DIPARTIMENTO
DI INGEGNERIA
DELL'INFORMAZIONE

1222·2022
800 ANNI

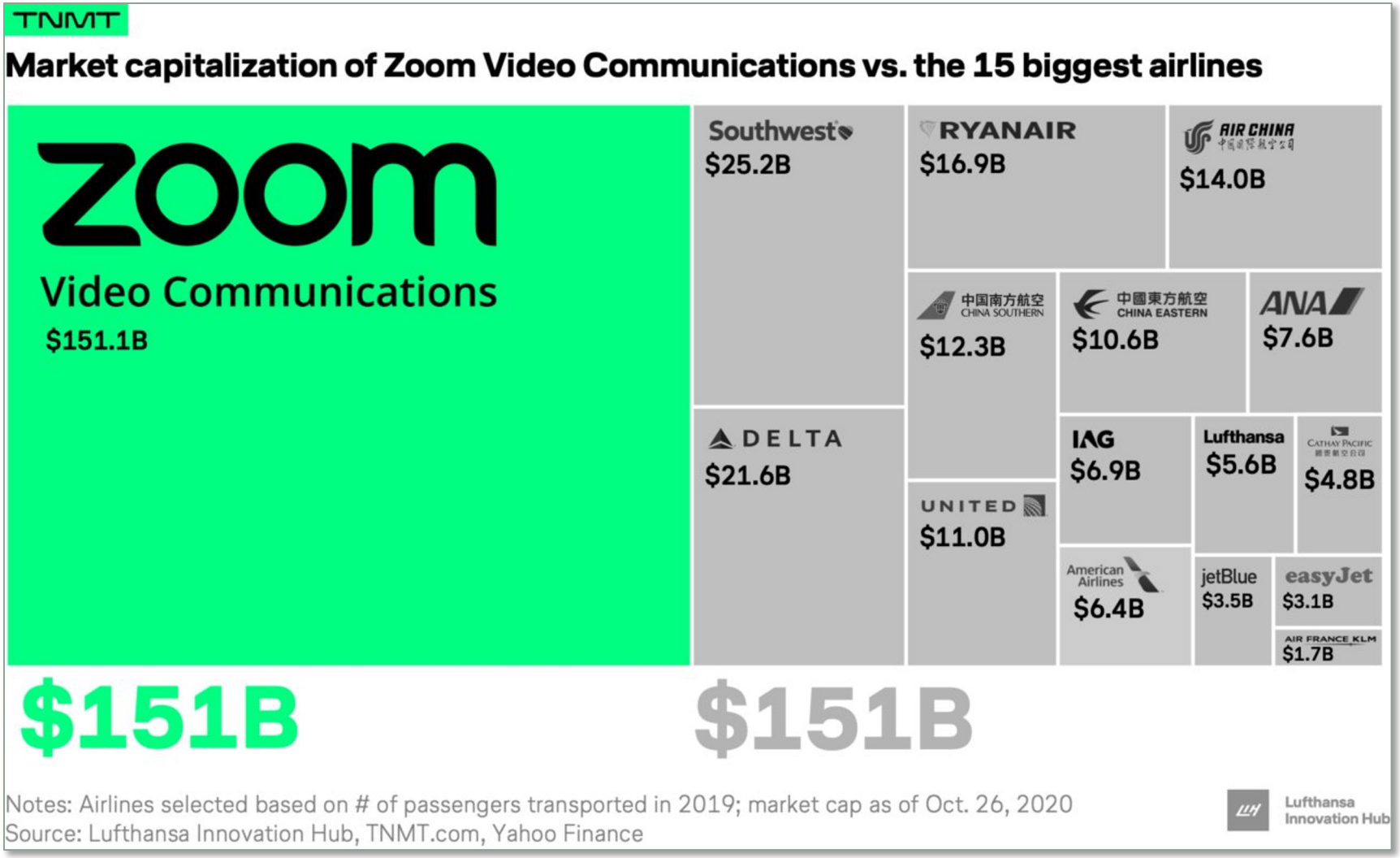
UNIVERSITÀ
DEGLI STUDI
DI PADOVA

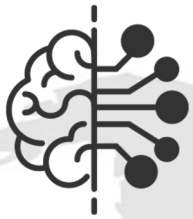
What is ICT?

Information and Communication Technology

systems (hardware and software) for transmitting, sharing, and processing information

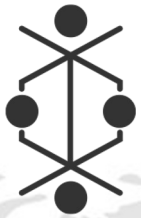
How much is “transport” worth?





machine learning
for heatlhcare

communication
technologies

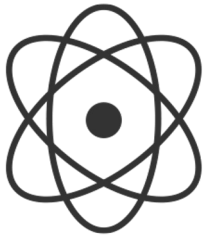


smart
industry 4.0

multimedia
& digital arts

MIME

photonics



quantum
information

Internet & security

medical ICT

ICT is pervasive

- Internet, Web browsing, home-banking, …
- Multimedia streaming, YouTube, Vimeo, PrimeVideo, Netflix ...
- Emails, mobile calls, …

- But this is only the tip of the iceberg…
  - **Smart Cities:** IoT sensing/compression/TX technologies
  - **Indoor, outdoor, vehicular networks:** radar & TX technologies
  - **Multi-access Edge Computing:** edge assisted communications & learning at the network edge (5G/6G mobile nets)
  - **Multimedia:** knowledge extraction from videos, point-clouds, etc., augmented & virtual reality, the metaverse, …
  - **New communication paradigms:** intelligent reflecting surfaces, underwater communications, massive MIMO, …
  - **Machine-learning & decision making** for internetworking
  - **Network and information security**
  - …

The modern ICT engineer – **tools**

- Solid mathematical background
  - Algebra, geometry, probability, statistics, signal theory, …
- Cross-disciplinary tools
  - Programming
    - **C/C++**: embedded and Internet-based systems
    - **Python**: scientific computing, machine learning, system integration
  - Machine learning
    - Classification, feature extraction, unsupervised *vs* supervised learning, deep learning, reinforcement learning, …
  - Optimization theory & methods
    - Convex optimization, Mixed-Integer Linear Programming (MILP), sequential optimization for networking, …

The modern ICT engineer – **technology & applications**

- Solid background on modern ICT *technology*
  - Communications: 5G systems, Wi-Fi, Internet, net. protocols, …
  - Multimedia: signal processing & transmission, …
  - TX media: photonic & quantum technology, fiber optics, antennas, mm-waves, …

- Deepening knowledge on specific ICT *applications*
  - ICT for Industry 4.0
  - Sensing systems, Internet of Things (IoT)
  - ICT for healthcare, e-health
  - More later, …

MIME

- A modern & flexible Master's Degree (2 years)
- Centered on
  - ICT: tools, technology and applications
  - With an eye on **modern ICT systems**
    - 5G (6G) mobile networks, Internet of Things,
    - Industry 4.0, virtual/augmented reality, e-health, …
- Allows you to shape your study path along three axes
  - Type of technology: communications, multimedia, TX media
  - Cross-disciplinary tools: programming, machine learning, optimization
  - Application domain: mobile nets, Internet, IoT, e-health, …

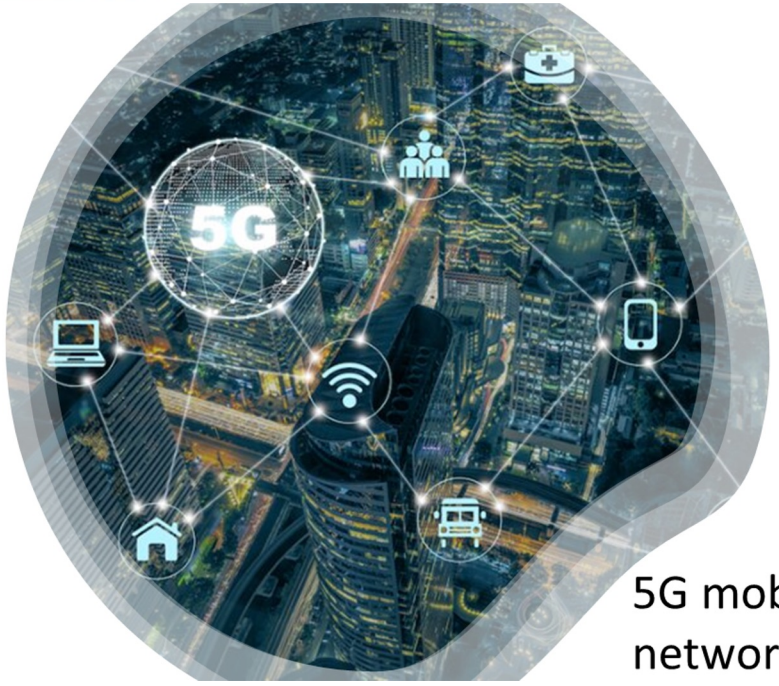
STUDY PATHS

Four curricula (Cx), eight tracks (Tx)

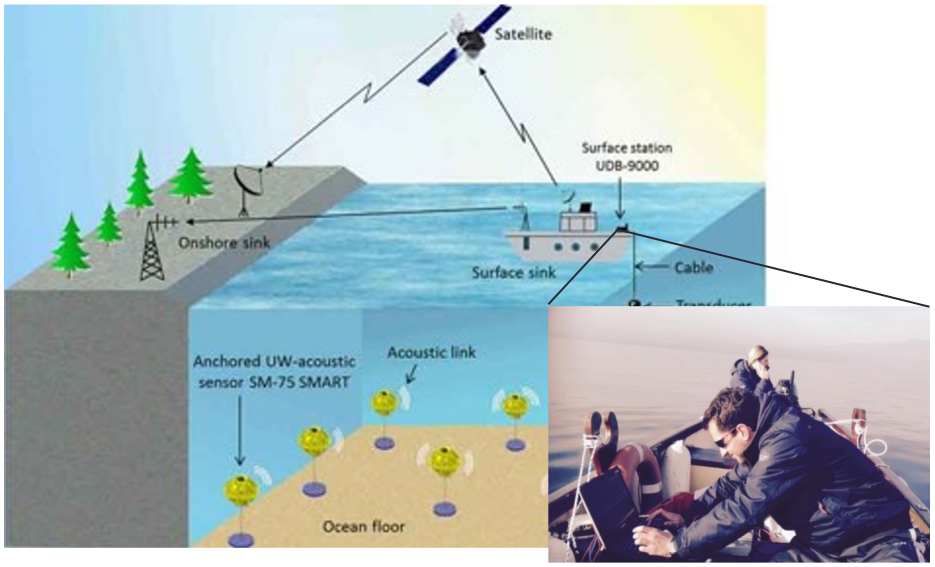
- C1 – Communications
  - T1. Communication technologies
  - T2. Smart Industry 4.0
- C2 – Cybersystems
  - T3. Internet & security
  - T4. Multimedia & digital arts
- C3 – Photonics
  - T5. Photonics
  - T6. Quantum information
- C4 – ICT for Life & health
  - T7. Medical ICT
  - T8. Machine learning for healthcare

Communications

Internet of Things



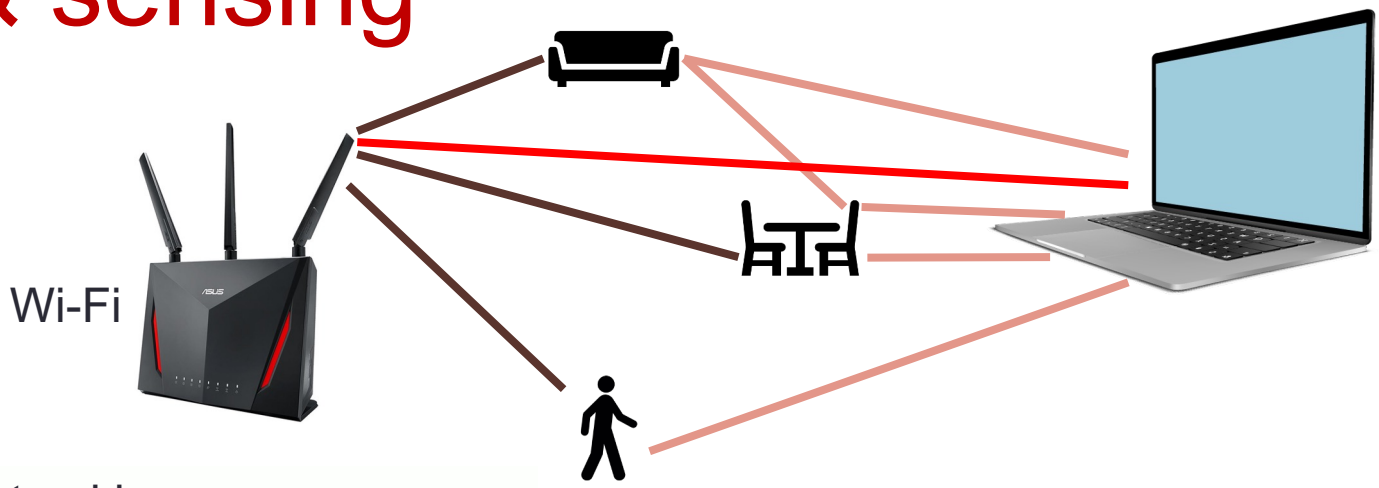
5G mobile networks



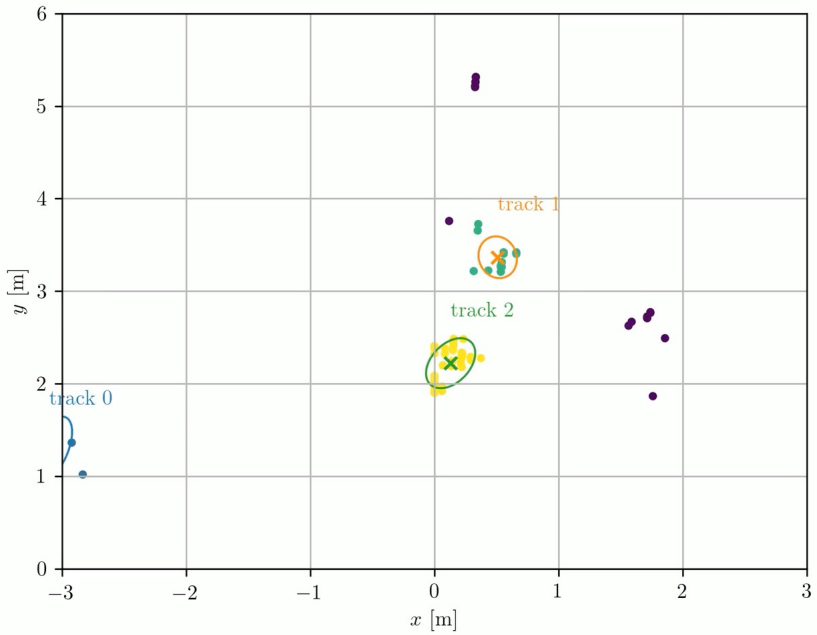
Underwater communication networks

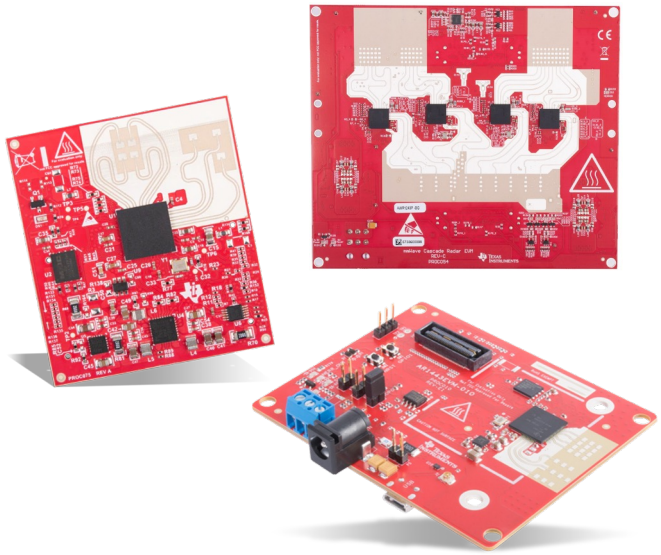
Massive MIMO

Comm & sensing



Realtime user tracking

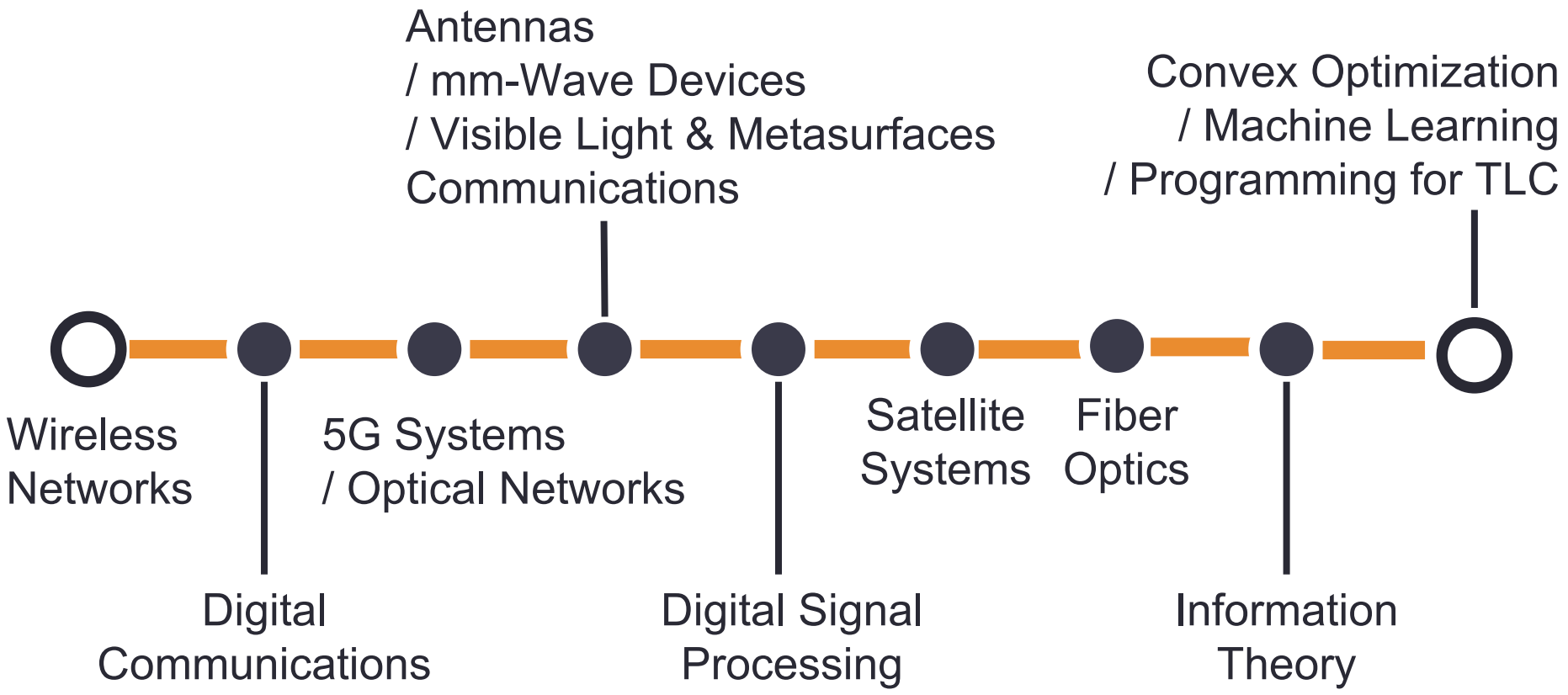




mm-wave radar devices

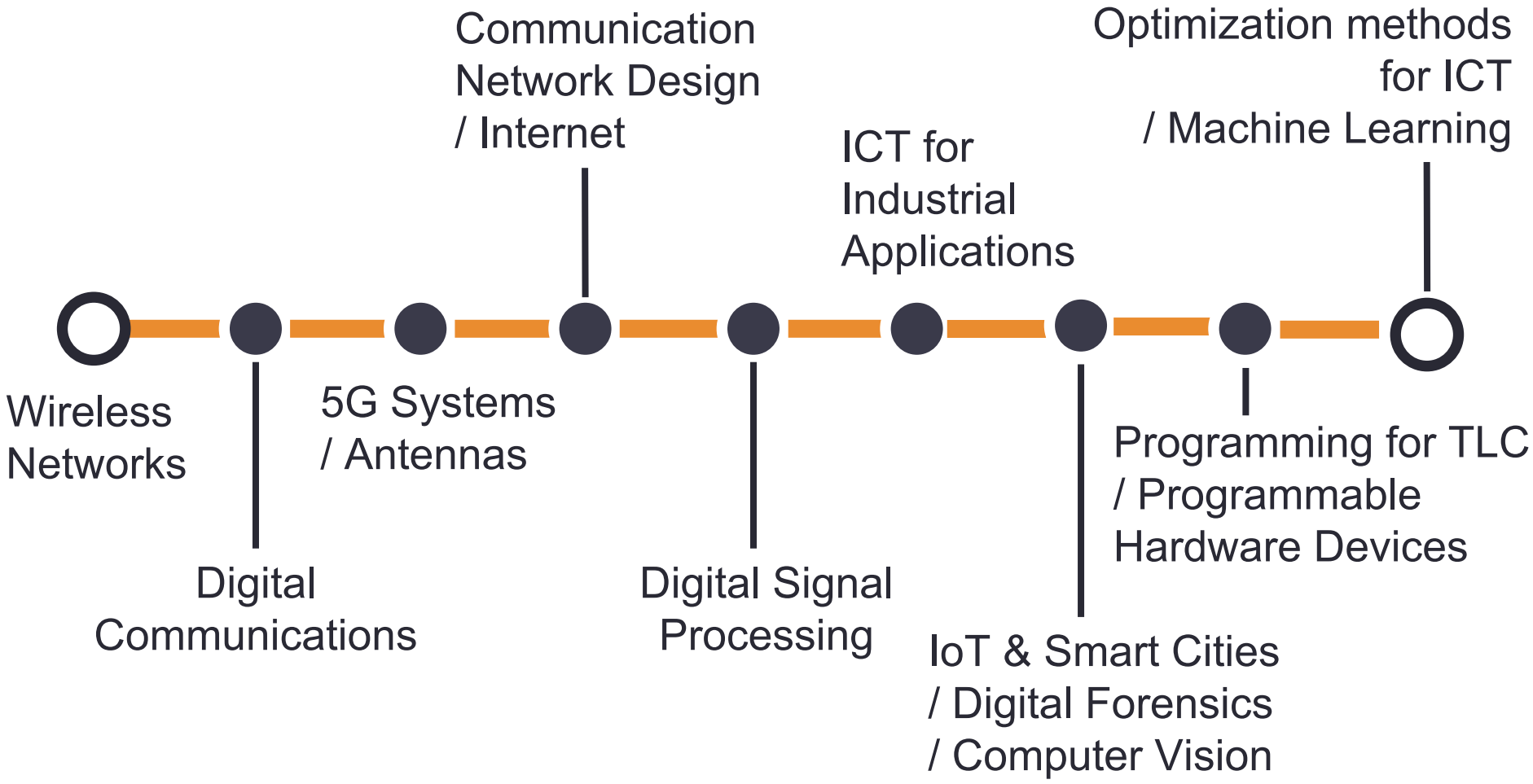
T1. Communication technologies

Related subjects

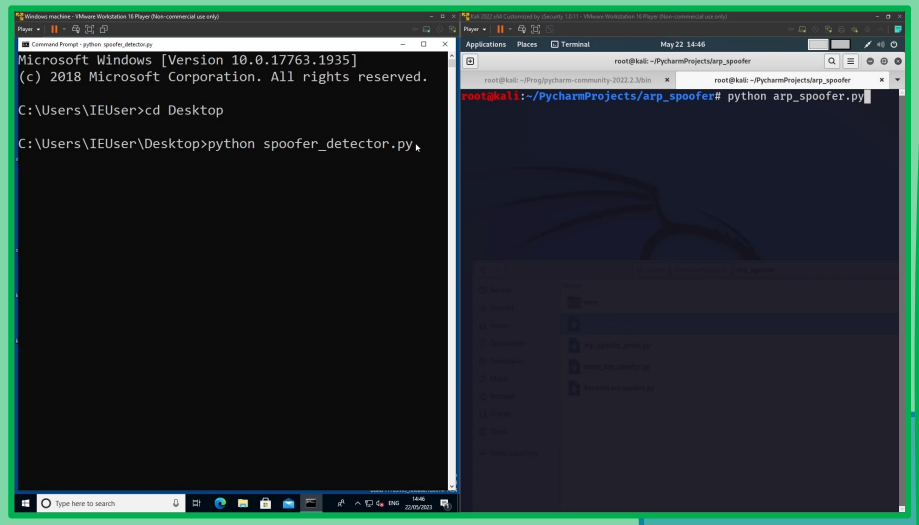


T2. Smart industry 4.0

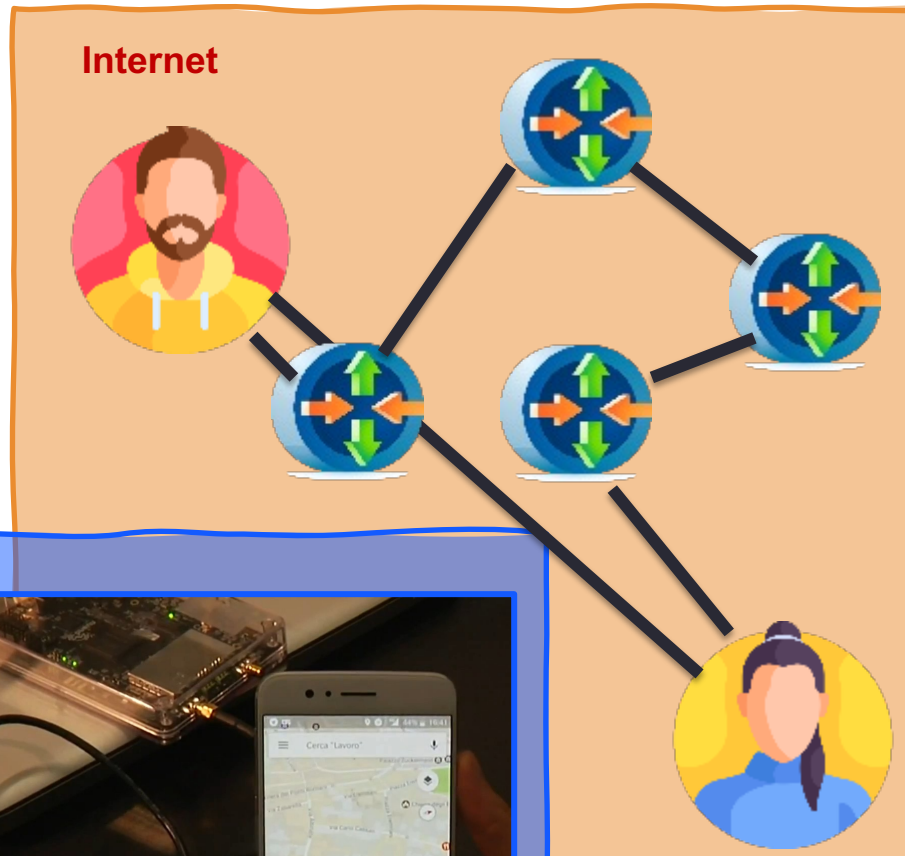
Related subjects

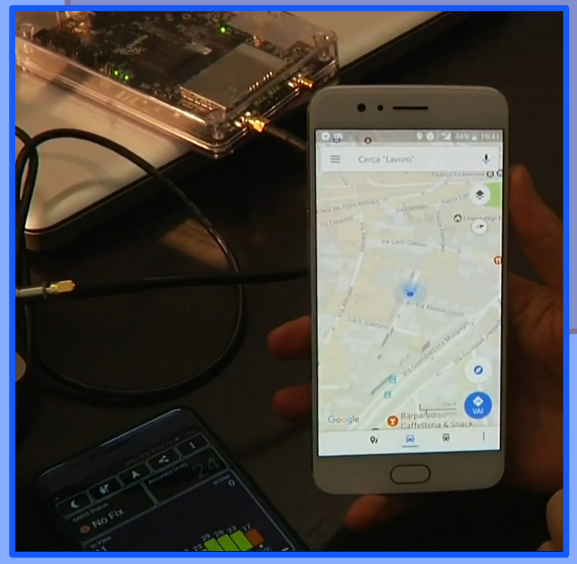


Internet & Security



Privacy & data protection for network systems



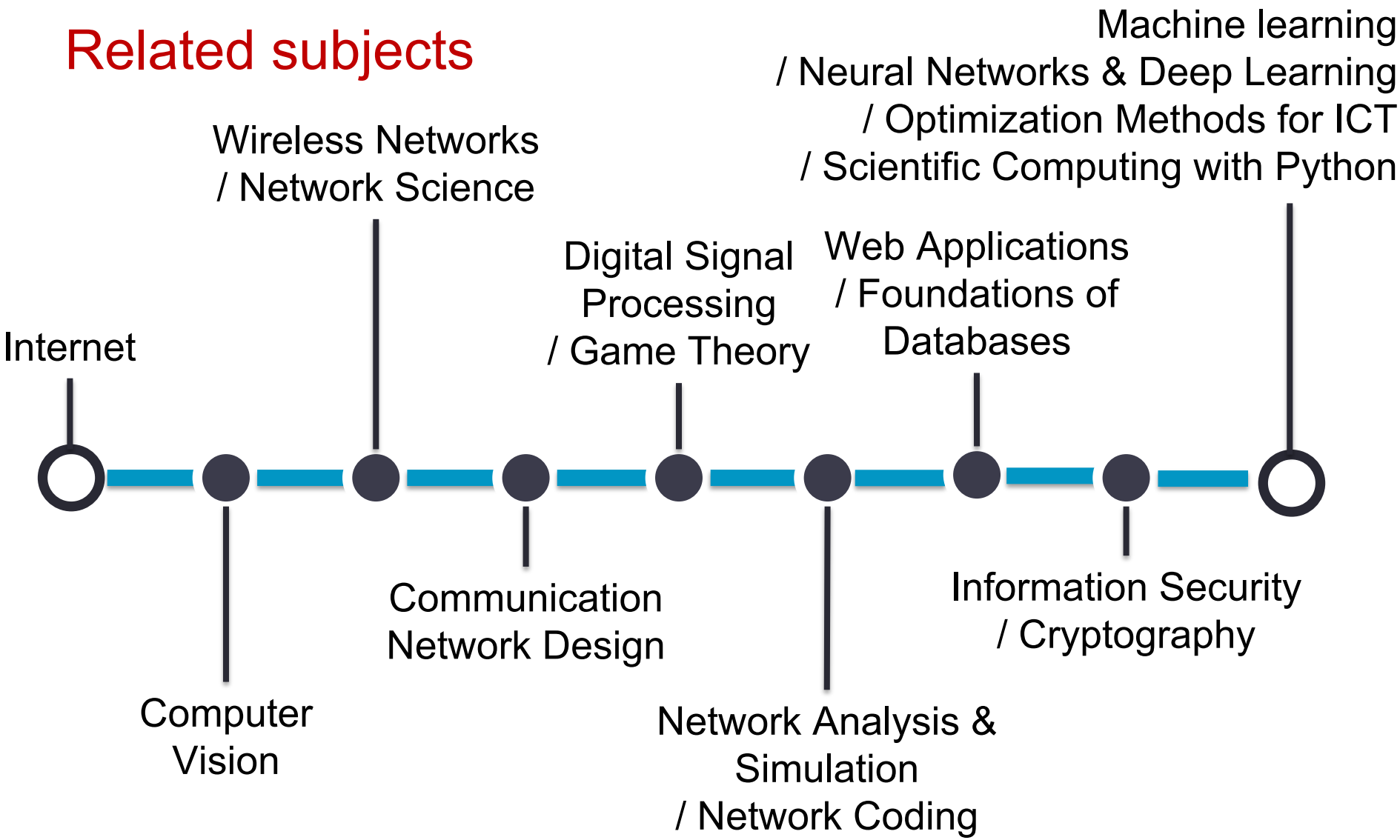


Secure satellite positioning

Icons created by Freepik.
Available at www.flaticon.com

T3. Internet & Security

Related subjects



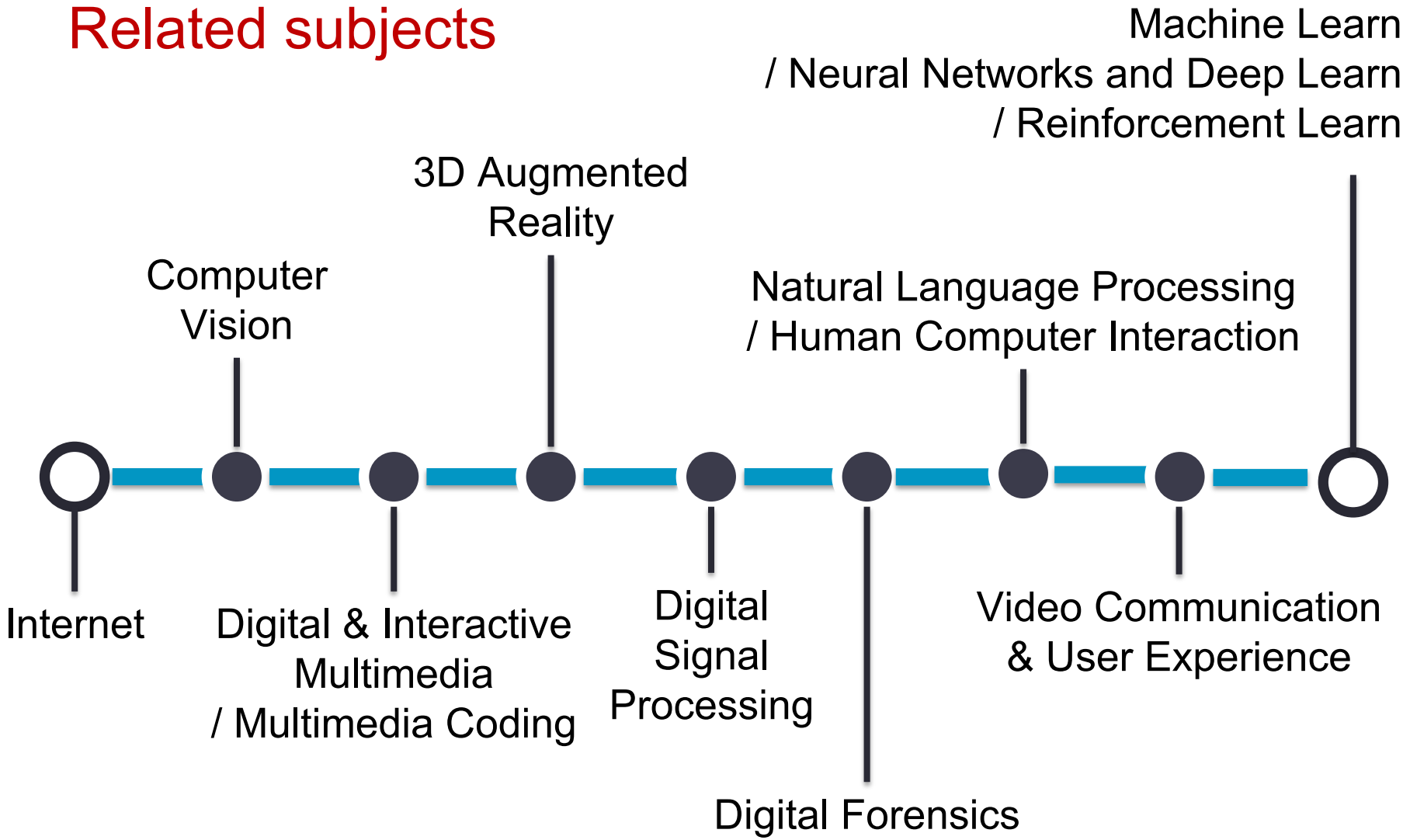
Multimedia & Digital Arts

Video segmentation for autonomous vehicles

Virtual Reality

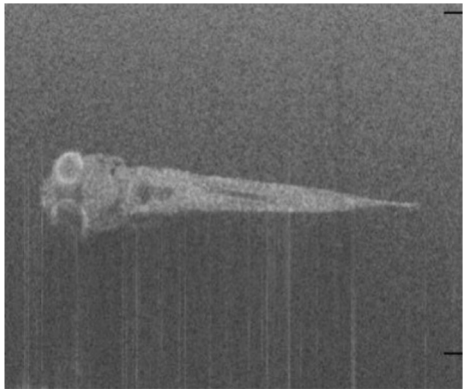
T4. Multimedia & Digital Arts

Related subjects

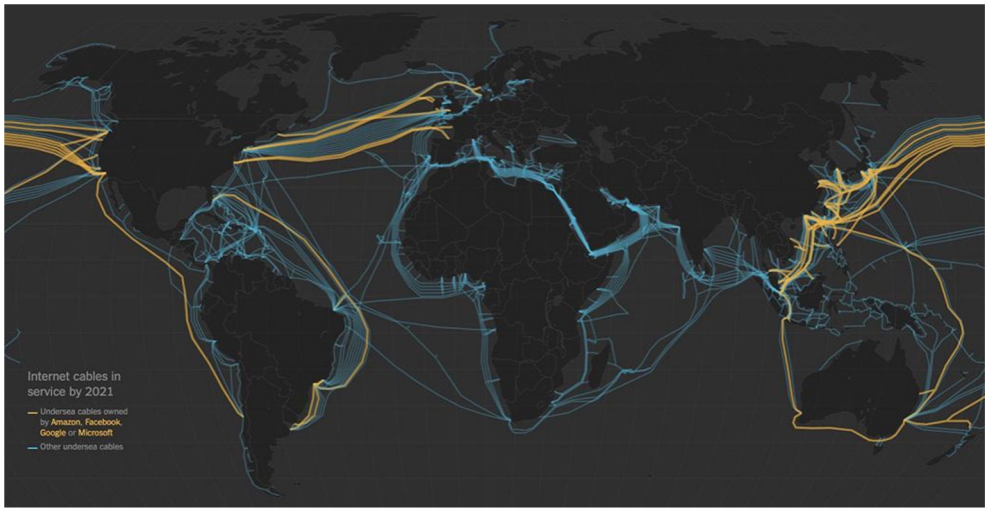


Photonics

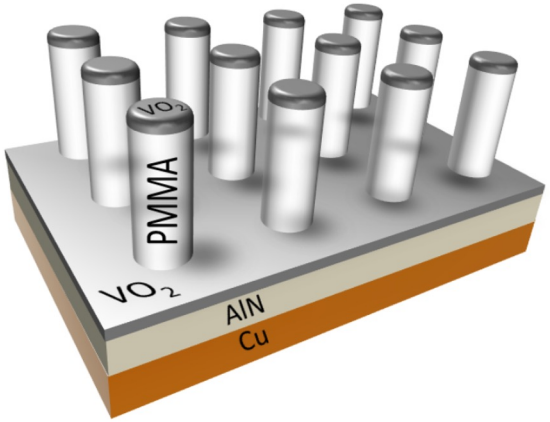
Biophotonics for imaging and sensing
(OCT of zebrafish)



2-billions of km of optical fiber guarantee world-wide communication

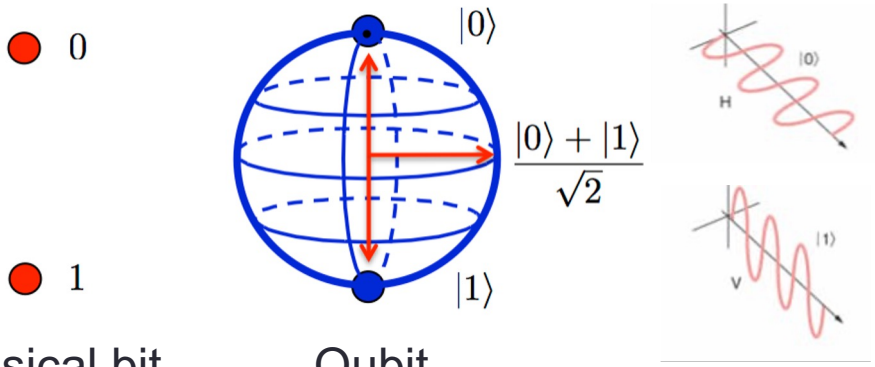


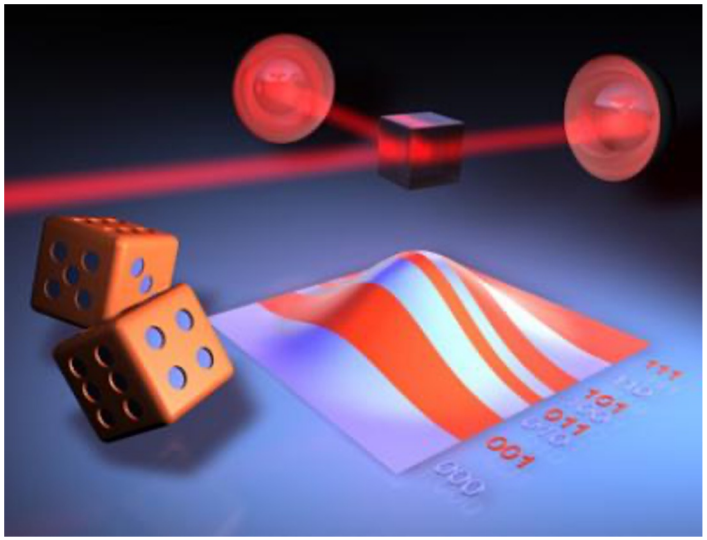
Reconfigurable antennas for 5G/6G communications
(Plasma reflectarray)



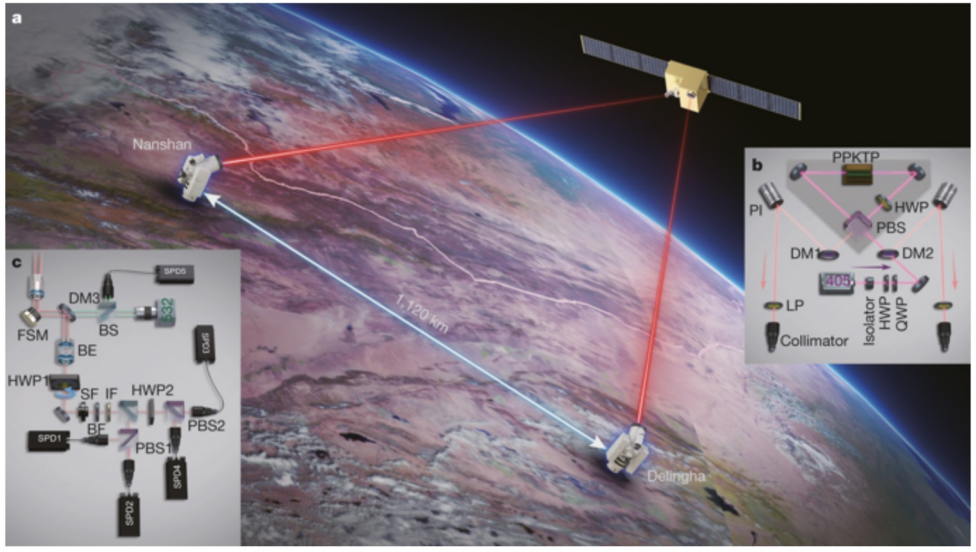
Nanophotonics and metamaterials enable light engineering
(A tunable metasurface based on vanadium dioxide)

Quantum information





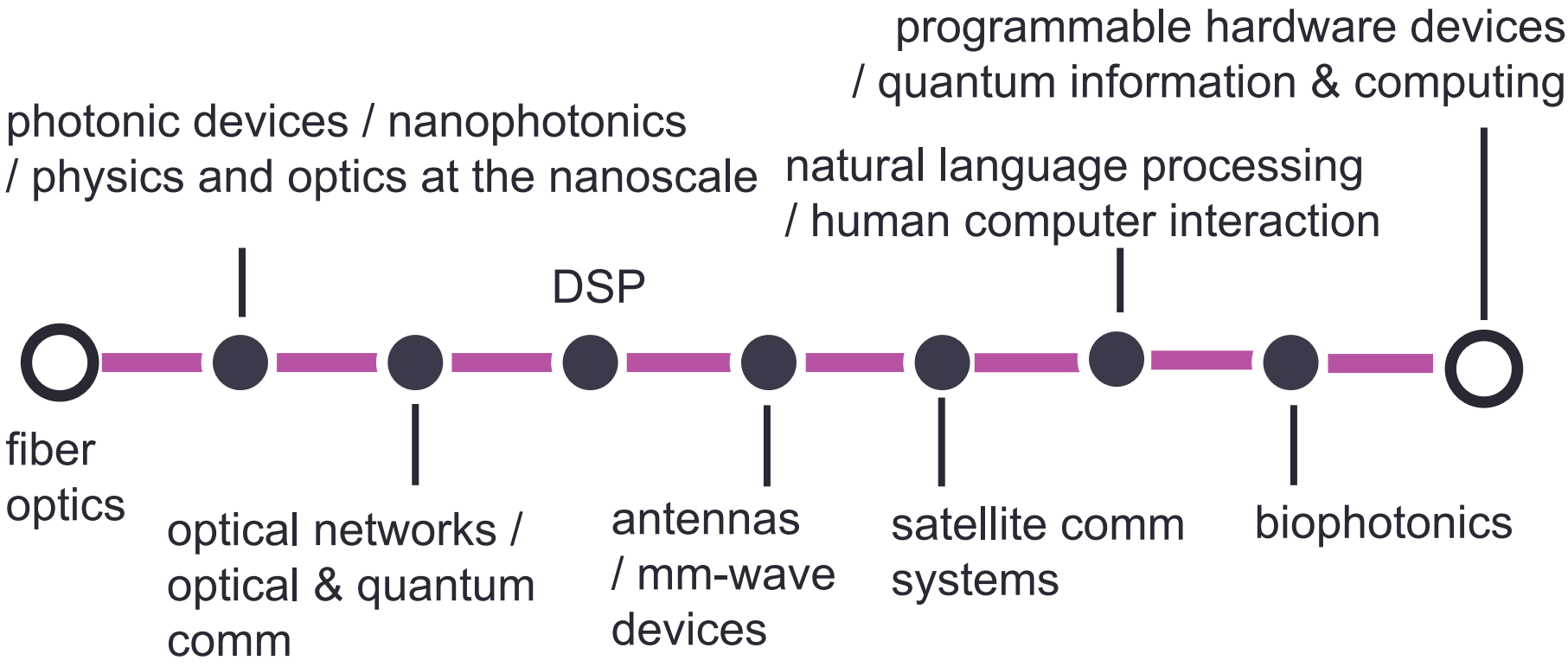
The perfect random number generator by quantum measurement



Entangled states of two photons for secure communications

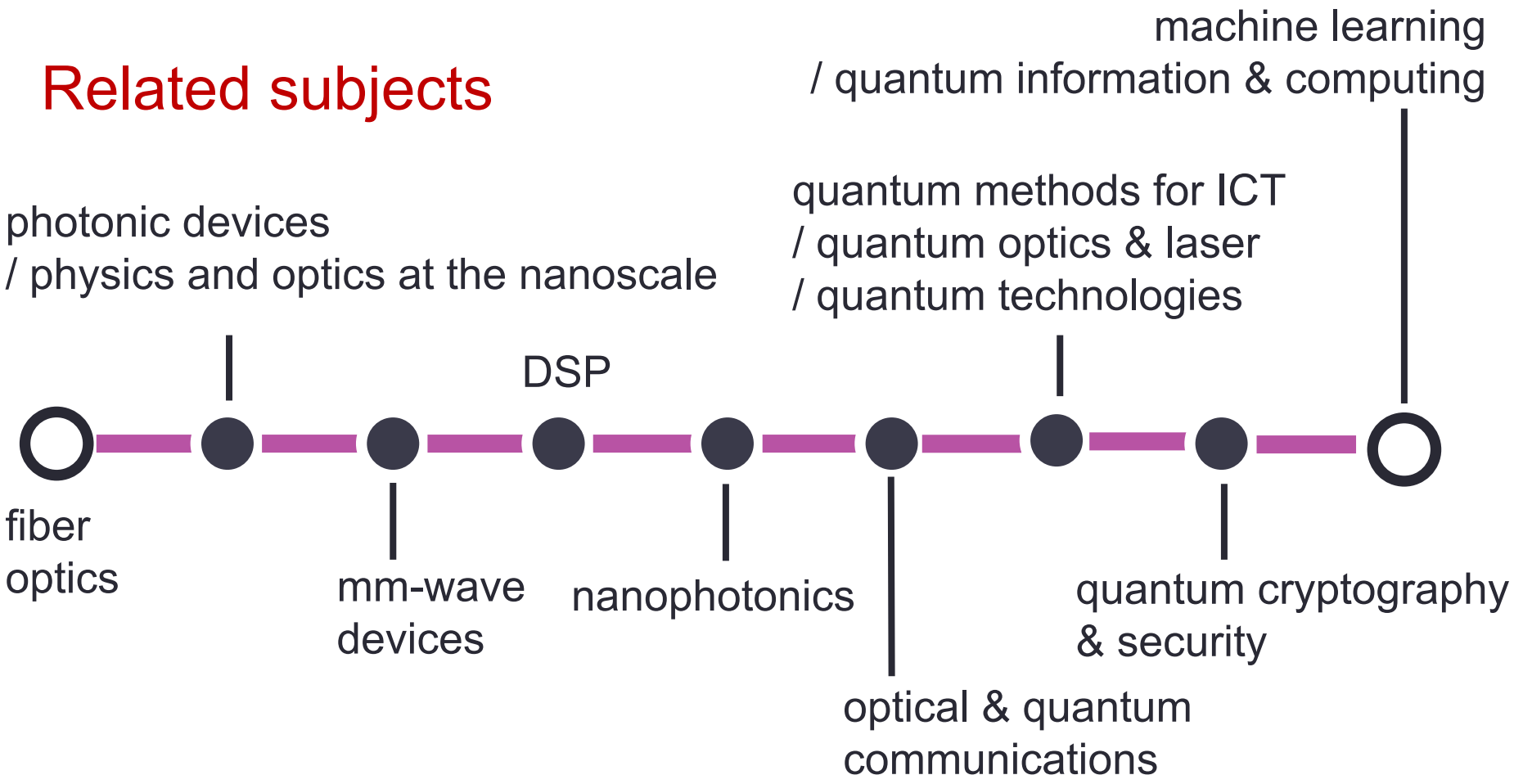
T5. Photonics

Related subjects

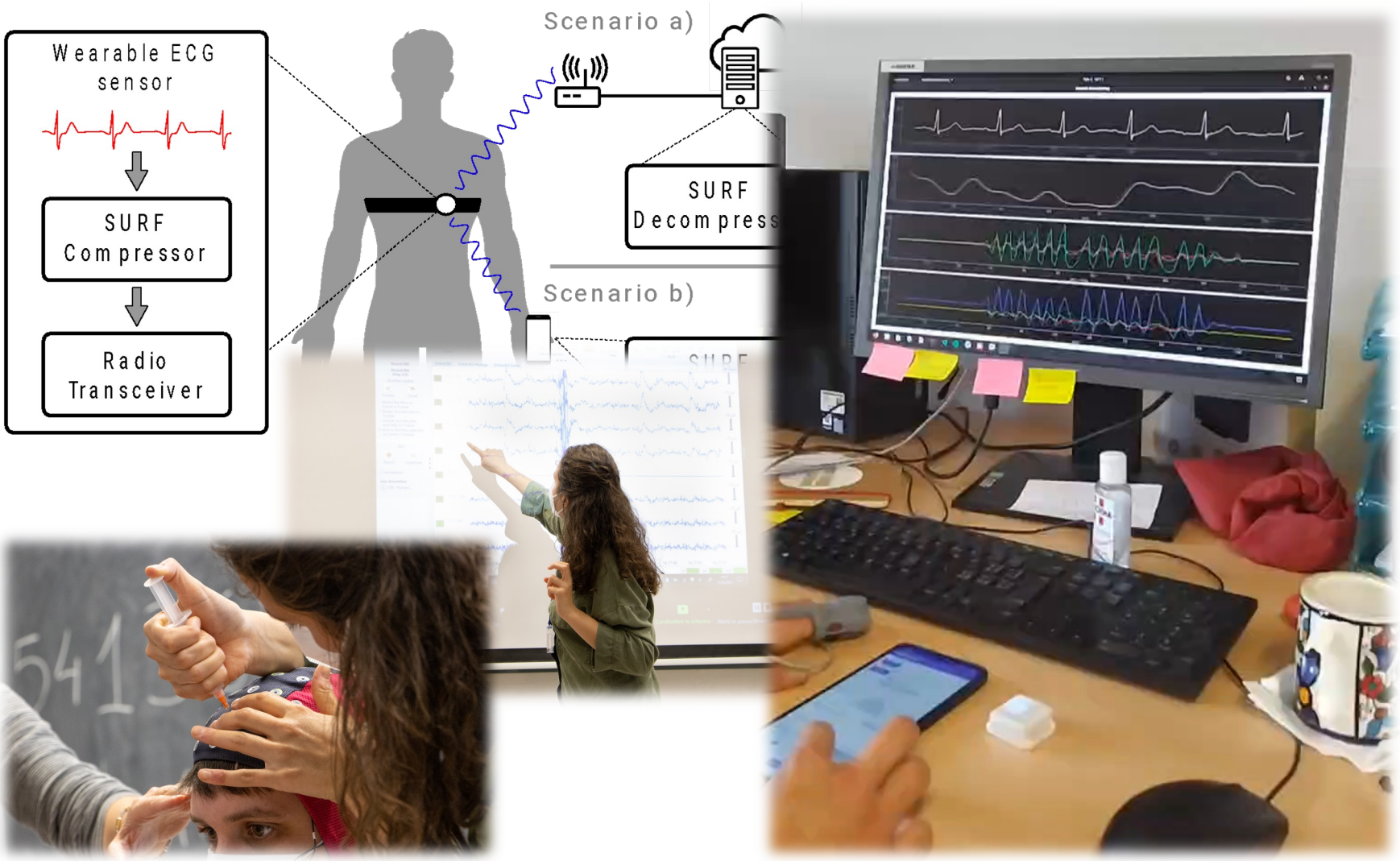


T6. Quantum information

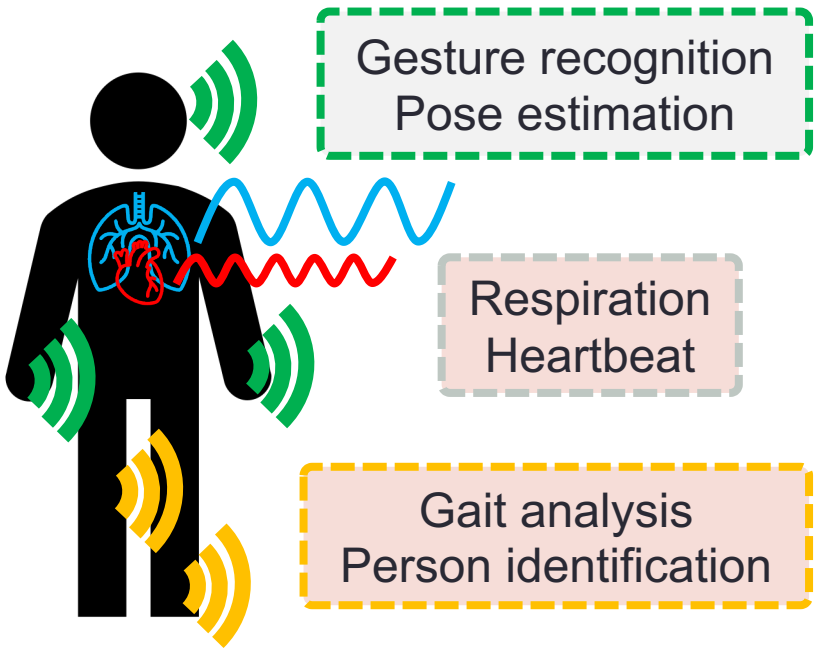
Related subjects

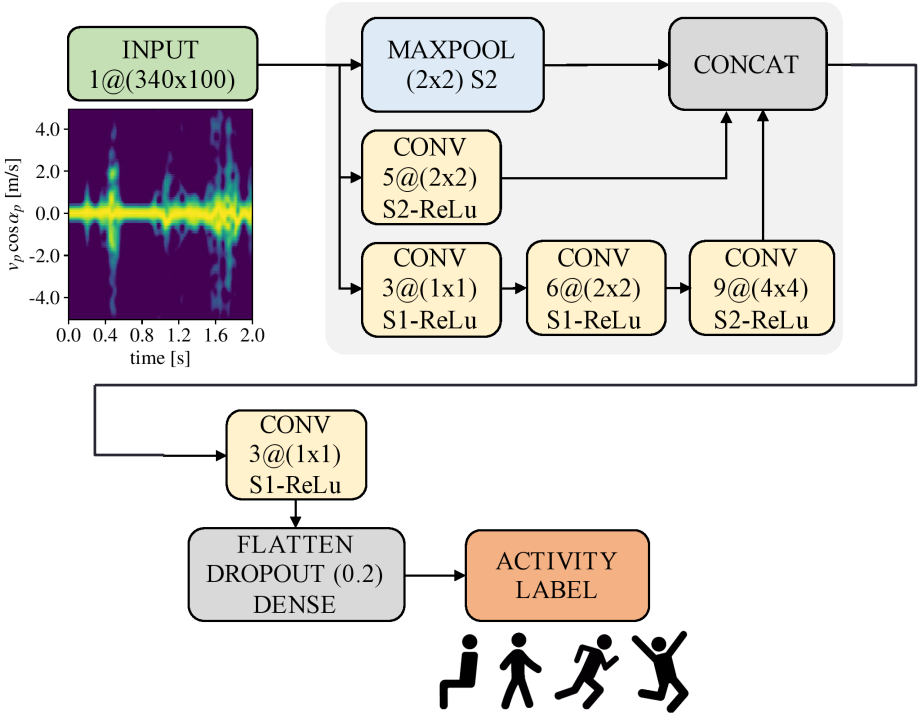


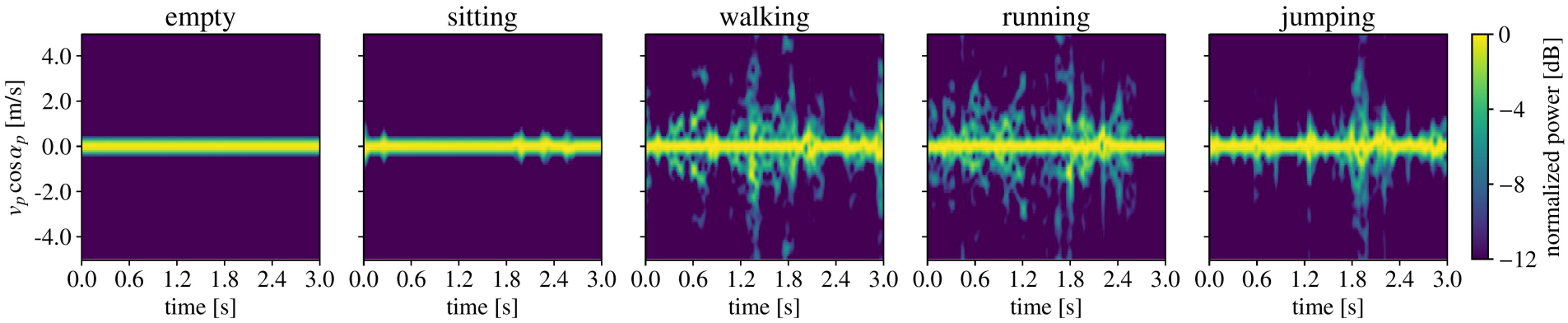
ICT for Life & health



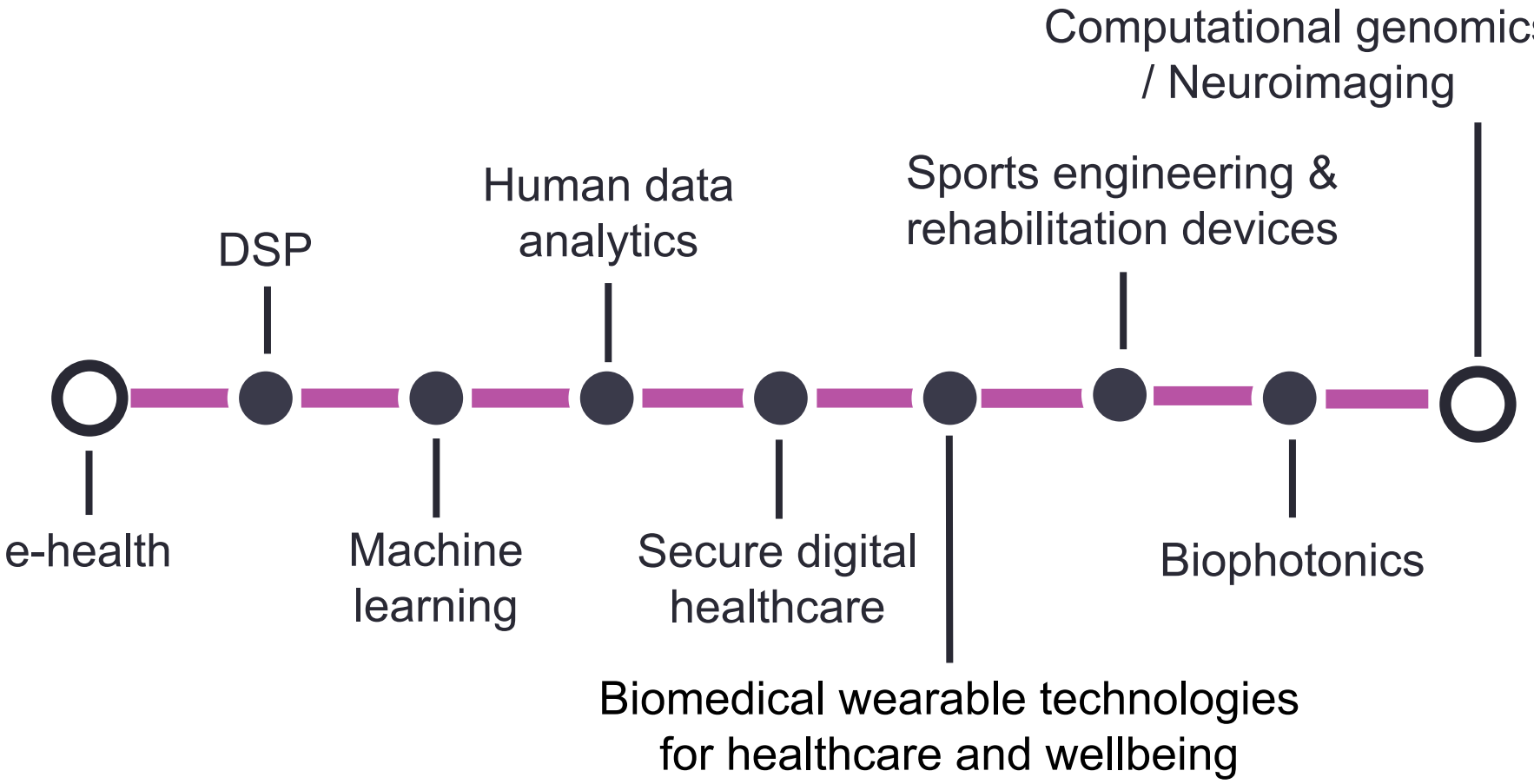
ICT for Life & health



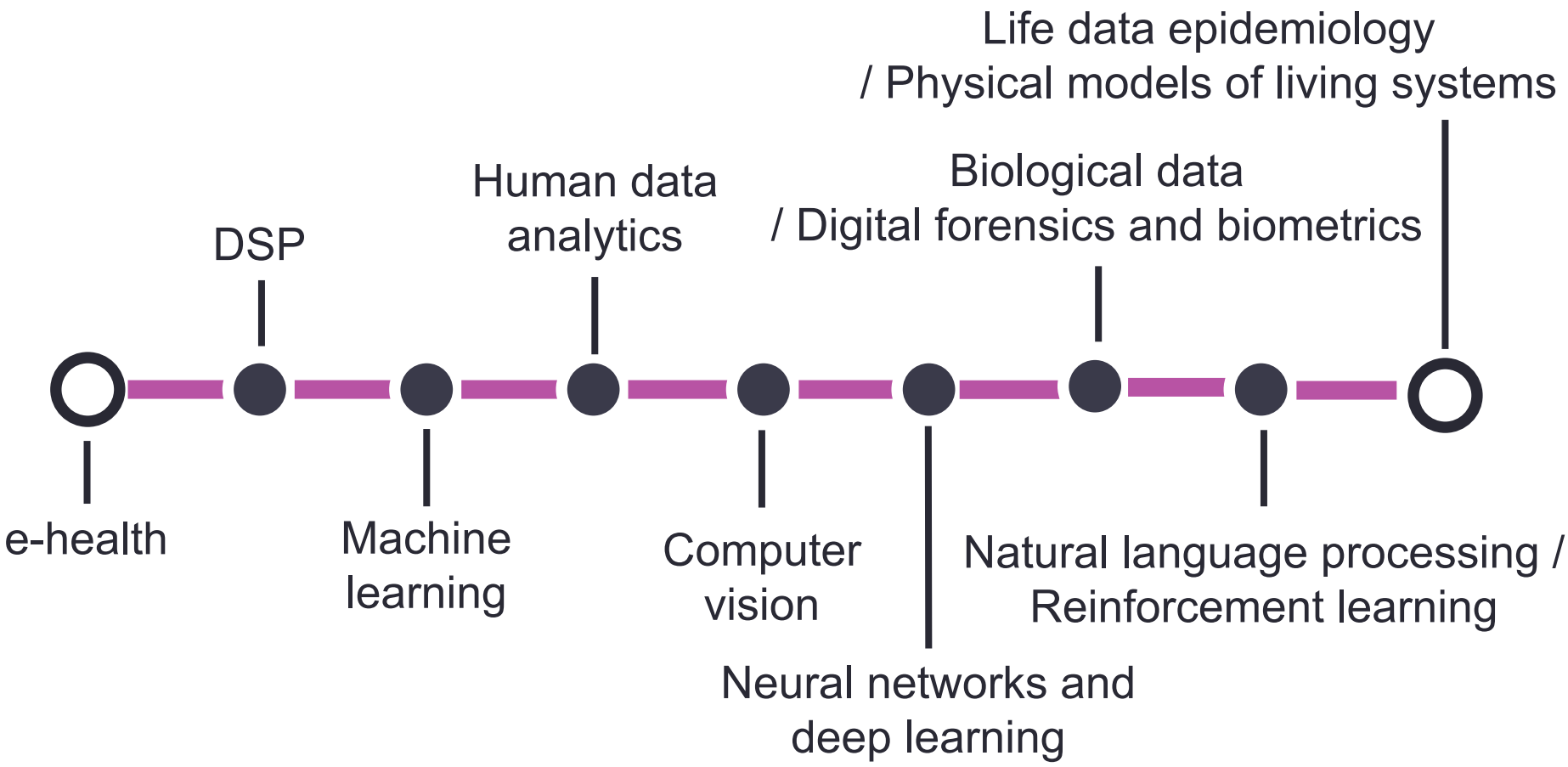




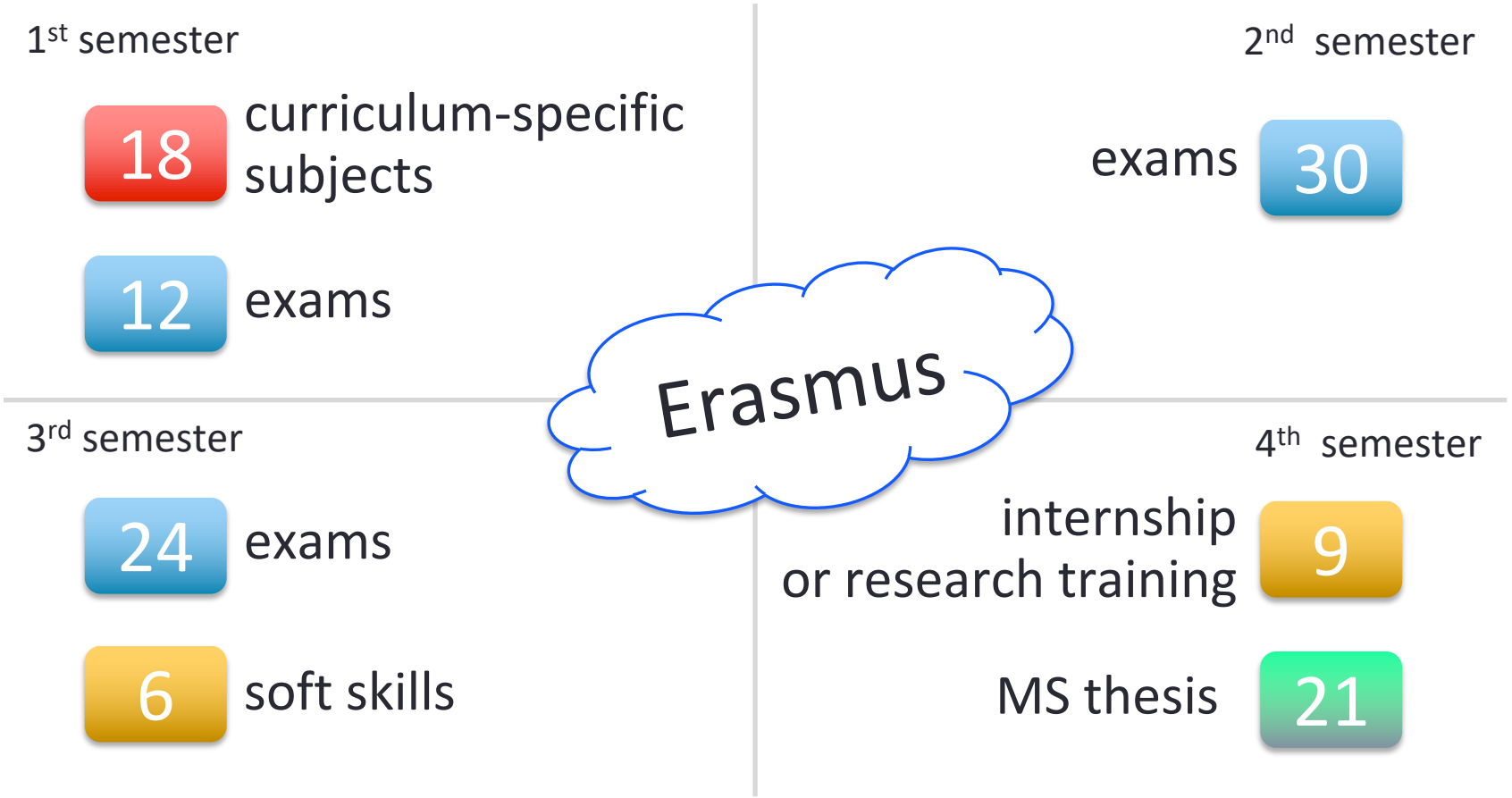
T7. Medical ICT



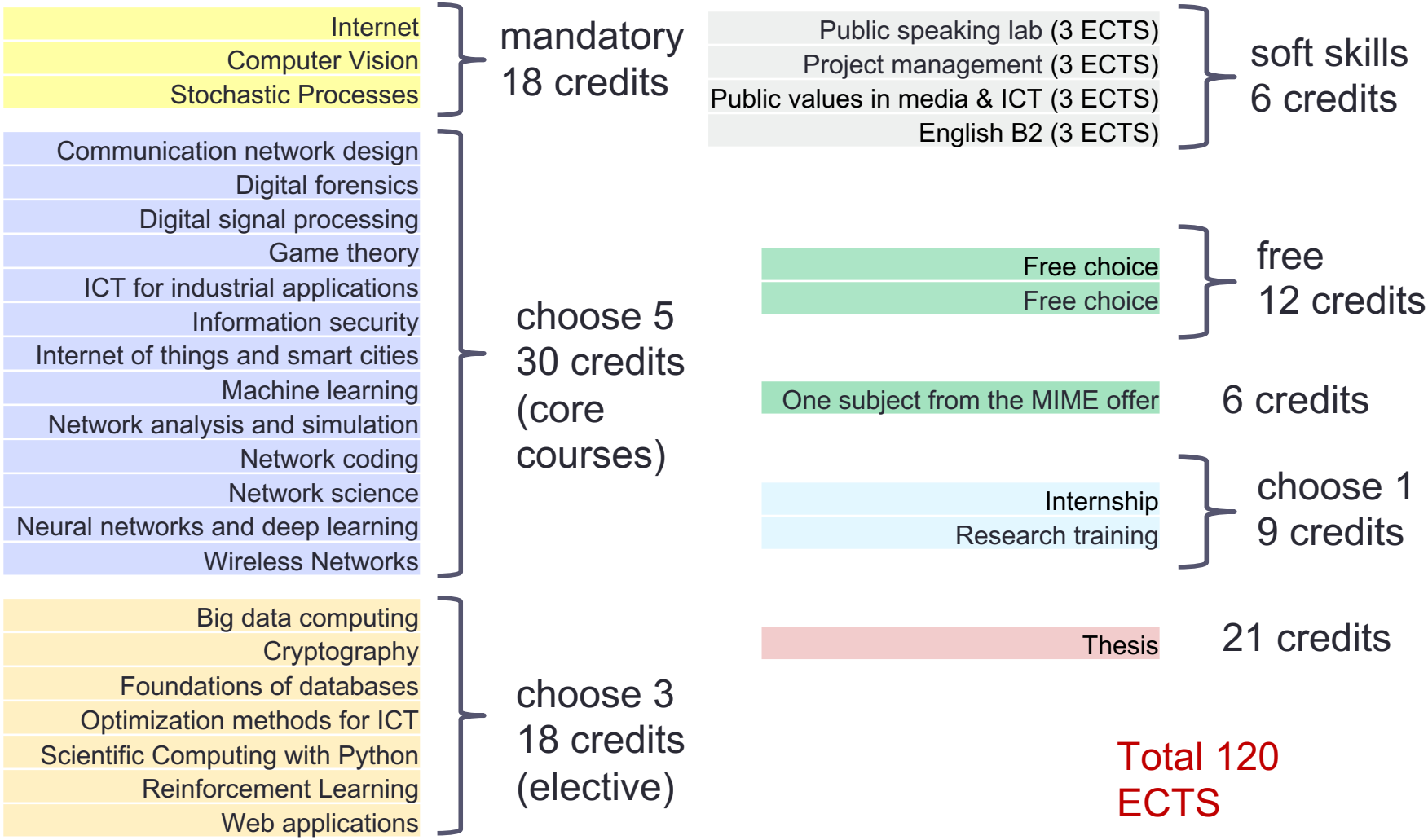
T8. Machine Learning for healthcare



Typical study plan – credit distribution



Example: T.2 Internet & Security track



INTERNSHIPS

Sony Eutec
STUTTGART (DE)

Multimedia R&D

Fiat Chrysler Automobiles
TURIN / USA

5G vehicular communications

Huawei
MILAN / CHINA

Cellular networks R&D

Policlinico Sant'Orsola
BOLOGNA

Infectious diseases unit

World Sensing
BARCELONA (ES)

Wireless sensors monitoring

RFI
MESTRE (VE)

Railway network

Telenor
OSLO (NO)

National telco operator

CAME SpA
DOSSON DI CASIER (TV)

Safe access

Infineon
PADOVA / AUSTRIA

Semiconductors and IoT

Athonet
BOLZANO VICENTINO (VI)

Software defined networking

INTERNATIONAL BY DESIGN

A truly multicultural environment

English as first and only language
240 international students accepted from 30+ countries on 5 continents

Mobility programs

- You can choose:
  - Erasmus+ to study in EU countries
  - SEMP to study in Switzerland
  - Ulisse program to study in Europe, America, Asia and Oceania
  - DECAMP virtual mobility as a partnership of European universities
  - Double Degree programs with **Universidad Politécnica de Madrid** and **National Taiwan University**
  - TIME double degree programs with **Danmarks Tekniske Universitet**, **Universitat Politècnica de Cataluña**, **Universidade de Lisboa**, **Université Catholique de Louvain** and **Yokohama University**.

STATISTICS

occupation perspective, satisfaction, …

Some numbers from AlmaLaurea

- Average duration of studies: 2.3 years
- Average graduation mark: 108.1
- Had an experience abroad: **32.2%** (during Covid)
- Got a scholarship: 25.6%
- Internships at companies: 64.5%
- Overall satisfaction: **96.6%**
- Teaching satisfaction: 97.8%
- Would enroll again: 80%

After graduating (AlmaLaurea)

- 33.3% enter a Ph.D. program
- 57.8% are employed after 1 year
- Average time from graduation to 1st job: 45 days
- Total unemployment rate: **2.4%**
- Monthly salary after 1 year: 1690€
- Permanent positions after 1 year: **53.8%**
- Monthly salary after 5 years: 2290€
- Permanent positions after 5 years: **80%**

ADMISSION PROCEDURE

Admission

- Holders of Italian degree ≥ 84/110 with at least 50 ECTS credits in:
  - maths (MAT/02, MAT/03, MAT/05, MAT/06)
  - physics (FIS/01)
  - computer science (INF/01, ING-INF/05)
  - telecommunications (ING-INF/02, ING-INF/03)

Direct access for graduates with a Bachelor degree in Information Engineering, Maths, Physics, Computer Science

Admission

- If you are an International student and you do not hold an italian degree, you will be evaluated by an Admission Committee to verify that an equivalent criterion applies

- Depending on the country, this translates into different minimum entry requirements on CGPA or percentage

- Two calls per year: typically one open from November to February and one from March to May (September for EU students)

- Check out https://mime.dei.unipd.it/applications/ for further details

FURTHER INFO & CONTACTS

mime@dei.unipd.it

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