Resume: William H. Southwell

Education:

B. S.	Physics	Brigham Young University
Ph. D.	Physics	Brigham Young University

Employment History:

Professor of Physics	4 years	South Dakota School of Mines and Technology
Optical Physicist	3 years	Owens Illinois
Member Technical Staff and Staff Scientist	24 years	Rockwell International
Consultant	6 years	Table Mountain Optics

Dr. Southwell is a theorist with emphasis on numerical analysis and modeling of optical systems and light propagation. He has contributed creatively in a wide range of subjects, including least squares variance analysis and optimization techniques, phase retrieval, optical waveguide propagation, Luneburg lenses, gradient-index lenses, unstable resonator modes, telescope design, irradiance redistribution, optical interference filters, and diffractive binary optics. He is the author of the virtual source theory of unstable resonator lasers, the thin film 90° phase shift coating, a ray-tracing code to trace kinoform lenses, the quintic semi-infinite band antireflection coating, coupled wave theory for rugate filters, the digital thin-film equivalence principle and flip-flop thin-film design method (featured on the cover of Applied Optics). His work is published mostly in the Optical Society journals, where he has also served in various editorial positions.

Some of his accomplishments in rugate technology include: Rugate coupled-wave theory, software for fast single line rugate spectral evaluation, digital flip-flop thin film design, quintic antireflection design, analog rugate fabrication with rate control, broadband spectral monitor for rugate deposition, software for multi-line rugate filter design, eye-centered design, apodization to suppress sidebands, modified exponential sine waves to suppress all harmonics, error compensation monitoring for rugagte deposition, wavelet theory for rugate filter design, enhanced thin film (ETF) design methods.

He has authored hundreds of technical reports and has published over 60 papers in national journals. He holds 23 patents, most of which deal with optical thin films. Dr. Southwell was elected a Fellow of the Optical Society of America for “contributions to gradient-index coatings and other analytical and computational aspects of physical optics and thin films.”

Dr. Southwell is noted for his ability to design optical coatings with difficult spectral requirements. He was the first place winner in world coating design contest (Berlin SPIE, 1992). He was a category winner in the OIC design contest (1995).

Currently, he is the owner of Table Mountain Optics, where he performs optical modeling, design, and analysis. He has written several optical software modeling and design tools.

Publications of William H. Southwell

1. William H. Southwell and J.D. Patterson, “Green’s Function Decoupling Methods,” Bull. Amer. Phys. Soc. **12**, 903 (1967).

2. William H. Southwell, “Using Pendulums to Measure the Universal Gravitational Constant,” Amer. J. Physics **35**, 1160-1161 (1967).

3. J. D. Patterson and William H. Southwell, “Green’s Function Theory of Ferromagnetism,” Amer. J. Physics **36**, 343-350 (1968).

4. W. H. Southwell, D. L. Decker, and H. B. Van fleet, “Mossbauer Effect Measurements in Iron at High Pressures, “ Phys. Rev. **171**, 354-360 (1968).

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Patents of William H. Southwell

1. U. S. Patent No. 3,784,308. Method and apparatus for measuring index of refraction of glass disks.

2. U.S. Patent No. 3,873,208. Refractometer for measuring the refractive index of solid, liquid, or gaseous materials in cylindrical shapes or containers.

3. U.S. Patent No. 3,994,599. Method and apparatus for measuring wall thickness and concentricity of tubular glass articles.

4. U. S. Patent No. 4,312,570. High reflectivity coated mirror producing 90º phase shift.

5. U. S. Patent No. 4,536,063. Thin film transmissive phase retarder.

6. U. S. Patent No. 4,583,822. Quintic refractive index profile antireflection coatings.

7. U. S. Patent No. 4,666,250. Optical coating design using flip-flop optimization.

8. U. S. Patent No. 4,707,611. Incremental monitoring of thin films.

9. U. S. Patent No.4,756,602. Narrowband optical filter with partitioned cavity.

10. U. S. Patent No. 4,778,251. Thickness error compensation for digital gradient-index optical coatings.

11. U. S. Patent No. 4,826,267. Spectral filter with integral antireflection coating.

12. U. S. Patent No. 4,934,788. Deposition of gradient index coatings using coevaporation with rate control.

13. U. S. Patent No. 5,000,575. Method of fabricating gradient index optical films.

14. U. S. Patent No.5,100,233. Refractive index monitor for deposition of gradient-index films.

15. U. S. Patent No. 5,144,484. Binary optic lens design using flip-flop optimization.

16. U. S. Patent No. 5,181,143. Multiple line rugate filter with index clipping.

17. U. S. Patent No.5,410,431. Multi-line narrowband-pass filters.

18. U. S. Patent No. 5,425,964. Deposition of multiple layer thin films using a broadband spectral monitor.

19. U. S. Patent No. 5,559,640. Automotive rear view mirror system.

20. U. S. Patent No. 5,828,489. Narrow wavelength polarizing beamsplitter.

21. U. S. Patent No. 6,392,801. Wide-angle rugate polarizing beamsplitter.

22. U. S. Patent No. 6,400,513. Optical beam coupling of multiple wavelengths into an output channel using spatial wavefront segmentation.

23. U. S. Patent No. 6,885,504. Method for the design and fabrication of complementary optical comb filter pairs.