<u>**CURRICULUM VITAE**</u>

ALEXANDER VLADIMIR SERGIENKO

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<u>**Education:**</u>

     Ph.D.,   1987, Moscow State University, Russia, Physics
     M.S.,   1981, Moscow State University, Russia, Physics

<u>**Professional Positions:**</u>

5/2003 – present   Boston University, Department of Electrical and Computer Engineering, Professor.
5/2003 – present   Boston University, Department of Physics, Professor.
9/1996 – present   Boston University, Photonics Center, Faculty.
1/2011 – 12/2011   Visiting Professor and Quantum Optics Lecturer, Department of Engineering Information (DEI), University of Padua, Italy
11/2006–10/2009   Quantum Information Partners LLP, Partner
7/2006 – 10/2009   London Quantum Networks Ltd, Member Advisory Board
1/2002 – 12/2005   Elsag S.p.A. Genoa, Italy, Consultant.
9/2000 – 4/2003   Boston University, Department of Electrical and Computer Engineering, Associate Professor.
9/2000 – 4/2003   Boston University, Department of Physics, Associate Professor.
10/1999 – 5/2001   MagiQ Technologies, Somerville, Massachusetts, Consultant.
9/1996 - 8/2000   Boston University, Department of Electrical and Computer Engineering, Assistant Professor.
10/1993 - 8/1996   University of Maryland Baltimore County, Department of Physics, Research Assistant Professor.
06/1993 - 8/1996   National Institute of Standards and Technology, Physics Laboratory, Guest Researcher.
6/1991 - 9/1993   University of Maryland Baltimore County, Department of Physics, Faculty Research Associate.
9/1990 - 5/1991   University of Maryland College Park, Department of Physics and Astronomy, Visiting Professor.
4/1987 - 8/1990   Moscow State University, Physics Department, Assistant Professor.
2/1981 - 3/1987   Moscow State University, Physics Department, Faculty Research Assistant.

Professional Societies:

Optical Society of America – Fellow, Chair of the Quantum Computing and Communication Technical Group
American Physical Society
IEEE\LEOS

Honors:
2010   Outstanding Referee - American Physical Society
2004   Fellow of the Optical Society of America
2001   Professor of the Year Award in Recognition of Excellence in Teaching, College of Engineering, Boston University.
1999   NSF CAREER award.

Professional Activities:

Teaching Experience: "Optical Measurement" (SC764), "Quantum Optics" (SC762), "Introduction to Photonics" (EC560) for graduate students, "Analog Electronics" (SC412), "Introduction to Electronics"(SC410), "Electrical Circuit Theory" (EK307), for undergraduate students at Boston University. "Electromagnetic Theory" for undergraduate students at the University of Maryland Baltimore County. "Basic Radiophysics" at the undergraduate level at Moscow State University. "Laser Spectroscopy" and "Nonlinear Optics" at the graduate level at Moscow State University. Initiated and supervised a graduate student laboratory on "Laser Spectroscopy".

Research Interests:

- Quantum state engineering, entanglement manipulation and processing on a chip, micro-and nano-photonics, ultrafast quantum optics.
- Quantum information processing, quantum cryptography and communication, quantum networking, linear-optical quantum computing.
- Quantum imaging.
- Ultra-precise optical measurement in science and technology (quantum metrology), characterization of organic, polymer, and semiconductor structures used in modern biophysics, nanophotonics, and optoelectronics.
- Dispersion cancellation and management, super-resolution phase sensors.
- Precise characterization of polarization and chromatic dispersion in elements of 40Gb/s and 100 Gb/s metropolitan ROADM telecommunication networks including WSS and add-drop multiplexers.
- Quantum nanoscale sensors, and sensor networks.
- Quantum bio-photonics, characterization and diagnostic of biological materials and devices for life sciences and proteomics by exploiting the power of entangled-photon states.
- Correlation spectroscopy with superconducting photon-counting detectors.
- Study of fundamental optical interactions (quantum light - quantum system) and quantum surface effects.

Research Experience: Experimental quantum optics and quantum information processing, bio-photonics, ultra-precise optical measurement (quantum metrology), multi-

spectral imaging and correlation spectroscopy. Laser physics and nonlinear optics of continuous wave and pulsed processes, parametric optical amplifiers and oscillators, ultrafast single photon detection and remote laser sensing, correlation spectroscopy and quantum radiometry in visible and infrared spectrum.

Research Support:
More than $9M in completed and current research grants from the Government and industry.

Patents:

1. David Simon, Alexander Sergienko, Lee Edvin Goldstein, and Robert H. Webb"Correlation Confocal Microscope", U.S. Patent Number US 8,829415 B2, September 9, 2014.

2. R. Wolleschensky M. Kempe, Magued B. Nasr, A. F. Abouraddy, M. C. Booth, B. E. A. Saleh, A. V. Sergienko, and M. C. Teich, "Methods and Systems for Microscopic Imaging" International Patent application WO 03/0606120. Pending.

3. M. C. Teich, B. E. A. Saleh, A. V. Sergienko, J. T. Fourkas, R. Wolleschensky, M. Kempe, and M. C. Booth, "High-Flux Entangled Photon Generation via Parametric Processes in a Laser Cavity," U.S. Patent Number 6,982,822, January 3, 2006.

4. Teich, Malvin C.; Saleh, Bahaa E A.; Sergienko, Alexander V.; Abouraddy, Ayman F.; Nasr, Magued B., "Quantum Optical Coherence Tomography Data Collection Apparatus and Method for Processing Therefore", United States Patent 6882431, April 19, 2005.

5. K. C. Toussaint, A. F. Abouraddy, A. V. Sergienko, B. E. A. Saleh, and M. C. Teich "Entangled Photon Ellipsometry", US Patent No. 6,822,739, November 24 2004.

6. A. V. Sergienko, B. E. A. Saleh, M. C. Teich, S. J. Bielagus, M. J. Merhar, ''Polarization Mode Dispersion Characterization Apparatus and Method'' US Patent No. 6,646,727 November 11, 2003.

7. D. N. Klyshko, A. A. Malygin, A. N. Penin, A. V. Sergienko, G. Kh. Kitaeva, M. V. Chekhova and S. P. Kulik "A Method for the Measurement of Spatial Distribution of Photodetectors Absolute Sensitivity and Device for Its Realization", Russia Patent No. 2030715, March 10, 1995.

8. G. Kh. Kitaeva, A. N. Penin, A. V. Sergienko, and A. V. Shepelev "A Method for the Measurement of Time Parameters of Optical Processes and Photoelectric Devices", USSR Patent No. 51533534, September 1, 1989.

Publications:

"H-Index" = 47 (Google Scholar) (10196 citations)

Books:

Alexander Sergienko, Saverio Pascazio, and Paolo Villoresi, (Eds.) "Quantum Communication and Quantum Networking", Springer, New York, ISBN 978-3-642-11730-5 (2009).

Alexander V. Sergienko ed. "Quantum Communications and Cryptography", CRC Press, Taylor & Francis Group, New York, ISBN 0-8483-3684-8, (2006).

Book Chapters:

1. David Simon, Gregg Jaeger and Alexander V. Sergienko. "Quantum Information In Communication and Imaging", International series on Modern Physics, World Scientific, Singapore, (2013).

2. Zachary D. Walton, Alexander V. Sergienko, Bahaa E. A. Saleh, and Malvin C. Teich, "Noise-Immune Quantum Key Distributions", in "Quantum Communications and Cryptography", CRC Press, Taylor & Francis Group, New York, ISBN 0-8483-3684-8, (2006).

3. Alexander V. Sergienko "Quantum Measurement With Entangled-Photon States", in "Quantum Information Processing & Communications in Europe", European Communities Publication Office, Brussels, November (2005). ISBN 92-894-8924-3 [http://www.cordis.lu/ist/fet/qipc-eu.htm]

4. A. V. Sergienko, G. S. Jaeger, G. Di Giuseppe, B. E. A. Saleh, and M. C. Teich "Quantum Information Processing and Precise Optical Measurement With Hyper-Entangled Quantum States", in NATO Advance Study Institute "Quantum Communication and Information Technologies", Ankara, Turkey, June 2002, Kluwer Academic Publishers, Dordrecht, ISBN 1-4020-1453-8 (2003), pp. 13-46.

5. A. V. Sergienko "Quantum Metrology With Entangled Photons", in CXLVI International School of Physics "Enrico Fermi", T. J. Quinn, S. Leschiutta, and P. Tavella (Eds.), IOS Press, Amsterdam ISBN 1 58603 167 8 (2001), pp. 715-746.

6. G. S. Jaeger and A. V. Sergienko "Multi-Photon Quantum Interferometry", in E. Wolf, "Progress in Optics" 42, Elsevier Science B.V. ISBN 0 444 50908 9 (2001), pp. 277-324.

Publications in Refereed Journals:

1. David S. Simon, Casey Fitzpatrick, and Alexander V. Sergienko, "Discrimination and synthesis of recursive quantum states in high-dimensional Hilbert spaces", *Physical Review A,* **v. 91**, 043806 (2015).

2. Casey A. Fitzpatrick, David S. Simon, Alexander V. Sergienko ''High-capacity imaging and rotationally insensitive object identification with correlated orbital angular momentum states'', *International Journal of Quantum Information*, **v.13**, 1560013, (2015).

3. Gregg S. Jaeger and Alexander V. Sergienko "Entanglement sudden death: a threat to advanced quantum key distribution?" *Natural Computing, .***v. 13**, pp. 459-467 (2014).

4. Alexander V. Sergienko, Néstor Uribe-Patarroyo, Andrew Fraine, David S. Simon, and Olga Minaeva "Efficient Identification of Objects Carrying Elements of High-Order Symmetry By Using Correlated Orbital Angular Momentum (OAM) States," European Physical Journal, EPJ Web of Conferences **v. 78**, 01008 (2014).

5. David Simon, Gregg Jaeger, and Alexander Sergienko "Quantum information in communication and imaging, " *International Journal of Quantum Information*, **v.12**, 143004 (2014).

6. David S. Simon and Alexander V. Sergienko, "High Capacity Quantum Key Distribution via Hyperentangled Degrees of Freedom", *New Journal of Physics*, **v.16**, 063052 (2014).

7. David S. Simon, Gregg Jaeger, and Alexander V. Sergienko, "Entangled-Coherent-State Quantum Key Distribution with Entanglement Witnessing", *Physical Review A*, **v. 89**, 012315 (2014).

8. Luca Mazzarella, Francesco Ticozzi, Alexander V. Sergienko, Giuseppe Vallone, Paolo Villoresi, "Asymmetric Architecture for Heralded Single Photon Sources", *Physical Review A*, **v. 88**, 023848 (2013).

9. Gregg Jaeger, David Simon, and Alexander V. Sergienko, "Implications of Disentanglement and Locality Induction for Quantum Information Processing and Cryptography, " *Quantum Matter* **v. 2**, 427-435 (2013).

10. Carsten Schuck, Wolfram H. P. Pernice, Olga Minaeva, Mo Li, Gregory Gol'tsman, Alexander V. Sergienko, and Hong X. Tang, "Matrix of integrated superconducting single-photon detectors with high timing resolution", *IEEE Transactions on Applied Superconductivity*, **v. 23**, No 3, 2201007 (2013).

11. David S. Simon, Nate Lawrence, Jacob Trevino, Luca Dal Negro, Alexander V. Sergienko, "High-capacity quantum Fibonacci coding for key distribution" *Physical Review A*, **v. 87**, 033212 (2013).

12. M. Minozzi, S. Bonora, A. V. Sergienko, G. Vallone, and P. Villoresi, "Optimization of Two-Photon Wavefunction in Parametric Down Conversion by Adaptive Optics Control of the Pump Radiation". *Optics Letters,* v. 38, No. 4, pp. 489-491 (2013).

13. Nestor Uribe-Patarroyo, Andrew Fraine, David S. Simon, Olga Minaeva, Alexander V. Sergienko, "Object identification using correlated orbital angular momentum states" *Physical Review Letters*, v.110, 043601 (2013).

14. W. Pernice, C. Schuck, O. Minaeva, M. Li, G.N. Goltsman, A.V. Sergienko, H. X. Tang, "High-speed and high-efficiency travelling wave single-photon detectors embedded in nanophotonic circuits", *Nature Communications v. 3*, 1325, 27 Dec. 2012 (DOI: 10.10308).

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