MEMO²

Methane goes mobile - Measurements and modelling

Sylvia Walter, Thomas Röckmann, and the MEMO² team

MEMO² Website

MEthane goes MObile

MEasurements and MOdelling

1. MEMO² at a glance

2. Scientific approach

3. MEMO² Team

4. First Results

Study site

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MEMO² at a glance

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Research
Training
Networking

- Type of project: H2020 ITN-ETN
  - Focus on research AND Training
  - Tripe "I" approach: Interdisciplinary, International, Intersectoral
- Budget: 3.4 m€
- 4 years (2017 - 2021)
- Consortium: >60 participants from 15 countries
  - 9 beneficiaries + 16 partners
  - 13 PhD students

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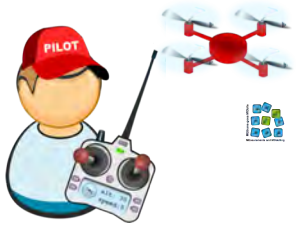
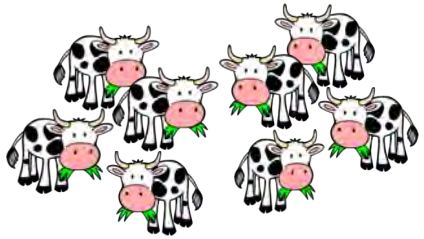
Study site

Scientific approach

Research
Training
Networking



- extend the traditional observation networks, which avoid being close to one source
- Use mobile analyser to „visit“ the sources
- Focus on source types to map the small-scale / local distribution of CH_4



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MEMO² Team

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22 participants

9 beneficiaries

- University of Groningen
- University Heidelberg
- Universite de Versailles St.Quentin-en-Yvesline
- Swiss Federal Laboratories for Materials Science and Technology
- Royal Holloway University of London
- Lund University
- Wageningen University
- AGH University of Science and Technology

16 partners

- Netherlands Organization for Applied Science Research (TNO)
- National Physical Laboratories
- Energy research Centre of the Netherlands (ECN)
- Polish Geological institute
- SHELL
- Umweltbundesamt
- Picarro Inc. Geneve
- Isoprime
- OONKEY
- Afvalzorg Deponie
- Viridor
- Avfall Sverige
- Whiffle Weather Finecasting
- Environment and Climate Change Canada
- GEOMAR
- Technical University Denmark

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Further project partners: National Physical Laboratories (GB), SHELL (NL), Isoprime (GB), OonKAY (NL), Afvalzorg Deponie (NL), Viridor (GB), Whiffle Weather Finecasting (NL)

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First Results - examples

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Scientific Work Packages

WP1
Mobile measurements of CH_4

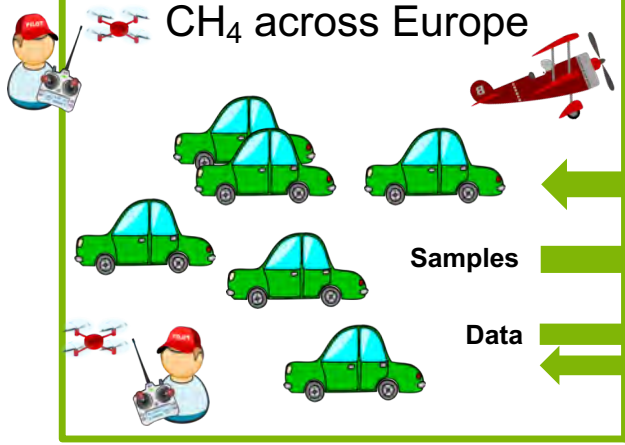
Aim: map the small-scale distribution of CH_4 across Europe

WP2
Isotopic measurements of CH_4

Aim: distinguish sources and provide novel EU-wide "isotopic source signature maps"

WP3
Modelling framework for CH_4

Aim: develop and use (novel) modelling tools to improve CH_4 inventories



Source information

Samples

Campaign support, inventories

Data

Campaign support, inventories

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First Results - examples

WP1 - Mobile measurements

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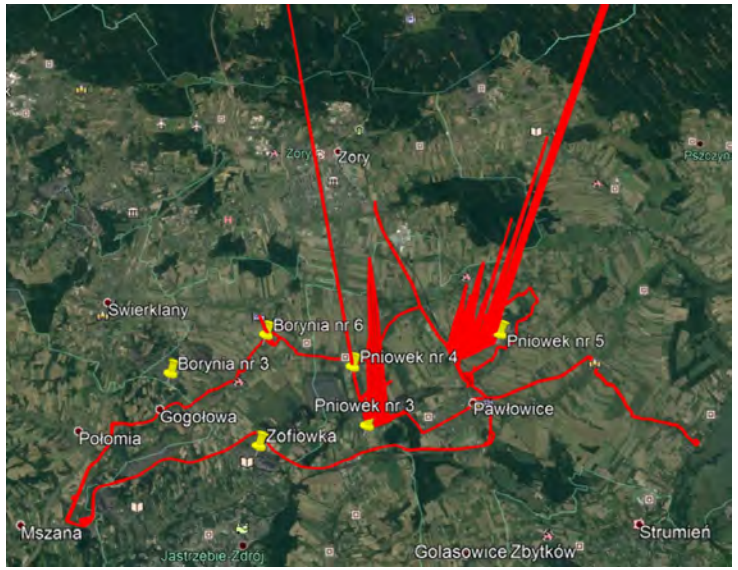
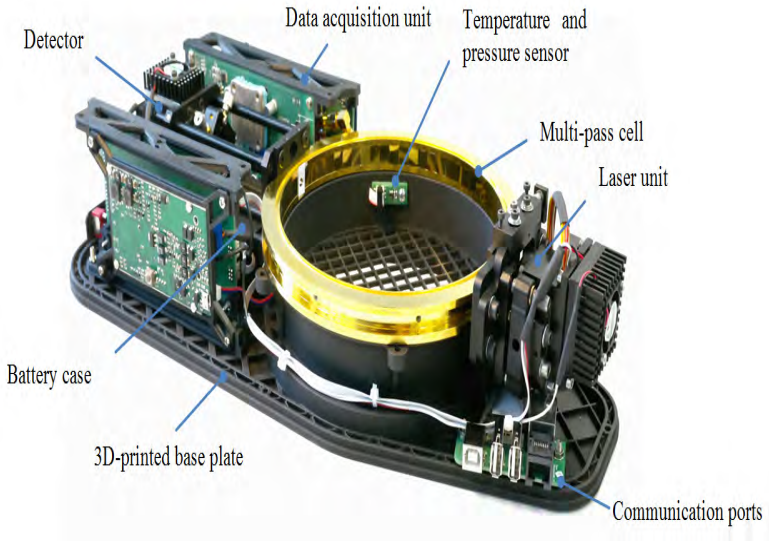
Joint measurement campaigns



CH_4 concentration measurements in Upper Silesian coal mining region.

Development lightweight CH_4 sensor



Sensor based on open-path direct absorption spectrometry, using a single-mode quantum cascade laser (DFB-QCL)

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WP2 - Isotopic measurements

WP3 - Modelling framework for CH_4

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WP2 - isotopic measurements

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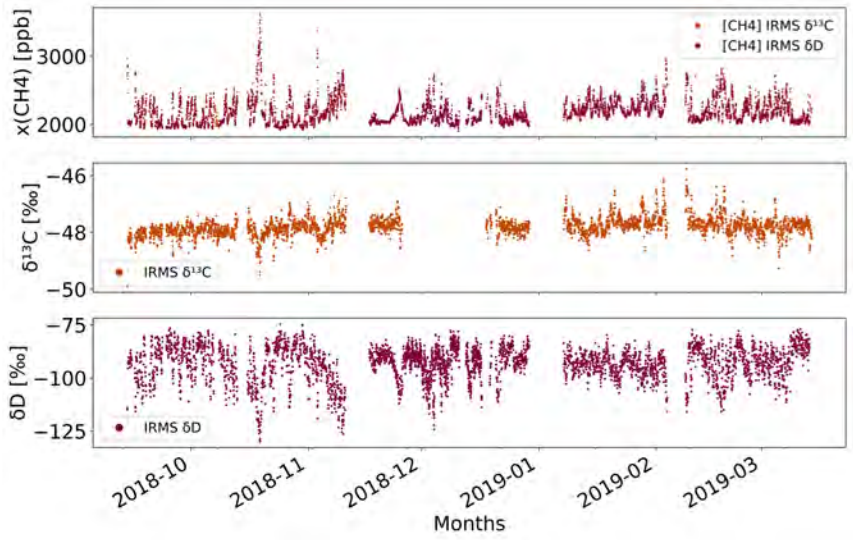
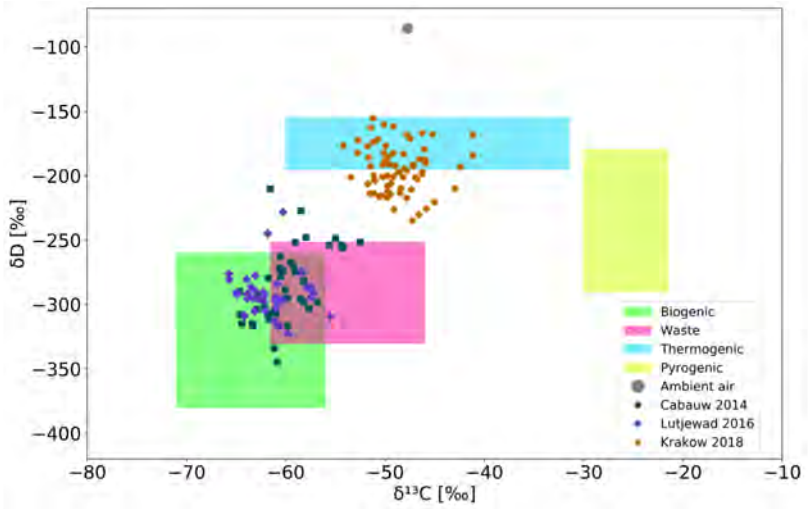
High-resolution δ^{13}C-CH_4 and δD-CH_4 data
3 locations, **1.4** years of data, and more than **17'000** measurements





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WP1 - Mobile measurements

WP3 - Modelling framework for CH_4

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WP3 - Modelling framework for CH_4

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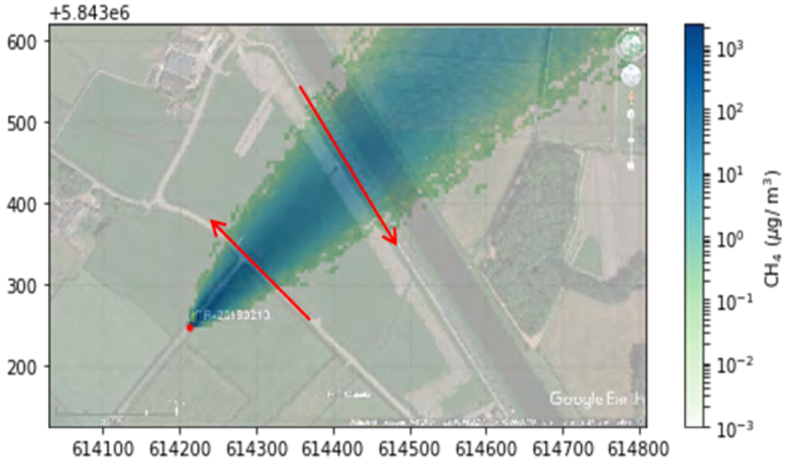

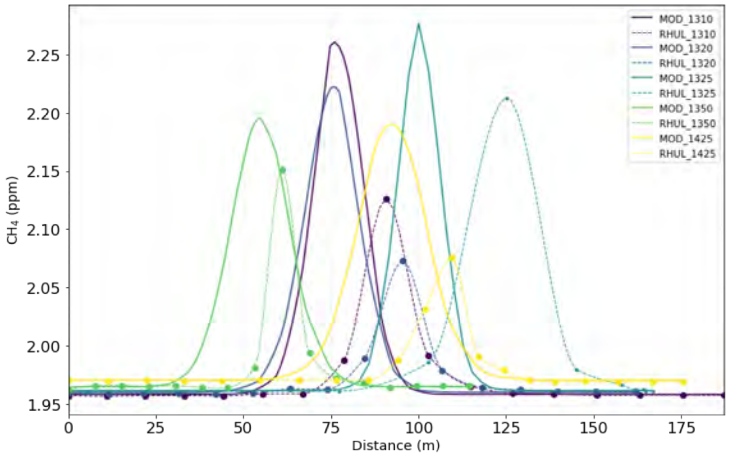

Left: GRAL simulated CH_4 concentration (5-minute average) during a tracer release experiment in February 2018. The red arrows denote the paths of the mobile measurement platforms crossing the plume multiple times at two distances from the source. Right: Simulated (solid lines) and measured (dotted lines with symbols) CH_4 mole fractions along different transects sampled by the car of RHUL. Matching the areas below the curves allows estimating the strength of the source.

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WP1 - Mobile measurements

WP2 - Isotopic measurements

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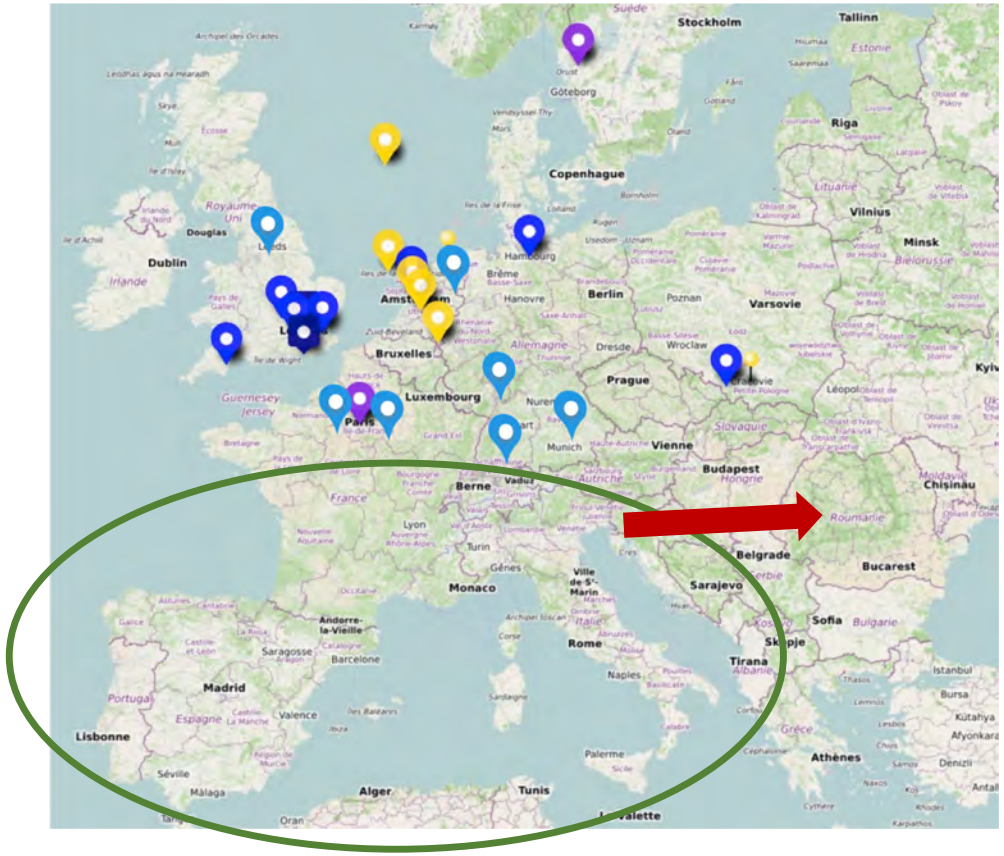
Research
Training
Networking

> 130 days of measurement campaigns



- MEMO² campaigns
- CoMet
- FOAM
- Pelagia 439
- City campaigns (NL, DE, UK, FR,…)

Planned campaign to Romania 2020

Collaborations?

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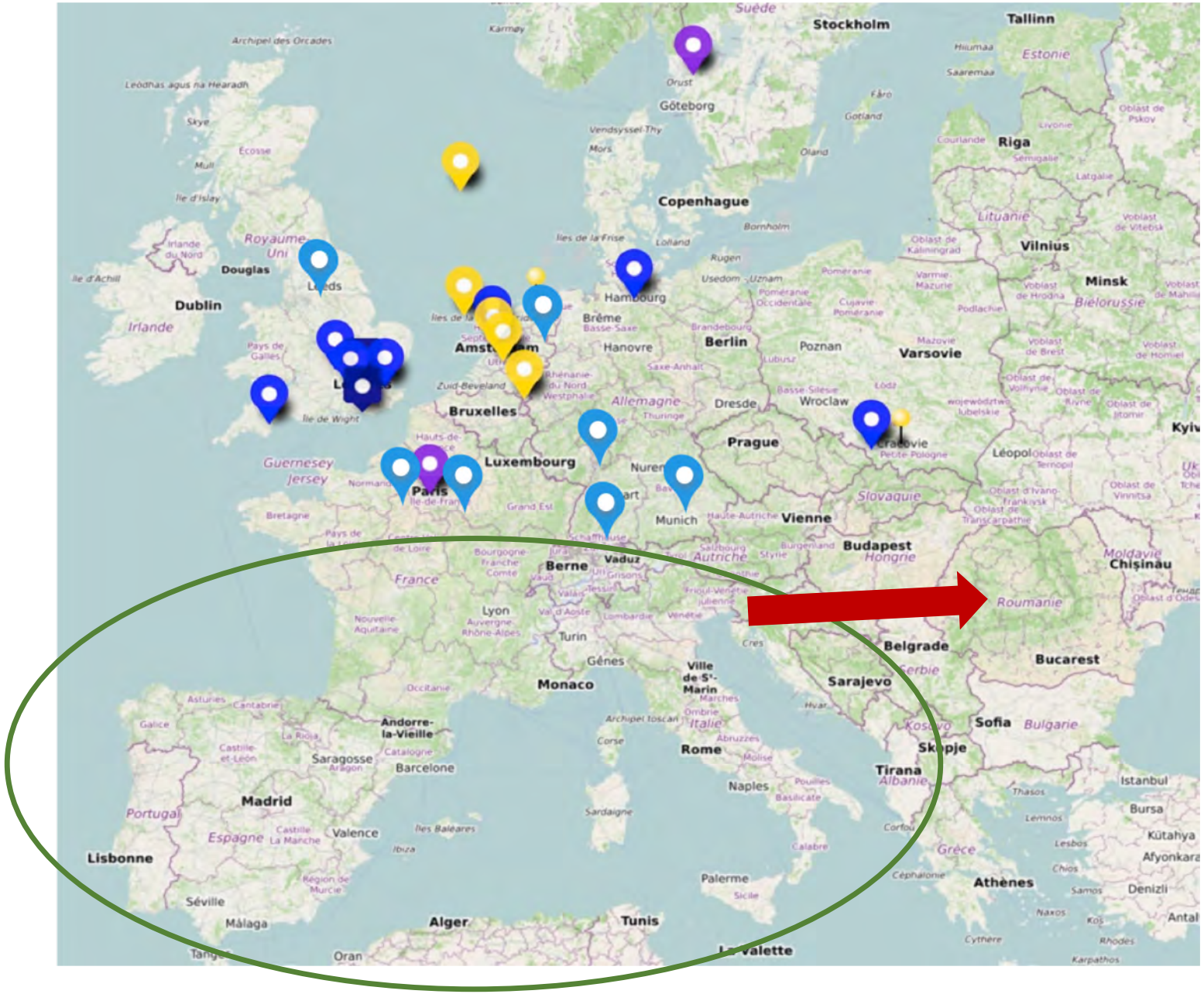

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MEMO² training

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MEMO² training structure

Research
Training
Networking

Local & Individual training

Theoretical knowledge:
- Courses, seminars, conferences
- Daily supervision
- Secondments

Expertise:
- Teaching assistance
- Publications & presentations
- Secondments

Life skills:
- Secondments
- non-academic mentor

Network-wide training

Theoretical knowledge:
- MEMO school courses
- Co-supervision

Expertise:
- MEMO school practise
- Joint field campaigns
- Project meetings
- Network days

Life skills:
- Network days
- Links with non-academic

International training

International conferences

Networking

Publications

https://h2020-memo2.eu/category/blog/

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Type of project

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MSCA-ITN-ETN - Marie Skłodowska-Curie Innovative Training Networks - European Training Networks

Key features

- International consortium
  - Beneficiaries from different countries, disciplines and sectors (min. 3, typically 6-10)
  - Participation of non-academic sector essential, as beneficiary OR partner
- **Joint training programme for Early Stage Researchers (ESRs)**
  - Training through research, mobility mandatory
  - Structured training modules, including secondments
  - Exposure to both public and private sector
- **Funding**
  - Project: 4 years
  - Max. 15 ESRs (3 years each, 540 person months in total)

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Work programme

http://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-guide-appl-msca-itn_en.pdf

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