CURRICULUM VITAE of ALEX VITKIN

EDUCATION and TRAINING	DEGREE	YEAR(s)	FIELD OF STUDY
Ontario Cancer Institute, Canada	Post doctorate	1994-1996	Clinical Physics Residency
McMaster University, Hamilton, Canada / Harvard U, USA	Ph.D.	1990-1994	Medical Physics
University of Toronto, Canada	M.A.Sc.	1988-1990	Mechanical Engineering
Queen's University, Kingston, Canada	B.A.Sc.	1981-1985	Engineering Physics

POSITIONS & HONORS

Positions and Employment

2007-present	Full Professor, Departments of Medical Biophysics and Radiation Oncology, University of Toronto, Canada
2004-present	Senior Scientist, Division of BioPhysics and BioImaging, Ontario Cancer Institute, Toronto, Canada
2002-2006	Associate Professor, Departments of Medical Biophysics and Radiation Oncology, University of Toronto, Canada
1997-present	Radiation Physicist, Radiation Oncology Physics, Princess Margaret Hospital, Toronto, Canada
1997-2003	Director, Radiation Physics Residency Program, Princess Margaret Hospital, Toronto, Canada
1996-2001	Assistant Professor, Dept of Medical Biophysics, University of Toronto, Canada
1996-2004	Staff Research Scientist, Ontario Cancer Institute / University Health Network, Toronto, Canada
1994-1997	Resident, Radiation Oncology Physics, Princess Margaret Hospital, Toronto, Canada
1990-1994	Visiting Researcher, Wellman Laboratories of Photomedicine, Massachusetts General Hospital, Boston, USA
1985-1988	Staff Scientist, Physics + Engineering, Xerox Research Centre of Canada, Toronto, Canada

Awards and Honours

2017	Publication Impact Prize in Medical Physics, Canadian Organization of Medical Physicists (COMP), Ottawa, Canada
2013, 2008	Research Productivity Award in Radiation Medicine, Princess Margaret Hospital, Toronto, Canada
2012-present	Visiting Professorship / Mega-Grant Leading Scientist, Nizhny Novgorod Medical Academy, Nizhny Novgorod, Russia
2012-present	Fellow, Society for Photo-optical Instrumentation Engineers (SPIE)
2011-present	Fellow, Optical Society of America (OSA)
2009-present	Visiting Professorship, Department of Physics, University of Cyprus, Nicosia, Cyprus
2007-present	International Visiting Lecturer, SPIE (Bellingham, WA, USA) and OSA (Washington, DC, USA)
2003-8	Premier's Research Excellence Award, Province of Ontario, Toronto, Canada
2007	Guest Faculty, CePOF Biophotonics Summer School, Universidade de Sao Paolo at San Carlos, Brazil
2005	Guest Faculty, International Photonics School, Inst. Nacional de Astrofisica, Optica y Electronica, Puebla, Mexico
1990-4	Centennial Scholarship, McMaster University, Hamilton, Canada
1992-4	National Cancer Institute (Canada) Steve Fonyo PhD Studentship, McMaster University, Hamilton, Canada
1992	Medical Research Council of Canada PhD Scholarship, McMaster University, Hamilton, Canada
1991-2	Natural Sciences Engineering Research Council, PhD Scholarship, McMaster University, Hamilton, Canada

Research Grants – study sections, panels, site visits, reviews

- Canadian Institutes of Health Research, Medical Physics and Imaging – panel member (2007 –)
- National Institutes of Health: NCI, NIBIB, NIDDK and NCRR – panelist on study sections (since 2004, ~20 in the last 5 years)
- Natural Sciences and Engineering Research Council of Canada, Global Partnerships Program – panel member (2005 –)
- Center for Integration of Medicine & Innovative Technology (CIMIT) – annual site visitor and panellist (Boston, MA, USA; 2005 –)
- Dutch Health R&D Council ZonMW – international advisory panellist / site visitor (The Hague, Netherlands – 2010, 2016)
- MIT Laser Biomedical Research Center – P41 site visitor (Boston, MA, USA – 2006, 2011, 2017)
- UBC / BCCA Molecular Imaging program – P01 site visitor and external advisor (Vancouver, BC, Canada, 2011 –)
- COMP-CAP Kirkby Medal Selections Committee (Ottawa, ON, Canada, 2017 --)
- Canada Foundation for Innovation (Ottawa, ON, Canada) • Michael Smith Foundation for Health Research (Vancouver, BC, Canada) • Alberta Heritage Foundation for Medical Research (Edmonton, AL, Canada) • US Army Medical Research and Materiels Command (Reston, VA, USA) • Dutch Technology Foundation STW (Amsterdam, Netherlands) • Raine Medical Research Foundation (Perth, Australia) • German Research Foundation DFG (Berlin, Germany) • IHU Biomedical Research Fund + Mission Plan Cancer (Paris, France) • National Biophotonics Imaging Platform (Galway, Ireland) • NZ Royal Society Mardsen Fund (Auckland, New Zealand) • Genesis Oncology Trust (Wellington, New Zealand) – *external reviewer*

Editorial Responsibilities

- 2009-present Topical Editor, *Optics Letters* (biophotonics, 2nd 3-year term), Optical Society of America, Washington, DC, USA
- 2014-present Editor, *Modern Technologies in Medicine*, Russian Medical Engineering Society, Nizhny Novgorod, Russia
- 2013 Guest Editor (Coherent Optical Methods), *Optical Engineering*, SPIE, Bellingham, WA, USA
- 2007 Guest Editor (Biophysics), *Journal of Applied Physics*, American Institute of Physics, College Park, MD, USA
- 1998-2002 Editorial Advisory Committee, *Optics & Photonics News*, OSA, Washington, DC, USA

Professional Activities & Other Experience

2000-present	Board Certification 2000, Recertification 2005 + 2010 + 2015, Canadian College of Physicists in Medicine, Canada
2002-2003	Task Group Member on Future of Radiation Medicine, Ministry of Health, Toronto, Ontario, Canada

Manuscript Reviewer (partial list of journals)

- The Analyst
- Journal of Biomedical Optics
- Lasers in Surgery and Medicine
- Nature Photonics
- Physics in Medicine and Biology
- Applied Optics
- Journal of Biophotonics
- Medical Physics
- Optics Express
- PLoS One
- Cancer Research
- Journal of the Royal Society Interface
- Nature
- Physical Review Letters
- Science Translational Medicine

Selected Invited National and International Lectures (last FIVE (5) years, total of 137)

2018 Universidade de Medellin, OSA Student Chapter invited lecturer (Medellin, Colombia)
2108 LALS International Conference (Bar Ilat University, Israel)
2018 SE Asia Biomedical Engineering Conference (Ho Chi Min City, Vietnam)
2017 UC Berkeley, SPIE Student Chapter invited lecturer (UC Berkeley, CA, USA)
2017 COPL Photonics grand rounds (Quebec City, QC, Canada)
2017 Topical Problems in Biophotonics (Volga, Russian Federation) – conference co-chair and plenary
2017 European Conference on Biomedical Optics (Munich, Germany) – conference co-chair and hot topics speaker
2016 University of Central Florida, SPIE Student Chapter invited lecturer (Orlando, FL, USA)
2016 Beijing Jiaotong University, SPIE Student chapter invited lecturer (Beijing, China)
2016 TNO Innovations in Optics invited lecture (Delft, Netherlands)
2016 Applications of Laser Technologies (Galway, Ireland)
2016 Mega-Grant Holders Annual Scientific Conference (Kazan', Russia)
2016 Rutgers University, OSA Student chapter invited lecturer (Brunswick, NJ, USA)
2015 Weizmann Institute of Science molecular imaging seminar (Rehovot, Israel)
2015 Topical Problems in Biophotonics (Volga, Russian Federation) – conference co-chair and plenary
2015 European Conference on Biomedical Optics (Munich, Germany) – conference co-chair and hot topics speaker
2015 International Conference on Biophotonics (Florence, Italy)
2015 Wash U International Year of Light Symposium + OSA student chapter invitee (St. Louis, MI, USA) – plenary
2015 McGill University / MUHC Med Phys Unit biomedical rounds (Montreal, QC, Canada)
2014 Florida International University, Biomedical Engineering rounds (Miami, FL, USA)
2014 OSA Europe Annual Congress (Prague, Czech Republic) – plenary
2014 Frontiers of Science – Gordon Conference on Lasers in Medicine & Biology (Plymouth, NH, USA)
2014 Mega-Grant Holders Annual Scientific Conference (St. Petersburg, Russia)
2014 Frontiers of Medical Imaging rounds, Nizhny Novgorod State Medical Academy (Nizhny Novgorod, Russia)
2014 SPIE Photonics Europe: Biophotonic Solutions for Better Health Care (Brussels, Belgium)
2014 Volga Cities, Science & People public lecture (Nizhny Novgorod, Russia)
2013 National University of Ireland, Physics lecture series (Galway, Ireland)
2013 Nizhny Novgorod State Medical Academy, University Senate lecture (Nizhny Novgorod, Russia)
2013 Institute of Bio-Organic Chemistry rounds (Moscow, Russia)
2013 National Taiwan University, Biomedical Engineering rounds (Taipei, Taiwan)
2013 International Symposium on Topical Problems in Biophotonics (Volga River - scientific cruise conference, Russia)
2013 Russian Academy of Sciences, Institute of Applied Physics SPIE Student chapter invited lecturer (Nizhny Novgorod, Russia)
2013 Photonics North, Biomedical Photonics conference (Ottawa, ON, Canada)
2013 Ryerson University, Physics and Astronomy departmental seminar series (Toronto, ON, Canada)
2013 National Cheng-Kung University, Physics seminar series (Tainan, Taiwan)
2013 York University, Biophysics Club invited lecturer (Toronto, ON, Canada)
2012 Universidad Nacional Autónoma de México, UNAM invited lecture (Mexico City, Mexico)
2012 McGill University, OSA Student chapter invited lecturer (Montreal, QC, Canada)
2012 Photonics North, Bio-Medical-Infection conference (Montreal, QC, Canada)
2012 SPIE Photonics Europe: Biophotonic Solutions for Better Health Care (Brussels, Belgium)
2012 McMaster University, SPIE Student chapter invited lecturer (Hamilton, ON, Canada)
2012 University of Toronto, Physics and Astronomy Club invited lecturer (Toronto, ON, Canada)
2012 TBRRI Medical Imaging Summer School (Thunder Bay, ON, Canada)
2011 University of Otago, LART Symposium + OSA Student chapter invited lecturer (Dunedin, New Zealand)
2011 Young Scientist's Conference on Radiophysics, Electronics, Photonics and Biophysics (Kharkov, Ukraine)
2011 Albert Einstein College of Medicine (Bronx, NY, USA)
2011 International Workshop of Fiber Optics and Passive Components (Montreal, QC, Canada)
2011 OSA Advanced Photonics Congress (Toronto, ON, Canada)
2011 Photonics North (Ottawa, ON, Canada) – plenary

Recent International Conferences Chairmanship

- Conference Chair - Novel Biophotonic Techniques and Applications, European Conference on Biomedical Optics ECBO (Munich, Germany, 2009; 2011; 2013; 2015; 2017); ECBO General Chair – 2019
- Conference co-Chair – Topical Problems in Biophotonics (Nizhnyi Novgorod, Russia, 2013; 2015; 2017)
- Organizing Committee / Session Chair – Photonics Europe, SPIE Photonics Congress (Brussels, Belgium, 2012; 2014; 2016)

- Organizing Committee / Session Chair – OSA Europe Photonics Congress (Prague, Czech Republic, 2014)
- Organizing Committee / Session Chair – International Scientific Mega-Grant Holders Conference (St. Petersburg, Russia, 2014)
- Organizing Committee / Session Chair – Biophotonics / Mathematics of Medical Imaging, MITACS-Fields Institute Symposium (Toronto, ON, Canada, 2011)
- Conference Co-Chair - Advanced International SAOT Workshop on Biophotonics (Erlangen, Germany, 2009)

Industry Linkages

- Michelson Diagnostics Ltd (Kent, UK – licensing agreement and ongoing collaboration)
- LightLab Imaging / St. Jude Medical (Cambridge, MA, USA – ongoing consultant, expert witness at a scientific lawsuit)
- National Institute of Optics, INO (Quebec City, QC, Canada – ongoing consultant)
- Ontario Institute for Cancer Research, IP and Commercialization (Toronto, ON, Canada – occasional consultant)
- Seno Medical Instruments (San Antonio, TX, USA) • FP Technologies (Mountain View, CA, USA) • GE Global Research (Niskayuna, NY, USA) • Med Tech Partners (Montreal, PQ, Canada) • LEK Medical Inc (San Francisco, CA, USA) • Monteris Medical Inc (Winnipeg, Manitoba) – occasional consultant

Patents

- Method and apparatus for high resolution optical imaging (PCT #10723-56, US #7,242,833; licensing agreement with Michelson Diagnostics Ltd, Kent, UK; continuing to receive royalty payments)
- Fiber-optic based real-time readout for radiation absorbed dose measurements (US #7,399,977).
- Laser photo-thermo-acoustic frequency swept heterodyned lock-in depth profilometry imaging system (US #7,525,661)
- A system for real-time tissue coagulation monitoring using interstitial optical probes (patent pending)
- A flexible polarimetric probe for performing Mueller matrix analysis of biological tissues (patent pending US #62/067,503; 23/10/2014)
- System and method for optimized mass spectrometry analysis (PCT pending, US provisional patent #62/221,778; 22/09/2015)
- Visualizing tissue motion on a sub-micron scale with low coherence tomography. (Russian Federation 2626310; 25/07/2017)
- A co-registration system for cross-polarized low coherence interferometry imaging. (Russian Federation 261535; 03/04/2017)

Peer Reviewed Publications **(Web of Science h-index = 39; Google Scholar index = 46)**

1. **Vitkin IA**, Christofides C, Mandelis A, Laser-induced photothermal reflectance investigation of silicon damaged by arsenic ion implantation: a temperature study, *Appl Phys Lett* 54 2392-4, 1989
2. **Vitkin IA**, Peralta SB, Mandelis A, Sadowski W, Walker E, Thin-film photopyroelectric detection of thermal impulse response of single-crystalline $YB_2Cu_3O_{7-x}$, *Meas Sci Technol* (formerly *J Phys E*) 1 184-8, 1990
3. Christofides C, **Vitkin IA**, Mandelis A, Photothermal reflectance investigation of processed silicon part I: room temperature study of the induced damage and of the annealing kinetics of defects in ion implanted wafers, *J Appl Phys* 67 2815-21, 1990
4. **Vitkin IA**, Christofides C, Mandelis A, Photothermal reflectance investigation of processed silicon part II: signal generation and lattice temperature dependence in ion implanted and amorphous thin layers, *J Appl Phys* 67, 2822-30, 1990
5. Simard-Normandin M, Weaver L, Vacca D, Rogers D, **Vitkin IA**, Tiedje T, Analytic microscopy of titanium nitride, *Can J Phys* 69 290-7, 1991
6. Prahl SA, **Vitkin IA**, Bruggemann U, Wilson BC, Anderson RR, Determination of optical properties of turbid media using pulsed photothermal radiometry, *Phys Med Biol* 37 1203-17, 1992
7. **Vitkin IA**, Wilson BC, Kaplan RS, Anderson RR, The feasibility of monitoring exogenous dye uptake in tissue *in vivo* using pulsed photothermal radiometry, *J Photochem Photobiol B: Biol* 16 235-9, 1992
8. **Vitkin IA**, Woolsey J, Wilson BC, Anderson RR, Optical and thermal characterization of natural (*Sepia Officinalis*) melanin, *Photochem Photobiol* 59 455-62, 1994
9. **Vitkin IA**, Wilson BC, Anderson RR, Pulsed photothermal radiometry in transparent media containing discrete optical absorbers, *Phys Med Biol* 39 1721-44, 1994
10. **Vitkin IA**, Wilson BC, Anderson RR, Analysis of layered scattering materials by pulsed photothermal radiometry: application to photon propagation in tissue, *Appl Opt* 34 2973-82, 1995
11. **Vitkin IA**, The optical shield of cephalopods: modelling the effect of melanin particle size, *Optics & Photonics News* 6 (10) 40-2, 1995
12. Kielne AW, Lilge L, **Vitkin IA**, Patterson MP, Wilson B, Hibst R, Steiner R, Why do veins appear blue: a new look at an old question, *Appl Opt* 35 1151-60, 1996
13. Silverman MP, Strange W, Badoz J, **Vitkin IA**, Large optical rotation in turbid chiral fluids, *Bull Amer Phys Soc* 41, 705, 1996
14. **Vitkin IA**, Polarized light, optical activity, and the asymmetry of life, *Optics & Photonics News* 7 (7) 30-3, 1996
15. Silverman MP, Strange W, Badoz J, **Vitkin IA**, Enhanced optical rotation and diminished depolarization in diffusive scattering from a chiral fluid, *Optics Communic* 132 410-6, 1996
16. Bays R, Wagnieres G, Robert D, Theumann JF, **Vitkin IA**, Savary JF, Monnier P, van den Bergh H, A three-dimensional optical phantom and its application in photodynamic therapy, *Lasers Surg Med* 21 227-234, 1997
17. **Vitkin IA**, Moriarty JA, Peters R *et al*, Magnetic resonance imaging of temperature changes during interstitial microwave heating: a phantom study, *Med Phys* 24 269-77, 1997
18. **Vitkin IA**, Shedding some light on the blue veins enigma, *Optics & Photonics News* 8 (6) 39-42, 1998
19. Iizuka MN, Sherar MD, **Vitkin IA**, Optical phantom materials for laser photocoagulation studies, *Lasers Surg Med* 25 159-69, 1999

20. Iizuka MN, **Vitkin IA**, Kolios MC, Sherar MD, Effect of dynamic optical properties on the biophysics of interstitial laser coagulation, *Phys Med Biol* 45 1335-57, 2000
21. Douplik AY, Stratonnikov AA, Loshchenov VB, Lebedeva VS, Derkacheva VM, **Vitkin IA**, Rumyanceva VD, Kusmin SG, Mironov AF, Luk'Yanets EA, The study of photodynamic reactions in human blood, *J Biomed Opt* 5 338-49, 2000
22. **Vitkin IA**, Hoskinson E, Polarization studies in multiply scattering chiral media, *Opt Eng* 39 353-62, 2000
23. Studinski R, **Vitkin IA**, Polarization preservation in exact backscattering direction in diffusive scattering from biological tissues, *J Biomed Opt* 5 330-7, 2000
24. Skinner MG, Everts S, Reid A, **Vitkin IA**, Lilge L, Sherar MD, Determination of the Arrhenius process parameters of rat prostate optical properties in the near-infrared over the 20-85^{o}C temperature range, *Phys Med Biol* 45 1375-86, 2000
25. **Vitkin IA**, Studinski R, Polarization preservation in diffusive scattering from in-vivo turbid biological media: effects of tissue optical absorption in the exact backscattering direction, *Optics Communic* 190 37-43, 2001
26. Whelan WM, Chun P, Chin L, **Vitkin IA**, Laser thermal therapy: utility of interstitial fluence monitoring for locating optical sensors, *Phys Med Biol* 46 N91-6, 2001
27. Nicolaides L, Chan Y, Mandelis A, **Vitkin IA**, Analytical and experimental aspects of optical property determination of turbid media using frequency-domain photothermal radiometry, *J Opt Soc Am A* 18 2548-2556, 2001
28. **Vitkin IA**, Introduction to special issue on biophotonics and trends in biomedical optics: guest editorial, *Optics & Photonics News* 12 (7) 5; *OPN Trends in Biophotonics* 1(2) S3, 2001
29. **Vitkin IA**, Laszlo RD, Whyman CL, Effects of molecular asymmetry of optically active molecules on the polarization properties of multiply scattered light, *Opt Express* 10, 222-229, 2002
30. Yang VXD, Gordon ML, Mok A, Zhao Y, Chen Z, Cobbold R, Wilson BC, **Vitkin IA**, Application of the Kasai velocity estimator and histogram segmentation for resolution improvement and motion suppression in phase-resolved optical Doppler tomography, *Opt Communic* 208 209-14, 2002
31. Hadley K, **Vitkin IA**, Optical rotation and linear and circular depolarization rates in diffusively scattered light from chiral, racemic, and achiral turbid media, *J Biomed Opt* 7 291-9, 2002
32. Yang VXD, Gzarnota GJ, **Vitkin IA**, Kolios M, Sherar MD, de Boer J, Wilson BC, Ultrasound backscatter microscopy/spectroscopy and optical coherence (Doppler) tomography for mechanism-specific monitoring of photodynamic therapy *in vivo* and *in vitro*, *Proc SPIE* 4612 128-35, 2002
33. Yang VXD, Goertz DE, Needles A, Gordon ML, Foster FS, Wilson BC, **Vitkin IA**, Structural and Doppler imaging of *xenopus laevis* embryos and murine skin tumors *in vivo*: a comparison of ultrasound biomicroscopy and optical coherence tomography, *Ultras Med Biol* 29 72-4, 2003
34. Chin L, Whelan WM, **Vitkin IA**, Models and measurements of light intensity changes during laser interstitial thermal therapy: implications for optical monitoring of the coagulation boundary location, *Phys Med Biol* 48 543-59*,* 2003
35. Chin L, Pop M, Whelan WM, Sherar MD, **Vitkin IA**, Utility of optical sensors in monitoring interstitial thermal therapies, *Rev Scient Instrum* 74 393-5, 2003
36. Yang VXD, Gordon ML, Qi B, Pekar J, Lo SSW, Seng-Yue E, Mok A, Wilson BC, **Vitkin IA,** High speed, wide velocity dynamic range Doppler optical coherence tomography (part I): system design, signal processing, and performance characterization, *Opt Express* 11 794-809, 2003
37. Yang VXD, Gordon ML, Seng-Yue E, Lo SSW, Qi B, Pekar J, Mok A, Wilson BC, **Vitkin IA**, High speed, wide velocity dynamic range Doppler optical coherence tomography (part II): imaging *in vivo* cardiac dynamics of *xenopus laevis*, *Opt Express* 11 1650-8, 2003
38. Yang VXD, Gordon ML, Tang S, Marcon NE, Gardiner G, Qi B, Bisland S, Seng-Yue E, Lo SSW, Pekar J, Wilson BC, **Vitkin IA**, High speed, wide velocity dynamic range Doppler optical coherence tomography (part III): *in vivo* endoscopic imaging of blood flow in the rat and human GI tract, *Opt Express* 11 2416-24, 2003
39. Yang VXD, Gordon ML, Qi B, Bisland SK, Seng-Yue E, Tang S, Pekar J, Lo S, Marcon NE, Wilson BC, **Vitkin IA**, High sensitivity detection and monitoring of microcirculation using cutaneous and catheter probes for Doppler optical coherence tomography, *Proc SPIE* 4965 153-9, 2003
40. Tang SJ, Gordon ML, Yang VXD, Faughnan ME, Cirocco M, Qi B, Seng-Yue E, Gardiner G, Haber G, Kandel G, Kortan P, **Vitkin IA**, Wilson BC, Marcon NE, *in vivo* Doppler optical coherence tomography of mucocutaneous telangiectases in hereditary hemorrhagic telangiectasia, *Gastroint Endoscopy* 58 591-8, 2003
41. Yang VXD, Gordon ML, Qi B, Seng-Yue E, Bisland SK, Lo S, Marcon NE, Wilson BC, **Vitkin IA**, High sensitivity detection and monitoring of microcirculation using cutaneous and catheter probes for Doppler optical coherence tomography, *Proc SPIE* 4965 153-9, 2003
42. Moriyama EH, Zangaro RA, Lobo PDC, Villaverde AB, Pacheco MT, **Vitkin IA**, Opto-thermal transfer simulation in laser-irradiated human dentin, *J Biomed Opt* 8 298-302, 2003
43. Yang VXD, Pekar J, Lo SSW, Gordon ML, Mok A, Wilson BC, **Vitkin IA**, Optical coherence and Doppler tomography for monitoring tissue changes induced by laser thermal therapy - an *in-vivo* study, *Rev Scient Instrum* 74 437-40, 2003
44. Korol R, Bikersteth B, Yang VXD, Dimov S, Vatsya P, Gordon ML, **Vitkin IA,** Liu L, Canham P, Clarke S, A Lucas, Semi-quantitative analysis of atherosclerotic plaque using optical coherence tomography and time-of-flight secondary ion mass spectrometry, *Proc. SPIE* 5140 212-20, 2003
45. Cote D, **Vitkin IA**, Balanced detection for low-noise precision polarimetric measurements of optically-active, multiply-scattering tissue phantoms, *J Biomed Opt* 9 213-20, 2004
46. Qi B, Himmer PA, Gordon ML, Yang VXD, Dickensheets DL, **Vitkin IA**, Dynamic focus control in high-speed optical coherence tomography based on a microelectromechanical (MEMS) mirror, *Opt Communic* 232 123-8, 2004
47. Chin L, Wilson BC, Whelan WM, **Vitkin IA**, Radiance monitoring of the extent of tissue coagulation during laser interstitial thermal therapy, *Opt Lett* 29 259-61, 2004
48. Yang VXD, Munce N, Pekar J, Gordon ML, Wilson BC, **Vitkin IA**, Novel micro-machined array tip for multi-focus fiber-based optical coherence tomography, *Opt Lett* 29 578-81, 2004

49. Fan Y, Mandelis A, Spirou G, **Vitkin IA**, Development of laser photo-thermo-acoustic frequency swept system for subsurface imaging, *J Acoust Soc Am* 116 3523-33, 2004
50. Yang VXD, Lui T, Standish BA, Mao L, Sinclair M, Jafari R, Munce N, Marcon NE, Kucharczyk W, Wilson BC, **Vitkin IA**, Interstitial Doppler optical coherence tomography, *Opt Lett* 30 1791-3, 2005
51. Yeow JTW, Yang VXD, Chanwan A, Gordon ML, Qi B, **Vitkin IA**, Wilson BC, Goldenberg AA, Micromachined 2D MEMS scanner for 3D optical coherence tomography, *Sensors Actuat* A117 331-40, 2005
52. Whelan WM, Davidson S, Chin LCL, **Vitkin IA**, Strategy for monitoring laser thermal therapy via changes in opto-thermal properties of heated tissues, *Intern J Thermophys* 26 233-41, 2005
53. Davidson S, **Vitkin IA**, Whelan WM, Characterization of measurement artifacts in fluoroptic temperature sensors: Implications for laser thermal therapy at 810 nm, *Lasers Surg Med* 36 289-96, 2005
54. Rink A, **Vitkin IA**, Jaffray DA, Suitability of radiochromic medium for real-time optical measurements of ionizing radiation dose, *Med Phys* 32 1140-55, 2005
55. Côté D, **Vitkin IA**, Robust concentration determination of optically active molecules in turbid media with validated 3-D polarization sensitive Monte Carlo simulation, *Opt Express* 13 148-63, 2005
56. Yang VXD, Qi B, Gordon ML, Seng-Yue E, Tang S, Gardiner G, Kortan P, Haber G, Kandel G, Marcon NE, **Vitkin IA**, Wilson BC, In vivo demonstration of endoscopic catheter-based Doppler optical coherence tomography imaging of vascular pathologies in the GI tract, *Gastrointest Endosc* 61 879-90, 2005
57. Spirou G, Oraevsky AA, **Vitkin IA**, Whelan WM, Optical and acoustic properties of polyvinyl chloride plastisol at 1064 nm for use as a tissue phantom in biomedical photoacoustics, *Phys Med Biol* 50 N141-53, 2005
58. Rink A, **Vitkin IA**, Jaffray DA, Characterization and real-time optical measurements of the ionizing radiation dose response for a new radiochromic medium, *Med Phys* 32 2510-16, 2005
59. Yang VXD, Himmer PA, Standish BA, Mao L, Jafari R, Munce N, Dickensheets DL, **Vitkin IA**, Doppler optical coherence tomography with micro-electro-mechanical membrane mirror for high-speed dynamic focus tracking, *Opt Lett* 31 1262-64, 2006
60. Skliarenko JV, Lunt SJ, Gordon ML, **Vitkin IA**, Milosevic M, Hill RP, Effects of vascular disrupting agent ZD6126 on interstitial fluid pressure and cell survival in tumours, *Cancer Res* 66 2074-80, 2006
61. Guo X, Wood MFG, **Vitkin IA**, Angular measurements of light scattered by turbid chiral media using linear Stokes polarimeter, *J Biomed Opt* 11 041105-10, 2006
62. Chin LCL, Whelan WM, **Vitkin IA**, Information content of point radiance measurements in turbid media: Implications for interstitial optical property quantification, *Appl Opt* 45 2101-14, 2006
63. Li H, Standish BA, Mariampillai A, Munce NR, Mao Y, Chiu S, Marcon NE, Wilson BC, **Vitkin IA**, Yang YXD, Feasibility of interstitial Doppler optical coherence tomography for in vivo detection of microvascular changes during photodynamic therapy, *Lasers Surg Med* 38 754-61, 2006
64. Wood MFG, Guo X, **Vitkin IA**, Polarized light propagation in multiply scattering media exhibiting both linear birefringence and optical activity: Monte Carlo model and experimental methodology, *J Biomed Opt* 12 14029-10, 2007
65. Standish BA, Yang VXD, Munce NR, WongKeeSong L-M, Lin A, Mao YI, **Vitkin IA**, Marcon NE, Wilson BC, Doppler optical coherence tomography monitoring of microvascular tissue response during photodynamic therapy in an animal model of Barrett's esophagus, *Gastrointest Endosc* 66 326-33, 2007
66. Standish BA, Jin X, Smolen J, Mariampillai A, Munce NR, Wilson BC, **Vitkin IA**, Yang VXD, Interstitial Doppler optical coherence tomography monitors microvascular changes during photodynamic therapy in a Dunning prostate model under varying treatment conditions, *J Biomed Opt* 12 034022-8, 2007
67. Guo X, Wood MFG, **Vitkin IA**, Stokes polarimetry in multiply scattering chiral media: effects of experimental geometry, *Appl Opt* 46 4491-4500, 2007
68. Guo X, Wood MFG, **Vitkin IA**, Monte Carlo study of pathlength distribution of polarized light in turbid media, *Opt Express* 15 1348-60, 2007
69. Rink A, **Vitkin IA**, Jaffray DA, Intra-irradiation changes in signal of polymer based dosimeter (Gafchromic EBT) due to dose rate variations, *Phys Med Biol* 52 N523-29, 2007
70. Rink A, **Vitkin IA**, Jaffray DA, Energy dependence (75 kVp to 18 MV) of radiochromic films assessed with a real-time optical dosimeter, *Med Phys* 34 458-63, 2007
71. Munce NR, Yang VXD, Standish BA, Qiang B, Butany J, Courtney BK, Graham JJ, Dick AJ, Strauss BH, Wright GA, **Vitkin IA**, Ex-vivo imaging of chronic total occlusions using forward-looking optical coherence tomography, *Lasers Surg Med* 39 28-35, 2007
72. Morofke D, Kolios MC, **Vitkin IA**, Yang VXD, Wide dynamic range detection of bi-directional flow in Doppler optical coherence tomography using 2-dimensional Kasai estimator, *Opt Lett* 32 253-55, 2007
73. Chin LCL, Whelan WM, **Vitkin IA**, Perturbative diffusion theory formalism for interpreting temporal light intensity changes during laser interstitial thermal therapy: implications for point optical monitoring of coagulation boundary dynamics, *Phys Med Biol* 52 1659-74, 2007
74. Mariampillai A, Standish BA, **Vitkin IA**, Yang VXD, Retrospectively gated 2D blood flow imaging at 1000 frames per second and 4D imaging at video rates with a swept source Doppler optical coherence tomography system, *Opt Express* 15 1627-38, 2007
75. Ahn H, Mousavi P, Chin LCL, Roth S, Finkelstein J, **Vitkin IA**, Whyne C, The effect of pre-vertebroplasty tumor ablation using laser-induced thermotherapy on biomechanical stability and cement fill in the metastatic spine, *Eur Spine J* 16 1171-78, 2007
76. Chin LCL, Whelan WM, **Vitkin IA**, Determination of the optical properties of turbid media using relative interstitial radiance measurements: Monte Carlo study, experimental verification and sensitivity analysis, *J Biomed Opt* 12 036706-11, 2007
77. Munce NR, Mariampillai A, Standish BA, Pop M, Anderson KJ, Liu GY, Luk T, Courtney BK, Wright GA, **Vitkin IA**, Yang VXD, Electrostatic forward-viewing scanning probe for optical coherence tomography using a dissipative polymer catheter, *Opt Lett* 33 657-59, 2008
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Book Chapters

1. **Vitkin IA**, Wilson BC, Anderson RR, Pulsed photothermal radiometry applications in biological media, in *Optical-Thermal Response of Laser Irradiated Tissue*, Welch AJ and van Gemert MJC, editors (Plenum, New York, USA), chapter 16, 1995
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Current Grant Support (last FIVE years, funded as Principal Investigator)

2018-2023 **Polarized Light Assessment of Multiply Scattering Heterogeneous Birefringent Media**
Natural Sciences & Engineering Research Council Canada (NSERC), 5 years

2018-2022 **Wide-field Polarimetric Imaging for Targeted and Rapid High-sensitivity Analysis of Breast Cancer with Mass Spectrometry**
Canadian Institutes of Health Research (CIHR), 5 years

2017-2019 **3D Laser Structured Biomedical Fiber – a Novel Sensor Platform for Rapid and Accurate Minimally Invasive Diagnosis**
Engineering/Medicine/Hospital Seed Fund (U of Toronto Engineering + Medicine Initiative), 2 years

2012-2017 **Spectroscopic and Textural Optical Coherence Tomography for Structural and Functional Monitoring of Radiation Therapy Effects**
Canadian Institutes of Health Research (CIHR), 5 years

2013-2018 **Development of Novel Optical Coherence Tomography Technologies for Personalized Cancer Medicine**
Leading Scientist Mega-Grant, Ministry of Education and Science, Russian Federation, 5 years

2012-2017 **Polarimetric Mueller Matrix Imaging in Multiply Scattering Inhomogeneous Birefringent Media**
Natural Sciences & Engineering Research Council Canada (NSERC), 5 years

Other CV sections – clinical, teaching, supervision, research summaries for SPIE Fellow Election

Clinical Medical Physics (Princess Margaret Hospital (PMH), Toronto):

- Clinical physicist, ocular and gynecologic high-dose-rate brachytherapy (2014-present)
- Clinical physicist, permanent prostate seed implant brachytherapy (2013-present)
- Lead physicist, intraoperative breast radiation therapy (2007-present, ~20 patients / year)
- Lead physicist, intravascular brachytherapy for cardiac restenosis control (2000-2004, 130 patients)
- Organizer, PMH weekly radiation physics seminar series (2000-2006)
- Director, PMH radiation physics residency program (1997-2003)

Teaching and Administrative (University of Toronto):

- Medical Biophysics – Student Seminars course; Optical, Thermal and Radiation Biophysics course
- Faculty of Medicine -- Decanal Promotions Committee panelist
- Radiation Oncology – Introduction to Radiation Oncology Physics + Advanced Medical Imaging lecture sets
- Institute of Medical Sciences – Frontiers of Radiation Medicine; Advanced Radiotherapy & Medical Physics lectures
- Mechanical and Industrial Engineering, Institute of Biomaterials and Biomedical Engineering, Biomedical Physics (Ryerson University) – guest lecturer

Assessment of Tenure and of other Senior Promotions Applications

University of Wisconsin (Biomedical Engineering); Case Western Reserve University (Biomedical Engineering); Stanford University (Biomedical Engineering); Johns Hopkins University (Faculty of Medicine); Northwestern University (Electrical and Computer Engineering); University of Indiana (Ophthalmology); University of Otago, New Zealand (Physics); Tianjin University, China (Precision Instrumentation and Optoelectronic Engineering); McMaster University (Engineering Physics); University of Waterloo (Physics); Ryerson University (Physics, Computer Science and Mathematics); Simon Fraser University (Engineering Science); University of British Columbia (Physics); University of Toronto (Medical Biophysics; Institute of Biomaterials and Biomedical Engineering; Radiation Oncology)

Supervision of Highly Qualified Personnel

45 BSc students, 13 MSc students (2 co-supervised), 10 PhD students (3 co-supervised), 5 exchange PhD students (Pakistan, India, Japan), 9 post-doctoral fellows -- update numbers!!!

Post-doctoral fellows and graduate students:

1. Post-doctoral fellows

- Sharon Katz, "OCT technology development for endoscopy", 1999-2001.
- Linda Mao, "Optical fiber sensors and probes for interstitial Doppler OCT", 2002-5.
- Daniel Cote, "Modeling and measurements of polarized light propagation in turbid media", 2002-4.
- Reza Jafari, "Time-frequency analysis and signal processing for time-domain OCT", 2002-4.

- Xinxin Guo, “Turbid polarization studies in biomedicine: effects of turbidity, chirality, and measurement geometry”, 2004-6.
- George Liu, “Development of a frequency-swept Doppler OCT system for bioimaging”, 2005-7.
- Nirmalya Ghosh, “Mueller matrix decomposition for extracting biophysical metrics from tissue polarimetry”, 2007-10
- Ivan Popov, “Speckle statistics and texture analysis in OCT medical imaging”, 2014-
- Mitsuro Sugita, “OCT speckle statistics, flow and Brownian motion parameters”, 2015-

2. Graduate students:

- Victor Yang (co-supervised with BC Wilson; Vitkin=primary supervisor), “Development and applications of Doppler OCT”, PhD 2000-2004 (winner of the Governor General’s Gold Medal for doctoral research).
- Megumi Iizuka (co-supervised with MD Sherar; Vitkin=primary supervisor), “Dynamic modulation of tissue optical properties during laser interstitial thermal therapy”, MSc 1996-1999
- Lee Chin (co-supervised with WM Whelan; Vitkin=primary supervisor), “Optical fluence and radiance measurements for prostate laser photo-coagulation: treatment monitoring and control,” PhD 1999-2008
- Maggie Gordon, “OCT monitoring of photodynamic therapy”, MSc 1999-2002
- Nigel Munce (co-supervised with GA Wright; Vitkin=primary supervisor), “Multi-modality guidance and intravascular OCT imaging of total chronic occlusions”, PhD 2003-2009
- Brendan Lloyd (co-supervised with WM Whelan; Whelan=primary supervisor), “Radiance and fluence monitoring of interstitial laser photocoagulation process”, MSc 2005-2008
- Alexandra Rink (co-supervised with DA Jaffray; Jaffray=primary supervisor), “Radiation dosimeters using fiber optic sensors for read-out”, PhD 2003-2009
- Gloria Spirou (co-supervised with WM Whelan; Whelan=primary supervisor), “Photoacoustic monitoring of interstitial laser photocoagulation process”, MSc 2004-2006
- Beau Standish, “Interstitial Doppler OCT for treatment monitoring and control of photodynamic therapies”, PhD 2004-2009
- Adrian Mariampillai, “High resolution microvascular imaging with OCT: applications to photodynamic therapy and beyond”, PhD 2004-2010
- Michael Leung, “Imaging cellular and vascular tumour response to radiation therapy by OCT and fluorescence microscopy *in-vivo*”, MSc 2007-2010
- Marika Wallenburg, “Turbid polarimetry and 2nd harmonic generation microscopy for measuring tissue anisotropy”, MSc 2008-2010
- Mike Wood, “Spectral polarimetry in turbid chiral media in the presence of birefringence”, PhD 2004-2010
- Manzoor Ahmad, “Refractive index profiles of multiply scattering media: effects on polarimetric investigations of tissue”, PhD 2010 (exchange student from Pakistan)
- Hafeez Ullah, “Speckle-variance OCT for viscosity-based contrast enhancement and tissue microvascular imaging”, PhD 2010 (exchange student from Pakistan)
- Leigh Conroy, “Shedding light on radiotherapy: optical coherence and fluorescence monitoring of early radiobiological vascular effects in irradiated tissues”, MSc 2010-2012
- Junpei Sugiyama “OCT for viscosity-based contrast enhancement and glucose monitoring”, PhD 2011 (exchange student from Japan)
- Andras Lindenmeier, “ Spectrsocopic and textural optical coherence tomography for early radibiological effects detection in irradiated tissues”, MSc 2011-2013
- Bahar Davoudi, "Structural, Doppler and speckle-variance OCT for monitoring late radiotherapy complications in upper and lower GI", PhD 2009-2014
- Sanaz Alali, “Tissue birefringence probed with polarized light: technology development and biomedical applications” PhD 2010-2014
- Adam Gribble, “Tissue polarimetry for extracellular matrix anisotropy measurements”, MSc 2012-present
- Andrew Weatherbee, “M-mode OCT for blood viscosity quantification and glucose monitoring”, MSc 2012-present
- Vani Damodaran, “Microvascular analysis of OCT images from late radiation toxicity patients”, PhD 2012 (exchange student from India)
- Laura Burgess (co-supervised with Gang Zhang), “OCT imaging of oral cancer PDT treatments”, MSc 2012-present
- Sumara Ashraf, “Speckle-variance OCT for viscosity contrast enhancement and glucose quantification”, PhD 2013 (exchange student from Pakistan)
- Valentin Demidov, “Vascular OCT for radiotherapeutic quantification”, PhD 2013-present
- Iftikhar Ahmad, “Polarimetric imaging of tissue via the 4-PEM approach”, PhD 2014 (exchange student from Pakistan)
- Sarah Forward, “Tissue polarimetry for fast *in-vivo* tissue measurements”, MSc 2015-present
- Jared Westreich, “Polarized light guidance for mass spectrometry in breast cancer”, MSc 2017-present

3. Miscellaneous supervisory roles (Medical Biophysics unless otherwise noted)

graduate thesis committees – Jason Davis MSc 1998-2000; Norman Freeman MSc 1998-2000; Louis-Michel Song MSc 1998-2004; Vanessa Choy MSc 2000-3; Michael Strauss MSc 2001-3; Andreas Rau MSc 2002-4; Paul Constantinou PhD 2001-8; Cathy Nangini PhD 2001-6; Claire McCann PhD 2004-7; Jay Detsky PhD 2004-8; Aman Thind PhD 2004-9; John Hudson PhD 2004-10 ; Brian Keller (IMS) PhD 2004-8; Isuru Silva MSc 2005-8; Golnaz Fahrat MSc 2007- ; Dououd

Shah MSc 2007-10; Eli Lechtman 2008-13; Kenneth Ng (IBBME) 2008- ; Steve Bartolac PhD 2010-3; Marc Calais MSc 2010-3 ; Jane He PhD 2012-8 ; Priscilla Lau PhD 2014- ; Caryn Geady MSc 2016-; Kevin Kuzai MSc 2017-; Ramy Ayoub 2018-..

theses defence examinations – Paul McNamara PhD (external examiner, University of Limerick, Ireland),Chiara Buscemi PhD (external examiner, University Paris-Est Cretiel, France), Alexander Doronin PhD (external examiner, University of Otago, New Zealand), Jalpa Soni PhD (external examiner,IISER Kolkata, India),Kathy Beaudette PhD (external examiner, Ecole Polytechnique, Montreal), Suja Shrestha PhD (Dentistry) Joshua Lockwood MEng (IBBME), Nasim Shams PhD, Ruoshi Shi MSc, Mattea Welch MSc, Daniel Schep MSc, Hirad Karimi PhD, Charles Tremblay-Derveau PhD, Daria Taiakina MSc, Nardin Samuel MSc, Mojden Shakiba MSc, Melissa Hill PhD, Jeff Cassidy MSc (ECE), Michael Velec PhD (IMS) , Mira Sibai MSc, Annie Strestha PhD (Dentistry), Charles Tremblay-Derveau MSc, Elizabeth de Guzman MSc, Lindsay Lustig MSc, Christopher Roy MSc, Setareh Ghorbanian MSc, Elizabeth Huyhn PhD, Greg Griffin MSc, Mark Jarvi PhD, Michael Velec MS (IMS), Jasdeep Sagar MSc, Matthew Scaife MSc, Karen Lim MSc (IMS), Benjamin Lai MSc, William Lo MSc, Mark Lee MSc (IMS), Michelle Lenarduzzi MSc, Alison Aiken MSc, Toby Lam MSc, Jinzi Zheng PhD, Gordon Duncan MSc, Xia Wu PhD, James Mainprize MSc, Brenda Chow MSc, Melanie Barfelds MSc, Olga Pawlzcyk MSc, Natalie Pamerleau MSc, Donald Christopher MSc, Claire McCann MSc, Adam Tunis MSc, Alina Mahai MSc (IMS), Laurel O'Malley MSc, Luc Charron MSc, Lindsay Auld MEng (Biomedical Engineering), Andrew White PhD; SGS chair – Fabio Settecase MSc, Heather Flemming PhD, Joanna Hodson PhD, Tracey Asano PhD, Carrie MacTavish PhD, John Stavrinides PhD, Laura Esmail PhD, Karen Aitken PhD, Olga Bykova PhD, Luca Pisterzi PhD, Jane Maciver PhD, Nancy Mitchell PhD, Gabriela Rozanski PhD, Brittany Matthews PhD, Lindsay Lustig MSc, Janice Pong MSc, Elina Korpela MSc, Stuart Locke MSc, Pietro Sollazzo MSc, John Doran PhD, Kristina Lisk PhD, Emad Heidaryashrash PhD

supervision of undergraduate (co-op) students – Emile Hoskinson, Nader Jahshan, David Giewercer, Ruchi Kalia, Leena Chacho, James Donald, Ryan Studinski, Maggie Gordon, Claire Whyman, Richard Laszlo, Stewart Lo, Julius Pekar, Kevin Hadley, Emily Seng-Yue, Alvin Mok, Natalie Swoboda, Josip Zic, Eric Cheng, Selma Li, Anton Izraelian, Maria Wunderlinch, Mike Sinclair, Michele Heng, Tracey Liu, Joshua Grimes, Brian Li, Stephanie Chiu, Daina Burnes, Paul Webster, Xiao Jin, Jurek Smolen, Tina Randall, Tewadros Mamo, Kenneth Lee, Timothy Luk, Louis Tan, Shannon Dang, Nasit Vurgun, Rain Wong, Melanie Morrison, Vani Damodaran (India), David Layden, Chitram Bannerjee (India), Vicky Madge, Barry Fung

Areas of professional specialization (optical biophysics and engineering; professional contributions meriting election to SPIE Fellowship) – candidate's 1-page statement [2013]

I have been engaged in biomedical optics research for 20 years, since my PhD studies at McMaster University (department of Physics and Astronomy) and Harvard University (Massachusetts General Hospital, Wellman Laboratories of Photomedicine).

- The PhD work focused on opto-thermal transfer in laser irradiated tissues, and I implemented the technique of pulsed photothermal radiometry (PPTR) for this purpose. Significant advances in PPTR ensued, including its extension to examinations of turbid media such as tissue, signal generation and evolution in layered scattering media, effects of particulate inclusions, determination of tissue optical properties and the ability to track tissue absorption changes. These conceptual and practical advanced were summarized in ~10 papers and book chapters stemming from my PhD thesis, and have since been picked up / extended by other research groups.

Following a post-doctoral fellowship at the University of Toronto and a clinical physics residency at the Princess Margaret Hospital / Ontario Cancer Institute, I became a medical physicist in radiation oncology, with a research program in biophotonics. I've been in Toronto since then, and am now a full professor of Medical Biophysics and Radiation Oncology at the University of Toronto, a medical physicist at Princess Margaret Hospital, and a senior scientist at the Ontario Cancer Institute (Biophysics and Bioimaging division). Accomplishments in the following areas can be noted:

- I initiated a program in the use of polarized light in biomedicine. The field of turbid polarimetry is underdeveloped in biophotonics, partly because of the extensive loss of polarization engendered by tissue multiple scattering. Yet we (and others) have developed methods to reliably measure and quantify the polarization-retaining fraction of multiply scattered light, and have used this finding in a variety of important pre-clinical scenarios (chiral molecule detection for glucose monitoring in diabetics, birefringence mapping in infarcted and regenerating heart muscle). Specific contributions, largely unavailable in biophotonics community previously, include: optimization of various polarization modulation / synchronous detection schemes, development and validation of polarization sensitive Monte Carlo models for simulating simultaneous polarimetry effects, derivation of polar decompositions for extracting unique biophysical characteristics otherwise obscured in the tissue Mueller matrix, and applications of this polarimetry platform in the above-mentioned preclinical scenarios. ~40 journal publications and several reviews / book chapters have summarized our findings, as active research in tissue polarimetry continues (for example, pathology detection and treatment response monitoring in urology).
- Since 2002, my group has played an active role in the advancement of optical coherence tomography (OCT) for functional imaging of tissues. Specifically, our research concentrated on OCT extensions that enable microvascular detection of tissue blood flow at the perfusion (microcirculation) level. Specific accomplishments include: world's first endoscopic Doppler OCT detection of subsurface microvasculature in human esophagus, MEMS-enabled dynamic focus tracking for SNR and resolution improvement in OCT, development of Doppler-free visualization of tissue microvasculature based on speckle variance, engineering of interstitial / endoscopic / intraoperative / multi-channel OCT probes, fundamental multimodality (OCT + other optical techniques) studies of cellular - vascular - stromal dynamics in a mouse window chamber model, and monitoring of photodynamic therapy treatment effects using the microvascular OCT platform. ~45 journal publications, patents (one licensed to Michelson Diagnostics Ltd, Kent, UK), and book chapters have summarized our progress over the past decade, and active research in biomedical OCT continues (currently concentrating on OCT imaging of early radiobiological changes in X-ray irradiated tissues, for optimization and feedback control of radiation therapy of cancers).
- An active program in optical fiber sensors for biomedical applications has also been pursued. Here, we have mostly concentrated on the development and use of novel interstitial opticalfluence and optical radiance fiber detectors, in the context of photothermal laser therapy. Specifically, our fiber sensor methodology has enabled *in-vivo* detection of such important photothermal treatment events as initiation of the thermal coagulation damage front, its evolution in time and space, and onset of tissue charring (an undesirable event to be avoided). We've also increased the information content of the fiber sensor feedback by replacing direction-independent fluence readings with directionally-resolved radiance detection. Recently, we took advantage of the fiber optic platform to address outstanding issues in on-line dosimetry in radiation therapy, by developing (and patenting) a fiber-based radiation sensor for accurate real-time point measurements of radiation absorbed dose. This approach is currently in scale-up production in a government optics lab, with clinical pilot testing scheduled to commence shortly.

Specific SPIE Fellows Nomination Criteria:

1. Technical accomplishments – leading edge research in biophotonics, including functional/vascular OCT, tissue polarimetry, and optical fiber sensors [>170 publications, several book chapters, many invited and plenary lectures, editorship of *Optics Letters*, participation in national and international research grant panels and site visits, organization of conferences, active educational/training activities (25 past and present MSc/PhD students, ~40 undergraduates), several patents, clinical translation of technologies (several patents and licensing agreements, ongoing human clinical studies), consulting engagements for several companies – details in CV]
2. Services to the general optics community – editorship of Optics Letters (biophotonics field, 2nd 3-year term), guest editorship of Journal of Applied Physics and Journal of Biomedical Optics, international lectures and visits as part of SPIE Visiting and OSA Travelling Lecturers programs, organization of conferences (ECBO, SPIE Photonics Europe, LALS, OSA Photonics Congress, SPIE Photonics North), service on many Canadian (NSERC, CIHR), USA (NIH, CIMIT, US Army) and other international research grants panels (Dutch ZonMw and STW, German DFG, NZealand's Royal Mardsen, Australia's Raine Medical Foundation)
3. Services to SPIE – active participation in SPIE Visiting Lecturer Program (visits to student chapters in Taiwan, Russia, Ukraine, Brazil, Germany, Cyprus, New Zealand, Israel, China, Vietnam), organization of conferences (SPIE Photonics North, Photonics Europe, European Conference on Biomed Optics – conference chair for Novel Biophotonic Techniques and Applications, etc)