

(Note. I could not do this in 200 words. Edit or discard as desired—it is a good start for my life history.)

BYU experiences

William H. Southwell. August 2025.

My BYU experience began 69 years ago in September 1956 when I enrolled as a Freshman. I graduated a year earlier from a small High School in eastern Wyoming, a class of 12 graduates. As a convert at age 15 in a small branch in Scottsbluff, Nebraska, I did not have the advantages of Primary, Scouting, or much church experience. But somehow, I felt driven by a strong desire to attend BYU. To save for BYU, I worked for a year in Denver. After graduating from Huntley High School, in a class of 12, in a farming community in eastern Wyoming, I enrolled in a BYU Freshman class of over 4000 in September 1956. It was overwhelming. That was the first of 7 years I would be a BYU student, spread over a 10-year period. But there I was, convinced that I had arrived at the greatest seat of learning in the world. Listed here are some of the ways that my BYU experience prepared me for my life in the world, hopefully to be a beacon of light to my fellow man and to glorify God.

- My English teachers were marvelous. One lesson that remained with me all these years was from one of them, Dr. Edward Hart, who said that the greatest example of maturity was Jesus on the cross saying, “Father, forgive them, for they know not what they do.”
- A creative writing class teacher, Dr. Clinton Larson, instilled in me an appreciation of poetry, especially the works of Gerard Manley Hopkins, and taught me that I can be creative.
- I attended music and theater productions. I tried to absorb all the cultural experiences I had missed. I remember the Vienna Philharmonic came to BYU. I was enthralled. They played the Blue Danube. At one point, the conductor stood straight, dropped his hands, and let the music roll on automatically, without direction, like the continual flow of the mighty river.
- I learned scholarship discipline from many teachers. I took a Book of Mormon class from Dr. Hugh Nibley, a great scholar who taught from his research note cards. On the opening day, he asked the class to give him a number between 1 and 520. He then turned to that page in the Book of Mormon and found something on that page that ancient writings have verified and that Joseph Smith could not have known.

- Devotionals. David O. McKay, J. Reuben Clark, Jr., Harold B. Lee, and many others helped me be grounded in the doctrine of the church.
- Ward Leaders. In one Ward, Stephen R. Covey was a counselor in the Bishopric. Another Ward, Truman Madsen was the Bishop.
- In my Graduate Student years, I was called to serve as second counselor to Bishop Walter D. Bowen and Gale Brimhall, first counselor, in the BYU 44th Married Students Ward. This was direct training in Priesthood Correlation that prepared me for later callings as Bishop, High Council, and Patriarch.
- I was taught a graduate class on *partial differential equations* by Dr. Harvey Fletcher, Jr., whose mathematical brilliance was an inspiration to me.
- I was taught *classical mechanics* by Dr. Richard Hales, who counseled me on which Physics graduate classes to take and when, which ultimately enabled me to obtain my PhD degree in just 3 years beyond my B.S. Degree.
- My dissertation advisors were Dr. Daniel L. Decker and Dr. Howard Van Fleet, both of whom were wise and caring people.
- I learned FORTRAN computer language when analyzing data for my BYU Physics PhD dissertation. The ability to generate theory and then model it with computer code, has been a hallmark career skill for me and has been of immense value to me throughout my professional career.

Below are some highlights from my life that were influenced by my BYU years.

- Enrolled as a Freshman at BYU 1956 Speech and Dramatic Arts major.
- Mission (Northern California) 1957-1959



Elder Southwell (right) in San Francisco 1959.

- Changed major to Physics 1960-1962
- Received BYU BS degree in Physics 1962



With wife Charis.

- NASA Ames Research Center, Optics Division at Mountain View, California, June 1962-September 1963. “We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard.” President John F. Kennedy.

- Enrolled as a Graduate Student in Physics at BYU in September 1963.
- Received a 3 year NDEA Fellowship (National Defense Education Act) to prepare Physics Professors
- Received a PhD in Physics in August 1966.
- Became Assistant Professor of Physics at the South Dakota School of Mines and Technology in September 1966 to December 1969.
- Technical Staff at Owens-Illinois Fecker Systems Division, Pittsburgh PA, from January 1970 to September 1973. Designed optics for the Air Force.
- Technical Staff at Autonetics Division of Rockwell International in Anaheim, CA 1973-1976
- Staff Scientist Rocketdyne Division of Rockwell International Laser Group 1978-1982. Developed a theory for high-energy lasers. Invented the phase shift optical coating, which enabled a concept for an *Air-borne missile defense system*. Received an award from the Rocketdyne President for this.



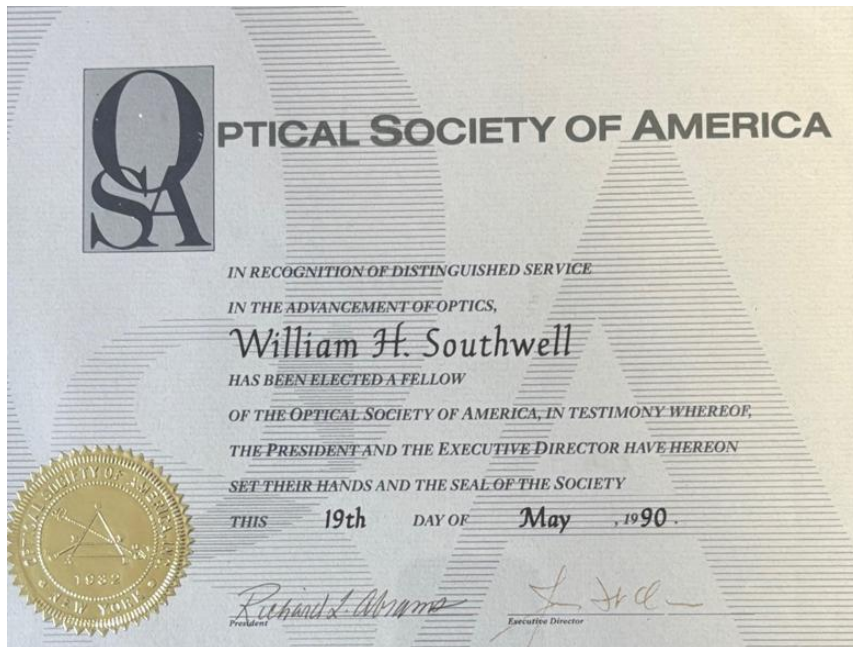
Norm Ryker President of Rocketdyne presenting award to Bill Southwell, autographed with, "Thanks, Bill for a great innovation that was conceived under great time constraints. Norm Ryker."

- The Phase-Shift coating invention has also been widely used to improve the quality of industrial *Laser Welding*.
- In 1980: Published a paper presenting the theory that was used in the first demonstration of *Adaptive Optics*, enabling ground-based telescopes to obtain clear images corrected for atmospheric turbulence. That paper has received over 1390 citations in the scientific literature.
- Technical Staff, Rockwell Science Center, 1982-1997. Worked on SDI (*Strategic Defense Initiative*, Reagan's Star Wars Project) technology that eventually led to the end of the cold war.
- Developed Sinusoidal Optical Thin Films (called *Rugates*) used to enhance or reduce reflections. Developed technology that enabled *laser eye protection* for Air Force pilots.
- Throughout his career, Dr. Southwell gave numerous presentations at professional meetings.



W. Southwell, Rockwell Science Center, photographed by W. J. Tomlinson, Bellcore, at the Annual Meeting of the Optical Society of America, October 1987.

- Was elected a Fellow of the Optical Society of America.



“IN RECOGNITION OF DISTINGUISHED SERVICE IN THE ADVANCEMENT OF OPTICS”

- Won first place in an international competition in an optical coating design contest presented at the International Symposium on Optical System Design, Berlin Germany, 1992.



Remembering the contest win 15 years later with Dr. Alfred Thelen (right), who had made the presentation, a German pioneer in Optical Coating Technology. (Since then, the design contest has been repeated every 3 years, with Dr. Southwell placing high in many of them, including second place in 2025.)

- Served a Humanitarian Mission for the Church of Jesus Christ of Latter-day Saints to Turkey, teaching English and Computers to the Turkish Parliament and other Government leaders, and in Serbia, teaching Serbian Judges, along with being Country Directors for LDS Charities (2001-2003).



Classroom of Serbian Judges.



In Turkey with wife Danna.

- Awarded a medal for technical achievements by the Air Force Research Laboratories. (2020)



Metal for technical achievement.

- Received a plaque from the United States Air Force (2022)



At the presentation: “In recognition of the many years of revolutionary contributions in the field of optical coatings. William H. Southwell has distinguished himself by his tireless dedication and exemplary service in support of the RXAP/MLPJ mission,” Walter Johnson, Air Force Scientist.

- W. H. Southwell has accumulated a substantial number of citations for his published work. According to his [Google Scholar profile](#), his citation metrics are as follows:
Total citations: Over **5,886**
Citations since 2020: 758
h-index: 32 (meaning 32 papers have at least 32 citations each)
i10-index: 58 (indicating 58 papers have at least 10 citations)
- His most cited paper, "*Wave-front estimation from wave-front slope measurements*" (JOSA, 1980), has received **1,391 citations**, and several others—especially in optical coatings and rugate filters—have hundreds of citations each.
- Dr. Southwell holds 27 Patents.