

# In Life, Like Underwater Acoustics, Paths Are Seldom Straight

*Marcia J. Isakson*



Serendipity reveals itself in those small interactions or events that change the course of your life. In chaos theory, small changes in initial conditions cause large changes in the final state of the system. This was famously described as the flap of a butterfly's wing in Brazil causing a tornado in Texas (Lorenz, 1993). To me, serendipity is the butterfly's wing.

Growing up in Hereford, a small cow town in the Texas panhandle, I may have needed more serendipity than most to get to where I am today. The first time that serendipity stepped in to reveal my next step, it influenced my choice of college. When I was in high school, we moved from Hereford to Chicago and then to Connecticut. On our way to Connecticut, we stopped by the United States Military Academy at West Point to take a tour of the historic campus. While on the tour bus, my mom remarked about how I should consider attending, especially since the campus was so beautiful. However, I had no plans to apply. The tour guide interrupted, stating I would not get in since West Point was very selective. Well, I found that exceptionally annoying, so I made it a point to apply. Long story short, I started as a new cadet in 1988.

Going to West Point had a tremendous impact on my life. None of my family had been in the military. Being in the army gave me a passion for national security. I learned to deeply respect the sacrifices that our service men and women make every day to keep the world safe. However, being in the military did not quell my passion for science and math that I have had from a very young age. I pursued degrees in both physics and mathematics at West Point. In my junior year, I experienced my second brush with serendipity. I was asked to spend a semester at Brookhaven National Laboratories, the first cadet ever to do so.

Being at Brookhaven showed me the world of academic research. I was involved with a nuclear engineering

project and published my first paper (Tuyle et al., 1993). Based on that experience, the academy asked if I would apply for a Hertz Foundation Fellowship. Major John Robertson, a West Point physics professor, helped me prepare for the rigorous two-round interview. Without such a fellowship, I would not be able to attend graduate school after West Point. Instead, I would be assigned to an operational unit like the rest of my classmates. However, again, serendipity intervened, and I was awarded a Hertz Foundation Fellowship in 1992 for the study of physics, thus, once more, changing the entire trajectory of my life.

I attended the University of Texas (UT) at Austin for my master's degree to be close to Fort Cavazos where my husband, John Isakson, was stationed. After completing that degree, I served first as a shop officer and then as a battalion operations officer in the 544th Maintenance Battalion. As a shop officer, I was responsible for ensuring direct support maintenance to army units. The soldiers in my shop fixed everything from tanks to small arms to radios. As a battalion operations officer, I was in charge of defense tactics, movement planning, qualification compliance, and intelligence for a 900-soldier maintenance battalion. I had a staff of 18 officers and noncommissioned officers (NCOs). I was happy in the army, serving the national security mission, but I knew I needed to

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get back to physics and math. So, in 1997, I resigned my commission to return to graduate school at UT Austin.

The second time through graduate school was challenging as I had two babies, both of whom were born prematurely. My husband and I worked as a team to raise our young family, and in 2001, I was anticipating graduating with my PhD in physics. I truly had no idea what I was going to do next, but again, serendipity intervened. My advisor, Dr. Greg Sitz, casually mentioned that there was a defense laboratory, Applied Research Laboratories, at UT Austin (ARL:UT; see [arlut.utexas.edu](http://arlut.utexas.edu)). This sounded great since I was interested in both national security and physics. I dropped off a resume at a career fair, without even talking to anyone. A week later, I was interviewed by Dr. Nick Chotiros, a long-time member of the Acoustical Society of America (ASA), for a job researching underwater acoustics. I had never worked in acoustics but had a long history with lasers and electromagnetic (EM) radiation. Nick told me "It's the same wave equation. You'll be fine." (It's not.) I started at ARL:UT in 2001, about a year before I finished my PhD.

I truly enjoyed my career at ARL:UT. I eventually learned the acoustic wave equation and taught underwater acoustics on the graduate level for years. I became interested in acoustic propagation in shallow water waveguides and scattering. I went on 15 at-sea tests. I loved the complex math and working with experimental equipment. I would spend hours honing a finite-element model or constructing a transducer interface. I thought that I would spend the rest of my career in research since I loved it so much. However, just as I was getting comfortable, serendipity nudged me once again.

It started with the ASA asking if I would consider running for president. I was on the Executive Council and had also served as the chair of several committees including External Affairs, Women in Acoustics, and Publishing Services. I had also served as the ASA representative to the American Institute of Physics. However, I was so sure that I would not be elected that I did not even mention that I was running for president to my laboratory director at ARL:UT. I was as shocked as anyone when I was elected to serve from 2017 to 2018. As the president, I realized that I might have some potential as a decent manager.

Then in 2018, the ARL:UT executive director, Dr. Clark Penrod, retired. One of the technical laboratory directors, Dr. Karl Fisher, took on that role, leaving a technical laboratory director job open for the Signal and Information Sciences Laboratory (SISL; see [bit.ly/3XQNBTL](http://bit.ly/3XQNBTL)). Walking by that director's office one day, I ran into a long-time colleague of mine in SISL. I mentioned that they would be soon getting a new director. He asked me if I would apply. I hadn't even considered it before that moment, but his casual (and serendipitous) comment stuck in my mind. After a few weeks of consideration, I decided to apply.

Although I was not chosen for the directorship, Karl asked me if I would take on some management duties including coordinating the ARL:UT Internal Research and Development (IR&D) program, running the laboratory-wide Task Force Ocean (TFO) project (see [tinyurl.com/2febmb63](http://tinyurl.com/2febmb63)) and interfacing with the newly stood-up Army Futures Command (AFC; see [army.mil/futures](http://army.mil/futures)) in Austin.

These new roles changed my career substantially. I went from a mostly independent researcher with a few students to coordinating dozens of IR&Ds, managing the TFO program with 25+ researchers, and establishing a new relationship for the laboratory with the army, all from the serendipitous moment of a casual question in the hall by a coworker.

Because of the IR&D program, I learned about research going on throughout the laboratory, broadening my perspective. Through the TFO community, I was invited to serve on the National Academies Ocean Studies Board and two National Academies study committees ([bit.ly/3xN1702](http://bit.ly/3xN1702)). From the AFC relationship, the laboratory established multiple new programs worth millions of dollars. Then, in 2021, the SISL director retired. I applied again and was hired as laboratory director.

Today, I still serve as the SISL Laboratory Director, a position I never imagined myself in, even six short years ago when I was confident that I would be researching underwater acoustics for the rest of my life. One of those premature babies, Grace (Isakson) Murley, is married and halfway through her MD/PhD at the University of Texas McGovern Medical School working in imaging with MD Anderson. She already has three publications.

## PATHS ARE SELDOM STRAIGHT

The other premature baby, Nicholas Isakson, now works for a major defense contractor in Dallas, Texas, as a software engineer, following in his mom's footsteps in national security. I can't wait to see where serendipity will point these wonderful young adults.

As for myself, although I always knew I wanted a career in math and science, I had no idea how that would develop. Like ray paths in underwater acoustics, the path of my life was seldom straight. I could not have predicted my career trajectory. I have no idea where serendipity will steer me next, but whatever it is, I'll be ready to face it.

### References

- Lorenz, E. (1993). *The Essence of Chaos*. University of Washington Press, Seattle, WA.
- Tuyle, G. J. V., Todosow, M., Geiger (now Isakson), M. J., Aronson, A. L., and Takahashi, H. (1993). Accelerator-driven subcritical target concept for transmutation of nuclear wastes. *Nuclear Technology* 101(1), 1-17. <https://doi.org/10.13182/NT93-A34764>.

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