

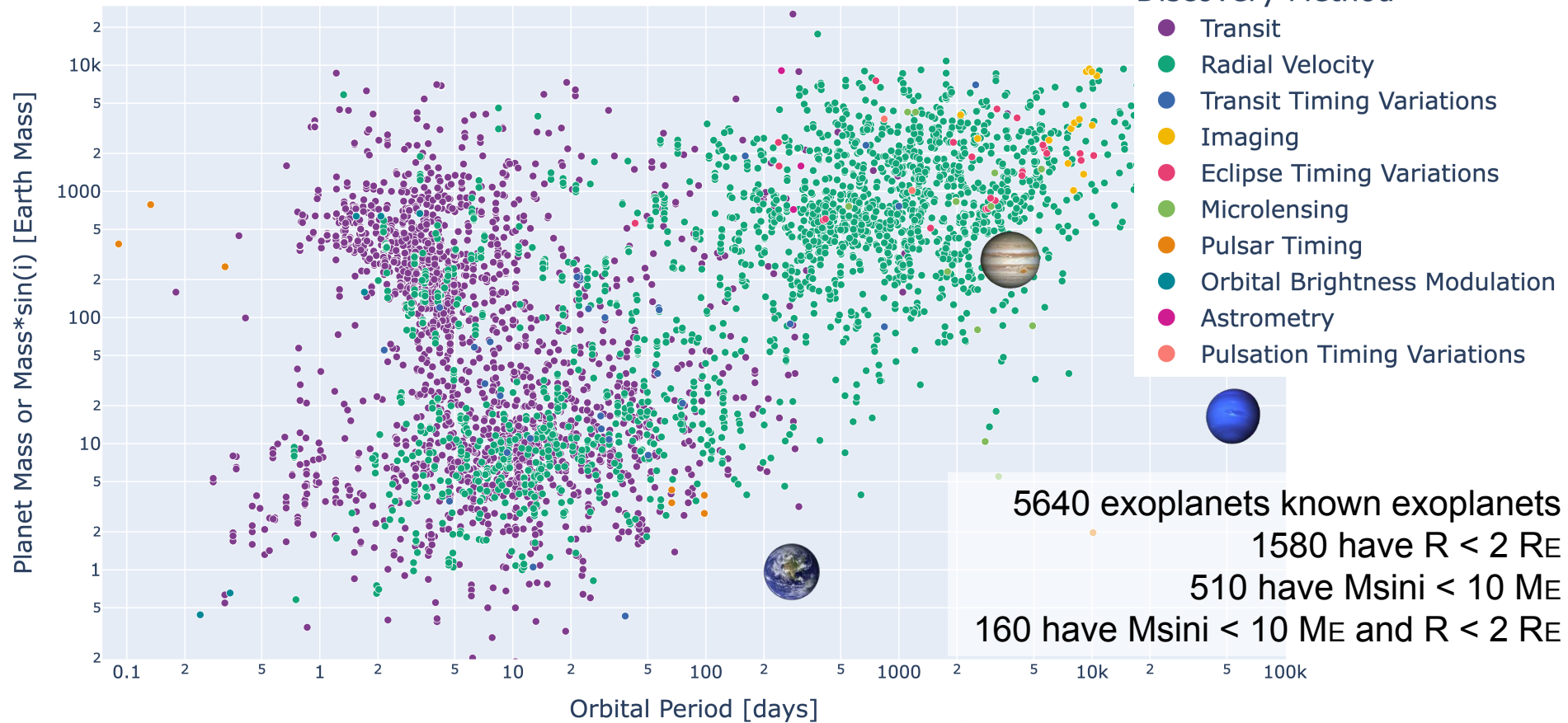
7th Institute of Space Sciences Summer School

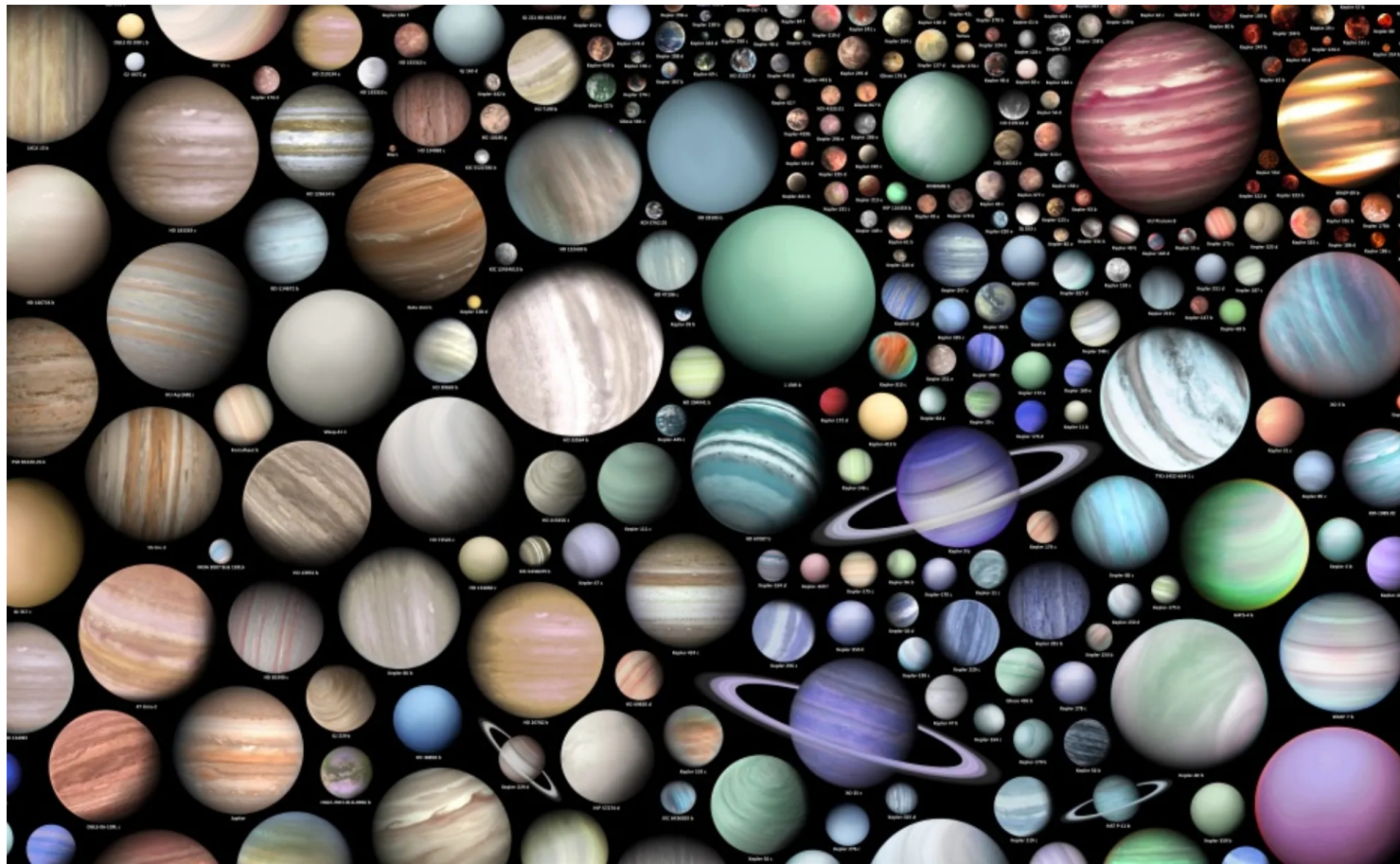
Multiwavelength Approach to Exoplanetary Systems

2 to 11 July 2024



NASA Exoplanet Archive, exoplanetarchive.ipac.caltech.edu, 2024-06-24 08:17:33





Phase I

- Detecting exoplanets and finding Hot Jupiters
- Ground-based spectrographs (HARPS)

Phase II

- Search for rocky exoplanets around low-mass stars
- Habitability & planet formation
- Ground-based spectrographs (HARPS, HARPS-N, CARMENES, ESPRESSO)
- Space-based photometers (Corot, Kepler)

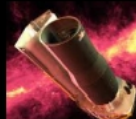
Phase III

- Characterizing planetary atmospheres
- Search for life, biomarkers
- Stellar magnetic activity problem
- Star-planet interactions and magnetism
- Space-based photometers and/or spectrographs (TESS, JWST, ARIEL)


The lively world of exoplanets: decades of future instruments

Space


SPITZER
1 m, infrared, NASA




Kepler
1 m, NASA




Gaia
1 m, astrometry, ESA




HST
2.5 m
NASA/ESA



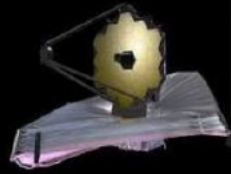
TESS
4x10 cm, NASA



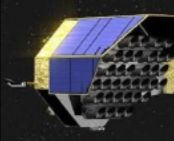
CHEOPS ✓
30 cm, ESA




JWST
6.5 m,
NASA/ESA/CSA



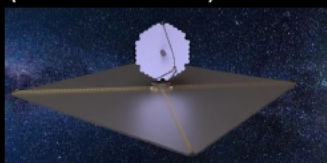
PLATO ✓
26x12 cm, ESA



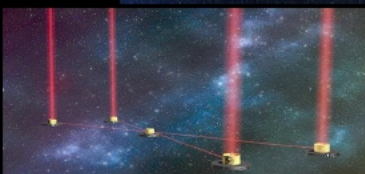
ARIEL ✓
1 m, spectra,
ESA




HWO (2020 Decadal)
6 m, NASA



LIFE? (Voyage 2050) ✓
4x2.5-m ESA




NOW **2025** **2030** **2040**




Ground

Doppler spec.
2-m class telescopes
HARPS (ESO) ✓
ESPRESSO
CARMENES
HARPS-N, GIANO
APF, PFS, NEID, HPF



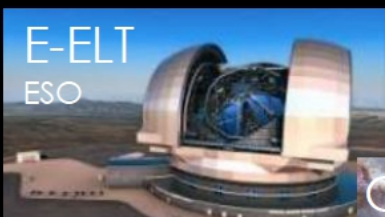
Transit searches
10 cm-1.5 m telescopes
TrES, WASP, HAT, NGTS,
MEarth, SPECULOOS, QATAR

Radio emission searches
LOFAR
GMRT




Direct imaging
10-m class telescopes
SPHERE/ESO
GPI/Gemini


E-ELT
ESO



TMT
USA, China, India



GMT
USA



Direct imaging and spectroscopy
30-m class telescopes

Scientific Organizing Comitee

Daniele Viganò



Fabio del Sordo



Manuel Perger



Juan Carlos Morales



Local Organizing Comitee

Simranpreet Kaur



Jordi Blanco Pozo



Òscar Morata



Rebeca Pirvu



Soumya Sengupta



Nuno Gómes



Carles Blazquez



Clàudia Soriano Guerrero



Albert Elias López



Computer issues

Fabio del Sordo



Nuno G3mes



Wi-Fi networks

- **eduroam**
your own credentials
available in all the campus
- **Third**
password: **icebarcelona2023**
available within the institute

Hands-on session

We recommend that people without computer (or without Linux/Mac) to join another participant to create small groups of 2-3 people

Problems can be solved today after the last session at around 18h

Logistics

- Certificate of attendance

Noemí Cortés



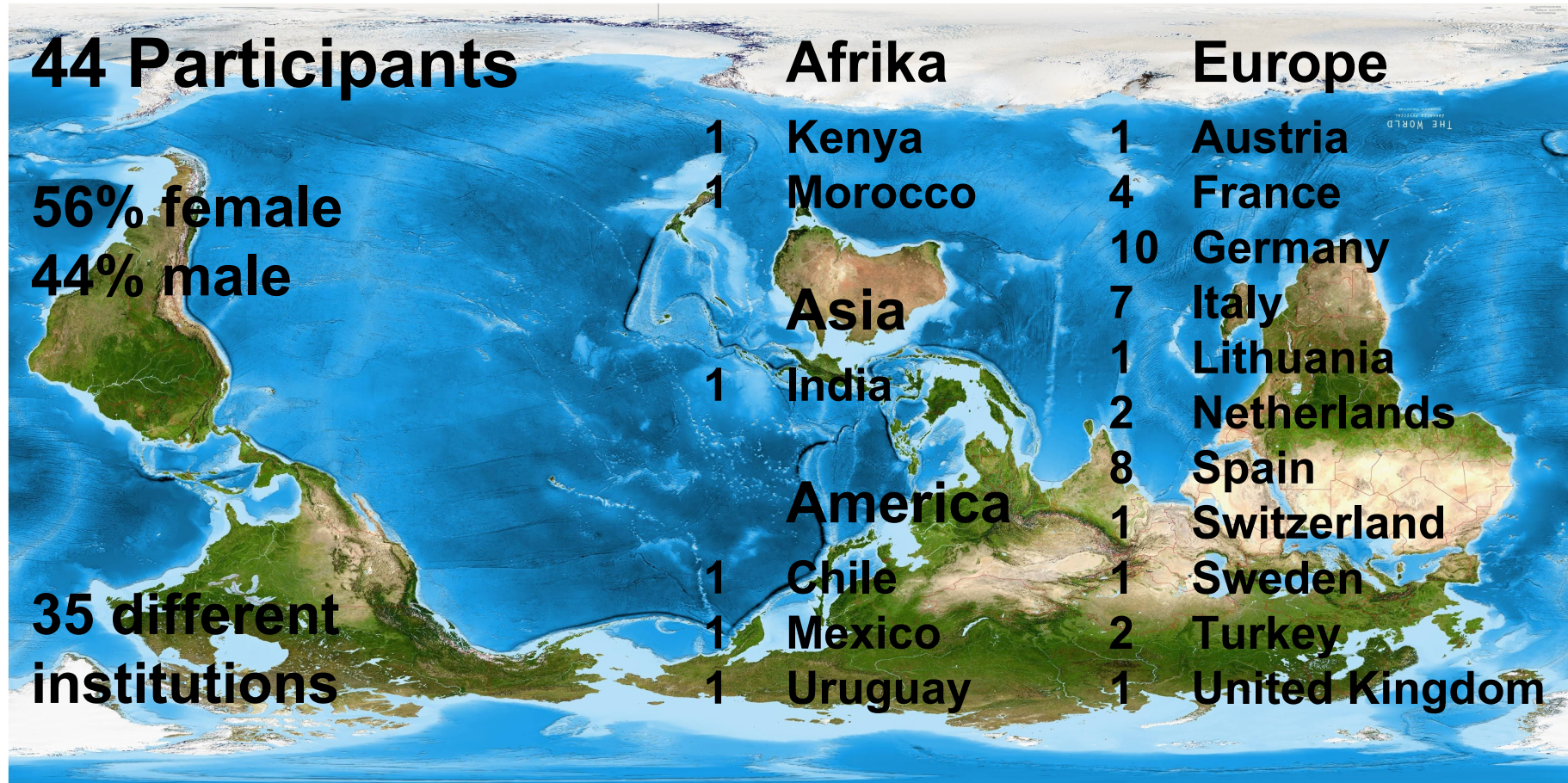
- Group Foto at Coffee Break
Friday 5th July 10:45 – 11:15
- short interviews

Alba Calejero



Jorge Rivero González





Julián Alvarado Gómez	Leibniz Institute for Astrophysics Potsdam	Germany
Guillem Anglada Escudé	ICE-CSIC/IEEC	Spain
Anthony Boccaletti	Observatoire de Paris	France
Rim Fares	United Arab Emirates University, Al Ain	UAE
Carlos Gascón	ICE-CSIC/IEEC	Spain
Jean-Mathias Grießmeier	Université d'Orléans	France
Ekaterina Ilin	ASTRON Institute for Radio Astronomy	Netherlands
Simranpreet Kaur	ICE-CSIC/IEEC	Spain
Marina Lafarga	University of Warwick	United Kingdom
Albert Elias López	ICE-CSIC/IEEC	Spain
Nadège Meunier	Université Grenoble Alpes	France
Juan Carlos Morales	ICE-CSIC/IEEC	Spain
Òscar Morata	ICE-CSIC/IEEC	Spain
Lisa Nortmann	Universität zu Göttingen	Germany
Manuel Perger	ICE-CSIC/IEEC	Spain
Ignasi Ribas	ICE-CSIC/IEEC	Spain
Sudeshna Boro Saikia	Universität Wien	Austria
Fabio del Sordo	ICE-CSIC/IEEC	Spain
Trifon Trifonov	Max-Planck-Institut für Astronomie	Germany
Daniele Viganò	ICE-CSIC/IEEC	Spain

General Programme

09:00 – 10:45	1:45h	Lecture
10:45 – 11:15	0:30h	Coffee Break
11:15 – 13:00	1:45h	Lecture

13:00 – 14:30	1:30h	Lunch
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14:30 – 16:00	1:30h	Hands-on
16:00 – 16:30	0:30h	Coffee Break
16:30 – 18:00	1:30h	Hands-on

- Material for the different lectures and hands-on sessions will be uploaded to the webpage during the school
- Most lecturers will be around for questions

<https://indico.ice.csic.es/e/summerschool24>

Schedule first week

Detection and characterisation of exoplanets

Tuesday
July 2nd

Wednesday
July 3rd

Thursday
July 4th

Friday
July 5th

Marina Lafarga
Data extraction from
high-resolution spectra

Nadège Meunier
Understanding stellar activity
in the exoplanetary field

Anthony Boccaletti
Direct Imaging
of exoplanets

Trifon Trifonov
Analysis of high-precision
radial velocities

Manuel Perger
Machine learning for
stellar activity mitigation

Lisa Nortmann
Characterizing planetary
atmospheres

Ignasi Ribas
Introduction of detection
and analysis methods

Marina Lafarga
Spectral data
extraction

Juan Carlos Morales
Transit
spectrophotometry

Carlos Gascón
Transmission
spectroscopy

Guillem Anglada Escudé
Methods of statistical
analysis

Trifon Trifonov
Analysis of
observational data I

Manuel Perger
Machine learning
in radial velocities

Juan Carlos Morales
Analysis of
observational data II

Schedule second week

Star-planet interaction and magnetism

Monday
July 8th

Daniele Viganò
Internal structure and
magnetism in planets

Fabio del Sordo
Dynamo and
magnetism: basis

Rim Fares
Star-planet magnetic interaction
and activity proxies

Albert Elias-López
Magnetic field data of
Jupiter and Earth

Tuesday
July 9th

Jean-Mathias Grießmeier
Mechanisms of radio
emission from exoplanets

Ekaterina Ilin
The role of flares in
Star-Planet Interactions

Simranpreet Kaur
Radio
estimates

Óscar Morata
Radio
data

Wednesday
July 10th

Julián Alvarado Gómez
Stellar Magnetism and
extrasolar Space Weather

Sudeshna Boro Sakia
The role of the host star
on planet habitability

Montsec
Excursion

Thursday
July 11th

Photometric
data analysis

Wrap-up
session

Visit to the

Observatori del Montsec

Wednesday, 10th of July

Joan Oró Telescope –
The biggest telescope in Catalunya

<https://montsec.ieec.cat/en/>

Bring warm clothes and sunscreen

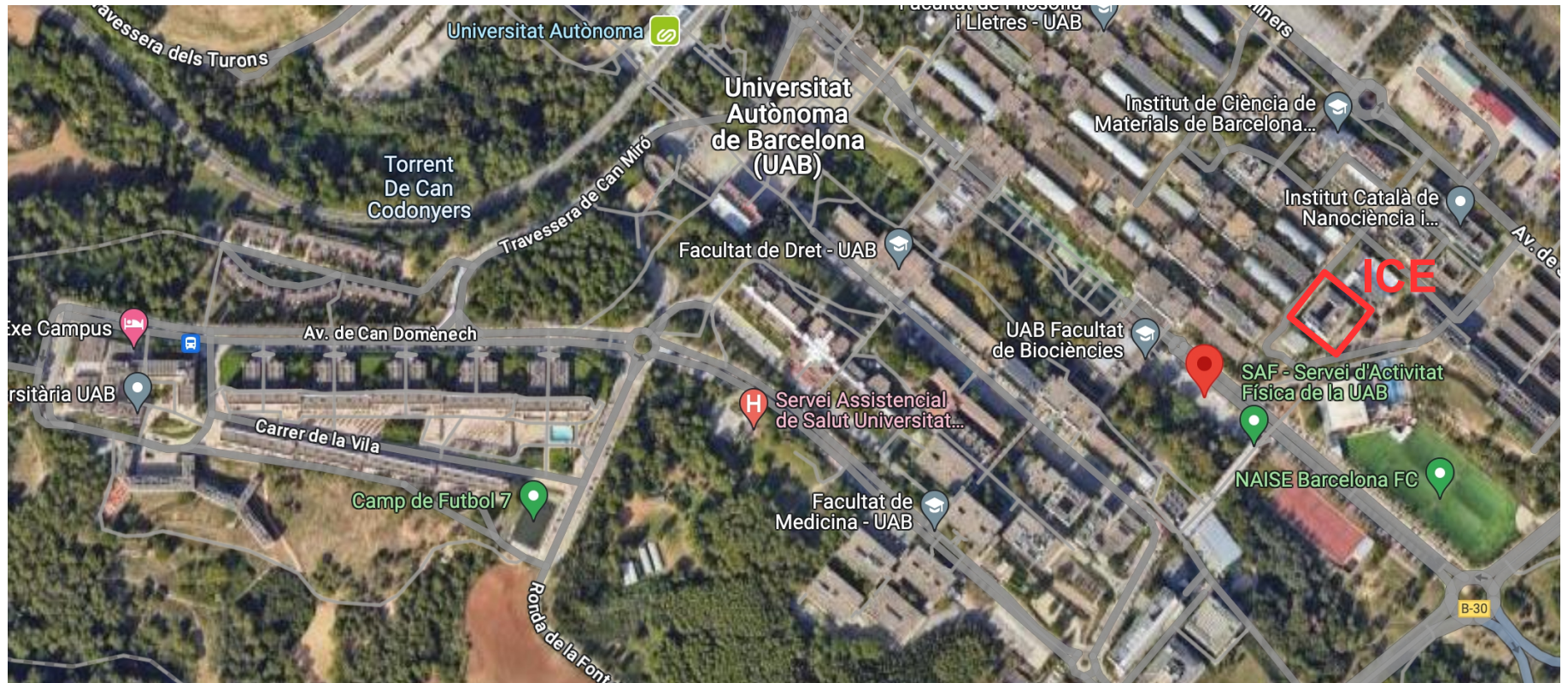
Thursday, 11th of July

14:30h final hands-on session on
reducing and analyzing the data



© IEEC - Kike Herrero

Wednesday July, 10th at 14:30h meeting point at bus park close to the SAF



14:30 Meeting

15:00 Departure

17:30 Arrival

Visit to the Observatory

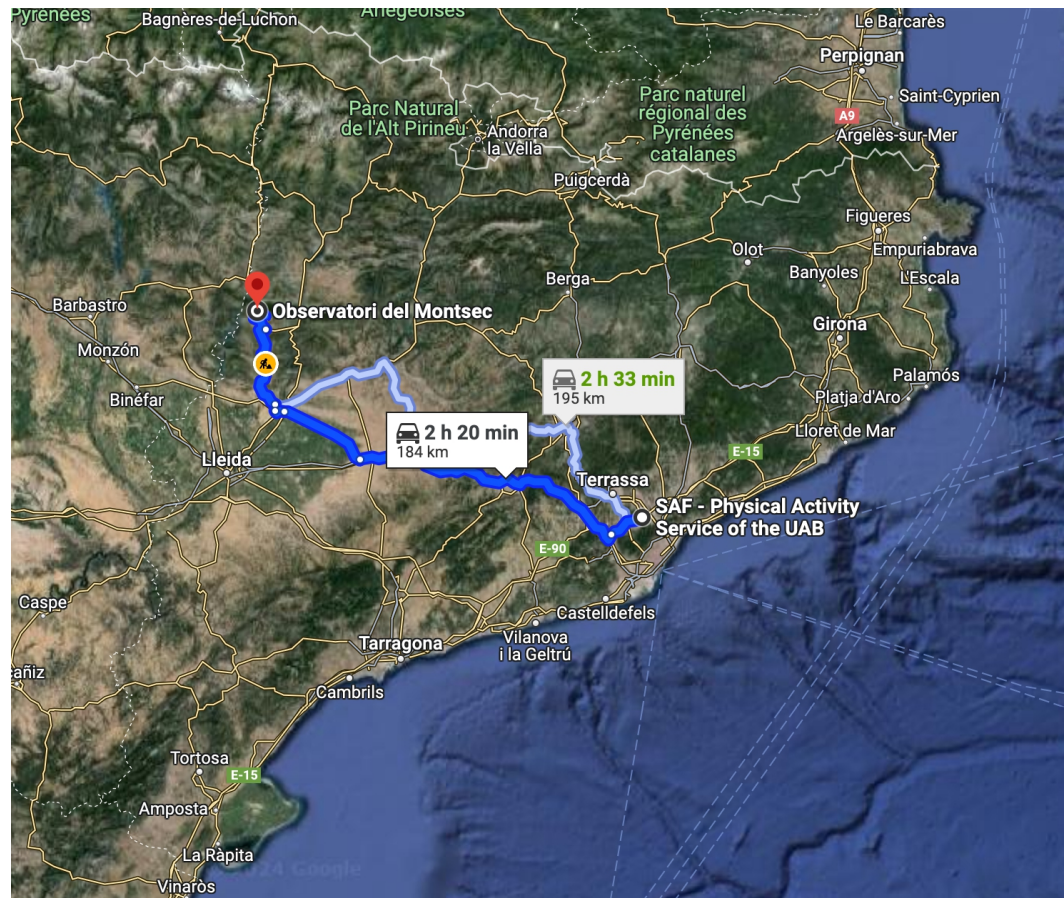
Dinner (catering)

22:00 Transit observations

23:00-24:00 Departure

1:30-2:30 Arrival

stops at Vila Universitaria &
Barcelona center (**where?**)



Solar observations

in optical and H α wavelengths to
localize and count dark spots and to
measure solar rotation period

6 morning coffee breaks from Wednesday to Wednesday

Please organize groups of 5 to 10 people

Posters in the Alberto Lobo room

Responsibles

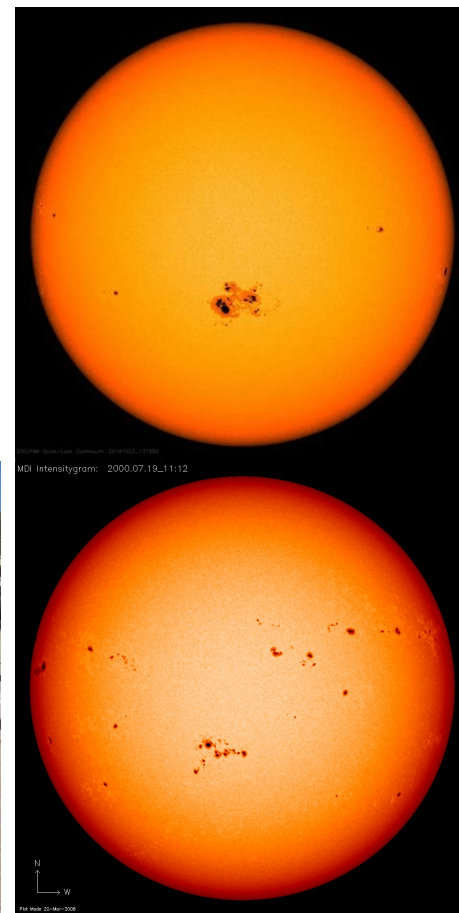
Jorge Rivero González

Fabio del Sordo

Carles Blasquez

Jordi Blanco

Rebeca Pirvu



IEEC^R

<https://www.ieec.cat/en/ieec/job-offers/>

**Institute of
Space Sciences**



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<https://ice.csic.es/about-us/jobs>

7th Institute of Space Sciences Summer School

Benvingudes i Benvinguts

