Avancerad Digitalisering

ABB ERICSSON SAAB Teknikföretagen VINNOVA

Website: kth.se/swewin

Welcome to the **Wireless Innovation Workshop** organized by the SweWIN Center!

KTH VETENSKAP OCH KONST

RI.SE Research Institutes of Sweden

ERICSSON

SAAB TECHNOLOGIES

CellMax

NW Northern Waves

ABB

BeammWave

Wireless expertise

Hardware

Algorithms, protocols

Applications

Emil Björnson

Director

Professor KTH

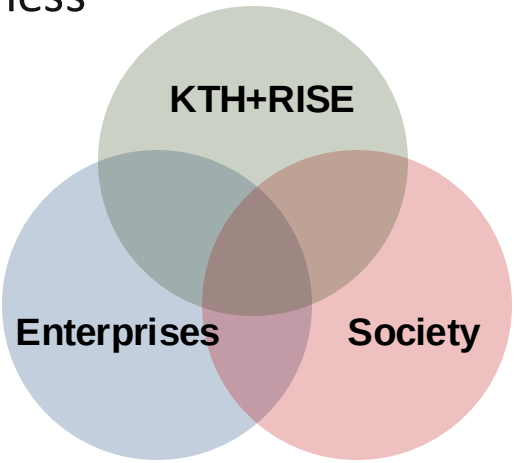
SweWIN is Competence Center: What is that?

- Funding scheme from Vinnova in the Advanced Digitalisation program

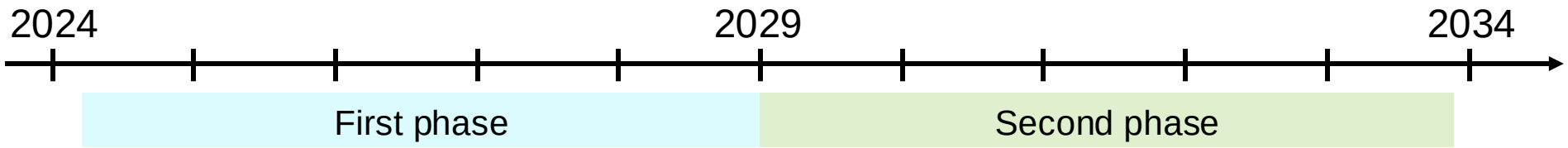
- Collaboration arena for universities, research institutes, companies, and society
  1. Conduct world-class research in an area important for Sweden's competitiveness
     > Internal budget and *center of gravity* for external funding

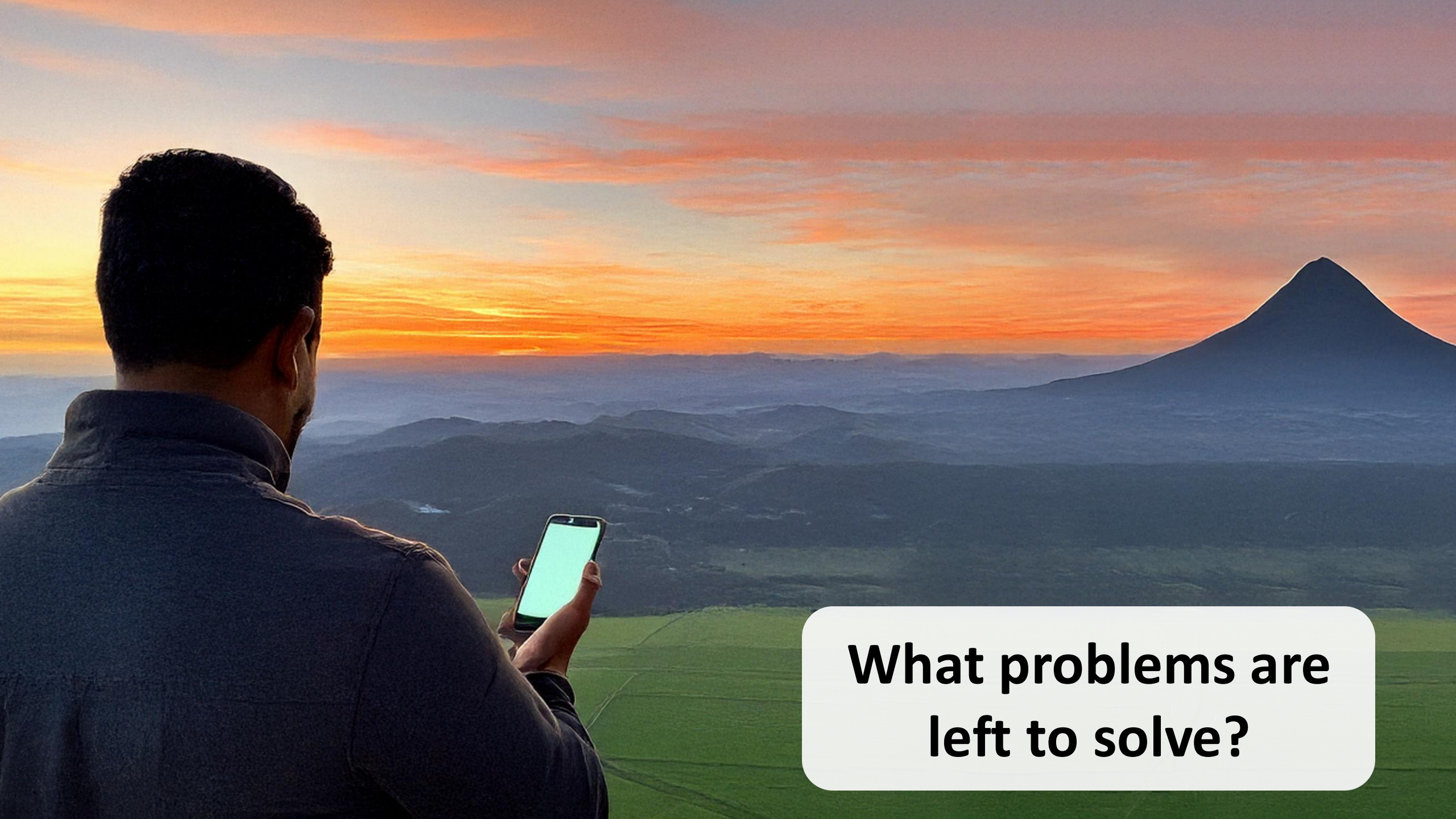
  2. Enhanced education: Curriculum, guest lectures, degree projects, …

  3. Outreach and dissemination:
     Internal and external workshops, social media presence, …

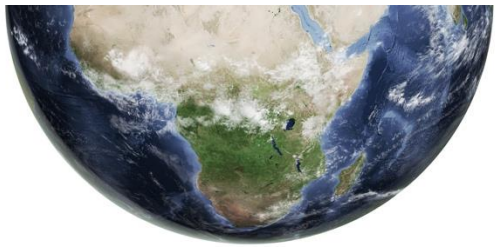


- 5+5 years effort

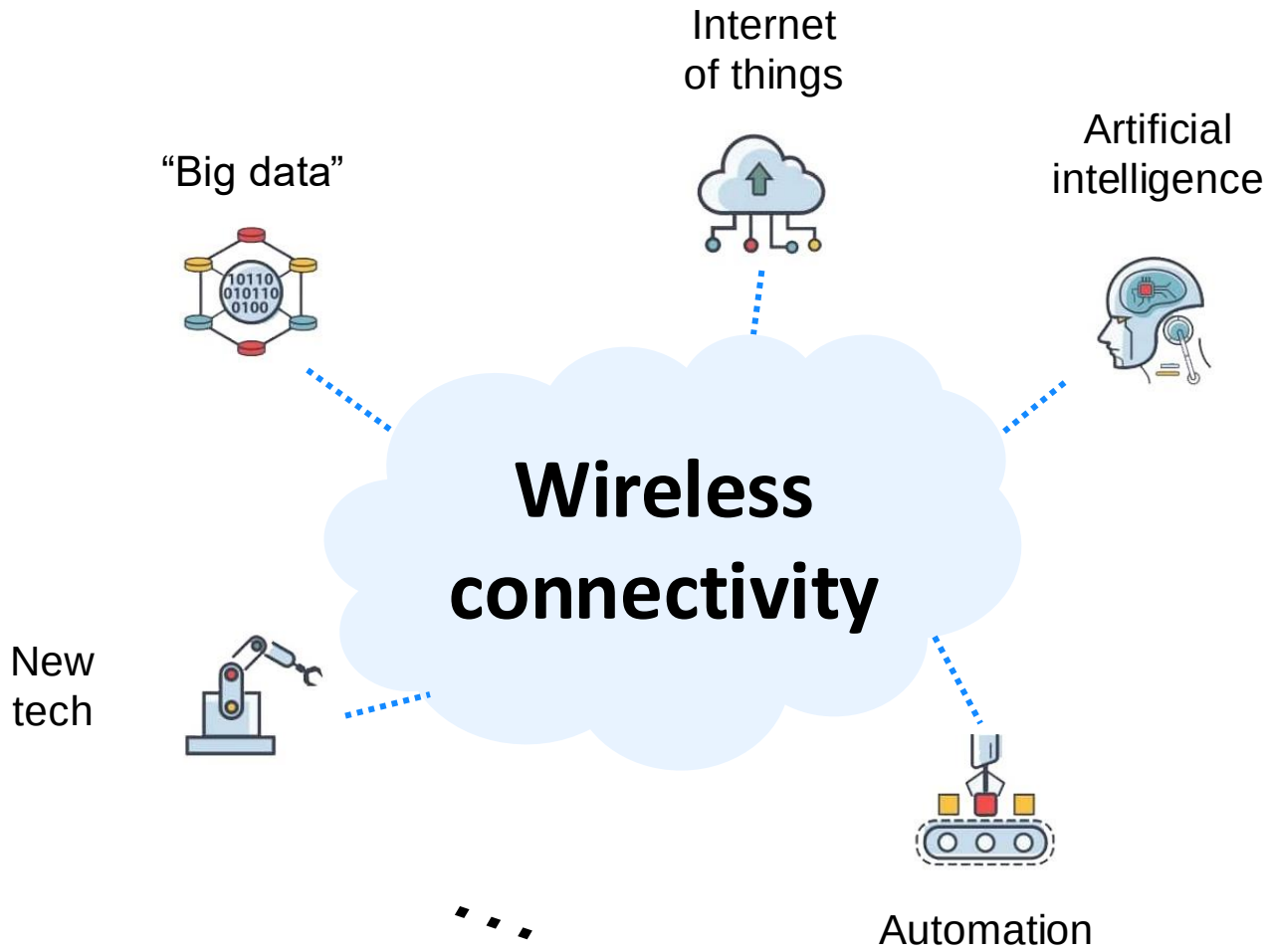



What problems are left to solve?

The Major Societal Challenge:
Sustainability



Too high resource utilization



Economic growth:
Improved living standard

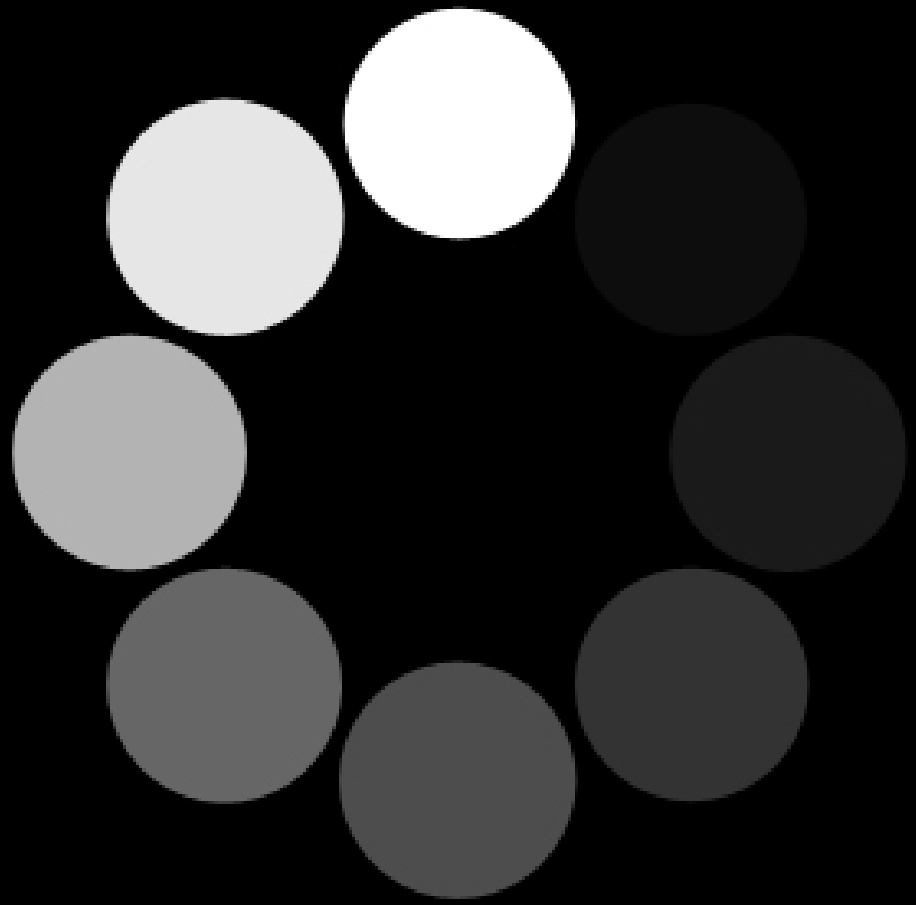
↓

More efficient resource utilization

↓

Key: Digital transformation

Higher demand on wireless technology



1. Availability

2. Trustworthiness

3. Green technology

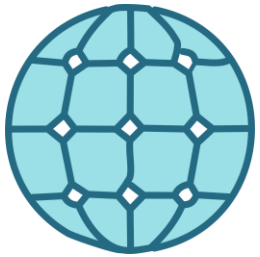
5G

Performance metrics

Bit rates
Bandwidth
Latency
…

SweWIN's "6G" approach:
Shift focus toward new metris and functionalities

Digitalization with integrated communication, sensing, and localization



Green technology	**Trustworthiness**	**Availability**
Hardware, infrastructure, orchestration, etc.	Predictable latency and bit rates Robustness against disturbances	Decent connectivity everywhere Cost efficiency

Approach: Define new measurable metrics and push our research and education in these directions

Research Areas

1. Radio electronics and antennas

Leader: Oscar Quevedo-Teruel

2. Physical layer and network architecture

Leader: Emil Björnson

3. Resource management and orchestration

Leader: Cicek Cavdar

4. Resilience and security

Leader: Mikael Skoglund

5. Learning and optimisation

Leader: Carlo Fischione

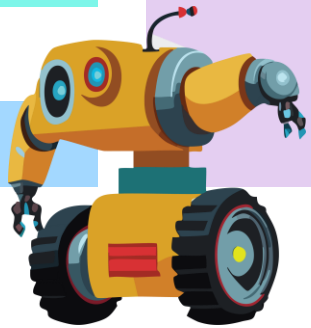
6. Wireless functional safety

Adjunct Prof. Zhibo Pang

AI expertise (RISE)

Sepideh Pashami

Anders Lindgren



Some achievements so far:

60 million kronor to research center for stable 6G everywhere on earth

"The vision of the 6G Satellite Communication Center is that mobile communication services will be seamlessly available to anyone with a 6G device, anywhere, anytime", says KTH Associate Professor Cicek Cavdar, Center Director.

Major funding investment in wireless communication systems

KTH will lead two research projects as the Swedish Research Council invests heavily in 6G. Photo: Daria Nepriakhina/Unsplash

Welcome to the Wireless Innovation Workshop

1st workshop in a series

Thanks to speakers and Ferdi Kara

Keynote
+ Research results

Today's agenda

9:00: Welcome address, Emil Björnson, Center Director

9:15: Keynote by Stefan Parkvall, Ericsson, "The road to 6G – wireless communication in the 2030s"

10:00: Coffee break

10:30-12: Technical presentations on federated learning, lens antennas, hybrid precoding design, integrated sensing and communication, and robust ML
by Mohammad Azimi Abarghouei, Parisa Ramezani, Oskar Zetterström, Steven Rivetti, Zinat Behdad, Sepideh Pashami