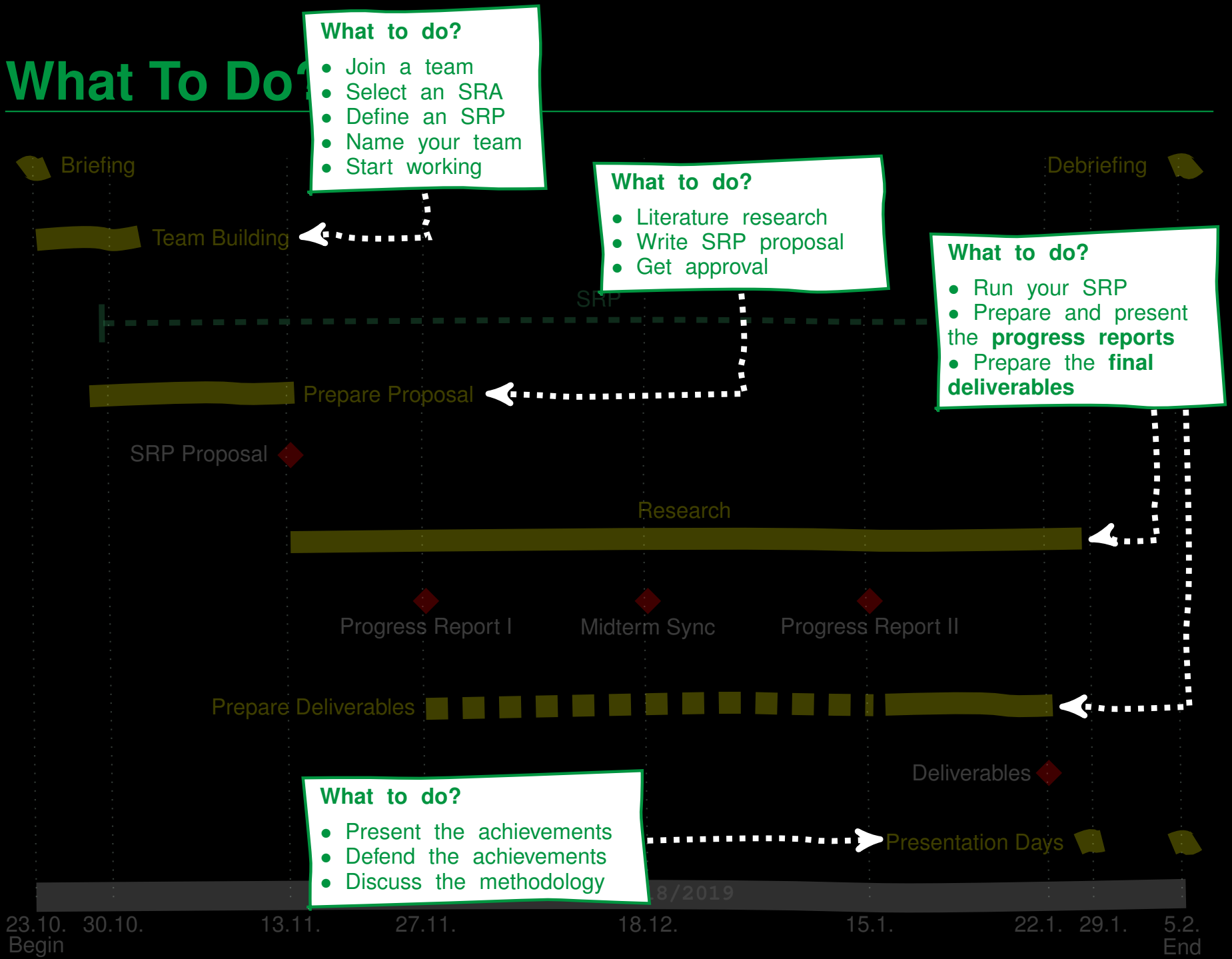
In Your Project You Will Touch . . .



Gantt Chart


Briefing
Debriefing
Team Building
SRP
Prepare Proposal
SRP Proposal
Research
Progress Report I
Midterm Sync
Progress Report II
Prepare Deliverables
Deliverables
Presentation Days
Fall Term 2018/2019
23.10.
Begin
30.10.
13.11.
27.11.
18.12.
15.1.
22.1.
29.1.
5.2.
End

What To Do?


What to do?
• Join a team
• Select an SRA
• Define an SRP
• Name your team
• Start working
What to do?
• Literature research
• Write SRP proposal
• Get approval
What to do?
• Run your SRP
• Prepare and present the progress reports
• Prepare the final deliverables
What to do?
• Present the achievements
• Defend the achievements
• Discuss the methodology
Briefing
Team Building
SRP
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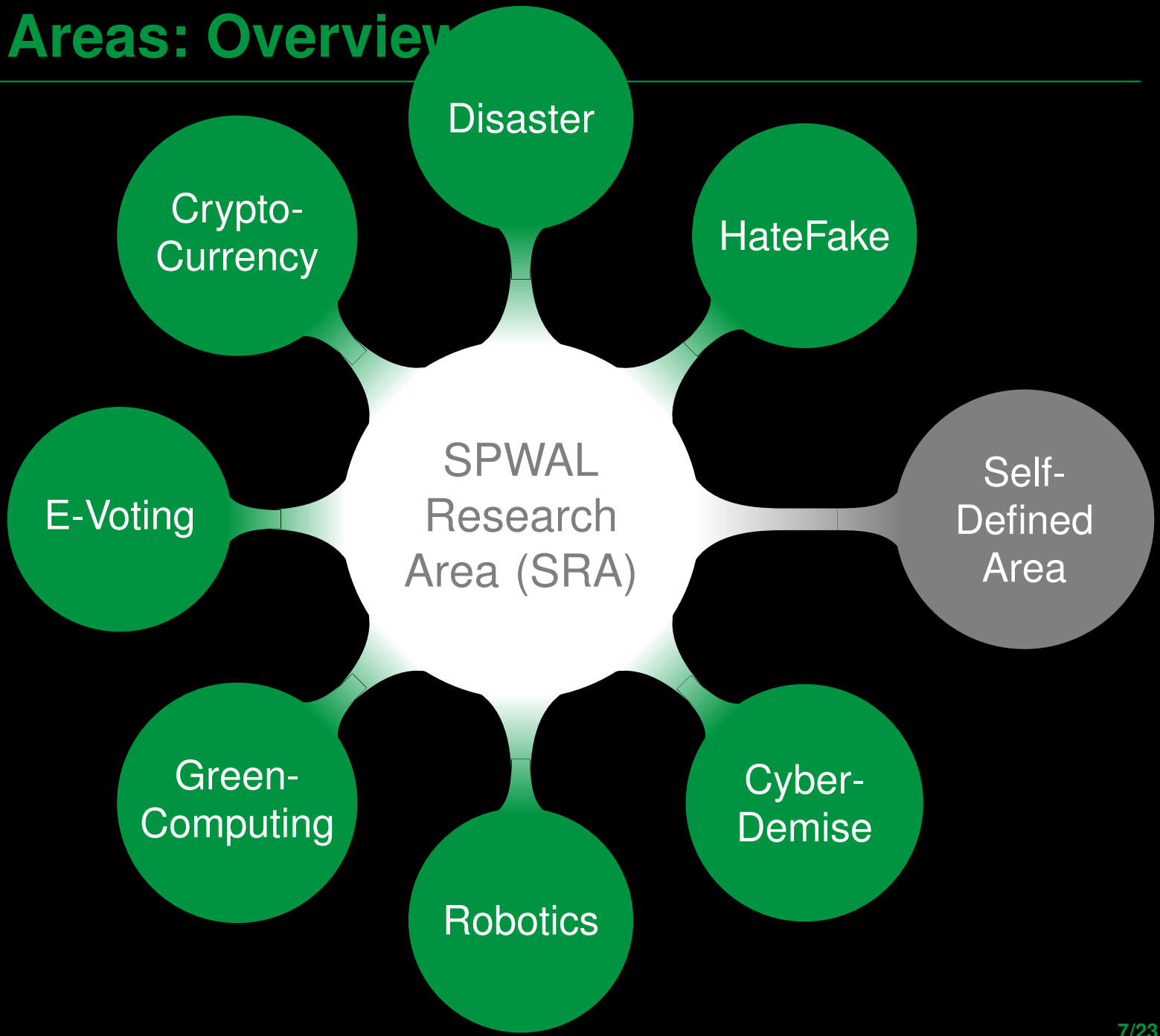
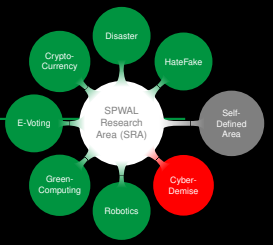
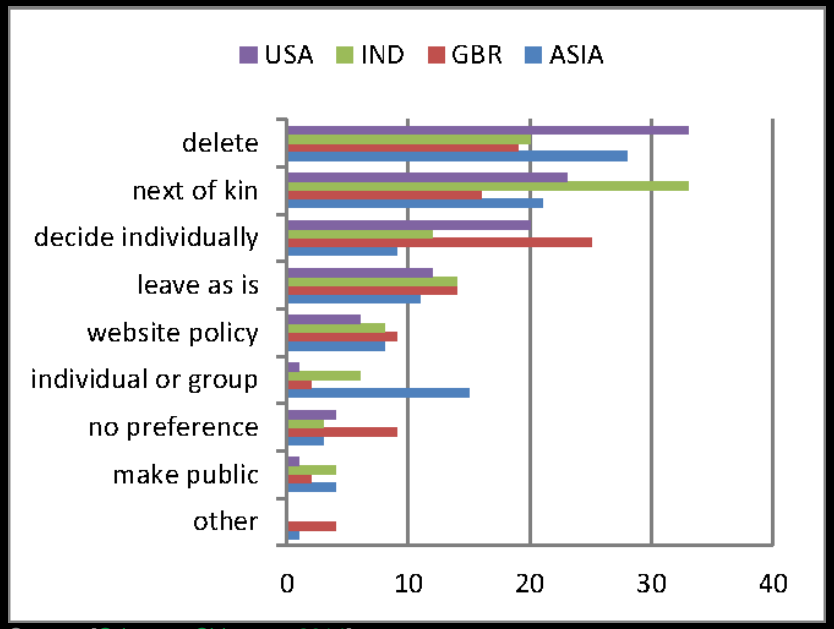
Project Areas: Overview



Area 1: CyberDemise

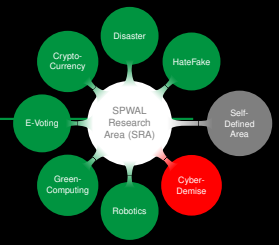


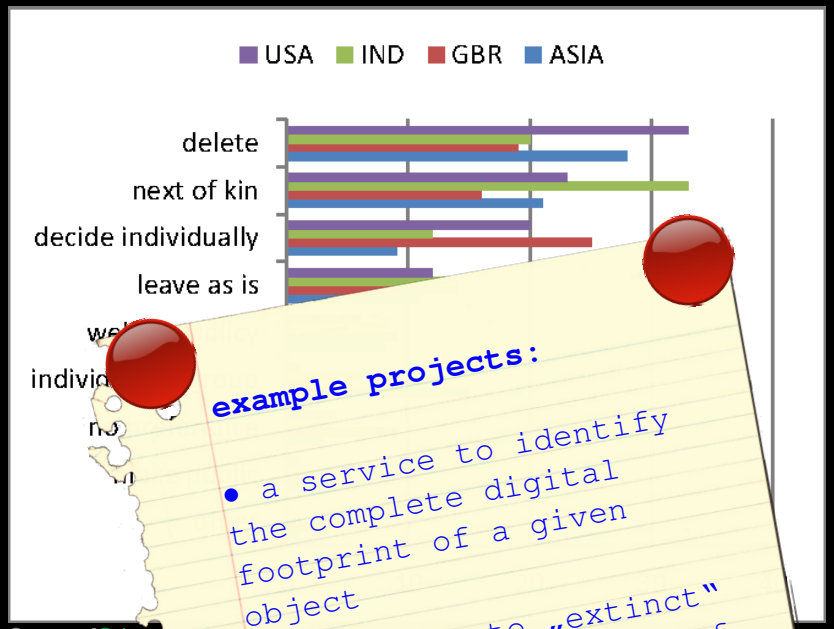


Source: [Grimm u. Chiasson, 2014]

- Observation
  - Longevity of digital footprints
- Questions
  1. What happens to this information in case of demise?
     - real death
     - virtual death
  2. How to make provision?
  3. Inherit? Bequeath?

Area 1: CyberDemise





Source: [Grim

example projects:

- a service to identify the complete digital footprint of a given object
- a service to „extinct" the digital footprint of a given object
- a role model for managing „digital heritage" with all related obligations and benefits
- ...

- Observation
  - Longevity of digital footprints
- Questions
  1. What happens to this information in case of demise?
     - real death
     - virtual death
  2. How to make provision?
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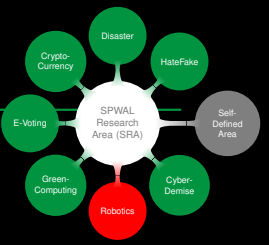
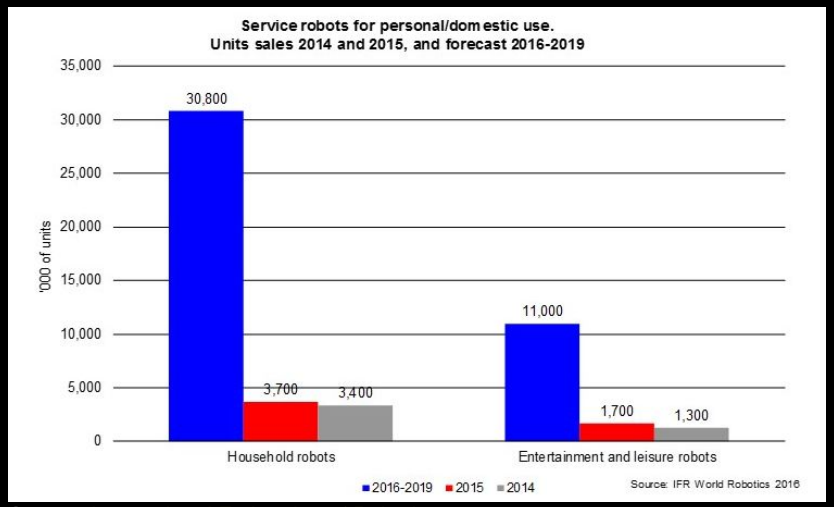
Area 2: Robotics

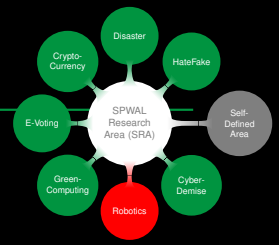


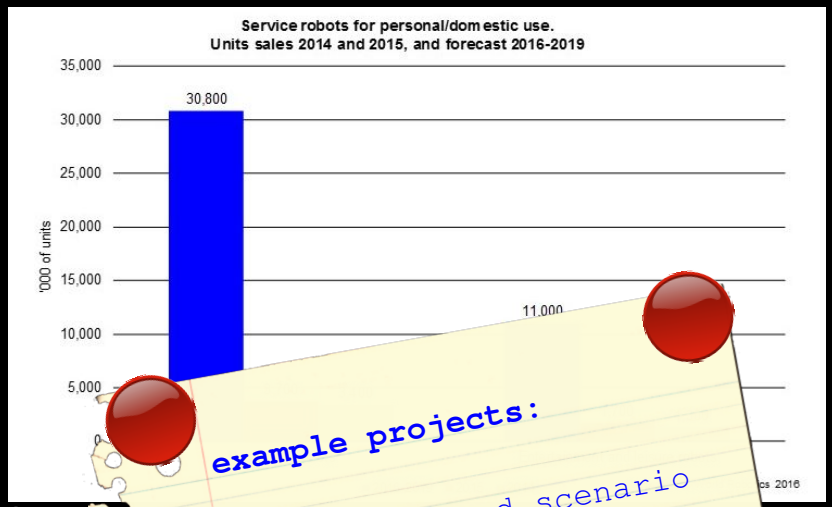


Source: International Federation of Robotics

- Observation
  - Robots are increasingly impacting modern life
- Questions
  1. Where and how will they succeed?
  2. Where and why will they fail?
  3. How could we „co-live“ in the future?
     - How to implement Asimov’s Laws of Robotics?

Area 2: Robotics





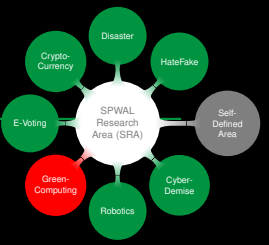
Source: Int

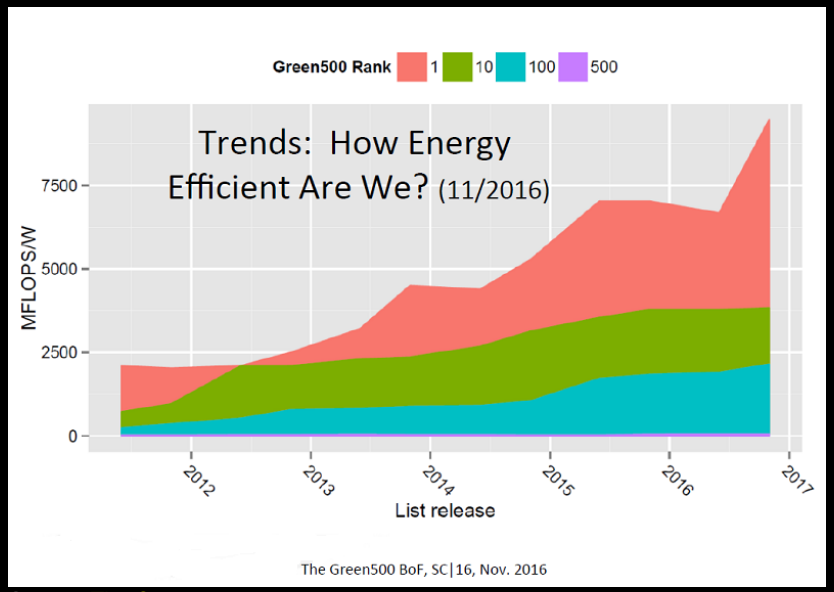
example projects:

- an elaborated scenario for cooperative autonomous underwater drones
- a deep learning approach to detect plagiarism
- a methodology to detect violations of Asimov's Laws of Robotics
- ...

- Observation
  - Robots are increasingly impacting modern life
- Questions
  1. Where and how will they succeed?
  2. Where and why will they fail?
  3. How could we „co-live“ in the future?
     - How to implement Asimov's Laws of Robotics?

Area 3: GreenComputing

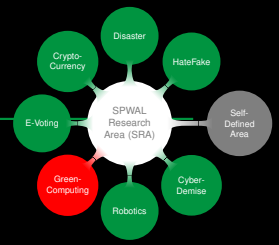


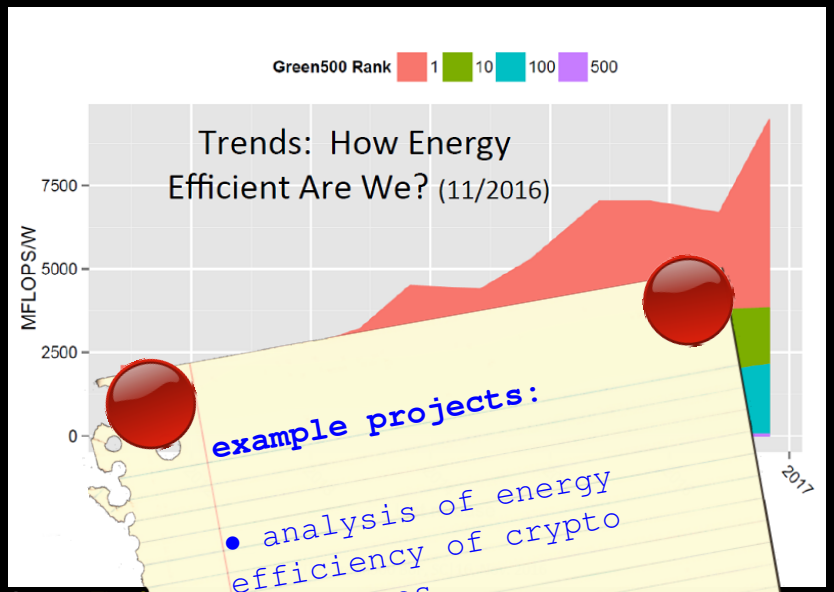


Source: The Green 500

- Observations
  - Large data centers have high energy footprint
  - E-waste is increasing
- Questions
  1. How to reduce energy consumption?
     - in the small (wireless sensors)
     - in the large (ultrascale)
  2. How to avoid e-waste?

Area 3: GreenComputing





Source: The G

example projects:

- analysis of energy efficiency of crypto techniques
- nano data centers versus traditional data centers
- proposal of an e-waste exchange service and its simulation
- ...

- Observations
  - Large data centers have high energy footprint
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- Questions
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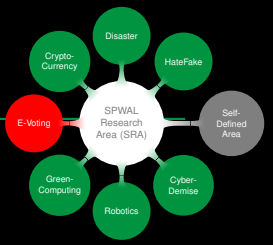
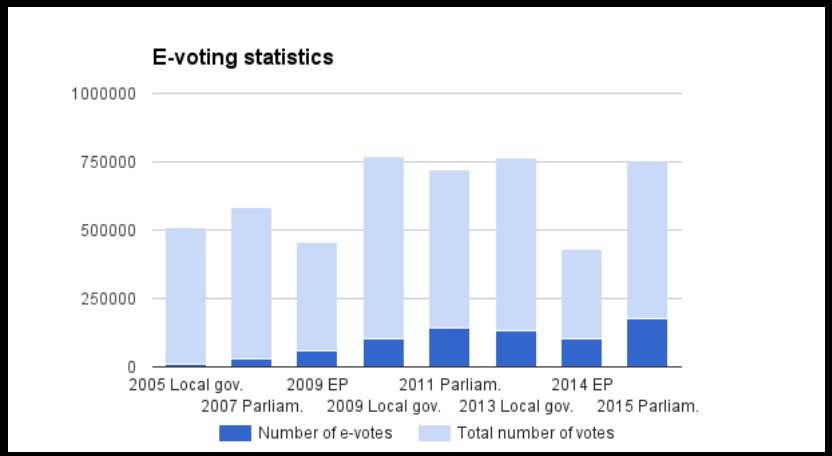
Area 4: E-Voting

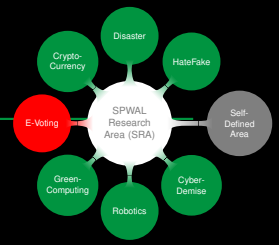




Source: University of Tartu, Estonia

- Observations
  - Election processes are increasingly digitized
- Questions
  1. How to secure e-voting systems?
  2. How to manage damages?
     - attacks
     - partial malfunctions
  3. How to achieve „everlasting privacy“?

Area 4: E-Voting



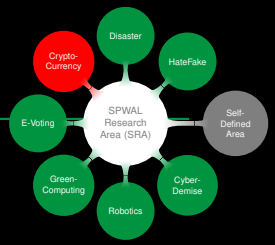
Source: Uni

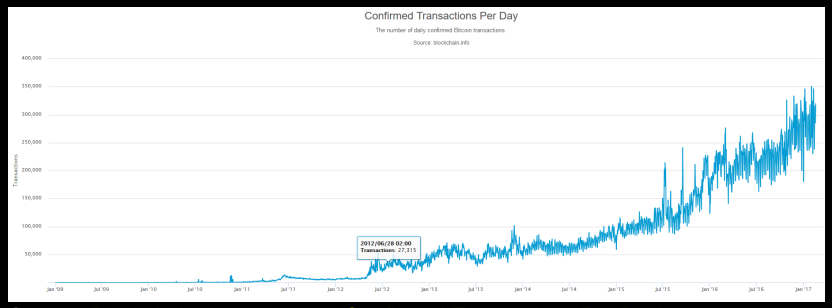
example projects:

- attack an e-voting system and propose countermeasures
- experiment with the „Helios Voting system"
- build a „Tor"-based approach to e-voting
- ...

- Observations
  - Election processes are increasingly digitized
- Questions
  1. How to secure e-voting systems?
  2. How to manage damages?
     - attacks
     - partial malfunctions
  3. How to achieve „everlasting privacy"?

Area 5: CryptoCurrency



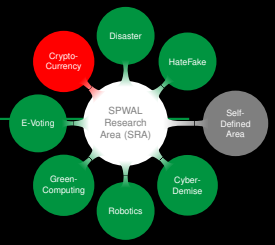


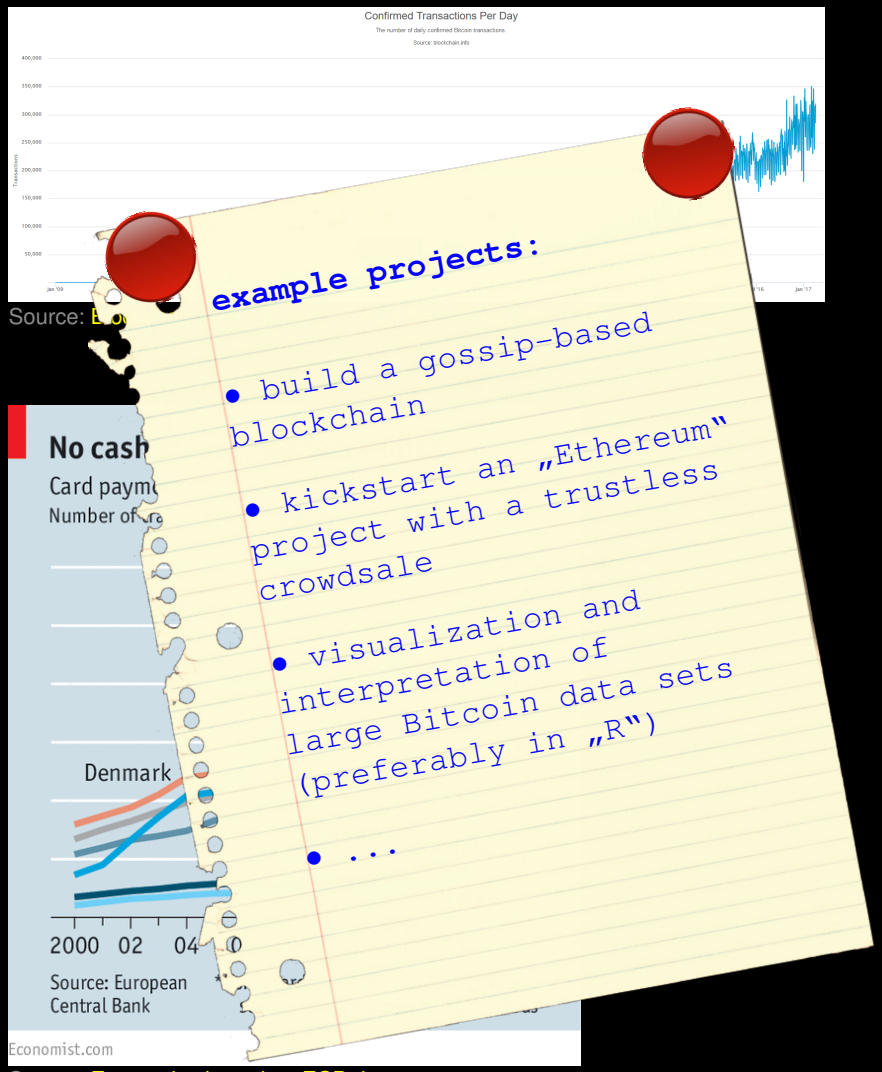
Source: Blockchain, Luxembourg (Confirmed Transactions Per Day)

Source: Economist, based on ECB data

- Observations
  - Cash-based transactions decline, cryptocurrency transactions rise
- Questions
  1. How should a digital payment platform be organized?
  2. How to implement „trust“?
  3. Which QoS-parameters are necessary?

Area 5: CryptoCurrency





Source: Economist, based on ECB data

- Observations
  - Cash-based transactions decline, cryptocurrency transactions rise
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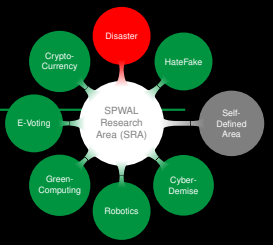
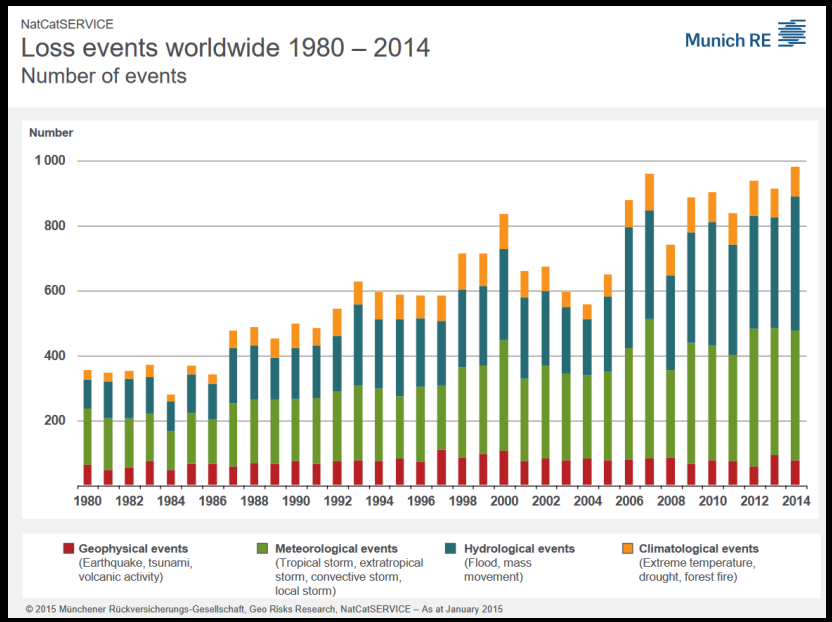
Area 6: Disaster

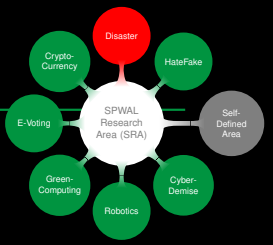


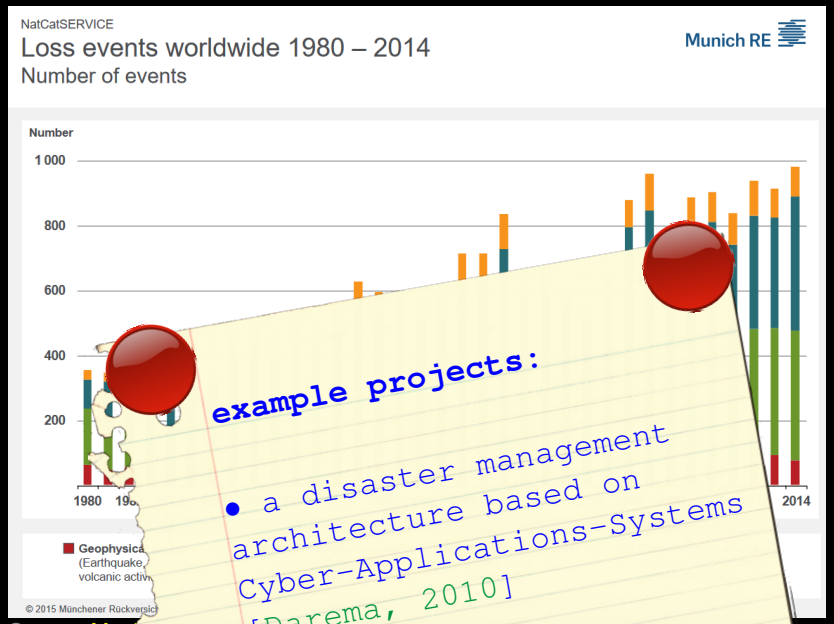


Source: Munich Re on behalf of UNISDR

- Observations
  - increasing frequency and ferocity of emergency situations around the globe
- Questions
  1. How to leverage real-time data?
  2. How to model disasters?
  3. How to protect critical infrastructures?

Area 6: Disaster





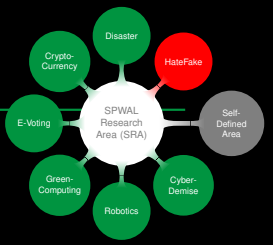
Source: Munich

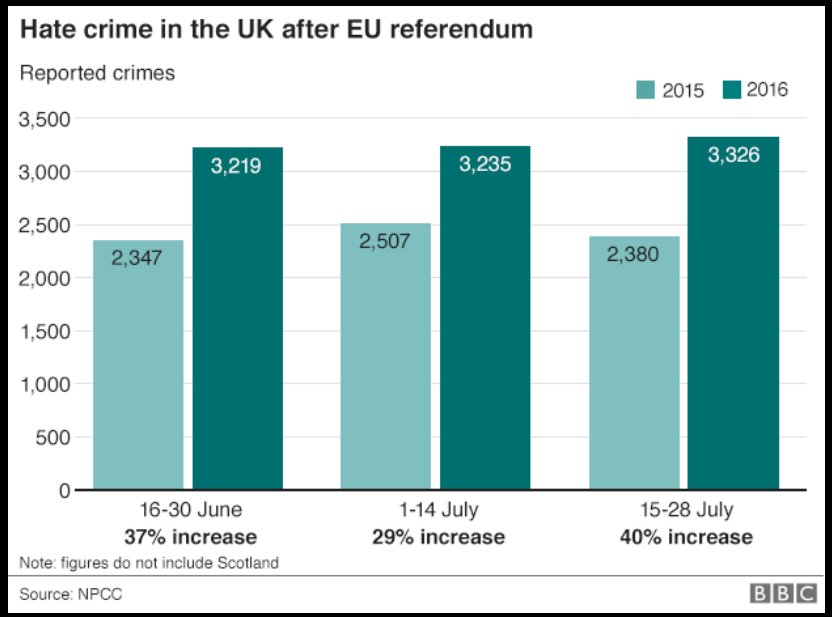
example projects:

- a disaster management architecture based on Cyber-Applications-Systems [Darema, 2010]
- a decision support system triggered by naturally caused events
- an emergency reaction system
- ...

- Observations
  - increasing frequency and ferocity of emergency situations around the globe
- Questions
  1. How to leverage real-time data?
  2. How to model disasters?
  3. How to protect critical infrastructures?

Area 7: HateFake

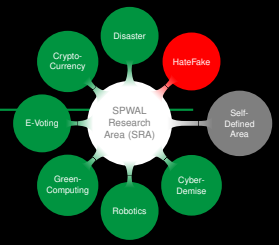


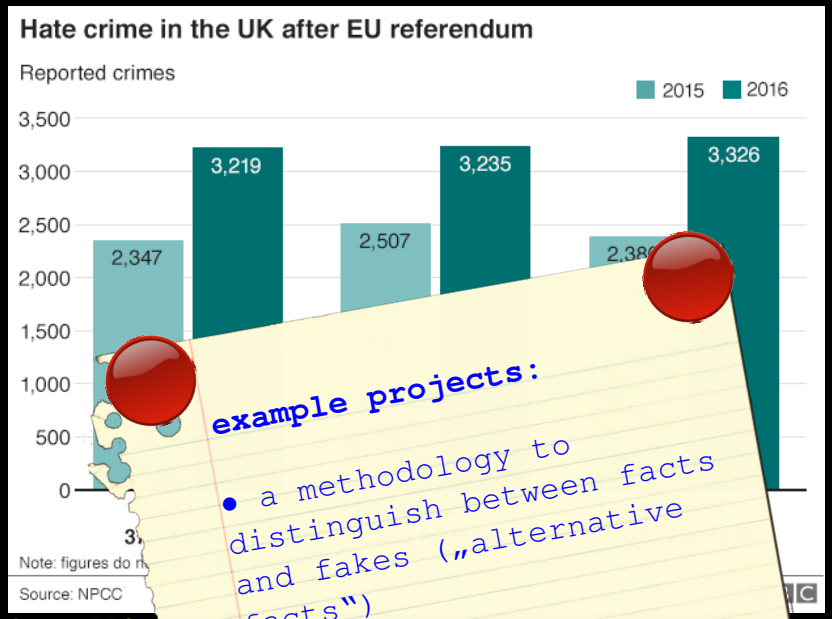


Source: BBC

- Observation
  - a rise of hate, fakes, and propaganda in social media
- Questions
  1. How to detect abuse of social media?
  2. How to distinguish fakes from facts?
  3. How to protect against hate, fakes, and propaganda?

Area 7: HateFake





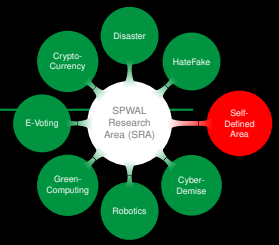
Source: BBC

example projects:

- a methodology to distinguish between facts and fakes („alternative facts")
- redo the Wineburg experiment with focus on Germany ([Wineburg u.a., 2016])
- a methodology to detect offensive statements towards specific groups
- ...

- Observation
  - a rise of hate, fakes, and propaganda in social media
- Questions
  1. How to detect abuse of social media?
  2. How to distinguish fakes from facts?
  3. How to protect against hate, fakes, and propaganda?

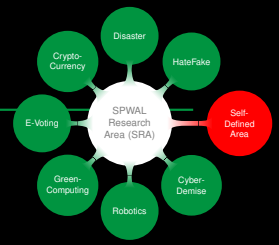
Area 8: SelfDefined



Source: Joseph Kosuth (1965), Hirshorn Museum, Smithsonian Institution

- Observation
  - What is your observation?
  - Which hypotheses do you derive?
- Questions
  1. What does your observation imply?
  2. Which research questions are instigated?

Area 8: SelfDefined



Source: Josep[illegible]

- Observation
  - What is your observation?
  - Which hypotheses do you derive?
- Questions
  1. What does your observation imply?
  2. Which research questions are instigated?

Project Proposals . . .

- MUST clearly address the scientific research question to be answered
- MUST specify the methodology to be applied in order to achieve the project's objectives
- MUST define the expected outcome
- MUST outline the context as far as related work is concerned
- SHOULD implement *at least one* use case for a proof-of-concept (this does not necessarily mean „code“)
- MUST be approved by instructor

Progress Reports . . .

- MUST summarize (for the reporting period) the achieved results
- MUST clearly specify the next steps and the expected results for the next reporting period
- MUST clearly justify any deviations (if any) from the approved plan
- MUST present an updated project plan in case of necessary adjustments

Final Reports and Presentations . . .

- MUST clearly address the scientific research question having been answered
- MUST specify the applied methodology
- MUST summarize the achieved results
- MUST position the work performed in the scientific context (related work)
- MUST report on the implementation of use cases as a proof-of-concept (if applicable)
- MUST be presented and defended in a plenum session

Report Formats

- We use the IEEE Templates for Transactions Articles
  - Either for MS Word
  - Or for LaTeX2e under Windows or MAC
  - Or for LaTeX2e under Unix
- LaTeX2e is strongly recommended!

How to Use the IEEEtran LATEX Class

Michael Shell, *Member, IEEE*

(Invited Paper)

***Abstract*—This article describes how to use the IEEEtran class with LATEX to produce high quality typeset papers that are suitable for submission to the Institute of Electrical and Electronics Engineers (IEEE). IEEEtran can produce conference, journal and technical note (correspondence) papers with a suitable choice of class options. This document was produced using IEEEtran in journal mode.**

***Index Terms*—Class, IEEEtran, LATEX, paper, style, template, typesetting.**

I. Introduction

WITH a recent IEEEtran class file, a computer running LATEX, and a basic understanding of the LATEX language, an author can produce professional quality typeset research papers very quickly, inexpensively, and with minimal effort. The purpose of this article is to serve as a user guide of IEEEtran LATEX class and to document its unique features and behavior.

This document applies to version 1.8b and later of IEEEtran. Prior versions do not have all of the features described here. IEEEtran will display the version number on the user's console when a document using it is being compiled. The latest version of IEEEtran and its support files can be obtained from IEEE's web site [1], or CTAN [2]. This latter site may have some optional packages along with more complex usage techniques, can be found in `bare_adv.tex`.

It is assumed that the reader has at least a basic working knowledge of LATEX. Those so lacking are strongly encouraged to read some of the excellent literature on the subject [4]–[6]. In particular, Tobias Oetiker's *The Not So Short Introduction to LATEX 2ε* [5], which provides a general overview of working with LATEX, and Stefan M. Moser's *How to Typeset Equations in LATEX* [6], which focuses on the formatting of IEEE-style equations using IEEEtran's IEEEeqnarray commands, are both available for free online.

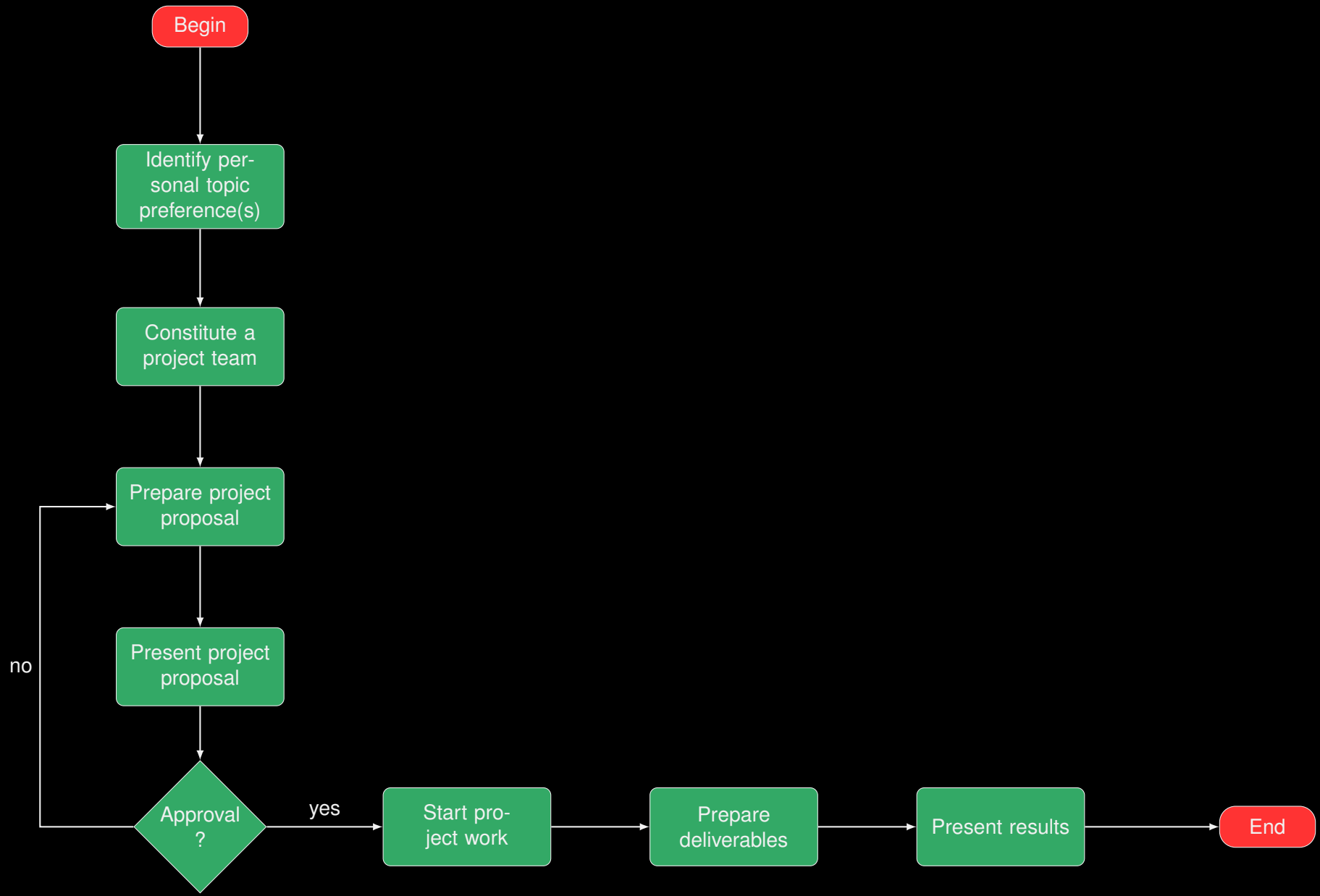
General support for LATEX related questions can be obtained in the internet newsgroup comp.text.tex. There is also a searchable list of frequently asked questions about LATEX [7].

Please note that the appendices sections contain information on installing the IEEEtran class file as well as tips on how to avoid commonly made mistakes.

II. Class Options

There are a number of class options that can be used to control the overall mode and behavior of IEEEtran. These are specified in the traditional LATEX way. For example,

What You Have To Do



Just in Case . . .

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