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Additional information is available at
the end of the article

Figure 1. Ellen Kooijman.

SOLID EARTH SCIENCES | EDITORIAL

Women in Geoscience: An interview with Ellen Kooijman

Ellen Kooijman^{1*}

About you

1. Tell us about your work at the Swedish Museum of Natural History



I work as a Senior Researcher in isotope geology and I am head of the Vegacenter, a national laboratory for micro-analysis in geosciences at the Swedish Museum of Natural History, Stockholm. I was recruited 5 years ago to build the laboratory, which houses a laser ablation system and two mass spectrometers. We serve the Swedish (and neighboring countries') science community by offering chemical and isotopic analysis of solid samples—e.g. minerals, rocks, teeth, bones, glasses—and water samples. My own research is in the fields of geochemistry, metamorphic petrology and tectonics. I use trace elements and isotopes in accessory minerals, such as zircon and rutile, to understand continental crust formation and the tectonics of orogenic belts.

2. What is your background and experience? How did you get to the role that you are in today?

I have a MSc degree in Earth Science from Utrecht University in the Netherlands and a PhD in geochemistry from the Westfaelische Wilhelms-Universitaet Muenster in Germany. After graduating I worked as a postdoctoral researcher at the University of California in Santa Barbara. During my PhD and postdoc I co-managed laboratories for laser ablation inductively-coupled plasma mass spectrometry (LA-ICP-MS). This gave me the perfect background to build the laboratory at the Swedish Museum of Natural History.

3. What made you decide to be a geoscientist?

I've been interested in the natural sciences since I was a child and I remember especially being interested in astronomy. My favourite school subjects were mathematics and physics and when I was 18 I visited universities to find out about these studies. By chance I happened upon geosciences, which is not a very common field of study in the Netherlands (there are no mountains and hardly any rocks!). I was immediately enthusiastic about the prospect of combining physics, mathematics and chemistry to try and understand the Earth so I chose to pursue that.

Research

4. What is your specialism and what do you enjoy most about working in your research area?

My research is in the fields of geochemistry, metamorphic petrology and tectonics. I use trace elements and isotopes in accessory minerals, such as zircon and rutile, to understand continental crust formation and the tectonics of orogenic belts. I enjoy that it allows me to spend a lot of time in the field as well as in the laboratory in addition to the regular office tasks. I also like the challenge of

trying to decipher what happens at great depth in the continental crust, which is difficult to sample. We do this by studying deep-crustal xenoliths that have been brought to the surface by magmatism and compare them to deep crustal rocks of older orogens where erosion has made them accessible at the surface.

5. Which piece of research that you have been involved in have you found the most enjoyable or satisfying? Can you share with us a bit about it?

The most enjoyable project I have worked on so far was a study on deep crustal xenoliths from the Pamir in Tajikistan, which was published earlier this year in *EPSL*. It was very exciting to work on samples of the lower crust that had been rapidly brought to the surface by magmatism and these were the deepest crustal samples that have been found on earth so far. They provided a unique opportunity to study processes in the lower part of an active orogen and we were able, for the first time, to catch a process in the act called “crustal foundering”, where the lower part of the crust sinks into the mantle.

6. What do you plan to research next?

My next project will focus on crustal xenoliths in Finland where I would like to study if similar processes that we observed in the root of an active orogen also happened in ancient continental crust.

The Lego Research Institute

7. How did you get involved with Lego and hear about Lego Ideas?

I am an Adult Fan of LEGO (AFOL) and have been building with LEGO bricks almost all my life. I was surfing the web for inspiration and one day stumbled upon LEGO® CUUSOO (now LEGO® Ideas); a platform that enables you to submit your own idea for a LEGO set. If an idea gets 10,000 supporters it will be reviewed and may be turned into an actual LEGO product. I was immediately excited about the concept and decided to post a project.

8. What inspired you to develop *The Research Institute*?

As a female scientist, I had noticed two things about the available LEGO sets: a too high male/female minifigure ratio and a rather stereotypical representation of the available female figures. It seemed logical that I would suggest a small set of female minifigures in interesting professions to make our LEGO city communities more diverse.

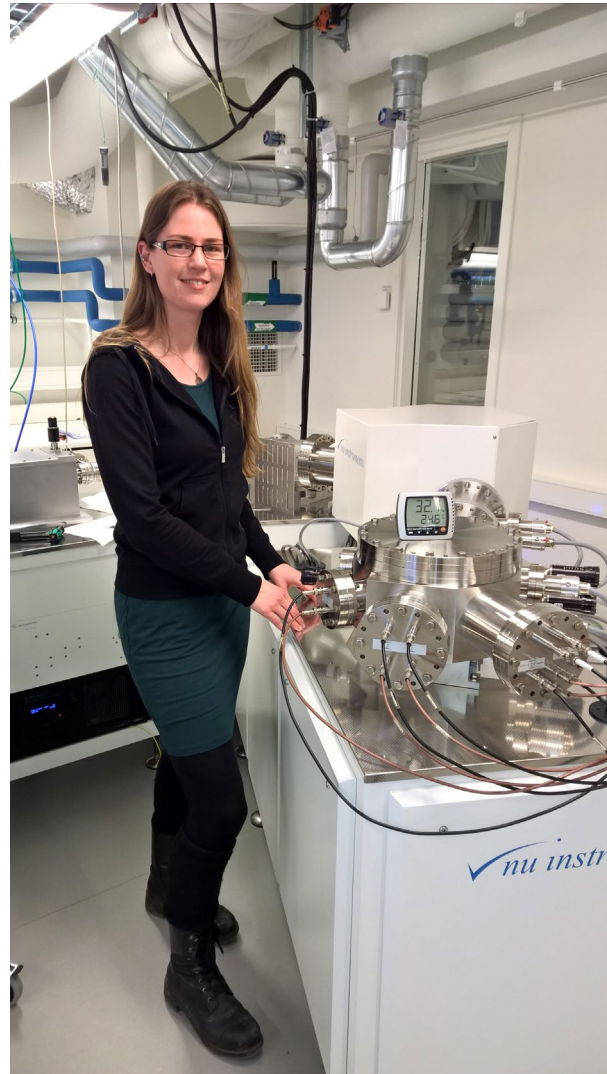
9. When developing your idea, did you encounter any differences with the Lego designers? Were you particularly passionate about certain features or attributes?

The Lego designer who developed the set into a product actually stayed very close to my original design. Only minor changes were made to comply with their quality standard and parts production schedule. I loved that they decided to base the chemist figure on me and gave her glasses and a long brown ponytail.

10. What did you hope to achieve by creating *The Research Institute*?

The original aim of the set was to get more girls interested in building with LEGO bricks. It was my favorite toy as a child and I think it has been very important in my development. If the set ends up inspiring girls to pursue careers in science and technology, that would be fantastic.

Figure 2. In the Vegacenter.



11. I see that Lego have now retired the product. How do you feel about this? Can our readers still access the product?

I was very disappointed that they retired the product so early, especially because there is still such a big demand for it. It may be possible to find some copies of the set on platforms such as Ebay, but they will likely be more expensive.

12. Are you working on any other Lego products?

Because there is still a demand for LEGO products like Research Institute I decided to start my own company together with a friend in the US, Glen Wadleigh, who was my collaborator on LEGO The Big Bang Theory (also a LEGO Ideas product that came out in 2015). Our company is called Brickyt (www.brickyt.com) and we design our own science-themed LEGO sets, which consist of genuine LEGO brand bricks.

I also have a new LEGO Ideas project online, which is currently gathering votes to get to the 10 000 supporter mark. This project is in collaboration with American author Brad Meltzer and is based on his book "I am Amelia Earhart" (<https://ideas.lego.com/projects/6e99ac19-94bf-4470-8159-9eae-6ba22f1e>). I am very excited about this project, because it also showcases a very inspiring woman.

13. Your career, being both in research and commercial worlds, is quite unique. Do you have any other advice to geoscientists who would like to explore additional career avenues?

I wouldn't really recommend to actively search for an additional career, because being a researcher is already quite demanding! My LEGO career started as a hobby that got a little out of hand. It's still very fun, but it's also challenging to find time to do both things well. The most important thing is that you are passionate about what you do.

Women in Geoscience

14. Why should more young people continue with the study and profession of STEM subjects? Do you have any messages or advice for them?

All our understanding of the world and universe around us and all technological advancements that we rely on are the result of people studying STEM. In an ever-changing world it's of crucial importance that we keep pursuing this knowledge, make progress and adapt to a constantly changing environment. My advice is always to try and learn as much about the world around you as possible and there is sure to be something that sparks the imagination and can grow into a passion.

15. How can geoscientists around the world support girls in pursuing STEM subjects, in particular geoscience?

I think small things can make a big difference. For example, my laboratory takes part in an annual Swedish event called "Introduce a Girl to Engineering Day". On this day high school girls are invited to companies and organisations to see what it's like to work in an engineering/technology based job and get some hands on experience. I think this is an excellent way to encourage and inspire girls to pursue a career in STEM. My lab technician is also a young woman so we make a rather good example of how it's perfectly normal for women to have technical jobs. I think if this kind of outreach would be widespread it can have a rather big impact.

16. Have you had to overcome any gender barriers in your career?

I think every woman in an academic position in natural sciences will face some issues at some point. A problem I still have is that especially older male researchers often don't take younger women seriously when they present their work. It can be quite daunting to give presentations to 80% male audiences when you know that a significant proportion of them will be sceptical no matter what you say.

General questions

17. To you, what is the biggest geoscience question that needs answering?

When did the continents first emerge?

18. What topics are you currently interested in learning more about? Are you following any research developments in particular?

I have recently started to develop an increasing interest in Early Earth and the evolution of Early Life.

19. What are your biggest concerns for the future within the geoscience field?

My biggest concern is with science and academia in general. I feel like scientists are getting pushed harder and harder. We are so forced to be productive at all times there is hardly time for a break and there is no room for just trying something interesting if you can't be sure it will have a publishable result. Most seminal scientific discoveries have been made by chance, but it seems to me in the current academic climate there is no longer room for that.

20. What is your biggest achievement in life or work?

My biggest career achievement is building a successful national laboratory. This was a considerable challenge and responsibility, but it was a good learning experience and I am very proud of the final result.

My biggest personal life achievement would have to be getting an official LEGO set produced that has three female scientists and that made headlines all around the world.

21. What has been the greatest challenge that you have faced or continue to face in your career?

I think the biggest challenge is to maintain a healthy work-life balance. As a perfectionist it is often hard to accept that there simply is not enough time in the day to do everything perfectly and not push it too much. This is something I still struggle with.

22. If everyone should read one piece of research what should it be?

There is really too much interesting stuff out there to just recommend one piece! I think people should try and read as much as possible. In the information age, being educated is everything!

23. Where is your favourite place on Earth?

I travel a lot so I don't really have one favourite place. I like different places for different reasons. I think Nepal is amazing for having tropical jungle in the south, high Himalayas in the north and a fascinating cultural heritage. I love Iceland for its unique wild landscape and interesting culture. The islands and fjords of western Norway will always be special to me for the fascinating rocks that inspired me to become a geologist.

24. Who or what inspires you?

I have often been asked who inspires me, but I have never really had an example or idol. I think it's really nature that has always inspired me and that also has led me to work in natural sciences.

25. How can others find you online and follow your activities?

Work webpage: <http://www.nrm.se/en/forskningochsamlingar/geovetenskap/medarbetareochkontakt/ellenkooijman.9002054.html>

Company webpage: www.brickyt.com

Twitter: @aIatariel

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