

**Curriculum Vitae**  
**JOSEPH ZEYLIKOVICH**

Institute for Ultrafast Spectroscopy and Lasers  
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**DEGREES & EXPERIENCE:**

College of Fine Mechanics and Optics, St.Petersburg, Russia	1966-1972	M.S. Quantum Electronics
State Institute of Optics, St. Petersburg, Russia	1972-1980	Ph.D. Optics
Institute of Physics of Belarus Academy of Sciences, Minsk	1986-1990	Doctor of Science. Physics
Grodno State University, Grodno, Belarus	1980-1993	Professor of Physics
IUSL, The City College of New York	01.1994-10.1998	Research Associate
Medical Optical Imaging, Inc Charlotte,NC	11.1998-05.2001	V.P. of Engineering
IUSL, The City College of New York	10.2001-present	Senior Researcher

**RESEARCH INTERESTS**

*Optics* Supercontinuum generation in photonic crystal fiber and its applications. Mid-infrared scanning imaging technique for cracks and corrosion detection beneath a thick paint layer.

*Nanophotonics:* Near-field scanning, atomic force and confocal microscopy and spectroscopy for nanoscale imaging. UV- to-visible image conversion using quantum dots (QDS) photoluminescence (PL). Spectral, temporal and coherence properties of the QDs PL.

*Biophysics:* Ultrafast optical coherence tomography for the high resolution depth-lateral tissue imaging and biomedical applications. Frequency-domain optical mammography for the breast cancer detection. Fluorescence spectroscopy and imaging fiber optic based micro-endoscope for the breast cancer ductoscopy.

*Ultrafast lasers and optical communications:* Phase-locked femtosecond lasers and its applications for ultrashort Laguerre-Gaussian pulses generation, multichannel optical communication and spectroscopy.

**Current Projects**

Near-field, confocal and atomic force microscopy for nanotechnology application. UV- to-visible image conversion using quantum dots PL. Spectral, temporal and coherence properties of the QDs PL.

Development of fluorescence spectroscopy micro-endoscope for the breast cancer ductoscopy. Supercontinuum generation and its applications. Phase-locked femtosecond lasers and its applications.

**VICE PRESIDENT OF ENGINEERING**

**Medical Optical Imaging Inc., 1998 - 2001**

- Developed, build and successfully tested the automated frequency-domain fiber optic based mammography device for the breast cancer imaging and diagnosis
- The principal goals are: development of the frequency-domain clinical prototype device and testing of that OMD *in vivo* on several hundreds of patients.

### Recent Publications

1. I. Zeylikovich "Short coherence length produced by a spatial incoherent source applied for the Linnik-type interferometer" *Appl. Opt.* 47, 2171-2177 (2008).
2. I. Zeylikovich, M. C. Tamargo and R. R. Alfano, "High resolution ultraviolet to visible image conversion using self-assembled CdSe/ZnCdMgSe quantum dots photoluminescence", *Journal of Physics B: Atomic, Molecular & Optical Physics*, **40**, ( 2007).
3. I. Zeylikovich, H. Sztul, V. Kartazaev, T. Le and R. R. Alfano, "Ultrashort Lagguere-Gaussian Pulses With Angular and Group Velocity Dispersion Compensation", *Optics Lett.*, 32, 2025-2027 (2007).
4. I. Zeylikovich, M. Tamargo and R. R. Alfano, "High Resolution Ultraviolet to Visible Image Conversion Using Self-Assembled CdSe/ZnCdMgSe Quantum Dots Photoluminescence" proceedings of CLEO/QELS, 2007
5. N. Valappil, M. Luberto, V.M. Menon, I. Zeylikovich, T.K. Gayen, J. Franco, B.B. Das, R.R. Alfano, "Solution processed microcavity structures with embedded quantum dots Photonics and Nanostructures – Fundamentals and Applications **5**, 184–188 (2007).
6. I. Zeylikovich, H. Sztul, V. Kartazaev, T. Le and R. R. Alfano, "Ultrashort Lagguere-Gaussian Pulses with Angular and Group Velocity Dispersion Compensation" proceedings of CLEO/QELS, 2007.
7. I. Zeylikovich, and R. R. Alfano, "Pulse-Induced Mutual Coherence of the Self-Assembled Quantum Dots Photoluminescence" proceedings of CLEO/QELS, 2007.
8. I. Zeylikovich, G. C. Tang, A. Katz, Y. Budansky, and R. R. Alfano, "Fluorescence-based micro-endoscopes for breast cancer ductoscopy," *Optical Biopsy VI, SPIE Proceedings*, Vol. 6091, 2006.
9. I. Zeylikovich, and R. R. Alfano, "Coherence Properties of the Supercontinuum Source" in "The supercontinuum laser source", Second Edition, Robert R. Alfano, Editor, p. 453-480, 2005, Springer.
10. I. Zeylikovich, V. Kartazaev and R. R. Alfano, "Spectral, Temporal and Coherence Properties of Supercontinuum Generation in a Photonic Crystal Fiber" *JOSA B*, 22, 1453-1460, (2005).
11. I. Zeylikovich and R. R. Alfano, "Free Space Supercontinuum Coherence Data Packets Multiplexing/Demultiplexing for Ultrafast Laser Communication," *IEEE J. Selected Topics in Quantum Electronics*, 10, 1233-1237, (2004)
12. I. Zeylikovich and R. R. Alfano, "Coherence properties of the supercontinuum source", *Appl. Phys. B* 77, 265-268, 2003
13. I. Zeylikovich, W. Wang, F. Zeng, J. Ali, B.L. Yu, V. Benischek and R. R. Alfano "Mid-IR transmission window for corrosion detection beneath paint", *Electronics Lett.*, 39, 39, 2002.
14. J. S. Zeylikovich, M. V. Klibanov, A. A. Kharisov, S. V. Martakov and J. L. Benson, "Pre-clinical studies and clinical evaluation of an optical mammography device," *Proceedings of the European Conference on Optical Biopsy*, Amsterdam, 2001.
15. J. Zeylikovich, "OCT: Recent Advantages and Applications," pp. 1-31. *Tech East'98 Technology Tutorial Notes*. Located with Photonics East 1998.
16. J. Zeylikovich, A. Gilerson, R. R. Alfano "Non-mechanical grating-generated scanning coherence microscopy", *Opt. Lett.*, 23, 1797, 1998.
17. J. Zeylikovich, and R. R. Alfano "Three-exposure interferometric histological image reconstruction of biological tissue", *Proceedings of the Conference on Optical Biopsy IISPIE Proc.*, 3250, 191-195, 1998.
18. J. Zeylikovich, and R. R. Alfano "Novel grating-generated heterodyne interferometric tomography of tissue", *Proceedings of the Conference on Optical Biopsy IISPIE Proc.*, 3250, pp.196-200, 1998
19. J. Zeylikovich, and R. R. Alfano "Heterodyne grating-generated scan correlation interferometry for reflectometry and signal-processing applications", *Opt. Lett.*, 16, 1259, 1997.

### Presentations:

1. I. Zeylikovich, M. Tamargo and R. R. Alfano, "High Resolution Ultraviolet to Visible Image Conversion Using Self-Assembled CdSe/ZnCdMgSe Quantum Dots Photoluminescence" oral presentation at CLEO/QELS 2007 in Baltimore, Maryland.
2. I. Zeylikovich, H. Sztul, V. Kartazaev, T. Le and R. R. Alfano, "Ultrashort Lagguere-Gaussian Pulses with Angular and Group Velocity Dispersion Compensation" oral presentation at CLEO/QELS 2007 in Baltimore, Maryland.
3. I. Zeylikovich, and R. R. Alfano, "Pulse-Induced Mutual Coherence of the Self-Assembled Quantum Dots Photoluminescence" oral presentation at CLEO/QELS 2007 in Baltimore, Maryland.

4. I. Zeylikovich, T. Gayen, X. Zhou, J. Franco, R. Alfano, M. Perez-Paz, M. Tamargo, "Coherence Properties of CdSe/ZnCdMgSe Self-assembled Quantum Dots Photoluminescence Under Femtosecond Pulse Excitation", the Rochester conference Frontiers in Optics, oral presentation, 2006
5. N. V. Valappil, I. Zeylikovich, T. K. Gayen, B. B. Das, R. R. Alfano, and V. M. Menon, "Control of Spontaneous Emission from Colloidal Quantum Dots in a Polymer Microcavity," MRS Fall 2006 Meeting in Boston, MA.
6. I. Zeylikovich, V. Kartazaev and R. R. Alfano, "Coherence Properties of Supercontinuum Generation in Microstructure Fiber", CLEO/QELS, poster-JWB52, Baltimore Convention Center, May 22 - May 27, 2005.
7. Iosif Zeylikovich, Guang C. Tang, Alvin Katz, Yury Budansky and Robert R. Alfano, "Fluorescence-based microendoscopes for breast cancer ductoscopy", 2005, SPIE's Photonics West symposium.
8. I. Zeylikovich and R. R. Alfano, "Free Space Supercontinuum Coherence Data Packets Multiplexing/Demultiplexing for Ultrafast Laser Communication," Frontiers in Optics, 88<sup>th</sup> annual meeting, 2003.
9. I. Zeylikovich, V. Kartazaev and R. R. Alfano, "Spectral, temporal and coherence properties of supercontinuum generation in a photonic crystal fiber," Frontiers in Optics, 89<sup>th</sup> annual meeting, 2004.

### Patents

1. R. R. Alfano and I. Zeylikovich, "Method and apparatus for producing multiple optical channels source from a supercontinuum generation for WDM communication," US patent, 2007, [www.freshpatents.com](http://www.freshpatents.com).
2. PROVISIONAL PATENT "Method and apparatus for the breast cancer ductoscopy using fluorescence spectroscopy and imaging", submitted in 2006.
3. I. Zeylikovich, M. Klibanov, A. Kharisov "Method and apparatus for detecting an abnormality within a host medium utilizing frequency-swept modulation diffusion tomography", US patent, 7,006,676 B1, Feb.28, 2006.
4. R. Alfano; Iosif Zeylikovich; Wubao Wang.; Jamal Ali.; Vincent Benischek, and Yury Budansky, "Systems and methods for non-destructively detecting material abnormalities beneath a coated surface" US 7,038,208 B2, 2006
5. Alfano, Robert R.; Zeylikovich, Iosif; Wang, Wubao; Ali, Jamal; Benischek, Vincent; Budansky, Yury; "Systems and methods for non-destructively detecting material abnormalities beneath a coated surface" U S Patent, 6,853,926, 2005.
6. Zeylikovich, Iosif; Alfano, Robert R "Performing selected optical measurements with optical coherence domain reflectometry ",US Patent, 6,437,867, 2002.