



Profile of a Field: MATHEMATICS

Paul Selvin, *et al.*

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When NASA astrophysicist Neil Gehrels is invited to talk at a meeting, the first thing he does is check the multicolored travel calendar he shares with his wife, Ellen Williams, a University of Maryland physics professor, to find out whether she already has travel plans for the same date. "I turn things down every month," says Gehrels, project scientist for NASA's Gamma Ray Observatory. So does Williams. Their agreement is that they get to travel equally and that they can't both be out of town at the same time—to make sure one parent is home each day to care

for their two preschool children. "Neither of us works nearly as much as we would

become part of a research group on surface physics at Maryland; the university has a block grant for the group, so Williams doesn't have to worry as much about funding. And Gehrels recently was named project scientist for the Gamma Ray Observatory.

Similar tensions, involving career choices, compromises, and children, are played out in every two-career scientific marriage. And for women in science, two-career marriage is the norm. According to figures from the American Institute of Physics, 44% of married women in physics are married to other physicists—and another 25% to some other breed of scientist. A remarkable 80% of female mathematicians are married to other scientists or engineers, along with a third of female chemists.

The pressing demands of two research careers mean that if a marriage is to work, couples must find creative solutions—and be willing to compromise. In the marriage of Stephen and Deborah Spector, childhood sweethearts who have coordinated their scientific careers since college, and who are now both on the faculty at the University of California at San Diego (UCSD), it was Stephen who had to compromise first. When Deborah was a postdoc in molecular biology at the University of California, San Francisco (UCSF), she got an offer she couldn't refuse: an assistant professorship of biology at UCSD. The problem was that her husband hadn't finished his medical residency and fellowship at UCSF. "We were out of synchrony," he recalls. "I wasn't ready to make the kind of move we were making." But he moved anyway—and was lucky enough to get a fellowship at the UCSD medical school. In retrospect, the couple says it was a good move. "We've been fortunate," says Deborah Spector, who was named a full professor shortly before her husband reached the same rank.

The time when the dual-career marriage really gets tough, though, isn't when job choices have to be made. It's

when the two-body problem becomes a "many-body problem," that is, when children arrive. Just having a baby can be a scheduling challenge: In giving birth to her third child, Deborah Spector had labor induced on a 3-day weekend so she could attend a student's thesis defense. Williams timed one pregnancy so that she could have a baby during a sabbatical and took all her sick leave and vacation time to bear the other.

Bearing children, of course, isn't the hardest part—raising them is. And when it comes to rearing children, the husbands in some scientific couples are lending a hand. Reached at home on one of the mornings when he takes care of his 9-month-old son, Oregon State University physicist David

Key Issue: Two-Career Science Marriage

Solving the "two-body problem" requires advanced lab techniques.

by Ann Gibbons

without kids or without each other," says Gehrels. "But I wouldn't have it any other way."

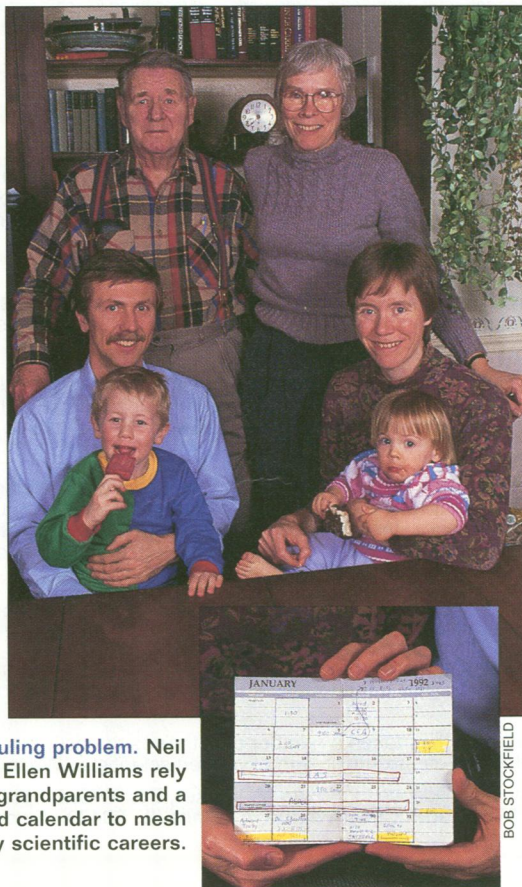
Welcome to the complicated lives of a dual-career science couple. Juggling schedules and days off is just one of the lab techniques required to solve what has come to be called the "two-body problem." But only one. An equally important technique is finding a way to compromise on job opportunities so they can live in the same city.

That's a choice Gehrels and Williams faced twice. They met in graduate school at the California Institute of Technology and searched for jobs together. She had a variety of offers, but in his field, gamma ray astrophysics, there were few openings. When he was offered a postdoc at NASA's Goddard Space Flight Center in Maryland, his wife turned down some highly acclaimed schools and accepted a postdoc at the University of Maryland, an offer she describes as "fairly attractive."

Two years later they replayed the same scenario. She had many options; he had one: staying at NASA, which Gehrels says is "gamma ray heaven." Williams recalls: "I desperately didn't want to stay, and he desperately did." They stayed. And in the beginning, she admits, "it was miserable." Williams was getting job offers from more prestigious schools—and turning them down. Gehrels was feeling guilty. "It was by far the most stressful time in our lives and our marriage," he says.

Things have worked out well in the Gehrels-Williams marriage—and, not so coincidentally, in their scientific careers. Williams has gained tenure at Maryland and now says, "It is not clear to me that I could have done any better anywhere else." She was made a full professor last year and has

Scheduling problem. Neil Gehrels and Ellen Williams rely on live-in grandparents and a color-coded calendar to mesh their two busy scientific careers.



BOB STOCKFIELD

Speaking Out

Barbara Simons



In 1975, when she was 34, divorced, and the mother of three, Barbara Simons began studying computer science through the extension program at the University of California at Berkeley. Six years later, she had earned her doctorate and landed a job at IBM's Research Center in San Jose, California.

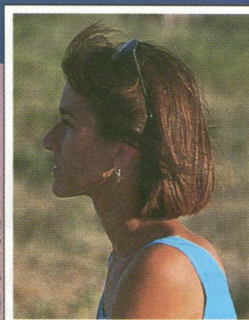
The difficulties she faced as a woman in computer science led Simons to devise a re-entry program for women and minorities at Berkeley. She and several other women raised \$100,000 to launch the program, which today is regarded as a great success. Simons continues as an IBM research scientist, working on polynomial time algorithms, and is the current secretary of the Association for Computing Machinery.

I was almost always the only woman in my graduate classes, which was very intimidating. Even though I was an older woman, I was still insecure in that setting and afraid to open my mouth. If I did, it was immediately obvious who was speaking—the woman. There simply was no anonymity. And I began thinking about why there were so few women in computer science and engineering.

I guess being an older woman, and one who had an easier time of it because I was fortunate enough to have an ex-husband supporting me, I felt a responsibility for other women. I knew how academia worked, which is important if you are an outsider. I knew you should never take no for an answer, which is something that women usually learn only when they are older. I also felt—and feel—that we will always have a sexist society until women are represented in all fields at all levels. But to get women into computer science, we needed alternative doors, and that is what the re-entry program provides. **V.M.**

Speaking Out

Joyce Poole



PHILIP CAYFORD

Poole, Elephant Program Coordinator for Kenya's Wildlife Service, has studied elephants in the wild since 1976. She concentrated on the animals' social structure, discovering that the African bulls, like their Asian counterparts, have sexual cycles—an observation contradicting all previous studies. She was

also the first to recognize the low frequency sounds elephants emit for communications up to 10 kilometers. When conservation groups gathered in Kenya in 1988 to discuss methods to protect the animals from ivory poachers, Poole assumed she would be invited, given her 12 years of research on elephant behavior and social structure. To her surprise and frustration, she was not. Instead, she was told by a representative of the groups organizing the meeting that her work was not relevant to the conservation of the elephant.

It was thought that because I was a woman I was too emotionally attached to the animals to make management decisions and that my study of their behavior was unimportant. I don't remember my reply, but inside I felt, 'I'm going to show you that it is important.' I decided that I would push for the ivory ban as hard as I could and began working on a proposal for this. I knew that many of the elephant populations had been badly affected by poaching, but I needed data to show this. Between January and April of '89, I collected age statistics and sex ratios for elephants in three of the most devastated areas....Using this data, Jorgen Thomasen (a conservationist with TRAFFIC—Trade Records Analysis of Flora and Fauna in Commerce) and I wrote a proposal for an ivory ban, which the government of Tanzania agreed to push. There were other proposals, but ours was the most detailed and scientific, and it was used to persuade the Convention on International Trade in Endangered Species to list the elephants in Appendix 1, banning the ivory trade. **V.M.**

McIntyre says he tries to do half the child care, staying home two mornings a week so that his wife, Janet Tate, also an assistant professor in the same department, can go to campus. But McIntyre concedes that "probably more falls on her. She's been breast-feeding, so there's more of an attachment." And Tate acknowledges that the problem concerns her: "I'm worried about the child taking a toll on my career. Time is a precious commodity."

Indeed, time is probably the most precious commodity in a two-career scientific marriage. In 1989, Wellesley College sociologist Paula Rayman and her former research assistant Heather Burbage surveyed 20 men and women in dual-career science marriages and concluded that "it does not seem possible to have it all for most respondents. Most seem to put enormous time and energy into work and feel a lack of time left for family. The give seems to be at home rather than at work. Yet, it is clear that they enjoy, even love, family life and deeply experience a loss and frustration at not being there enough."

In spite of such sacrifices, scientific couples who understand each other find ways to make their marriages succeed. What is more, they find compensations in

being married to someone who is in sympathy with the scientific enterprise. "There's always been a complete understanding of why

I work a 16- to 20-hour day, 7 days a week," says Deborah Spector. Williams adds: "I must say that probably my husband more than anybody else has been a person who encouraged me to excel and to realize that it was OK to excel. Having an intellectual companion, somebody to talk to who can share your concerns, is wonderful. It's almost hard for me to imagine you could work out a successful marriage otherwise."

Even split?
Physicists David McIntyre and Janet Tate try to divide the child care, but he concedes "more falls on her."

