Randy Park, B.Sc., M.Eng.

Professional Accomplishments

Randy Park has worked in the field of high technology for over three decades. Beginning with fiber optics communications, he designed, assisted, and supervised the design of several pieces of world-first fiber optics equipment. These include the first PC-based Optical Time Domain Reflectometer, a cutoff wavelength measurement system, high speed light sources and detectors, an electronic rotational speed monitor, signal acquisition and averaging systems, and several types of fiber communications equipment.

Randy has presented dozens of seminars and workshops on fiber optics to audiences including fiber installation personnel, manufacturing associates, engineers, and executives. One of his strengths is the ability to express complex topics in language and concepts appropriate to his audiences. His interest and skill in presenting led him to develop his "Thinking for Results" and "Decision Advancement" programs which help people identify assumptions, solve problems, and deal with uncertainty and complexity in a wide variety of situations.

Randy is excellent at seeing big picture situations, integrating his broad knowledge of technology with his understanding of how people make decisions to provide guidance on what people are likely to embrace.

Please see the chart of accomplishments and Appendices for more details on these accomplishments.

Current Activities

Randy has continued to provide technology consulting and design services throughout his career. Having worked in and followed a wide range of technologies since high school, Randy is extremely technology and computer savvy. He has programmed in assembly language, Microchip microcontrollers, Java, Basic, flash animations, HTML, web site programming, and other languages. In addition to Microsoft Office, he has used Wordperfect suite, the CorelDraw suite of graphics programs, AutoCAD, and many other specialized programs.

In addition to technology work, in 2002 Randy created Decision Advancement, an approach which helps individuals in organizations master their thinking, decision making, problem solving, and communication skills. A professional speaker and facilitator, Randy has spoken to and facilitated groups from four to four hundred. A particular strength is his ability to connect with a wide range of participant backgrounds. Randy is the author of the books "Thinking for Results - Success Strategies" and "The Prediction Trap - and how to avoid it."

Randy's scientific training and approaches come into play in his analysis of organizational processes and systems. He has carried out process mapping, capturing both the conspicuous work and communications flow as well as the underlying (often unconscious) acts people carry out which they often forget to mention. His systems analysis skills and experience with product design and manufacturing help him create models which help organizations tackle manufacturability, resource constraints, and capacity challenges.

As a business owner for over 25 years, Randy has handled the challenge of managing complex projects, in both technology and in training and development. He works well with both clients and other facilitators, having co-facilitated numerous programs over the years.

Professional Associations

Randy is a member of the Institute of Electrical and Electronic Engineers, the System Dynamics Society, and the Canadian Association of Professional Speakers.

University Education

Degree:	**Master of Engineering**, 1981	McMaster University
Major:	Engineering Physics	Hamilton, Ontario
Degree:	**Bachelor of Science**, 1979	Simon Fraser University
Major:	Physics, Honours First Class	Burnaby, British Columbia
Minor:	Mathematics	

Career History

President — **1986 to present**
LIGHTGUIDE SYSTEMS INC. — TORONTO, ONTARIO

Randy Park started Lightguide Systems Inc. in 1986 to provide custom fiber optics design, training, consulting, testing, and installation assistance. He has provided custom equipment design, advice on communications systems, contract R&D support, and delivered presentations on fibre optics in many cities, for a wide range of clients, at many different skill levels. He also successfully designed and delivered several test systems which used microprocessors, analog/digital signal acquisition, computer interface/display, and other leading edge technologies.

Principal — **2002 to present**
DECISION ADVANCEMENT / THINKING FOR RESULTS — TORONTO, ONTARIO

Randy first delivered "Thinking for Results" presentations in 2002. Since then has written two books on thinking and decision making and developed a wide range of programs. He has spoken to hundreds of groups and thousands of people across Canada and the U.S. as well as in Turkey and via video conference in Czech Republic and India.

Vice President, Technical; Research Scientist — **1982 to 1986**
OPTO-ELECTRONICS INC. — OAKVILLE, ONTARIO

At Opto-Electronics, Randy was responsible for managing teams of two to five scientists and technicians. He performed scientific research and product design, leading and/or initiating several new products.

Contact information

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Randy Park - Chart of major accomplishments

Technology

- **Technology Research, Design, & Development**
  - **Masters of Engineering, fiber optics specialty**
    - Semiconductor Diode Laser Dynamics
      - Masters project
      (see Appendix 1)
    - Optical Time Domain Reflectometry
      - Masters project
      (see Appendix 2)
  - **Fiber optic subsystems**
    - Electro-optic streak camera
      - research and demonstration of LiNbO3 optical deflection streak camera (see Appendix 3)
    - Amplified Photodiode System
      -used microwave amplifier modules to electrically amplify ns signals, fiber or lens input
    - Photon Counting Detection
      - initially 850 nm, later 1300/1550 nm
      (see Appendix 4)
    - Tuneable Erbium fiber laser
      - typically 30 nm tuning range in C-band or L-band
      (see Appendix 5)
  - **Test equipment**
    - Signal Enhancer
      - microprocessor based signal averager interfaced with sampling oscilloscope to extract low level signals from noise
    - Picosecond Fiber Optic System
      - modular sources and detectors for fiber testing: led the design and development of this system
    - MM8 Multimode OTDR
      - World's first PC based OTDR
      (see Appendix 6)
    - Single mode cutoff measurement
      - PC interface spectrometer system to measure cutoff wavelength in single mode fibers
      (see Appendix 7)
    - Spin Pit Monitoring System
      - monitors speed of rotating aircraft parts during test, raises alarm if speed goes out of desired range

- Communications
  - Multichannel analog communications - to transmit sensor signals within aerospace manufacturing facility (see Appendix 8)
  - Fiber optics communications design of Freeway Traffic Management System in Toronto, including novel passive optical bus configuration
  - Various short distance, baseband multimode communications systems (video, data, voice)
- Other
  - Prototype microcontroller (PIC) optical reader for transit passes

Fiber Optics Test and Installation work

- Field Testing
  - OTDR testing of single mode and multimode cables and systems
  - Loss testing of single mode and multimode cables and systems
  - Chromatic dispersion testing of single mode fibers
- Fiber installation
  - Lab and field installation of single and multimode fiber connectors
  - Lab and field fusion and mechanical splicing of single, multimode fibers

Fiber Optics Training

- Installers, technicians
  - ½ day to 2 day courses on splicing, connectorization, and/or testing
- Engineers
  - ½ day to 3 day courses on fiber system design: loss budget, dispersion (modal, chromatic, PMD), optical amplifiers, WDM, physical design and testing
- Manufacturing
  - designed and delivered custom ½ day hands-on courses on fiber preparation, splicing, fiber handling, and connector cleaning for Celestica. Delivered to hundreds of employees in dozens of sessions.
- OTDR Simulator
  - designed and programmed a software OTDR simulator for education purposes. Runs on a PC and simulates events, traces, and operation of an OTDR

Organizational Improvement

- Thinking, Decision Making
  - Seminars and workshops delivered to hundreds of people on thinking, decision making, assumptions, problem solving
  - Presented dozens of keynote speeches
  - Published two books: *Thinking for Results - Success Strategies*, and *The Prediction Trap and how to avoid it*
- Communications
  - Seminars and workshops on inter personal communications and presentation skills
- Systems Thinking
  - Workshops on systems thinking: big picture, identifying boundaries, visual tools, thinking things through, consequences
  - System Dynamics analysis: developed and presented a model to examine factors that lead to success of an association
  - Scenario Exploration/Planning: approaches to deal with uncertainties for the future
  - Process Mapping: facilitation of employees identifying current process steps; mapping these steps for analysis of ways to improve

Appendices - Details on selected projects

Appendix 1: Semiconductor Diode Laser Dynamics (Masters project)

This was the on campus research project requirement for the Masters of Engineering degree. The project studied the dynamic properties of semiconductor diode lasers including measuring optical output pulses when driven by various electrical pulses as well as investigating the effect of optical feedback from an external cavity. It required knowledge of electrical and optical properties of laser diodes, ultrafast electronic drive circuits, microstrip transmission line design, avalanche transistor electronic pulsers, and impedance matching to laser diodes. It also involved aligning the laser diode with external optics such as microscope objectives and mirrors on an optical table.

Appendix 2: Optical Time Domain Reflectometry (Masters project)

This was the off-campus research project requirement for the Masters of Engineering degree. It was a theoretical and experimental study of optical time domain reflectometry techniques applied to fiber-optic systems. Rayleigh back scattering coefficients were calculated for multimode and single mode fibers. Modal and waveguide dispersion calculations were carried out to determine the possibility of measuring dispersion using an OTDR system. A high-speed laser diode pulse system was developed to produce the short and powerful light pulses necessary for the OTDR.

Appendix 3: Electro-optic Streak Camera (employee at Opto-Electronics Inc.)

This was a proof of concept research project carried out at Opto-Electronics Inc. in Oakville, Canada and funded by the National Research Council. The concept was to deflect a high-speed optical pulse across a photodiode array such that very short duration light pulses could be measured by relatively slow photodetectors. The key component was an optical deflector constructed from a 500 µ thick piece of LiNbO3 with aluminum electrodes deposited on the top of and the bottom of the crystals and driven by a fast, high-voltage electrical signal. A first generation prototype was demonstrated and delivered to the National Research Council.

Appendix 4: Photon Counting Detection (employee at Opto-Electronics Inc.)

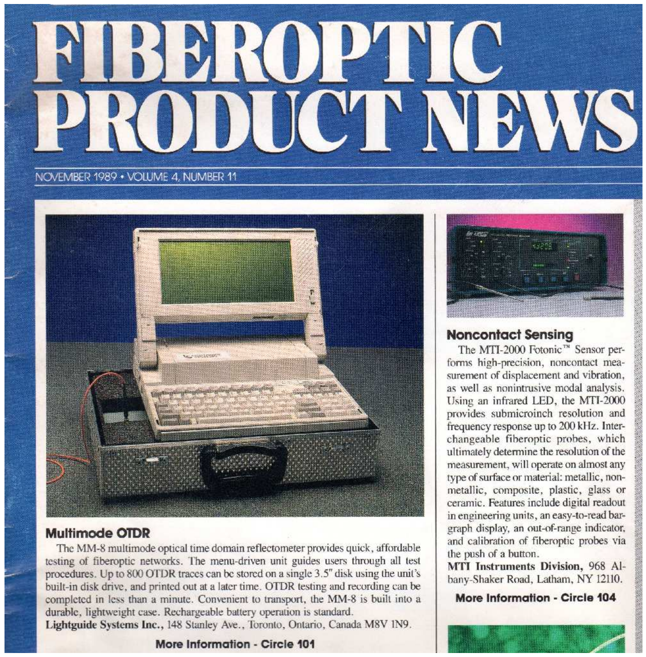
Several of Opto-Electronics Inc.'s fiber optics products were used in high-speed optical time domain reflectometry. In order to improve the sensitivity of the optical detection, a photon counting detection system was developed. The initial work used silicon avalanche photodiodes operated in the Geiger mode by raising their bias voltage above the normal breakdown voltage. This was done using a combination of a d.c. bias voltage just below breakdown and adding a synchronous high-speed gating pulse to the d.c. voltage to bias the photodiode above breakdown voltage. This pulse approach served to gate the detection to the time region of interest and simultaneously keep the dark count low.

Appendix 5: Wavelength Tunable Erbium Fiber Laser (contract to Opto-Electronics Inc.)

Again as an enhancement to Opto-Electronics Inc.'s high-resolution OTDR systems, a need for a wavelength tunable OTDR was identified. Randy was the lead designer and developer of a triggerable, short light pulse, wavelength tunable, Erbium fiber based pulsed laser. The system used commercial LiNbO3 fiber-optic modulators to initiate and gait an optical pulse which circulated around an amplifying loop. A microprocessor was used to measure output pulses and control bias voltages, wavelength tuning and display, and an optical polarization controller to achieve optimum performance.

Appendix 6: MM8 PC-based Multimode OTDR (Lightguide Systems Inc.)

Soon after Randy started Lightguide Systems Inc., and was involved in the installation and testing of fiber-optic local area and communication systems, he recognized the need for an affordable, short distance OTDR. This was also around the time when the first laptop computers were developed. Having designed several pieces of test equipment in the past, he recognized that often the most expensive and design intensive portion of an instrument was the user interface and display. He saw the potential for using a PC as the basis for the input, data processing, and output. He designed the optics, optoelectronic interfaces, and electronics to create a module which interfaced with a laptop computer and became the world's first PC-based OTDR (see photo.)



FIBEROPTIC PRODUCT NEWS

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Multimode OTDR

The MM-8 multimode optical time domain reflectometer provides quick, affordable testing of fiberoptic networks. The menu-driven unit guides users through all test procedures. Up to 800 OTDR traces can be stored on a single 3.5″ disk using the unit's built-in disk drive, and printed out at a later time. OTDR testing and recording can be completed in less than a minute. Convenient to transport, the MM-8 is built into a durable, lightweight case. Rechargeable battery operation is standard.
Lightguide Systems Inc., 148 Stanley Ave., Toronto, Ontario, Canada M8V 1N9.

More Information - Circle 101

Noncontact Sensing

The MTI-2000 Fotonic™ Sensor performs high-precision, noncontact measurement of displacement and vibration, as well as nonintrusive modal analysis. Using an infrared LED, the MTI-2000 provides submicroinch resolution and frequency response up to 200 kHz. Interchangeable fiberoptic probes, which ultimately determine the resolution of the measurement, will operate on almost any type of surface or material: metallic, nonmetallic, composite, plastic, glass or ceramic. Features include digital readout in engineering units, an easy-to-read bargraph display, an out-of-range indicator, and calibration of fiberoptic probes via the push of a button.
MTI Instruments Division, 968 Albany-Shaker Road, Latham, NY 12110.

More Information - Circle 104

Appendix 7: Single Mode Cutoff Wavelength Measurement System (Lightguide Systems Inc.)

In response to a request from a longtime consulting client, Kinectrics, Randy developed a single mode cutoff wavelength measurement system. Like the MM8, this used a computer for the data acquisition, processing, and display. Randy designed a grading based spectrometer system with a high-intensity halogen light bulb as the broadband light source and an optical chopper to filter out noise and increase sensitivity.

Appendix 8: Multichannel Analog Communications System (Lightguide Systems Inc.)

This system was designed for Pratt and Whitney Canada. The requirement was to transmit analog signals of 0 to 1 V amplitude and 0 to 40 kHz frequency over moderate distances from jet engine test cells to a central recording location. Previously, the signals had been transmitted using coaxial cable, which required frequency compensation depending on the length of the cable. The systems also required frequent calibration. The fiber-optic system developed used one channel per fiber (since Pratt & Whitney had already installed multiple fiber cables) and 16 bit analog to digital conversion for transmission over the fiber. The client was very pleased with this product; the final product exceeded the initial specifications and the client commented that it never required adjustment at the annual calibration interval.