






LETTER

# Reaching out to early-career astrobiologists: AbGradE’s actions and perspectives

Philippe Nauny<sup>1</sup> , Alessia Cassaro<sup>2</sup> , Nina Kopacz<sup>3</sup>, Lena Noack<sup>4</sup>, Hayk Palabikyan<sup>5</sup>, Silvana Pinna<sup>6</sup> , Alex Price<sup>7</sup>, Hector A. Stavrakakis<sup>8,9</sup>  and Ruth-Sophie Taubner<sup>10</sup> 

<sup>1</sup>School of Geographical & Earth Sciences, University of Glasgow, Gregory Building, Lilybank Gardens, Glasgow G12 8QQ, UK

<sup>2</sup>Department of Ecological and Biological Sciences (DEB), University of Tuscia, Largo dell’università snc, 01100 Viterbo, Italy

<sup>3</sup>Department of Earth Science, Utrecht University, Vening Meineszgebouw A, Princetonlaan 8a, 3584 CB Utrecht, The Netherlands

<sup>4</sup>Department of Earth Sciences, Freie Universität Berlin, Malteserstr. 74-100, 12249 Berlin, Germany

<sup>5</sup>Archaea Physiology and Biotechnology Group, Department of Functional and Evolutionary Ecology, University of Vienna, UBB Building, Djerassiplatz 1, 1030 Vienna, Austria

<sup>6</sup>Centre for Life’s Origins and Evolution (CLOE), Department of Genetics, Evolution and Environment, University College London, Darwin Building, Gower Street, London WC1E 6BT, UK

<sup>7</sup>School of Environment, Earth and Ecosystem Sciences, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK

<sup>8</sup>Department of Geological Sciences, School of Mining and Metallurgical Engineering, National Technical University of Athens, Iroon Polytechniou 9 str. GR15773, Zografou Campus, Athens, Greece

<sup>9</sup>STELLAR DISCOVERIES Scientific Association, Theanos str. 15, 11854 Athens, Greece

<sup>10</sup>Institute for Chemical Technology of Organic Materials, Johannes Kepler University Linz, Altenberger Straße 69, 4040 Linz, Austria

**Author for correspondence:** Ruth-Sophie Taubner, E-mail: [abgrade@eana-net.eu](mailto:abgrade@eana-net.eu)

**Received:** 10 December 2021; **Revised:** 27 January 2022; **Accepted:** 4 February 2022

**Keywords:** AbGradE, astrobiology, early-career

## Abstract

Astrobiology Graduates in Europe (AbGradE, pronounced *ab-grad-ee*) is an association of early-career scientists working in fields relevant to astrobiological research. Conceptualized in 2013, it was initially designed as a mini-conference or workshop dedicated to early-career researchers, providing a friendly environment where early-career minds would be able to present their research without being intimidated by the possibility of facing a more traditional audience, composed mainly of senior scientists. Within the last couple of years, AbGradE became the first point of call for European, but also for an increasing number of non-European, early-career astrobiologists. This article aims to present how AbGradE has evolved over the years (in its structure and in its way of organizing events), how it has adapted with the COVID-19 pandemic, and what future developments are considered.

## Contents

<b>AbGradE’s first steps</b>	<b>2</b>
<b>Committee</b>	<b>2</b>
<b>Meetings</b>	<b>3</b>
Event format . . . . .	3
Audience . . . . .	3
Topics engaged . . . . .	3
Science communication . . . . .	4
Statistics . . . . .	5
Feedback . . . . .	5
<b>Partnerships</b>	<b>5</b>

EANA . . . . .	5
EAC and COST . . . . .	6
EAI . . . . .	7
EPEC . . . . .	7
AbGradCon . . . . .	7
<b>Online presence</b> . . . . .	<b>7</b>
Website . . . . .	7
Social media . . . . .	8
Newsletter . . . . .	8
<b>Adaptation to the COVID-19 pandemic</b> . . . . .	<b>8</b>
<b>Future</b> . . . . .	<b>9</b>

### AbGradE's first steps

The idea of a European network for early-career astrobiologists (ECAs) was in the heads of many people for years. When EANA, the European Astrobiology Network Association, was founded in 2001 (Brack, 2005), the idea of supporting ECAs was an important point in the organizational structure from the very first moment on. Activities like the *Space Factor Contest* and the awarding of travel grants for the EANA meetings helped to promote the work of ECAs and gave them a great opportunity to make their first steps in the scientific world. However, the desire for an event only dedicated to and attended by ECAs continuously increased, especially after the positive experiences of several European ECAs at American (AbGradCon – Astrobiology Graduate Conference) and French (EJC – Exobiologie Jeunes Chercheurs) early-career activities. Eventually, in 2013 at the 13th EANA meeting in Szczecin, Poland, a group of motivated ECAs launched such an organization whose main task would be to organize events for ECAs in Europe. Already one year later, the first AbGradE symposium took place in Edinburgh, UK (Samuels *et al.*, 2015). This symposium was also intended as an informal networking event set at the same location of, and just before, the annual conference of EANA. It even led to the production of a reflective piece on the vision of astrobiology from ECAs' perspective (Noack *et al.*, 2015). From 2014 on, AbGradE organized an event dedicated to ECAs right before every EANA meeting. Over the years, AbGradE also teamed up with other organizations, like the European Astrobiology Campus (EAC), the European Astrobiology Institute (EAI), and the Europlanet Early Career (EPEC) network, as will be detailed later.

### Committee

AbGradE is led by an executive committee composed of about 10–20 ECAs at various academic levels (from master students to postdocs) from different, mainly European research institutions. There is no membership in the traditional sense of having people registered to the organization and therefore also no membership fees are collected. The AbGradE committee is run voluntarily.

The committee primarily oversees the entire organization of conferences and workshops, which focus on topics related to astrobiology or the needs of ECAs. Originally unstructured besides one dedicated treasurer, the AbGradE committee quickly obtained a representative seat at the EANA council to give a stronger voice to the point of view of ECAs.

Following the growth of AbGradE and astrobiology as a field in Europe, a formal structure with elected representatives (a president and two vice-presidents), a secretary, a representative at the EANA council, a treasurer, and two persons managing the social media accounts was adopted in 2017. As AbGradE moved towards being independent, additional tasks were added, such as managing the online presence and compiling a quarterly newsletter.

The AbGradE committee currently has 12 active members and 24 former members. So far, each member, past or active, has been active between 1 and 7 years. Members reflect a diverse background, coming from different countries and different institutions, having different scientific backgrounds (to

date, nobody with a humanities background has decided to join the committee) and academic level. New members are co-opted by current committee members. To ensure a certain standard, applicants for the AbGradE committee should already be at a post-graduate level (*i.e.*, at least at the end of their Master studies) – to ensure they have a better knowledge of the realities of research – and should have already attended at least one AbGradE meeting in person.

## Meetings

Even though the AbGradE events were initially focused on the scientific core of astrobiology, they evolved over time to offer more diverse content, thus appealing to a wider audience. Organizing online meetings because of the coronavirus disease 2019 (COVID-19) pandemic helped to reach out to an even more international and diverse audience than AbGradE already had.

## Event format

Since AbGradE's inception, the event format varied, alternating conference and workshop every year. As mentioned above, the first event took the form of a symposium where ECAs could present their research. This was complemented with talks from senior keynote speakers. To have a different experience, the second event was conceptualized as a workshop, thus giving participants the possibility to think about the design of different space missions and to explore their ideas. This second event took place at ESTEC (Noordwijk, the Netherlands) and offered the possibility to invite specialists involved in space missions. These specialists served as mentors for the different groups during the workshop. In the following years, this alternation between symposia and workshops was kept, inviting local scientists to act as mentors whenever it was possible.

## Audience

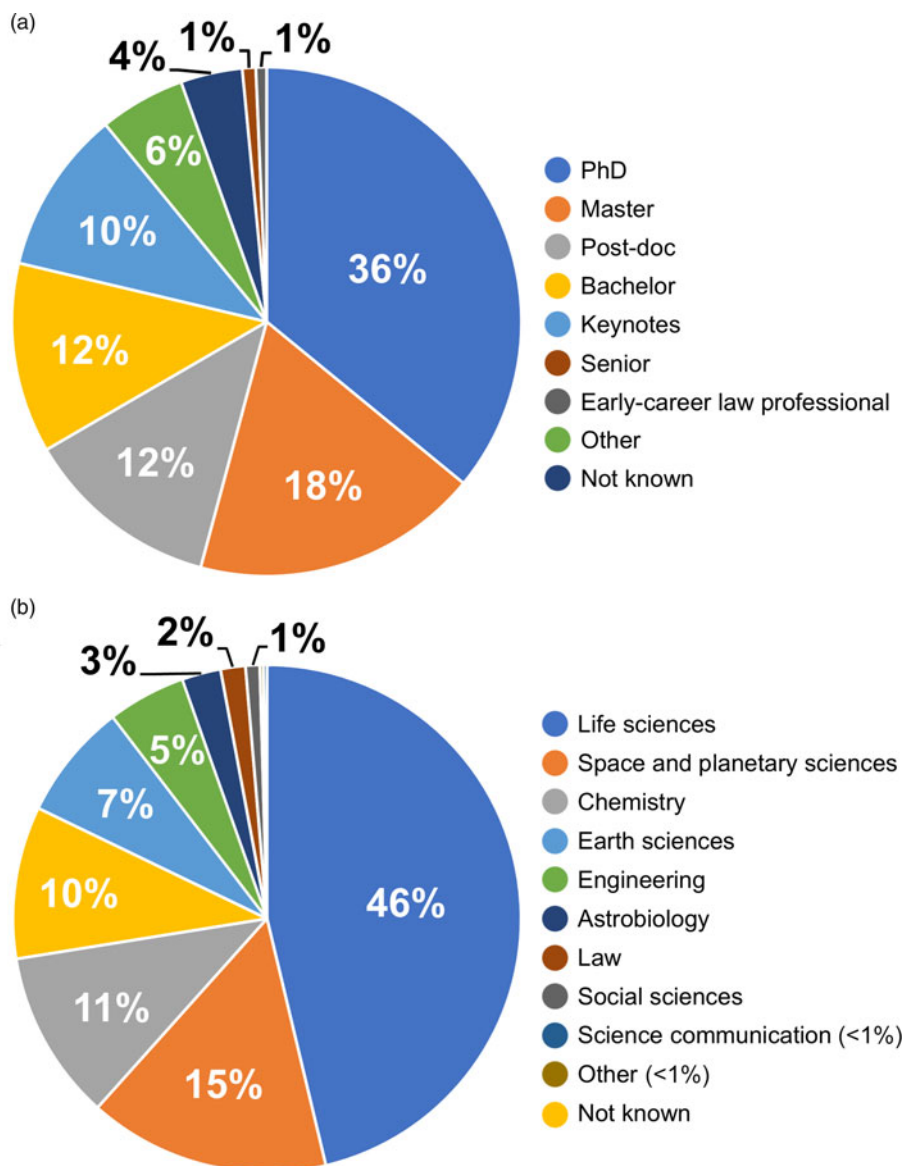
The initial target audience was ECAs *stricto sensu* – *i.e.*, post-graduate students and post-doctoral researchers – working on scientific questions relevant to astrobiology. Later, undergraduate-level students and space engineers progressively started to join the AbGradE events, too. Senior scientists have occasionally also attended the meetings, but the majority of experienced participants joined as invited keynote speakers (Fig. 1(a)).

People attending AbGradE symposia or workshops have a background in life sciences, space and planetary sciences, chemistry, etc. (Fig. 1(b)). Over the years, the background of the attendees became more diverse. The interdisciplinary interaction of the attendees could be useful to the ECAs to expand their horizons, to learn how to communicate science-related topics to other scientists, and how to disseminate scientific information to expert or non-expert audiences.

## Topics engaged

The conferences' main focus has indeed been primarily science, with the occasional engineering topic. However, in discussions with attendees, it was identified that AbGradE events could also serve as an ideal framework for escapades into topics that have not necessarily been covered in astrobiology meetings before. Therefore, an online mini-conference on *Space law and governance* was organized in May 2021, representing the first event focusing on the humanities side of astrobiology rather than the scientific one. This involvement of the wider space community undoubtedly offers a more holistic view in the effort of studying space.

The workshops, which have been only in-person so far, are usually about designing and proposing space missions. Besides these traditional workshops, AbGradE organized another one in 2019, focused on networking and general advice for students wishing to pursue a scientific career. Due to mobility restrictions during the COVID-19 pandemic, AbGradE organized its first online symposium in



**FIG. 1.** Relative proportions of (a) the academic level and (b) the scientific background, respectively, of all AbGradE attendees so far.

2020. In addition to contributed talks by ECAs, representatives of several research institutions from Europe and beyond presented their working groups and potential research directions, as well as career opportunities.

**Science communication**

By providing a relaxed environment – compared to the fast pace and intimidating atmosphere of many traditional conferences – to ECAs, the attendees are encouraged to present their research to a friendly audience of peers. This opportunity to practice their science communication skills may help them boost their confidence. To give participants some hints on how to improve their communication, two

**TABLE I.** All events organized by AbGradE to date

Time	Location	Type	Participants	Nationalities
Oct. 2014	Edinburgh, UK	Symposium	39	12
Oct. 2015	Noordwijk, NL	Workshop	24	8
Sept. 2016	Athens, GR	Symposium	37	13
Aug. 2017	Tartu, EST	<i>Symposium</i>	41	19
Aug. 2017	Aarhus, DK	Workshop	23	17
Sept. 2018	Berlin, DE	Symposium	60	21
May 2019	Prague, CZ	<i>Workshop</i>	31	15
Sept. 2019	Orléans, FR	Workshop	22	13
Aug. 2020	Online	Symposium	169	40
May 2021	Online	Symposium	47	17
Sept. 2021	Online	Symposium	91	29

Participant and nationality numbers include both regular attendees and keynote speakers. Events organized in collaboration with another organization are italicized.

dedicated presentations on this topic were also given by a scientific outreach communicator in 2018 and 2019.

### Statistics

Even if the events attracted mostly Europeans and people working in Europe, for thematic and travel reasons, people coming from further away have also been welcome.

Details regarding the different events can be found in [Table I](#). Without accounting for keynote speakers, the AbGradE events prior to the pandemic had an overall participation of 191 persons coming from 40 countries and working in institutions from 32 countries. With the virtual meetings held during the pandemic, the number of total participants expanded to 438, coming from 54 countries and working in 48 countries worldwide. The location origin of participants and of the institutions in which they work is displayed in [Fig. 2](#).

### Feedback

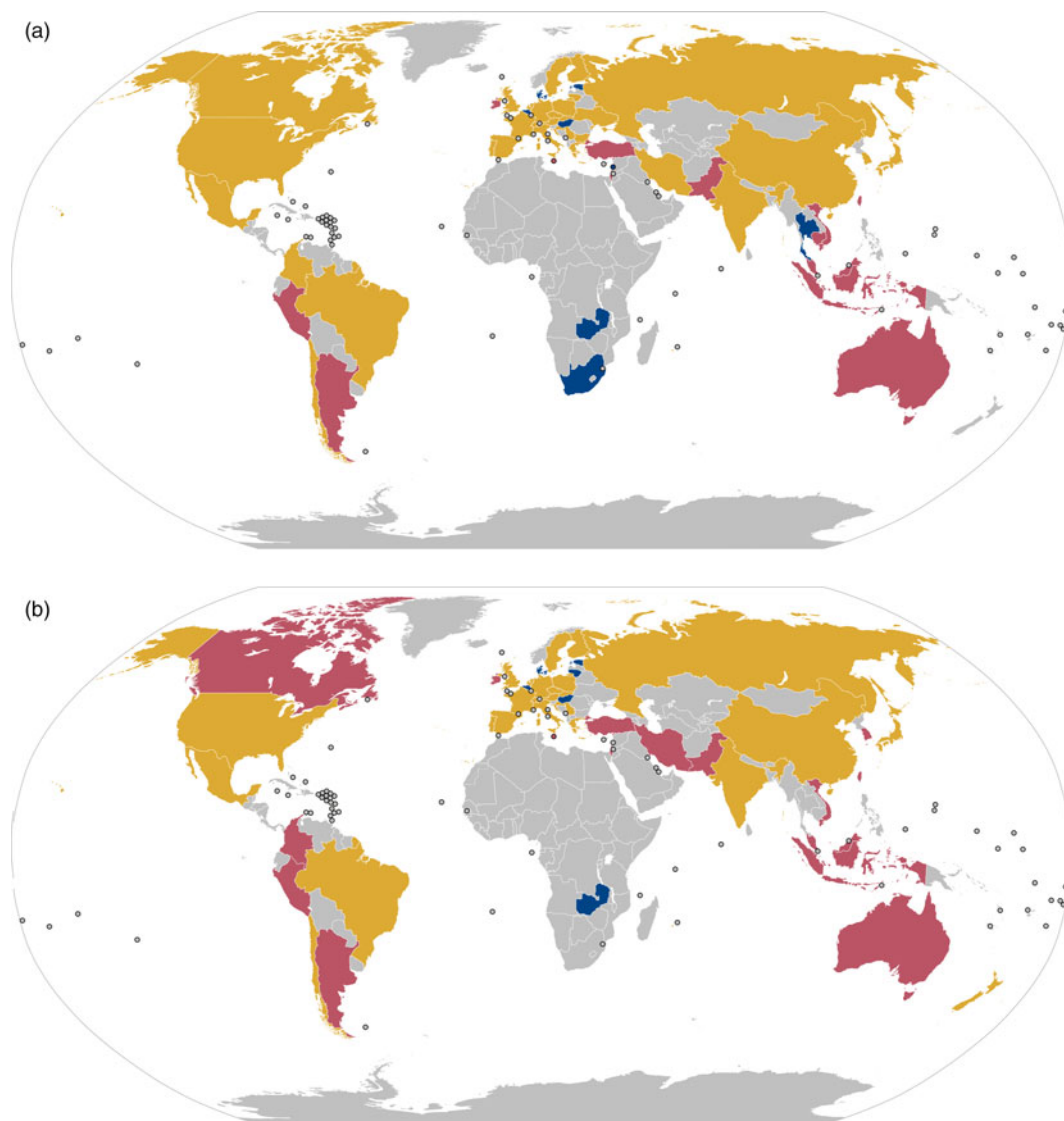
To improve the quality of the conferences and workshops, feedback questionnaires are always handed out to participants at the end of any event organized. If time allows, a live feedback discussion is also organized with the participants. They help to highlight what parts of the meeting could be improved and to identify what topics they would like to hear about in future meetings. These elements are taken into consideration, to the best of our ability, when organizing the following event.

### Partnerships

Over the years different partnerships with other scientific organizations or working groups linked to astrobiology or space research were established. They are presented below.

### EANA

As mentioned above, AbGradE was created by ECAs for ECAs as an offshoot of EANA. Consequently, the main symposia and workshops are always held the days preceding EANA to give an opportunity to the attendees to present their research a first time in a less intimidating environment



**FIG. 2.** Maps show the location of (a) the participants' origin and (b) where they were studying or working when attending an AbGradE event. The yellow colour indicates that people participated to both physical and online meetings; blue is for physical meetings only; red is for online meetings only.

and to socialize and network with other ECAs. The internal organization of AbGradE is separated from EANA's, but AbGradE has a representative in the EANA committee. In 2021, AbGradE co-organized the EANA International Spring School on hydrothermal vents. As this school was a great success, further joint schools are envisaged.

### ***EAC and COST***

The first collaboration with an organization outside EANA happened in 2017. Still aimed for ECAs, this conference organized in Tartu, Estonia, was designed together with the European Astrobiology Campus (EAC) and the COST Action TD1308 *Origins and Evolution of Life on Earth and in the Universe* (Gargaud *et al.*, 2018). The contribution of AbGradE to help build a European identity for

astrobiology is also mentioned in the COST Action White Paper on societal implications of astrobiology research in Europe (Capova *et al.*, 2018).

### **EAI**

A second collaboration was the co-organization – together with the **EAI** – of a workshop in Prague, Czechia, in 2019. Mimicking the events preceding EANA conferences, this workshop took place right before the EAI's first general assembly. The presence of participants from the USA gave this workshop a transcontinental flavour and allowed for points of view different from European ones to be considered. Another workshop was scheduled for 2020 in La Palma (Canary Islands, Spain), following the same model. However, the COVID-19 pandemic caused it to be postponed several times. It is now planned for 2023, provided a physical meeting is possible by then. Further, the AbGradE committee has a representative seat at the EAI board of trustees.

### **EPEC**

The joint 2020 workshop at La Palma mentioned above would have also seen a collaboration with EPEC. This workshop would have emphasized the astronomy and planetary science side of astrobiology. A similar event is currently being prepared and should take place in 2022.

### **AbGradCon**

From the very beginning of AbGradE (Samuels *et al.*, 2015), it was already considered having a joint meeting with AbGradCon. AbGradCon has similar aims and interests to AbGradE, but is traditionally organized in the USA. Representatives of AbGradE and AbGradCon have regularly attended each other's meetings over the last couple of years. AbGradCon was also invited to give a keynote talk about the organization in the 2020 virtual meeting. Members of the AbGradE executive committee were invited to help with the abstract review process for AbGradCon 2020 in Japan (which was then shifted to an online meeting in September 2021).

### **Online presence**

Having a proper online presence with information updated in a regular manner and providing the ECAs community with the latest news about upcoming meetings, job announcements and other opportunities, became one of the main tasks of AbGradE, besides the organization of the meetings. While AbGradE started to be active on the world wide web with only a subpage of the EANA homepage, it now operates its own website (<https://abgrade.eu/>), can be found on social media channels like Facebook (<https://www.facebook.com/AbGradE/>) and Twitter (<https://twitter.com/abgradeurope>), and regularly posts on professional networking pages like LinkedIn and ResearchGate.

### **Website**

From the beginning, AbGradE has put continuous effort into developing a solid online presence. Following the growing independence of AbGradE, in March 2021 AbGradE ultimately migrated from its EANA corner to an independent website. The new website gives the AbGradE committee the possibility to act on a more dynamic platform, dedicated to help ECAs navigating the field of astrobiology. The website offers the opportunity to follow updates via an email subscription. Over the last couple of months, an average of over 600 monthly unique visits were counted. Like the former EANA-based homepage, the new one includes information about past and future events, the AbGradE committee, an overview on job openings for post-graduate and post-doctoral positions, and an overview about collaborating organizations and their events, etc. With the website now under

direct management by the AbGradE committee, it offers a more in-depth and regularly updated look at this organization and its activities.

### ***Social media***

The use of social media can highly impact the development of a network, providing a tool for quick and efficient communication. AbGradE is mainly active on Twitter and Facebook, with almost 800 followers on Twitter and more than 800 on Facebook (as of December 2021). The highest interest of the online followers can be seen in the age group 25–34 years. Before the launch of the new website, the social media channels were AbGradE's main tool to announce the latest news, as the editorial access to the former homepage was often limited. For example, the Twitter account has been used to share live coverage from the events. Now having an AbGradE-administrated website, these platforms serve as an additional tool for the quick spread of information, running jointly with the updates on the website.

### ***Newsletter***

In 2021, AbGradE began sending out a quarterly newsletter, which can be easily subscribed to via the AbGradE website. The newsletter offers a snapshot of the information posted regularly on the website, namely upcoming events, job openings, and links to online resources such as seminars and educational tools. Each issue begins with a cover story highlighting an ECA along with a picture of their lab or field work, and encourages readers to send in their stories for future issues. A section of each issue is also dedicated to recent member publications, to keep each other up to date on our activities. The final page of the newsletter is open for more informal advertisements, such as popular science tools, science fiction literature recommendations, etc.

Receiving a quarterly newsletter provides a common thread for the network members, encouraging a sense of community during the lockdown-ridden time of the pandemic. Though the information can be looked up on the website individually by each member, reading it in a posted newsletter adds the feeling of a simultaneous, shared experience.

### **Adaptation to the COVID-19 pandemic**

AbGradE committee members and followers constitute an international community, represented by scientific members of various organizations and universities. Due to our dynamic working routines, the 'home office' practices and digital communication tools have been part of our everyday life already before their global application during lockdowns and travel restrictions of the COVID-19 pandemic. Nevertheless, the pandemic has had a strong impact on our internal communication, organization of events and public outreach in various ways.

The committee members of AbGradE are mostly located in different European countries. Therefore, internal meetings have always taken place online and utilized several tools throughout the years. The need to not only reach each other, but also to record, store and exchange data, required the use of complete platforms (firstly [Slack](#) and eventually Microsoft Teams), already before lockdowns and travel restrictions. Since the outbreak of the pandemic, digital tools have been improved and globally established as a crucial working routine, therefore empowering the experience among AbGradE members and allowing the team to quickly adapt. On the other hand, residential and institutional differences have been an important factor to consider, since only a few of the developed digital platforms manage to be licensed and become recognized by official organizations.

Unlike AbGradE's internal practices, the organized events have been strongly altered since the onset of the COVID-19 pandemic. In the past, exciting in-person events have maintained and expanded the AbGradE community for years. It has been challenging to ignite enthusiasm in front of a screen, instead of on a tour inside an aerospace centre or at a nerdy pub quiz. Therefore, in order to connect fellow researchers and guide them on their career development in the times of digital events, AbGradE



needed to be more creative to sustain efficient networking opportunities. To fill in this empty space of personal interactions, AbGradE's attempts to enable scientific exchanges between ECAs have been concentrated on the communication tools, discussed above. Nevertheless, hosting online meetings has also had several advantages. The online events *Virtual AbGradE'20*, *Space Law and Governance'21* and *Virtual AbGradE'21* have been the most attended AbGradE events with participants from more than 40 countries. In this way, the international online events of AbGradE have offered a valuable experience for early-career presenters around the globe and have created novel opportunities for intercontinental scientific exchange. In the recent past, AbGradE has successfully utilized not only various platforms for digital presentations (e.g., Zoom and [GoToMeeting](#)), but also online tools for networking (e.g., [Wonder](#)).

## Future

In addition to what has already been accomplished, and besides the continuous improvements AbGradE aims to implement, there are still more plans for the future.

In the spirit of the 'work from home' attitude prevalent during the COVID-19 pandemic, AbGradE is working to provide more online resources and events. For example, AbGradE is planning to launch a working group using Microsoft Teams, with the aim of creating a space for ECAs to collaborate across the different fields of astrobiology. The space is intended for all who want to take part, but not for the internet at large, allowing for a small-scale, focused working group. It will also serve as a digital 'home base' for the AbGradE network.

Though the return of regular in-person symposia and workshops is anticipated in 2022, a separate area of online development is the organization of smaller virtual meetings dedicated to astrobiology-related topics, such as the 2021 meeting on space law and governance. Future mini conferences could deal, for example with the ethical, historical, philosophical or linguistic aspects of astrobiology. Complementary to those, future workshops could deal with issues related to research, such as career development and mental health at work.

Finally, AbGradE will continue raising awareness among ECAs about the work of the organization, through our usual events, but also by being involved with the organization of thematic schools, for example with EANA or the SFE (Société Française d'Exobiologie).

AbGradE is a dynamic organization run by ECAs, for ECAs, empowering students interested in astrobiology to realize they can pursue it as a career wholeheartedly. The organization is working not only to facilitate the ECAs' first steps into the world of science with a 'learning by doing' attitude, it is also building the network of the next generation of astrobiologists. Astrobiology as a field needs to cultivate such a network in order to satisfy its interdisciplinary nature, explore new emergent topics in science, and promote the friendly exchange of knowledge between laboratories and groups spread around the world. Though the style of the meetings and topics engaged may vary depending on the interests of future committee members, AbGradE will always aim to be an enjoyable, educational and inspiring point of entry for the budding astrobiologist.

**Acknowledgements.** We would like to thank all current and past members of the AbGradE committee, who helped building this organization. Further we would like to thank our partners, especially EANA and EAI, for their support over the past years.

## References

- AbGradCon (2021) Overview. Available at: <https://www.abgradcon.org/> (accessed: 9 December 2021).
- AbGradE (2021) About AbGradE. Available at: <https://www.abgrade.eu/about/> (accessed: 9 December 2021).
- Brack A (2005) Astrobiology in Europe: The European Astrobiology Network Association. *Astrobiology* 5, 576–578.
- Capova KA, Persson E, Milligan T and Dunér D (2018) *Astrobiology and society in Europe Today*. Springer.
- EAC (2021) About EAC. Available at: <http://astrobiology-campus.eu/about-eac-2/> (accessed: 9 December 2021).
- EAI (2021) About EAI. Available at: <https://europeanastrobiology.eu/about-the-eai/> (accessed: 9 December 2021).
- EANA (2021) Overview. Available at: <http://www.eana-net.eu/> (accessed: 9 December 2021).

- EJC (2021) Available as part of the French Astrobiology Society at: <https://www.exobiologie.fr/> (accessed: 9 December 2021).
- EPEC (2021) Europlanet Early Career (EPEC) Network. Available at: <https://www.europlanet-society.org/early-careers-network/> (accessed: 9 December 2021).
- Gargaud M, Geppert W, Brucato J, Chatzitheorides E, Dunér D, Hrušák J, Javaux E, Kanuchova Z, Kee T, Kereszturi A, López-García P, Losiak A, Malatere C, Mason N, Motlep R, Noack L, Prieto-Ballesteros O, Szuszkiewicz E, ten Kate IL and Žabka J (2018) The COST Action ‘Origin and Evolution of Life on Earth and in the Universe’: An interdisciplinary research, training and outreach effort. 20th EGU General Assembly, EGU2018. *Proceedings from the conference held 4–13 April, 2018 in Vienna, Austria*, p. 7133.
- GoToMeeting (2021) Overview. Available at: <https://www.goto.com/meeting> (accessed: 9 December 2021).
- Noack L, Verseux C, Serrano P, Musilova M, Nauny P, Samuels T, Schwendner P, Simoncini E and Stevens A (2015) Astrobiology from early-career scientists’ perspective. *International Journal of Astrobiology* **14**, 533–535.
- Samuels T, Noack L, Verseux C and Serrano P (2015) A new network for astrobiology in Europe. *Astronomy & Geophysics* **56**, 2.15–2.17.
- Slack (2021) Overview. Available at: <https://slack.com/> (accessed: 9 December 2021).
- Wonder (2021) Overview. Available at: <https://wonder.me/> (accessed: 9 December 2021).