

SERT Kick-off

Software Engineering ReThought

background/introduction

(Tony Gorschek)

→ Engineer (first) / Problem Solver / Researcher

- Professor, PhD (Tekn. Dr.) Software Engineering, M.Sc. Computer Science + B.Sc. Business Administration
- 15 years in industry (6 start-ups, CTO, Senior Executive Consultant, Chief Architect, Technical Advisor, Developer, Product Manager/Business Analyst, Investor)
- 14 years in research (Technology Product Management, Requirements Engineering, Quality Assurance, Agile transformation/continuous development, Lean Product development, Value based product development)
- Research leader and project manager **SERT**.



- [illegible]



Telio

(Helene Ålander and Team)

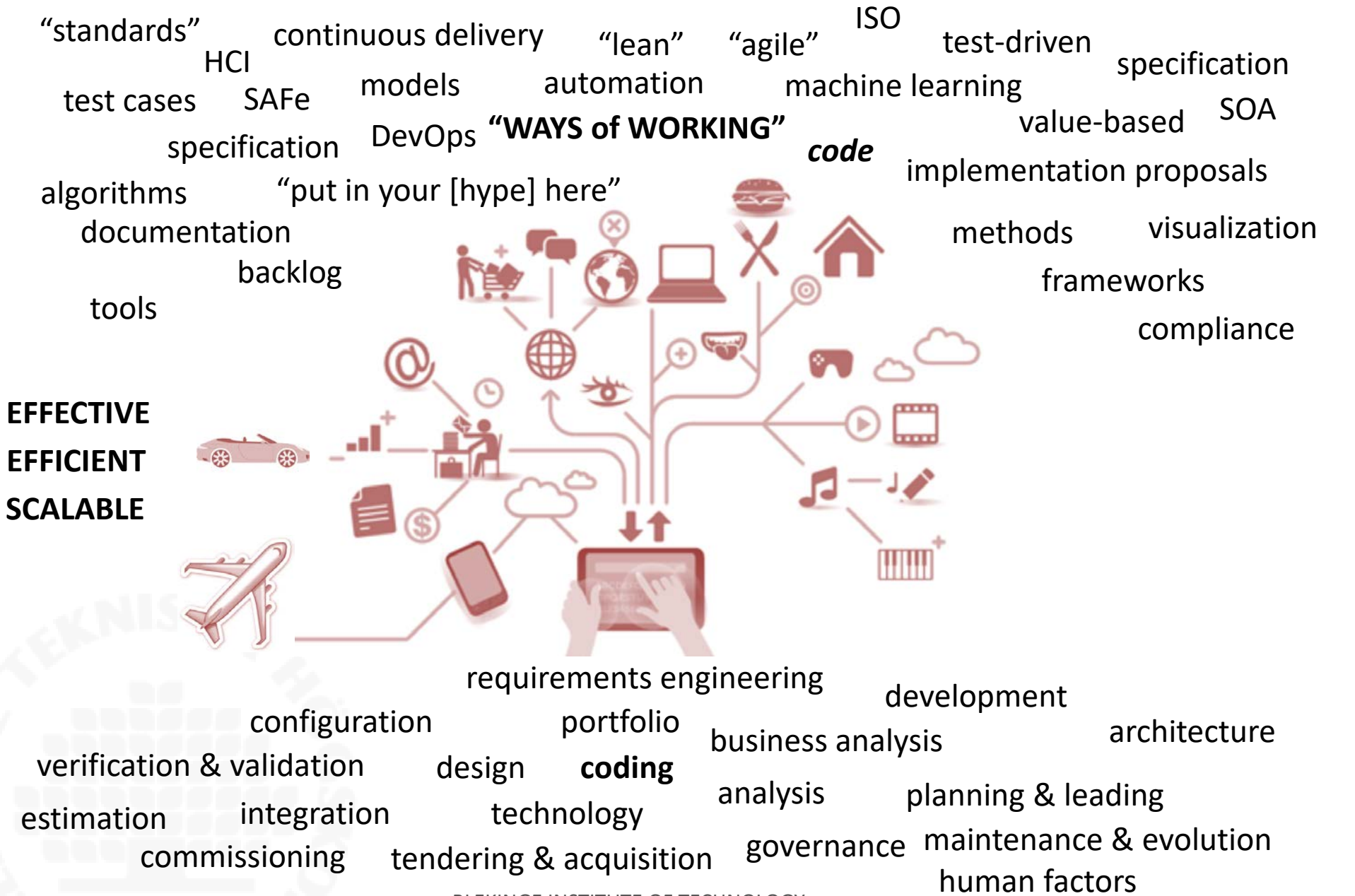


”SERT Profile”

... what is it?



software engineering



Challenges

when we create or use products and services

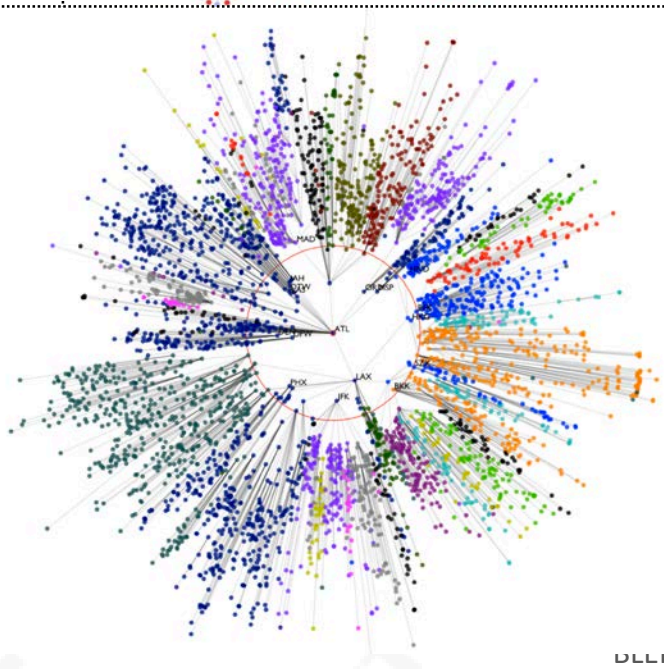
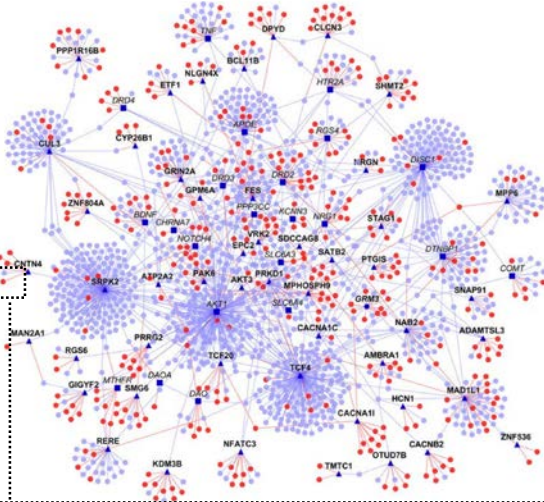


challenges software based products and services

6 Macro-challenges in software engineering

- Size and Complexity (CH1)
- Product Development and Release Speed (CH2)
- Product Emergent Properties (CH3)
- Product Lifespan (CH4)
- Product Non-functional Aspects (CH5)
- Product and Process Value (CH6)

- Future SW = **MORE** → defects, requirements, systems, size, complexity, technical debt, coordination and communication, challenges, security, compliance, threats, maintenance, complex development organizations, larger teams, more dependencies between organizations...



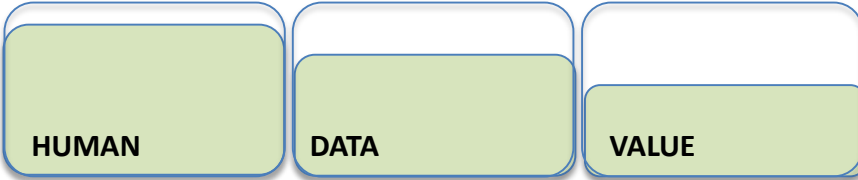


We need to **change** the way we **engineer Software** in a **radical** way to **meet the challenges** of the next 20y

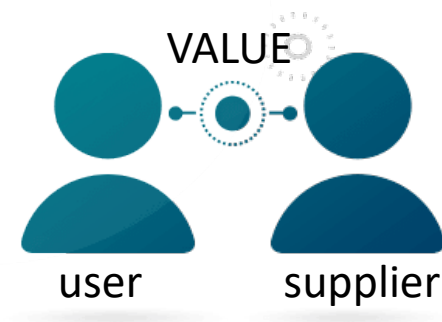


research agenda

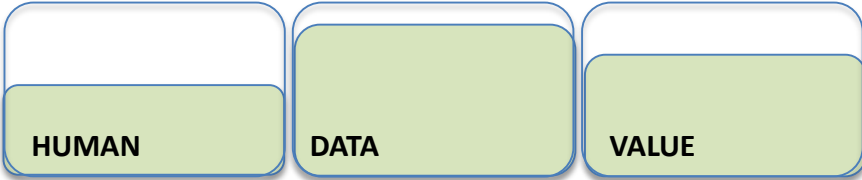
preparing the solutions for tomorrow
(first three directions...)



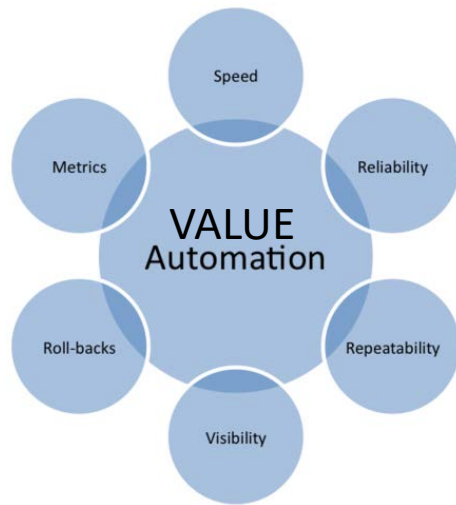
human and user based software development



- Use **massive** user and system to system **data** (interaction, measurement, behaviour, activity, telemetrics) **to guide**:
 - Feature **SELECTION**
 - Quality **NEEDS**
 - Define **VALUES** (priority)
- Continuous experimentation and learning (next gen. continuous delivery)
- Establish **VALUE based testing** (move from code to value focus in testing)
- Requirements **AUTOMATION** (verification and validation)
- **STANDARDS/COMPLIANCE** automation and **VALUE** measurement
- Feature **REMOVAL** strategies and acceptance
- Preventive planning for product evolution and total cost of ownership including **asset VALUE** (Technical debt management)



scalable and value based engineering



→ Quantify and qualify VALUEs

- Ability to TEST both INTERNAL and EXTERNAL
Value types

→ **Value based testing and AUTOMATION** (selection and prioritization of WHAT to test based on VALUE impact)

→ Develop ACCEPTANCE CRITERIA for:

- Learning systems with **emergent properties**
- Un-planned massive systems interaction
- Complex requirements –
SAFETY/SECURITY/COMPLIANCE

→ Automate testing for complex requirements

→ **Human – Automation interface** (assuring new techniques for trust, human understandability in complex systems development and development automation)

→ Analysis tools for Automation (test) results

→ **Human-Machine/Automation symbiosis** in engineering

HUMAN

DATA

VALUE

elastic lean engineering



- **CONTEXT AWARE** Agile/LEAN/DevOps/SAFe (next generation of flexible management of engineering)
- Active and continuous WASTE identification and removal
 - Waste metrics
 - Separate Waste from *Overhead*
 - Waste warning automation
 - Waste based process change (**evidence based**)
- **ASSET Value control** (measure, control and correct “technical debt” during product evolution)
- Total cost of ownership (TCO)
- **Human based** engineering (productivity of engineers)
- END – to – END software engineering
- Organization – Team – System architecture optimization to manage interfaces and interface overhead
- **LeaGile 2.0... SCALABILITY**
- What works over “cook-book” recipe

”SERT = Software Engineering ReThought”

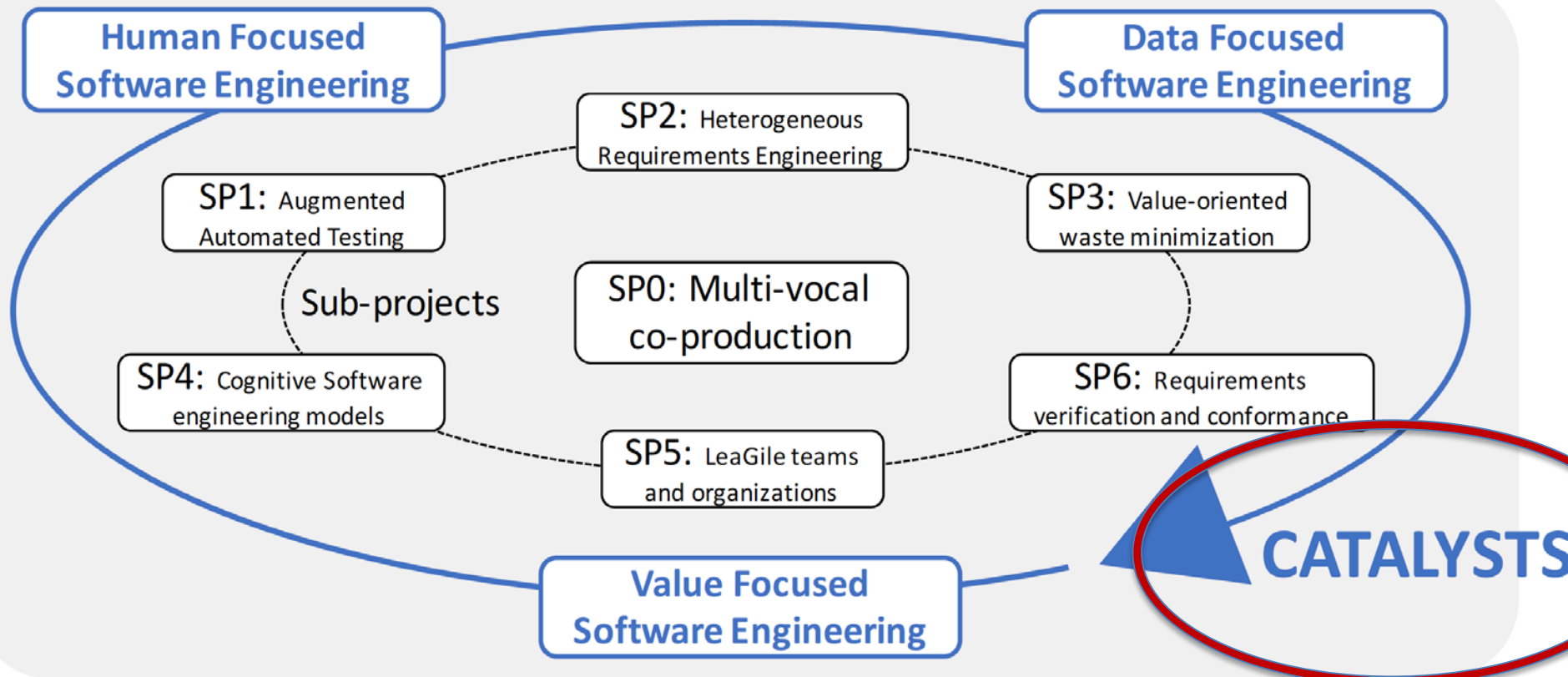
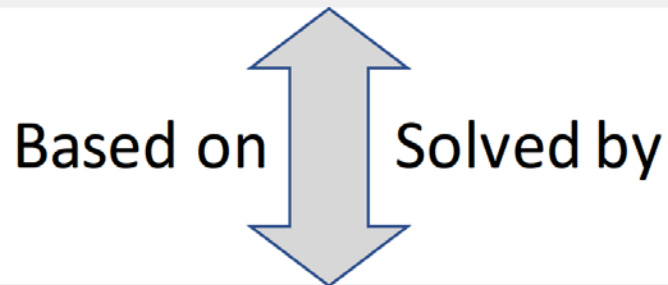
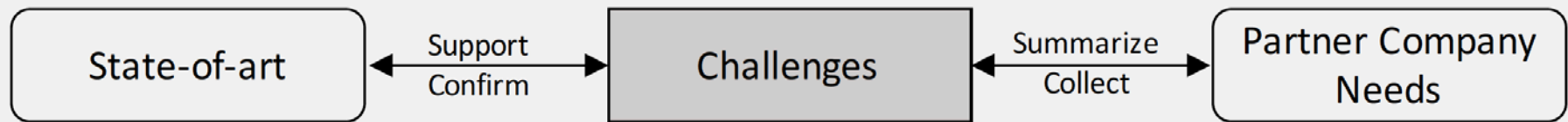
... so... what are we “rethinking”



SERT Profile

SUB-PROJECTS – Concrete start...

Challenges for the Next Generation Software Engineering



Software Engineering is an applied engineering science and needs to adapt to solve future challenges

CATALYSTS

Value Focused SE

value

Value/Waste
Business Economy
Measurement
Lean
VBSE
Non-functional asp.

Human Focused SE

human

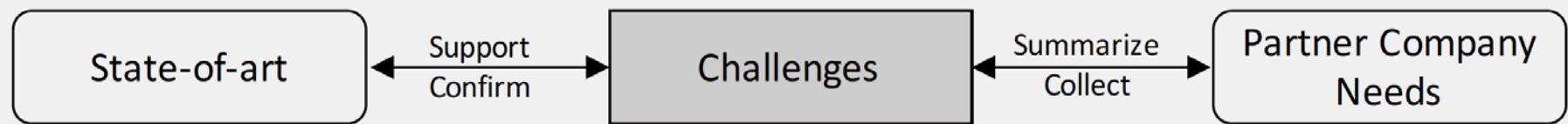
Cognition
Psychology
Org./Team
Arch. vs Org.
Non-functional asp.

Data Focused SE

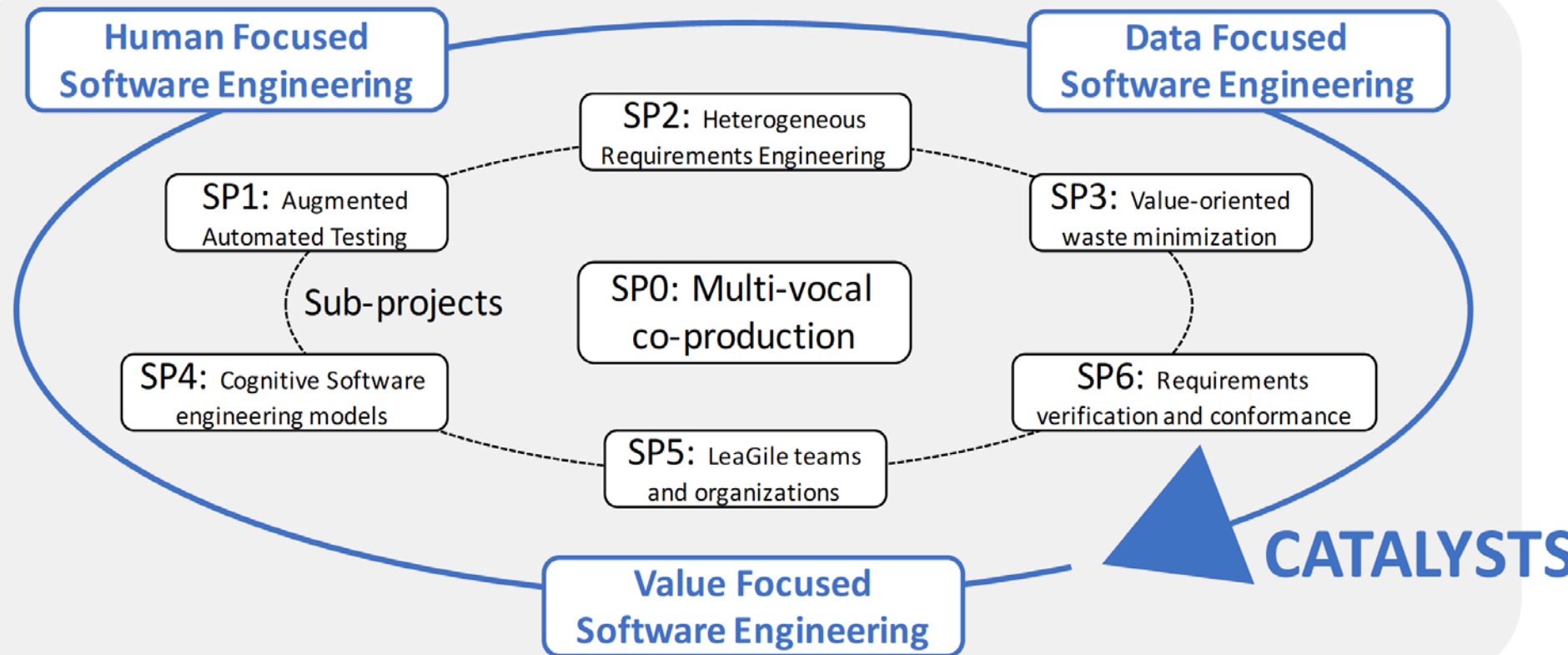
data

Application
of ML on SE
challenges
Data-driven
Continuous
Evidence based

Challenges for the Next Generation Software Engineering



Based on	Solved by



(initial) Sub-projects

SP1 : Augmented Automated Testing: leveraging human-machine symbiosis for high-level test automation.

Meaningful automation

Automation ROI

Human-Automation optimization

SP2: Heterogeneous multi-source continuous requirements engineering.

*ML/AI based harvesting of req./data/
intelligence irt product development*

SP3: Value-Oriented Strategy to Detect and Minimize Waste. **[BASE]**

WASTE identification, Real Lean

Technical debt / Asset degradation mngmt

SP4: Cognitive software engineering development models. **[BASE]**

Maximize human potential in engineering

Human – machine symbiosis

SP5: Study and Improve LeaGile handling of organizational and team interfaces.

Real™ LeaGile! WASTE – VALUE – OH

SCALABILITY // VALUE BASE // Tech/org...

SP6: Verification of Software Requirements in Dynamic, Complex and Regulated Markets.

*Applied human augmentation through
meaningful automation (applied
compliance...)*

the team from our side

researchers and engineers

the core team

Krzysztof Wnuk: Requirements, Agile/Lean, Product Management.

Michael Unterkalmsteiner: Requirements and Testing,
Data-focused Software Engineering, Natural Language Processing

Fabian Fagerholm: Developer Experience, Agile/Lean, Data-driven, Human-focused

Tony Gorschek: Requirements, Agile/Lean, Product Management, Value based,

Robert Feldt: Testing, Human-focused, AI/ML, Process Improvement, Requirements

Emil Alégroth: Testing, Requirements, Product Management, Human-focused

Javier Gonzalez Huerta: Software Architectures, Technical Debt, Software Quality, Agile & Lean

... + (to come) 10+ more senior researchers, postdocs and PhD students...



supporting scientists

Darja Smite: SE, GSE

Emil Numminen: Industrial Economics

Michael Felderer: SE

Niklas Lavesson: CS, Machine Learning

Martin Andersson: Industrial Economics

Veselka Boeva: CS, Machine Learning

Markus Martini: Cognitive Psychology

Michel Nass: Visual test autom.

Raquel Ouriques: SE, Knowledge Mngmt in SE

Per Lenberg: SE, human factors

M. Svahnberg: SE, Architectures

the partners



SONY

Handelsbanken



MaxKompetens



Telia

TimePeopleGroup



QTEMA

ERICSSON



CGI



FORTNOX

Småföretagens bästa vän

KK-stiftelsen



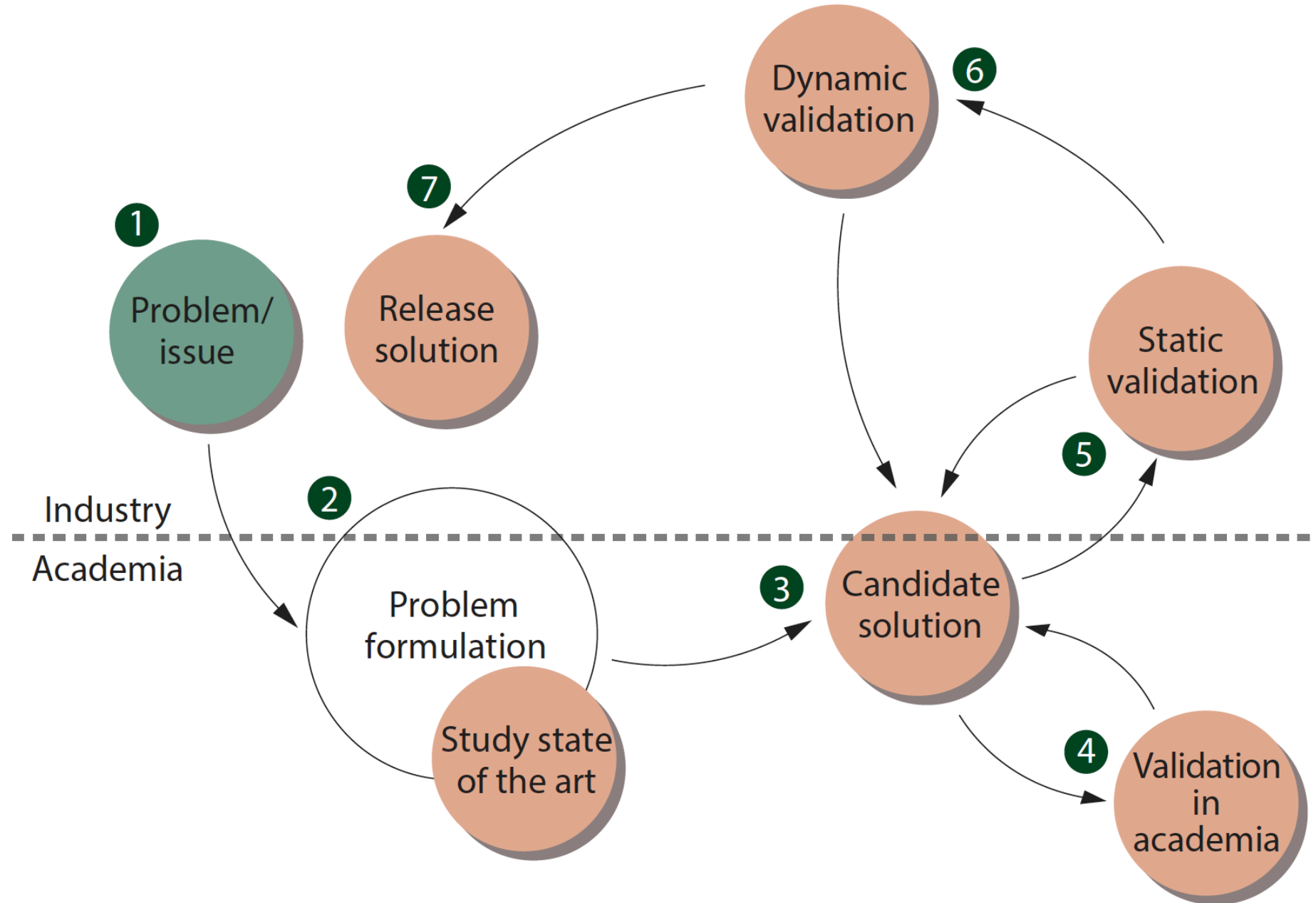
SOFTWARE ENGINEERING
R@THOUGHT

”Software Engineering ReThought”

... what are we “rethinking” PART II



(how we do research) 3rd gen empirical SE



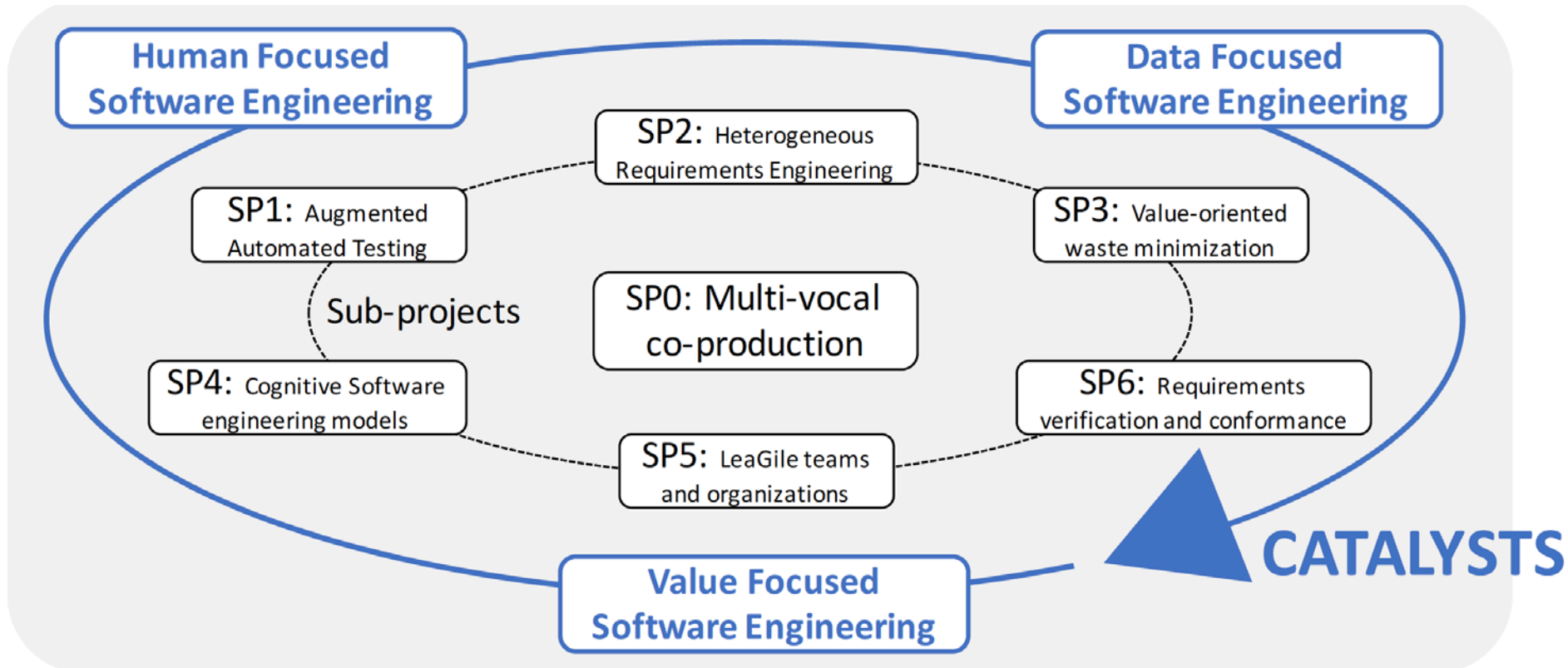
RESEARCH PROFILE consisting of individual sub-projects that run and adapt over time...

8y running, 10-12 industry partners, 120MSEK+

“Agile” in terms of sub-projects and contents

Formal start OKT2018

- “Smorgasbord” for partners
- Influence by partners
- Partners get first access to solutions
- 10+ researchers working on long-term challenges relevant for partners
- Sub-projects and what we do in the Profile changes over time as needed... [but] long-term RESEARCH



SERT Kick-off

goals, agenda, practicalities



kick-off goals



- Introductions and meetings...
- Overall project view to discuss how we can work...
- Sub-project seminars and introduction to subject areas and ideas...
- Discuss areas and exchange ideas
- Meet other companies and discuss challenges
- Get an idea where and how you would like to start (you)
- Get a formal "start" (although the first year is going to be a start...)

kick-off program

- 10:30** **Slot 1 - Human-machine mutualism over parasitism –**
Robert Feldt (Emil Alégroth)
- 11:00** **Slot 2 - Toward multi-source data-driven requirements engineering –**
Krzysztof Wnuk
- 11:30** **Slot 3 - Value as a means of reducing waste and overhead –**
Javier Gonzalez Huerta
- 12:ish-13.00** **Lunch**



kick-off program

- 13:00** **Slot 4 - Designing cognitive software engineering work systems** - *Fabian Fagerholm*
- 13:30** **Slot 5 - Verification of Software Requirements in Dynamic, Complex and Regulated Markets –**
Michael Unterkalmsteiner
- 14:ish** **Fika**
- 14:20 - 17:ish** **Interactive session with Poster Islands**
- 17:ish** **Wrap-up –** *Tony Gorschek*
- 18:00** **Dinner at Quality Friends Hotel**

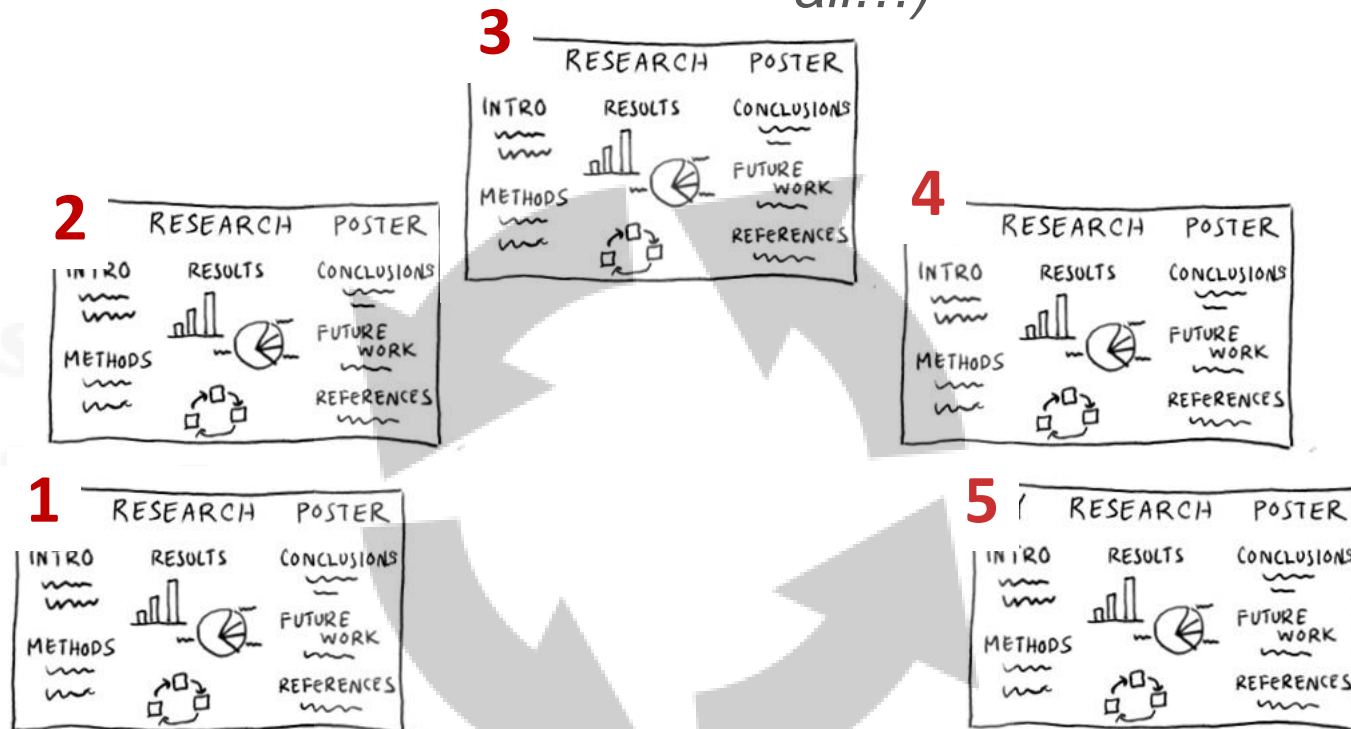
interactive poster island session (start 14.30)

PURPOSE

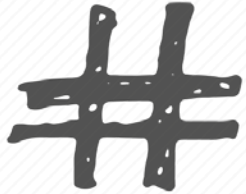
- Meet the team
- Questions and Answers
- Discuss ideas and concepts
- Exchange names and get going...

FORMAT

- 1h 10min round robin in fixed groups (everyone gets 10min at all poster islands)...
- (After one hour => free for all...)



practical stuff



- During the event, use **#SERT2018** if you want to “tag” the event (in live-stream, twitter etc.)
- **Live-reporter** Sylvia Asklöf Forsell from BTH
- Lunch menu: **Hawaiian Poke ball** (choose btw salmon, shrimps, roastbeef) (Special request for food is marked)
- To connect to **wifi** – choose “Telia Wifi” and log in with first and last name
- Link for live-streaming:
<https://www.bth.se/events/kick-off-sert/>

now to the sessions...

10:30

**Slot 1 - Human-machine
mutualism over parasitism –
*Robert Feldt (Emil Alégroth)***

