

# FRED BUSHROE

Tel: 520-881-6007

Fax: 866-270-0446

info@inov.com

Tucson, Az

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## SPECIALIZED SKILLS

Optical Product Design & Development

Optical Systems: Imaging, Illumination, Laser

Project Management & Optical Facility Set-up

Opto-Mechanical Systems for Production

Mechanical Design and CAD Modeling

Optical Recovery Strategies

## EXPERIENCE

**INOV, Inc.**, 1992-Present, President. Optical Product and System Development, Project Management & Opto-Mechanical Engineering: Opto-mechanical design for laser marking system head; applies bar-code matrix to cell phone displays in production. Developed stereoscopic eyeglass mounted loupes for surgeons; set a new industry standard; included automated production assembly machines resulting in unprecedented customer satisfaction and comfort. Developed ultra-light head worn fiber optic medical illuminator. Designed a quick-release handle & system for fiber optic lit dental mirrors. Designed and fabricated a stereo mini-video display for M.R.I. brain imaging. Developed automated systems and manual tooling for production. Provided on site production / assembly training. Many other projects in: machine vision, entertainment, mining, illumination, and precision laser scanning, software and business.

**Optical Device Engineering Corporation**, 4/01-11/04, Company Founder and Director of R&D and Strategic Development. Developed key intellectual property, recruited key talent, and co-invented the world's first vibration insensitive Fizeau interferometer for ultra precision optical 3D metrology. Sold systems to Kodak, Raytheon & others. ODEC was sold in November of 2004 to a partner company, and systems are successfully being manufactured and sold to fabricators of ultra precision optical systems.

**Chorum Technologies Inc.**, 4/00-4/01, Division Founder and Senior Engineering Manager. Recruited key talent and founded a Packaging and Automation division, of 23 (12 engineers); \$3 Million annual budget. Under my direction, our team completed an aggressive six-month opto-mechanical design milestone in 4.5 months. Managed successful opto-mechanical tolerancing, design, and hermetic packaging of miniature free-space fiber optic components to Belcore GR1221 specs. Team built automated stations for volume: fiber device assembly, packaging, laser welding, and automated testing. Implemented production processes, including seam sealing, inductive soldering, leak testing and novel automated opto-mechanical component tests.

**Walt Disney Imagineering**, Projection Development Contract, Glendale, CA., 3/91-8/92, Invented laser diffraction alignment tool for projection (Pat.5257051), now an industry std. Designed optics for interactive rides. Gave robots a face w/ fiber optic imaging system. Creative proposals funded for \$90,000.

**Hi-Shear Technology Corp.**, Torrance, CA., 3/90-10/90, Laser Engineering Contract. Optimized laser diode coupling into optical fibers, and developed process optimization (Taguchi) experiments.

**Optical Data Storage Center**, Optical Sciences Center, U. of A., Tucson, Az., 9/88-12/89, R&D funded by IBM, Kodak, Hewlett-Packard. Designed & fabricated a polarization head for an optical disk test system. Design included polarization optics, laser diode & detection optics, mounting and precision alignment.

**Hewlett - Packard Labs**, Storage Technologies Department, Palo Alto, CA., 6/88-9/88, Planned the construction of the above computer controlled optical disk test system; built at Optical Sciences Center.

**Fiber Optics Lab**, Optical Sciences Center, U. of A., Tucson, Az., 8/87-6/88, Designed and modeled a fiber optic fuel level sensor for jet aircraft fuel tanks. Set up a hands-on educational fiber optics laboratory for Masters and Ph.D. students.

**Infrared CCD and Detector Laboratory**, Optical Sciences Center, 9/85-6/87, U. of A., Programmed an infra-red CCD tester. Developed a piezoelectric nanometer-positioner for a scanning tunneling microscope.

**Diagnostic Imaging Laboratory**, Optical Sciences Center, U. of A., 5/85-9/86, Executed experiments to count single photon events. Programmed experiment interface software and Image processing software.

## **EDUCATION**

**M.S. OPTICAL SCIENCES**, Optical Sciences Center, University of Arizona, Graduated 1989.

**B.S. in ELECTRICAL ENGINEERING**, Graduated Magna Cum Laude, University of Arizona, 1987.

- Chairman IEEE, 1985, 175 members “Most active student chapter ever under Bushroe” -E.E. Dept. Head.
- Arizona-Mexico Commission, 1987, visited & studied U.S. manufacturing companies in Mexico.

**Languages:** English, Spoken Portuguese.

**Professional Societies:** Optical Engineering Society: SPIE, Optical Society of America: OSA.

### **Invited Speaker:**

Semicon West 2001, San Jose, Photonic Packaging Symposium,  
Title: **Automation Options for Photonic Component Manufacturers.**

IEEE PhoPack2002, Stanford University, Photonic Devices & Systems Packaging Symposium,  
Title: **Getting Light In and Out of your Hermetic Photonic Package.**

### **US Patents:**

Inventor, Eleven Patents: six issued, five pending.