

## TO THINE OWN SELF BE TRUE: A GEOLOGIST'S JOURNEY

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**Geologists wear many hats—several of which may be practically invisible to the general public. Between studies, research, field work, sample preparation and analysis, applications, outreach, teaching, and so much more, a large number of geologists also spend countless hours each year peer-reviewing scientific articles or serving on journal Editorial Boards. Professor J. Gregory Shellnutt of National Taiwan Normal University has served as a leader of numerous geoscience journals, including recently joining as co-editor of *The Canadian Journal of Mineralogy and Petrology (CJMP)*. Greg's story—and his new book—caught our eye and we were lucky enough to connect with him for this *Elements Life in Science* interview.**

**ELEMENTS** Hi Greg! Tell us a bit about yourself and your background and interests as a geologist.

**SHELLNUTT** I was born in Halifax, Nova Scotia (Canada) and raised in Dartmouth. It is a pleasant place to grow up as the folks are friendly and have a strong sense of community. Geologically speaking, the city has all of the scars of past glaciations with drumlins, lakes and rivers, and cliffs which makes for plenty of year-round outdoor fun. Not that far from the city is the Joggins Fossil Cliffs that host spectacular Carboniferous tree fossils and amongst the oldest reptile fossils. Charles Lyell was particularly fond of the deposits and they played a role in the Great Oxford Debate of 1860. Also, there were a number of gold rushes in Nova Scotia from the mid-19<sup>th</sup> century to mid-20<sup>th</sup> century, the coal mines powered industrialization, and many prominent Canadian geologists (Sir William Dawson, Eugène Rodolphe Faribault, Abraham Gesner, George Dawson) surveyed the region and contributed to the development of the Geological Survey of Canada. It's easy to become enamored with geology while growing up in Nova Scotia as, like the ocean, it's never too far from the mind.

**ELEMENTS** How did you, as a Canadian, end up doing your PhD in Hong Kong, followed by a post-doc and professorship in Taiwan? Tell us about your experience (e.g., challenges/rewards of working as a foreigner in Asia versus Canada; insights you have acquired; advice for others considering the same).

**SHELLNUTT** My path to Hong Kong goes through México City. In mid-2002 I was down on my luck but still looking to continue my studies. My undergraduate supervisor, Jaroslav Dostal, offered me a one-year internship funded through a North America Free Trade Agreement (NAFTA) program that would involve 3–4 months working with Duncan Keppie at Universidad Nacional Autónoma de México.

At the same time, I was looking into PhD programs in Canada and Hong Kong as a new Earth Sciences Department was established at The



Looking westward over the Chad Basin from Hadjer el Khamis, Chad (January 2013).

University of Hong Kong (HKU) and John Malpas, a colleague of my mentors, was the Chair. After a long-distance telephone interview with John in late 2002, he encouraged me to apply and work with Mei-Fu Zhou. I applied, but in the meantime, I was heading to México to finish my internship.

México was great, I had a blast... not just on a research level, but on a personal level as the graduate students welcomed me and the faculty were very kind. I learned enough Spanish, heavily accented mind you, to have an enjoyable life. During my final weeks in México I received an acceptance letter to the PhD program at HKU. I did not hesitate to say yes because I figured if México was this enjoyable, surely Hong Kong would be equally so.

My time at HKU could not have better. My project was fun, Mei-Fu was a great supervisor as he gave me a tremendous amount of leeway to follow my research interests, and the department had a close group of graduate students. In the background was always Hong Kong... a wonderful blend of East and West that is always lively, modern, and vibrant with an enviable selection of cuisine. It also gave me an opportunity to learn about Chinese culture whether it was from my classmates and close friends, The Hong Kong Museum of History, or even the Museu de Macau. For the first 2 years it was nothing but discoveries and faux pas (plural)... and field work... and lab work... and field work... and lab work. Then the last two years were nothing but lab work and writing with a little bit of field work.



Crossing from the Indus River Valley to Shyok River Valley the over the Khardung Pass, India (July 2008).

As my degree was winding down I started to look for a post-doctoral fellowship. I met with Bor-Ming Jahn who recently returned to Taiwan from Université de Rennes (France) to become the director of the Institute of Earth Sciences at Academia Sinica. Bor-Ming and I got along well and I moved to Taipei in November of 2007. I found that adjusting to life in Taiwan was relatively easy because of my experiences in Hong Kong and China. A few years later I was hired by the Department of Earth Sciences at National Taiwan Normal University (NTNU) as an Assistant Professor and I have been here ever since and have enjoyed every minute of it.

Honestly, whether it was México, Hong Kong, China, or Taiwan there were very few outright challenges. I find immigration regulations and keeping up with jurisdictional tax regulations to be a nuisance as they



In front of Pyramid of the Moon at Teotihuacan, Mexico (March 2003).

tend to be needlessly complex, but they are relatively trivial. Learning the intricacies of a new work environment takes some time, but as long as one is not afraid to make mistakes and learn from those mistakes, life is generally good. Now, not every experience I had was rosy and there were a few unpleasant moments, but each and every time I learned from them and it made me a better person. I suppose that has been the most rewarding experience... developing deeper perspectives on just about everything.

Now the tricky part... advice for others considering a similar path. The early 2000s were a different time. "Globalization" was in full swing and there were plenty of overseas opportunities for students. The number of international students was growing and eager minds could follow their interests with relative ease and many universities were keen to attract international students. A big bump in the road was the 2008 financial crisis. I was searching for a faculty position in 2008–2010 and there was substantial reduction of academic jobs. When the job market rebounded, it was highly competitive. Furthermore, being outside my home country during this time did not improve my chances to find a position back home. I was very fortunate to have found my position at NTNU. I recognize that the path that I chose was very much a product of its time and would be difficult, although not impossible, to replicate today. However, when one door closes another one invariably opens and I am certain new and different paths will be available. Nevertheless, if I were to give advice it would be to paraphrase Polonius in *Hamlet* Act 1, Scene 3:

Give every one thy ear, but few thy voice.  
 Take each person's counsel, but reserve thy judgment.  
 Costly thy clothes as thy purse can buy,  
 But not expressed in fancy; rich, not gaudy,  
 For the apparel oft proclaims the wearer,  
 And they in the country of the best rank and class  
 Are of a most selective and lavish leaders in that.  
 Neither a borrower nor a lender be,  
 For loan oft loses both itself and friend,  
 And borrowing dulls the edge of husbandry.  
**This above all — to thine own self be true,**  
 And it must follow, as the night the day,  
 Thou canst not then be false to anyone.

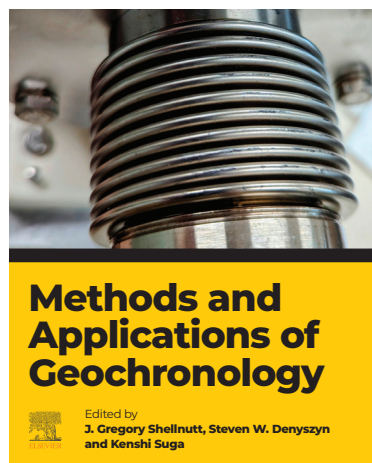
**ELEMENTS** While contributing to a wide range of peer-reviewed articles as an editor within the geoscience literature, you have also very recently published an interesting new textbook, "Methods and Applications of Geochronology." Tell us about the scope of this text and how it differs from other resources on this topic.

**SHELLNUTT** I was contacted by Amy Shapiro, acquisitions editor for Earth and Atmospheric Sciences at Elsevier, in the summer of 2021 regarding the development of a book on methods and applications of geochronology. After our initial conversation, I started to think about the type of book and its structure. I asked my colleagues Steve Denyszyn and Kenshi Suga to be involved and we hashed out the broad theme of the book and began the solicitation process.

Our goal was to create a geochronology book for doctoral students and early career scientists that was accessible to non-specialists and offered practical views to those more familiar to geochronology methods. There

are a number of geochronology books that discuss foundational aspects of isotopic systematics, but there are fewer books that discuss practical matters such as best practices in sample preparation or applying the "right" methodology for the task at hand.

All of the authors contributed solid chapters that are rigorous, informative, and enjoyable to read. There are chapters that focus on high precision TIMS dating, ion probe dating, LA-ICP-MS and LA-ICP-MS/MS spot dating, fission track dating, applications of Ar-Ar dating to geology and paleontology, and



zircon growth kinematics. We hope that the book can help to introduce and attract students to geochronology and also make the subject matter relatable to specialists and non-specialists alike.

**ELEMENTS** What advice might you have for undergraduate and graduate students in the geosciences today?

**SHELLNUTT** I think if one has chosen to study in the geosciences the path forward is always clear as it is one of the few disciplines that has a built-in "call to adventure." At some point, nearly all geoscientists will end up working under adverse conditions in a remote part of the world that will be physically and mentally demanding. As a consequence, the geoscientist will ask themselves, "What am I doing here? Why I am doing this?" The answer to these questions will always be right in front of you... whether it's watching the sun rise in the Himalaya or a July snowfall in the Arctic, seeing the fog roll up the mountains of the Hoang Lien Son Range, storm clouds parting for a brief moment on the shores of Kluane Lake, or feeling the blazing sun of the Sahel... the Earth is a pretty cool place.

More practically, the opportunities in the geosciences are vast as there will always be demand for natural resources that provide energy and allow for technological development, but there is also the need to understand geohazards, environmental remediation, planetary exploration, and ocean exploration. Honestly, are there better "sandboxes" to play in?

I guess my advice for students would be this... be bold, be brave, don't be stupid, and be mindful that life is like a contact sport and that one should never not consider to get back up after being knocked down.