The International Summer School in Astrobiology, Spain - 2018/2019

Rory Barnes
University of Washington
U.S. Director of Summer School

Biomarkers: Signs of Life Through Space and Time (2018)

In June 2018 astrobiology students from around the world gathered in Santander, Spain to learn astrobiology from leading experts. This years theme, *Biomarkers: Signs of Life Through Space and Time*, encouraged students to think about how they would identify signs of life on the ancient Earth, Mars, icy satellites of the outer solar system, and exoplanets from an interdisciplinary perspective. With lectures and hands-on activities, students learned how to identify life in the universe.

PARTICIPANTS

36 Students Total
16 from US institutions, 20 from EU institutions
19 female students, 17 male students

LECTURERS

Laurie Barge, JPL, Icy Satellites
Víctor Parro, CAB, Mars
Jörn Peckmann, Hamburg, Early Earth
Aki Roberge, GSFC, Exoplanets

Biomarkers: Signs of Life Through Space and Time (2018)

8 Lectures:

- Signs of Life on Early Earth
- The Preservation of Biomarkers Across Geological Time
- Technologies for the Detection of Molecular Biomarkers
- Searching for Signs of Life on Mars
- Ocean Worlds: Geochemistry, Redox Cycling and Habitability
- Ocean Worlds: Defining Biosignatures and Developing Strategies for Life Detection
- Observing Planets at Interstellar Distances
- Does an Exoplanet have a Biosphere?

4 Group Projects, presented on the final day:

- Biomarkers in Ancient Earth Rocks
- Biomarkers in Simulated Martian Data
- Biomarkers in Simulated icy satellite data
- Simulated Spectra of a Terrestrial Exoplanet

Excursion to Altamira and El Soplao Caves

Public lecture by Víctor Parro: “Busqueda de vida en marte… y más allá”

Palacio de la Magdalena, site of the school

Prof. Laurie Barge (JPL - Icy Worlds)

Students engaged in group projects

Prof. Aki Roberge (GSFC - Exoplanets)

Touring the Altamira Cave

El Soplao Cave

A final presentation by one of the student groups

At the end of the school, all students receive a diploma

Evaluating the School

U.S. Students asked to complete Pre- and Post-School Assessments

Overarching objectives:

- To teach cutting edge astrobiology to graduate students
- To cultivate an astrobiology community
- To establish lifelong connections with the international AB community

Questions followed the BASIK methodology (Davies & Scalise, 2015) and EBI Assessment (Burnam-Fink *et al.,* 2018):

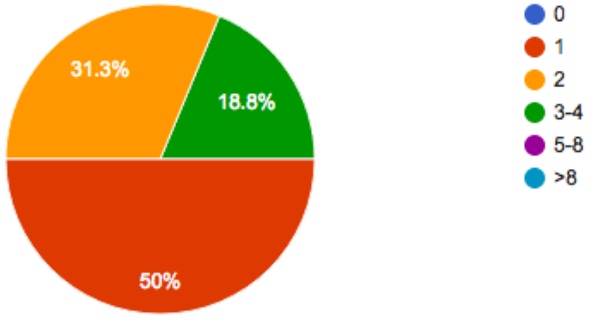
- Behavior
- Attitude
- Skills
- Interest
- Knowledge

Also included questions on interdisciplinary science, international experiences, and self-identity

Assessment Examples

How often per month do you attend colloquia/seminars outside your immediate area of study?

16 responses

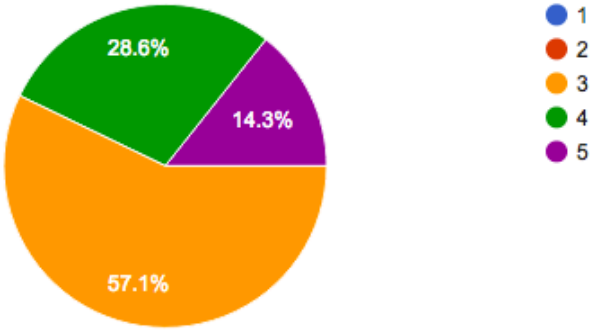


Behavior

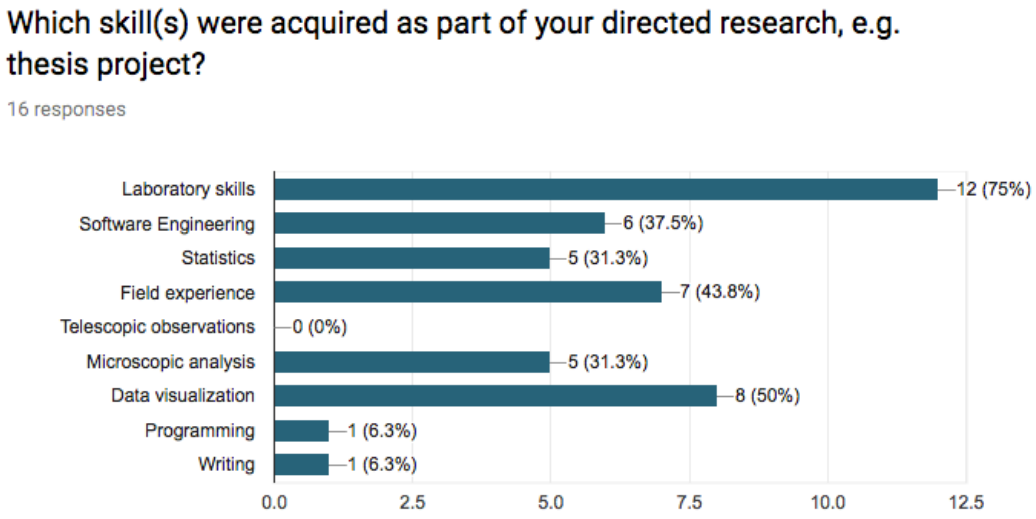
If you are in a conversation with a peer from another discipline, and they use jargon, how likely are you to interrupt and ask them to explain, with 1 being never and 5 being always?

7 responses

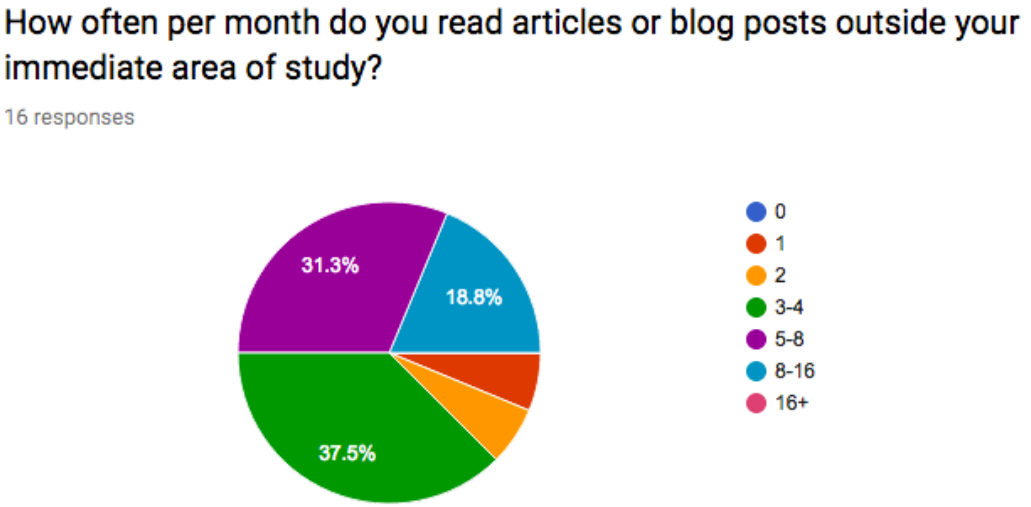
Attitude



Assessment Examples



Skills



Interest

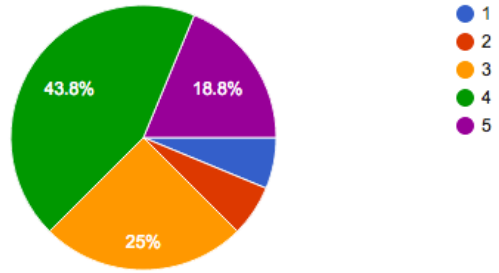
Assessment Examples

Knowledge

Pre-School

Biology is a physico-chemical system governed mathematical laws, hence signs of alien life can be predicted and validated in our Solar System, e.g. by in situ measurements.

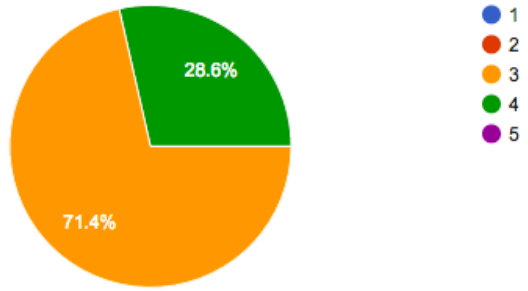
16 responses



Post-School

Biology is a physico-chemical system governed mathematical laws, hence signs of alien life can be predicted and validated in our Solar System, e.g. by in situ measurements.

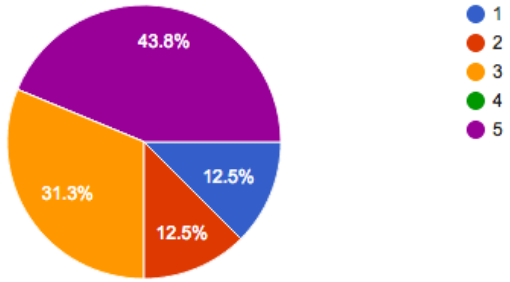
7 responses



Impact

I plan on pursuing, or have already pursued, my formal training in another country.

16 responses



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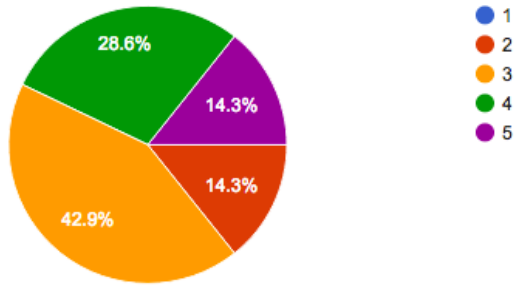
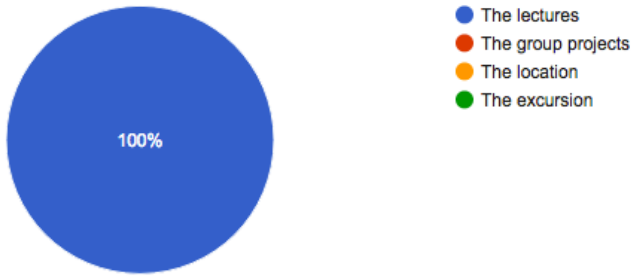


Overall Assessments

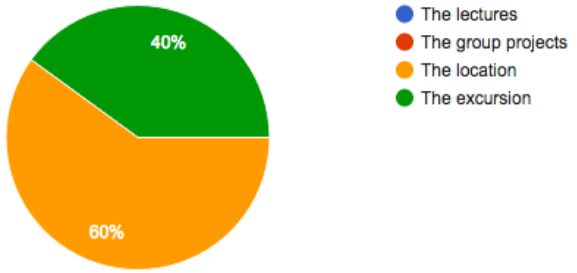
Which of the following was the best aspect of this year's school?

7 responses



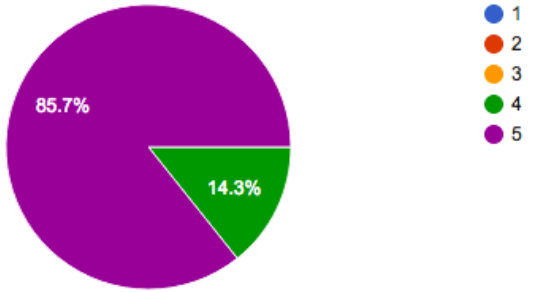
Which of the following was the worst aspect of this year's school?

5 responses



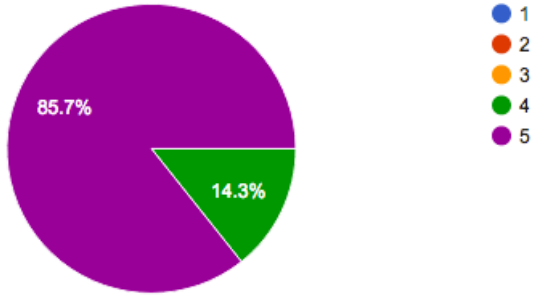
On a scale of 1-5, with 1 being very unlikely, how likely are you to recommend the school to your peers?

7 responses



On a scale of 1-5, with 1 being low, please rate the value of the entire experience.

7 responses



How can the school be improved in future years?

5 responses

I really had a terrific experience and cannot think of much for improvement. The only things I can think of to improve upon (and they are picky) is better access to filtered water throughout the day. The locks in the rooms were a bit nerve-wrecking because if you locked the door from the inside and misplaced your key, you could not unlock the door to get outside (potential fire hazard).

Please note I have put 'location' as the 'worst' purely based on the provided food. The geographic location and the Palacio are magnificent.

Minor improvements could include a google drive that is designated to all attendees with the required readings and introduction to the summer course. Contact between students while traveling to Santander is greatly encouraged and students should be the ones to initiate the conversations (Thank you Melissa for your work!).

Just dietary concerns. As a vegetarian I found myself eating potatoes many times a day all week. That would be my only complaint.

The schedule and amount of information were well designed and delivered

Please add any other comments you have here:

3 responses

Thank you for giving me this opportunity. I learned a lot across an array of astrobiological topics, and made several new friends and potential future collaborators. The location was absolutely beautiful and I will always cherish this one-of-a-kind experience.

This was an excellent experience which is already directly impacting and improving my work. I also highly value the opportunity to make friends and meet future collaborators in an international community of astrobiologists. Thank you all for organizing the school and lectures!

Thank you for the opportunity to attend this special summer school session. Not only was I able to communicate with other people from different fields about the planetary sciences, I was able to comfortably communicate with the presenters. The presenters were down to Earth and very kind, offering advice in various aspects (research, post-doc work, etc). Attendees from the European-side were wonderful and kind as well - it was a wonderful cultural learning experience! I wish all those students a successful future in all of their endeavors.

XVII School of Astrobiology (July 22-26, 2019)

From Astrochemistry to the Origin of Life

The origin of life is one of the most fundamental topics in astrobiology, and lies at the intersection of astronomy, physics, chemistry, geology, and biology. Initially organic compounds form in the interstellar medium, and their interaction with radiation and surfaces – from grains of sand to growing planetesimals -- facilitates the steady growth of complex molecules. In this way, they form chemical systems that can combine to create genetic material and metabolism. On our planet, the evolution of these protocellular materials gave rise to LUCA, the last universal common ancestor to all life, and from which all of Earth's biodiversity is derived.

The 17th Astrobiology Summer School will connect the fundamental aspects of astrochemistry, prebiotic chemistry, and the origin of life. The students will attend lectures given by experts in these fields, will prepare and present a group project, and will participate in an excursion to a relevant geological site near Santander. The schools is primarily aimed at graduate students in science or engineering, but is open to anyone interested in the origin of life and astrobiology.

Program and Deadlines to be announced by the end of February!

Beyond 2019

After 4 years as director, I will be stepping down after this year

In the past, the US director has been either the NAI Director, or an NAI PI

Responsibilities include:

- Working with CAB colleagues to pick a theme and lecturers
- Working with NAI Central to send out announcements
- Reviewing applications and selecting students
- Attending the school
- Administering pre- and post-school assessments
- Written reports, reporting to NAI, etc.

I have example reports, polls, etc. to share, and will be available to help in the transition