Program today

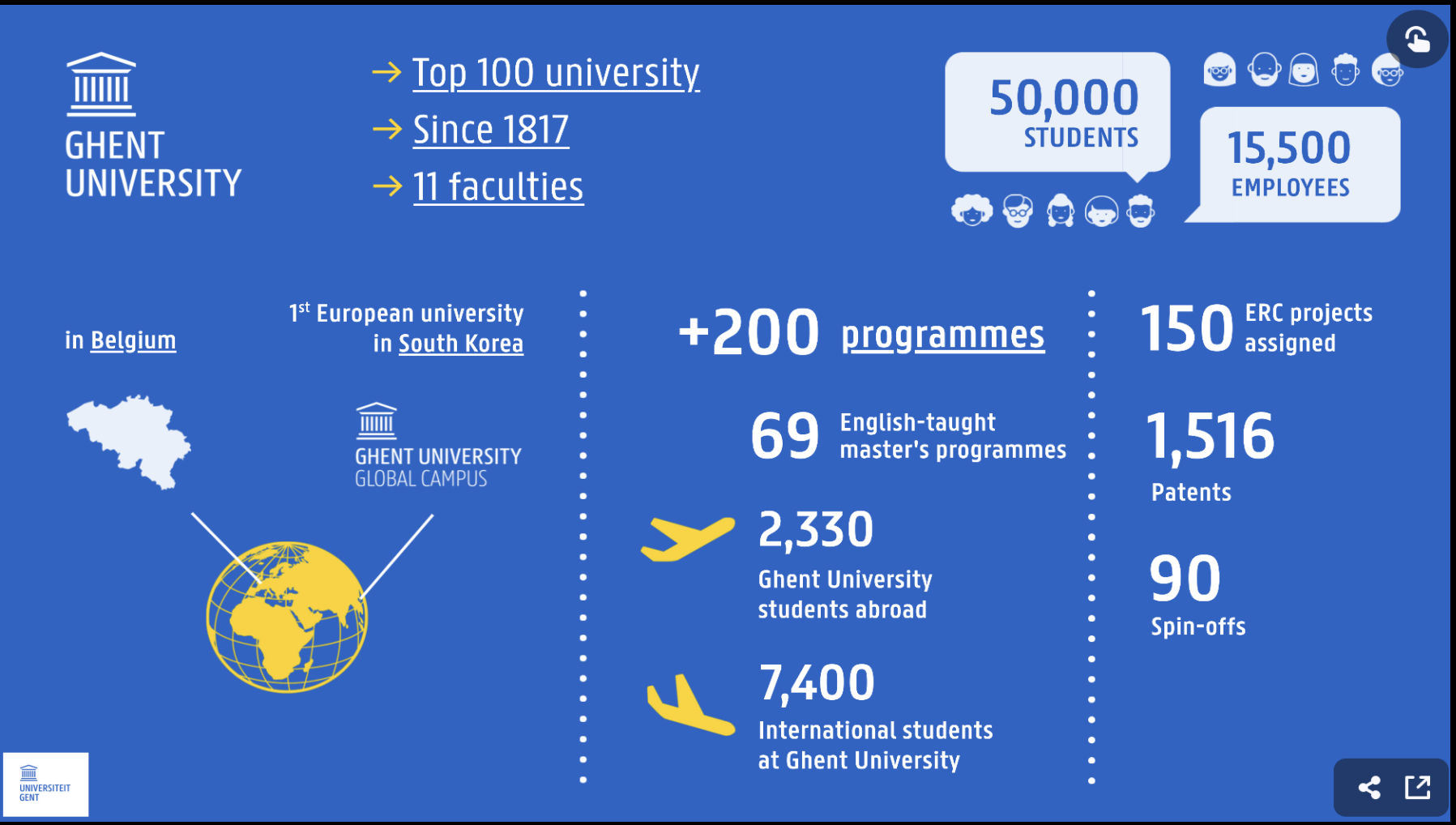
CMS Management visit

Wednesday Apr 23, 2025, 12:30 PM → 10:00 PM Europe/Brussels

Ground Floor (Proeftuinstraat 86, Ghent, INW, Building N3)

12:30 PM → 2:00 PM	**Lunch**	1h 30m
2:00 PM → 2:10 PM	**Presentation of the group activities** **Speaker**: Didar Dobur	10m
2:10 PM → 2:20 PM	**Detector R&D involvements** **Speaker**: Kirill Skovpen (Ghent University)	10m
2:20 PM → 3:20 PM	**Data analysis projects** **Speakers**: Adina Maria Tomaru (Ghent University), David Marckx (Ghent University), Jan van der Linden (UGent), Joscha Knolle (Ghent University), Maarten De Coen (UGent), Niels Van den Bossche (Ghent University)	1h
3:20 PM → 3:40 PM	**Visit to RPC lab with hands-on spacer test** **Speakers**: David Marckx (Ghent University), Jules Vandenbroeck (Ghent University)	20m
3:40 PM → 4:00 PM	**Visit to GEM lab** **Speaker**: Karam Kaspar	20m
4:00 PM → 4:40 PM	**GlassRPC assembly in the Clean room** **Speakers**: Adina Maria Tomaru (Ghent University), Yves Israel	40m
5:15 PM → 6:00 PM	**Meeting with the Dean, Research director and the department chair in Ghent**	45m

Ghent University in numbers



Ghent University in numbers

GHENT UNIVERSITY

→ Top 100 university
→ Since 1817
→ 11 faculties

50,000 STUDENTS

15,500 EMPLOYEES

in Belgium

1st European university in South Korea

GHENT UNIVERSITY GLOBAL CAMPUS

+200 progra

69 English-t master's

2,330 Ghent University students abroad

7,400 International stu at Ghent Univers

UNIVERSITEIT GENT

GHENT UNIVERSITY

DEPARTMENT OF PHYSICS AND ASTRONOMY

Research Education Contact

Research groups

- → Astronomy
- → Atmospheric Physics
- → Biophysics
- → Center for Molecular Modeling
- → Experimental Particle Physics and Gravity
- → Quantum Theory
- → Radiation Physics - UGCT
- → Theoretical High Energy Physics
- → Theoretical Nuclear Physics and Statistical Physics

Education

- → Bachelor program
- → Master program
- → Master of Space Studies (with KU Leuven)

- 25 faculty (11 ERC)
- Each year ~50-60 Ba
- ~40-50 Master studnts

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GHENT UNIVERSITY GLOBAL CAMPUS

UNIVERSITEIT GENT

EPPg μv

Ghent University
Experimental Particle
Physics and gravity

CMS PROJECT 8 ICECUBE LIGO VIRGO KAGRA SHiP EINSTEIN TELESCOPE

GHENT UNIVERSITY

DEPARTMENT OF PHYSICS AND ASTRONOMY

n Contact

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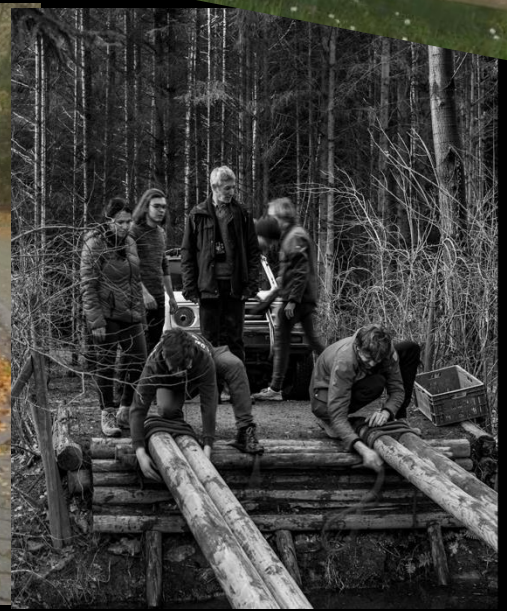
UGent Team



UGent Team in CMS

Permanent


Guest Professors


Postdoctoral researchers




PhD students





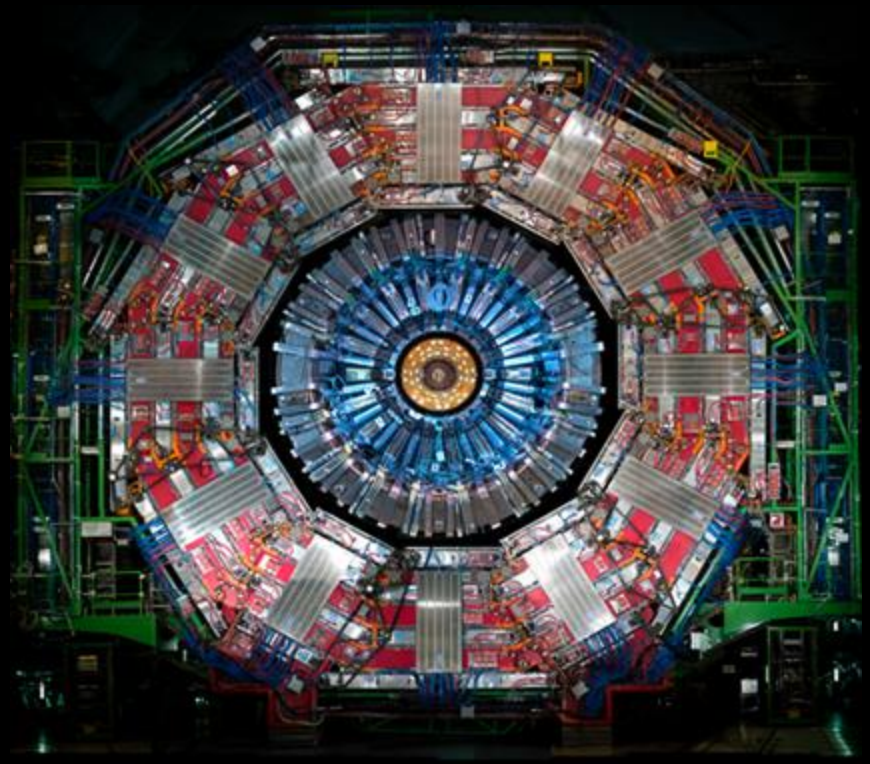






- 2 Technicians, 1 engineer
- Master students (5-6 each year)

Belgian context

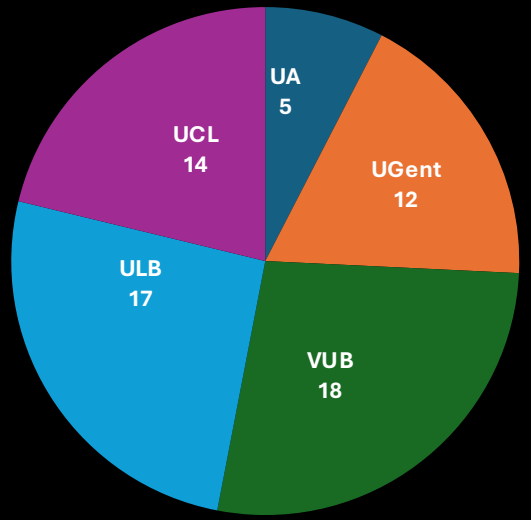


UGent, UA, VUB, ULB, UCL participate in **CMS**

→ UGent joined CMS in 2007

→ I joined as faculty in 2015

~70 Belgian authors out of 2372 (3%)



- Over the past years on the Flemish side the experimental particle physics lost a lot of person-power either people leaving or to GW research.
- On the Walonian side this was mitigated by FNRS researcher positions, but not on on the Flemish side.

Strong collaboration among the institutes in funding applications and research projects

Funding for our research

- **FWO: main funding agency in the Flemish part**
  - Hercules: HL-LHC upgrade (~5 MEuro + 25%)
  - IRI: main funding for CMS: M&O, Tier2, travel, personnel for EPR/detector work etc.
    - Apply together with VUB-UAntwerp colleagues (5.5 M Euro/4 years)
    - Next application in 2026
  - Regular research projects:
    - Each prof. can run 2 at a time
    - "*Four top prodiction*" (1 M Euro in collaboration with R. Scoefbeck)
    - "*Heavy sterile neutrinos*" (400 kEuro)
  - iBOF: "*Higgs-charm coupling*", consortium with VUB/UAntwerp (2.4 MEuro)
  - PhD and postdoc grants (Jan, Joscha)
  - Few other projects (~500 kEuro)

- **University funding:** I was rather successful in the past (GOA, PhD, postdoc grants), However, our university decided to remove all these competitive channels and distribute this research money to every prof. equally (30 kEuro/year) → nearly impossible to maintain this size of a group in the future

EPR/Shifts status of the team

Summary of the institute (ALL members, in EPR months (*)) — 2022

Work Due :	**44.08**
Work done :	**64.50**
EPR (all) Shifts done :	**3.15**
Central Shifts done :	**0.71**
Work + EPR (all) Shifts done :	**67.65**
Ratio done/Expected :	**1.53** (EPR work plus Shifts done)/(AuthorDue)

Summary of the institute (ALL members, in EPR months (*)) — 2023

Work Due :	**42.94**
Work done :	**67.20**
EPR (all) Shifts done :	**6.25**
Central Shifts done :	**1.29**
Work + EPR (all) Shifts done :	**73.45**
Ratio done/Expected :	**1.71** (EPR work plus Shifts done)/(AuthorDue)

Summary of the institute (ALL members, in EPR months (*)) — 2024

Work Due :	**46.45**
Work done :	**60.50**
EPR (all) Shifts done :	**1.89**
Central Shifts done :	**1.57**
Work + EPR (all) Shifts done :	**62.39**
Ratio done/Expected :	**1.34** (EPR work plus Shifts done)/(AuthorDue)

Much more service tasks done than we needed to

Main areas of contribution

- LUMI POG
- BTV, calibration of b-tagging
- Tracking POG
- PPD, ML based DQM
- MC modeling of top processes
- GEM/RPC studies

Some areas of our work got no EPR credit: ie. MVA based Lepton ID development and calibration

Our shift performance is less great, but this year we are much more active with various central shifts

Our physics interest in CMS

Top Physics

- Many high profile analyses
- Searching for new physics via precision
  - Observation of tZq
  - Observation of four-top-quark production
  - Most precise cross section measurements in several tt+X measurements → ttW, ttZ, ttGamma
  - tt+cc/bb
  - Polarisation studies in single-top
  - EFT interpretations
- Several L3 convenors in the group

(see Niels, David and Joscha's talks)

Exotic physics

- $t\bar{t}$ +Dark Matter
- Search for heavy sterile neutrinos
  - 1 GeV – 1 TeV mass range
  - Prompt & long lived
  - Multiple publications
  - 4 PhD students graduated
  - 1 ongoing

see Adina's presenation)

Higgs Physics

- Higgs-charm coupling
- ttH, H->cc
- Large funding (VUB-UA-UGent)

See Jan's talk

Supersymetry

- Historically strong contribution (RunI & II)
- Gluino/stop pair-prod.
- Electroweak Production of charginos& Neutralinos, (Legacy paper)