UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Escola d'Enginyeria de Telecomunicació i Aeroespacial de Castelldefels

The Abdus Salam International Centre for Theoretical Physics
Physics Without Frontiers

IAEA International Atomic Energy Agency

unesco United Nations Educational, Scientific and Cultural Organization

Sri Lankan Summer School of Stellar Evolution and Asteroseismology

KPSC. Jayaratne, S. Ganesh, G. Handler,
J. Adassuriya, J. L. Gutiérrez

Problematics and Goals

A large number of students seeking a PhD in astrophysics leave Sri Lanka to do it. The local astrophysical community is small, and somewhat disconnected.

Primary aims are:

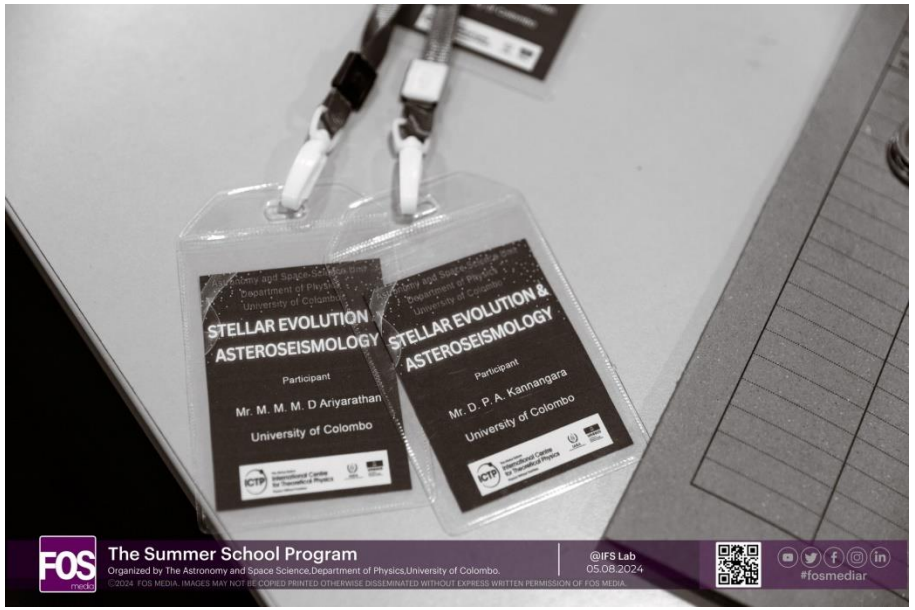
- Capacity building: promote PhD's and MPhil's in Astronomy and Astrophysics at University of Colombo and other public universities.
- Introduce astrophysical concepts to Physics students.

As a secondary aim, we fostered students improve their ICT skills (Linux) and promote coding for astronomical applications (Fortran 90).

An important aim was to train PhD students and TAs in order to provide the course in following years.

Content of the Summer School

1. Introduction of Astronomy and Space Science Unit and PWF.
2. Astronomical observables.
3. Introduction to MESA (and a minimum of Linux).
4. The Main Sequence.
5. He burning phase.
6. The AGB phase.
7. Asteroseismology.



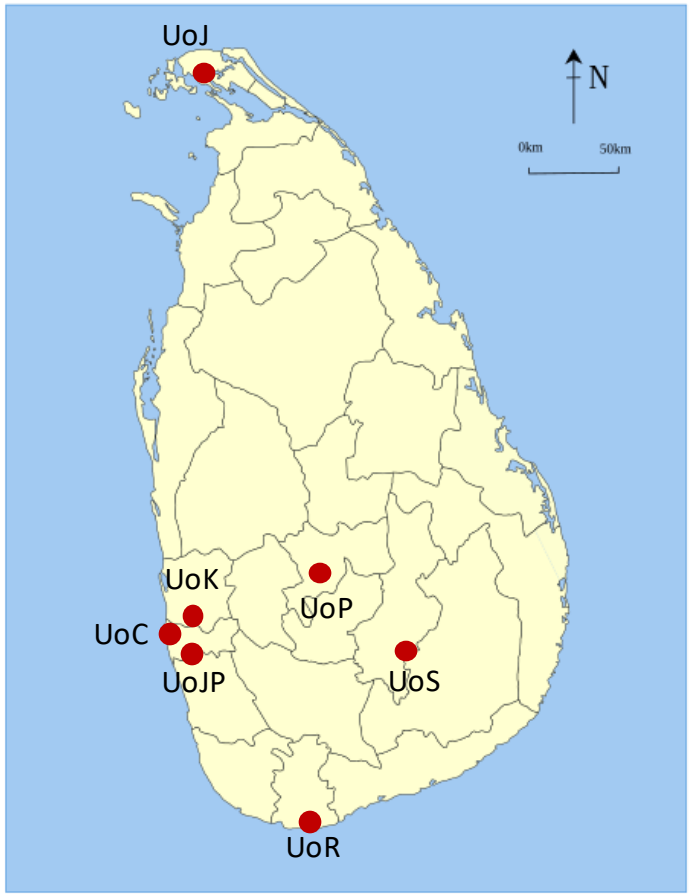
Poster of the summer school

Participation

We hosted 21 students (the maximum allowed in the course) from all over Sri Lanka and five teaching assistants.

We strived for gender parity: six female students attended the workshop, and two of the teaching assistants were women.

Students were able to simulate the main sequence (H burning) and most of the He burning phase for low mass stars.



University	No of participants	
University of Colombo (UoC)	4	Undergraduates
	3	Postgraduates
University of Peradeniya (UoP)	2	Undergraduates
University of Kelaniya (UoK)	2	Undergraduates
University of Sri Jayawardenapura (UoJP)	3	Undergraduates
University of Sabaragamuwa (UoS)	3	Undergraduates
University of Jaffna (UoJ)	2	Undergraduates
University of Ruhuna (UoR)	2	Undergraduates

Conferences Presentations

- Jayaratne, KPSC., History of Astronomy in Sri Lanka.
- Handler, G., Pulsation in close binary stars.
- Ganesh, S., Ground and space based observations of stars.
- Gutiérrez, J., Population III stars.
- Gutiérrez, J., Final evolution of One (Mg) degenerate objects.
- Adassuriya, J., Asteroseismology of Delta Scuti stars.

Hands on Experience of MESA

The state of art stellar evolution code, Modules of Experiments in Stellar Astrophysics (MESA) was introduced.

- Installation procedure (with the help of teaching assistants)
- Set up of the simulations
- Simulation controls and outputs
- Generation of restart models

Course outcomes

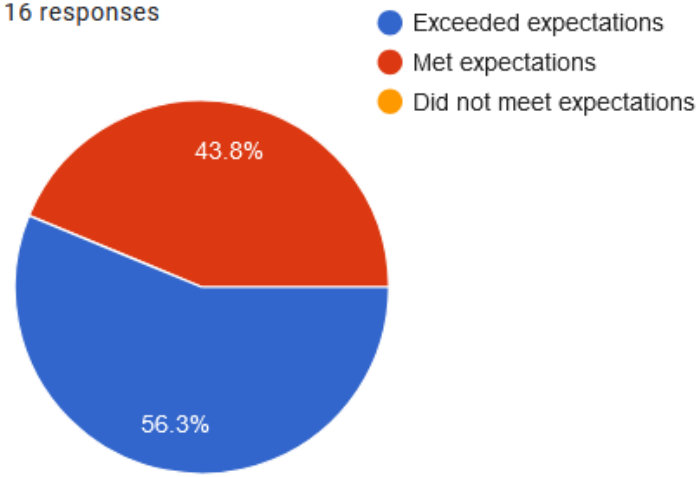
- Awareness of the observation facilities and astronomical data sources to study variable stars.
- Awareness of stellar modeling facilities with theoretical aspects.
- Opportunities to collaborate with Astronomy and Space Science Unit, UoC and other universities for the postgraduate programs.
- Identify the ability to utilize the computer lab facilities at the Sri Lankan universities for the Astrophysics programs.
- Established a network among students interested in astronomy and astrophysics research among the universities.

Feedbacks of the workshop

Student's feedback is obtained through a Google questionnaire.

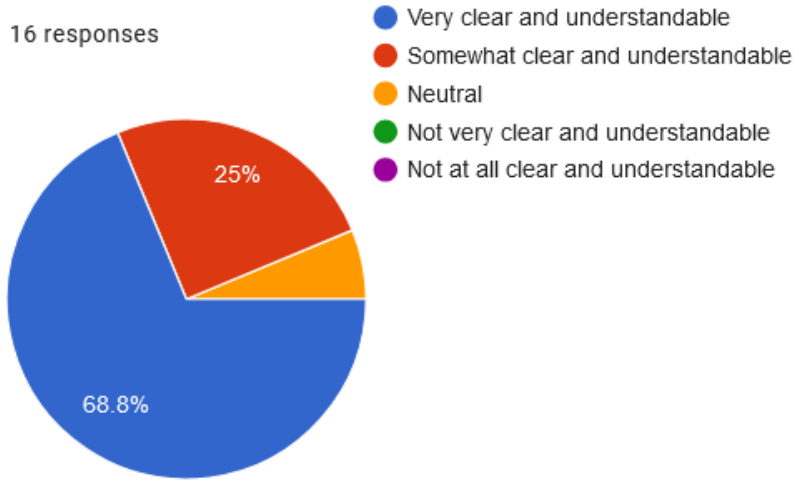
1. Did the workshop meet your initial expectations?

16 responses



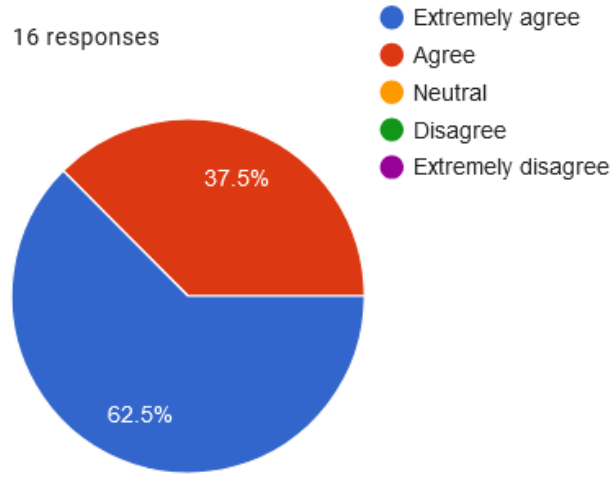
5. Was the information presented clear and easy to understand?

16 responses



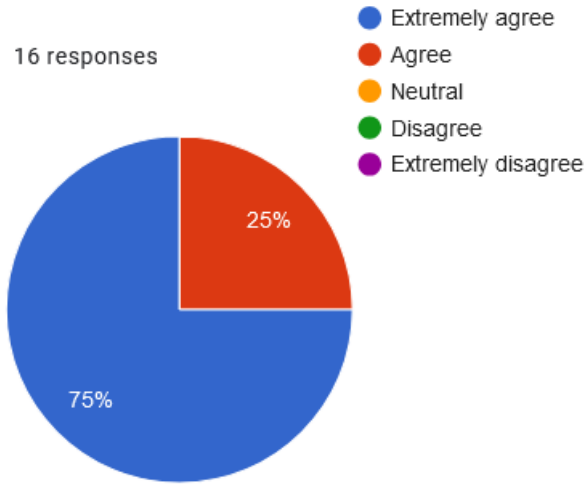
8. Was adequate time given for Q&A?

16 responses



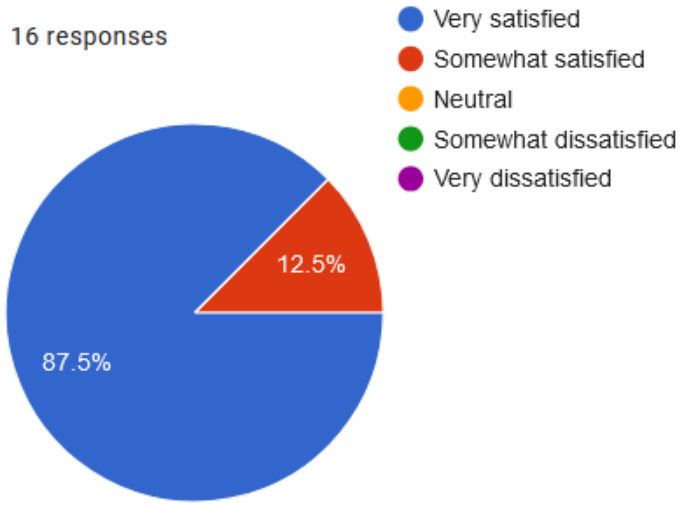
6. Were the workshop materials/slides easy to follow and aid your understanding of the topic?

16 responses



11. How would you rate your overall satisfaction with the workshop?

16 responses



Feedbacks of the workshop

13. Are there any improvements you would suggest for future workshops?

9 responses

1.It's better to provide a printed material. It would more helpful to go throughout the programme.
2.Better to install the Mesa by participants.
3.Its better to provide a brief (pre programme) pdf about MESA other than given in MESA website.
4.Can be make the participants interact among them.
These are some of positive feedbacks to elevate next level.

Do more like these sessions (Stella modeling)

It is very useful to having an observations.

If a session can be arranged for observations also, I think that would be good. Because it helps to gain knowledge about how to get data with observations.

It would be better to have more practical sessions either by having the workshop for more days.

Yes, absolutely

No

14. Do you have any suggestions for the topics of future Astronomy and Astrophysics workshops?

8 responses

Variable stars, Exoplanet and Asterosesimology

Observational Astronomy

1.Observations and to share the hands on experience with instruments.
2.IRAF and PyRAF tools

Cosmological Red shift and the Expansion of the Universe

Observational Techniques: Using telescopes and instruments for astronomy.
Exoplanet Discovery: Techniques for finding and studying exoplanets

I would like to study the galaxies in the next summer school

Space evolution with Rocketry and Rovers

No

Conferences outside University of Colombo

As a way to provide further impact on the scientific community in Sri Lanka, we delivered two conferences outside Colombo:

1. Gutiérrez, J., A Swarm of Femtosatellites to Study the Lower Thermosphere, A C Clarke Institute for Modern Technologies, Mount Lavinia, August 9.
2. Gutiérrez, J., Stellar Archaeology, University of Peradeniya, Peradeniya, August 12.

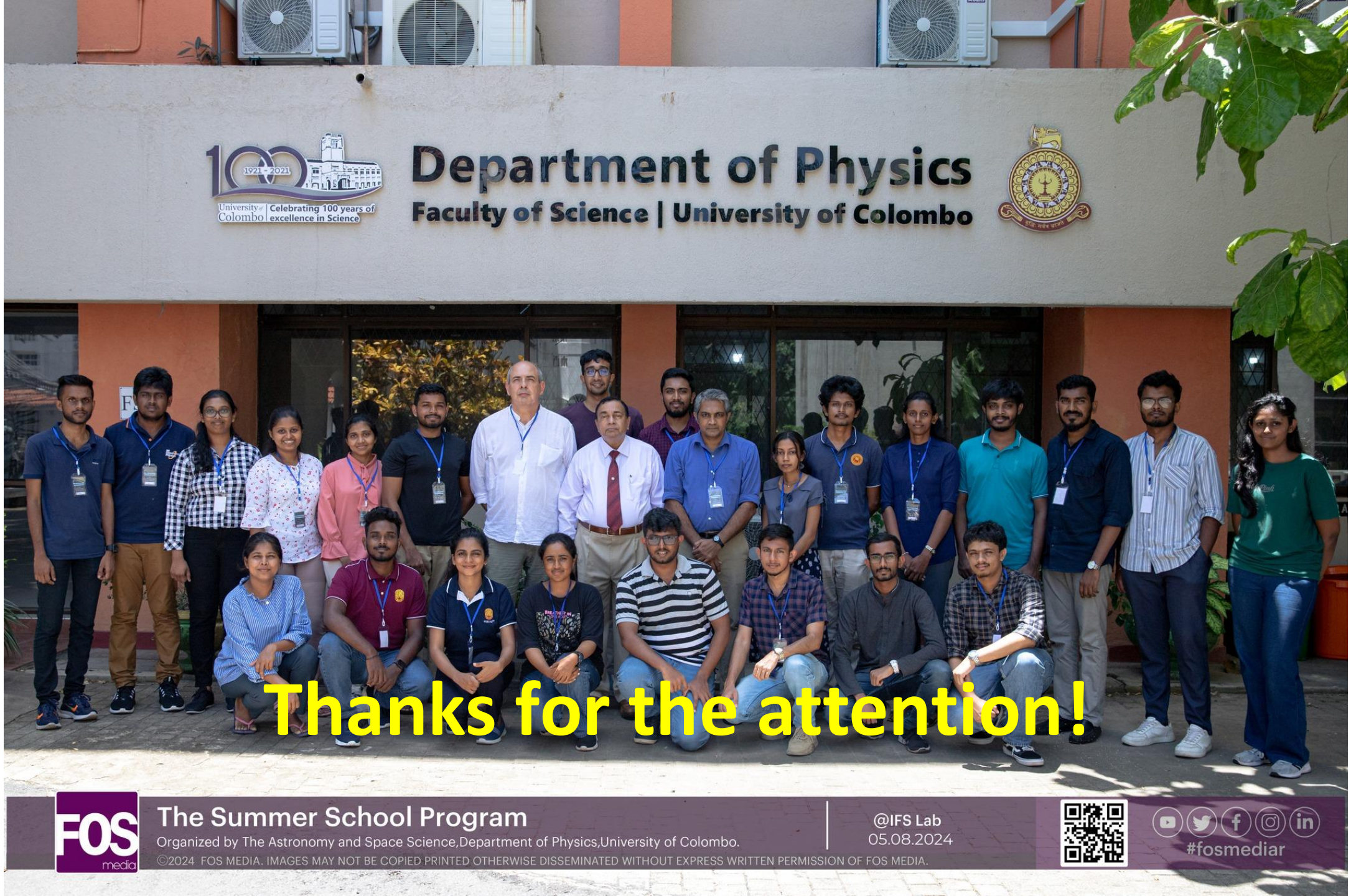
Conclusions and Future Work

Conclusions

- We consider that the school was a success.
- A PhD student is already working with MESA.
- Nevertheless, it is too early to properly assess the outcome of the course.
- The support from ICTP, the University of Colombo, and the A C Clarke Institute for Modern Technologies was instrumental for this project.

Future developments:

- Identify ways for helping students following the course further explore stellar evolution with a final degree thesis or a PhD.
- Check if any of the students following the course is currently using MESA or other numerical code to further his/her knowledge in astrophysics.
- Organize workshops on astronomical data analysis.



The Summer School Program

Organized by The Astronomy and Space Science,Department of Physics,University of Colombo.

@IFS Lab

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