

AIDA innova training course on quantum applications



23 - 24 January 2025



CERN

With a focus on particle detection technologies for applied physicists and engineers

Rafael Ballabriga, Thomas Brent,

Anne Dabrowski, Amanda Diez Fernandez,

Ana Dorda, Sabrina El Yacoubi, Georgy Kornakov,

Antoine Laudrain, Lucie Linssen,

Beatrice Mandelli, Rita Pinho



This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 101004761.

WP2: Communication, Outreach and Knowledge Transfer

- **What is AIDAInnova? What do we do?**

- EU-funded programme for academics, industries and organisms.
- explore applications of novel technologies, strengthen synergies between projects, ...

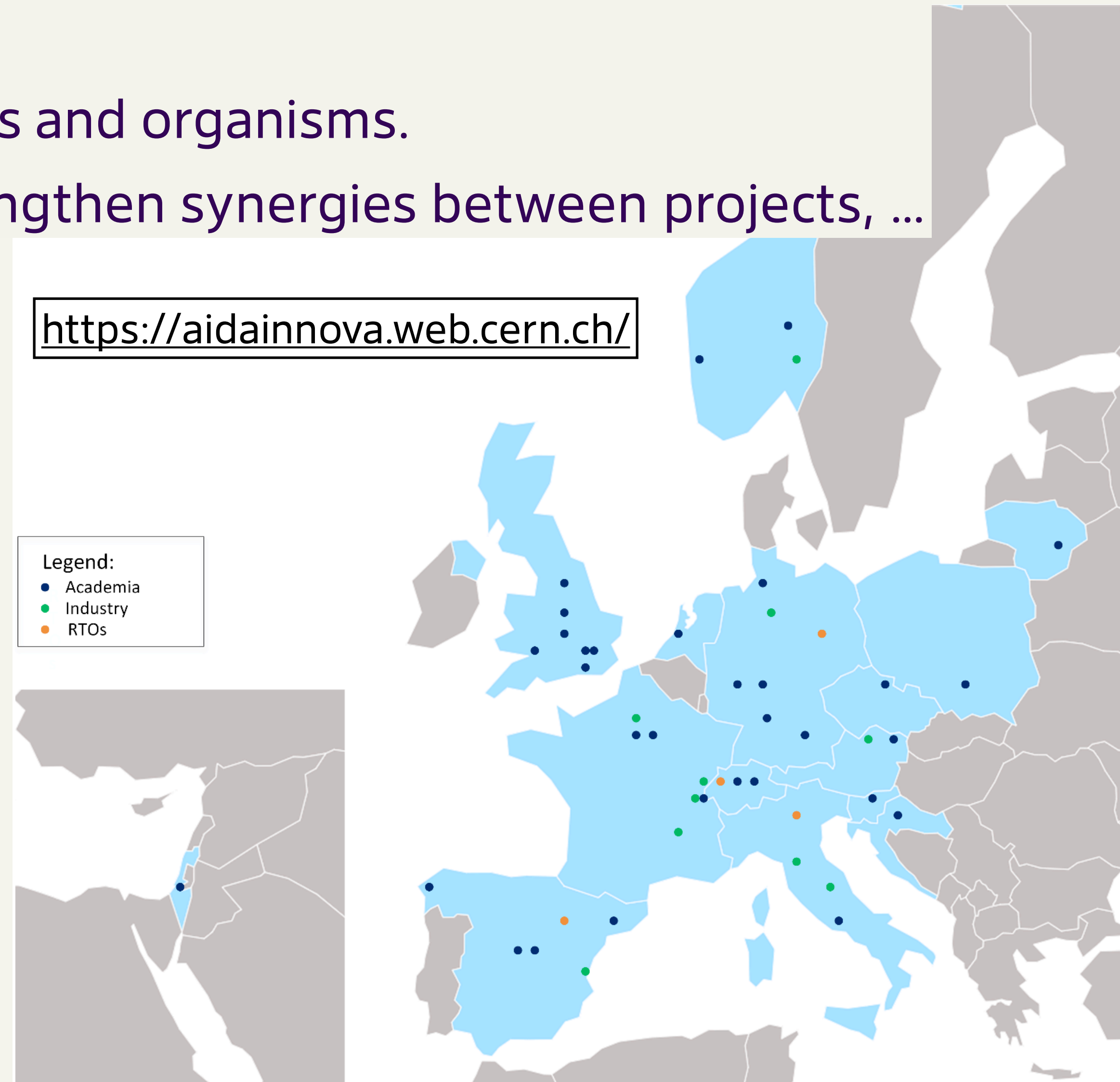
- **12 work packages:** testbeams, silicon sensors, calorimeters, gaseous detectors, mechanics, electronics, software, etc...

- **WP2: communication, outreach, technology transfer.**

- One of our goals is the training of early career scientists.
- We chose a topic we consider important for the future development of the field...
- ... and that linked with hardware developed within AIDAInnova.
- → training on quantum technologies.

<https://aidainnova.web.cern.ch/>

Legend:
 ● Academia
 ● Industry
 ● RTOs



TL;DR: enjoy, ask questions, discuss, network!

- Lecturers are top level researchers, **from academia and industry**.
- Target audience is young researchers and engineers, who do not yet have an extensive experience in the field of quantum technologies and detectors.
 - Goal is to give you an **introduction in a range of different topics...**
 - ... which can be applied to HEP detectors (not only colliders).
- **Don't be afraid to ask questions!**
 - ~100 registrations to the school, so you won't be alone wondering!
- Take advantage of this school to **expand your network!**
 - Valuable contacts whether you are just interested in the topic "for fun", or this is a part of your PhD / work!

- Thursday:

- General introduction (Andrei Nomerotski)
- Quantum timing (Andrei Nomerotski)
- Biomedical applications (Lorenzo Cortese)
- Time-of-flight detectors (Sara Pellegrini)

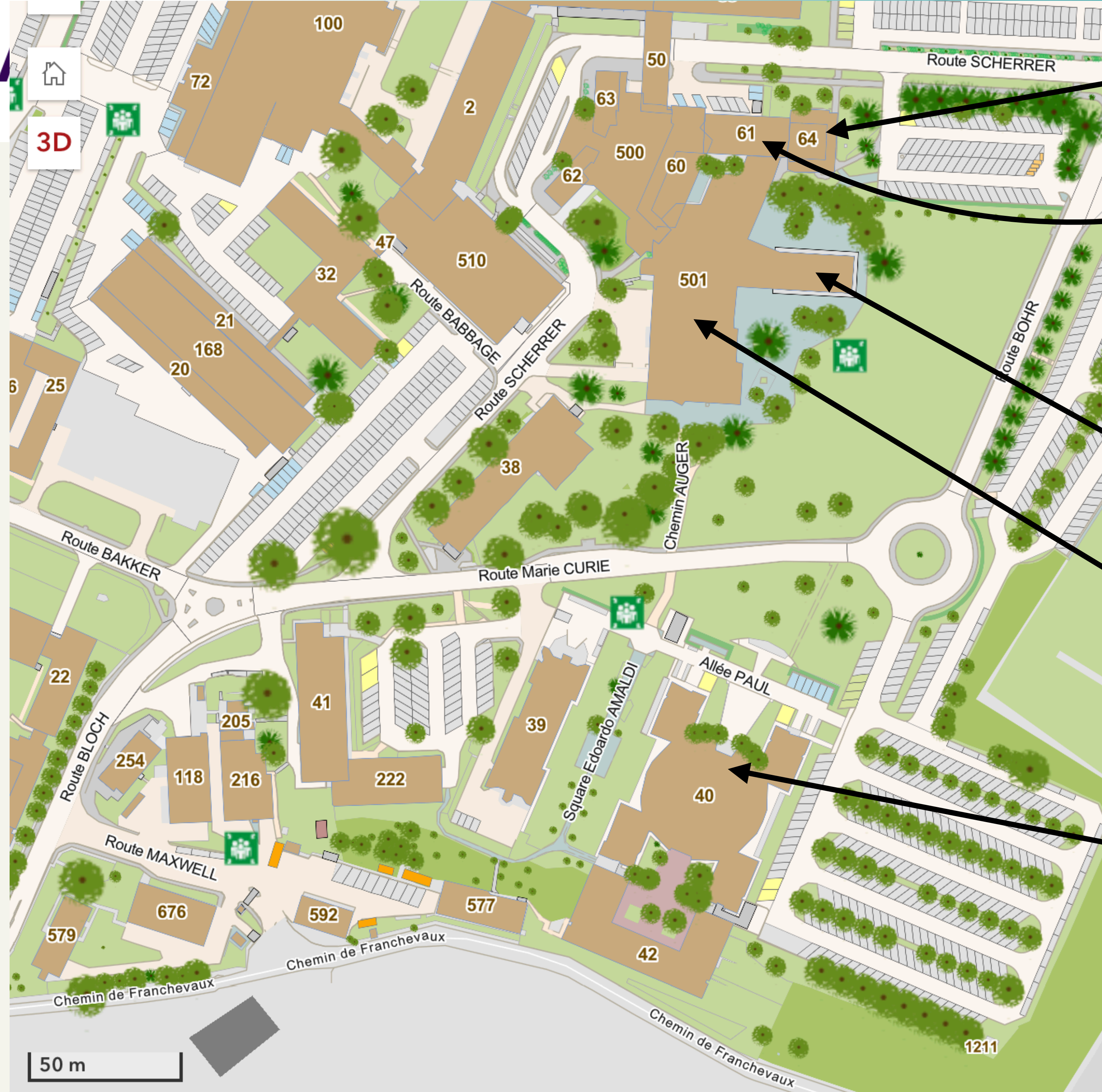
- Quantum random number generators (Massimo Caccia)
- Quantum computing applications (Daniel Egger)
- Superconducting nanowires (Boris Korhz)
- Industry talk: IDQuantique (Félix Bussière)
- Readout electronics (Perceval Coudrain)

- Friday:

- Quantum sensing & metrology (Jan Theodoor Janssen)
- Transition Edge Sensors (Jose Rubiera Gimeno)
- Quantitative-CMOS (Ljiljana Durdevic)
- Hybrid pixel sensors (Michael Campbell)

- Monolithic pixel technologies (Thanushan Kugathasan)
- SiPMs (Alberto Gola)
- Industry talk: AMS Instruments (Shazia Farooq)
- Quantum sensing+computing (Eduardo Charbon)

- Typical lecture: 30'-35' talk + 10'-15' questions
 - **Lot of time for questions and discussions!**
- **Today's talks:** Council Chamber (+ Pas Perdus for posters & cocktail)
- **Tomorrow's talks:** 40/S2-D01 ("Dirac"), round building across the street
- **Lunches:**
 - **today:** light lunch during poster session [see next slide], provided by us.
 - **tomorrow:** easiest is R1, just downstairs (on your own charge).
- **Networking breakfast:** tomorrow morning in R1 extension (glass box / "aquarium").
- **Group picture:** just before this afternoon's session (13:55)!



Council chamber: Thursday

"Pas Perdu":

- Posters
- Thursday lunch
- Networking cocktail

Aquarium: networking breakfast

Restaurant 1: Friday lunch

40/S2-D01 "Dirac": Friday

- Posters are from students and researchers **about their own work**. Topics (not only QT!) include:
 - Quantum applications
 - Cryogenic technologies for quantum and particle detection
 - Particle detection and radiation studies
 - Advanced detector technologies for cosmic observations
 - Materials science and experimental techniques
- **Today during lunch break!**
 - If not already installed, please do it during the coffee break this morning.
 - Lunch: light buffet served in Pas Perdus
- **Extends during networking cocktail this evening.**
- Please remove your poster at the end of the day.

Thank you and enjoy!