

## BIOGRAPHICAL SKETCH

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NAME Larin, Kirill V.	POSITION TITLE Assistant Professor of Biomedical Engineering, Mechanical Engineering, and Electrical and Computer Engineering		
eRA COMMONS USER NAME klarin			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Saratov State University (Saratov, Russia)	M.S.	1995	Laser Physics and Mathematics
Russian Academy of Science (Saratov, Russia)		1993-1997	Biomedical Optics
Rice University (Houston, TX)		1997-1998	Biomedical Optics
University of Texas Medical Branch (Galveston)	M.S.	2001	Cellular Physiology and Molecular Biophysics
University of Texas Medical Branch (Galveston)	Ph.D.	2002	Biomedical Sciences and Biomedical Engineering
University of Texas Medical Branch (Galveston) and University of Texas (Austin)	Postdoc	2002-2004	Biomedical Engineering and Optics

### A. Positions and Honors

#### Positions and Employment

Start/End Dates (MM/DD/YYYY)	Position Title	Name of Organization and Department
01/01/1993-07/31/1995	Research Assistant	Department of Laser Physics, Institute of Precision Mechanics, Russian Academy of Science, Saratov, Russia
08/01/1995-10/09/1997	Research Fellow	Department of Laser Physics, Institute of Precision Mechanics, Russian Academy of Science, Saratov, Russia
10/10/1997-08/22/1998	Visiting Scholar	Department of Electrical and Computer Engineering, Rice University, Houston, TX
08/23/1998-07/15/2002	Graduate Assistant	Department of Physiology and Biophysics, University of Texas Medical Branch, Galveston, TX
07/16/2002-07/14/2004	Postdoctoral Fellow	Center for Biomedical Engineering at University of Texas Medical Branch and Department of Biomedical Engineering at University of Texas at Austin
07/15/2004-currently	Assistant Professor	Biomedical Engineering and Mechanical Engineering, University of Houston, Houston, TX
09/01/2005-currently	Assistant Professor	Electrical and Computer Engineering, University of Houston, Houston, TX
03/28/2007-currently	Adjunct Professor	Department of Optics and Biophysics, Saratov State University, Saratov, Russia

#### Other Experience and Professional Memberships

1998-present	Member of The International Society for Optical Engineering (SPIE)
2003-present	Member of The Optical Society of America (OSA)
2004-2005	Co-chair of Lasers & Optics sessions at Annual Meeting of Houston Society for Engineering in Medicine and Biology.
2006-Present	Various NIBIB Study Sections – Ad Hoc Member, National Institutes of Health
2006-Present	Imaging Study Section – Member, Methodist/Cornell Research Institute

- 2002-Present Reviewer for Optics Letters, Applied Optics, Physics in Medicine and Biology, Journal of Optics A: Pure and Applied Optics, Journal of Biomedical Optics, Physics Review Letters.
- 2007-present Member of American Society for Laser Medicine and Surgery (ASLMS)

### **Honors and Awards**

- 1995 Diploma with Honors (Saratov State University, Russia)
- 1995 Student educational grant (International Soros Student Educational Program)
- 1996 Graduate student educational grant (International Soros Student Educational Program)
- 1997 Graduate student educational grant (International Soros Student Educational Program)
- 1997 Yeltsin Presidential award for young scientists (Boris Yeltsin, Moscow, Russia)
- 1998 Travel award (American Society for Photobiology)
- 2000 Educational Student Grant (SPIE)
- 2001 Winner of SPIE student 1st prize, OPTO Southwest conference, Tucson, Arizona (SPIE)
- 2002 Student Grant Award (SPIE)
- 2002 Mason Guest Award (University of Texas Medical Branch, Galveston, TX)
- 2005 New Faculty Award (University of Houston, Houston, TX)
- 2006 Wallace Coulter Foundation Young Investigator Translational Award
- 2006 Manuscript [13] was featured on the cover of Applied Optics December 20<sup>th</sup> issue
- 2007 DOD Young Investigator Award (Office of Naval Research)
- 2008 Invited speaker at Photonics West conference (San Jose, CA)
- 2008 Outstanding Young Scientist Award (HSEMB)

### **Patents**

- [1] K.V. Larin, "Biometrics Method to Detect and Identify Layers of Skin and Artificial Materials Covering the Skin," filed in 2006.
- [2] M. Francheck and K. Larin, "Imaging Via Computational Models: Information Recovery from Intravascular Ultrasound (IVUS) Using Dynamic Systems Analysis," pending, 2007.

### **B. Selected peer-reviewed publications (in chronological order).**

- [1] D. A. Zimnyakov, V. P. Ryabukho, and K. V. Larin, "Microlens Effect Due to the Diffraction of Focused Beams on Large-Scale Phase Screens," Letters to Journal of Theoretical Physics, vol. 20, p. 14, 1994.
- [2] D. A. Zimnyakov, V. V. Tuchin, A. A. Mishin, and K. V. Larin, "Correlation dimension of speckle patterns for fractal-like scatterers," Applied Nonlinear Dynamics, vol. 3, pp. 126-134, 1995.
- [3] R. O. Esenaliev, K. V. Larin, I. V. Larina, and M. Motamedi, "Noninvasive monitoring of glucose concentration with optical coherence tomography," Optics Letters, vol. 26, pp. 992-994, 2001.
- [4] R. O. Esenaliev, I. V. Larina, K. V. Larin, D. J. Deyo, M. Motamedi, and D. S. Prough, "Optoacoustic technique for noninvasive monitoring of blood oxygenation: a feasibility study," Applied Optics, vol. 41, p. 4722, 2002.
- [5] K. V. Larin, M. S. Eledrisi, M. Motamedi, and R. O. Esenaliev, "Noninvasive blood glucose monitoring with optical coherence tomography - A pilot study in human subjects," Diabetes Care, vol. 25, p. 2263, 2002.
- [6] K. V. Larin, I. V. Larina, M. Motamedi, and R. O. Esenaliev, "Optoacoustic laser monitoring of cooling and freezing of tissues," Quantum Electronics, vol. 32, p. 953, 2002.
- [7] A. I. Kholodnykh, I. Y. Petrova, K. V. Larin, M. Motamedi, and R. O. Esenaliev, "Precision of measurement of tissue optical properties with optical coherence tomography," Applied Optics, vol. 42, p. 3027, 2003.
- [8] K. V. Larin, M. Motamedi, T. V. Ashitkov, and R. O. Esenaliev, "Specificity of noninvasive blood glucose sensing using optical coherence tomography technique: a pilot study," Physics in Medicine and Biology, vol. 48, p. 1371, 2003.
- [9] K. V. Larin, T. Akkin, R. O. Esenaliev, M. Motamedi, and T. E. Milner, "Phase-sensitive optical low-coherence reflectometry for the detection of analyte concentrations," Applied Optics, vol. 43 (cover paper), pp. 3408-3414, 2004.
- [10] K. V. Larin, I. V. Larina, and R. O. Esenaliev, "Monitoring of tissue coagulation during thermotherapy using optoacoustic technique," Journal of Physics D: Applied Physics, vol. 38, pp. 2645-2653, 2005.

- [11] I. V. Larina, M. B. Evers, T. V. Ashitkov, C. Bartels, K. V. Larin, and R. O. Esenaliev, "Enhancement of drug delivery in tumors by using interaction of nanoparticles with ultrasound radiation," *Technology in Cancer Research and Treatment*, vol. 4, pp. 217-226, 2005.
- [12] I. V. Larina, K. V. Larin, and R. O. Esenaliev, "Real-time optoacoustic monitoring of temperature in tissues," *Journal of Physics D: Applied Physics*, vol. 38, pp. 2633–2639, 2005.
- [13] Y. Cheng and K. V. Larin, "Artificial fingerprint recognition using optical coherence tomography with autocorrelation analysis," *Applied Optics*, vol. 45 (cover paper), pp. 9238-9245, 2006.
- [14] M. Ghosn, V. V. Tuchin, and K. V. Larin, "Depth-Resolved Monitoring of Glucose Diffusion in Tissues by Using Optical Coherence Tomography," *Optics Letters*, vol. 31, pp. 2314-2316, 2006.
- [15] K. V. Larin and M. Ghosn, "Influence of experimental conditions on drug diffusion in cornea," *Quantum Electronics*, vol. 36, pp. 1083-1088, 2006.
- [16] R. K. Manapuram, M. Ghosn, and K. V. Larin, "Identification of Artificial Fingerprints Using Optical Coherence Tomography Technique " *Asian Journal of Physics*, vol. 15, pp. 15-27, 2006.
- [17] Y. Cheng and K. V. Larin, "In vivo Two- and Three-Dimensional Imaging of Artificial and Real Fingerprints with Optical Coherence Tomography," *Photonics Technology Letters*, vol. 19, pp. 1634-1636, 2007.
- [18] M. Ghosn, V. V. Tuchin, and K. V. Larin, "Non-Destructive Quantification of Analytes Diffusion in Cornea and Sclera by Using Optical Coherence Tomography," *Investigative Ophthalmology & Visual Science*, vol. 48, pp. 2726-2733, 2007.
- [19] K. V. Larin, M. G. Ghosn, S. N. Ivers, A. Tellez, and J. F. Granada, "Quantification of glucose diffusion in arterial tissues by using optical coherence tomography," *Laser Phys. Lett.*, vol. 4, pp. 312-317, 2007.
- [20] S. Anandampillai, X. Zhang, P. Sharma, G. C. Lynch, M. A. Francheck, and K. V. Larin, "Quantum dot – DNA interaction: Computational Issues and Preliminary Insights on Use of Quantum Dots as Biosensors," *Computer Methods in Applied Mechanics and Engineering*, vol. (accepted) (invited paper), 2008.
- [21] S. Chang, Y. Cheng, K. V. Larin, Y. Mao, S. Sherif, and C. Flueraru, "Optical coherence tomography used for security and fingerprint-sensing applications," *IET Image Processing*, vol. 2, pp. 48-58, 2008.
- [22] M. G. Ghosn, E. F. Carbajal, N. Befrui, A. Tellez, J. F. Granada, and K. V. Larin, "Permeability of Hyperosmotic Agent in Normal and Atherosclerotic Vascular Tissues," *Journal of Biomedical Optics*, vol. 13, p. 010505(3), 2008.
- [23] M. G. Ghosn, E. F. Carbajal, N. Befrui, V. V. Tuchin, and K. V. Larin, "Differential Permeability Rate and Percent Clearing of Glucose in Different Regions in Rabbit Sclera," *Journal of Biomedical Optics*, vol. accepted, 2008.
- [24] K. V. Larin and V. V. Tuchin, "Functional Imaging and Assessment of Glucose Diffusion in Epithelial Tissues with Optical Coherence Tomography," *Quantum Electronics*, vol. accepted, 2008.
- [25] I. V. Larina, E. F. Carbajal, V. V. Tuchin, M. E. Dickinson, and K. V. Larin, "Enhanced OCT imaging of embryonic tissue with optical clearing," *Laser Phys. Lett.*, vol. 5, pp. 476-480, 2008.

*Selected Reviewed Proceedings (out of 40):*

- [1] D. A. Zimnyakov, V. V. Tuchin, K. V. Larin, A. A. Mishin, and I. S. Peretochkin, "Fractal scattering structure analysis using scanning interferometer with focused probing beams," *Proc. of SPIE*, vol. 2647, pp. 80-85, 1995.
- [2] K. V. Larin, D. A. Zimnyakov, A. A. Mishin, and V. V. Tuchin, "Analytical simulation of statistically inhomogenous intensity fluctuations of biospeckles using band-limited fractal model," *Proc. of SPIE*, vol. 3053, pp. 98-106, 1997.
- [3] K. V. Larin and A. A. Oraevsky, "Optoacoustic signal profiles for monitoring glucose concentration in turbid media," *Proc. of SPIE*, vol. 3726, pp. 576-583, 1999.
- [4] K. V. Larin, I. V. Larina, M. Motamedi, and R. O. Esenaliev, "Monitoring of temperature distribution in tissues with optoacoustic technique in real time," *Proc. of SPIE*, vol. 3916, pp. 311-321, 2000.
- [5] K. V. Larin, O. Hartrumpf, I. V. Larina, and R. O. Esenaliev, "Comparison of optoacoustic tomography with ultrasound and x-ray imaging for breast cancer detection," *Proc. of SPIE*, vol. 4256, pp. 147-153, 2001.
- [6] K. V. Larin, I. V. Larina, M. Motamedi, V. M. Gelikonov, R. V. Kuranov, and R. O. Esenaliev, "Potential application of optical coherence tomography for noninvasive monitoring of glucose concentration," *Proc. of SPIE*, vol. 4263, pp. 83-90, 2001.

- [7] K. V. Larin, M. S. Eledrisi, T. V. Ashitkov, M. Motamedi, and R. O. Esenaliev, "Monitoring of tissue optical properties using OCT: application for blood glucose analysis," *Proc. of SPIE*, vol. 4707, pp. 181-188, 2002.
- [8] K. V. Larin, T. V. Ashitkov, M. Motamedi, and R. O. Esenaliev, "Application of optical coherence tomography for noninvasive blood glucose monitoring during hyperglycemia," *Proc. of SPIE*, vol. 5068, pp. 294-298, 2003.
- [9] K. V. Larin, T. V. Ashitkov, M. Motamedi, and R. O. Esenaliev, "Specificity of noninvasive blood glucose monitoring with optical coherence tomography," *Proc. of SPIE*, vol. 4965, pp. 25-31, 2003.
- [10] A. I. Kholodnykh, K. Hosseini, K. V. Larin, A. A. Vassilieva, R. O. Esenaliev, and M. Motamedi, "Accurate in vivo measurements of the corneal light backscattering in-depth distribution with optical coherence tomography for different hydration states," *Proc. of SPIE*, vol. 5316, pp. 12-15, 2004.
- [11] K. V. Larin, T. Akkin, T. E. Milner, D. P. Dave, M. Motamedi, and R. O. Esenaliev, "Measurement of refractive index variation of physiological analytes using differential-phase OCT," *Proc. of SPIE*, vol. 5325, pp. 31-34, 2004.
- [12] K. V. Larin, R. O. Esenaliev, E. Kim, S. Oh, M. Motamedi, and T. E. Milner, "Monitoring refractive index variations in turbid media using phase-sensitive frequency-domain OCT," *Proc. of SPIE*, vol. 5690, pp. 422-425, 2005.
- [13] Y. Cheng and K. V. Larin, "Identification of artificial fingerprints using optical coherence tomography technique," *Proc. SPIE*, vol. 6402, p. 64020O, 2006.
- [14] M. G. Ghosn, Y. Cheng, and K. V. Larin, "Monitoring of drug diffusion in ocular tissues," *Proc. SPIE* vol. 6163, pp. 61630301 - 61630305, 2006.

## C. Research Support

### Ongoing Research Support

Wallace H. Coulter Foundation Larin (PI) 10/01/2006-09/30/2008  
 Young Investigator Translational Award  
 Development of Objective, Noninvasive Technique to Assess Viability of Human Pre-Implantation Stage Embryos  
 This study is to develop novel method for functional assessment of embryos at early stage of development  
 Role: PI

Office of Naval Research Larin (PI) 06/01/07 - 05/31/10  
 Young Investigator Award  
 Novel Method of Noninvasive Detection and Assessment of Gas Emboli and DCS  
 This study is to develop novel optical method for high-resolution imaging and detection of circulating microbubbles in blood  
 Role: PI

### Completed Research Support

GEAR. Larin (PI) 9/01/06-8/31/07  
 University of Houston  
 Development of Fourier-Domain Optical Coherence Tomography for Ultra-Sensitive Monitoring of Eye's Lens Optical Properties  
 The goal of this study was to evaluate optical properties of accommodating lens as a function of age  
 Role: PI

Small Grant Program. Larin (PI) 12/01/06-11/30/07  
 University of Houston  
 Automated identification of artificial fingerprints by using Optical Coherence Tomography.  
 The goal of this study was to develop novel algorithms for automatic identification of artificial fingerprints.  
 Role: PI