

ROBERT PAUL DAHLGREN

PO Box 90158
San Jose, CA 95109
+1 (408) 437-9292 office
+1 (408) 858-9491 mobile
bob.dahlgren@ieee.org

PROFILE

Engineer – Physicist – Scientist – Engineering Manager

Over 20 years of experience with optical technology, a top-performing innovator with demonstrated scientific capability for independent, directed, or directing “r&D” in emerging technologies. Proven track record for bringing products from concept to market, and for increasing revenue through innovation, new product development, and cost-reduction. Lifelong learner with highly evolved networking and interpersonal skills, and extensive contacts at all levels of the industry.

Strong theoretical, experimental, and commercial experience in multiple disciplines such as electronics, optics, fiber optics, materials, physics, acoustics, ultra-precise mechanical systems, computer control, aerospace, biomedical, guidance, and sensing. Engineering knowledge includes the architecting, engineering, prototyping, and manufacturing of complex electro-mechanical, electronic, and optical systems. Examples include gigabit/second transceivers, optical interconnect switches, optical gyroscopes, optical metrology systems, medical equipment, test instrumentation, planar lightwave circuits, and other optical devices. Knowledge of the politics and process of standards development, and how technology direction and product definition can be aligned with the evolving market landscape.

SKILL SET

- Organizational, market, technology, and business development
- Vision, pathfinding, marketing, new product development
- Management of people and programs, team building/leadership
- Startup services, technology transfer, strategy, IP development
- Researching, designing, and manufacturing of optical devices
- Researching, architecting, and manufacturing of optical system
- Designing and prototyping of ultra-precise mechanical devices
- Designing and construction of computer-controlled test systems
- Supplier, foundry, and contract manufacturing development
- Semiconductor processing, packaging, and lithography
- Modeling and simulation of complex devices and systems
- Signal integrity, DFM, DFT, rel, HALT, HASS, nuclear testing
- Electromagnetic compliance and laser regulatory issues
- Materials, cleaning, and adhesive application and quality control
- Machine shop, lab setup, optical polishing, SMT prototyping

EDUCATION

Massachusetts Institute of Technology, Cambridge, Massachusetts
Master's Degree in Aeronautics/Astronautics, 1993
San Jose State University, San Jose, California
Master's Degree in Physics, 2001
University of Minnesota, Minneapolis, Minnesota
Bachelor's Degree in Electrical Engineering, 1983

EMPLOYMENT

Silicon Valley Photonics, Ltd., San Jose, California
Senior Consulting Engineer, 1999-2003

- Formed and managed SVP Corporation to serve the training and consulting needs of the worldwide optoelectronics industry. A variety of projects were performed for over 30 clients, project details can be provided upon request. Refer to <http://www.svphotonics.com>

Transcendata, Inc., Palo Alto, California
Director of Fiber Optic R&D, 1998-1999

- Projects included R&D of multi-level modulation as applied to optical communications. Modeling of linearity, noise, and transient dynamics of lasers with respect to multi-level modulation. Establishment of evaluation lab, multi-gigabit test bed, supplier base, laser requirements, and CMOS laser driver requirements.

Fujikura Technology America Corp., Santa Clara, California
Manager of Fiber Optic R&D, 1992-1998

- Established the American R&D office and lab with the FTAC President, and conceived and developed products that led to \$25M annual revenue. Performed technology mining in Japan, product definition, coordinated prototype development, schematic, mechanical drawing, board layout, BOM, conformity, alpha-testing, schedule, cost, design reviews, and other aspects of the pre-production design.
- Developed concept, requirements and roadmap for optical transceiver, cable, and value-add business with marketing. This led to an entire product line manufactured by Tohoku Fujikura and US contract manufacturers, which was marketed and sold by Fujikura America.
- Specified, negotiated, and project managed a high-speed module tester for mass production. A third-party system integrator performed all design, programming, and construction of the tester, which performed at a rate better than one transceiver calibrated and tested every 3 minutes.
- Discovered that optical fiber cable could radiate EMI, and proposed reducing the metal content in duplex-SC connectors. This led to vastly reduced RF emissions, significant IP and a major product line (with many design wins) for the joint venture company Alcoa Fujikura, Ltd.
- Another example project was a first-principles examination of the electromagnetic emission of gigabit transceiver modules, resulting in new design rules which nearly eliminated the need for metal shielding. The modified products enjoy good competitive advantage because they meet

stringent FCC and European requirements by a wide margin, and have reduced manufacturing and parts cost.

- R&D and applications engineering for specialty fiber product line, such as polarization-preserving fiber, imaging bundle fiber, radiation-hard fiber, and erbium-doped fiber.

The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Member of the Technical Staff, Draper Fellow, 1987 -1992

- Sought and received IR&D funding averaging \$500k annually, and received multi-million dollar funding and follow-on from various NASA and DoD contracts on Fiber Optic Gyroscope (FOG) components.
- Established optical device lab and research direction, supervising four engineers, two technicians and a grad student. Constructed coil-winding machines, a 4th-generation polarization-preserving fused coupler machine, and other high-performance systems. Devices fabricated for programs included fiber-optic couplers, spliceless gyro resonators, air bearings, planar lightwave circuits, polarizers, FOG coils, and Nd:YAG microchip lasers. This department became a prolific source of patents and became a resource both laboratory-wide and beyond (MIT, Tufts, Supercollider, Micracor Inc).
- Performed radiation testing of FOG components with ⁶⁰Co (gamma-radiation), flash x-ray (high dose-rate gamma), and supercritical pulsed neutron reactor (nuclear event simulator).

Sperry Aerospace Corp. (Honeywell), Phoenix, Arizona

Scientist, Senior Scientist, 1985 -1987

- Developed processes and fixtures used in mass-production of polarization-preserving components for fiber optic gyroscopes. These are key elements in navigation systems for commercial and military applications, and are a significant source of revenue. Fixtures constructed included a principal-axis alignment, laser tapering, polishing, quadropole coil winding, gyro assembly, and “loop-closure” splicing.
- One project involved technology transfer of a fiber-fusion furnace from a sister division on the East coast. After several design iterations, a completely new approach was invented that was a major improvement in terms of lifetime and heat zone uniformity.
- Other projects included fixtures and process for polished couplers, high-performance test beds, and pigtailling and packaging of planar lightwave circuits and other optical fiber devices.

Seagate Corp. (Magnetic Peripherals) Minneapolis, Minnesota

Optical Scientist, 1983-1985

- Investigated optical metrology techniques such as interferometry, flying-height testers, and laser Doppler vibrometry for disk drive manufacturing. This involved understanding of Fourier optics, CCD imaging, data acquisition, computer programming, vibration control, air bearings, motion control, pneumatics, and diamond turning.
- Developed improved xenon light source with variable wavelength, new fringe algorithm, and other improvements for flying height testers.

- Invented and patented a flying -height tester calibration standard that was an absolute reference. This ended an interminable fight between different manufacturing plants, eliminating a major source of scrap.

Honeywell Inc., Minneapolis, Minnesota

Technician, Student Intern, 1979 -1983

- Avionics projects included ring laser gyroscope (RLG) design, processing, reliability, and root -cause analysis. Familiar with HeNe and CO₂ laser fabrication, ultrasonic diamond glass machining, polis hing, optical contact bonding, and ultra -clean processing.
- Research projects included fabrication of some of the early examples of optical fiber switches, polarizers, modulators, and single -mode couplers. These were applied to fiber-optic gyroscope, magnetometer, and hydrophone programs.
- Microlithography and photomask experience, including operation of pattern generator, step-and-repeat camera, mask inspection and rework.

TEACHING

UC Berkeley Extension School, Berkeley California

Short Course Instructor, College of Engineering

2001 – present

The Exploratorium Science Museum, San Francisco California

Volunteer-Tutor, Physics

2003 – present

PUBLICATIONS

“Lapped Polarization -Maintaining Fiber Resonator,” OFS, 1988

“Ultra-High Finesse PM Fiber Resonator,” SPIE, V1169, 1989

“Measurement of the Radiation Effects on the Refractive Index of PANDA High-Birefringence Fibers,” HEART, 1990

“Wide Dynamic Range Alignment Transfer Device,” 93rd Annual Meeting of the ACS, Symposium on Solid -State Materials, 1991

“Single -Polarization Fiber Optic Resonator for Gyro Applications,” SPIE, V1585, 1991

“Polished Coupler and Resonator Fabrication,” SPIE, V1795, 1992

“Studies in Fiber -Optic Couplers and Resonators,” MIT Thesis, 1993

“Computer-Controlled Technique for Cutting Curved Grooves in Polished Fiber-Optic Coupler Substrates,” Photonics Technology Letters, 1993

“Theoretical Comparison of Low- and High-Splitting Ratio Resonators,” SPIE, V2070, 1993

“Performance of Miniaturized Optical Fiber Interconnects Between Sensor-Embedded Composite Panels,” SPIE, V2072, 1993

“Specialty Fibers for Sensors and Sensor Components,” SPIE, V2292, 1994

“Standards-Based Transceivers Simplify Gigabit/Second Datacom Link Design,” Fiberoptic Product News, December, 1997

“Short-Wavelength Optical Transceiver using VCSEL,” Fujikura Technology Review, 1999.

“Multilevel Analog Signaling Techniques for 10 Gigabit Ethernet,” IEEE 802.3 Plenary Meeting, July 1999

“Electromagnetic Emission from ‘Dielectric’ Optical Fiber Cables,” PhoPack, 2002

“Photonic Bandgap Quasi-Crystals for Integrated WDM Devices,” SPIE, V4989, 2003

“Optical Gyroscopes: Sensing Rotation Without Moving Parts” IEEE/LEOS Santa Clara Valley Chapter, 2003

PATENTS

4,624,564	11-25-95	“Calibration Standards for Flying Height Testers”
4,883,337	11-28-89	“Low Strain Optical Fiber Coil”
4,991,922	2-12-91	“Optical Fiber Coupler and Method”
5,022,735	1-11-91	“Fiber Splice Coating System”
5,078,465	1-7-92	“Fused Coupler and Method of Alignment”
5,042,896	11-27-91	“Polarization Device”
5,170,450	12-8-92	“Dual-Core Fiber Launching Coupler”
5,166,940	11-2-92	“Fiber Laser and Method of Making Same”
575,319*	10-8-92	“Fused PM Fiber Single-Polarization Resonator”

*Patent allowed, but is currently classified, subject to DoD secrecy order.

APPOINTMENTS

Optical Device Engineering Corporation – Advisory Board, 2001-2003
Silicon Valley Photonics, Ltd. – Board Member, 2001-2003
Optical Society of Northern California – Board Member, 2003
Fiber Channel Association – Organizing Committee, 1993
EIA/TIA – Working group 6.9.3 chairman, 1991 -1993
US Air Force – US Air Force Fiber Optic Gyro IRB, 1992 (selected)
US Army – US Army Avionics Hardness TIWG Committee, 1990-1991

CLEARANCE

DoD “Secret” level (1980)
Vetted by high-net-worth individuals (2001)

AFFILIATIONS

ASPE – Member
IEEE – Senior Member
LEOS – Senior Member
IEE (UK) – Member
OSA – Member
SPIE – Member

VOLUNTEERING

The Exploratorium – Tutor
MIT – MITCNC Telecom Panel Committee
“Sciencepalooza” – Science fair judge
San Jose City College – Laser Technology Advisory Committee
“Optics-Ed” – Founder, interim chair, organizing, steering committees
IEEE – Kindergarten-College outreach committee
IEEE – Standards Committees 802.3 (Optical Ethernet)
IEEE – Gyroscope Advisory Board (GAB)
CPMT – Program committees, conference technical co-chair
LEOS – Annual meeting, program committees
LEOS Santa Clara Valley – Secretary, Vice-Chairman, Chairman
LEOS Boston Chapter – Secretary, Vice-Chairman
OSA – Reviewer JOSA, JLWT, Photonics Technology Letters
OSA – Local chapter Optical Society of Northern California
SPIE – Conference Co-chairman, technical program committees
SPIE – Fiber Optics, Biomedical, Homeland Security working groups

AWARDS

2000 – IEEE “3rd Millennium” Award
1996 – Fujikura “Exemplary Engineering” Award
1990 – Two of my technicians received “Draper Recognition” Awards
1986 – Sperry “Inventor’s Award” for fused coupler furnace
1982 – Honeywell “Special Achievement” Award