

Microsurgical Guidance and Assessment Using 3-D Doppler Fourier-Domain Optical Coherence Tomography

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Abstract

In this talk, I will describe the development of ultrafast 3-dimensional (3D) optical coherence tomography (OCT) imaging systems that assist surgeons during microsurgical procedures and provide intraoperative assessment. The system is based on a full-range non-uniform Fourier-Domain OCT (FD-OCT). The system was built in a CPU-GPU heterogeneous computing architecture capable of video OCT image processing. The system displays at a maximum speed of 10 volume/second for an image volume size of $160 \times 80 \times 1024$ (X×Y×Z) pixels. We have used this system to visualize and guide a prototypical microsurgical maneuver; microvascular anastomosis of the rat femoral artery. Our preliminary experiments using 3D-OCT- guided microvascular anastomosis showed optimal visualization of the rat femoral artery (diameter < 0.8 mm), instruments, and suture material. Real-time intraoperative guidance helped facilitate precise suture placement due to optimized views of the vessel wall during anastomosis. I will also describe using the system for robotic surgical guidance that include the development of smart surgical tools.

Curriculum Vitae

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Educational Background:

Ph.D. Optical Science & Electrical Engineering (CREOL), University of Central Florida, 1996
Thesis entitled, "Spatial Solitons in AlGaAs Waveguides," Advisor: George I. Stegeman
M.S. Optical Science & Electrical Engineering (CREOL), University of Central Florida, 1993
B.S. Physics, Western Washington University, 1992

Professional Experience:

2008-Present Chair, Electrical and Computer Engineering, Johns Hopkins University
2006-Present Professor, Electrical and Computer Engineering, Johns Hopkins University
2001-2006 Associate Professor, Electrical and Computer Engineering, Johns Hopkins University
1998-2001 Assistant Professor, Electrical and Computer Engineering, Johns Hopkins University
1996-1998 Research Engineer (Federal Employee), U.S. Naval Research Laboratory
1992-1996 Research Assistant, CREOL, University of Central Florida

Honors and Awards:

- Fellow, SPIE-The International Society for Optics and Photonics, 2013-
- Fellow, Optical Society of America (OSA), 2010-
- Guest Professor, Shanghai Jiao Tong University, 2008-
- The Oak Ridge Institute of Science and Education Fellowship, 2004 and 2005
- Brain Korea Faculty Fellowship, 2003
- Visiting Scholar Fellowship, The Institute of Advanced Studies, The Australian National University, 2002
- NASA-ASEE Faculty Fellowship, 2001
- FY'00 Office of Naval Research Young Investigator, 2000
- Alan Berman annual research publication award, Naval Research Lab., 1997
- Outstanding Performance Awards, Naval Research Lab., 1996-8
- NATO Graduate Fellowship, 1993 and 1995
- NSF Graduate Fellowship, 1995
- Outstanding Graduate Award, Western Washington University, 1992
- University Merit Scholarship, Western Washington University, 1989-91

Professional Services:

- National Global R&D Advisory Committee, South Korea Ministry of Knowledge & Economy, 2012-2014
- Duke University, ECE Department, External Advisory Board Member, 2012- 2015
- Scientific Committee Member, International Biophotonics Meeting, SPIE, 2012-
- Board of Editors, Journal of the Optical Society of Korea, 2007-
- Program Committee, Optical Fibers and Sensors, SPIE Photonics West, BIOS, 2009-
- Technical Review Committee, Center for Devices and Radiological Health, FDA, 2007-

- Co-Organizer, Image Guided Intervention/Surgery, 7th NIH Inter-Institute Workshop on Optical Diagnostic and Biophotonic Methods from Bench to Bedside, September 16, 2011
- Organizing Committee, Metropolitan Biophotonics Symposium 2010-
- Program Committee, Biophotonics and Optical Sensing, IEEE ACP, 2009-2011
- Program Director, Symposium on Nano-Biophotonics, CLEO/QELS 2011
- OSA Representative, LaserFest Outreach Program, 2006-
- National Institute of Astrophysics, Optics and Electronics (INAOE) Summer School, invited Lecturer, 2012
- Co-Organizer, "FE:New Biophotonics Technologies I," Asian Communications and Photonics Conf., 2009
- Guest Editor, Focus Issue on Bio-Photonics, Chinese Optics Letters, 2008
- Topical Editor, Optics Letters, Optical Society of America, 2002-2008
- Program Co-Director, Conference on Lasers and Electro-Optics, Pacific Rim, 2007
- Session Chairs for a large number of Optical Society of America (OSA), International Society for Optics and Photonics (SPIE), and IEEE Photonics Society conference sessions
- Member of OSA, SPIE, IEEE, and American Physical Society (APS)
- Panelist and Reviewer:
 - Frequent reviewer for SPIE Journals: Applied Optics, Journal of Biomedical Optics; APS Journals: Physical Review Letters, Applied Physics Letters; OSA Journals: Optics Letters, Optics Express, JOSA B; IEEE Journals: Trans. BME and Photonics Technology Letters, IEEE JQE; the Association for Research in Vision and Ophthalmology (ARVO) Journals
 - Frequent NSF panel members for ECCS - Elect, Photonics, & Mag. Device and CBET - Biomedical Engineering
- Invited talks to a large number of domestic and international universities, national laboratories, and corporations

Committees and University Services:

- Homewood Faculty Assembly, Steering Committee Member, 2012 –
- Whiting School of Engineering, Strategic Committee Member, 2012 –
- Program Committee, ECE, JHU Engineering for Professional Programs, 2007 -
- Promotion Committees
- ECE Departmental Advisory Committee, 1999 - 2007
- ECE Departmental Y2K Coordinator, 1999
- ECE Graduate Admission Committee, 2000 - 2007
- GBO, Defense and Qualifying Examination Committees for ECE, BME, and CS Department
- ECE Department Space Committee, 2001 - 2007
- ECE Department Curriculum Committee, 2004 -

Research Areas Accomplishments

- Biophotonics: Fiber optic devices for medical and biological applications
 - Fiber optic common-path optical coherent tomography (OCT) for in-vivo 3-D imaging
 - Real-time common-path 3-D OCT
 - Smart, optical sensor guided microsurgical tools
 - OCT guided robotic microsurgeries
 - Virtual biopsy
 - Fiber optic confocal Doppler 3-D imaging
 - OCT image guided cochlea implant
 - Real-time 3-D OCT video image guided microsurgery
 - Raman/fluorescence spectrometer system based on tunable fiber laser system
- Broadband high power fiber laser sources for bio-optics, remote sensing, optical communications and RF photonics
 - Tunable single- and multi-wavelength fiber lasers
 - Ultrawideband, high speed wavelength swept fiber laser
 - Ultra high data rate pulse train sources
 - Intracavity supercontinuum fiber ring laser
- Photonic Crystal and Microstructure Devices

- Design and test photonic crystal fibers and Microstructure Devices
- Design and test photonic integrated circuits
- Microwave Photonics
 - Novel photonic RF frequency shifter based on broadband chirped optical pulses
 - Ultrafast photonic analog to digital converters (ADC) based on WDM method
 - Developed various photonic methods for RF signal processing
- Second-order and third-order nonlinear optical processes
 - First experimental observation of Manakov solitons
 - First demonstration of backward second harmonic generation
 - Study of cascaded effects in periodically poled LiNbO₃.
- Efficient high frequency Electro-Optic modulators
 - Characterization and development of transparent ferroelectric ceramics (SBN, BST), polymers, and organic single crystals (DAST) for E-O applications.
 - Developing Broadband Electro-Optic modulators based on slow-wave waveguides

PUBLICATIONS:

Journals in Review/Press

1. Alexis Cheng, Jin U. Kang , Russell H. Taylor , Emad Boctor, “Direct 3D Ultrasound to Video Registration using Photoacoustic Markers,” Journal of Biomedical Optics, Feb. 2013 submitted
2. Yong Huang, Zuhaib Ibrahim , Dedi Tong , Shan Zhu , Qi Mao , John Pang , W.P. Andrew Lee , Gerald Brandacher , Jin U. Kang, “Microvascular anastomosis guidance and evaluation using real-time 4D Fourier domain Doppler optical coherence tomography,”
3. Daguang Xu, Yong Huang, and Jin U. Kang, “Compressive sensing with dispersion compensation on non-linear wavenumber sampled spectral domain optical coherence tomography,” Opt. Express Submitted Oct 2012

Published Refereed Journal Publications:

(2013)

4. Yong Huang and Jin U. Kang, “Quantum cascade laser thermal therapy guided by Fourier domain optical coherence tomography,” invited paper, Chinese Opt. Lett., 10th Anniversary Special Issue, Volume: 11 Issue: 1 011701, JAN 10 2013
5. Xuan Liu, Yong Huang, Jessica C. Ramella-Roman, Scott A. Mathews, and Jin U. Kang, “Quantitative transverse flow measurement using optical coherence tomography speckle decorrelation analysis,” OPTICS LETTERS Vol. 38, No. 5, March 1, 2013
6. X. Liu, J. C. Ramella-Roman, Y. Huang, Y. Guo, and J. U. Kang, "Robust spectral-domain optical coherence tomography speckle model and its cross-correlation coefficient analysis," Journal of the Optical Society of America A, JOSA A, Vol. 30, Issue 1, pp. 51-59 (2013)
7. Sarah Sunshine, Marcin Balicki, Xingchi He, Kevin Olds, Jin U. Kang, Peter Gehlbach, MD, Russell Taylor, Iulian Iordachita, James T. Handa, “A Force-sensing Microsurgical Instrument That Detects Forces Below Human Tactile Sensation,” RETINA The Journal of Retinal and Vitreous Diseases, 2013 Jan;33(1):200-6.
8. Jaepyeong Cha, Jing Zhang, Saumya Gurbani, Gyeong Woo Cheon, Min Li, and Jin U. Kang, “Gene transfection efficacy assessment of human cervical cancer cells using dual-mode fluorescence microendoscopy,” Biomedical Optics Express, Vol. 4 Issue 1, pp.151-159 (2013)

(2012)

9. Daguang Xu, Namrata Vaswani, Yong Huang and Jin U. Kang, “Modified Compressive Sensing Optical Coherence Tomography with noise reduction,” Optics Letters, Vol. 37, Issue 20, pp. 4209-4211 (2012)
10. Kim, KS; Park, HJ; Kang, HS; Kang, JU; Song, CG, “Real-time surface tracking system using common-path spectral domain optical coherence tomography,” Optical Engineering, Vol.: 51 Iss.: 11, NOV 2012
11. Mingtao Zhao, Yong Huang, and Jin U Kang, “Sapphire ball lens based fiber probe for common-path optical coherence tomography and its applications in corneal and retinal imaging,” Optics Letters Vol. 37, Iss. 23, pp. 4835-4837 (2012)

12. Yong Huang, Xuan Liu, Cheol Song, and Jin U. Kang, "Motion-compensated hand-held common-path Fourier-domain optical coherence tomography probe for image-guided intervention," *Biomed. Opt. Express*, Vol. 3, Iss. 12, pp. 3105–3118 (2012)
13. Cheol Song, Peter L. Gehlbach, and Jin U. Kang, "Active Tremor Cancellation by A "Smart" Handheld Vitreoretinal Microsurgical Tool using Swept Source Optical Coherence Tomography," *Optics Express*, Vol. 20, No. 21, pp. 23414-23421, October 2012
14. Yong Huang, Xuan Liu, and Jin U. Kang, "Real-time 3D and 4D Fourier domain Doppler optical coherence tomography based on dual graphics processing units," *Biomedical Optics Express*, Vol. 3, Issue 9, pp. 2162-2174 (2012)
15. Yong Huang and Jin U. Kang, "Real-time reference A-line subtraction using graphics processing unit for high-frame rate Fourier-domain optical coherence tomography video imaging," *Opt. Eng.* 51, 073203 (Jul 06, 2012)
16. Kang Zhang and Jin U. Kang, "Graphics Processing Unit based Ultrahigh Speed Real-Time Fourier Domain Optical Coherence Tomography," *J. Spec. Topics in Quantum. Electron.*, Vol: 18 , Iss: 4, 1270 – 1279, 2012
17. Jin U. Kang, Yong Huang, Kang Zhang, Zuhair Ibrahim, Jaepyeong Cha, W.P. Andrew Lee, Gerald Brandacher, and Peter L. Gehlbach, "Real-Time 3-D Fourier-Domain Optical Coherence Tomography Video Image Guided Microsurgeries," *J. Biomed. Opt.* 17, 081403 (May 15, 2012);
18. Xuan Liu, Yong Huang, and Jin U. Kang, "Distortion-free freehand-scanning OCT implemented with real-time scanning speed variance correction," *Optics Express*, Vol. 20, No. 15, 16567, 16 July 2012
19. Ibrahim, Z; Mao, Q; Grahmmer, J; Buretta, K; Christensen, J; Yuan, N; Cooney, D ; Lee, W. P. A.; Kang, J; Brandacher, G, "3D Image Guided Micro-Vascular Anastomosis Using Ultra High Speed Fourier Domain Optical Coherence Tomography in Murine Vascularized Composite Allotransplantation Models," *AMERICAN JOURNAL OF TRANSPLANTATION* Volume: 12 Special Issue: SI Supplement: 3 Pages: 274-275 Meeting Abstract: 835 Published: MAY 2012
20. Nathanael Kuo, Hyun Jae Kang, Danny Y. Song, Jin U. Kang, and Emad Boctor, "Real-time photoacoustic imaging of prostate brachytherapy seeds using a clinical ultrasound system," *J. Biomed. Opt.*, 17(6), 066005, June 2012
21. Xuan Liu, Iulian I. Iordachita, Xingchi He, Russell H. Taylor, and Jin U. Kang, "Miniature fiber-optic force sensor based on low-coherence Fabry-Pérot interferometry for vitreoretinal microsurgery," *Biomed. Opt. Express* 3, 1062-1076 (2012)
22. Jae-Ho Han and Jin U. Kang, "Neuromorphic Biophotonic Sensor Based on Near Infrared Optical Reflectometry," *IEEE SENSORS JOURNAL* Volume: 12 Issue 3 Pg: 474-478, MAR 2012
23. J.-H. Han · J.U. Kang, "Effect of multimodal coupling in imaging micro-endoscopic fiber bundle on optical coherence tomography," *Appl Phys B* Volume: 106 Issue: 3 Pages: 635-643 MAR 2012

(2011)

24. Yong Huang, Kang Zhang, Jin U. Kang, Don Calogero, Robert H. James, and Ilko K. Ilev, "A Non-Contact Common-Path Fourier Domain Optical Coherence Tomography Method for In-Vitro Intraocular Lens Power Measurement," *J. Biomed. Opt.* 16(12), 126005, Dec. 2011
25. Kang Zhang, Yong Huang, and Jin U. Kang, "Full-range Fourier-domain optical coherence tomography imaging probe with a magnetic-driven resonant fiber cantilever," *Opt. Eng.* 50, 119002 (2011)
26. Xuan Liu, Yong Huang, Kang Zhang, and Jin U. Kang, "Spectroscopic-Speckle Variance OCT for Microvasculature Detection and Analysis," *Biomedical Optics Express*, Vol. 2, Issue 11, pp. 2995-3009 (2011)
27. J. Han, J. Kang, "Correlated Photon-Pair Source for Secured -Band Quantum Communications," *IEEE Photonics Technology Letters*, Volume: 23, Issue: 16, 2011
28. J.-H. Han, J.U. Kang, C.G. Song, "Polarization sensitive subcutaneous and muscle imaging based on common path optical coherence tomography using near infrared source," *J. Med Syst.* Volume 35, Number 4, 521-526, 2011
29. Yong Huang, Kang Zhang, Ching Lin, and Jin U. Kang, "Motion compensated fiber-optic confocal microscope based on a common-path optical coherence tomography distance sensor," *Optical Eng.* Vol. 50(8), Aug. 2011
30. Kang Zhang and Jin U. Kang, "Common-path low-coherence interferometry fiber-optic sensor guided micro-incision," *J. Biomed. Opt.* 16, 095003, Sep 01, 2011
31. Seung Nam Son, Jae-jin Song, Jin U. Kang, Chang-Seok Kim, "Simultaneous second harmonic generations of multiple wavelength laser outputs for blood hemoglobin sensing source," *Sensors*, vol. 11, Issue 6, 6125-6130, May 2011
32. Xuan Liu, Yong Huang, and Jin U. Kang, "Dark-field illuminated reflectance fiber bundle endoscopic microscope," *Journal of Biomedical Optics*, vol. 16, Issue 4, 046003, April 2011

33. Kang Zhang and Jin U. Kang, 'Real-time numerical dispersion compensation using graphics processing unit for Fourier-domain optical coherence tomography,' IEE Electron. Lett. Volume 47, Issue 5, p.309–310, March 2011
34. Kang Zhang and Jin U. Kang, "Real-time intraoperative 4D full-range FD-OCT based on the dual graphics processing units architecture for microsurgery guidance," Biomedical Optics Express, Vol. 2, Issue 4, pp. 764-770 (2011)
35. Do-Hyun Kim, Chul-Gyu Song, Ilko K Ilev, and Jin U. Kang, "Axial-scanning low-coherence interferometer for non-contact thickness measurement of biological samples," Applied Optics, 50(6), 970-974 2011
36. Song Chul-Gyu, Kang Jin U., Design of the Computerized 3D Endoscopic Imaging System for Delicate Endoscopic Surgery, JOURNAL OF MEDICAL SYSTEMS Volume: 35 Issue: 1 Pages: 135-141 FEB 2011

(2010)

37. Kang Zhang, Esen K. Akpek, Richard P. Weiblinger, Do-Hyun Kim, Jin U. Kang, and Ilko K. Ilev, "A Noninvasive Three- Dimensional Volumetric Quality Evaluation of Post-Surgical Clear Corneal Incision Using High-Resolution Fourier-Domain Optical Coherence Tomography," IEE Electron. Letts, vol. 46, 1482, 2010
38. Xuan Liu, Marcin Balicki, Russell H. Taylor and Jin U. Kang, "Towards Automatic Online Calibration of Fourier-Domain OCT for Robot Assisted VitreoRetinal Surgery," Opt. Exp., vol. 18, No. 23, 24331-24343, Oct., 2010
39. J. Han, J. Lee, T. Lee and J. U. Kang, "Near infrared imaging of micro-structured polymer-metal surface pattern," Opto-Electronics Review, Volume 18, Number 2, Pages 163-167, 2010
40. Kang Zhang and Jin U. Kang, "Graphics Processing Unit Accelerated Non-uniform fast Fourier transform for ultrahigh-speed, real-time Fourier-domain OCT," Opt. Exp., vol. 18, Iss. 22, pp. 23472-23487, Oct., 2010
41. Xuan Liu and Jin U. Kang, "Compressive OCT: The Application of Compressed Sensing in Spectral Domain Optical Coherence Tomography," Opt. Exp., Vol. 18, Iss. 21, pp. 22010–22019, 2010
42. Xuan Liu and Jin U. Kang, "Depth resolved Blood Oxygen Saturation Assessment Using Spectroscopic Common-Path Fourier Domain Optical Coherence Tomography," IEEE Transactions on Biomedical Engineering, vol. 57, no. 10, pp. 2572-2575, Oct 2010
43. Kang Zhang and Jin U. Kang, "Real-time 4D signal processing and visualization using graphics processing unit on a regular nonlinear-k Fourier-domain OCT system," Optics Express, Vol. 18, Issue 11, pp. 11772-11784, 2010
44. K Kim, J. Seo, Jin Kang, C. Song, "Implementation of a Multi-functional Ambulatory Urodynamics Monitoring System Based on Newly Devised Abdominal Pressure Measurement," Journal of Medical Systems. 34(6). 1011-1021, 2010.
45. Jin U. Kang, Jae-Ho Han, Xuan Liu, Kang Zhang, Chul Gyu Song, and Peter Gehlbach, "Endoscopic Functional Fourier Domain Common Path Optical Coherence Tomography for Microsurgery," IEEE J. of Select. Topic in Quantum. Electron., vol. 16, no. 4, pp. 781-792, 2010
46. Jae-Ho Han, Junghoon Lee, and Jin U. Kang, "Pixelation effect removal from fiber bundle probe based optical coherence tomography imaging," Optics Express Vol. 18, Iss. 7, pp. 7427–7439, 2010
47. J.-H. Han, I. K. Ilev, D.-H. Kim, C. G. Song, J. U. Kang, "Investigation of gold-coated bare fiber probe for in situ intra-vitreous coherence domain optical imaging and sensing," App. Phys. B, vol. 99, 741-746, 2010.
48. Jin U. Kang, "Virtual Biopsy," Proceedings of the IEEE, Invited Paper, Vol. 98, No. 4, April 2010
49. Jin U. Kang, Jae-Ho Han, Xuan Liu and Kang Zhang, "Common-Path Optical Coherence Tomography for Biomedical Imaging and Sensing," J. of Opt. So. K, invited paper, vol. 14, no.1, pp. 1-13, 2010
50. Jae-Ho Han, Xuan Liu, Jin U. Kang, and Chul Gyu Song, "High-resolution subsurface articular cartilage imaging based on Fourier domain common path optical coherence tomography," Chinese Optics Letters, vol. 8, no. 2, pp. 167-169, Feb. 2010.
51. Thomas, M., Siegrist, K., Torruellas, W., Kang, J., Petrillo, K. "Estimates of Near-Infrared Atmospheric Window Absorption," Johns Hopkins Apl Technical Digest. 28(3). 264-265, 2010
52. Kang Zhang, Elizabeth Katz, Do-Hyun Kim, Jin U. Kang and Ilko K. Ilev, "A common-path optical coherence tomography guided fiber probe for spatially precise optical nerve stimulation," Electron. Letts., v. 46, no. 2, pp. 118-120, 2010

(2009)

53. Weichao Wang, Kang Zhang, Qiushi Ren, Jin U. Kang, "Comparison of Different Focusing Systems for Common-Path OCT with Fiber Optic Bundle as Endoscopic Probe," Opt. Eng., vol. 48, no. 10, pg 103001, 2009

54. J.-H. Han, X. Liu, C.G. Song and J.U. Kang, "Common path optical coherence tomography with a fibre bundle probe," *Electron. Letts.*, vol. 45, Iss. 22, pg. 1110; 2009
55. Kang Zhang, Weichao Wang, Jaeho Han and Jin U. Kang, "Surface Topology and Motion Compensation System for Microsurgery Guidance and Intervention based on Common-Path Optical Coherence Tomography," *IEEE Trans. Biomedical Engineering*, Vol. 56, No. 9, 2318-2321, 2009
56. Keo Sik Kim, Jeong Hwan Seo, Jin U. Kang and Chul Gyu Song, "Implementation of a Multi-functional Ambulatory Urodynamics Monitoring System Based on Newly Devised Abdominal Pressure Measurement," *J. Med. Syst.*, vol. 33, DOI 10.1007/s10916-009-9318-1, Published Online May 2009
57. Iulian Iordachita, Zhenglong Sun, Marcin Balicki, Jin U. Kang, Soo jay Phee, James Handa, Peter Gehlbach and Russell H. Taylor, "A Sub-Millemetric, 0.25 mN Resolution Fully Integrated Fiber-Optic Force Sensing Tool for Retinal Microsurgery International Journal of Computer Assisted Radiology and Surgery," *Int. J. CARS*, vol. 4:383-390, 2009
58. Keo Sik Kim, Jeong Hwan Seo, Jin U. Kang, and Chul Gyu Song, "An enhanced algorithm for knee joint sound classification using feature extraction based on time-frequency analysis," *Computer Methods and Programs in Biomedicine*, vol. 94, 198-2006, 2009

(2008)

59. Xuan Liu, Xiaolu Li, Do-Hyun Kim, Ilko Ilev and Jin U. Kang, "Fiber Optic Fourier-domain Common-path OCT," *C. Optics Letters*, Vol.06, Issue 12, pp.899-903, 2008
60. Ukharsh Sharma, Jin U. Kang, "Simultaneous Imaging and Measurement of Applied Force on Cornea by Using a Common-Path Optical Coherence Tomography System with an External Contact Reference," *C. Optics Letters*, Vol.06, Issue 12, pp.910-913, 2008
61. K.S. Kim, J. H. Seo, Jin U. Kang, and C.G. Song, "Enhanced time-frequency analysis of VAG signals by segmentation and denoising algorithm," *IEE Electron. Lett.*, vol. 44, No. 20, Sept. 2008
62. C.G. Song, K. S. Kim, J. H. Seo, and Jin U. Kang, "Improved algorithm of continuous abdominal pressure using surface EMG," *IEE Electron. Lett.*, vol. 44, No.14, 2008
63. Xiaolu Li, Jae-Ho Han, Xuan Liu and Jin U. Kang, "SNR Analysis of all-fiber common-path optical coherence tomography," *Appl. Opt.*, vol. 47, pp. 4833-4840, 2008
64. Kang Zhang and Jin U. Kang, "C-Band Wavelength-Swept Single-Longitudinal-Mode Erbium-Doped Fiber Ring Laser," *Optics Express*, vol. 16, pp.14173-14179 (2008)
65. Do-Hyun Kim, Jin U. Kang, and Ilko K. Ilev, "Upconversion Fiber-Optic Confocal Microscopy Under Near-Infrared Pumping," *Optics Letters*, Vol. 33 Issue 5, pp.425-427 (2008)
66. Do-Hyun Kim, Ilko K. Ilev, and Jin U. Kang, "Fiber-Optic Confocal Microscopy Using a 1.55 μm Fiber Laser for Multimodal Biophotonics Applications," *Journal of Special Topics in Quantum Electronics*, vol. 14(1), pg 82-87, 2008

(2007)

67. U. Sharma and Jin U. Kang, "Common-path OCT with side-viewing bare fiber probe for endoscopic OCT," *Rev. Sci. Instrum*, vol. 78, 113102, 2007
68. Jae-Ho Han, Jin U. Kang, "Dual Wavelength-Swept Fiber Ring Laser for wavelength-dependent pump-probe measurements," *IEE Electron. Lett.*, vol. 43(23), 2007
69. Do-Hyun Kim, Ilko Ilev, Jin U. Kang, "Advanced Confocal Microscope Using Single Hollow-Core Photonic Bandgap Fibre Design," *IEE Electron. Lett.*, vol. 43(11) 608-609, 2007
70. A. B. Cooper, Jacob B. Khurgin, S. Xu, Jin U. Kang, "Phase and polarization diversity for minimum MAI OCDMA networks," *IEEE Journal of Selected Topics in Quantum Electronics*, vol. 13, No. 5, 2007
71. Do-Hyun Kim and Jin U. Kang, "Analysis of temperature dependent birefringence of polarization maintaining photonic crystal fiber," *Optics Engineering*, 46, 075003, 2007

(2006)

72. Jin U. Kang, "Observation of Random Lasing in Gold Nanoshell/Water Solution," *Appl. Phys. Lett.*, 89,1, 2006

(2005)

73. U. Sharma, G. Chen, and Jin U. Kang, "Fiber optic confocal laser Doppler velocimeter using an all-fiber laser source for high resolution measurements," *Opt. Exp.*, vol. 13, pp. 6250-6258, 2005
74. Gang Chen and Jin U. Kang, "Waveguide mode converter based on 2-D Photonic Crystals," *Opt. Lett.*, vol. 30, pp. 1656-1658, 2005

75. U. Sharma, N. M. Fried and Jin U. Kang, "All-fiber Fizeau optical coherence tomography: sensitivity optimization and system analysis," *IEEE Select. J. of Quant. Electron*, vol. 11, 4, pp.799-805 2005
76. Gang Chen, Jin U. Kang and Jacob B. Khurgin, "Frequency discriminator based on ring-assisted fiber Sagnac filter," *IEEE Photon. Tech. Lett.*, vol. 17, pp. 109-111, 2005

(2004)

77. C.-S. Kim, Y.-G. Han, Jin U. Kang, B. Choi and J. S. Nelson, "Polarization-insensitive multi-wavelength switching based on polarization-selective long period fiber gratings," *Opt. Exp.*, vol. 12, pp. 1082-1087, 2004
78. Do-Hyun Kim and Jin U. Kang, "Temperature-insensitive Sagnac loop interferometer based on polarization maintaining photonic crystal fiber," *Opt. Exp.*, vol.12, pp. 4490-4495, 2004
79. U. Sharma, C.S. Kim and Jin U. Kang, "Highly stable tunable dual-wavelength Q-switched fiber laser for DIAL applications," *IEEE Photon. Tech. Lett.*, vol. 16, pp. 1277-1279, 2004
80. C. S. Kim and Jin U. Kang, "Electro-optic wavelength-tunable fiber ring laser based on cascaded composite Sagnac loop filters," *Opt. Lett.*, vol. 29, 1677-1679, 2004
81. C. S. Kim and Jin U. Kang, "Multi-wavelength switching of Raman fiber ring laser incorporating composite PMF Lyot-Sagnac filter," *App. Optics*, vol. 43, pp. 1-7, 2004
82. Gang Chen and Jin U. Kang, "Nonlinear switching and optical limiting in double-loop fiber Sagnac filter," *J. of Optics A*, vol. 6, pp. 361-371, 2004

(2003)

83. S. Y. Kim and Jin U. Kang, "Polarization independent, figure-eight birefringent Sagnac variable comb-filter/attenuator," *IEEE Photon. Tech. Lett.*, vol., 16, pp.294-296, 2003
84. Young-Geun Han, Sang Hyuck Kim, Sang Bae Lee, Chang-Seok Kim, Jin U. Kang, U.C. Baek and Y. Chung, "Novel Raman fiber laser and fiber-optic sensors using multi-channel fiber gratings," *Journal. Opt. Soc. Kr*, vol. 7, pp. 97-101, June 2003
85. X. Xie, J. Khurgin, J. Kang and F.-S. Choa, "Linearized Mach-Zehnder Intensity Modulator," *IEEE Photon. Tech. Lett.*, vol. 15, pp. 531-533, 2003
86. Young-Geun Han, Chang-Seok Kim, Jin. U. Kang, Un-Chul Paek, and Youngjoo Chung, "Multiwavelength Raman Fiber Ring Laser using Tunable Cascaded Long-Period Fiber Gratings," *IEEE Photon. Tech. Lett.*, vol. 15, pp. 383-385, 2003
87. Chang-Seok Kim, Young-Geun Han, Raymond M. Sova, Un-Chul Paek, Youngjoo Chang and Jin U. Kang, "Optical fiber modal birefringence measurement based on Lyot-Sagnac interferometer," *IEEE Photon. Tech. Lett.*, vol. 15, pp. 269-271, 2003
88. Chang-Seok Kim, Raymond Sova and Jin U. Kang, "Novel multi-wavelength Raman source using a tunable all-fiber Sagnac loop filter," *Opt. Comm.*, vol. 218, pp.291-295, 2003
89. Young-Geun Han, Chang-Seok Kim, Jin. U. Kang, Un-Chul Paek, and Youngjoo Chung, "Simultaneous measurement of temperature and strain by adjusting temperature and strain sensitivity of long-period fiber gratings," *Opt. Exp.*, vol. 11, pp. 476-481, 2003

(2002)

90. Jin U. Kang, Xiaobo Xie, Jacob Khurgin, "Group Velocity Modified Ti-diffused LiNbO₃ Waveguides with Dual Bragg Gratings," *Electron. Lett.*, vol. 38, pp. 1049-1051, 2002
91. Do-Hyun Kim, Jin U. Kang and Jacob B. Khurgin, "Cascaded Raman Self-Frequency Shifted Soliton Generation in an All-PM Er/Yb-doped Fiber Amplifier," *App. Phys. Lett.*, vol. 81, pp. 2695-2697, 2002
92. Xiaobo Xie, Jacob Khurgin, Jin U. Kang and Fow-Sen Choa, "Ring-Assisted Frequency Discriminator With Improved Linearity," *Photonics Tech. Lett.*, vol 14, pp. 1136-1138, 2002
93. Jin U. Kang, C. S. Kim and Jacob B. Khurgin, "Fiber-laser SHG yields broad bandwidth at high power," *Laser Focus World*, vol. 38, issue 2, Feb. 2002
94. Jacob B. Khurgin, Igor Vurgaftman, Jerry R. Meyer, Shuangmei Xu and Jin U. Kang, "Reduced cross-talk semiconductor optical amplifiers based on type-II quantum wells," *Photonics Tech. Lett.*, Vol. 14, 278-279, 2002
95. Xiaobo Xie, Jacob B. Khurgin, Jin U. Kang and Fow-Sen Choa, "Compact Linearized Optical FM Discriminator," *Photonics Tech. Lett.*, Vol. 14, 384-386, 2002
96. Raymond Sova, Chang-Seok Kim and Jin U. Kang, "Dual-Wavelength All-PM Fiber Ring Laser," *Photonics Tech. Lett.*, Vol. 14, 287-289, 2002

(2001)

97. Cedric F. Lam, M. Boroditsky, Mark D. Feuer, Nicholas J. Frigo, Bhavesh Desai, and Jin U. Kang, "Demonstration of Programmable Optical Multicasting in a Regional/Metro Area Network," *Photonic Technology Letters*, Vol. 13, pp. 1236-1238, 2001

(2000)

98. Jin U. Kang, "Broadband quasi-stationary pulses in mode-locked fiber ring laser," *Opt. Comm.* Vol. 182, 433-436, 2000
99. Jin U. Kang and R. Sova, "Observation of dual relaxation-oscillations and their dynamics in all-PM erbium/ytterbium fiber ring-lasers," *Electron. Lett.* Vol. 36, 1361-1362, 2000
100. J. B. Khurgin, Jin U. Kang, and Yujie Ding, "Ultrabroad-bandwidth electro-optic modulator based on a cascaded Bragg grating," *Opt. Lett.* Vol. 25, 70-72, 2000

(1999)

101. T. R. Clark, J. U. Kang, and R. D. Esman, "Time- and wavelength- interweaved photonic sampler for analog-digital conversion," *IEEE Photon. Tech. Lett.* Vol. 11, 1168-1170, 1999
102. Jin U. Kang and Ronald D. Esman, "Demonstration of time interweaved photonic 4 channel WDM sampler for a hybrid analog-digital converter," *Electron. Lett.*, Vol. 35, 60-61, 1999
103. H. Dietrich, J. U. Kang, M. Y. Frankel, and B. Molnar, "An implantation approach to SEU suppression in GaAs," *Electron. Lett.* Apr. 19-20, 1999
104. Michael L. Dennis, Thomas F. Carruthers, Walter I. Kaechele, R. Brian Jenkins, Jin U. Kang, and Irl N. Duling, III, "Long span repeaterless transmission using adiabatic solitons," *IEEE Photon. Tech. Lett.* Vol. 11, 478-480, 1999

(1998)

105. X. H. Gu, R. Y. Korotkov, and Y. J. Ding, J. U. Kang, J. B. Khurgin, "Observation of backward third-harmonic generation in periodically-poled lithium niobate," *Optics Comm.*, Vol. 155, 323-326, 1998
106. Jin U. Kang, Michael Y. Frankel, and Ronald D. Esman, "Highly Parallel Pulsed Opto-Electronic Analog Digital Converter," *IEEE Photon. Tech. Lett.*, Vol. 10, 1626-1628, 1998
107. Jin U. Kang, Jacob Khurgin, C. C. Yang, H. H. Lin, and George I. Stegeman, "Two-photon transitions between bound-to-continuum states in AlGaAs/GaAs Multiple Quantum Well," *Appl. Phys. Lett.*, Vol. 73, 3638-3640, 1998
108. Jin U. Kang, Ralph Posey, Jr., and Ronald D. Esman, "Demonstration of supercontinuum generation in long cavity fiber ring laser," *Opt. Lett.*, Vol. 23, 1375-1377, 1998
109. J. U. Kang, G. I. Stegeman, J. S. Aitchison, and N. Ahkmediev, "Spatial solitons in AlGaAs waveguides," *Int. J. Optical and Quantum Electron.*, Vol. 30, 649-671, 1998
110. Jin U. Kang, Michael Y. Frankel, Ronald D. Esman, "Demonstration of microwave frequency shifting by use of a highly chirped mode-locked fiber laser," *Optics Lett.*, Vol. 23, 1188-1190, 1998
111. Y. J. Ding and J. U. Kang, and Jacob B. Khurgin, "Theory of backward second-harmonic generation using laser pulses in quasi-phase-matched second-order nonlinear medium," *IEEE J. Quantum Electron.*, Vol. 34, 966-974, 1998
112. Jin U. Kang, Michael Y. Frankel, Ronald D. Esman, D. A. Thompson and B. J. Robinson, "Dependence of carrier lifetime and resistivity on annealing in InP grown by He-plasma-assisted molecular beam epitaxy," *J. Appl. Phys.* Vol. 83, 3423-3425, 1998
113. H. Pinkney, p. Simpson, J. U. Kang, M. Y. Frankel D. A. Thompson, B. J. Robinson, and P. Mascher, "Characterization of annealed high-resistivity InP grown by He-plasma-assisted epitaxy," *J. Vac. Sci. Technol. A*, Vol. 16(2) 772-775, 1998
114. Jin U. Kang, Michael Y. Frankel, Ronald D. Esman, D. A. Thompson and B. J. Robinson, "InGaAsP grown by He-plasma-assisted molecular beam epitaxy for 1.55 μ m high speed photodetectors," *App. Phys. Lett.* Vol. 72, 1278-1280, 1998
115. Xinhua Gu, Roman Y. Korotkov, Yujie J. Ding, Jin U. Kang, Jacob. B. Khurgin, "Backward second-harmonic generation in periodically poled lithium niobate," *J. Opt. Soc. Am. B*, Vol. 15, 1561-1566, 1998

(1997)

116. Michael Y. Frankel, Jin U. Kang and Ronald D. Esman, "High-Performance Photonic Analog-Digital Converter," *Electron. Lett.* Vol. 33, 2096-2097, 1997

- 117.M. L. Dennis, M. A. Putnam, J. U. Kang, T. E. Tsai, I. N. Duling III, E. J. Friebele, "Interrogation of fiber Bragg gratings by mode-locked erbium fiber laser," *Optics Lett*, Vol. 22, 1362-1364, 1997
- 118.J. U. Kang, W. K. Burns, Y. J. Ding, and J. S. Melinger, "First observation of backward second-harmonic generation in periodically-poled bulk LiNbO₃," *Optics Lett.*, Vol. 22, 862-864, 1997
- 119.J. U. Kang, M. Y. Frankel, J.-W. Huang, and T. F. Kuech, "Ultrafast carrier trapping in oxygen-doped metal-organic vapor phase epitaxy GaAs," *App. Phys. Lett*, 70, 1560-1562, 1997
- 120.P. Miller, J. S. Aitchison, J. U. Kang, G. I. Stegeman, A. Villeneuve, G. T. Kennedy, and W. Sibbett, "Nonlinear Waveguide Arrays in AlGaAs," *J. Opt. Soc. Am. B*, Vol. 14, 3224-3231, 1997
- 121.J. S. Aitchison, D. C. Hutchings, J. M. Arnold, J. U. Kang, G. I. Stegeman, E. Ostrovskaya, and N. Ahkmediev, "Power-Dependent Polarisation Dynamics of mixed mode Spatial Solitary waves in AlGaAs waveguides," *J. Opt. Soc. Am. B*, Vol. 14, 3032-3037, 1997
- 122.J. U. Kang, G. I. Stegeman, J. S. Aitchison, "Spatial soliton robustness against spatially anisotropic phase perturbations," *App. Phys. Lett*, Vol. 70, 1363-1365, 1997
- 123.E. A. Ostrovskaya, N. M. Ahkmediev, J. U. Kang, G. I. Stegeman, and J. S. Aitchison, "Mixed-mode spatial solitons in semiconductor waveguides," *J. Opt. Soc. Am. B*, Vol. 14, 880-887, 1997
- 124.J. S. Aitchison, and D. C. Hutchings, J. U. Kang, G. I. Stegeman, " Nonlinearities of AlGaAs below half the band gap," *IEEE J. Quant. Electron.*, Vol. 33, 341-348, 1997

(1996)

- 125.J. U. Kang, G. I. Stegeman, J. S. Aitchison, A. Villeneuve, N. Ahkmediev, "AlGaAs below half the band gap: A Laboratory for spatial soliton physics," *J. Pure Appl. Opt.* Vol. 5, 583-594, 1996
- 126.J. U. Kang, G. I. Stegeman, J. S. Aitchison, and N. Ahkmediev, " Observation of Manakov soliton in AlGaAs planar waveguides," *Phys. Rev. Lett.*, Vol. 76, 3699-3702, 1996
- 127.Jin U. Kang, G. I. Stegeman, and J. S. Aitchison, "One-Dimensional Spatial Soliton Dragging and All-Optical Switching in AlGaAs Waveguides," *Optics Lett.*, Vol. 21, 189-191, 1996

(1995)

- 128.J. S. Aitchison, Jin. U. Kang, G. I. Stegeman, "Signal Gain due to a polarization coupling in an AlGaAs Channel Waveguide," *App. Phys. Lett*, Vol. 67, 2456-2458, 1995
- 129.Jin U. Kang, G. I. Stegeman, and J. S. Aitchison, "Weak Beam Trapping by a Bright Spatial Soliton in AlGaAs Waveguides," *Optics Lett.*, Vol. 20, 2069-2071, 1995
- 130.Villeneuve, P. Vamyshev, J. U. Kang, G. I. Stegeman, J. S. Aitchison and C. N. Ironside, "Time Domain All-Optical Demultiplexing with a Semiconductor Directional Coupler", *Appl. Phys. Lett.*, Vol. 66, 1668-1670, 1995
- 131.Villeneuve, J. U. Kang, J. S. Aitchison, and G. I. Stegeman, "Unity ratio of cross- to self-phase modulation in bulk AlGaAs and AlGaAs/GaAs multiple quantum well waveguides at half the band gap," *Appl. Phys. Lett*, Vol. 67, 760-762, 1995
- 132.Jin U. Kang, G. I. Stegeman, and J. S. Aitchison, 'All-optical multiplexing of femtosecond signals using an AlGaAs nonlinear directional coupler,' *Electron. Lett*, Vol. 31, 118-119, 1995
- 133.Jin U. Kang, G. I. Stegeman, C-H. Huang, D-U. Li, H-H. Lin, H-C. Chang, and C. C. Yang, "Birefringence of Passive Multi-Quantum-Well Semiconductor Slab Waveguides," *IEEE Photon. Tech. Lett.*, Vol. 7, 769-771, 1995
- 134.Villeneuve, J. S. Aitchison, B. Vogeles, R. Tapella, J. U. Kang, C. Trevinos, and G. I. Stegeman, "Waveguide Design for Minimum Nonlinear Effective Area and Switching Energy in AlGaAs at Half the Bandgap", *Electron. Lett*, Vol. 31, 549-551, 1995
- 135.Villeneuve, P. Vamyshev, J. U. Kang, G. I. Stegeman, J. S. Aitchison and C. N. Ironside, "Efficient Time-Domain Demultiplexing with Separate Signal and Control Wavelengths in an AlGaAs Nonlinear Directional Coupler", *IEEE J. Quant. Electron.*, Vol. 31, 2165-2172, 1995

(1994)

- 136.G. I. Stegeman, A. Villeneuve, J. Kang, J. S. Aitchison, C. N. Ironside, K. Al-Hemyari, C. C. Yang, C.-H. Lin, H.-H. Lin, G. T. Kennedy, R. S. Grant, and W. Sibbett, 'AlGaAs Below Half Bandgap: The Silicon of Nonlinear Optical Materials,' *Int. J. of Nonlinear Optical Physics*, Vol 3, 347-371, 1994
- 137.Jin U. Kang, Alain Villeneuve, Mansoor Sheik-Bahae, George I Stegeman, Kadhair Al-hemyari, J. Stewart Aitchison, and Charles N. Ironside, 'Limitation due to three-photon absorption on the useful spectral range for nonlinear optics in AlGaAs below half band gap,' *Appl. Phys. Lett*. Vol. 65, 147-149, 1994

138. Dug Y. Kim, William E. Torruellas, Jin Kang, Christian Bosshard, George I. Stegeman, Petar Vidakovic, Joseph Zyss, W. E. Moerner, R. Twieg, and G. Bjorklund, 'Second-order cascading as the origin of large third-order effects in organic single-crystal-core fibers,' *Optics Lett.* Vol. 19, 868-870, 1994
139. Villeneuve, J. S. Aitchison, J. U. Kang, P. G. Wigley, and G. I. Stegeman, 'Integrated Ultrafast Saturable Absorber,' *Optics Lett.* Vol. 19, 761-763, 1994
140. B.L. Lawrence, M. Cha, J.U. Kang, W. Toruellas, G.I. Stegeman, G. Baker, J. Meth and S. Etemad, 'Large purely refractive nonlinear index of single crystal P-toluene sulphonate (PTS) at 1600 nm', *Electron. Lett.*, Vol. 30, 447-448, 1994
141. I Ledoux, J Zyss, C GU, P YEH, HJ EICHLER, A HAASE, R MENZEL, GI STEGEMAN, A VILLENEUVE, J KANG, JS AITCHISON, CN IRONSIDE, K AL-HEMYARI, CC YANG, CH LIN, HH LIN, GT KENNEDY, RS GRANT, W SIBBETT, N SONDERER, P GÜNTER, "Nonlinear organic molecules and materials for optoelectronic devices," *International Journal of Nonlinear Optical Physics*, vol. 3, iss. 3, pages 287-316, 1994

(1993)

142. K. Al-hemyari, A. Villeneuve, J. U. Kang, J. S. Aitchison, C. N. Ironside, G. I. Stegeman, 'Ultrafast all-optical switching in GaAlAs directional couplers at 1.55 μm without multiphoton absorption', *Appl. Phys. Lett.* Vol. 63, 3562-3564, 1993
143. Villeneuve, K. Al-Hemyari, J. U. Kang, C. N. Ironside, J. S. Aitchison and G. I. Stegeman, 'Demonstration of All-Optical Demultiplexing at 1555 nm with an AlGaAs Directional Coupler', *Electron. Lett.*, Vol. 29, 721-722, 1993

Invited Conference Presentation/Publication

144. Jin U. Kang, "Ultra-fast real-time optical coherence tomography guided microsurgery," Invited Paper NIH100-13 Image Guided Intervention/Surgery, 7th NIH Inter-Institute Workshop on Optical Diagnostic and Biophotonic Methods from Bench to Bedside, September 16, 2011
145. Jin U. Kang and Xuan Liu, "Functional Common-Path Fourier-Domain OCT for Hemoglobin Oxygen Saturation Imaging," invited, ACP 2009, Shanghai, China
146. Jin U. Kang, "Broadband fiber lasers and applications," Quantum Electronics Lecture Series, Univ. Maryland CP, March 2008
147. Jin U. Kang, "Common-path fiber optic OCT," Distinguished Lecture Series, Shanghai Jiao-Tong University, 2008
148. Jin U. Kang, "Entangled photon pair generation based on intra-cavity FWM," Physics Division, NIST Seminar series, 2008
149. Jin U. Kang, "Common-path fiber optic OCT and their applications," CDRH Invited Seminar Series, FDA, 2008
150. Jin U. Kang and Do-Hyun Kim, "Temperature independent birefringence in polarization maintaining photonic crystal fiber," CLEO, PR, MD1-1, 2007
151. Jin U. Kang and Ray Sova, "Ultrahigh repetition rate solitary wave generation," ISSSE, 2007
152. Jin U. Kang, "Fiber Optic Tunable Multirate solitary wave generation," IMACS, China, 2007
153. Jin U. Kang, "Tunable Multi-wavelength fiber lasers and their applications," SPIE Photonics West 2001 on Rare-Earth-Doped Materials and Devices VI, January 2002.
154. Jin U. Kang, "Nonlinear optics near half the bandgap of semiconductors," SPIE Photonics West 2000 International Symposium on "Ultrafast Phenomena in Semiconductors IV, 2000
155. Jin U. Kang, "Broadband fiber lasers and their applications," Bulletin of the Korean Physical Society, Korean Physical Society Annual Meeting, 17-1, I-1, 1999
156. J. U. Kang, C. J. Hamilton, J. S. Aitchison, and G. I. Stegeman, "Spatial soliton robustness against spatially anisotropic phase perturbations," International Conference on Quantum Electronics and Laser Science, 1997
157. J. U. Kang, G. I. Stegeman, J. S. Aitchison, and N. Ahkmediev, " Observation of Manakov spatial soliton in AlGaAs planar waveguides," International Quantum Electronics Conference, TuB3, 1996
158. J. U. Kang, G. I. Stegeman, and J. S. Aitchison, "All-optical switching based on spatial solitons in AlGaAs," The 10th Annual International AeroSense Symposium, 2749-20, 1996
159. Jin U. Kang, George Stegeman, W. Torruellas, A. Villeneuve, and J. S. Aitchison, "Photonics Applications of Spatial Soliton Switches," SPIE AeroSense Orlando, 1995

Refereed Conference Proceedings and Other Publications:

160. Sungwook Yang, Marcin Balicki, Robert A. MacLachlan, Xuan Liu, Jin U. Kang, Russell H. Taylor, Cameron N Riviere. "Optical Coherence Tomography Scanning with a Handheld Vitreoretinal Micromanipulator" Proceedings of IEEE EMBS Conference 2012.
161. Seth Billings, Nishikant Deshmukh, Hyun Jae Kang, Russell Taylor, Emad Boctor, "System for Robot-Assisted Real-Time Laparoscopic Ultrasound Elastography", SPIE Medical Imaging 2012, San Diego, Volume: 8316, 83161W
162. Zuhair Ibrahim, Yong Huang, Jaepyeong Cha, Qi Mao, Johanna Grahammer, Gabriel Brat, Kate Buretta, Joani Chirstensen, Nance Yuan, Damon Cooney, WP Andrew Lee, Jin U Kang, Gerald Brandacher, "Image Guided Reconstructive Microsurgery Using Ultra High Speed Fourier," 91st Annual meeting of American Association of Plastic Surgeons Domain Optical Coherence Tomography
163. Marcin Balicki, Rogerio Richa, Balazs Vagvolgyi, Peter Kazanzides, Peter Gehlbach, James Handa, Jin Kang, Russell Taylor. "Interactive OCT Annotation and Visualization for Vitreoretinal Surgery" Workshop on Augmented Environments for Computer-Assisted Interventions - MICCAI 2012. Best Poster Award.
164. Peter L. Gehlbach, Yong Huang, Jin U. Kang, "3-D Image Guided Retinal Surgery Using Real-Time High-Speed Fourier-Domain Optical Coherence Tomography," Program: 807/D745, Session:124, ARVO 2012
165. X. Liu, I. I. Iordachita, X. C. He, R. H. Taylor, J. U. Kang, "Miniature fiber-optic force sensor for vitreoretinal microsurgery based on low-coherence Fabry-Perot interferometry," Proceedings of SPIE, vol. 8218 (821800), 2012
166. X. C. He, M. A. Balicki, J. U. Kang, P. L. Gehlbach, J. T. Handa, R. H. Taylor, I. I. Iordachita, "Force sensing micro-forceps with integrated fiber Bragg grating for vitreoretinal surgery," Proceedings of SPIE, vol. 8218 (82180W) 2012
167. K. Zhang and J.U. Kang, "Graphics processing unit based ultrahigh speed real-time multidimensional Fourier domain optical coherence tomography," Proceedings of SPIE, vol. 8213 (82132B), 2012
168. Yong Huang, Jin U. Kang, "Corneal tissue ablation using 6.1 μm quantum cascade laser", in Ophthalmic Technologies XXII, Fabrice Manns; Per G. Söderberg; Arthur Ho, Editors, Proceedings of SPIE Vol. 8209 (SPIE, Bellingham, WA 2012), 82091W
169. Y Huang, K Zhang, W. J. Yi, and J. U. Kang, "In-vivo gingival sulcus imaging using full-range, complex-conjugate-free, endoscopic spectral domain optical coherence tomography," Proceedings of SPIE, vol 8208 (820804) 2012
170. Abner Rodriguez , Jin U. Kang, and Yong Huang, "Real-time 4D non-invasive subsurface corrosion inspection using ultrahigh-speed, Fourier-domain optical coherence tomography," Proc. SPIE 8155, Infrared Sensors, Devices, and Applications; and Single Photon Imaging II, 81550W (September 16, 2011);
171. R. Taylor, J. Kang, I. Iordachita, G. Hager, P. Kazanzides, C. Riviere, E. Gower, R. Richa, M. Balicki, X. He, X. Liu, K. Olds, R. Sznitman, B. Vagvolgyi, P. Gehlbach, J. Handa, "Recent Work Toward a Microsurgical Assistant for Retinal Surgery," Proceedings of The Hamlyn Symposium on Medical Robotics, 2011.
172. S. Malkov, D. Bergles, J. U. Kang, "Motion compensation for two photon microscopy by optical coherence tomography feedback." CWB5. CLEO Technical Digest, 2011
173. All-Fiber Common-Path Fourier-Domain Optical Coherence Tomography moving 2-axis based on Active Surface Tracking Algorithm (PaperID:101). Minho Kim*, Chul-Gyu Song, Keo-Sik Kim, Sanghun Ryu , Jeong-Hwan Seo, Jin U Kang, IEEE iCAST 2011
174. Kang Zhang, Jin U. Kang, "Real-Time Numerical Dispersion Compensation for Standard/Full-Range Complex Fourier-Domain Optical Coherence Tomography, CLEO Technical Digest, ATuC4 2011
175. Yi Yang, A Brinton Cooper, Jacob B. Khurgin, Jin U. Kang, "Robustness of Coherent SPE-OCDMA to Combined Dispersion Impairments," CLEO Technical Digest, JWA5 2011
176. Kang Zhang, Yong Huang, Jin U. Kang, "Full-Range, Complex-Conjugate-Free, Endoscopic Spectral-Domain Optical Coherence Tomography," CLEO Technical Digest, JThA2 2011
177. Kang Zhang and Jin U. Kang, "Real-Time 4D Full-Range Complex Fourier-domain OCT with Non-Uniform Fast Fourier Transform Based on Dual Graphics Processing Units Architecture," 2011 Bio-Optics: Design and Application (BODA) Topical Meeting, Monterey CA
178. Y. Huang, K. Zhang, C. Lin, J. U. Kang, "A motion compensated fiber optic confocal microscope based on common-path optical coherence tomography distance sensor," Proceedings of SPIE volume 7894-08, Progress in biomedical Optics and Imaging, vo. 12, no 12, Jan. 2011
179. K. Zhang, P. Gehlbach, J. U. Kang, "A common-path optical coherence tomography distance-sensor based surface tracking and motion compensation hand-held microsurgical tool," Proceedings of SPIE volume 7894-0G, Progress in biomedical Optics and Imaging, vo. 12, no 12, Jan. 2011
180. Xuan Liu; Marcin Balicki; Russell H. Taylor; Jin U. Kang, "Automatic online spectral calibration of Fourier-domain OCT for robotic surgery," Proceedings of SPIE Volume: 7890, Jan. 2011

181. Xuan Liu; Jin U. Kang Sparse OCT: optimizing compressed sensing in spectral domain optical coherence tomography, Proceedings of SPIE, Vol. 7904, Jan. 2011
182. Kang Zhang; Yong Huang; Gustavo Pradilla; Betty Tyler; Jin U. Kang, "Real-time intraoperative full-range complex FD-OCT guided cerebral blood vessel identification and brain tumor resection in neurosurgery," Proceedings of SPIE Vol. 7883, Jan. 2011
183. N. Kuo, H. J. Kang, T. DeJournett, J. Spicer, and E. Boctor, "Photoacoustic imaging of prostate brachytherapy seeds in ex vivo prostate," Proc. SPIE 7964, 796409 (2011)
184. Kang Zhang; Jin U. Kang, "Real-time dual-mode standard/complex Fourier-domain OCT system using graphics processing unit accelerated 4D signal processing and visualization," Proceedings of SPIE, Vol. 7904, Jan. 2011
185. Peter L. Gehlbach, Kang Zhang and Jin U. Kang, "A Free-hand Surface Tracking and Motion Compensation Microsurgical Tool System Based on a Common-path Optical Coherence Tomography Distance Sensor," Proceedings of 28th Annual ASRS Meeting, Vancouver, 2010
186. Kang Zhang, Keith G. Petrillo, Peter L. Gehlbach, Jin U. Kang, "A Free-Hand Surface Tracking and Motion Compensation Microsurgical Tool System based on Common-path Optical Coherence Tomography Distance Sensor," CTuB6, OSA Tech. Digest., CLEO 2010
187. Kang Zhang, Elizabeth Katz, Do-Hyun Kim, Jin U. Kang, Ilko K. Ilev, "A Fiber-Optic Nerve Stimulation Probe Integrated with a Precise Common-Path Optical Coherence Tomography Distance Sensor," CTuP2, OSA Tech. Digest., CLEO 2010
188. Kang Zhang, Esen Akpek, Richard P. Weiblinger, Do-Hyun Kim, Jin U. Kang, Ilko K. Ilev, Post-Surgical Volumetric Evaluation of Clear Corneal Incision Quality Using a High-Resolution 3-D Spectral-Domain Optical Coherence Tomography," AMA2, OSA Tech. Digest., CLEO 2010
189. Raphael Sznitman*, Seth Billings, Diego Rother, Daniel Mirota, Yi Yang, Jim Handa, Peter Gehlbach, Jin U. Kang, Gregory D. Hager and Russell Taylor, "Active Multispectral Illumination and Image Fusion for Retinal Microsurgery," Information Processing in Computer-Assisted Interventions, Book Series: Lecture Notes in Computer Science Volume: 6135 Pages: 12-22 2010
190. Jin U. Kang, "Progress toward inexpensive endoscopic high-resolution common-path OCT (Invited Paper)", Paper 7559-24, Proceeding of SPIE, BIOS 2010.
191. Jae-Ho Han; Liu Xuan; Jin U. Kang; Chul-Gyu Song, "A study on the qualitative morphological features of the muscle and subcutaneous shapes in vivo using Fourier-domain common path OCT, Proceedings of SPIE, Vol. 7554, Jan. 2010
192. Jin U. Kang and Xuan Liu, "high resolution hemoglobin oxygen saturation level imaging using morlet wavelet transformed spectroscopic optical coherence tomography," IEEE International Symposium on Biomedical Imaging (ISBI) 2010
193. Jin U. Kang and Xuan Liu, "Functional Common-Path Fourier-Domain OCT for Hemoglobin Oxygen Saturation Imaging," invited, ACP 2009, Shanghai, China
194. Liu, Xuan; Meisne, Eric; Han, Jae-Ho; Zhang, Kang; Gehlbach, Peter; Taylor, Russell; Kang, Jin U., "Internal limiting membrane layer visualization and vitreoretinal surgery guidance using a common-path OCT integrated microsurgical tool," Proceedings of the SPIE, Volume 7550, pp. 755003-755003-4 (2010).
195. Chul-Gyu Song, Jae-Ho Han, Xuan Liu, and Jin U. Kang, "A study on the qualitative morphological features of the muscle and subcutaneous shapes in vivo using Fourier-domain common path OCT," Paper 7554-89, SPIE Photonics West Technical Digest, 2009
196. J.-H. Han, X. Liu, C. G. Song, J. U. Kang, "Fourier Domain Common-Path Optical Coherence Tomography with a Conduit Fiber Bundle Probe," TuJ3 11.15 - 11.30, IEEE LEOS Technical Digest, 2009
197. Jae-Ho Han, Marcin Balicki, Kang Zhang, Xuan Liu, James Handa, Russell Taylor, Jin U. Kang, "Common-Path Fourier-Domain Optical Coherence Tomography with a Fiber Optic Probe Integrated into a Surgical Needle," CMCC2, OSA Technical Digest, CLEO 2009
198. Kang Zhang and Jin U. Kang, "Self-Adaptive Common-Path Fourier-Domain Optical Coherence Tomography with Real-Time Surface Recognition and Feedback Control," JTuD59, OSA Technical Digest, CLEO 2009
199. Kang Zhang, Jae-Ho Han, Jin U. Kang, "All-Fiber Common-Path Fourier-Domain Optical Coherence Microscopy for 3-D in vivo Endoscopic Subcellular Imaging, JWA74, OSA Technical Digest, CLEO 2009
200. Marcin Balicki, Jae-Ho Han, Iulian Iordachita, Peter Gehlbach, Russell Taylor and Jin Kang, "Common-Path Optical Coherent Tomography for Guided Robotic Interventions in Retinal Surgery - Preliminary Study," Int. Conf. on Medical Image Computing and Computer Assisted Intervention (MICCAI), "Best Paper," 03-4, 2009
201. Zhenglong Sun, Marcin Balicki, Jin Kang, James Handa, Russell H. Taylor, Iulian Iordachita, "A sub-millimetric 0.25 mN resolution fully integrated fiber-optic force sensing tool for retinal microsurgery," Computer Assisted Radiology and Surgery (CARS) 2009

202. Zhengloung Sun, Marcin Balicki, Jin Kang, James Handa, Russell H. Taylor, Iulian Iordachita, "Development and Preliminary Data of Novel Integrated Optical Micro-Force Sensing Tools for Retinal Microsurgery," Contributed paper #1601, Proceedings of IEEE International Conference on Robotics and Automation, 2009
203. Do-Hyun Kim, Jin U. Kang and Ilko K. Ilev, "Advanced Confocal Fiber-Optic Imaging and Sensing Approaches," Proceedings of SPIE, 7172, 2009
204. Xuan Liu, Do-Hyun Kim, Ilko Ilev and Jin U. Kang, "Fiber-Optic Fourier-Domain Common-Path OCT," Proceedings of IEEE/LEOS 2008 Annual Meeting
205. Jae-Ho Han, Scott Hendrickson, Jin U. Kang, "In situ Frog Retina Imaging Using Common-Path OCT with a Gold-Coated Bare Fiber Probe," CFM6, OSA CLEO Technical Digest 2008
206. Jae Suk Park, Eun Joo Jung, Myung Yung Jeong, Chang-Seok Kim, Jin U. Kang, "Endoscopic common-path OCT based on sweeping laser source and curled optical patch cord," Proceedings of SPIE, vol. 6851, 685101, 2008
207. Jin U. Kang, "Ultrahigh Repetition Rate Solitary Wave Generation," MOWB-11.6, Proceedings of ISSSE, Montreal, 2007
208. Jin U. Kang, Do-Hyun Kim, Ilko Ilev, "Non-Invasive Fiber-Optic Glucose Sensor Based on Stimulated Raman," TuI4, IEEE/LEOS Technical Digest, LEOS Annual Meeting, 2007
209. Do-Hyun Kim, Jin U. Kang, Ilko Ilev, "Using Mid-Infrared Glucose Absorption Peak Changes for High-Precision Glucose Detection," TuI5, LEOS Technical Digest, LEOS Annual Meeting, 2007
210. Jin U. Kang, Abner Rodriguez, "Fourier Domain common-path fiber OCT with tunable reference: analysis and optimization," JtuA55, OSA Technical Digest, CLEO2007
211. Do-Hyun Kim, Ronald Waynant, Ilko K. Ilev, Jin U. Kang, "An all-fiber optic confocal interference microscope using low-coherence near infrared light source," JTUA51, OSA Technical Digest, CLEO, 2007
212. A Brinton Cooper, Jacob B. Khurgin, Shangmei Xu, Jin U. Kang, "High spectral efficiency phase diversity coherent optical CDMA with low MAI," JTUA129, OSA Technical Digest, CLEO 2007
213. Abner Rodrigues, Do-Hyun Kim, Jin U. Kang, "Endoscopic fiber confocal microscopy using a GRIN lens," CTuEE2, OSA Technical Digest, CLEO 2007
214. Do-Hyun Kim, Jin U. Kang, Ronald W. Waynant, Ilko K. Ilev, "Upconversion fiber-optic confocal microscopy using a near-infrared light source," CTuF6, OSA Technical Digest, CLEO 2007
215. Jae-Ho Han, Yi Yang, Jin U. Kang, "Linewidth broadening in single-mode sub-kHz fiber ring laser with unpumped Er-doped Sagnac loop, JWA72, OSA Technical Digest, CLEO 2007
216. Jae-Ho Han, Jin U. Kang, "Generation of entangled photon pairs based on intra-cavity four wavemixing in dual-wavelength fiber ring laser," QWF3, OSA Technical Digest, CLEO 2007
217. Jin U. Kang, Jacob B. Khurgin, "Observation of Random Lasing in Gold-silica Nanoshell/Water Solution, OSA Technical Digest., CLEO 2006 QTuI2
218. Anthony K. Ngo; Utkarsh Sharma; Jin U. Kang; Nathaniel M. Fried, "Laser welding of urinary tissues, ex vivo, using a tunable Thulium fiber laser," Proceedings of SPIE, vol. 6078, 60781B, 2006
219. Abner Rodriguez, Jin U. Kang, Gang Chen, Mikhail Vorontsov, "Demonstration of Speckle and Interference pattern Control Using a Wavelength-Swept Fiber Laser, OSA Technical Digest, CLEO 2006 CWD2
220. A. Brinton Cooper III, Jacob B. Khurgin, Jin U. Kang, "Phase and Polarization Diversity for OCDMA, OSA Technical Digest, CLEO 2006, CWH4
221. Jin U. Kang, Utkarsh Sharma, "Measurement of Applied Force on Cornea Based on Common-Path Optical Coherence Tomography with External Contact Reference, OSA Technical Digest., CLEO 2006 CTuG3
222. Do-Hyun Kim, Jin U. Kang, Ronald W. Waynant, Ilko K. Ilev, "Simple Confocal Microscopy Based on Single Hollow-Core Photonic Bandgap Fiber, OSA Technical Digest, CLEO 2006, CMR1
223. Hyun Youk, Jin U. Kang, Jacob Khurgin, Anant Agrawal, Ilko Ilev, Ronald Waynant, "Surface Enhanced Raman Glucose Detection Using Gold Nanoshells, OSA Technical Digest, CLEO 2006, CMH5
224. Jin U. Kang, "Spatial Solitons in AlGaAs near Third of Bandgap," 4th IMAC Inter. Conf. on NL Evol. Equ. And Wave. Ph., Athens, Georgia, 2005
225. Do-Hyun Kim and Jin U. Kang, "Sagnac Loop Interferometer Using Polarization Maintaining Photonic Crystal Fiber," CTuD6, CLEO 2005
226. Utkarsh Sharma, Jin U. Kang, Nathaniel M. Fried, "Fizeau Optical Coherence Tomography: Sensitivity Optimization and System Analysis," CFA5, CLEO 2005
227. Jacob B. Khurgin, Jin U. Kang, F. S. Choa, M. Boroditsky, "Comparative analysis of the optical buffers based on coupled resonators lines and on media with electromagnetically induced transparency," CWA 14, CLEO 2004
228. Gang Chen, Chang-Seok Kim, Jin U. Kang, Jacob B. Khurgin, "Ring-Assisted Sagnac Frequency Discriminator," CthMM5, OSA Conf. Lasers and Elec. Opt., San Francisco, 2004

229. Chang-Seok Kim, Fatima N. Farokhrooz, Jin U. Kang, "Fast wavelength-swept fiber laser using electro-optic polarization controller," CthGG, CLEO 2004
230. Utkarsh Sharma, Jin U. Kang, Nathaniel M. Fried and Jeff Bush, "Optical coherence tomography based on an all-fiber autocorrelator using probe-end reflection as reference," CWJ, CLEO 2004
231. Jin U. Kang, Gang Chen, Jacob B. Khurgin, "Nonlinear switching and filtering dynamics in double-loop fiber Sagnac Filter," MC22, OSA Nonlinear Guided Wave Conf. (NGWC), Toronto, March 2004
232. Jacob B. Khurgin and Jin U. Kang, "Slow waves in linear and nonlinear photonic crystal waveguides: Figures of merit," TuB6, OSA NLGW conference, Toronto, March 2004
233. Utkarsh Sharma, Chang-Seok Kim, and Jin U. Kang, "Tunable dual wavelength Q-switched fiber laser for DIAL applications", CLEO/QELS 2003, Paper: CThY7, Baltimore, Maryland (June 1-7, 2003)
234. Fatima N. Farokhrooz, Chang-Seok Kim, Xiaobo Xie, Jin U. Kang, and Jacob B. Khurgin, "Tunable Fiber Sagnac FM Discriminator", CLEO/QELS 2003, Paper: CTuV2, Baltimore, Maryland (June 1-7, 2003)
235. Chang-Seok Kim, Gang Chen, Fatima N. Farokhrooz, and Jin U. Kang, "Demonstrations of PM fiber Sagnac variable optical attenuation for Raman gain control", CLEO/QELS 2003, Paper: CWA54, Baltimore, Maryland (June 1-7, 2003)
236. Chang-Seok Kim, Young-Geun Han, Raymond M. Sova, Jin U. Kang, Un-Chul Paek and Youngjoo Chung, "Novel method of fiber birefringence measurement based on Lyot-Sagnac interferometer," TuK, OFC2003,
237. Chang-Seok Kim, Young-Geun Han, Raymond M. Sova, Jin U. Kang, Un-Chul Paek and Youngjoo Chung, "Measurement of fiber birefringence using Lyot-Sagnac interferometer," Symposium on Optical Fiber Measurements, NIST, Sept. 2002
238. Fow-Sen Choa, Jacob B. Khurgin and Jin U. Kang, "Efficient Wideband Integrated Lightwave Devices for RF Transmissions," GOMAC, 4-3, March 2002
239. Jin U. Kang, Chang-Seok Kim, and Jacob B. Khurgin, "Fiber-Laser SHG Yields Broad Bandwidth at High Power, *Laser Focus World*," Vol. 38, issue 2, February 2002
240. Raymond Sova and Jin U. Kang, "Soliton Pulse Train Generator based on a Novel Tunable Dual-Wavelength Fiber Ring Laser," CTh0, Conf. on Lasers and Electro Optics 2002
241. Raymond Sova, Jin U. Kang and Jacob B. Khurgin, "Tunable Dual Wavelength Fiber Ring Laser based on Second Order Sagnac-Lyot Fiber Filters," CThC, Conf. on Lasers and Electro Optics 2002
242. Chang-Seok Kim and Jin U. Kang, "Second Harmonic Generation of Broadband All-Fiber Raman Source," Conf. on Lasers and Electro Optics, 2002
243. Do-Hyun Kim, Jin U. Kang, Jacob B. Khurgin, "Anisotropic cascaded Raman Self-frequency Shifted Solitons Generated in a Fiber Amplifier," QThE, Quantum Electronics and Lasers Conf. 2002
244. Raymond M. Sova, Chang-Seok Kim and Jin U. Kang, "Tunable all-fiber birefringence comb filters," ThGG61, Optical Fiber Communications Conference, 2002
245. Chang-Seok Kim, Raymond M. Sova, Jin U. Kang, Jacob B. Khurgin, "Novel Multi-wavelength cascaded-Raman source based on tunable fiber Sagnac loop filter," WJ1, Optical Fiber Communication conf., 2002
246. Jin U. Kang, Ray Sova, and Chang-Seok Kim, "Tunable Multiwavelength fiber lasers and their applications," Proceedings of SPEI vol. 4645-02. 2002
247. D.Y. Kim, Jin U. Kang and Jacob B. Khurgin "Cascaded Raman Self-Frequency Shifted Solitons Generation in Er/Yb-Doped Fiber Amplifier," LEOS Annual Meeting Technical Digest 2001, WV2
248. Chang-Seok Kim, Jin U. Kang, "Second Harmonic Generation of Polarization Maintaining Yb-Doped Fiber Laser using Periodically-Poled Lithium Niobate," LEOS Annual Meeting Technical Digest 2001, MH2
249. Jin U. Kang, Chang-Seok Kim, Ray Sova, J. B. Khurgin and H. Shaw, "High performance fiber lasers for UV-DIAL," NASA Earth Science and Technology Technical Digest 2001, B1P1
250. Jin U. Kang, D. H. Kim, J. B. Khurgin, N. N. Akhmediev, H. Han and H. Shaw, "Wide-Spectrum multi-soliton complex in Er/Yb-doped fiber amplifier," CLEO/Pacific 2001, Postdeadline, WJPD1-9
251. J. B. Khurgin, Jin U. Kang, Igor Vurgaftman, and Jerry R. Meyer, "Improving efficiency of Q-switched semiconductor lasers based on type-II quantum wells," CLEO 2001 Technical Digest, CtuM57, pp. 196
252. Raymond M. Sova, Chang-Seok Kim, and Jin U. Kang, "Dual-wavelength, all-PM Er/Yb fiber ring laser with wavelength and channel separation tenability," CLEO 2001 Technical Digest, CWA52, pp. 301
253. J. B. Khurgin and Jin U. Kang, "Light slowing down in Moire fiber gratings and its implications for nonlinear optics," QELS 2001 Technical Digest, QWD5
254. Jin U. Kang, Jacob B. Khurgin and H. Han, "Phase-locking and divergence in mutually trapped orthogonally polarized solitons," Ultrafast Electronics and Optoelectronics Technical Digest 2001, UFB3-1, pp. 108
255. Jacob B. Khurgin, Jin U. Kang, and E. Rosencher, "Frequency domain investigation of passively mode-locked lasers with intra-cavity frequency conversion," Ultrafast Electronics and Optoelectronics Technical Digest 2001, UWA7-1, pp. 17

256. Raymond Sova and Jin U. Kang, "Relaxation oscillations and carrier dynamics in an all-PM Er/Yb ring laser," OSA Annual Meeting, WFF3, 2000
257. Jin U. Kang and J. B. Khurgin, "Dual relaxation-oscillations and their dynamics in all-PM Er/Yb fiber ring lasers," CLEO 2000 Technical Digest, CThV5, 546, 2000
258. J. B. Khurgin, Jin U. Kang and Y. Ding, "Novel Ultra-broad-bandwidth Electro-optic modulator based on cascaded Bragg grating," Optical Fiber Communication Conference, WM18, 2000
259. Jin U. Kang, A. Villeneuve, J. S. Aitchison, and G. I. Stegeman "Nonlinear optics near half the bandgap of semiconductors," invited, SPIE Photonic West 2000 International Symposium on "Ultrafast Phenomena in Semiconductors IV, 2000
260. Jin U. Kang, "Broadband fiber lasers and their applications," invited, Bulletin of the Korean Physical Society 17-1, I-1, 1999
261. Jin U. Kang, "Effects of the fifth order nonlinearities on 1-D Kerr spatial solitons," ThBB1, OSA annual meeting 1999
262. Jin U. Kang, Harry B. Dietrich, Michael Y. Frankel, and Bela Molnar, "Ultrafast carrier trapping in oxygen- and aluminum- implanted GaAs," QELS'99, QThG20
263. T. R. Clark, J. U. Kang, and R. D. Esman, "Time-interweaved wavelength multiplexed photonic sampler for a hybrid analog-to-digital converter," CLEO'99, CTuN3,
264. Jin U. Kang, Andrew Lee, and Moshe Horowitz, "Enhancing the spectral bandwidth of non-stationary pulses in modelocked fiber ring laser," CLEO'99, CWA8
265. Jin U. Kang, "Demonstration of fiber strain sensor based on dispersive microwave frequency shifting," OFS'99,F1-7
266. Jin U. Kang, Keith Williams, Michael Y. Frankel, and Ronald D. Esman, "A high-speed photodetector based on He-plasma assisted MBE grown InGaAsP," CLEO'99 CTuK22
267. Michael L. Dennis, Thomas F. Carruthers, Walter I. Kaechele, R. Brian Jenkins, Jin U. Kang, and Irl N. Duling, III, "Long span repeaterless transmission using adiabatic solitons," OFC'99. WC6-1
268. Xinhua Gu, Yujie J. Ding, Jin U. Kang, and Jacob B. Khurgin, "Backward Second-harmonic Generation in Periodically-poled LiNbO₃," 30, Optics In 1998, Optics & Photonics News, Dec 1998
269. Jin U. Kang, Michael Y. Frankel, Ronald D. Esman, "Characterization of a hybrid photonic analog-digital converter based on WDM technique," WCC, 11th LEOS Annual meeting
270. Jin U. Kang, Michael Y. Frankel, Ronald D. Esman, "Photonic RF frequency shifter based on highly chirped mode-locked fiber laser," WA3, 1998 International Topical Meeting on Microwave Photonics.
271. Xinhua Gu, Yujie J. Ding, Jin U. Kang, and Jacob B. Khurgin, "Backward sum-frequency generation in periodically-poled bulk LiNbO₃," OSA 98
272. X. Gu, Y. J. Ding, J. U. Kang, and J. B. Khurgin, "Quasi-phase-matched backward second-harmonic and sum-frequency generation in periodically-poled lithium niobate," Paper ThC17 Nonlinear Optics'98, Kauai, Hawaii, Aug. 10-14, 1998.
273. Jin U. Kang, Jacob Khurgin, C. C. Yang, H. H. Lin, and George I. Stegeman, "Two-photon transitions between bound-to-continuum states in AlGaAs/GaAs Multiple Quantum Well," CLEO/IQEC'98, QFH5
274. Jacob Khurgin, Jin U. Kang, C. C. Yang, H. H. Lin, and George I. Stegeman, "Nonlinear optical properties of AlGaAs/GaAs Multiple Quantum Well due to two-photon transitions between bound-top continuum states,"NLO'98
275. Jin U. Kang, ralph Posey, Jr., and Ronald D. Esman, "Demonstration of supercontinuum generation in long cavity fiber ring laser," CLEO'98, CtuK3
276. Francis J. Kub, Gordon Wood Anderson, Edward M. Alexander, Michael Y. Frankel, and Jin U. Kang, "Large-length, high-speed, discrete silicon photodetectors for coherent optical processing," Optoelectronic Integrated Circuits II Conference at Photonics West 1998
277. Jin U. Kang, Michael Y. Frankel, and Ronald D. Esman, "High-Performance Photonic Analog-Digital Converter," LEOS post-deadline paper, 1997.
278. H. Pinkney, p. Simpson, J. U. Kang, D. A. Thompson, B. J. Robinson, and P. Mascher, "Characterization of annealed high-resistivity InP grown by He-plasma-assisted epitaxy," Canadian Semiconductor Technology Conf., Ottawa, 12-15 Aug. 1997
279. Yujie J. Ding, Roman Korotkov, Jin U. Kang, Jacob B. Khurgin, "Backward Second-Harmonic Generation Based on Quasi-Phase Matching," SPIE, Ultrafast Phenomena in Semiconductors, 98 invited talk
280. J. U. Kang, C. J. Hamilton, J. S. Aitchison, and G. I. Stegeman, "Spatial soliton robustness against spatially anisotropic phase perturbations," QELS' 97, invited talk
281. J. U. Kang, G. I. Stegeman, J. S. Aitchison, and N. Ahkmediev, " Observation of Manakov spatial soliton in AlGaAs planar waveguides, " invited talk, IQEC'96, TuB3

282. J. U. Kang, G. I. Stegeman, and J. S. Aitchison, "All-optical switching based on spatial solitons in AlGaAs," The 10th Annual International AeroSense Symposium, conference 2749-20, invited talk, 1996
283. G. I. Stegeman, Jin U. Kang, Alain Villeneuve, J. S. Aitchison, "AlGaAs Below Half Bandgap: A Laboratory for Nonlinear Optics," European Optical Society, Topical Meeting Digest series: Vol. 7, pg 3-6, invited talk
284. G. I. Stegeman, Jin Kang, J. S. Aitchison, C. N. Ironside, and Alain villeneuve, "Nonlinear semiconductor waveguide switching devices," The 12th UK National Quantum Electronics Conference (QE-12), 4-8 sep. 1995, 8-1, invited talk
285. Villeneuve, J. S. Aitchison, J. U. Kang, and G. I. Stegeman, " Nonlinear Optics in AlGaAs at half the band gap," IEEE Lasers and Electro-Optics Society 1995 8th Annual Meeting, vol. 2, p. 15-16, invited talk
286. Jin U. Kang, George Stegeman, W. Torruellas, A. Villeneuve, and J. S. Aitchison, "Photonics Applications of Spatial Soliton Switches," SPIE Orlando'95, invited talk
287. Hutchings, J. S. Aitchison, A. Villeneuve, G. T. Kennedy, W. Sibbett, J. U. Kang, G. I. Stegeman, " Polarization Dependence of Ultrafast Nonlinear Refraction in Semiconductors at the half-bandgap," Optics & Photonics News, vol. 6, No. 12, Dec. 1995
288. Yujie J. Ding, Jin U. Kang, Jacob B. Khurgin, "Theory of backward second-harmonic generation using ultrafast laser pulses in quasi-phase-matched second-order nonlinear medium," TuB3, OSA annual meeting'97
289. Roman Korotkov, Yujie J. Ding, Jin U. Kang, Jacob B. Khurgin, "Backward second-harmonic generation in periodically-poled lithium niobate from nanosecond laser pulses," TuT2, OSA annual meeting'97
290. J. U. Kang, W. K. Burns, Y. J. Ding, and J. S. Melinger, "First observation of backward second-harmonic generation in periodically-poled bulk LiNbO₃," CLEO'97
291. Ostrovskaya, N. M. Akhmediev, J. U. Kang, G. I. Stegeman, and J. S. Aitchison, "Polarization dynamics, bifurcations and switching of spatial solitons in semiconductor waveguides," ACOFT'96, p. 81-4 (1996)
292. J. U. Kang, G. I. Stegeman, J. S. Aitchison, D. C. Hutchings, E. Ostrovskaya, and N. Akhmediev, " Dynamics of mixed-mode spatial solitary waves in AlGaAs waveguides," QELS'97
293. J. U. Kang, M. Y. Frankel, J.-W. Huang, and T. F. Kuech, "Subpicosecond carrier `trapping in oxygen-doped metalorganic vapor phase epitaxy GaAs," Ultrafast Electronics, Nevada, 1997
294. M. A. Putnam, M. L. Dennis, J. U. Kang, T. E. Tsai, I. N. Duling III, E. J. Friebele, "Interrogation of fiber Bragg gratings by mode-locked erbium fiber laser and dispersion compensating fiber," OFC 97, WJ4
295. M. A. Putnam, M. L. Dennis, J. U. Kang, T. E. Tsai, I. N. Duling III, E. J. Friebele, "Interrogation of fiber Bragg gratings by mode-locked erbium fiber laser and dispersion compensating fiber," SPIE 4th Annual Symposium in Smart Structures and Materials, Ses. 9 3042-44
296. P. Millar, J. S. Aitchison, J. U. Kang, G. I. Stegeman, and A. Villeneuve, "Nonlinear multi-core directional couplers in AlGaAs," Nonlinear Guided Waves and Their Applications'96, SaA4
297. J. S. Aitchison, D. C. Hutchings, J. U. Kang, G. I. Stegeman, E. A. Ostrovskaya, and N. N. Akhmediev, " vector spatial solitons," Nonlinear Guided Waves and Their Applications'96, SuD3
298. Ostrovskaya, N. N. Akhmediev, G. I. Stegeman, J. U. Kang, and J. S. Aitchison, "Mixed-mode spatial solitons in semiconductor waveguides," Nonlinear Guided Waves and Their Applications'96, FD16
299. J. Boyle, W. A. Pender, W. J. Blau, Y. Baek, J. Kang, R. Fuerst, and G. I. Stegeman, " Nonlinear absorption and refraction in poly 3-BCMU polydiacetylene optical waveguides in the low-loss fiber communications windows," Nonlinear Guided Waves and Their Applications'96, FD22
300. J. U. Kang, G. I. Stegeman, J. S. Aitchison, and N. Akhmediev, " Manakov spatial solitons," Optics'96, Optics & Photonics News, 7, 30 (1996)
301. J. U. Kang, G. I. Stegeman, and J. S. Aitchison, "All-optical switching based on spatial solitons in AlGaAs," CLEO'96
302. Jin U. Kang, Gijs Krijnen, George I Stegeman, J. Stewart Aitchison, and C. N. Ironside, "Complete switching with an improvement in the switching intensity in AlGaAs nonlinear directional couplers using the higher order orthogonal modes," NATO ASI Ser., 3. High Technology, Vol 3, pp 451-452
303. J. U. Kang, G. I. Stegeman, and J. S. Aitchison, "Interaction of a weak probe beam with a bright spatial soliton in an AlGaAs planar waveguide," QTuH4, QELS'95, Baltimore
304. Villeneuve, J. U. Kang, G. I. Stegeman, J. S. Aitchison, D. C. Hutchings, "Cross-phase modulation in bulk and MQW AlGaAs waveguides at half the band gab," QWD29, QELS'95, Baltimore
305. Jin U. Kang, G. I. Stegeman, and J. S. Aitchison, 'All-optical multiplexing of femtosecond signals using an AlGaAs nonlinear directional coupler,' CThB3, CLEO'95, Baltimore
306. Villeneuve, J. S. Aitchison, B. Vogege, R. Tapella, J. U. Kang, C. Trevinos, and G. I. Stegeman, "Waveguide Design for Minimum Nonlinear Effective Area and Switching Energy in AlGaAs at Half the Bandgap", CThB7, CLEO'95

307. Jin U. Kang, Alain Villeneuve, George I Stegeman, Kadhair Al-hemyari, J. Stewart Aitchison, and Charles N. Ironside, "Three photon absorption coefficients of $\text{Al}_{0.18}\text{Ga}_{0.82}\text{As}$ below half the band gap," Nonlinear Guided-Wave Phenomena Cambridge, UK 1993, MA4
308. K. Al-hemyari, A. Villeneuve, J. U. Kang, J. S. Aitchison, C. N. Ironside, G. I. Stegeman, "Ultrafast all-optical switching in an integrated zero-gap nonlinear directional coupler below half the band gap of GaAlAs at $1.55\ \mu\text{m}$," CLEO, Anaheim, 1994, CTuC5
309. Jin U. Kang, Alain Villeneuve, Mansoor Sheik-Bahae, George I Stegeman, Kadhair Al-hemyari, J. Stewart Aitchison, and Charles N. Ironside, "Three-photon absorption limitation of the useful spectral range for nonlinear optics in AlGaAs below half band gap," IQEC Anaheim, 1994, QTuO3
310. J. U. Kang, G. Krijnen, G. I. Stegeman, A. Villeneuve, J. S. Aitchison, and C. N. Ironside, "All-optical multiplexing of femto-second signals using an AlGaAs nonlinear directional coupler," Nonlinear Guided-Waves and Their Application, 1995, Dana Point, CA NThA3.
311. Villeneuve, P. Mamyshev, J. U. Kang, G. I. Stegeman, J. S. Aitchison, C. N. Ironside, 'All-optical demultiplexing without pulse breakup using different signal and control wavelengths,' Nonlinear Guided-Waves and Their Applications, 1995, Dana Point, CA NThA4.
312. J. S. Aitchison, A. Villeneuve, J. U. Kang, P. G. Wigley, and G. I. Stegeman, "Integrated saturable absorber employing spatial solitons," Nonlinear Guided-Waves and Their Application, 1995, Dana Point, CA NSaC5.
313. J. S. Aitchison, A. Villeneuve, J. U. Kang, and G. I. Stegeman, "Multiplexing and demultiplexing using an AlGaAs nonlinear directional couplers," IEE colloquium on Towards Terabit Transmission, pp. 7/1-7/6 London, May 19, 1995
314. Yang, C-H. Huang, D-U. Li, H-H. Lin, H-C. chang, Jin Kang, and G. I. Stegeman, "Effects of layered structures on the birefringence in multiple quantum well semiconductor slab waveguides," FG3, OSA annual meeting, Portland
315. Villeneuve, K. Al-Hemyari, J. U. Kang, C. N. Ironside, J. S. Aitchison and G. I. Stegeman, "Investigations of all-optical switching in optimized AlGaAs directional couplers," CLEO 1993, CThM5
316. K. Al-hemyari, A. Villeneuve, J. U. Kang, J. S. Aitchison, C. N. Ironside, G. I. Stegeman, "Demonstration of all-optical demultiplexing at 1555nm with an AlGaAs directional coupler," CLEO 1993, CThM6
317. Villeneuve, J. U. Kang, and G. I. Stegeman, "Influence of dispersion on the nonlinear directional coupler," OSA Toronto 1993, ThEEE3

Recently Featured Articles in Magazines and Newspapers:

- Phys.Org News, "Cyborg Surgeon: Hand and Technology Combine in New Surgical Tool That Enables Superhuman Precision," Sep. 27, 2012
- ScienceDaily, "Cyborg Surgeon: Hand and Technology Combine in New Surgical Tool That Enables Superhuman Precision," Sep. 27, 2012
- Optical Coherence Tomography News, "Cyborg Surgeon: Hand and Technology Combine in New Surgical Tool That Enables Superhuman Precision," 9/27/2012
- NVIDIA CUDA Spotlight, "Tools for Microsurgeons", 04/22/2011,
- BioOptics World, "The next step in real-time OCT," page 24-27, March/April 2011
- IEE Electronics Letters, "touching a nerve," v. 21, No. 2, pp. 103-104, 2010
- OCT News, "Real-time 4D signal processing and visualization using graphics processing unit on a regular nonlinear-k Fourier-domain OCT system", Feature of The Week 05/30/2010
- BioOptics World "OPTICAL COHERENCE TOMOGRAPHY: Inexpensive GPU key to broadly accessible real-time 3D FD-OCT", 07/01/2010,
- OCT News, "Johns Hopkins University Researchers Demonstrate a Hand-Held Microsurgical Tool with Motion Compensation and 4-D Imaging using OCT", Feature of The Week 10/17/2010
- OCT News, "New Optical Tool Could Produce 'Virtual Biopsies' for Brain Cancer," Nov. 2009
- SPIE Newsroom, "Simple fiber-optic source for optical coherence tomography," 10.1117, 2008

Current Grants and Contracts

- Co-Investigator, “Small Business ERC Collaborative Opportunity to Develop Safe and Reliable System for In-situ Restoration of Patency in Cerebrospinal Fluid (CSF) Shunts,” NSF/SBIR IIP-1246039 SECO Supplement, Actuated Medical, Inc, 10/1/2012-9/30/2013
- PI: “OCT Image Guided Microsurgical Tools with Enhanced Surgical Functions,” NIH/NIE R01, 1R01EY021540-01A1, 8/01/2011-7/31/2016, \$1,900,000
- Co-PI: “OCT Imaging and Assistive Systems for Cochlear Implant Surgery,” Cochlear Corp. 02/01/2011-03/31/2013, \$250,000
- Co-PI: “Fluorescent sensors for neurotransmitters –towards real-time imaging of acetylcholine in vivo,” Synaptic Plasticity and Cognitive Disorders Program, Brain Science Institute (BSi), 11/1/10-12/31/12, \$600,000 Total Direct Cost
- PI: “Phase locked, ultra-stable cavity ring-down spectroscopy using extreme-broad comb source for high-resolution trace gas detection,” NIST, 70NANB10H252, 09/01/10-08/30/13, \$65,686 Total
- PI: “3DLithography of Thick Photopolymers for Imaging and Photonic Crystal Waveguides,” NSF/Zenwa Inc., NSF IIP-0822695, June 29, 2010-July 31, 2013, \$60,000 Total.
- PI: “In Vivo Laser Retinal Abrasion using 6.3 μm Quantum Cascade Laser,” NSF/ERC MIRTHE, Aug. 2010-2015, \$65k/year
- PI: “Motion compensated two-photon microscope,” BSi, Feb. 3/1/2010-12/31/2012, \$77,000
- Co-Investigator: “A microsurgical assistant system,” BRP, NIH, 1R01 EB 007969-01, 7/1/08-6/30/2013, \$5,884.819
- PI: “Development of Non-Invasive Laser Diagnostic Techniques of Muscle/Joint Disorders,” KASBIR, S. Korea, 6/1/2009-12/31/2012, \$115,000

Previously Funded Programs

- PI: “Common-Path OCT for Real Time Imaging in Minimally Invasive Neurosurgery,” NIH, NINDS, 1R21NS063131-01A1, 7/15/2009-7/14/2012, \$438,358
- Co-PI: “A Key Enabling Technology for Optical Networks,” NSF, ECCS-0925470, \$336,239, 09/01/09-08/31/2012
- Co-Investigator (PI:Okamura), Infrastructure for integrated sensing, modeling, and manipulation with robotic and human-machine systems, NSF/MRI, MRI07 07-22943, 9/1/2007-9/1/2010
- Co-Investigator (PI: R.H. Taylor) NSF Engineering Research Center for Computer-Integrated Surgical Systems and Technology: EEC9731478, 9/1/97-12/31/2008
- Co-PI: “Active Multispectral Illumination for Video Microscopy and Endoscopy,” Equinox Corp, 9/1/08-8/30/09, \$149,998
- Co-PI: “REU-Site Program in Nanotechnology for Biology and Medicine,” NSF, 3/17/ 2007-02/28/2010, \$284,926
- PI, “Impact of very weak atmospheric absorption to high-energy-laser systems (HELs) and their applications,” \$125K, APL 6/1/2009-5/30/2010
- PI: “Collaborative Research on Optical Imaging System and Data Processing,” Pusan NU, South Korean, Sept. 1, 2009-January 31, 2010, \$43,000
- PI, “Common-Path All Fiber Optical Coherence Tomography,” NSF/ BME NSF101485, \$89,000/Year, 2007-2008
- PI with Fibertek Corp, “LIDAR for Lunar Landing,” STTR Phase 1, NASA, STTR Program, T7.02-Remote Sensors for Entry, Descent and Landing Applications NASA, \$35,000, 2007-2008
- PI with Fibertek Corp, “Ultra-Compact Doppler LIDAR for Unmanned Aerial/Ground Vehicles,” SBIR Phase II, Topic A03-048-PHASE-II, \$65,000, 2006-2008
- PI with Jim Franson at APL: “Compact and Efficient Sources of Entangled Photons for Quantum Key Distribution Systems,” APL-WSE Partnership Fund, \$150,000, 2005-2007
- PI: “Ultra-stable, wavelength swept fiber laser for coherence control in free-space laser communications,” ARL, 2004-2006, \$130,000
- PI: Compact Raman/fluorescence spectrometer based on fiber lasers, GSFC/NASA, 2004-2005, \$60,000
- PI: Free-space laser communications system for space communications,” NASA, 2004-2005, \$32,000

- PI: “Ultra-Stable Optical Clock,” APL, March 2003, \$20,000
- Co-PIs with F-S. Chao and J. B. Khurgin, “Photonic Crystals,” NSA, Oct 2002 – Oct 2004, \$100,000
- JHU-PI with FiberTek Corp, Compact, efficient LIDAR for un-manned aerial/ground vehicles, ARL, STTR, phase 1, \$70,000, 2004
- Co-PIs with F-S. Chao and J. B. Khurgin “High performance broadband lightwave devices for RF signal processing and transmission,” DARPA, June 2000-2004, \$ \$1,390,000
- PI: “High performance, broadband optoelectronic microwave devices based on broadband modelocked lasers,” ONR, June 1, 2000 – September 30, 2003, \$300,000
- PI: “A compact, highly efficient, and rugged all solid-state UV source based on fiber lasers for UV-DIAL” NASA, June 1, 2000 – May 31, 2003, \$805,000
- PI: “Photonics Research,” JDS Uniphase, \$40,000 Cash and \$180,000 Equipments, July 2000
- PI: “Ultrafast Optical Probing,” \$ 300,000, ONR/NRL, 1996-1998
- PI: “Temporal-spectral reciprocity in highly chirped pulses,” \$ 300,000, ONR/NRL, 1998-2000
- PI: “Photonic analog-to-digital converter,” \$ 450,000, DARPA, 1998-2001
- Co-PI: “Optical materials for RF-photonics,” \$ 200,000, ONR/NRL, 1996-1999

Patents:

- Jin Ung Kang, Yong Huang, “Optical coherence tomography system having real-time artifact and saturation correction,” WO/2013/025810, Int. No.: PCT/US2012/050957 Date: 02/21/2013
- Jin Ung Kang, Seth Billings, Peter Gehlbach, James Handa, Yong Huang, Russell H. Taylor, Yi Yang, C10970 Compact High Efficient Multispectral LED Based Endoscopic Illumination System,” US Patent 20,130,033,887, 02/07/2013
- Jin U. Kang, Yong Huang, Kang Zhang, “Mid-infrared laser therapy device and system,” US Patent 20,120,283,804, 11/08/2012
- Jin U. Kang, Peter Gehlbach, Russell H. Taylor, Kang Zhang, “Surface Tracking and Motion Compensating Surgical Tool System,” WO Patent WO/2012/012,540, 01/26/2012
- Jin Kang, Marcin Arkadiusz Balicki, Kumar Rajesh, Russell H Taylor, “Autofocusing endoscope and system,” WO Patent WO/2012/018,796, 02/09/2012
- Jin U Kang, Yong Huang, Kang Zhang, “A motion-compensated confocal microscope,” WO Patent 2,012,151,546, 9/11/2012
- Jin U. Kang, Xuan Liu, “Dark field endoscopic Microscope,” US Patent 20,120,283,516, 11/8/2012
- Jin U. Kang, Kang Zhang, “Real-time, dispersion-compensated low-coherence interferometry system,” WO Patent 2,012,151,547, 11/09/2012
- Russell H. Taylor, Jin U. Kang, and John Niparko, “Optical Sensing System for Cochlear Implant Surgery,” WO/2012/040297, Int. No.: PCT/US2011/052503 Date: 03/29/2012
- Jin Ung Kang, Xuan Liu, Marcin Balicki, “Automatic Online Calibration of Fourier-Domain Optical Coherence Tomography Systems,” WO/2012/018832, Int. No.: PCT/US2011/046290, Date:02/09/2012
- Jin Ung Kang, Kang Zhang, “Real-time, three-dimensional optical coherence tomography system,” WO/2012/088320, Int. No.: PCT/US2011/066603, Date:06/28/2012
- Jin U. Kang, Kang Zhang, “Four-dimensional optical coherence tomography imaging and guidance system,” US Patent 20,120,281,236, 11/08/2012
- Jin U. Kang and Xuan Liu, “OCT speckle de-correlation based quantitative transverse flow assessment,” C12140, executed Oct 2012
- Jin U. Kang and Xuan Liu, “Durable single mode fiber probe with optimized reference reflectivity,” C12139 executed Oct 2012
- Jin U. Kang and Yong Huang, “Real-time 3D and 4D Fourier domain Doppler optical coherence tomography based on dual graphics processing units,” C12135 executed Oct 2012
- Jin U. Kang and Yong Huang, “Motion-compensated free-hand scanning common-path Fourier domain optical coherence tomography probe for image guided intervention,” C12133 executed Oct 2012
- Jin U. Kang and Xuan Liu, “Axial Motion Distortion Correction in Manually Scanned Hand-held Optical Coherence Tomography System,” C12194 submitted Oct 2012
- Jin Ung Kang, Mingtao Zhao, Russell Taylor, “Three-dimensional Optical Coherence Tomography Imaging and Sensing for Guiding Cochlear Implant Surgery,” C12088 executed Aug. 2012

- Jin U. Kang Xuan Liu, "Distortion-free free-hand OCT imaging," JHU ref. C11817, 12/28/2011
- Jin U. Kang, Yong Huang, "Intraocular Laser Therapy using Quantum Cascade Laser (QCL) Operating at ~6 Micron Wavelength Regime," JHU Ref. C11485, 3/25/2011
- Emad Boctor, Jin U. Kang, et.al., International Patent Application No.: PCT/US11/24917, Entitled: Interventional Photo-acoustic Imaging System, Intl Filing Date: February 15, 2011, Inventors: JHU Reference No.: P11002-02, U of TX Reference No.: 5966 EME
- Jin U. Kang and Kang Zhang, "Full-range Complex-conjugate-free Endoscopic Spectral-domain Optical Coherence Tomography," ROI, JHU Ref.: C11324, Nov. 2010
- Jin U. Kang and Kang Zhang, "Graphics Processing Unit Accelerated Non-uniform Fast Fourier Transformed Fourier-domain OCT," ROI, JHU Ref.: C11323, Nov 2010
- Russell H. Taylor, Seth Billings, Peter Gehlbach, Gregory Hager, James Handa, Jin Ung Kang C10789, Programmable Multispectral Illumination System for Surgery and Visualization of Light-sensitive Tissues PCT/US2010/044596 2009-08-05
- Jae Ho Han, James Handa, Jin Ung Kang, Marcin Balicki, Peter Gehlbach, Russell H. Taylor, C10900 Surgical Instrument with Integrated Forward Looking Optical Coherence Tomography 61/256,560 2009-10-30
- Russell H. Taylor, Iulian Iordachita, Jin Ung Kang, C11162, Interferometric Force Sensor for Microsurgical Instruments, 61/365,995, 2010-07-20
- Marcin Balicki, Jin Ung Kang, Rajesh Kumar, Russell H. Taylor , C11174 GRIN Lens Fiberscope System with Integrated Optical Coherence Tomography 61/370,044 2010-08-02
- Jin Ung Kang, Peter Gehlbach, Russell H. Taylor C11161 1-D Surface Tracking and Motion Compensation Hand-held Microsurgical Tool System Based on Dynamic Common-Path Optical Coherence Tomography Sensor, 61/365,998, 2010-07-20
- Jin Kang, Emad Boctor, C11002, Interventional Photo-acoustic Imaging System, 61/304,626, 2010-02-15
- Russell H. Taylor, Jin Kang, John Niparko, C11225, Optical Sensing System for Cochlear Implant Surgery Provisional, 0/21/2010 Co-Inventor, "Compact High Efficient Multispectral LED based Endoscopic Illumination System," JHU reference #C10970, 2009
- Co-Inventor, "Programmable Multispectral Illumination System for Surgery and Visualization of Light-Sensitive Tissues," U.S. Provisional Patent Application Number is 61/231,519, 2009
- Co-Inventor, "Surgical Instrument with Integrated Forward Looking Optical Coherence Tomography" JHU reference #C10900, 2009
- Jin U. Kang, "Non-invasive Glucose sensing," JHU provision patent, 2006
- Jin U. Kang and Utkarsh Sharma, "Common-Path Interferometer Based Fiber Optic Endoscopic Optical Coherence Tomography with Fully Encapsulated Scanning Fiber Optic Probe and Dynamic Off-set Control for Non-invasive Optical Biopsy," JHU Ref.: #4850, 2005
- Jin U. Kang, Ilko Ilev and Ron Waynant, "Non-invasive fiber optic endoscopic confocal Doppler velocimeter for coronary disease detection," JHU ROI, 2005
- Jin U. Kang, "Tunable Multi-wavelength Fiber Laser," JHU provisional patent, 2002
- Jin U. Kang, "A Compact, Highly Efficient, and Rugged UV Source Based on Fiber Lasers," JHU Provisional patent, 1622, US Patent US 2002/0054613 A1
- Michael I. Dennis, Martin A. Putnam, Jin U. Kang, Irl N. Duling, III, and Edward J. Friebers, "Modelocked fiber lasers particularly for fiber Bragg grating sensor array" Pat. No. 6,122,305
- Harry B. Dietrich, Jin U. Kang, Michael Y. Frankel, and Bela Molnar, "A new design and fabrication method for the suppression of single event upset failures in digital circuits made from GaAs or its related compounds," Patent # 6335562, 2002

Teaching:

- Developed MSE program in Photonics and Optoelectronics
- Developed Optoelectronics Laboratory course, 520.484
- Developed Bio-Photonics Laboratory course, 520.483
- Developed ECE Engineering Team Project Courses-520.452 and 520.211
- Course:
520.345, Electrical and Computer Engineering Laboratory, 1999-present
Fall 1999 (82 students), Fall 2000 (78 students), Fall 2001(85 students), Fall 2002 (98 students), Fall 2003 (92 students), Fall 2004 (95 students), Fall 2008 (65 students)

- 520.483, Bio-Photonics Laboratory, 2005-present
Spring 2008 (19 students)
- 520.410, Fiber Optics and Photonics, 2000-present
Spring 2000 (11 students), Spring 2001 (30 students), Spring 2002 (23 students), Spring 2003 (18 students), Spring 2004 (16 students), Spring 2005 (15 students), Spring 2008 (16 students)
- 520-484, Optoelectronics Laboratory
Spring 2004 (15 students), Spring 2005 (18 students)
- 520.763, Seminar on Nonlinear Optics, Quantum Electronics, and Solid-State
Fall 1999 (6 students)
- 520.498, Senior Design Project, Spring 2000 (5 students), Spring 2001 (4 students), Spring 2002 (2 students)

Current Post-Doc and Research Staff:

- Cheol Song, Ph.D., “Smart Microsurgical Tools based on OCT”
- Xuan Liu, Ph.D., “OCT for microsurgery”
- Mingtao Zhao, Ph.D., “OCT for microsurgery”

Current Ph.D. Students:

- Yang Yi: ‘Biomedical Imaging,’ 4th year
- Yong Huang: “Fourier-Domain Optical Coherence Tomography,” 4th year
- Daguang Xu: “compressed OCT,” 4th year
- Phillip Wilcox: “Wavelength Conversion,” 2nd year
- Richard Cha: “Bio-optic Sensor and fiber devices,” 1st year
- Springer, Ryan M. “Nonlinear Optics” 2nd year
- Cheon, Gyeong Woo, “Smart Surgical Tools,” 1st year

Former Students, Research Staffs and Visiting Scholars:

Ph.D. Students:

- Raymond Sova, Ph.D. 2003
Dissertation title: Multi-rate soliton pulse train generator based on novel fiber optic components
Current Position: senior technical staff at the Johns Hopkins Applied Physics Laboratory
- Chang-Seok Kim, Ph.D. 2004
Dissertation title: Tunable multi-wavelength fiber lasers based on novel fiber-optic components
Current Position: Associate Professor at the Pusan National University, South Korea
- Gang Chen, Ph.D. 2005
Dissertation title: Optical Waveguide Devices Based on Fiber Sagnac Interferometers and Photonic Crystals
Current Position: Photonics Engineer, CEYX Technologies, Inc., San Diego, CA
- Utkarsh Sharma, Ph.D. 2006
Dissertation title: Fiber Lasers and All-fiber Optic Devices for Applications in Sensing and Medical Imaging
Current Position: Senior Optical Engineer, Carl Zeiss Meditec, CA
- Do-Hyun Kim, Ph.D. 2006
Dissertation title: Fiber Optic Confocal Microscopy for Biomedical Imaging
Current Position: Research Staff, FDA, Rockville, MD
- Abner Rodriguez, Ph.D. 2008
Dissertation title: All-Fiber Endoscopic Optical Imaging Devices

Current Position: Research Engineer, Naval Surface Weapon Center, PA

- Scott Hendrickson, Ph.D. 2009
Dissertation title: Guided-Wave Evanescent Field Devices
Current Position: Technical Staff Member, JHU APL, MD
- Jae-Ho Han, Ph.D. 2010
Dissertation title: Common Path Optical Coherence Tomography Based on Fiber Bundle Imager
Current Position: Assistant Professor, Korea University, Seoul, South Korea
- Xuan Liu, Ph.D. 2011
Dissertation title: Functional Fourier-Domain Optical Coherence Tomography for Guiding Vitreoretinal Surgery
Current Position: Post-Doc, JHU
- Kang Zhang, Ph.D. 2011
Dissertation title: Functional Fourier-Domain Optical Coherence Tomography for Guiding Vitreoretinal Surgery
Current Position: Research Engineer, GE Global Research

Research Staffs and Visiting Scholars:

- Xiaolu Li, Ph.D.: Visiting Scholar, Fourier domain OCT
Current Position: Lecturer, Beijing Normal University
- Chul-Gyu Song, Ph.D.: Visiting Associate Professor, Polarization Sensitive OCT
Current Position: Associate Professor, Chunbuk National University
- Weichao Wang: Visiting Scholar, High Speed Fourier Domain OCT
Current Position: Ph.D. Student, Beijing Univ.
- Young Geun Han, Ph.D., Visiting Scholar/ Student, Fiber Lasers
Current Position: Associate Professor, Hanyang University
- Yu Seok Bae, Post-Doc Fellow
Current Position: Associate Professor, Daejeon University of Science and Technology

M.S. Students:

- Seyed Hejazi, M.S. 2002, project: Fiber optic amplifiers
- Anita Lakshmipathy, M.S. 2002, project: Fiber optic sensors
- Dom Acosta, M.S. 2004, project: Fiber optic devices
- Daniel Coleman, M.S. 2004, project: Fiber optic devices
- Thurein Paing, M.S. 2004, project: Fiber optic devices
- Yi Yang, M.S. 2007, project: Optical Coherence Tomography