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Headline:

High performance technology leader seeking opportunities in advanced & emerging commercial technologies and products

Précis:

Over 30 years of broad, creative, product focused technical expertise, ranging from quantum optics and solid state physics to electrical, mechanical and opto-mechanical systems engineering, augments experience in product management, technology portfolio management, and motivational group and team leadership in large and small companies, to drive projects and organizations to achieve aggressive business goals.

Building on my Engineering Physics background, I have practical competence in multiple technology arenas. This, combined with a focus on system performance and optimization and strong analytical skills, has enabled rapid innovative contributions across markets and segments.

Past areas of direct experience include:

- optical component design, process integration, characterisation, and packaging
- optical instrumentation development
- optical communications systems and components characteristics and usage
- advanced materials research
- biomedical instrumentation
- image processing and analysis
- solar energy systems
- intellectual property
- building, mentoring and leading cross disciplinary teams
- operating in a medically regulated business environment
- analysis of user requirements and conversion to product definition
- high performance within early phase startups

I bring the ability, based on deep technical experience, physical insight, and a systems approach to customers and markets, to couple nascent market requirements to appropriate technology platforms, and to do and steer the research and development needed to bring those products to market.

> Most recent positions: Annidis Corporation

Director of Product Research, Director of Product Development, System Engineer, Technical Product Manager, IP manager at Annidis Corporation in Ottawa (9 years - some overlapping responsibilities)

Primary Annidis product: The Annidis RHA2020 Multi-spectral Digital Ophthalmoscope

- An electro-opto-mechanical system for 'remote sensing' of pathology in the human retina using multi-spectral imaging.
- Operated via software/robotics and designed for remote support, upgrades, and back-up data transfer.
- Utilizes multiple LED light sources and CCD pan-chromatic camera
- Automatically acquires single field MSI and auto-fluorescence images, dual field stereo images and multi-field stitched mosaic images
- Unique attributes of the instrument allow faster and more obvious identification of retinal anomalies, especially subtle features, requiring monitoring or follow-up

Position responsibilities:

Research:

- New products and features, from concept to hand off to formal product development
- Exploration of new components for existing products
- (recently) Leading clinical research

Product Development:
- Implementation of new features for manufactured products
- Second stage research activities
- Development tracking and tracing processes

Systems Engineer:
- Cross platform technical direction
- Product expert & third-line customer support and troubleshooting
- Manufacturing process development
- Light safety assurance

Technical Product Manager:
- Instrument features and operation
- Technical marketing
- Regulatory support
- Product Safety analysis and process
- In-field performance analysis and improvement proposals

Intellectual Property Manager:
- Maintained patent portfolio, including decisions on filing, abandonment, etc.

> Career Vignettes

Technical:

Bell Northern Research: Phase-locked diode laser array targeting inter-satellite free-space optical communications.
- Lead investigator on an externally funded contract
- Designed all aspects of the 8 element device
- Created novel instrumentation for controlling and characterising operation
- Developed a real-time multi-element spectral tuning instrumentation system.

Bell Northern Research: Automated Electro-Optical sampling system for probing 2-10 Gb/s *internal* electrical signals in MSI GaAs circuits at wafer level prior to dicing and packaging.
- Designed and implemented the full opto-electro-mechanical system from conception to operation with custom optics on a commercial probe station
- Key system parameters: ~10 mV system sensitivity @ <20 ps rise times
- gain switched diode laser probe triggered from timing pattern
- very low noise electronic amplification
- SW control and display
- Invented and patented a novel dynamic referencing system to remove offsets and drift.

>> Spin-off value: GaAs wafer characterisation tool for low variability GaAs-FETs
- Noted the variations in the static birefringent micro-structure of GaAs substrates
- Correlated that with threshold voltage variation and with GaAs boule growth technology.
- Technique led to a screening method for qualifying suppliers and crystal growth processes
- Scientific paper published

Nortel: Monolithically optically pumped high power diode laser
- Design separates optical requirements for stable, low loss, large area optical modes from the electronic requirements for efficient conversion of current to photons
- reduces the effect of thermal gradients on the optical mode
- Awarded US patent

Nortel: Nortel Advanced Optical Integration initiative
- Instigated and led an 'optical wire bonds' research project

- Systems analysis of semiconductor optics assembly/packaging, available component technologies, yield and test requirements, expected product offerings, and electrical analog benchmarks identified the approach as optimum
- Identified required optical, mechanical and tooling requirements for flexible hybrid integration
- Investigated approaches and generated prototypes
- Technical paper published

Annidis: Improved imaging process for imaging through ocular lens implants
- Conceived of, and managed product implementation of a new software based semi-automatic method of acquiring retinal images with the Annidis RHA
- Reduced the difficulty of imaging patients with post-cataract artificial lenses
- Resulted in simpler, more reproducible process for operators
- Improved image quality for doctors' evaluations

Annidis: Improved instrument ease of use and final image quality
- Identified, through on-site customer visits, image analysis, knowledge of eye physiology, and analysis of the optical system, the human interface and optical shortcomings in the RHA which hampered an operator's ability to capture high quality images.
- Drove rapid improvements through automated eye tracking during image acquisition
- Identified modest hardware changes and significant software changes to enable
- Developed improved imaging process flow and GUI layout for (typically non-technical) operators
- Resulted in dramatically improved and reproducible results and customer satisfaction

Consulting (Clayton & associates):

Patent infringement investigation:
- Research and analysis involving reverse engineering patents and marketing materials
- Investigations and evidence production on hardware purchased for defence/offense

Technical Market evaluation:
- Investigated market opportunities for a patented novel multi-computer interconnection network topology
- Investigated market for confidential photonic bandgap/nanotechnology concept

Industry Organisations:

MIT Communication Technology Roadmap:
- Co-editor of the III-V Integration Technology chapter for Phase I of the MIT Communications Technology Roadmap (CTR-I).
- Contributing editor of the Integration, Packaging and Interconnection chapter of CTR-II

2007 iNEMI Roadmap
- Contributing editor of the Opto-electronics chapter
- Coordinated and chaired cross disciplinary teleconferences for data acquisition and analysis

Research Proposals:
- Generated a successful grant/programme proposal and programme definition for an advanced solar energy research combining universities, research institutes and commercial companies

General technology consulting:
- Optical, opto-electronic, optical communications, and general technology consulting for VC companies or partners.

Intellectual Property evaluation:
- Patent evaluation for various clients (confidential)

Business & Organization Roles:

Technology Management:

Nortel: Technology portfolio management for Nortel High Performance Optical Components group
- Responsible for the core technology roadmap, process integration

- Explored new markets for the technology platform
- Marketed the technical capability and roadmap to large key customers

InVisage: Build start-up infrastructure from scratch
- As VP of Advanced Materials (employee #1) of a new venture backed start-up I was responsible for transitioning a nascent technology from university labs to a commercial company, while continuing research progress in the university. I took it from one office of one person to 2 labs with processing equipment and staff of 12 while maintaining progress on delivering key milestones.

Annidis: NSBRI/NASA advanced technology award
- Successful NASA/NSBRI competition presentation of Annidis technology for application to neuro-optic pathology for crews in long duration space flight. Initial phase is medical study to establish efficacy for RHA on terrestrial models. Target outcome is a miniaturized version of the Annidis RHA for deployment in long duration missions

Annidis: Product management & Technical Marketing for the Annidis RHA
- Drove improvements to the definition of the required feature set for the instrument through:
  - use case analysis
  - customer site experience
  - discussions with users and potential customers
- Used the same feedback, combined with industry analysis and consultations with highly regarded industry leaders to develop value propositions and corresponding technical marketing materials for initial sales activities.

Annidis: FDA 510(k) process
- Core member of the successful 510(k) FDA submission
- Developed in-house processes to manage post-certification changes to document continued compliance with the initial certification
- Developed multiple quality improvement processes and corresponding documentation to enhance ISO13485 mandated traceability of deployed instruments

M&A:

Nortel: CoreTek Acquisition (Boston)
- Main technical consultant on the technology and technical status of the company's unique tuneable laser technology and processing methods

Nortel: Divestiture of the High Performance Optical Components (HPOCS) group
- Made presentations to potential purchasing company teams, and was responsible for providing deep technical answers to technology questions.
- Was the HPOCS representative in the negotiation of patent splitting between Nortel and HPOCS in preparation for the sale of HPOCS (required to help set the value of the HPOCS divestiture)

Team leadership:

Nortel: 980 nm diode laser project
- Technical lead with overall responsibility for the project and team developing a high power diode lasers for fiber amplifiers.
  - The team consisted of scientific staff (PhD & MSc), lab operators, and external resources covering all required functions from materials and device design through to performance and reliability verification.
- Specific responsibilities in device design, process integration, and test and measurement
  - Developed appropriate relationships with the larger organisation to facilitate progress

Nortel: Research effectiveness
- As a technical manager I identified bottlenecks in the organization of the two device R&D groups that conflicted with key (telecom-bubble) group goals
  - enhancing employee satisfaction/retention
  - mentoring new employees

  - maintaining product requirement/performance oversight
  - maintaining or reducing new product introduction cycles
- Proposed, in conjunction with the other technical manager, and received senior management approval to restructure:
  - merge our teams under a professional 'people manager' for HR purposes
  - we two technical managers focus on the technical delivery aspects
- This resulted in highly improved employee satisfaction, improved R&D quality and requirements matching, and more rapid development

InVisage: Building the team

- While outfitting the company facilities I recruited 8 staff and built a tight goal oriented team which was rapidly able to transfer in the university technology and achieve significant progress within 10 months.

Annidis: Improving effectiveness

- After becoming responsible for product development, I identified the organisational issues in the software development process which had led to poor SW quality and slow development. I identified an improved software development model which resulted in significantly improved velocity and quality.

> Distinctions, Affiliations and Publications:

Nortel "Top Talent"	2000
5 granted patents, 11 peer reviewed publications	
6 industry Panels and Working Groups, 14 conference & invited presentations	
Contributing member of the MIT Microphotonics Consortium	2002–2010
Editorial Advisory Board member	2005/2006, 2008/2010
Contributing editor: Photonic Interconnect, Packaging, Integration & Test	2009
Chapter co-author: III-V Integration	2005
Editor/author: iNEMI 2007 Technology Roadmap - Optoelectronics	2006
Member of the Board of the Canadian Photonics Consortium	2003 – 2005
Executive Committee	2004 – 2005
Member of the Technical Committee, IPRA 2005	2005
Prime on Nortel/NRC 'Solid State Optical Consortium'	1996 – 1998
BASc (Engineering Physics), University of British Columbia	1981