

## **Balancing an Engineering/Science Career and Family: A Novel Approach**

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### **Abstract**

The stresses of balancing professional and personal lives are commonly accepted as part of beginning and building a career. In engineering particularly, the need to maintain awareness of technical progress is critical to staying marketable in the field. Life issues, such as parenting, assuming care of elderly parents or maintaining a healthy balance between work and home, are playing an increasingly important part in the lives of all professionals, technical or not. The ability to successfully manage the balance in a manner that manifests growth both personally and professionally is a sought-after attribute.

This paper describes the development of a small business focusing on science education. The partners who founded *Science Surround* are female engineers who, after becoming parents, realized the need to balance their professional and personal lives. Both have a passionate interest in sparking an early realization of the prevalence of science and math in everyday life. In addition, through the experiences gained both in industry and academia, they realized the importance of modeling to children success in science, math, engineering and technology fields (SMET). Indeed, exposing children to these fields early in their educational lives might make a difference in whether or not they decide to pursue SMET oriented fields as a career.

One partner is a Ph.D. in Electrical Engineering, mother of two, and the Director of the Women in Engineering and Outreach Programs at North Carolina State University. In addition, she has industry experience with Bell Labs, Texas Instruments and other industries. The other partner has a B.Sc. in Engineering Management/Mechanical Engineering, is the mother of two, and a consultant to North Carolina State University on a GK-12 NSF Engineering Fellows grant and outreach. She has 10 years industry experience with IBM Corporation. The combined experiences of these women and the application of their technical skills provide a solid foundation for their business, *Science Surround*. The business is a perfect way of balancing the need to utilize technical skills while enjoying a busy personal life.

### **Introduction**

The last several decades have been a time of frenzied personal growth and activity. The need to succeed both personally and professionally is a societal expectation. Professionals are faced with

shrinking numbers of colleagues, while the amount of work to be done remains the same or grows. Personally, having children and/or taking on the care of an elderly relative exponentially increases the workload at home. The dichotomy is that, in general, society has little respect for people who chose to not to try to “have it all.” In the few decades, increasing numbers of technical professionals have had to come to the realization that the amount of available time each day is constant, and it is in this realization that alternative approaches to personal and professional growth are born.

In the case of the authors, both engineers working in industry and academia, it was the decision to have children that necessitated a shift in priorities. In both cases, it was a family decision that it would be the mother who would take on primary responsibility for childcare. When our children were small, we both juggled our responsibilities at home with those at work through a creative mix of unpaid leave of absence, part time work, and non-tenure track positions. However, neither child rearing nor elder care is a short-term responsibility, requiring us to reevaluate our careers with respect to a long-term solution.

Pursuing a part time career (vs. part time job) was an option. Unfortunately, in both academia and in industry, we experienced a definite lack of respect from colleagues and management for the method we chose to balance our responsibilities, in addition to time limits on part time employment. Because part time careers are not valued or encouraged, technical professional women (and men) are faced with the difficult choice of continuing to work full-time under tremendous personal stress or leaving their professions altogether. The latter is detrimental to their employers, due to the technical expertise and experience that leaves with them. In addition, the technical professional is then prevented from practicing that for which she/he has trained. For us, the solution of starting our own business became obvious.

## **Business Development**

Both of us had discovered, since becoming parents, a love of teaching science to our children. It was also apparent among the parents we knew that this is an area that many do NOT feel comfortable teaching their children. In addition, when our children started school we learned, to our great dismay, that our state measures the success of its students, teachers and schools based on demonstrated competency in math and language. Science is a subject that is taught when there is time, and during a normal school day this “free” time seldom materialized. At the same time, we were both struck by how eager the children we came into contact with were to learn about science. All of these, combined with encouragement of the parents of children we knew, factored into our decision to launch *Science Surround*.

We began our planning by talking to other parents about the kind of extracurricular activities they were willing to seek out for their children, and commit time and money to. Science, as we have observed in our interactions with children and their parents, is a subject that many parents are not comfortable with teaching, as well as one they are not confident is being taught at school. (It so happens that in our current work as consultants on a National Science Foundation GK-12 Engineering Fellows grant, we have had the opportunity to survey the parents of approximately 1500 students. Formal data analysis is not yet available, but the initial reading of completed surveys supports this statement.) Many of the parents we talked to have a technical background,

but had no interest or skill, in their own opinions, in applying their technical knowledge to the teaching of scientific concepts to children. This gap, we realized, was one we could fill, based on our own passionate belief that children are never too young to experience science. The key, we felt, was in helping children to realize that like reading and math, science is present in what they experience every day. To that end, we decided to offer for-fee classes for children in grades Pre K-5.

Our initial offering was a summer science series; weekly two hour long classes exploring areas such as insects, the playground, flight, chemistry and dinosaurs. We conducted two classes each week, one geared to students from preschool through second grade; the other for children in grades three to five. Each class followed the same basic formula: an introduction using books and pictures, several hands-on activities, a craft project, and a snack. The snack was tied to the class theme and preparing it was an activity unto itself. The first summer, we filled our classes to the capacity we had set merely by word of mouth and passing flyers to about 30 parents we knew.

When the school year began, we had requests from the parents of our students to offer after school science lessons. So, we developed a series of hour-long science explorations, and offered our services to parents for “science birthday parties.” In this case, we charge the parent a flat fee for a minimum number of children, and design a science experience based on an area of interest to the birthday child. For example, if six-year-old Nick had an avid interest in dinosaurs, we would bring our collection of fossils to share, plus guide the children in the making of a “fossil” impression using plaster and clay or a dinosaur “habitat” diorama.

In succeeding summers, in the interests of pursuing our goal of helping children realize the “everyday/everywhere-ness” of science, we refined our offering list to focus on venues familiar to children. The Science of Playgrounds<sup>1</sup> explored the physics of the swing, slide and merry-go-round. Children, natural sports enthusiasts, learned about the science behind the sport in “The Physics of Sports.”<sup>2</sup> Roller coasters and other thrill rides and the forces in play with them became the focus of “The Science of Amusement Parks.” Would-be pirates learned about buoyancy, one-eyed vision, “walking the plank” (and inadvertently the simple machine the lever) and following a treasure map (using compasses and measuring tools) in “The Science of Pirates.” Nearly **every** area of interest for children can be explored scientifically, thus reinforcing the idea that science is prevalent in society.<sup>3</sup>

Recently, we’ve expanded our offerings to include large group assemblies at schools and “home field” field trips. These are classroom visits to deliver a hands-on, inquiry-based lesson on a curriculum concept, for which schools pay a per-child nominal charge. Familiarizing ourselves with the details of the state science curriculum added a dimension to the business that makes these offerings very desirable to public schools. We continue summer and after-school classes and have added science fair preparation and middle school exploratory offerings.

In the four years since its inception, *Science Surround* has brought science exploration to many children AND their parents. For example, a local independent bookstore hired us to do Saturday morning science presentations for children while their parents shopped. Much to our surprise and enjoyment, it quickly became clear that the parents were just as interested as the children in

the presentation, if the jockeying for seats was any indication! Another popular offering is the Science Fair Preparation workshop. For five weeks each winter, students meet for 90 minutes each week to decide on a science fair topic, design the experiment, analyze the results, and prepare the display. Parents are involved as well. One way is through a separate workshop in which the parent/child team performs and analyzes the results of an assigned experiment. Parents learn how intimidating experiments can be for children (and sometimes for *them*), and students are in the rare position of being the “leader” with their parent. The parents of children in the classes are asked to be the sounding board at home, and to provide assistance when necessary with experiment execution, data collection and display preparation.

## Conclusion

To start any kind of business, you need a certain set of “ingredients.” To start a services business that values non-monetary payoff as much as monetary gain, the list is even more specialized. A like-minded partner, a supportive family situation with a spouse agreeing to be the primary breadwinner, a sense of humor, resourcefulness and persistence are all keys to the growth of our business. The most important factor, however, is that we truly *love* what we do. Making science fun and inspiring wonder in adults and children is a wonderful byproduct of this endeavor.

A science education business is a wonderful way to utilize the hard won technical expertise of an engineer who has reprioritized his/her life to better balance increasing family responsibilities. During busier times at home, the business can be a part-time commitment. As owners, we have the choice of turning down too much business or commitments during inconvenient hours. Indeed, the freedom to determine your own schedule outweighs the monetary aspects during this time. With an increasingly technical society, and the problems facing science instruction in today’s K-12 schools, there is intense interest in informal science education instruction. Therefore, when the time is right to focus on business expansion, opportunities abound for local growth and franchising opportunity. For now, the ability to determine our own schedule, plus our belief that we are truly making a difference regarding attitudes toward science in the children we come into contact with, is payoff enough.

## References

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