Many parents believe in the power and importance of education. Ray and Jean Sol simply decided not to leave the details to others. They served as both teachers and fellow students while homeschooling their daughter Jennifer. Mother and daughter graduated from ASU’s Honors College last year and currently are pursuing graduate studies in geography.

Many New Jersey families head for the seashore on fine summer weekends. Not the Sol family of Pittstown. Instead of the shore, the Sols often drove one and a half hours to the University of Pennsylvania Museum in Philadelphia. The trips to Philadelphia were not limited to summertime. Jean and Ray Sol made the drive on fall, winter, and spring weekends, too. Between 1987 and 1989, they made the trek almost every weekend just so their teenage daughter, Jennifer, could sort bones in the museum’s prehistoric skeletal collection. “We’d go through the boxes and catalogue what was there,” says Jennifer, who received her bachelor’s degree in anthropology last December from Arizona State University. “It was like putting together a jigsaw puzzle without all the pieces.”
For the Sols, learning is not school work, it’s a way of life. For the past two decades, from Chicago to Pittstown to a su, they have filled their lives with one research project after another. Jennifer consumes information like it was candy. She has a sweet tooth for knowledge, and her parents have done their best to indulge her wide-ranging intellectual tastes.

“In terms of being truly gifted people, a devoted family, I’ve not seen anything quite like them,” says Janet Monge, curator of Penn Museum’s skeletal collections.

“The amount of work we did during those years was astounding. We identified a huge quantity of skeletons. We did basically what would be considered background work for a really good-quality publication or dissertation,” Monge adds.

Jean and Ray Sol have been teachers and fellow students to Jennifer as well as parents.

“It was impossible to keep her from learning when she was little,” says Jean, now a graduate student in geography, as is her daughter.

When Jennifer was 2, her mother was an undergraduate at Elmhurst College in Illinois. Jean recalls studying for a geography exam once, and noticing that Jennifer had suddenly added Russian place names to her vocabulary.

“By the time she left kindergarten she was reading at the high-school level and doing advanced mathematics.”

Jean says that Jennifer was bored and miserable as a first-grader in a private school for gifted children near Chicago. Jennifer was interested in Greek mythology. Her classmates were interested in Wonder Woman.

“The teachers would ask me to help out other students,” Jennifer says. But her classmates became ill-at-ease in her company. She had more in common with adults who shared her intellectual interests than she did with her age peers.

The Sols were paying $2,500 in school fees annually, yet Jennifer was still far beyond her classmates and finding errors in her school books. “She was very unhappy,” Jean says.

In desperation, the Sols pulled their child out of school halfway through the year. They decided to teach her at home. They would use the tuition savings for educational trips to Europe and Canada.

“The joke ever since was that she was a first-grade dropout.”

Jean put her own college education on hold to focus on her daughter’s homeschooling. “I felt she was much more important than my degree at that point,” she says.

Her husband, a former teacher, has had a long career as an at&t executive. That gave the Sols some expertise and flexibility unavailable to other families. “There are single parents who work and homeschool,” Jean says. “It was fortunate. I didn’t have to work.”

The Sols kept detailed records about how each hour of Jennifer’s education was spent, including all of her homework assignments. It turned out that she received more hours of schooling at home than she would have received in a traditional school.

“I didn’t have any pretentions about knowing everything that she wanted to learn,” Jean says. Jean was scared at first, and had few concrete goals. But she knew that Jennifer needed to learn how to learn, and how things related to each other. She also wanted Jennifer to get positive feedback, which was often lacking in school.

When the Sols lived in Chicago, they took advantage of the non-credit adult classes offered at Adler Planetarium and the University of Chicago. They also took courses in ancient Greek and Mideastern history at the University of Chicago’s Oriental Institute.

One or both parents attended all of Jennifer’s classes with her. Their fellow students often at first thought that the Sols were too cheap to hire a babysitter. But by the end of class they figured out that Jennifer had dragged in her parents.

“I certainly learned a lot. I had a wonderful time,” Jean says.

As an at&t human resources executive, Ray spent eight years helping oversee the breakup of the Bell System. When he was moved to at&t headquarters in New Jersey, Jennifer began taking classes at the University of Pennsylvania.

Some of the classes at Chicago and Penn were taught by doctoral students. If Jennifer liked them, the Sols would hire them as tutors. Under one tutor at Chicago, Jennifer studied The Iliad, The Odyssey, and other aspects of Greek literature and history. Another Penn tutor happened to be a visiting doctoral student from the University of Cambridge. He taught her Irish and Celtic history every Saturday for a year.

“We’ve taken five trips to Europe, mainly England, Ireland, Scotland, and Wales, visiting places we had studied about,” Jean says.

“Those were our field trips.”

The family visited Stratford, Ontario, each year for the Shakespeare festival. Shakespeare was “another interest of Jennifer’s.” It’s a phrase Jean often uses.

Homeschooling is perhaps more common and accepted now than it was in Jennifer’s younger days, but school officials often still frown on the practice. In New Jersey, the Sols lived in the country so as not to arouse the curiosity or suspicion of neighbors about Jennifer being at home year-round.

Newsweek and Time magazines both published articles about homeschooling during the past two years. Time even printed an excerpt in its Nov. 21, 1994, issue from a letter that the Sol family wrote in response: “We learned and we grew. We would do it again, with only one change: our daughter, Jennifer, would never have gone outside to school in the first place.”

The Sols moved to Arizona in time for Jennifer to begin college at a su. Allergies tormented both mother and daughter in New Jersey. Ray knew Phoenix from business trips and got a transfer from at&t. It didn’t hurt that the Chicago Cubs come to Mesa for spring training.

“We watched our share of Cubs games on wgn,” Jean says.

Jennifer’s pre-college curriculum had been less structured than that of most students. She sometimes spent weeks devoted to one subject. “The most important thing is to believe you can do it,” says Jennifer, of both homeschooling parents and children.

The Sols’ system apparently worked. Jennifer’s Graduate Equivalency Diploma and at&t scores were high enough to get her admitted directly into a su’s Honors College.
Jean Sol found out how to get the attention of an ASU geography class. She simply asked the students to imagine being rich and living anywhere in the country they wanted.

Sol was serving as an undergraduate teaching assistant for a course in computer cartography to earn an independent study credit in the University Honors College. Instructor Tom Paradise had asked her to present a lesson on place perception. The question: Which are the areas people say they would most like to live, and which are the places they would most like to avoid?

Sol surveyed the students following her presentation. She asked them where they would build three houses if they could afford to quit working and live anywhere they wanted. Each student was to make selections based separately on safety, environment, and culture.

Sol later expanded the survey to include 220 students enrolled in ASU geography classes.

“I decided to use a graduated circle map. In other words, the more people who chose one city, the bigger the circle would get on the map,” Sol explains. “I mapped the students data to get them involved.”

She presented the completed maps later in the semester. She completed three maps to show her results. When selecting a home based solely on environmental factors, the students liked Arizona, the Colorado Rockies, and the California coast.

“With safety as the parameter, they were spread out a little bit more. The students liked a lot of the same places, but they also liked some of the smaller towns,” Sol says. The culture parameter grouped student preferences in two large clusters. One cluster was situated in the northeast from New York City to Washington, D.C. The western cluster centered on San Francisco.

“Los Angeles lost out big time,” Sol explains. “These students did not care about living near Disneyland. They wanted San Francisco.”

Most place-perception studies do not ask for three parameters. A common question is a typical study asks simply: “Where is your favorite place to live?” Perhaps that is one reason Sol’s research received such a favorable response at the Association of American Geographers conference. The conference just happened to take place in San Francisco.

Jennifer Sol expected to get results from her ASU honors thesis in geography that sounded logical enough, but she was in for a surprise. Her thesis analyzed the effect in the Phoenix area of federally mandated travel reduction programs on transportation patterns. The programs were devised to improve air quality.

The primary data source for her thesis were responses ASU employees made to a series of travel-behavior questionnaires. The thesis builds on related research conducted by ASU geography Professor Elizabeth Burns and the University of Arizona’s Sandra Rosenbloom.

Sol expected to find that more men had switched to public transport, biking, and walking to work, while women continued to use their cars as before. Her data showed nearly the opposite.

“Women reduced their single-occupant vehicle usage from 80.6 percent to 70.2 percent of all commuters, while men’s use of single-occupant vehicles changed only 1 percent, from 69.4 percent to 68.4 percent.”

Jennifer Sol expected to get results from her ASU honors thesis in geography that sounded logical enough, but she was in for a surprise. Her thesis analyzed the effect in the Phoenix area of federally mandated travel reduction programs on transportation patterns. The programs were devised to improve air quality. Sol was especially interested in the differences in commuting patterns of male versus female employees from 1992 to 1994. The initial evidence suggested that women are more likely to drive their cars as a lone occupant.

“Women have more responsibilities for child care, including shuttling children to and from daycare, school, and lessons. They also are on call even when children are at any of those destinations because the child may become ill,” Sol explains. “Women also do most of the family errands.”

The most likely explanations for the behavior shift? Sol thinks that ASU’s travel reduction programs and beefed-up bus services offered by the City of Tempe may finally be having an impact.

— Steve Koppes
"Jean and Jenny Sol have long been committed to ‘homeschooling,’ but that is a misstatement,” says Michael Cochise Young, associate dean of the a su Honors College.

“What they have done in the years prior to arriving at a su is ‘world schooling,’ using local resources and the issues suggested by their local environment as both the subjects and the instruments of their inquiry. And they brought to that study, as they do to all they touch, an enthusiasm and wonder that refreshes the vision of the persons around them.”

As an a su honors student, Jennifer continued the research begun at the Penn Museum. The 3,000-year-old remains she worked with came from two sites in northwest Iran, a large town and a village. Most of the remains came from the larger site, called Hasanlu.

It’s an important site to archaeologists who specialize in the region because it had been destroyed at the transition between the Bronze and Iron ages. Artifacts found there combine the two technologies. Iron blades come hafted to bronze handles, for example.

**During their months** of sorting through the bones of 300 individuals represented in the collection, the Sols each developed their own informal specializations. They all ended up working with nearly every part of the skeleton eventually, but Jennifer favored skulls, while Jean did spines and data recording.

“Dad was the hand and foot expert,” Jennifer says.

Ray’s reconstructions of hand and foot bones were excellent, according to the Penn Museum’s Monge. Skeletons that have been buried for thousands of years usually deteriorate and the small bones get lost. But the Hasanlu remains were well-preserved and excavated with extraordinary care.

“You need quite a bit of experience and finesse to identify the small bones of the digits,” Monge explains. “He would have everything labeled to a level of precision that you really can’t duplicate. It was more than just commitment. It was love.”

Jennifer had intended to write her honors thesis on the sword cuts and other traumas inflicted on the skulls of the 300 individuals represented in the Penn collection. The project required her to return to Philadelphia in 1992 for another two weeks of data collection. Her parents grabbed their portable computer and went along to assist her.

“They spent their vacation here in Philadelphia in a hotel, right across the street from the museum, and we worked every day on skeletal collections,” Monge remembers.

Jennifer, meanwhile, had started another project at a su as a research assistant to anthropology Professor Charles Merbs.

“I came across a very interesting skeleton of a man who had a lot of arthritis and also another kind of disorder that is very rare,” she says.

The 2,000-year-old skeleton from Sudan, Africa, had been afflicted with Diffuse Idiopathic Skeletal Hyperostosis. dish causes bony growths that resemble melted wax growing down the front of the spine.

Jennifer, then a junior, presented the results of her analysis during a poster session at the 1992 Paleopathology Society conference in Toronto. Undergraduates don’t often present research at national conferences.

**Like many undergraduates**, however, Jennifer evolved new academic interests as a result of taking elective courses. She says taking two geography courses in the spring of 1993, “really changed my life.” Her new-found excitement for geography prompted her to switch her honors thesis topic from physical anthropology to human geography (see sidebar).

Jennifer graduated summa cum laude, an honor bestowed on students who have attained a cumulative grade-point average of at least 3.8 on a 4.0 scale. She also earned membership to Phi Beta Kappa, the honorary society for students in the liberal arts and sciences with high scholastic rank, and Mortar Board, the senior honor society that places an additional premium on community service.

After Jean finally resumed her college education at a su, Jennifer talked her into tackling the extra intellectual challenges offered by the Honors College. She picked up where she left off in geography years earlier. Like her daughter, she gained membership in Mortar Board (Jean served as its president, Jennifer as its secretary, in 1993-94).

In 1993, Jean had been named the Outstanding Undergraduate Student in the Department of Geography. She obtained her bachelor’s degree summa cum laude in May 1994, just seven months ahead of her daughter.

Jean wrote her honors thesis on urban sprawl in Maricopa County, Ariz. During the 1993 spring semester, she was one of five a su Honors College students to present papers based on their theses at the National Conference on Undergraduate Research in Salt Lake City.

Jean had studied the impact of large-scale residential developments on the Phoenix-area landscape from 1970 to 1990. She found that the communities didn’t turn out as the developers had promised, and that the Maricopa Association of Governments had miscalculated their population projections.

She presented another research project during a poster session at the Association of American Geographers conference in San Francisco last year. That project started after Jean had become an undergraduate teaching assistant for a computer cartography (map-making) course that she had taken previously (see sidebar).

Jean’s love of map-making led to her first commission while she was still an undergraduate. She generated six maps on a computer—one with Jennifer’s help in a time crunch—for a su history Professor Bradford Luckingham.


**The pursuit** of a doctoral degree and teaching at the college level are long-range goals for both Sols. After obtaining her master’s degree, though, Jennifer would first like to find a job where she could use Geographic Information Systems (gis), a way of making maps and analyzing spatial patterns on computers. Jean would ideally combine consulting with an academic career.

Whatever the future holds, one thing seems certain. After years of independent study, the Sols have found a comfortable intellectual home at a su.

*For more information about geography research at a su, call the Geography Department at 602.965.7533. For more information about the University Honors College, call 965.2359.*