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SWATNet has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Grant Agreement No 955620



Space Weather Awareness Training Network

Emilia Kilpua, University of Helsinki

visit us: <https://swatnet.eu> - <https://twitter.com/SWATNetProject>

SWATNet team:

Coordinator: E. Kilpua (University of Helsinki)

Project Manager: A. Boiko (Vabo Consult)

Beneficiary PIs: T. Barata (Uni. of Coimbra), R. Erdelyi (Uni. of Sheffield), D. Del Moro (Uni. degli Studi di Roma Tor Vergata), M. Georgoulis (Academy of Athens), K. Murawski (Maria Curie Skłodowska Uni.), A. Nindos (Uni. of Ioannina), K. Petrovay (Eötvös Loránd Uni.), S. Patsourakos (Uni. of Ioannina), S. Poedts (KU Leuven), R. Vainio (Uni. of Turku)

Early Stage Researchers: A. Andre-Hoffmann (AA/UoI), S. Biswal (USFD), S. Bourgeois (UC), S. Chierichini (USFD), G. Francisco (UNITOV), E. Husidic (KUL), L.A. John (UTU), R. Mugatwala (UNITOV), G. Nogueira (ELTE), S. Koya (UoI/AA), M. Kumar (UMCS), A. Wagner (UH)

Academic Partners / co-supervisors / administration: M. Korsos (Hungarian Solar Physics Foundation), B. Belucz (HSPF), A. Afanasiev (UTU), J. Pomoell (UH), D. Price (UH), L. Calconi, A. Di Salvo, R. Overbeek (KUL), J. Fernande (), J.

Industrial partners: J. Depauw (Space Application Services), J. Lehti (Aboa Space Research Oy), S. Loddo (NEXT ingegneria dei sistemi), J. Pimienta (Instituto Pedro Nunes), T. Hegedus (Astrotech)

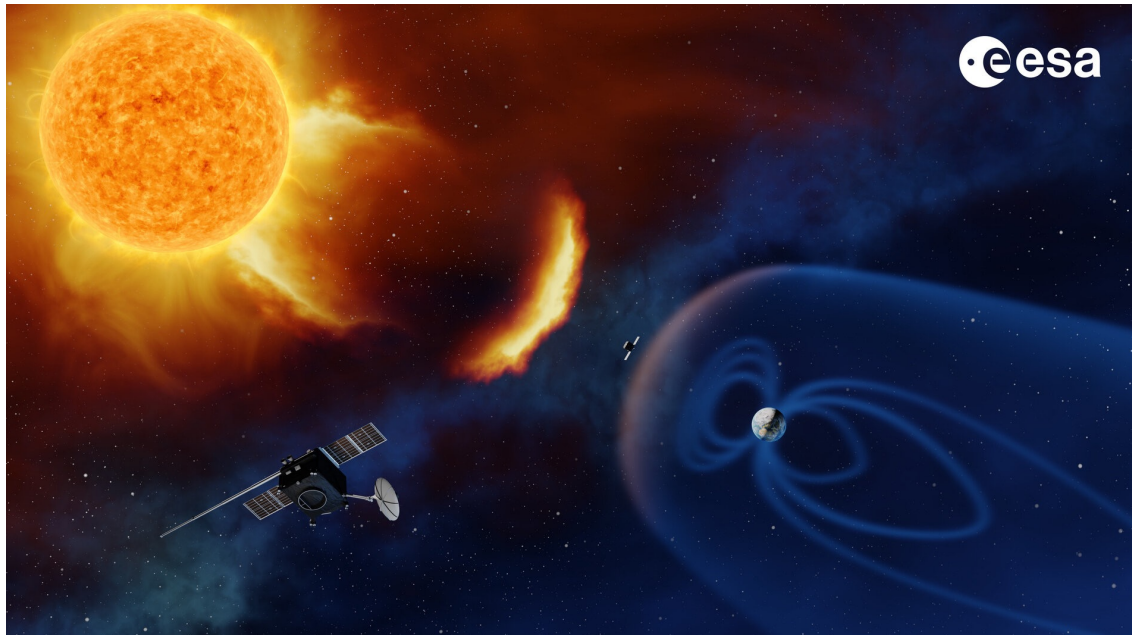
EGU General Assembly
24-28 March, 2023

contact
Emilia.Kilpua@helsinki.fi

SWATNet in a Nutshell

H2020 EC Marie Skłodowska-Curie Innovative Training Network

- Train a new generation of creative, entrepreneurial and innovative **Early Stage Researchers (ESRs)** for variety of careers
- Develop sustainable joint doctoral degree structures in Europe
- Extend traditional academic research training (e.g., industry exposure)



Aims at breakthroughs in our physical understanding of key agents of Space Weather

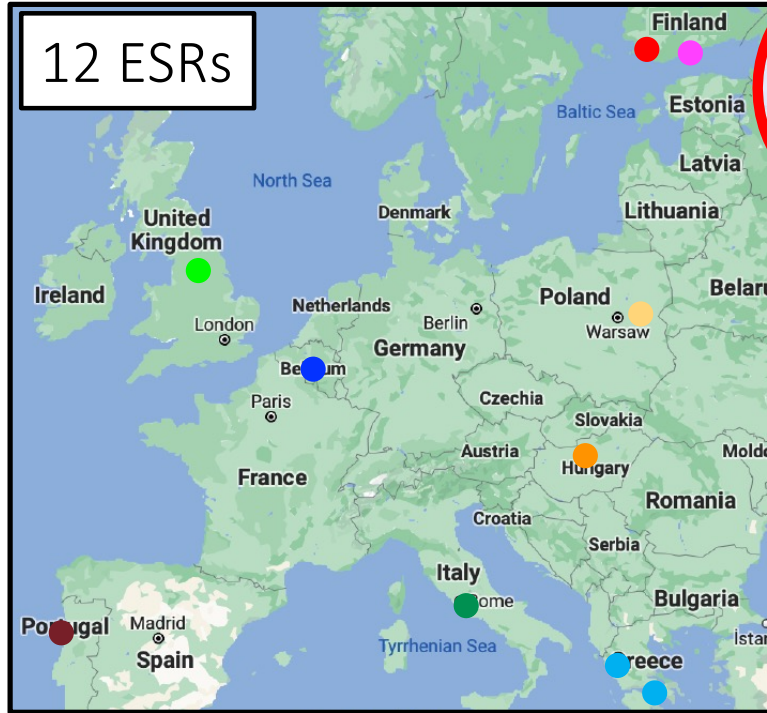
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Who we are?



University of Helsinki, University of Turku, KU Leuven
 University of Sheffield, Academy of Athens/University of Ioannina,
 Eötvös Loránd University, Università degli Studi di Roma Tor Vergata,
 University of Coimbra, Maria Curie Skłodowska University

Hungarian Solar Physics Foundation (HSPF)

Meet the External Advisory Board for SWATNet



<https://swatnet.eu/external-advisory-board/>

Aboa Space Research Oy (Finland)
 NEXT ingegneria dei sistemi (Italy)
 Space Applications (Belgium)
 Instituto Pedro Nunes (Portugal)
 AstroTech (Hungary)

- ~20 supervisors and co-supervisors
- Project manager (Vabo Consult)
- Host administrations

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SWATNet training program

Research skills: Each ESR works in a cutting-edge research project → **interdisciplinary research skills** useful both in academia and outside (e.g., numerical simulations, machine learning, time-series analysis)

Mobility: 6-12 months visit to other SWATNet host for joint/double degree → exposure to **different research environment** and supervising practises

Industry training: 2-3 months industrial training at a space related company → **exposure to industry** and related skills

Observatory training: 1 month at **Gyula Bay Zoltán Solar Observatory /HSPF** → learning to operate a telescope and process observations

SWATNet Training program

- 3 schools (2 credits)
 - 7 workshops (1 credit)
- extensive **knowledge of space physics** and **space weather + transferrable skills** (outreach, project management...)

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SWATNet training program

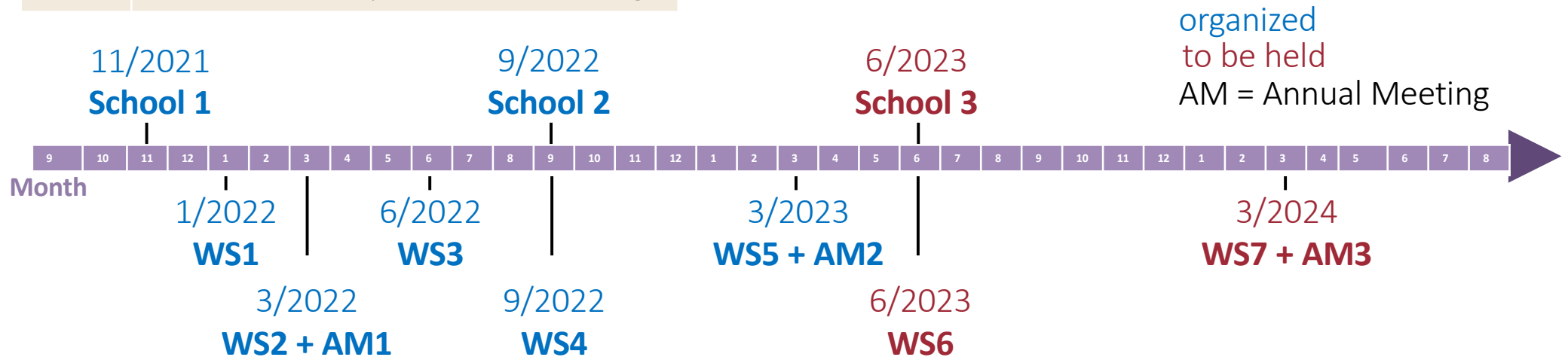
Workshops (WS)

WS1	Communicating Science*
WS2	Research Project Management*
WS3	Solar activity and space weather
WS4	Communication and Outreach
WS5	Mini-MBA + Annual meeting
WS6	Entrepreneurialism in Space Physics
WS7	Career workshop + Annual meeting

Schools

School 1	Introduction to Space Weather*
School 2	Sun-Earth interactions
School 3	Space Weather and our Technological Society

*online meetings



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School/WS format

Planning and preparations

- Start ~3-6 months before
- Schedule published at Webpage
- Possible **pre-assignments**

During the activities

- Lectures, practice and group work
- Social activities
- Tweeting

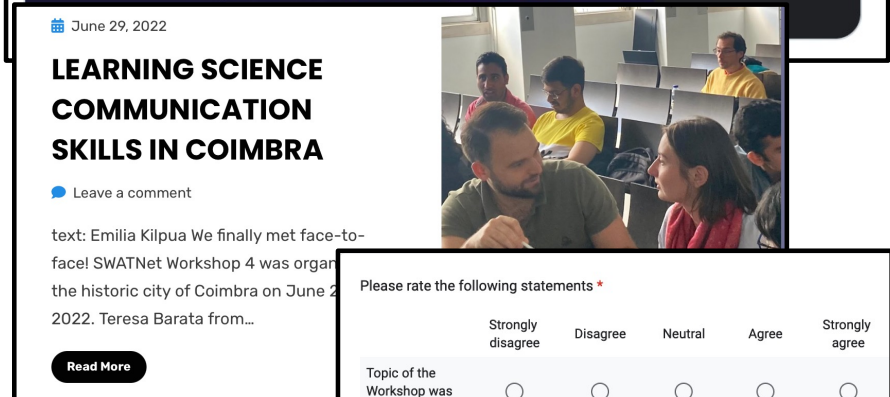
Post-event activities

- **Feedback** using the same form
- Possible **after-assignments**
- Reporting via **Deliverables & blog** posts
- **Certificates** for the participants

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SWATNet - Space Weather Awareness Tr... @SWAT... · 24. maalisk. ...
The second day of #SWATNetProject Workshop 5 dedicated to mini-MBA starts with the session with Silvia Loddo from NEXT Ingegneria dei Sistemi S.p.A. speaking to early-stage researchers #ESRs about the essentials of the bid management @SP2RC #spaceweather



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Examples

- Online activity: School 1
- Our first on-site activity: Workshop 4

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School 1: Solar terrestrial (online)



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	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
	Monday, 8 November	Tuesday, 9 November	Wednesday, 10 November	Thursday, 11 November	Friday, 12 November
09:30 - 09:45	Welcome				
09:45 - 10:00	<i>Emilia Kilpua</i>	Icebreaker	Icebreaker	Icebreaker	Icebreaker
10:00 - 10:15		Solar Ex	Helio Ex	AI Ex	Group work
10:15 - 11:00	Intro <i>Hannu Koskinen</i>				
11:00 - 11:15					
11:15 - 12:00	Solar L1 <i>Chris Nelson</i> Introduction to Solar Modeling	Helio L1 <i>Barbara Perri</i> Introduction to space weather modelling	AI L1 Dario Del Moro Introduction to Artificial Intelligence	Group work	
12:00 - 12:15					
12:15 - 13:00	Solar L2 <i>Spiros Patsourakos</i> The Solar Atmosphere and its Magnetic Instabilities	Helio L2 <i>Emilia Kilpua</i> Coronal and heliospheric modelling	AI L2 <i>Jiajia Liu</i> Machine Learning and Space Weather		
13:00 - 14:15	Lunch				
14:15 - 15:00	Solar L3 <i>Manolis Georgoulis</i> Prediction Methods of Solar Eruptive Manifestations	Helio L3 <i>Kris Murawski</i> Multi-fluid modelling of the solar atmosphere and waves	AI L3 <i>Pedro Pina</i> Mathematical Morphology and Solar Images I	Group work	Presentations
15:00 - 15:15					
15:15 - 16:00	Solar L4 <i>Dibyendu Nandy</i> Space Climate & pertinent observations	Helio L4 <i>Rami Vainio</i> SEP modelling introduction	AI L4 <i>Teresa Barata & Pedro Pina</i> Mathematical Morphology and Solar Images II		
16:00 - 16:15					
16:15 - 18:00	Homework				



SWATNet School

"Introduction to Space Weather"

8 - 12 November 2021 (online)

@SWATNetProject

#SWATNetSchool

<https://swatnet.eu/>

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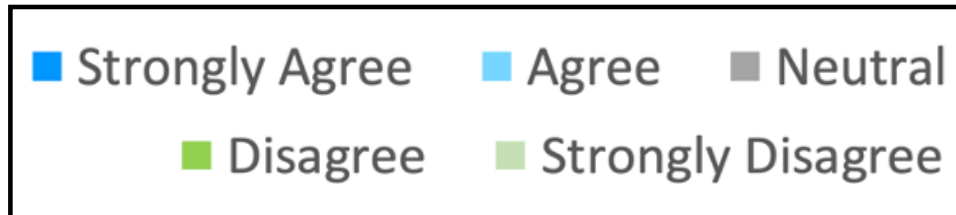
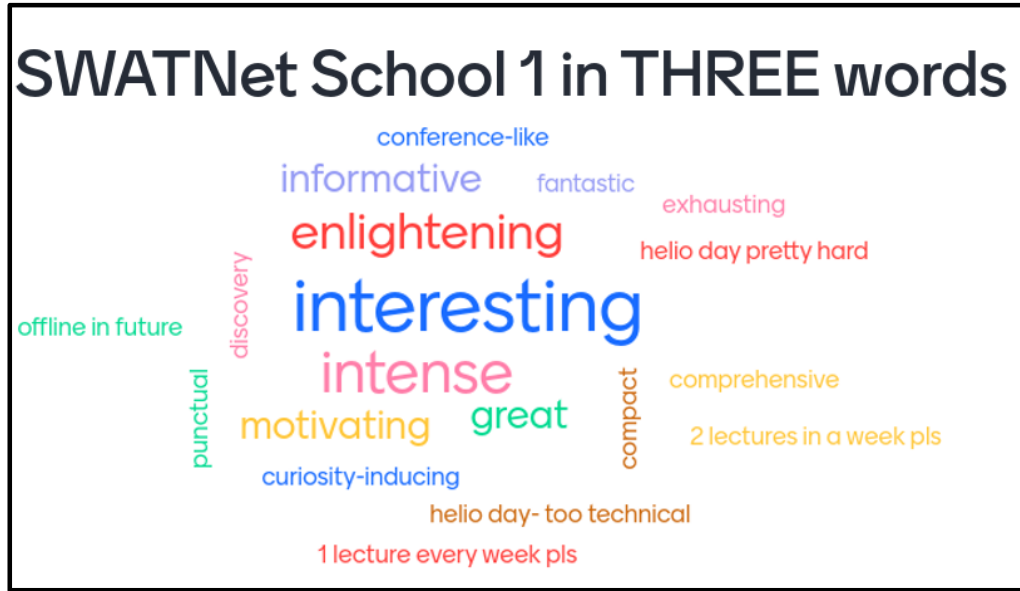
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- **Purpose:** teach ESRs **scientific knowledge** behind this network
- Divided in three **WP-related themes**
- **Pre-assignment:** reading papers
- **Group work:** text on a given topic + presentations
- **After-assignment:** **Learning Journal**
- Fun ~15 min icebreaker activities
- **Homework:** Inventing **questions** from lecture topics (discussed each morning) + **Python-Notebook** exercises

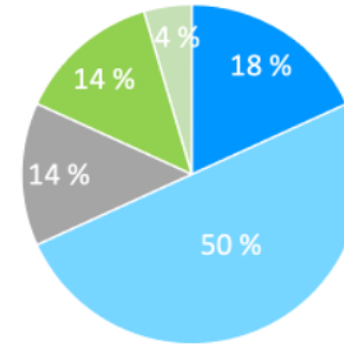
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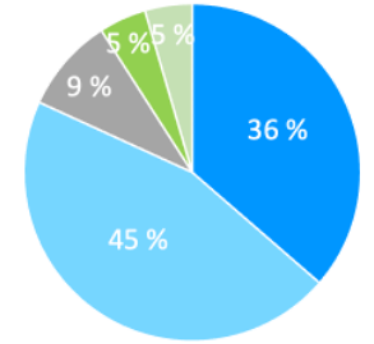
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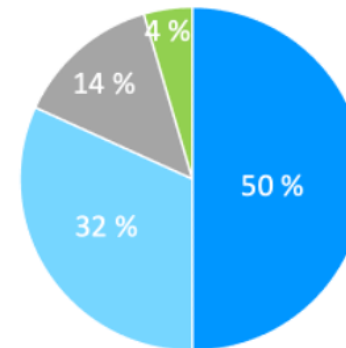
There was enough interactions among students



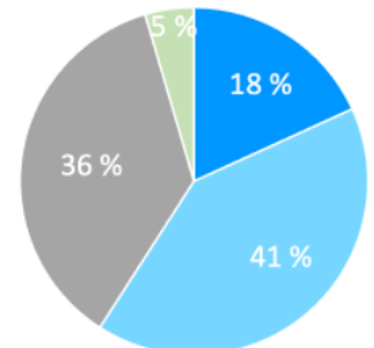
There was enough interactions with the lecturers



I liked exercises being formulating questions



Learning Diary enhanced my learning



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WS4: Communication & outreach (onsite)



Local Time	Monday, 20 June 2022	Tuesday, 21 June 2022	Wednesday, 22 June 2022
(Portugal)	Day 1	Day 2	Day 3
09:45 - 10:15	Arrival of participants: Registration & Welcome	Social program: UC & Joanina library tour	From confusion to clarity: making complicated concepts simple, by Lea Urpa (via Zoom)
10:15 - 10:45			Practice (via Zoom), by Lea Urpa
10:45 - 11:00			Stretching legs
11:00 - 11:30			Practice (via Zoom), by Lea Urpa
11:30 - 12:30			Discussion & Wrap-up
12:30 - 14:00	Lunch		Departure of participants
14:00 - 14:30	Writing about science without being boring (theory followed by exercises), by Sérgio Pereira (IA)	Science Communication: What? Why? Who? When? Where?, by Ana Carvalho (III-UC)	
14:30 - 15:00		Communicate to various types of public - Practical experience exercise, by Ana Carvalho (III-UC)	
15:00 - 15:30			
15:30 - 15:45	Stretching legs		
15:45 - 16:15	Talking about science to non-scientists (hands-on communication exercises), by Catarina Leonte (IA)	Media training: tips and hints for better communicating science in front of a camera, by Marta Costa and Karine Paniza (DCOM - UC)	
16:15 - 16:45			
16:45 - 17:15			
17:15 - 17:30	Picture time		
17:30 - 18:00	Departure to dinner		
18:00 - 22:00	Networking dinner "Public outreach of space weather" & Observation night at Observatory	Networking Dinner "Science BBQ - share your communication tips and tricks"	

Legend	Theory	Theory & Practice
	Practice	Info sessions, discussions, networking

On-site at University of Coimbra, Portugal

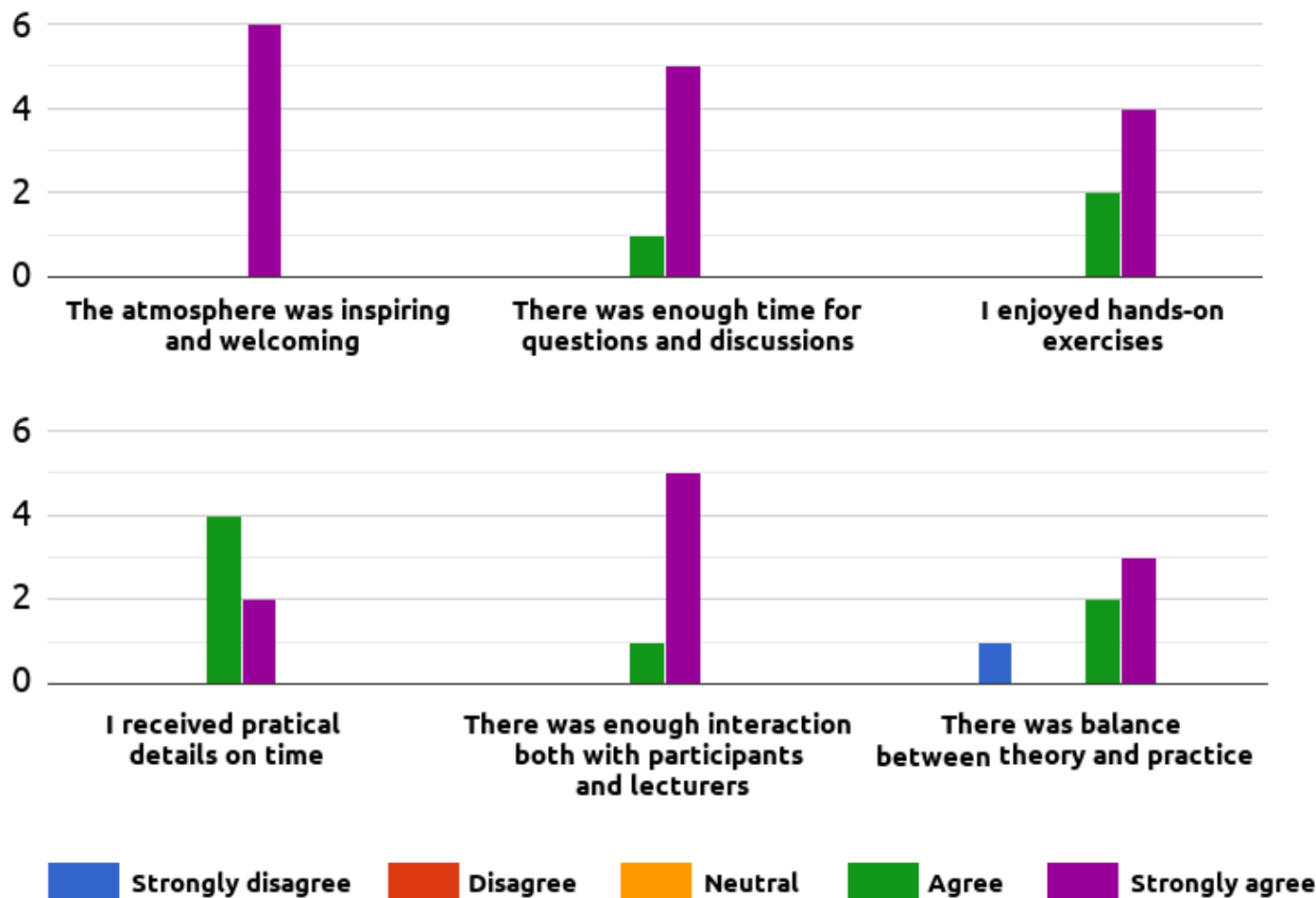
- **Purpose:** teach ESRs skills needed in science communication to different target groups
- **Practical exercises:** 3-min pitch talks, explain your thesis in 1-min to specified audience, front-of-the-camera training, research paper into a popular articles
- **Social events:** Visit to Geophysical and Astronomical Observatory and Joanina Library and the Royal Palace

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WS4: Communication & outreach (onsite)



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WS4/Coimbra



School 2 & WS3/Athens



WS4/Coimbra



WS5/Sheffield



School 2 & WS3/Athens



WS4/Coimbra



WS5/Sheffield



School 2 & WS3/Athens

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Summary/lessons learned

- SWATNet has an extensive and ambitious training program for PhD students in the field of heliophysics (7 workshops and three schools, e.g., in 2022 we organized one school and four workshops) to teach both field specific knowledge and transferrable skills
- Organized by our academic partners with many talks and practical sessions given also by our industry partners and invited outside speakers/trainers
- To easy practical arrangements Workshops were combined with Schools and Annual Meetings.
- At the beginning more time was spent on establishing good practices (planning word-document, regular meetings, schedule template, feedback form, deliverable outline ..) and those has been used for all activities



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