

Born in July 1963 in South Vietnam, I am the second child in a family of four children (one older sister, two younger brothers). We were part of a much larger family: my father had 14 siblings, my mother 5. Both my parents had emigrated to South Vietnam from North Vietnam in 1955. We lived in an alley in Saigon with our large extended family; my paternal grandparents lived across the alley, while various aunts and uncles either lived with us or a few houses away. Meal times were large affairs, always with at least 10 people. There were always cousins to play with, and the alley was the perfect place to play as there was no traffic. We children were mostly left alone by the grownups (until we were old enough to do chores), and we could do pretty much what we wanted, like climbing on rooftops. My father worked as a clerk for the US army at the airport, while my mother stayed home to cook and clean for the huge extended family. My father taught me French, and sent me to a French school. The teaching style emphasized rote memorization, and there was no science education. Education was important in our family, and for a while I received money for being first in my class each month. Unfortunately this lucrative habit stopped when I was first too often. There were no toys, so we had to be creative with our free time. To amuse myself, I wrote stories and poems, illustrated notebooks, made ropes out of rubber bands, did origami with newspaper. There was no library, but there were shops in the neighborhood that rented out paperbacks. When I had money, I rented books and hid behind the (very full) clotheslines to read in peace.



Caption: the author, age 10



Caption: Class photo from elementary school, circa 5th grade. The author is in the front row, all the way to the right.

In April 1975, the South Vietnamese government collapsed, and the Vietnam war came to an end. My father came home one evening and announced that we had to leave. My mother quickly packed a small bag for each of us. Her primary concern was to be able to leave the country; she did not know how we were going to live wherever we were going, so she packed the things she thought we would need for living in the street, such as light blankets. Being the most wayward of the four kids, I sneaked my color pencils – my most prized possessions -- into my bag. We all left the very next day. I was 11 at the time and found the whole thing extremely exciting; only now, with a kid of my own, do I appreciate how terrifying it must have been to my parents.

We spent the next five days sitting outside Tan Son Nhat airport. My mother stayed with us kids, while my father rushed around, searching for a way to leave the country. At night we slept in various places, but never in our own home. My uncle brought us food each day. We finally were permitted to leave on a US army plane, thanks to my father's connections. We took off during the night and landed at Wake Island, a territory of the US in the Pacific that had been quickly converted into a makeshift refugee camp. We stayed about one week on the island, and I remember playing on beautiful white beaches.

After Wake, we flew to the US, stopping briefly in Hawaii. We were supposed to go to a refugee camp in Arkansas, but bad weather changed the flight plan and we went instead to the marine base Camp Pendleton, near San Diego, California. We lived in tents and slept on cots, with about 20 people per tent. There was not much to do but roam the place and stand in line for meals. I did not know what was going to happen next, but again, for an 11-yr-old, it was all very exciting.

We spent the next several months in a series of rented garages and motel rooms. In July, an aunt (my mother's youngest sister) came to visit us from Paducah, Kentucky. She had married an American soldier, and her entire family (aunt, husband, and two kids) drove to Long Beach to visit us. At some point during the visit, it was decided that my mother and we four kids would go back to Kentucky with them. My father was to remain in Southern California to learn a trade and find employment. So nine of us set out in a single car to drive to Kentucky, a non-stop two-day journey. Kids were everywhere in the car except the driver's seat.

After a happy year in Kentucky, we relocated to Ventura, California, in the summer of 1976 to join my father, who by that time had become a bookkeeper. (My family still remains in Southern California. Many relatives also settled there, while others are spread out across the United States, Canada, France, and Hong Kong). My father's job was in Los Angeles; since he did not know how to drive, he rented a room there and took the bus home every other weekend to visit the family. My mother found a job on an assembly line in an electronics factory, leaving each morning before we woke up and returning after we came home from school. She never learned English so I took care of all paperwork around the house. When I was in 8th grade, the school principal one day asked me if I wanted to skip the rest of 8th grade and go straight into 9th grade. Naturally I said "yes."

The high school years in Ventura went well academically. The school was not very challenging and, unfortunately, I got good grades without much effort. When it was time to apply to college, the only colleges I had heard of at the time were UCLA (it was nearby) and Caltech (my cousin went there). Since no one in the family had been to college, my father bought me the Barron's guide to colleges to help me choose schools. I chose a few schools from the top 10 list and applied to them. I had no idea what these schools were looking for, but somehow I got accepted to MIT, Stanford, and Princeton. At first I decided on MIT, but changed my mind at the last minute and chose Stanford because they offered a better financial aid package.

At Stanford, following my father's advice, I started to study mechanical engineering. My father did not know anything about engineering and I suspect mechanical engineering was the only type of engineering he had ever heard of. I tried a few mechanical engineering classes and did not like them much. Having so little background in science, I found mechanical quantities like stress and strain quite alien. Some friends suggested that I try physics. The much more fundamental derivations in physics courses made me happier so I stayed with physics. I obtained a bachelor's degree in Physics from Stanford in 1984 without ever taking a course in astronomy. I was not aware of anything in space until a short stint at the Jet Propulsion Laboratory in 1985 introduced me to planetary astronomy. The remarkable images of the planets returned by the various spacecraft opened my eyes to the things that lay beyond Earth. For the first time, I thought it might be quite wonderful to study the exotic objects that made up the solar system. When I decided to go to graduate school, I applied to the Earth, Atmospheric and Planetary Science Department at MIT, on a whim. I was accepted and decided to abandon traditional physics for astronomy.

Before starting at MIT, I spent the summer of 1986 in Nepal, after meeting a woman who was moving there to work. In Kathmandu, I was fortunate enough to meet someone who was working for Save The Children, and I volunteered to teach English in Takukot, one of the villages where Save The Children worked. The village was relatively accessible, only one day's walk from Pokhara, the nearest city. I lived on the balcony of a hut that served as the Save The Children office. Now and then Peace Corps volunteers would stop by on their way to Kathmandu or to another village, and it was nice to be able to speak English and catch up on news from the outside world.

While in Nepal, upon hearing that the border between Nepal and Tibet was open for the first time since the 1950's, I decided to go to Tibet. I had always wanted to visit the place ever since I learned about it from one of my favorite books, "Tintin in Tibet." I set out for Tibet with two Peace Corps volunteers, starting with a bus ride from Kathmandu to the Chinese border. It was during the monsoon season and when the road collapsed shortly before the Chinese border, we walked. We crossed the border -- it was simply a line painted on the ground -- and waited for a Chinese bus that supposedly would take us to Lhasa. Luckily a bus did materialize after a couple of days' wait, and then it was a 2-day bus ride to Lhasa. We saw Everest in the distance, and like the bus driver, we ate and slept at truck stops.

Lhasa was still unknown to tourists at that time; it had the feel of a frontier town, with just enough infrastructure to maintain civilization. There was no modern hotel, and we somehow found guesthouses where we stayed. I remember washing my hair in a horse trough. I visited the Potala, the Dalai Lama's old residence. A cheerful young monk exchanged a little Buddha statue made out of mud for my pen.

I enrolled as a graduate student in the Department of Earth, Atmospheric, and Planetary Science at MIT in the fall of 1986. There, my assigned advisor was David Jewitt and this was the start of our longtime collaboration. I had the most wonderful time in graduate school. I was free to pursue any subject that struck my interest, essentially without any other concern. Astronomy problems were challenging and fun, and I was very happy in my new field. Dave and I collaborated on many projects focusing on physical properties of the small primitive bodies of the solar system: comets, asteroids, satellites of the outer planets. In 1987, we started our survey of the outer solar system, wishing to confirm that the outer solar system was truly as empty as it seemed. This work was to occupy us for many years. My doctoral thesis was on the relationship between comets and asteroids. Dave left MIT in 1988 to take a professorship at the University of Hawaii in Manoa; I also moved to Hawaii to continue working with him, while remaining a

graduate student at MIT. It was a wonderful arrangement.

While in Hawaii, a lot of my (and Dave's) time was spent on the summit of Mauna Kea, on the island of Hawaii, where the telescopes were located. It was not pleasant to spend time at 14,000 ft, but the conditions there were so ideal for observing that we could count on getting better observations there than anywhere else. So we went observing as often as we could, cursing each time we headed up the mountain. We also published a lot; it was a very happy time for me.



Caption: Dave and the author in the control room of the University of Hawaii 2.2m telescope, before the discovery of the Kuiper Belt



Caption: Dave and the author in the control room of the University of Hawaii 2.2m telescope, after the discovery of the Kuiper Belt

I received my Ph.D. from MIT in the summer of 1990, and in the fall of that year, I left Hawaii to be a Harvard-Smithsonian Postdoctoral Fellow at the Center for Astrophysics in Cambridge, Massachusetts. It was a shock to be back on the fast-paced East Coast after two years in Hawaii, and I found every excuse to return to the islands. On Aug. 30, 1992, using the University of Hawaii's 2.2-meter telescope on Mauna Kea, David and I discovered the object 1992 QB1, the first acknowledged representative of the Kuiper Belt. Before it received its official title (15760) 1992 QB1, we nicknamed our newly found object "Smiley" after the fictitious British spymaster George Smiley in John Le Carre's spy novels. The 1992-1993 academic year was spent at UC Berkeley as a Hubble Fellow, followed by a year at Stanford. In the fall of 1994, I joined the

faculty at Harvard University as an assistant professor in the Astronomy Department. I left Harvard in 1998 to join the Astronomy faculty at the University of Leiden in the Netherlands, where I stayed until 2001.

Until 2001, research was my top priority. I did make time to learn to play the cello (badly), and when possible, I traveled to remote places like Patagonia, Alaska, Madagascar, and Mongolia. Tierra Del Fuego was very cold (I went there in the southern winter), and the Strait of Magellan very choppy. Yurts were wonderful places to stay in, but perhaps that was because it was summer time.

I returned to the US in the fall of 2001 to do instrumentation as a member of the Technical Staff at the MIT Lincoln Laboratory in Lexington, Massachusetts. This change of direction from traditional science was prompted by my desire to learn how to build instruments; I had always felt that my education was lacking in this area, and I very much wanted to learn how to make things work. It was a big change from what I used to do as a pure scientist, and the transformation from a very good scientist to an apprentice engineer was not easy. I missed the familiarity of astronomy, but it was fun to teach myself something completely different. It was also refreshing to work with pragmatic engineers. I learned to work with lasers, particularly how to use their coherent light to make various types of very precise measurements. I hope that with the Kavli prize will come opportunities to apply some of these engineering techniques to astronomy problems.

In my personal life, I am married to Ronnie Hoogerwerf, whom I met at Leiden. We live with our 6-year-old daughter Eliot, and Mango, a Newfoundland dog, in Lexington, Massachusetts, where we are kept busy by a vegetable garden and a very popular birdfeeder. A few bluejays and cardinals live in the woods behind the house and are regular visitors, as is a family of wild turkeys. A woodpecker pecks on the house now and then.



Caption: Mango and Eliot

