

## **A remarkable fly from busy motherhood to Iberian Space Science Summer School (i4S)**

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SCOSTEP never fails to make me believe in my dream. It always stands as a strong backbone for my dream to pursue Space weather research and become a graduate in the field with a heart full of memorable and precious experiences. I was a mom-to-be when I heard about my selection as SCOSTEP SVS in 2017 at Goddard Space flight center. Despite so many health and emotional struggles, I have attended SVS but soon after I came to realize that I can't continue both research and motherhood together due to my personal situations. So, I have discontinued my Ph.D. in an interesting stage of my research career as an SVS SCOSTEP scholar. It makes me both happy for them and hurts me inside out watching all my fellow research scholars getting graduated and progress in their careers as I am sitting inside the home all alone with an unfulfilled dream. Meanwhile, I have always engaged in all the online research zoom conferences and seminars conducted by ISWI, SCOSTEP, and all other space research platforms (Thanks to COVID 19 pandemic! Which helped me to connect all my friends and eminent scientists in the field of space weather during the tough time). Through all the motivations I have gained from all these conferences and online meets, I have joined as a new Ph.D. scholar after 5 years-long battle with my insecurities.

When I got an email call for Iberian Space Science Summer School (i4S) through the SCOSTEP mailing list I was so excited as this is the first opportunity after COVID 19 to meet all my idol eminent researchers from all over the world and all the likely minded so many research scholars from different research institutions. Even though I sent the completed application, I have no faith in me to get selected as SCOSTEP will select only 40 students around the world. Finally, after two or three months wait, the selection emails reached me with happy tears in my eyes. After so many rejections from all the tries to get out of the well of self-doubts, loneliness, and unfulfilled dream, SCOSTEP ISWI ISEE supported Iberian Space Science Summer School (i4S) selection gave me a strong wing to fly towards my dream to fulfil. The main objective of the school is to provide professional development for young researchers in the domain of Space Weather, with an emphasis on the fundamental science of the Sun-Earth system, modelling, and forecasting. This 5 days summer school was held in June 2022 (6-10) at University of Alcala, Spain.

With the full financial support by SCOSTEP ISWI ISEE, I could reach the i4S summer school. The first day was very much important for me, that's the day I have to awaken as a research scholar. The five-year research gap in my career made me a bit anxious and I always choose to be very silent in a group. But the first day of school and the introductory session made me feel comfortable in the group of 28 research scholars and the group of scientists I have already known through their research works. From the introductory session itself, I realized that this i4S school had a well-planned agenda to make all the research scholars engaged with the different projects planned by the school. Thus we 5 groups of 6 members in each group attended daily lectures that were partitioned from Sun to Earth. The school is brilliantly scheduled as every group will get equal knowledge about all these five research areas. Each group has daily interaction with the experts in these five fields of research work.

1. Solar part
2. Interplanetary medium
3. Geomagnetic field
4. Ionosphere
5. Risk to modern society

The group is divided according to five important space weather activity happened on 2010,2015,2017,2022

- |                         |                |            |
|-------------------------|----------------|------------|
| 1. Group 1              | 2. Group 2     | 3. Group 3 |
| February 2022, Starlink | September 2017 | June 2015  |

4. Group 4  
March 2015  
St Patrick

5. Group 5  
April 2010  
Galaxy event

I have included in group 1, February 2022 Starlink event analysis.

**Daily Lectures:**

**Day 1:**

First-day lectures covered the area of Solar activity by Ludwig Klein, Solar eruptions by Natchimuthuk Gopalswamy, NASA GSFC, USA, and Space weather Patricia Doherty, Boston College, USA. Every lecture was an outstanding source of knowledge that made us capable to do the project work assigned in its full meaning.

**Day 2:**

**Day 2** lectures were concentrated on interplanetary medium-related research work. A talk on Interplanetary medium by Consuelo Cid and Magnetosphere by Kazuo Shiokawa. The lectures started from very basic and covered all the higher sessions of the field of work, which helped even a research scholar who concentrated only in any other related area can understand the theoretical part of this particular research area.

**Day 3:**

Day 3 was dedicated to the Solar wind -Magnetosphere interaction lecture by Raman Lopez and the Geomagnetic field by Masahito Nose. These lectures helped us to acquire deep knowledge about the Solar Wind-Magnetosphere interaction and how the geomagnetic field is involved in space weather activities.

**Day 4:**

The Day 4 lectures covered the Ionosphere and lower atmosphere part by Sandro Radicella and Ruth Leiberman. These lectures helped me to understand about Ionosphere effects due to Solarwind magnetosphere interaction with the Ionosphere and lower atmosphere.

**Day 5**

Day 5 lectures helped me to understand low-cost instrumentation through a series of talks by

- VLF receptor for flare detection - **Alberto García - Observatorio de Yebes - Spain**
- Callisto receptor for radio burst detection - **Christian Monstein – ETH Zurich - Switzerland**
- Low-cost magnetometer for geomagnetic disturbances – **Farideh Honary – Lancaster University - UK**
- Low-cost GNSS receptor – **Dinesh Manandhar – Center for Spatial Information Science - Japan**

This helped me to strongly believe that there are research people around the world who is striving to make data available globally without any barriers from the country and even a research scholar and his group can make collaboration for data collection

**Project discussions:**

From day 1 to 5 we have assigned a dedicated time of interaction with the eminent scientist in each session of the project work. During the time the scientist made sure that each student in the group acquired particular data analysis ability for that day. This group work and interaction helped me a lot to have a great connection with the group members from different research institutions around the world and by interacting with them I have gained a lot of knowledge regarding their data analysis ability and the way they tackle each scientific problem. The complete interactions with scientists who considered each student as their own team and supported a lot. This helped me to overcome all the fear of approaching the eminent scientist for discussion and the self-doubt of clearing my questions regarding the work. This group work helped me to come out from the pupa of silence I have created within the last five years of struggles and emotional and mental barriers. I felt so relieved to get back my older research-oriented mind.

**Oral research work presentation, Project Group presentation, Poster session**

This school provided a very good platform to deliver our present research work in front of great scientists in the research field through its dedicated and well time managed oral research work presentation, group project presentation, and a poster session. This helped me to overcome all fear of facing the people to deliver my work. This platform gave so much work-related advice to scientists and helped me to clear my questions regarding my work. For the project group presentation, we six students in the group worked well together sharing our ideas, and finally presented each topic very clearly with

the final result. Our Starlink group project made it clear that Space weather issues are unpredictable but yet through well-planned prediction research, we can avoid the huge societal loss the space weather used to produce. Poster presentations during tea break helped me to make a good connection with all the students and the variety of their research problems.

### **Unexpected yet wonderful visit to European Space Agency (ESA) Madrid**

This was such a thoughtful decision made realized by the i4S team. Such a wonderful opportunity each space research scholar can achieve in their early career path. A short time visit to ESA made me so much happier and I would never think that I can enter ESA' but ended up entering and spending a few minutes in the wonder of ESA's mission control rooms. The ESA tour and each research mission are explained thoroughly. I was so thrilled to see the SOHO mission miniature. I was so fortunate to walked through the iconic places of ESAC facilities. CESAR and ESAC experts described the European Space Agency, the Astronomy Center in Madrid, and provided insights on some of the key science missions and results. The group had the privilege to talk to Chris Watson, from the ESAC Solar Orbiter Science Operations team, who presented the latest status of the spacecraft and the first science investigations and results

### **Visit to University of Alcalá, Spain**

The Alcalá University visit is such a memorable part of this school. The history of this University is such a precious one

### **The school participants and the everlasting bond we have shared:**

I cherished the bond shared by each participant. Everyone takes care of others and made it feels like there is no barrier between higher research institutes and university researchers. Timely help, advice, idea sharing, and helps in programming language use helped me a lot and made us feel comfortable and I felt so lucky to have a lot of friends around the world with the same research interest. Within these five days of togetherness, they made me feel that I have a home in every corner of the world. Thank you so much.

### **Acknowledgment:**

Thanking wholeheartedly International Space Weather Initiative (ISWI), the Institute for Space-Earth Environmental Research (ISEE), and the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) for supporting me abundantly to come back to mainstream research programs through the financial fund you have provided to attend the school. That has had a life-changing impact on my career. Thank you for the all help and support extended to me by Prof. Antonio from Alcalá University who made sure that each and every participant is comfortable with the stay arrangements provided and also such wonderful timely coordination of the school program. Brilliantly coordinated 5 days in school have such a research powerpack impact on each student's research professional development. Thanking all the eminent scientists who reached here for giving us guidance despite their busy schedules.

Thank you, Mai Asakura, for the support she extended to me.

Thank you smouch each and every eminent personality of co-ordinators to make this school such a huge success. Regards,

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ESA mission control room

Some of my precious memories

