

INAR

INSTITUTE FOR ATMOSPHERIC AND
EARTH SYSTEM RESEARCH

Science-oriented university education at INAR

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*Yliopistojen tehtävänä on edistää vapaata tutkimusta
sekä tieteellistä ja taiteellista sivistystä,
antaa tutkimukseen perustuvaa ylintä opetusta
sekä kasvattaa opiskelijoita palvelemaan
isänmaata ja ihmiskuntaa.*

Yliopistolaki 24.7.2009/558, 2§

*The task of the universities is to promote
free research and scientific and artistic education,
to give the highest education based on research,
and raise students to serve the fatherland
and mankind.*

University law 24.7.2009/558, 2§

INAR Outline

INSTITUTE FOR ATMOSPHERIC AND
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- Study programmes
- Intensive research-oriented courses
- Online education

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INSTITUTE FOR ATMOSPHERIC AND
EARTH SYSTEM RESEARCH

MSc in atmospheric sciences

Physical Sciences

Chemistry

Forest Sciences

Environmental
Sciences

Geosciences

Science Teacher



BSc programmes
3 years, 180 ECTS

Other BSc
programmes in UH,
Finland and abroad:
annual call in
December-January

Master's programme in atmospheric sciences
2 years, 120 ECTS

6 study tracks

Aerosol Physics

Atmospheric
Chemistry and
Analysis

Biogeochemical
Cycles

Geophysics of
the
Hydrosphere

Remote Sensing

Meteorology

PhD programs (~50%), research & development and expert tasks (~50%)

The only degree
programme in Finland
giving the meteorologist
qualification

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PhD in Atmospheric Sciences

- Doctoral Programme in Atmospheric Sciences (ATM-DP)
- Essentially the same research areas as in ATM-MP
- Target time for doctoral studies 4 years, including 30 ECTS of course studies and a doctoral thesis (usually a collection of 4-5 published papers and a summary)
- Annual call for letters of intent for students to get in contact with a supervisor
- 4 application periods per year for students with contact to a supervisor

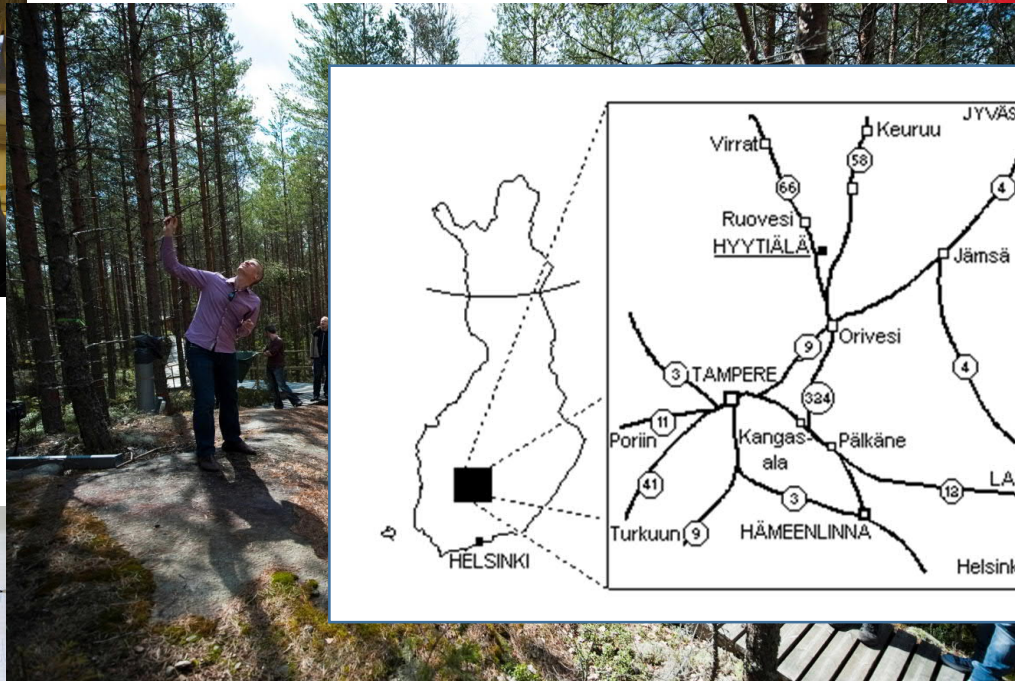
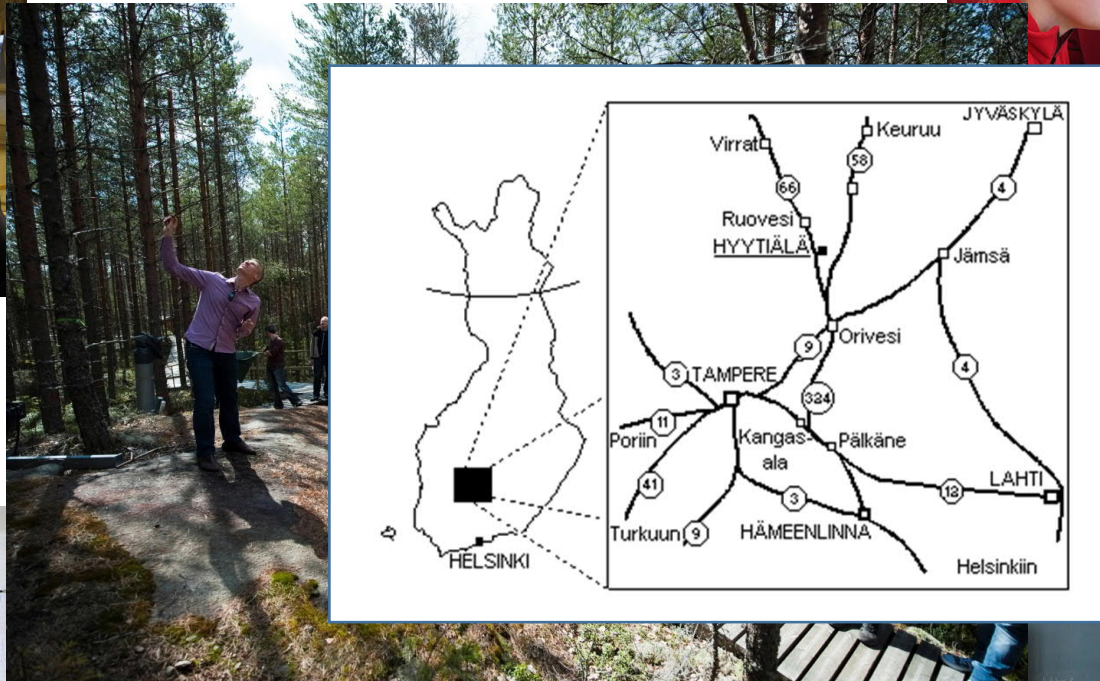
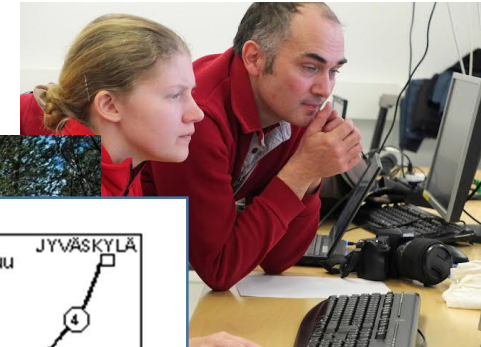
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Intensive research-oriented courses

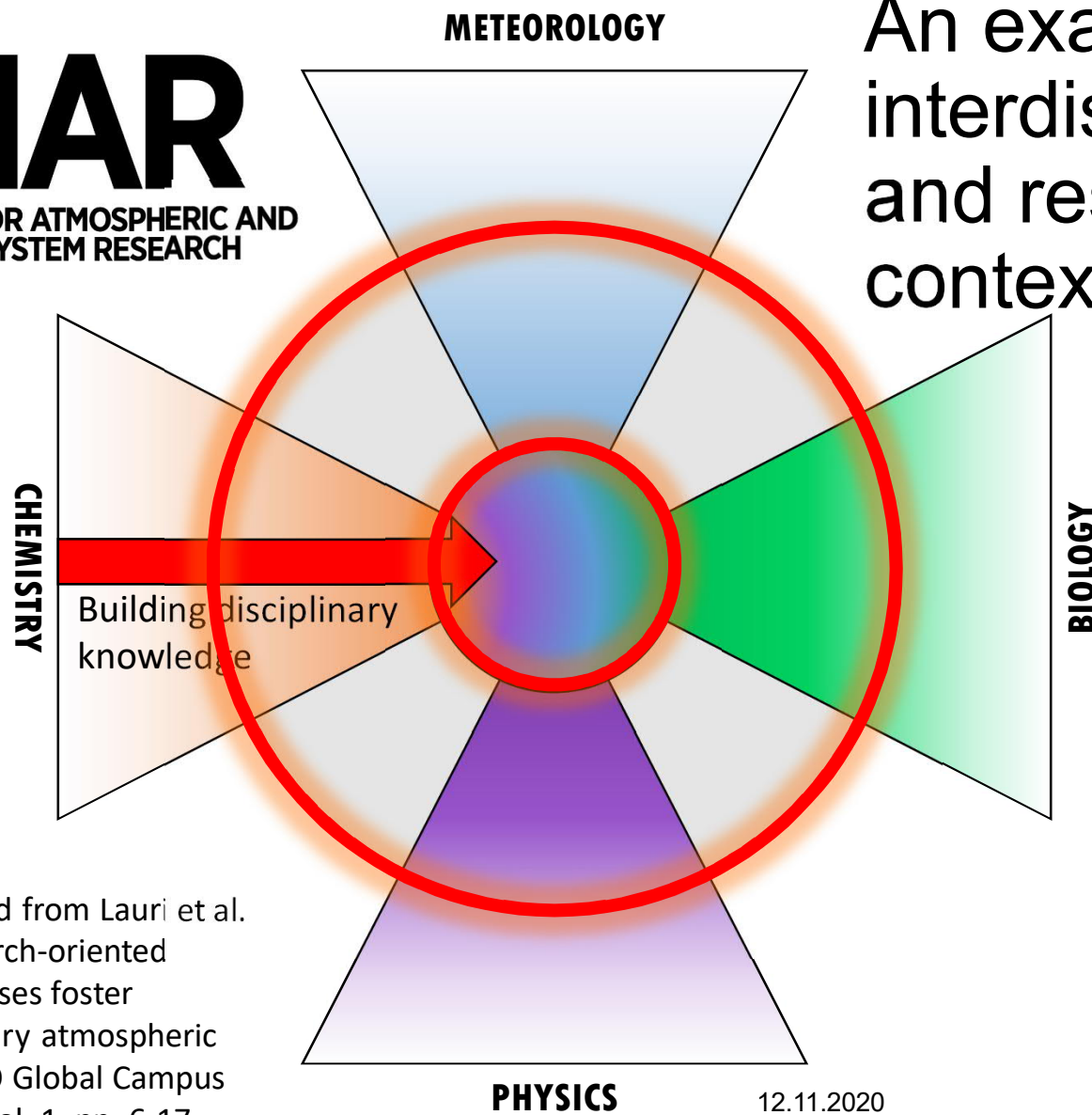


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Learning on an intensive course

- Hyytiälä winter/autumn school (twice per year)
 - (Advanced) Analysis of Atmosphere-surface Interactions and Feedbacks
- 2017 winter school: a pre-course and an after-course survey to find out about students' assessment of their learning
 - Ruuskanen et al.: An Exploratory Study of the Learning of Transferable Skills in a Research-Oriented Intensive Course in Atmospheric Sciences. Sustainability 10:1385 (2018).
- Conclusions:
 - Students enjoyed multidisciplinary environment for learning
 - Students felt that they had learnt important skills during the course, most importantly data analysis
 - Real scientific questions and use of real data motivated the students a lot
- Note: there are several other research-oriented intensive courses available at INAR and by PEEEX
 - See <https://www.atm.helsinki.fi/peex/index.php/education>



An example of interdisciplinary learning and research in a course context

- Building disciplinary knowledge by relying on what is learnt earlier (each triangle)
- Peer and horizontal learning between students and teacher(s) (outer circle)
- Building new knowledge requiring interdisciplinary approach (inner circle)

Figure adopted from Lauri et al. (2020): Research-oriented intensive courses foster multidisciplinary atmospheric science. WMO Global Campus Innovations, vol. 1, pp. 6-17.

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- All disciplines needed to provide solutions to grand challenges like climate and environmental change
- Massive Open Online Courses (MOOC) provide an accessible tool for the international audience
- E.g. Lehtonen et al., 2018: A pedagogy of interconnectedness for encountering climate change as a wicked sustainability problem, *Journal of Cleaner Production*, 199, 860-867

- Between 2016 and 2020, about ten new Massive Open Online Courses (MOOCs) in atmospheric and climate sciences and sustainability
- All material **freely available**, also for teachers all over the world
- ECTS credits given only for those who participate the U. Helsinki course, others get a certificate
- See <https://blogs.helsinki.fi/climateuniversity/>

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Online education
MOOCs

 **CLIMATE
UNIVERSITY**

 **SUSTAINABLE.NOW**

 **SYSTEMSCHANGE.NOW**

 **SOLUTIONS.NOW**

 **STATISTICAL TOOLS
FOR CLIMATE AND
ATMOSPHERIC SCIENCE**

 **LUKIOLAISEN
ILMASTO.NYT**

 **CLIMATECOMMS.NOW**

 **LEADERSHIP FOR
SUSTAINABLE CHANGE**

 **CLIMATE.NOW**

 **CIRCULAR.NOW**