



SPACE

a w a r e n e s s

WHO IS A YOUNG SCIENCE PROFESSIONAL?

PhD Student

Field Space sciences

Type

Level of study PhD



What is it about?

Being a doctoral student (or a PhD student) means to study and work in an environment with intellectual freedom, however requires really good self-motivation in order to manage the benefits of this freedom. Generally speaking, working for academia requires teaching experience, which provides advanced communication skills in order to speak to young generations in their language. Academic environment provides young graduate students with a possibility to improve their skills by interacting with other young scientists, develop strong computational skills, and design various concepts. In addition, development of an ability to conduct a research independently as well as self-management, decision making and mentoring skills is among significant benefits of academia.

The career path of PhD students in aerospace or astronautics starts with exploring their field of studies in a "specific" topic such as electric propulsion, composite manufacturing, wind turbines, computational fluid dynamics, orbital mechanics or mission optimization.

In addition, since we are dealing with the most complex and critical sector of the world, "interdisciplinary research vision" is also a significant mind-set that young scientists/engineers should gain. Imagine yourself performing research on specific protein molecule to prevent diseases. At the same time, you can think of the impact of other proteins on astronauts during the long duration spaceflight. Therefore, you can apply your specific research to space technology.

Global Vision: International Events and Benefits

Let's switch off for a moment from the technical topic and talk about international events and conferences.

During PhD education, all young professionals participate in conferences/meetings/congresses that are related to their research field. In some PhD programmes it can be even an obligation. It is highly important to learn current academic trends of a specific field, in which a PhD student is currently working in. For example, if someone is working for CubeSat, European CubeSat Symposium or iCubeSat are two significant conferences that he/she can participate in. Another example is the International Electric Propulsion Conference (IEPC) which is valuable for those who are working for electric propulsion.

There are also several high level international events for the space sector like International Astronautical Congress, Space Generation Congress (webpage of the organiser <https://spacegeneration.org/>), Space Symposium, AIAA (American Institute of Aeronautics and Astronautics) SciTech (<https://scitech.aiaa.org/>), Space, Defence and Aviation conferences that bring together engineers, senior executives, professors, students, and all space pioneers from all over the world.

Furthermore, United Nations Office of Outer Space Affairs provides several funds and projects that aim at students and young professionals from developing countries.

The greatest advantage of participating in these events is the opportunity to increase your awareness on the space sector. These events will also boost your motivation since you will have the chance to meet people like Buzz Aldrin, Elon Musk, Chris Hadfield or Bill Nye. Imagine that motivation and inspiration! You can also establish contacts for future collaboration for common goals to making space more affordable and accessible.

Being a Teaching Assistant:

As a PhD candidate you can be either research assistant (RA) or teaching assistant (TA), or both - this depends on the education system of the university where your PhD programme takes place.

It is important to have some numeracy and literacy skills as a TA. Presentation, teaching and communication skills are a must for TAs and they can be greatly improved by regular practice or on-job training that university usually offers. The key feature here is that TAs should be able to "transfer" their knowledge in an efficient and clear way to the students. One method that can work is the use of examples from daily life to demonstrate a concept or a problem to students to make the solution closely related to the reality. TAs' workload often depends on the time of the year – there are no students during the summer time.

What would I do every day?

Well, a PhD student's day-to-day routine is to research international events, follow scientific news and updates, socialise and make own plans, think and drink thousands of litres of coffee that will "power" his inspiration.

Stephanie: So, how was your day?

Leonard: You know, I'm a physicist, I thought about stuff.

Stephanie: That's it?

Leonard: I wrote some of it down.

Quote from the TV-series "The Big Bang Theory", episode The Lizard-Spock Expansion

One of the best things in academia is that every PhD student is free to manage his own time. This is a great opportunity to foster global thinking and time management skills.

Daily activities might change depending on the type of research a PhD student is carrying out or workload. For instance, if someone is performing computational analysis, they spent almost all the time on the computer. On the other hand, experimental studies such as electric propulsion development, aircraft wing experiments or CubeSat production require much more “action” – PhD student has to deal with special machinery and tools in cleanrooms/laboratories. Depending on the type of research, some studies (like biological and pharmaceutical) have time constraints. For example, the task to find proper time to test a bacteria culture can take a while, and researchers have to stay in the lab until the test is over, sometimes until late night or even morning or the next day. But this hard work can result in rewarding feeling, when something you have been working on is implemented in real life.

Where can I work?

There is no specific career path for PhD students. It depends on a lot of factors such as research field, advisor, country or personal goals.

As a PhD student you are depended on a thesis advisor. Since in academia a career path of every PhD student is generally guided by an advisor, some people call this bond “*more than a marriage*”. So, finding a proper advisor is the key at the PhD level.

During PhD studies, you can work for the university where your PhD studies are taking place as teaching assistant (TA). If your advisor is conducting project(s) with companies or institutions, you most probably will have an opportunity to work with them too.

If a PhD student is willing to stay in academia, he/she can become a professor. It is necessary to remember that this path requires a certain number of scientific publications and wide established connections with colleagues all over the world. Teaching abilities are also important. Therefore, universities are a major work environment for professors. After becoming a professor, you can also collaborate with institutions/companies for a common project. In addition, if you have job or project experience with institutes/companies you can also switch your career from being a professors to work full time for a company. However, this change of career path is more suitable for young professionals than to professors since many companies are interested to employ a young professional with the PhD degree.

This is a job for me, if I...

...am willing to educate younger generations,

...lean to work in an environment with intellectual freedom,

...want to create and quickly try new ideas with accessible tools,

...prefer flexible schedule instead of usual “nine to five” working hours,

...am willing to invest time in a long-term research that might be rewarding and lead to top-notch development of modern technologies.

Text based on information kindly provided by Ozan Kara (cover image), PhD Student, KOC University, and National Point of Contact Turkey, Space Generation Advisory Council

Online profile: <https://sites.google.com/view/ozankaraspace/home>



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