Norway and CERN

- Norway fun facts
- University system and numbers
- CERN users, staff and fellows
- Project resources (in general)
- Some key developments since 2009
- Summary

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R-ECFA visit to Norway
U. Oslo, 2 October 2015

Norway fun facts

Norway contributes ~2.6% of CERN membership fees (180 Mkr in 2011)

University education in Norway

- Bachelor (3 y), Master (2 y), Ph.D (3-4* y)

Students in higher education, by category of educational institution[1]

	2000/01	Per cent female	2013/14	Per cent female
Total students	**186 002**	**60.0**	**253 317**	**59.1**
Universities	69 195	55.3	105 628	57.1
Specialised institutions at university level	7 706	48.9	31 788	51.5
University colleges	84 880	65.9	93 440	64.4
National institutes of the arts	770	68.3	853	64.8
Norwegian Police University College	940	29.7	2 522	40.0
Military colleges	949	6.0	4 141	14.2
Private university colleges	21 562	56.7	14 945	71.2

[1] Norwegian students abroad are not included.
Source: Statistics Norway.

http://www.ssb.no/en/utuvh/

Norwegian University of Life Sciences	Ås
Norwegian University of Science and Technology	Trondheim
University of Agder	Kristiansand, Grimstad
University of Bergen	Bergen
University of Nordland	Bodø
University of Oslo	Oslo
University of Stavanger	Stavanger
University of Tromsø	Tromsø

- Numerous University Colleges, some with good technology programmes
- UiO+UiB produce around 300-400 PhD/year
- (*) 4yr with 25% teaching duty (typical)

CERN

PhD education

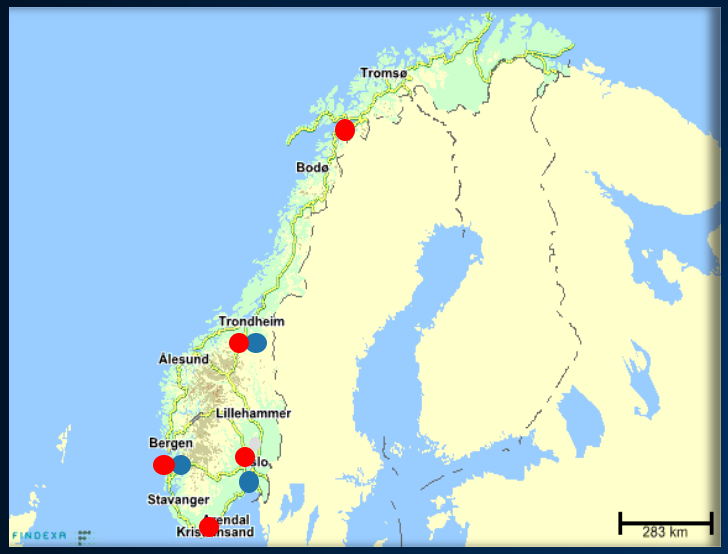
- 4 years (8 semesters FTE)
  - 1 year teaching (2 semesters FTE)
  - Formal courses (30 st.p, 1 semester FTE)
  - * Author qualification 80 days (1 semester FTE)
  - Research * and OTP (shifts and/or other service) (4 semesters FTE)
  - All this multi-tasked

- More on this tough life in Steffen Mæland's talk end of the day

Physics students – 1st choice BSc

	UiO (*)	NTNU	UiB
Places (2015)	90	50	45
2011	120	70	45
2012	116	85	46
2013	155	89	60
2014	179	75	57
2015	207	113	54
(*) Physics, Astronomy, Meteorology			

High Energy Physics in Norway



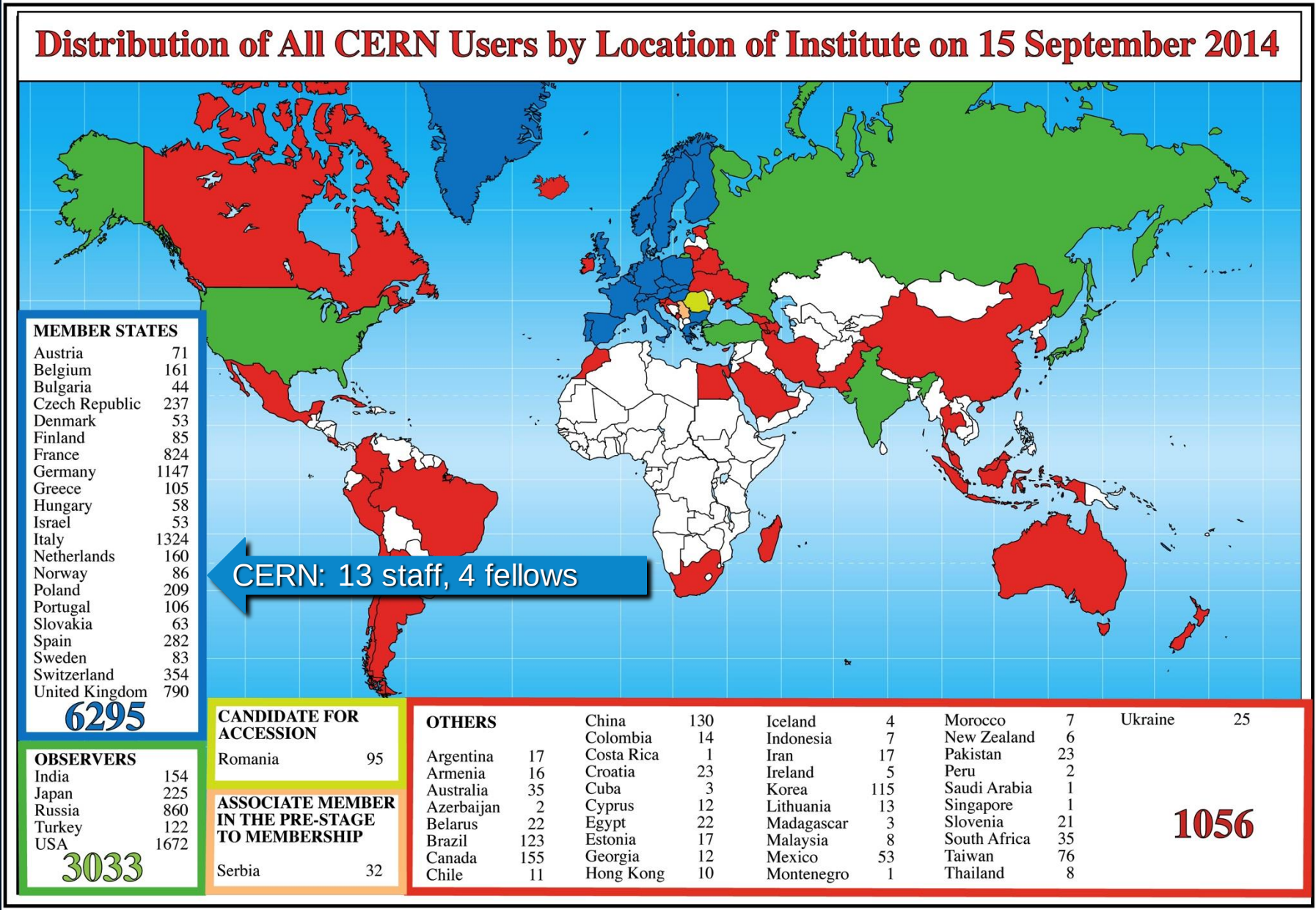
Blue: Oslo, Bergen, Trondheim: Traditional Universities, the two first with experimental particle physics groups

Red: New Universities or University Colleges currently involved at CERN (offering up through master level). Some also involved in the ATLAS/ALICE experiments. Supply, with NTNU, all technical students at master level (10-12 yearly)

Today (2014) around 140 Norwegian researchers, engineers, postdocs, PhD students and master students are involved in the CERN activities:

- At CERN: Around 15 technical students at CERN in addition to the Norwegian staff (10-12 at master and ~5 PhD level)
- Around 90 Norwegian researchers (of all categories above) are registered as users travelling frequently to CERN
- The rest travel less frequently or work in Norway within the CERN-related research programmes

CERN users (2014)



CERN Teacher Programme

Teacher Programme Participants 1998 - 2013 (Total: 7067)

MEMBER STATES

Austria	111
Belgium	110
Bulgaria	279
Czech Republic	146
Denmark	83
Finland	472
France	237
Germany	642
Greece	518
Hungary	348
Israel	7
Italy	270
Netherlands	99
Norway	105
Poland	544
Portugal	328
Slovakia	221
Spain	309
Sweden	147
Switzerland	157
United Kingdom	1048

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CANDIDATE FOR ACCESSION

Romania	12

ASSOCIATE MEMBER IN THE PRE-STAGE TO MEMBERSHIP

Serbia	14

OBSERVER STATES

India	2
Japan	5
Russia	193
Turkey	3
USA	65

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OTHERS

Angola	4	China	1	Ireland	5	Morocco	2	Swaziland	1
Australia	5	Croatia	1	Kazakhstan	3	Mozambique	17	Thailand	7
Azerbaijan	1	Cyprus	8	Kenya	4	Qatar	1	T.F.Y.R.O.M.	11
Brazil	114	Dominican Rep.	21	Latvia	1	Rwanda	17	Timor-Leste	7
Burundi	1	Ecuador	2	Lebanon	1	Sao Tome	4	Uganda	3
Cameroon	3	Estonia	46	Madagascar	2	Saudi Arabia	1	Ukraine	77
Canada	3	Georgia	74	Malta	36	Singapore	2	U.A.E.	1
Cape Verde	3	Ghana	6	Mexico	6	Slovenia	21		
Chile	3	Guinea Bissau	1	Mongolia	1	South Africa	6		
		Iran	1	Montenegro	13	South Korea	44		

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Resources and programme

- Universities supported by Research Council (RC) grants, the three main ones (ATLAS, ALICE, “Technology”) covering for now 2012-19
  - PhD grants from universities crucial
  - Typically 50-50 financing, migrating towards 70-30 (RC-U)
- Additional smaller projects (also the RC or FP7/Horizon2020 or other type of grants) – accelerator R&D, ISOLDE, AEGIS, etc
- All presented in the following talks

- Technology Project – CERN exploitation: Links to CERN master (next slide) or Ph.D programmes (Adli later), and covers also ILO/TTO (Nordahl later)

Technical Students

- The Norwegian Technical student program is currently very successful with 10-12 bachelor/master students at CERN every year – from institutes outside traditional HEP/NP providing access to CERN from “everywhere”
- From an initial investment of support for 3-4 months the students are typically extended by CERN to 12 months, and even 14 months in some cases. The monthly cost is 3414 CHF
- The two Norwegian CERN staff members who have been doing most of the work have been Jens Vigen and Nils Høimyr, and they are willing to continue to promote the program. Jens Vigen leads the sub-project.

- Focus mainly on areas where we have Norwegian activities and/or staff (order arbitrary):
  - CLIC, AWAKE and accelerator technology in general, Information Technology, Information Systems, Technology transfer, Silicon sensors and electronics

- These students are prime candidates for later PhD grants at CERN

Developments since last visit (2009)

- Staff in experimental particle physics (ATLAS and ALICE) renewed (Bugge, Stapnes, Løvhoiden, Skaali -> Sandaker, Roed, Postdoc)
- Staff increase in Nuclear Physics (Siem, Goergen)
- Increased activity related to astroparticle physics (see talks of Sandaker and Theory)
- Accelerator Physics (new position: Adli)
- Renewal in theory (Høgåsen,Eeg, Osland - > Raklew, Bringmann, Kersten)
- Permanent Researcher contracts (project-financed)
- Unfavorable exchange rate to CHF

Exchange rate to CHF

01.2006 01.2009 01.2012 01.2015

01.2010

Summary

- Many positive developments but two main problems on the table:
  - Financing of the LHC experimental upgrades, and without sacrificing all other parts of the programme
  - The Norwegian staff numbers at CERN