Is being a Planetary Scientist the best job in the world?

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Abstract

Planetary science, understood in a broad sense including astrobiology, is a discipline that in addition to generating great fascination and awe through the questions it tries to answer and the discoveries it makes, helps us understand what our place in the universe is, where we come from and ultimately who we are. At the same time, what we have learned through planetary science brings to our attention a planet that is truly unique: the Earth.

Our planet is unique in many respects, the most remarkable of which is that it harbours life, from simple unicellular life to complex organisms and what we call intelligent life. But planetary science may in the not too-distant future end up revealing that our planet is in fact not so unique, that life exists and can thrive in other planetary bodies of our solar system or of other solar systems.

This discipline thus has not only a very strong and appealing scientific content, but its discoveries can also have profound philosophical, social, cultural and even religious implications. Even if we consider planetary science only from a non-biological perspective, its findings have the capacity of leaving us astonished, as over the decades and over the centuries it has shown and described our solar system with an ever-increasing level of detail. We have, for instance, gone a long way since the discovery of the Galilean Moons in the 17th century up until the spectacular images of these moons relayed back to Earth by the Voyager spacecrafts in the late 70s and early 80s, and the Galileo spacecraft in the 90s.

Finding answers to the kinds of questions that planetary scientists ask, and designing the means that allow to find those answers, are therefore probably some of the most exciting things that one can do in life. However, how does one become a planetary scientist? What and where should you study? And, what is involved in actually working as one? What are the pros and cons?

The author presents his experience learning planetary science at the Open University (UK) and tries to identify some optimal approaches and resources to become professionally involved in this field.

Contents

"It brings us closer to space, to the Universe and to our 'heavenly' bodies than any other branch of Astronomy".

"**The planets represent our laboratory for studying the Earth, its atmosphere, geology, atmospheric chemistries, etc. There are a lot of things about our planet that we can't understand by just studying the Earth alone**".

"There are few truly practical benefits, but it allows the public to answer questions that are fundamental to our existence, and to place the Earth and ourselves into context".

"**We won't understand the Earth if we don't understand comparable planetary bodies**".

c. Is it the best job in the world?

"**Planetary Science is unique in that it represents a connection between virtually all areas of science, engineering, and technology**".

"**There is no feeling in the world like seeing the first picture sent back from a space probe of somewhere that nobody has ever seen before, or of figuring out something that nobody else has realized before**".

"Being able to participate and contribute to the scientific understanding of the planetary objects, and to collaborate on an international level which brings scientists and engineers together to plan a space mission, execute it and reap the benefits, was a dream come true".

"The people I work with in general are cooperative and friendly, and I get to go to interesting places like Antarctica".

"I doubt it, but many of us are devoted to it".

d. What/ who inspires planetary scientists?

"I became involved in planetary sciences by pursuing my interests in physics and astronomy, and it led to this field".

"Space exploration caught my imagination".

"I became interested in planetary sciences and astrobiology in 1976 when Viking landed on Mars".

"I have always known that I wanted to study planets, ever since I was in grade school".

"Jim Pollack and Al Seiff were my mentors and very much of my inspiration".

"Carl Sagan. He was an outstanding scientist and an excellent educator. He inspired me".

"Carl Sagan inspired the 60s, 70s, 80s generation of graduates".

"Collin Pillinger: he shook up the ESA and UK government system by getting Beagle onto Mars Expres".

e. What are its (future) challenges/ threats?

"**The challenges are that planetary science, as happens with astronomy, is largely observational. However, we are beginning to study in situ and this is opening up new possibilities for exploration and understanding, but in situ requires significant funding and funding will always be a problem**".

"Challenges are mainly technological". "The main threat is low budgets –and this is true for many fields of science".

"There is always more to be done, and we can always use more good people".

"**The number of planetary scientists and the amount of work are definitely unbalanced, but only because as we get better at exploring, we have more questions answered but more questions to be answered**".

"Threats: funding cuts. Opportunities: growing expertise and funding for Indian and Chinese scientists".

f. The role of outreach: the public face of planetary science

"Outreach is important for the survival of the job, since it is outreach (in one form or another) that will bring new people and ideas into this field".

"The public pays for us to bring their dreams to reality, we owe them the sharing".

"It is very important that people are aware of and understand what and how planetary studies contribute to society".

"Doing good outreach is good for the field in general, but it will not help your career any. Do it if you enjoy it, but otherwise do what you enjoy".

"Without outreach fewer people would be interested in (or think it worth paying for) what we do".

g. How do you become one?

There is no simple answer to this question. There are many possible roads to Planetary Science and many different places where you can study it. In the United States, for instance, some universities frequently mentioned are: University of Arizona, Arizona State University, University of Colorado, Caltech, MIT, New Mexico State, University of Idaho and also Brown University and Rhode Island University. In the UK, the Open University is well known for its Planetary Science program. But the scope of options worldwide is very big.

The planetary scientists participating in this study have pursued careers in: Electrical Engineering (PhD), Astronomy/ Physics (B.A.) and Applied Physics (M.S.); Physics then Astrophysics (with PhD in Astrophysics); Physics then Astronomy (B.S.); Geology and PhD in Geochemistry; PhD in Geology then Remote Sensing.

h. What events should you attend? Take good note of these…

AGU (American Geophysical Union): www.agu.org

DPS (Division of Planetary Sciences of the AAS): http://dps.aas.org/

EGU (European Geosciences Union): www.egu.eu

EPSC (European Planetary Science Congress): http://meetings.copernicus.org

IPPW (International Planetary Probe Workshop): www.planetaryprobe.eu

LPSC (Lunar and Planetary Science Conference): www.lpi.usra.edu/meetings/lpsc2010/

i. And also these…

Alpbach Summer School: www.summerschoolalpbach.at

COSPAR (Committee on Space Research): http://cosparhq.cnes.fr

Europlanet: www.europlanet-ri.eu

GLUC (Global Lunar Congress): www.iafastro.org

IAC (International Astronautical Congress): www.iafastro.org

j. What is required to succeed?

"Curiosity, ambition, interest, enthusiasm, energy. Physics, geology, mathematics, etc., **but none of these matter without those qualities mentioned before**".

"Enthusiasm, motivation, imagination, hard-working, tenacity".

"You have to be able to come up with your own ideas and know how to pursue them to completion".

"Technically you have to be able to write papers, and I personally think that computer programming is invaluable".

k. What comes after a life devoted to planetary science?

"I haven't thought beyond my career yet. My post-career career is still far over the horizon for me".

"I was not planning on retiring until I was too old to do anything at all".
"I will die at my desk, still doing planetary science".

"I worked with several giants in the field (Al Seiff and Jim Pollack), both of whom worked until days before they passed away".

"I have considered giving conferences, writing books on the subject, becoming advisor for new missions and getting involved in related projects, like in arts (planetary sciences are a lot like art: imagine, create, fulfill…)".

2. The author's experience at the Open University

a. Back to university

I started studying Physics in the University of Barcelona, and became member of the ASTER Astronomy association in Barcelona, at the end of the '80s, but I had to discontinue those studies after a couple of years, when I began a full-time job in my hometown Lleida.

This job led to several other full-time jobs in Barcelona, lately having to do with aeronautics and space, and it was not until 2008, almost twenty years later (after several unsuccessful attempts to go back to university), that my boss suggested that I should consider distance learning through the Open University (based in the United Kingdom).

I liked the idea, so I asked for an appointment with an OU counselor in Spain, and a few months later I had already applied. I started my studies at the OU with the course **S283 Planetary Science and the Search for Life**.

Taking this course was probably one of the best decisions in my academic life. Although I've always been eager to learn, I can hardly remember enjoying so much a university-level course. **S283** took me on an in-depth tour not only of our Solar System and all its planets, moons and other bodies, but also of planets around other stars, and even embarked me on the search for life in other worlds.

So I started studying Planetary Science related topics at the beginning of 2008 with this course, and then went on with the course **S196 Introduction to the Planets**.

T173 Engineering the Future followed, and after successfully completing the **ISU Space Studies Program 2009** at the NASA Ames Research Center (Ca., USA), I went on to study **S171 The Empire of Microbes**.

I am currently studying **S282 Astronomy**, **S193 Fossils and the History of Life** and **SXR208 Observing the Universe**, working towards a BSc in Physics and a B in Engineering. I plan to eventually become involved in Planetary Science and Exploration, including Human Spaceflight. I'm specially interested in Astrobiology.

b. Space congresses

Just before finishing **S283**, my boss sent me to the IAC in October 2008, in Glasgow, to make several important project-related contacts. This was an excellent complement to my ongoing studies, and what I had already learned with the OU considerably increased my confidence when dealing with experts not only in the field of planetary science and exploration, but also in space in general.

Some months earlier I had been appointed to help organise, from the industry side, the **7th International Planetary Probe Workshop**, scheduled to take place in Barcelona in June 2010.

3. The planetary scientist test

1) Would you be willing to work in one of the most demanding, less tolerant to failure and most complex jobs that exist, in the limit of technological development?

2) And to have to wait between 10 and 15 years until your mission materializes and is launched?

3) And then risking the launch to fail and have to start everything over (if lucky)?

4) And even if the launch didn't fail, having to wait between 1 and 7 additional years until the spacecraft reaches its destination?

5) And again, having arrived to its destination, risking it to fail to perform its assigned tasks?

6) And even if everything worked out and you managed to collect all the planned data, having to fight for funding to process that data?

7) Are you afraid of Math? Physics? Chemistry? Geology? Biology & Life Sciences? Engineering? Technology? Computer science & Data processing?

8) Would you be willing to deal with Law & Policy? Economics? Management & Leadership? Public Outreach & Communication? Teams (sometimes big ones)? Many international partners and different cultures?

9) Would you commit yourself to reaching an outstanding level of knowledge of at least one foreign language, spoken, read and written?

10) Would you be willing to (probably have to) study abroad for at least a few years?

4. Epilogue

"When did you know you wanted to be an astronomer?

Well… when I was about 8 years old, I was watching sunset and I asked my dad: 'What's that bright star over there?'

He said that it wasn't really a star at all, that it was actually a whole planet, called Venus.

He said: 'You know why they called it Venus?' He said: 'Because they thought it was so beautiful, and glowing… But what they didn't know is that it's filled with deadly gases, sulfuric gas and rain'.

Wow!! I thought: 'This is it, I'm hooked!'"

(From the movie 'Contact', based on the novel by Carl Sagan)

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