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How a Real Housewife Became an Astrobiologist

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In 1987, with three children, all sons under the age of 10, a husband who lost his job in the oil bust of Houston, and a family that needed money, I found myself at the local public school employed as a teacher's aide. I made $742 a month. At the end of the year, I had the obligatory review of my work. The principal was demanding and was considered somewhat difficult. However, she offered some advice. "Why don't you consider going back to school, Janet? You can have a job here for as long as I am principal, but I think you should look into it."

It had been 10 years since I had thought anything about academia, and it wasn't the best decade to be out of science. As a classically trained biologist in my undergraduate career, very little of what I knew transferred to the molecular biological experimental side that was going on in most biology and biochemistry departments in the late 1980s. I was obligated to Houston and, quite honestly, I was quite happy with motherhood.

The University of Houston seemed a likely place to consider my principal's suggestion. Having received my undergraduate degree through a merit-based, state-supported scholarship in Arkansas, I liked the idea of the large, public university and its agenda to serve a diverse Houston community. The decision was made to go back when, with a little bit of exploration, (1) I realized the paying salary for a teaching assistant at the University of Houston provided $780 a month; (2) I managed to pass the GRE; (3) I discovered my schedule would be more flexible than it would be at a public school; (4) my very capable, quite amazing, widowed mother chose to join our family home in Houston; and (5) my husband told me he had always hoped I would have the chance.

In the first two weeks of graduate school, after teaching assistant assignments were made, I found myself spending time between the research labs of an old Russian microbiologist, Dr. Peter Jurtshuk; a middle-aged chemical engineer turned theoretical biologist, Dr. George Fox; and the undergraduate microbiology teaching labs. Having never taken a microbiology course I was a bit stymied by my placement as the undergraduate microbiology teaching assistant. Turns out, it was the Russian microbiologist, Dr. Jurtshuk, who would admit, some years later, that he chose me because I was more "mature" and he liked what he saw on my transcript. The first attribute was certainly accurate, because I was 10 years senior to almost every other graduate student in the department. His choice would shape my science career.

Very quickly, I realized that the intellectual demands of graduate school provided a counterbalance to the demands and rigors of motherhood. Truly, the two jobs I held, both difficult, allowed me to do better at each of them. For me, this meant that the tendency to worry about whether I was doing things right with my children could be offset by the intellectual freedom, exercise, and focus demanded by graduate school. (In plain speak: I didn't have time to obsess quite so much on either job.) This was a personal epiphany. The truth of it must be balanced by acknowledging that, at this point, my children effectively had their mother or grandmother available for maternal support 24/7.

The scientist who would become my primary mentor and friend, the theoretical biologist, Dr. George Fox, was the co-discoverer of Archaea. Despite my unending difficulty with "pBluescript" cloning, I was enamored with George's intellectual insight and with what his lab was doing. Thinking about deep time and the interest that NASA's Exobiology program had in understanding how life originated was a part of science that my previous training had not exposed me to. I was quite amazed to learn that life had quite factually, through the record of ribosomal RNA in extant organisms, been divided into three domains. I knew full well that this information had not gotten into the textbooks of my children's schools. I wondered why.

During the seven years it took me to complete my Ph.D., NASA implemented a program called the NASA Astrobiology Institute (NAI); and George's lab, among hundreds of others, competed for a spot in this new institute. My interest in it was authentic and not only because it looked like big money. I had moved almost entirely into bioinformatic analysis, mining the dizzying amount of DNA that was then being sequenced for phylogenetic clues. It was clear to me that the melding of biology and computer science, while necessary, was not the only cross-fertilization of disciplines needed by astrobiology. Understanding how an extant record, based on nucleic acids, reflected ancient history meant one also needed to consider ancient climates, geologies, and a host of other completely foreign fields. Astrobiology meant interactions with a broad host of scientists intent on finding a common language. Developing new collaborations was essential. Astrobiology meant that finding answers to some of the sexiest questions in science had real potential. Becoming a community was an almost guaranteed natural outcome of the program.

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FIG. 1. Siefert "in the field," photo courtesy of Pioneer Productions. Color images available online at www.liebertonline.com/ast.

Remaining in Houston was a necessary constraint for me. Luckily, the burgeoning field of astrobiology and my role as a bioinformatician provided for applications other than just deep time research. I made a move to Rice University as a postdoc and, despite the unlikely circumstance, landed in the Statistics Department. Besides close proximity to a premier medical facility and my willingness to transfer "bootstrap methods" and "branching processes" to medical informatics, I was armed with a Keck Fellowship that provided more training in math than a biologist could wish for.

Now a Senior Faculty Fellow (a real title, not an acknowledgement of my age), I remain in Rice's Statistics Department today: their resident astrobiologist.

For the last 12 years I have continued to work across disciplines. My training has expanded to field microbiology (Fig. 1) and microbial population dynamics. I work with an international group of individuals. We work at the Cuatro Ciénegas Basin (Fig. 2), an oasis in the Chihuahuan desert in the state of Coahuila, Mexico. It is a field site that holds promise as a proxy for an earlier period in Earth's history: the late Precambrian, the biological frontier when microbial life was giving way to the dominance of more complex eukaryotic organisms. The Cuatro Ciénegas Basin is a rare place. It has a biological endemism equal to the Galápagos, it presents anomalous elemental stoichiometry with regards to phosphorus, and it has a hydrologic system dominated by living stromatolitic features. As such, it has proven a distinctive opportunity for the field of astrobiology. It is an extant ecological time machine that provides investigative collaborative opportunity. It can, and is, being prospected for biosignatures of past and present life that can be used in our search for extraterrestrial life. I have become enamored with the way microbiology shaped our planet early and still does today.

I am involved with NAI teams that use our work to inform The Virtual Planetary Laboratory as well as allow us to "Follow The Elements" through field research. These people, who have expertise in disciplines as varied as paleoatmosphere chemistry, isotope geochemistry, astronomy, and limnology, all strive to bring anything and everything to the

FIG. 2. Cuatro Ciénegas Basin, photo courtesy of Tommy Lavergne, Rice University. Color images available online at www.liebertonline.com/ast.

table that will one day help us understand Earth biology and the possibility of extraterrestrial life. I have been influenced by and worked with scientists with whom I would never have had the opportunity to spend intellectual effort if not for coming of age as a scientist when astrobiology was going through its own rights of passage as a discipline.

Five years ago, I lost one of those sons I mentioned above, my oldest one, in a senseless, tragic accident. Of the many pivotal moments in my life, this one must be marked as the most significant in my life and, by extension, my science career. Because, at least for this mother scientist, it required an examination and admission of what it is I really believe in: what is, indeed, worth pursuing.

Among the things I learned, two are worth describing here. The first is that science's pursuit of truth, when bolstered by fine intellect and encouraged by open-mindedness and honesty, is compulsory. It answers to the part of us that desires to understand our place in evolving biology, our philosophy about our place in that evolution, and the world we live in. The second is more personal. The field of astrobiology not only afforded me intellectual partners in this pursuit, but a host of collaborators who became friends from as many cultures, ideologies, nationalities, and philosophies as I might have imagined. If not for astrobiology, I would not have had the opportunity to know them. Upon examination, my life is far more richer because of many of them.

I still find that many of the problems addressed by my lab and the extended astrobiology team I work with are some of the sexiest around. It might not be the stuff of reality television, but it surely is the stuff of reality. If not for astrobiology, my own evolution would not have taken the course it did. There will be a few astrobiologists who provide us with history-making discoveries. There are a number of us who will add in some way, large or small, to the knowledge that will allow us to look beyond. I hope that through interactions that only scientists can provide, we ensure that the truths of science filter down to the next generation.

If you are an aspiring astrobiologist and you are reading this, I wish for you similar stochastics. If you are an astrobiologist of long standing, I applaud the likelihood that you, too, will be or have been instrumental in a young, or even mature, real housewife's astrobiologist's career. If you are someone with the potential to ensure funding for astrobiology, show us the money.

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Abbreviation

NAI, NASA Astrobiology Institute.

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