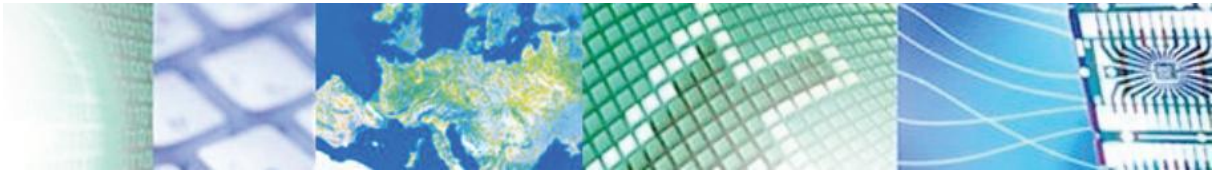


CHIST-ERA Projects Seminar 2022
Towards Sustainable ICT (S-ICT)

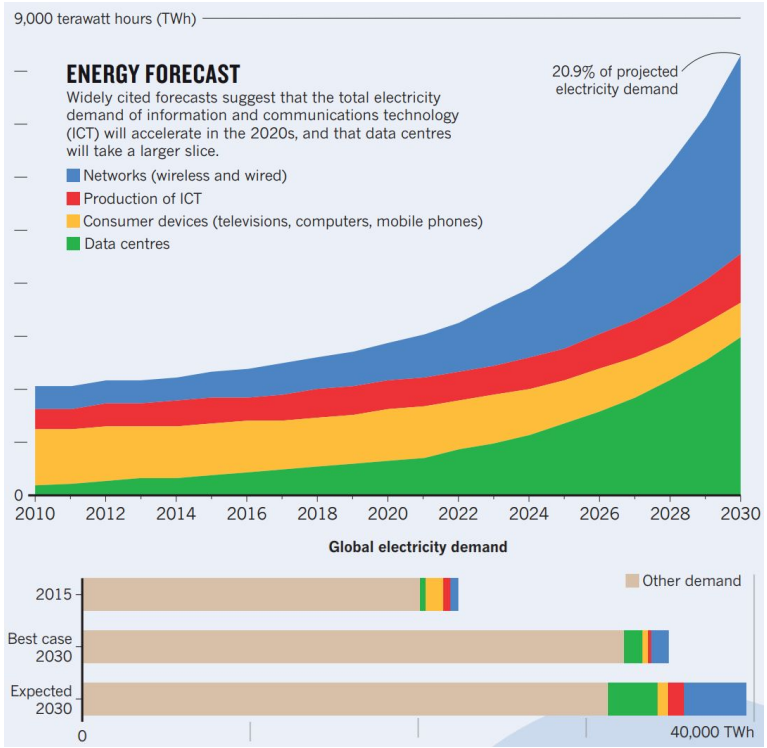
Speaker(s)

March 30th, 2022

Programme co-funded by the
EUROPEAN UNION

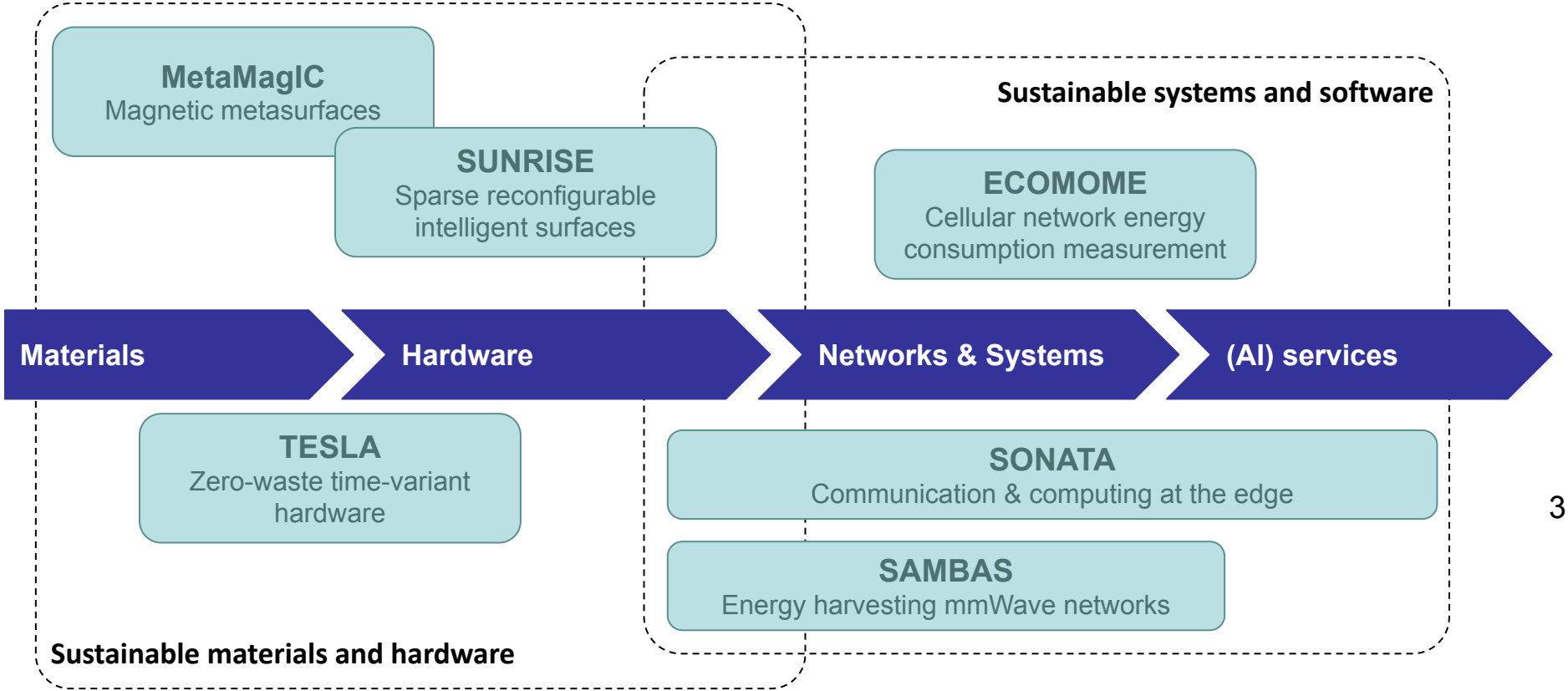
Motivation for Sustainable ICT

- By 2030, ICT will consume up to 20% of the world's electricity
- To make ICT more sustainable we need to:
  - ✔ Make ICT technology more energy efficient
  - ✔ Reduce reliance on non renewable energy sources
  - ✔ Harvest energy directly at the source
  - ✔ Reduce e-waste



Source: *https://media.nature.com/original/magazine-assets/d41586-018-06610-y/d41586-018-06610-y.pdf*

Funded Projects



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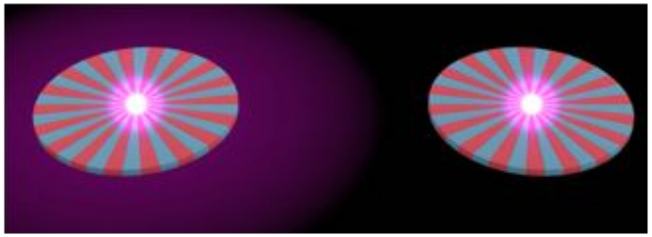
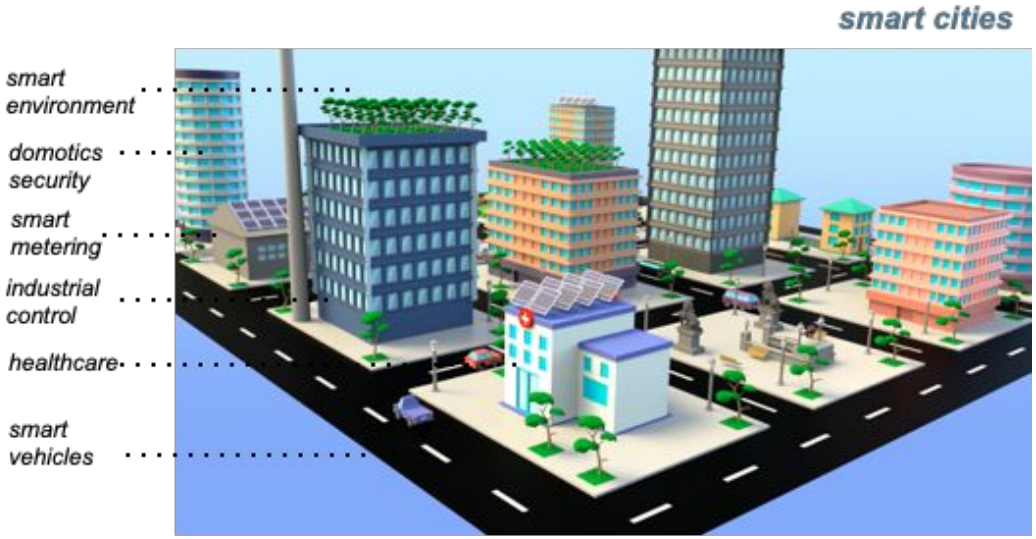
MetaMagIC

MetaMagIC

MetaMagIC aims to provide effective solutions to address world challenges related to the use of energy-efficient and sustainable ICT technologies based on magnetic functional devices.



- Energy-efficient or autonomous magnetic sensors with enhanced sensitivity
- Low-power electronic devices operated with residual magnetic fields
- Efficient remote charging systems
- Self-protected magnetic devices with extended lifetimes



ICMAB INSTITUT DE CIÈNCIA DE MATERIALS DE BARCELONA EXCELENCIA SEVERO OCHOA

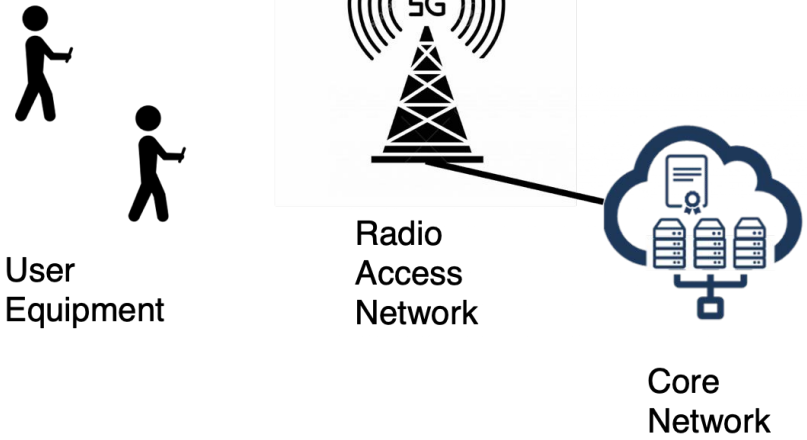
UAB Universitat Autònoma de Barcelona

LIÈGE université

CEITEC Central European Institute of Technology BRNO | CZECH REPUBLIC

UNIVERSITY OF BATH

- Conduct the first independent **measurement study** on **mobile network energy consumption**
- Design **clear and accurate energy consumption models**, to be used by decision makers and the general public
- Propose and evaluate **energy-aware network management solutions** for beyond 5G technologies



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SAMBAS

Universiteit Antwerpen

GHENT UNIVERSITY

SODIRA Connect Edge Computing

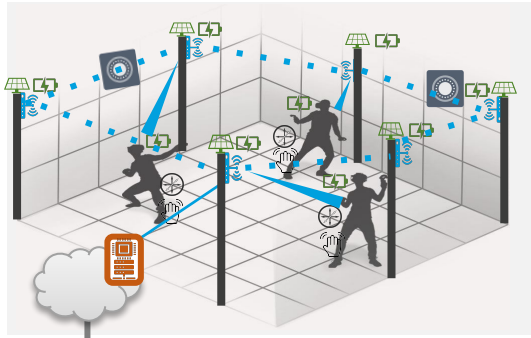
Université de Poitiers

Budapest University of Technology and Economics

University of Essex

(2) energy-optimized mmWave communications protocol stack

(3) energy-aware protocols and algorithms for wireless meshing and handovers



Internet

(1) modular and energy-efficient mmWave μBS with energy harvesting capabilities

(4) Energy-aware resource allocation and service placement algorithms

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SONATA

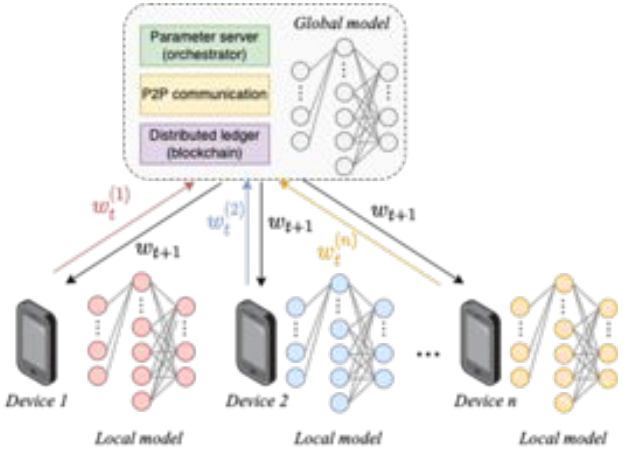
cttc Centre Tecnològic de Telecomunicacions de Catalunya

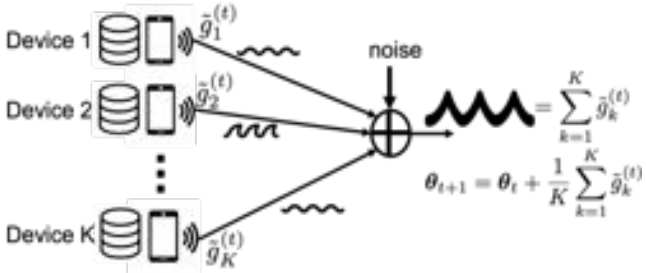
Imperial College London

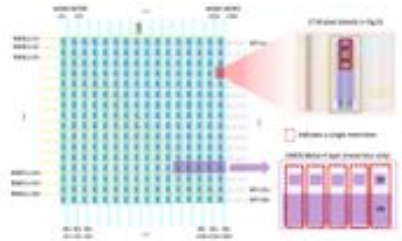
Bilkent University

Pázmány Péter Katolikus Egyetem

- **Memristors** for energy efficient edge devices
- **Distributed/Decentralized Machine Learning** at the edge
- **Over-the-air-computation**
- Incorporation of **Energy Harvesting** into edge nodes and devices
- **Real use case applications**
  - ✔ Mobile traffic characterization
  - ✔ Massive IoT deployments







Envisioned long-term outcomes

	MetaMagIC	SUNRISE	TESLA	SAMBAS	ECOMOME	SONATA
1] Reduction of e-waste	✅	✅	✅			
2] Wireless network optimization	✅	✅		✅	✅	✅
3] Efficient mmWave technology		✅		✅		
4] Power consumption modelling	✅			✅	✅	✅
5] Recyclable components	✅		✅			
6] Reduced natural resource use			✅	✅		✅
7] AI energy reduction					✅	✅

Role of the CHIST-ERA Support

- Coordination between CHIST-ERA and national agencies went smooth

- CHIST-ERA seminar was useful to foster collaboration among S-ICT projects
  - ✔ Structured and moderated cooperation to create a joint presentation is helpful
  - ✔ Physical meeting would be useful

- Would be useful to organize additional S-ICT specific workshops throughout the project runtime (in addition to yearly seminar)
  - ✔ For example 1 day extra after the yearly seminar
  - ✔ Mobilize together for future CHIST-ERA calls

Responsible Research & Innovation

- Gender and diversity
  - Inherit gender unbalance in the ICT field
- Open Science
  - Going beyond open access publications: making data and code publicly available
- Public engagement
  - Design specific tools (apps, websites, add-ons) to share results with policy makers and the general public

Open Science

- **OA publications:**
  - ✔ All (present) partners confirm that their institutions / governments already impose publications to be published on OA platforms
  - ✔ A willingness to go beyond research papers in OA and publish openly collected data and code

- **Obstacles:**
  - ✔ Local rules can be different for the partners
  - ✔ Consortium agreements not always very clear on patent and IPR issues
  - ✔ Management of confidential results and data (from industrial partners or collaborators) not always compatible with open science principles.

Impact & Technology Transfer

End-user awareness

E.g., Energy consumption visualization, website, videos

Industrial partners

Sodira-Connect

Standardization

E.g., ITU, SNS JU, O-RAN Alliance

Industrial contacts

E.g., British Telecom, Ericsson, NetAI, Magcam, MiniBatt, …

Questions

Questions ?