CWC Oulu in Brief

Tuomo Hänninen

CWC
oulu.fi/cwc

University of Oulu: General

- Established in 1958
- Total funding 220 M€
- 10 faculties
- 14 200 students
- 2 900 employees
  ~220 professors
  ~1600 researchers/teaching
- 22 study programmes
- 23 international M.Sc. programs

Multi-disciplinary Research on Five Focus Areas

- Creating sustainability through materials and systems
- Molecular and environmental basis of life-long health
- Digital solutions in sensing and interactions
- Earth and near-space system and environmental change
- Understanding humans in change

University of Oulu: Faculties

- Oulu Business School
- Oulu Mining School
- Oulu School of Architecture
- Biochemistry and Molecular Medicine
- Humanities
- Education
- Science
- Medicine
- Technology
- Information Technology and Electrical Engineering (ITEE):
  - 12 Research Units

FACULTY OF INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING (ITEE)

CRITICAL MASS IN OUR RESEARCH FOCUS AREAS

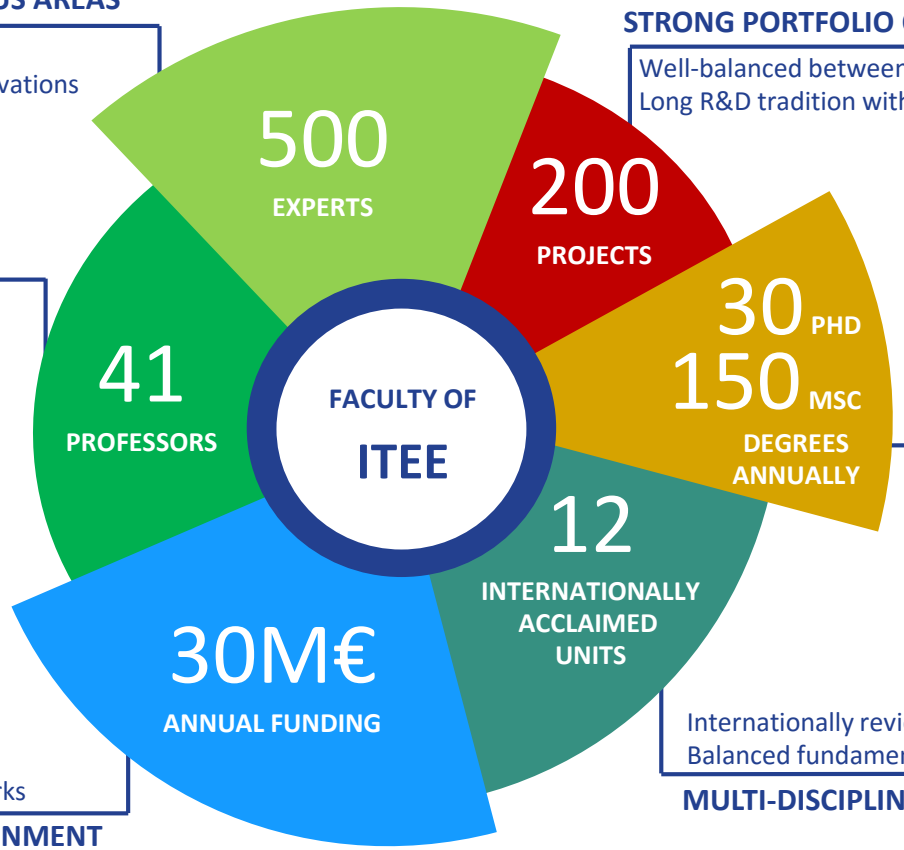
International staff > 35%
Multi-disciplinary expertise resulting new innovations

STRONG PORTFOLIO OF RESEARCH PROJECTS

Well-balanced between fundamental and applied research
Long R&D tradition with local and international companies

COMPETENCE CUMULATION

Experienced professors
Each professor has a seasoned team



HIGH-QUALITY EDUCATION

Competent workforce for companies, research institutions and public sector

Internationally reviewed and credited research units
Balanced fundamental and applied research

MULTI-DISCIPLINARY ICT RESEARCH

Seasoned in winning funding
Excellent local and intl. networks

OFFERING STABLE ENVIRONMENT

THE WORLD UNIVERSITY RANKINGS — University of Oulu, Finland

201-250th WORLD UNIVERSITY RANKINGS 2017

98th COMPUTER SCIENCE 2017

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ITEE RESEARCH UNITS

CAS	**CIRCUITS AND SYSTEMS** PROF. JUHA KOSTAMOVAARA
MIC	**MICROELECTRONICS** PROF. HELI JANTUNEN
OPEM	**OPTO-ELECTRONICS AND MEASUREMENT TECHNIQUES** PROF. IGOR MEGLINSKI
CWC-RT	**CWC- RADIO TECHNOLOGIES** PROF. MARKKU JUNTTI
CWC-NS	**CWC - NETWORKS AND SYSTEMS** PROF. JARI IINATTI
CMVS	**CENTER FOR MACHINE VISION AND SIGNAL ANALYSIS** PROF. OLLI SILVEN
BISG	**BIOMIMETICS AND INTELLIGENT SYSTEMS** PROF. JUHA RÖNING
M3S	**EMPIRICAL SOFTWARE ENGINEERING IN SOFTWARE, SYSTEMS AND SERVICES** PROF. MARKKU OIVO
UBICOMP	**UBIQUITOUS COMPUTING** PROF. TIMO OJALA
OASIS	**OULU ADVANCED RESEARCH ON SERVICE AND INFORMATION SYSTEMS** PROF. HARRI OINAS-KUKKONEN
INTERACT	**HUMAN COMPUTER INTERACTION AND HUMAN-CENTERED DEVELOPMENT** PROF. NETTA IIVARI
ACM	**APPLIED AND COMPUTATIONAL MATHEMATICS** PROF. KEIJO RUOTSALAINEN

UNIVERSITY OF OULU

Centre for Wireless Communications (CWC) in Brief

- Research and teaching staff: ~ 150
- Total funding ~ 9 M€ / year:
  - 75% external research funding
  - 25% university budget funding
- Research organised under CWC since 1995
  - CWC – Radio Technologies (Prof. Markku Juntti)
  - CWC – Networks and Systems (Prof. Jari Iinatti)
- An international research and working environment
  - High-quality theses and dissertations
  - Peer-reviewed publications
  - Research results to be utilised by research partners in their R&D
  - IPRs
- Master- and doctoral-level training in Wireless Communications Engineering (WCE)

CWC Approach

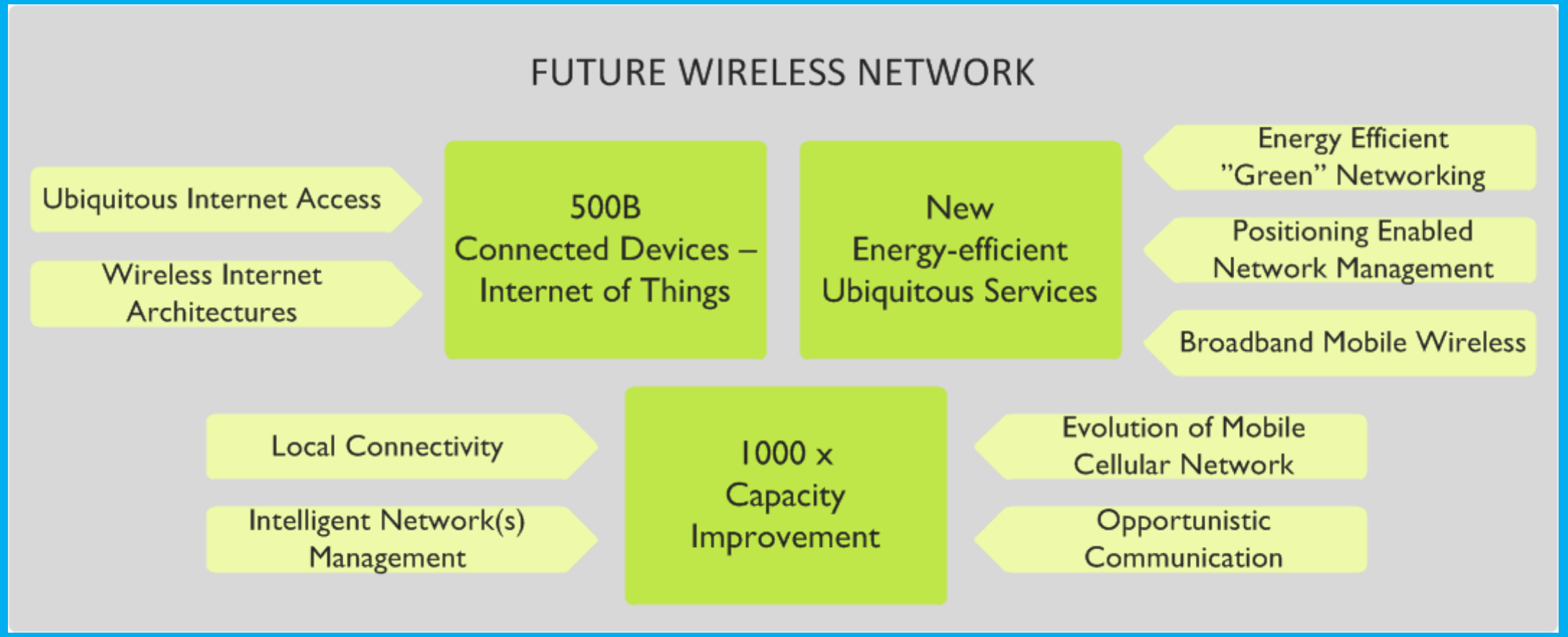
Mission

- Research driven
- Graduates for research or business career
- New technology for real use
- Collaborate globally with companies

Objectives

- Forerunner
- Valued partner for research cooperation
- Research driven training and education
- Fast reacting
  - To the needs expressed by partners
  - Changes in the operation environment
- Interaction with the surrounding community
  - Projects realised with external funding
  - Through long-term national research partners

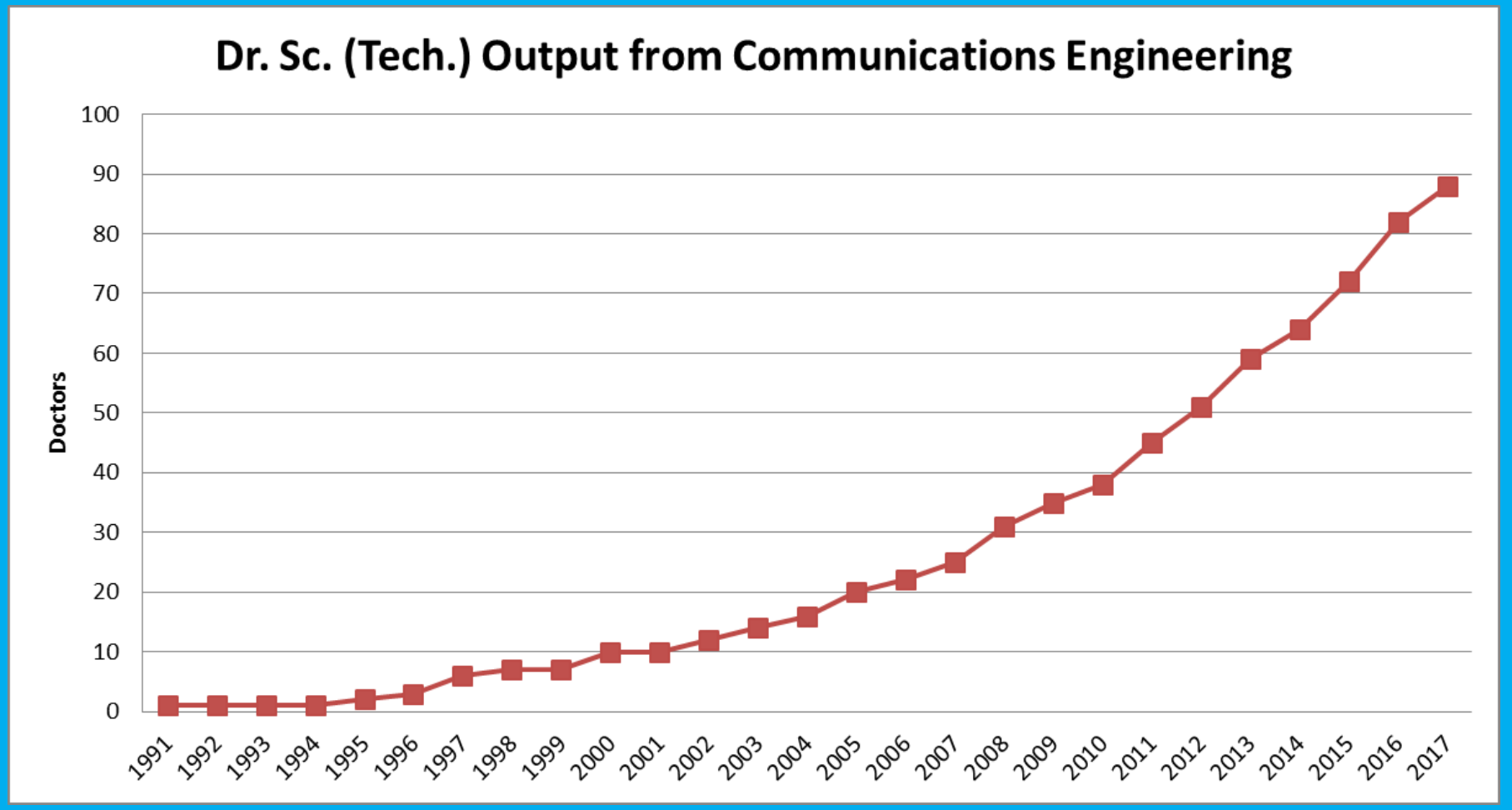
Future Wireless Networks



Fundamental Research → Fundamental technology competence
Applied Research → New technologies and product solutions

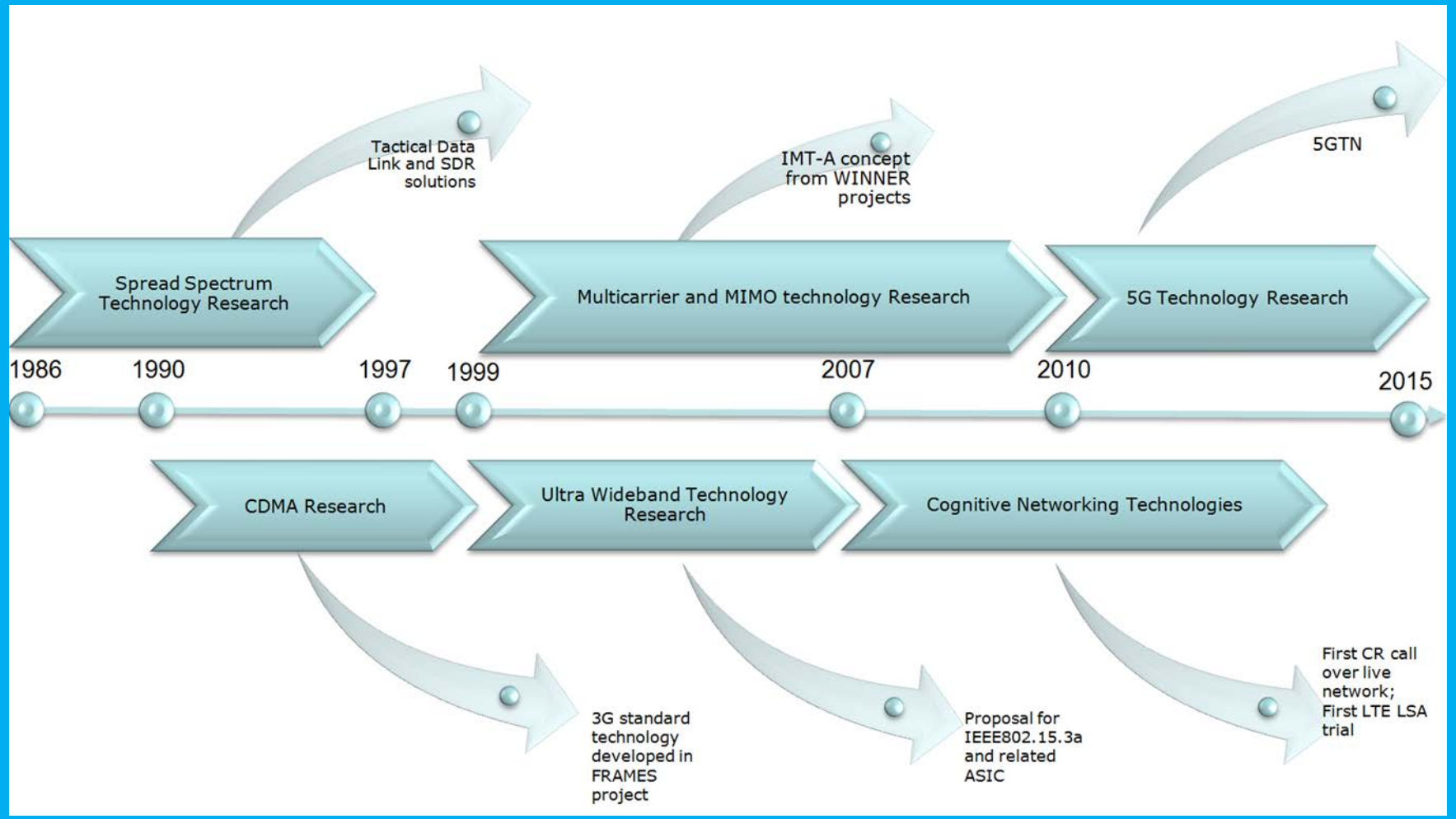
Fundamental Research Until Now

CWC's Role in Technology Development for the Needs of the Academic Community



Applied Research Until Now

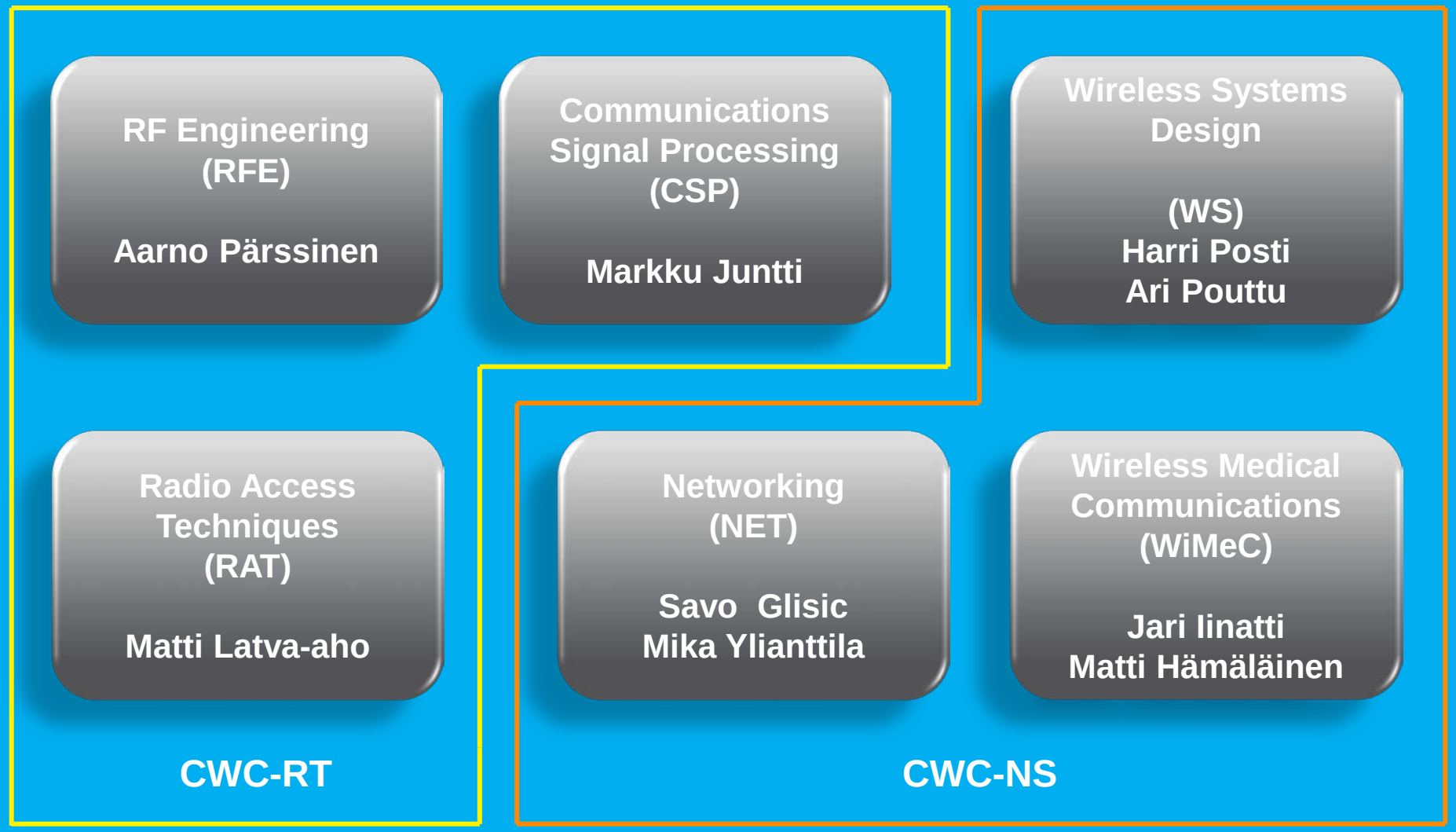
CWC's Role in Fundamental Technology Development for the Needs of Industry



+ Spinn-offs:

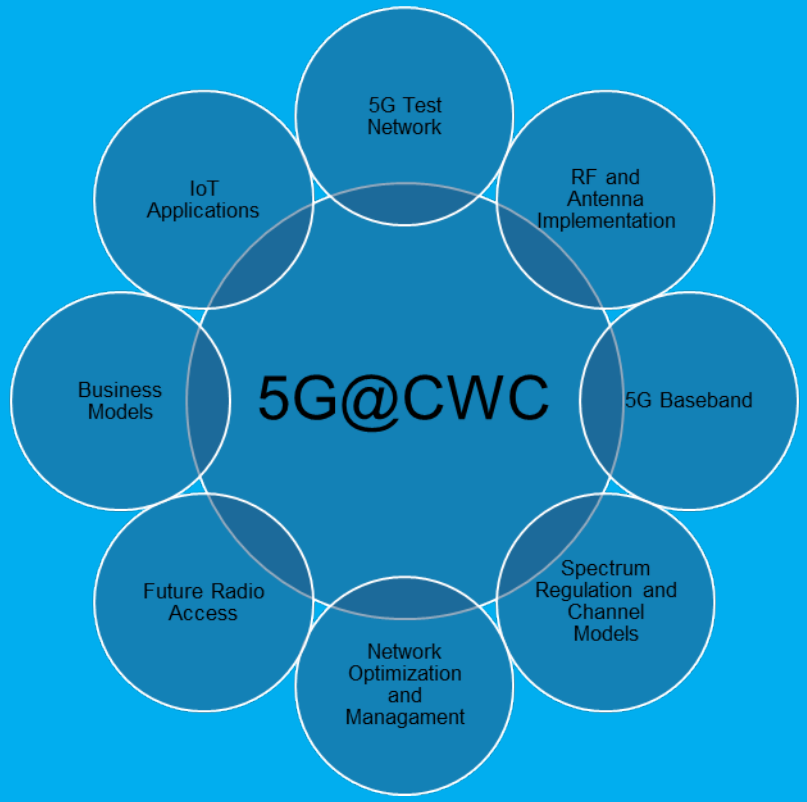
- **Sensinode**
- **KNL Networks (Kyynel)**
- **Solmu**

CWC's Research Groups and Units



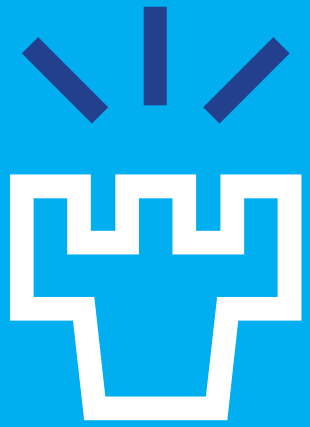
CWC's Expertise Areas

- Networking
- Security and Trustworthy Wireless Internet
- Mobile Cellular Systems (3G, 4G, 5G)
- Radio Access Networks
- Cognitive Systems
- Broadband Short Range Access
- Algorithms and Architectures for Wireless Systems
- Radio Engineering
- Iterative Information Processing
- Robust Signal Processing
- Interference Management
- Transfer to Emerging Technologies
- Security and Defense Communications
- Short Range Communications and Medical ICT



CENTRE FOR WIRELESS COMMUNICATIONS
University of Oulu

#cwcoulu #5GTN



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