
DAVID S. SIMON

20 Monadnock Road
Arlington, MA 02476

(781) 859-5046 (home)
(781) 491-2478 (cell)

simond@bu.edu ,
dsimon@stonehill.edu

Current Positions:

- **Professor of Physics and Engineering**, Dept. of Physics and Astronomy & Dept. of Engineering, **Stonehill College**
- **Visiting Researcher**, Dept. of Electrical and Comp. Eng. / Photonics Center, **Boston University**

Research statistics:

h-index: 19 **i-10 index:** 34

(Source: Google scholar)

EDUCATION

- **PhD** electrical engineering (photonics/optical engineering) **Boston University**, 2011
- **MS** electrical engineering (photonics) **Boston University**, 2010
- **PhD** theoretical physics (quantum field theory) **Johns Hopkins University**, 1993
- **MA** physics **Johns Hopkins University**, 1988
- **BS** physics and mathematics **Ohio State University**, 1986

EMPLOYMENT

- **Stonehill College (2011-present):**
 - **Professor**, Dept of Engineering 2023-present
 - **Professor**, Dept. of Physics and Astronomy, 7/18-present.
 - **Program manager**, photonics technician certification program (Stonehill, Bridgewater State, MIT collaboration), 9/18-5/22
 - **Associate Professor**, Dept. of Physics and Astronomy, 7/12- 7/18.
 - **Faculty Teaching Fellow**, Dept. of Physics and Astronomy, 8/11-6/12.
- **Boston University (2007-present):**
 - **Visiting Researcher**, Dept. of Electrical and Computer Engineering, and Photonics Center (Quantum Communication and Measurement Lab), 9/12-present.
 - **Post-Doctoral Researcher**, Dept. of Electrical and Computer Engineering, and Photonics Center (Quantum Communication and Measurement Lab), 1/11- 8/12.
 - **Research Assistant**, Dept. of Electrical and Computer Engineering/Photonic Center, 8/07-12/10.
- **Nova Southeastern University (1993-2007):**
 - **Science Coordinator**, Division of Mathematics, Science, and Technology, 5/06 –7/07.
 - **Associate professor**, Division of Mathematics, Science, and Technology, 8/98 – 7/07.
 - **Assistant professor**, Division of Mathematics, Science, and Technology, 8/93-8/98.
 - **Instructor**, Institute for Computer-Aided Mathematics Program (ICAMP), 6/97 – 7/97 and 6/01-7/01. Taught intensive 3-week summer courses on advanced math topics to high-school students.
- **Johns Hopkins University (1986-1993):**
 - **Instructor**, Center for Talented Youth (**CTY**), 6/92-7/93. Taught intensive 3-week science courses to gifted high school students.
 - **Senior teaching assistant** for general physics, 1/93 – 5/93. Supervised 10 graduate teaching assistants for introductory physics course with about 300 students.
 - **Graduate teaching assistant** for introductory physics and astronomy courses, 9/86-12/92.

TOPICS OF CURRENT AND PAST RESEARCH

- **Quantum Optics/Photonics/Optical Engineering**
 - Applications of directionally-unbiased optical devices
 - Quantum walks, optical implementations of topological states
 - Optical orbital angular momentum states
 - Applications of correlated or entangled photons to microscopy and imaging

- Quantum optical methods for characterization and manipulation of aberration, frequency dispersion, polarization mode dispersion, turbulence, and diffractive effects
- Classical and quantum information theory in optics and communication
- Interferometry with non-classical states of light
- Nonlinear optics (parametric down conversion)
- **Mathematical Physics/Quantum Field Theory/Quantum Mechanics**
 - Quantum cryptography
 - Quantum information processing
 - Relativistic Harmonic Oscillators
 - Applications of quantum entanglement in optics
 - Supersymmetry in quantum mechanics
 - Differential geometric methods in gauge field theory

BOOKS

Authored:

- **Introduction to Quantum Science and Technology**, D.S. Simon, to appear, Springer-Nature Publishing, 2024.
- **Topology in Optics: Tying Light in Knots**, D. S. Simon, Institute of Physics Press (2nd edition 2021, 1st edition 2018). (Favorably reviewed in *Optics and Photonics News*, Sept. 2021)
- **A Guided Tour of Light Beams: From Lasers to Optical Knots**, D. S. Simon, Institute of Physics Press (2nd edition 2020, 1st edition 2016)
- **Quantum Metrology, Imaging, and Communication**, D. S. Simon, G. Jaeger, A. V. Sergienko, Springer-Verlag, Berlin, 2017.
- **Basic Theory and Experiment in Physics**, D. J. Castano and D. S. Simon, Kendall/Hunt (3rd edition 2006, 2nd edition 2004, 1st edition 2003).

Edited:

- **Quantum Arrangements: The Life and Work of Michael J. Horne**, G. Jaeger, D. Simon, A. V. Sergienko, D. Greenberger and A. Zeilinger (eds.), Springer-Verlag, 2021.

BOOK CHAPTERS:

- **Quantum Information in Communication and Imaging**, D.S. Simon, G. Jaeger, and A.V. Sergienko, in *Quantum Foundations and Open Quantum Systems*, eds. C. Pombo and T. Nieuwenhuizen, World Scientific, 2014. (Published simultaneously in *International Journal of Quantum Information*, **12**, No. 4, 1430004 (2014))
- **High Capacity Quantum Communication with Fibonacci Coding**, D. S. Simon, J. Trevino, N. Lawrence, L. dal Negro, and A.V. Sergienko, Proceedings of Coherence and Quantum Optics (CQO) /Quantum Information and Measurement (QIM), eds. N.P. Bigelow, J. H. Eberly, C.R. Stroud, 353-360, Optical Society of America (**Invited paper**, 2014).

PATENT

- **Correlation Confocal Microscope**, D.S. Simon, A.V. Sergienko, L. Goldstein, R. Webb, application filed June 27, 2012. Patent approved Sept. 9, 2014.

PEER-REVIEWED JOURNAL ARTICLES:

1. **Phase Amplification in Grover-Coin Based Interferometry**, C. R. Schwarze, D. S. Simon, A. V. Sergienko, in preparation (2024)
2. **Experimental demonstration of a Grover-Michelson interferometer**, C. R. Schwarze, D. S. Simon, A. D. Manni, A. Ndao, A. V. Sergienko, in preparation (2024)
3. **Single-photon description of the lossless optical Y-coupler**, C. R. Schwarze, A. D. Manni, D. S. Simon, A. V. Sergienko, submitted to Phys. Rev. A (2024)
4. **Exceptional Points in SSH-like Models with Hopping Amplitude Gradients**, D. S. Simon, C. Schwarze, and A. V. Sergienko, submitted to J. Opt. Soc. Am. B (2024)
5. **Tunable linear-optical phase amplification**, C. R. Schwarze, D. S. Simon, A. Ndao, A. V. Sergienko, Phys. Rev. A **109**, 053508 (2024)
6. **Finite-element assembly approach of optical quantum walk networks**, C. R. Schwarze, D. S. Simon, A. D. Manni, A. Ndao, A. V. Sergienko, J. Opt. Soc. Am. B **41**(6), 1304-1316 (2024)
7. **Enhanced-sensitivity interferometry with phase-sensitive unbiased multiports**, C. R. Schwarze, D. S. Simon, A. V. Sergienko, Phys. Rev. A **107**, 052615 (2023)

8. **Interferometry and higher-dimensional phase measurements using directionally unbiased linear optics**, D. S. Simon, C. Schwarze, and A. V. Sergienko, Phys. Rev. A **106**, 033706 (2022).
9. **Controllable entangled state distribution in a dual-rail reconfigurable optical network**, S. Osawa, D. S. Simon, A. V. Sergienko, Phys. Rev. A **104**, 012617 (2021) - Chosen as **Editor's Suggestion**, intended to "direct readers to interesting, important, and well-written articles"
10. **Higher-Dimensional Hong-Ou-Mandel effect with Linear Multiports**, S. Osawa, D. S. Simon, A. V. Sergienko, Phys. Rev. A **102**, 063712 (2020)
11. **Quantum-Clustered Two-Photon Walks**, D. S. Simon, S. Osawa, and A. V. Sergienko, Physical Review A **101** 032118 (2020)
12. **Directionally-Unbiased Unitary Optical Devices in Discrete-Time Quantum Walks**, S. Osawa, D. S. Simon, and A. V. Sergienko, Entropy, **21**, 853 (2019).
13. **Investigation of directional and directionally-unbiased devices in linear optics for quantum walk applications**, S. Osawa, D. S. Simon, and A. V. Sergienko, Proc. of SPIE, **11134**, 111340C (2019).
14. **A Modular Industry-Centered Program for Photonics Certification**, D. Simon, G. Gu, C. Schnitzer, E. Devaney, T. Kling, J. Diop, Proc. SPIE **11143**, 111431L (2019)
15. **Topological Qubits as Carriers of Quantum Information in Optics**, G. Jaeger, D.S. Simon, A.V. Sergienko, Applied Sciences **9**, 575 (2019)
16. **Topological Boundaries and Bulk Wavefunctions in the SSH model**, D. S. Simon, S. Osawa, A. V. Sergienko, Journal of Physics: Condensed Matter **31**, 045001 (2019)
17. **Experimental Demonstration of Directionally-Unbiased Linear-Optical Multiport**, S. Osawa, D. S. Simon, A.V. Sergienko, Optics Express **26**, 27201 (2018) - **Editor's Pick**, highlighted by the editors in recognition of "excellent scientific quality"
18. **Hyperentangled Topology and Polarization Enables Error-Protected Quantum Registers**, D. S. Simon, S. Osawa, A. V. Sergienko, New Journal of Physics **20**, 093032 (2018)
19. **Quantum Simulation of Topologically Protected States Using Directionally-Unbiased Linear Optical Multiports**, D.S. Simon, C. A. Fitzpatrick, S. Osawa, and A.V. Sergienko, Phys. Rev. A **96**, 013858 (2017)
20. **Quantum Simulation of Discrete-Time Hamiltonians using Directionally-Unbiased Linear Optical Multiports**, D.S. Simon, C. A. Fitzpatrick, S. Osawa, and A.V. Sergienko, Physical Review A **95**, 042109 (2017)
21. **Spectrally engineered broadband photon source for polarization quantum interferometry**, A. Thomas, M. Van Camp, O. Minaeva, D. S. Simon, and A. V. Sergienko, Optics Express **24**, 24947 (2016).
22. **Group Transformations and Entangled-State Quantum Gates Based on Directionally-Unbiased Optical Multi-Ports**, D.S. Simon, C. A. Fitzpatrick and A.V. Sergienko, Physical Review A **93**, 043845 (2016).
23. **Quantum Sensors: Improved Optical Measurement via Specialized Quantum States**, D.S. Simon, Journal of Sensors, article ID 6051286 (**Invited paper**, 2016).
24. **Coherent State Quantum Key Distribution Based on Entanglement Sudden Death**, G. Jaeger, D. S. Simon, and A. V. Sergienko, Quantum Information Processing **15** (3), 1117 (**Invited paper**, 2016).
25. **Discrimination and Synthesis of Recursive Quantum States in High-Dimensional Hilbert Spaces**, D.S. Simon, C. A. Fitzpatrick and A.V. Sergienko, Phys. Rev. A **91**, 043806 (2015)
26. **High-Capacity Imaging and Rotationally Insensitive Object Identification with Correlated Orbital Angular Momentum States**, C. A. Fitzpatrick, D. S. Simon, A. V. Sergienko, International Journal of Quantum Information, **12**, 1560013 (2015).
27. **High-Capacity Quantum Key Distribution via Hyper-Entangled Degrees of Freedom**, D. S. Simon and A. V. Sergienko, New Journal of Physics, **16**, 063052 (2014).
28. **Quantum Information in Communication and Imaging**, D. S. Simon, G. Jaeger, and A. V. Sergienko, International Journal of Quantum Information, Vol. 12, No. 4, 1430004 (2014). (**Invited paper**. Published simultaneously in proceedings of the *Advanced School in Quantum Foundations and Open Quantum Systems*)
29. **Entangled-Coherent- State Quantum Key Distribution with Entanglement Witnessing**, D. S. Simon, G. Jaeger, and A. V. Sergienko, Physical Review A **89** 012315 (2014).
30. **Implications of disentanglement and locality induction for quantum information processing and cryptography**, G. Jaeger, **D. Simon**, A. Sergienko, *Quantum Matter*, **2**, 427-435 (**Invited paper**, 2013).
31. **High Capacity Quantum Fibonacci Coding for Key Distribution**, D.S. Simon, J. Trevino, N. Lawrence, L. dal Negro, and A.V. Sergienko, *Physical Review A* **87**, 032312 (2013).
32. **Object Identification Using Correlated Orbital Angular Momentum States**, N. Uribe-Patarroyo, A.M. Fraine, D.S. Simon, O.M. Minaeva, A.V. Sergienko, *Physical Review Letters* **110**, 043601 (2013).
33. **Two-Photon Spiral Imaging with Correlated Orbital Angular Momentum States**, D.S. Simon and A.V. Sergienko, Physical Review A **85**, 043825 (2012).

34. **Broadband Source of Polarization Entangled Photons**, A.M. Fraine, O.M. Minaeva, D.S. Simon, R. Egorov, A.V. Sergienko, *Optics Letters*, **37**, 1910 (2012).
35. **Evaluation of Polarization Mode Dispersion in a Wavelength Selective Switch using Quantum Interferometry**, A.M. Fraine, O.M. Minaeva, D.S. Simon, R. Egorov, A.V. Sergienko, *Optics Express* **20**, 2025 (2012).
36. **A Theoretical Analysis of Quantum Imaging through Turbulence**, K.W.C. Chan, D.S. Simon, A. V. Sergienko, N.C. Hardy, J.H. Shapiro, P. Ben Dixon, Gregory Howland, John C. Howell, Joseph H. Eberly, M.N. O'Sullivan, B. Rodenburg, Robert W. Boyd, *Phys. Rev. A* **84**, 043807 (2011).
37. **Supersymmetry and Duality in Relativistic Oscillator Systems**, D.S. Simon, *Physics Letters A* **375**, 3751–3754 (2011).
38. **Evaluation of Polarization Mode Dispersion and Chromatic Dispersion using Quantum Interferometry**, A. Fraine, D.S. Simon, O. Minaeva, R. Egorov, and A.V. Sergienko, *Optics Express* **19**, 22820-22836 (2011).
39. **Quantum ghost imaging through turbulence**, P.B. Dixon, G. Howland, K.W.C. Chan, C. O'Sullivan-Hale, B. Rodenburg, N.C. Hardy, D.S. Simon, J.H. Shapiro, A.V. Sergienko, R.W. Boyd, J.C. Howell, *Physical Review A* **83**, 051803(R) (2011).
40. **Correlated-Photon Imaging with Cancellation of Object-Induced Aberration**, D.S. Simon and A.V. Sergienko, *J. Optical Society of America B* **28**, 247 (2011).
41. **Twin-Photon Confocal Microscopy**, D.S. Simon and A.V. Sergienko, *Optics Express* **18**, 22147 (2010).
42. **Odd-Order Aberration Cancellation in Correlated-Photon Imaging**, D.S. Simon and A.V. Sergienko, *Physical Review A* **82**, 023819 (2010).
43. **The Correlation Confocal Microscope**, D.S. Simon and A.V. Sergienko, *Optics Express*, **18**, 9766, (2010). (Chosen for reprinting in *The Virtual Journal of Biomedical Optics*, **5**, no. 9, 2010.)
44. **Spatial-Dispersion Cancellation in Quantum Interferometry**, D.S. Simon and A.V. Sergienko, *Phys. Rev. A* **80**, 053813 (2009).
45. **Multiparameter Entangled State Engineering Using Adaptive Optics**, C. Bonato, D.S. Simon, P. Villoresi, A.V. Sergienko, *Phys. Rev. A*, **79**, 062304 (2009). (Chosen for reprinting in *Virtual Journal of Quantum Information*, **9**, no. 6 2009)
46. **Odd- and Even-Order Dispersion Cancellation in Quantum Interferometry**, O. Minaeva, C. Bonato, B.E. Saleh, D.S. Simon, A.V. Sergienko, *Phys. Rev. Lett.* **102**, 100504 (2009). (Chosen for inclusion in *Virtual J. Quant. Info.*, **9**, no. 5 2009)
47. **Dispersion and Mutual Information in Quantum Interferometry**, D.S. Simon, A.V. Sergienko, T.B. Bahder, *Physical Review A* **78**, 053829 (2008).
48. **Duality and Supersymmetric Quantum Mechanics**, D.S. Simon, *Journal of Physics A: Mathematical and General*, **35**, p. 4143 (2002).
49. **Fibonacci-Type Polynomials as a Trajectory of a Discrete Dynamical System**, M. He, P. Ricci, and D.S. Simon, in *Rendiconti Del Circolo Matematico Di Palermo, Ser. II, Vol. LI*, 367 (2002).
50. **Entropy of Square Non-Negative Matrices**, M. He, P. Ricci, and D.S. Simon, *Nonlinear Analysis* **47**, 1905 (2001).
51. **Entropy and Zeta Function of the Fibonacci Matrix**, M. He, P. Ricci, and D.S. Simon, in *Problemi Attuali Dell'Analisi E Della Fisica Matematica*, Aracne Editrice (2000).
52. **Numerical Results on the Zeros of the Generalized Fibonacci Polynomials**, M. He, P. Ricci, and D.S. Simon, *Journal Calcolo, Istituto Di Analisi Numerica*, **34**, 25 (1997).
53. **Semiclassical Determinants of Schrodinger Operators on Bundles with Curvature of Low Rank**, D.S. Simon, *Journal of Mathematical Physics*, **38** (8), 4389, (1997).
54. **Dynamics of the Zeros of Fibonacci Polynomials**, M. He, D.S. Simon, P. Ricci, *Fibonacci Quarterly*, **35**, 160 (1997).
55. **Semiclassical Determinants of Schrodinger Operators on Bundles with Curvature of Low Rank**, D.S. Simon, *Journal of Mathematical Physics*, **38**, 4389 (1997).
56. **Determinants of Schrodinger Operators on Line Bundles**, D.S. Simon, *Journal of Mathematical Physics*, **36** (6), 3168 (1995).

ADDITIONAL PAPERS ON THE PHYSICS E-PRINT ARCHIVE (<http://arxiv.org/>):

57. **Security in the Multi-Dimensional Fibonacci Protocol**, David S. Simon, Casey Fitzpatrick, Alexander V. Sergienko, [arXiv:1503.04448](https://arxiv.org/abs/1503.04448) (quant-ph), 2015.
58. **Turbulence Mitigation in Phase-Conjugated Two-Photon Imaging**, David S. Simon, Alexander V. Sergienko, [arXiv:1105.0128](https://arxiv.org/abs/1105.0128) (quantum-ph), 2011.

PRESENTATIONS, POSTERS, AND INVITED LECTURES:

1. D. S. Simon, "Physical applications of Topology", Physics Dept. seminar, Brown University, April 25, 2024. (Invited talk)
2. D. Simon, C. Schwarze, A. Sergienko, "Directionally-Unbiased Linear Multiports: Quantum Interference and Registration of Multi-Dimensional Rotation", Quantum 2.0, Rotterdam, Netherlands, June 23-27, 2024. (Accepted)
3. C. R. Schwarze, D. S. Simon, S. Osawa, and A. V. Sergienko, "Higher-dimensional Hong-Ou-Mandel effect and quantum state routing with directionally-unbiased linear-optical devices," in CLEO 2024, Optica Publishing Group, May 2024 (Accepted)
4. C. R. Schwarze, A. D. Manni, D. S. Simon, A. V. Sergienko, "Super-resolution interferometric phase measurements with directionally unbiased linear-optical devices", Interferometry and Structured Light 2024/ SPIE Optical Engineering + Applications, San Diego, Aug. 18-22, 2024
5. A. D. Manni, C. R. Schwarze, D. S. Simon, A. V. Sergienko, "Directionally Unbiased Nanophotonic Waveguide Multiports for Integrated Quantum Photonics Applications", Quantum Nanophotonic Materials, Devices, and Systems 2024/SPIE Nanoscience and Engineering, San Diego, Aug. 18-22, 2024
6. C. R. Schwarze, D. S. Simon, A. Ndao, and A. V. Sergienko, "Super-resolution interferometric phase measurement with directionally-unbiased linear-optical devices," in CLEO 2024, Optica Publishing Group, May 2024 (Accepted)
7. A. D. Manni, C. R. Schwarze, D. S. Simon, A. Ndao, and A. V. Sergienko, "Directionally unbiased nanophotonic waveguide multiports for integrated quantum photonics applications," in SPIE Optics + Photonics 2024, SPIE, Aug. 2024 (Submitted)
8. A. V. Sergienko, D. S. Simon, A. D. Manni, C. R. Schwarze, and A. Ndao, in SPIE Optics + Photonics 2024, SPIE, Aug. 2024 (Submitted)
9. S. Osawa, C. Schwarze, D. S. Simon, and A. V. Sergienko, "Higher-dimensional Hong-Ou-Mandel effect with linear-optical Grover multiports," in Conference on Lasers and Electro-Optics/Europe (CLEO/Europe 2023), Munich, Germany, Optica Publishing Group, Jun. 2023
10. S. Osawa, C. Schwarze, D. S. Simon, and A. V. Sergienko, "Higher-dimensional hong-ou-mandel effect with linear-optical grover multiports," in Central European Workshop on Quantum Optics, CEWQO 2023, Jul. 2023
11. A. V. Sergienko, D. S. Simon, S. Osawa, and C. Schwarze, "Higher-dimensional hong-ou-mandel effect with linear-optical grover multiports," in European Quantum Electronics Conference (EQEC 2023), Turin, Italy, Optica Publishing Group, Sep. 2023
12. D. Simon, "Two-photon Interference: From Foundations of Quantum Mechanics to Astronomy", Truman State University – March 23, 2022 (invited talk).
13. A. Sergienko; D. Simon; S. Osawa, "Joint Topological and Polarization Entanglement in Quantum Photonics Information Processing", Rochester Conference on Coherence and Quantum Optics, Rochester, NY, Aug. 4-8, 2019.
14. A. V. Sergienko, D. S. Simon, and S. Osawa, "Noise-resistant quantum optical information processing via joint topological and polarization entanglement", SPIE Optics + Photonics, San Diego, CA, August 11-15 (2019)
15. S. Osawa., D. S. Simon, and A. V. Sergienko, "Practical implementation of higher dimensional scattering quantum walks using directionally-unbiased linear-optical devices", SPIE Optics + Photonics, San Diego, CA, August 11-15 (2019)
16. A. Sergienko; D. Simon; S. Osawa, "New Linear-Optical Approach to Quantum Information Processing and Quantum Simulation", 26th Central European Workshop on Quantum Optics, Paderborn University, Germany, June 3–7, 2019
17. D. Simon, G. Gu, C. Schnitzer, E. Devaney, T. Kling, J. Diop, "A Modular Industry-Centered Program for Photonics Certification", Quebec, Canada, May 21-24, 2019.
18. A. Sergienko; D. Simon; S. Osawa, "Optical Information Processing with Noise-Resistant Entangled Topological States", CLEO 2019, San Jose, May 5-10, 2019.
19. D. Simon, S. Osawa, A. Sergienko, "Optical Information Processing with Entangled Topological States", American Physical Society March Meeting, Boston, March 4-8, 2019.
20. A. Sergienko, D. Simon, S. Osawa, "New Linear Optical Approach to Quantum Information Processing and Quantum Simulation", American Physical Society March Meeting, Boston, March 4-8, 2019.
21. S. Osawa, D. Simon, A. Sergienko, "Practical Implementations of Photonic Quantum Walks on Graphs", American Physical Society March Meeting, Boston, March 4-8, 2019.
22. S. Osawa, D. Simon, A. Sergienko, "Experimental Implementation of Directionally-Unbiased Linear-Optical Multiport", Frontiers in Optics/Laser Science 2018, Washington, D.C, September 16-20, 2018.

23. S. Osawa, David S. Simon, and Alexander V. Sergienko, "Directionally-unbiased linear-optical multiport: theory and experiment", New trends in quantum information and condensed matter physics University of Tokyo Kashiwa campus, Chiba, Japan, July 31 - August 3 (2018)
24. A. V. Sergienko, D. S. Simon, C. A. Fitzpatrick, "Directionally-Unbiased Multiports for Quantum Walks and Hamiltonian-Based Computing", Boston Photonics Centennial Conference, Harvard, Feb. 25, 2017.
25. David S. Simon, Casey Fitzpatrick, and Alexander V. Sergienko, "Quantum Simulation of Complex Systems with Directionally Unbiased Linear-Optical Multiports", DOE Workshop on Quantum Computing, Washington, DC, February 14-16, 2017.
26. A. V. Sergienko, D. S. Simon, C. A. Fitzpatrick "Entangled-State Quantum Gates With Directionally Unbiased Linear-Optical Multiports, " OSA Frontiers in Optics, 100th OSA Annual Meeting, Rochester, NY, October 17-21, 2016.
27. D. S. Simon, C. A. Fitzpatrick, and A. V. Sergienko, "Symmetry-Based Directionally-Unbiased Multiports for Quantum Walks and Quantum Information Processing", Gordon Conf. on Quantum Science, Stonehill College, August 1-5, 2016.
28. D. S. Simon, C. A. Fitzpatrick, and A. V. Sergienko, "High Capacity Quantum Communication Protocols-Engineering Entangled States in High-Dimensional Hilbert Space", Conf. on Quantum Information and Control, Toronto, ON, Aug. 17-21, 2015.
29. D. S. Simon, C. A. Fitzpatrick, and A. V. Sergienko, "Physical implementation of high-dimensional quantum states for communication and information processing," Third International Conference on Optical Angular Momentum, New York, Aug. 4-7, 2015.
30. C. A. Fitzpatrick, D. S. Simon, and A. V. Sergienko, "High Capacity Quantum Communication Protocols-Engineering Entangled States in High-Dimensional Hilbert Space", Canadian Summer School on Quantum Information, Toronto, ON, Aug. 10-14, 2015.
31. A. V. Sergienko, D. S. Simon, C. A. Fitzpatrick, O. Minaeva, "High Capacity Fibonacci Protocol for Quantum Communication-Engineering Entangled States in High-Dimensional Hilbert Space", European Conference on Lasers and Electro-Optics and the European Quantum Electronics Conference (CLEO/Europe-EQEC), Munich June 21-25, 2015.
32. A. V. Sergienko, D. S. Simon, C. A. Fitzpatrick, O. Minaeva, "High Capacity Fibonacci Protocol for Quantum Communication - Engineering Entangled States in High-Dimensional Hilbert Space", Workshop for Quantum Repeaters and Networks, Pacific Grove, Ca, May 15-17, 2015.
33. A. Sergienko, D. S. Simon, "High-capacity quantum Fibonacci coding for key distribution", 4th International Conf. on Quantum Cryptography, Paris, September 1-5, 2014.
34. O. Minaeva, A. Fraine, D. S. Simon, G. Jaeger and A. Sergienko "Development of Entangled-Coherent-State Quantum Key Distribution with Single-Photon Nonlinear Cross-Phase Modulation", 4th International Conf. on Quantum Cryptography., Paris, September 1-5, 2014.
35. D. S. Simon, "High Capacity Quantum Key Distribution with Hyper-Entangled Angular Momentum States", Gordon Conf. on Quantum Science, Stonehill College, July 27-August 1, 2014.
36. A. V. Sergienko, N. Uribe-Patarroyo, A. Fraine, D. S. Simon, and O. Minaeva, "Efficient Identification of Objects Carrying Elements of High-Order Symmetry by Using Correlated Orbital Angular Momentum (OAM) States", Conf. in Celebration of Wigner's 111th Birthday, Nov. 11-13 (2013). (Text available online: EPJ Web of Conferences 78, 01008 (2014), <http://www.epj-conferences.org>.)
37. O. Minaeva, A. Fraine, D.S. Simon, G.N. Goltsman, and A.V. Sergienko "High-- - resolution quantum measurement in modern telecommunication using broadband entanglement and fast single-- - photon detectors", 2nd International Conference on Quantum Technology, Russian Quantum Center, Moscow, Russia, July 20-24, 2013.
38. A. V. Sergienko, N. Uribe-Patarroyo, A. Fraine, D. Simon, O. Minaeva "Effective Image Recognition Using High-Order Symmetry of Correlated Orbital Angular Momentum (OAM) States" International Conference "Advances in Foundations of Quantum Mechanics and Quantum Information with atoms and photons", Turin, Italy, May 25-30, 2014. (Invited talk)
39. A. Fraine, O. Minaeva, D.S. Simon, G. S. Jaeger, A.V. Sergienko, "Nonlinear Optics in Graphene for Quantum Optics Applications", SPIE Photonics Europe Conference on Quantum Optics, Brussels, April 14-17, 2014.
40. D. S. Simon, J. Trevino, N. Lawrence, L. dal Negro, and A.V. Sergienko, "High-capacity Fibonacci Key Coding in Quantum Communication", Coherence and Quantum Optics (CQO) /Quantum Information and Measurement (QIM), Rochester, NY, June 17-20 (2013). (Invited talk)
41. A. Fraine, N. Uribe-Patarroyo, D.S. Simon, O.V. Minaeva, A.V. Sergienko, "Object Identification Using Correlated Orbital Angular Momentum States", Coherence and Quantum Optics (CQO) /Quantum Information and Measurement (QIM), Rochester, NY, June 17-20 (2013).
42. A. Fraine, N. Uribe-Patarroyo, D.S. Simon, O.V. Minaeva, A.V. Sergienko, "Object Identification Using Correlated Orbital Angular Momentum States", Conference on Lasers and Electro-Optics (CLEO) , San Jose, CA, June 9-14 (2013).

43. Alexander V. Sergienko, David S. Simon, Nate Lawrence, Jacob Trevino, Luca Dal Negro, "Quantum Key Distribution with Fibonacci States", SPIE Photonics West, San Francisco, Feb. 2-7 (2013).
44. N. Uribe-Patarroyo, A. Fraine, D.S. Simon, O.V. Minaeva, A.V. Sergienko, "Object Identification using Correlated Orbital Angular Momentum States", Frontiers in Optics, Rochester, NY, Oct. 14 (2012).
45. David S. Simon, "Quantum Information in Communication and Imaging", Advanced School in Quantum Foundations and Open Quantum Systems, João Pessoa, Brazil, July 16-28 (2012). (4 hours of Invited lectures)
46. Alexander V. Sergienko, David S. Simon, Nate Lawrence, Jacob Trevino, Luca Dal Negro, "Quantum Key Distribution with Fibonacci Orbital Angular Momentum", 11th International Conference on Quantum Communication, Measurement, and Computing, July 30-Aug. 3 (2012).
47. O.V. Minaeva, A.M. Fraine, R. Egorov, D. S. Simon and A. V. Sergienko, "High Resolution Measurement of Polarization Mode Dispersion (PMD) in Telecom_Switch using Quantum Interferometry", 11th International Conference on Quantum Communication, Measurement, and Computing, July 30-Aug. 3 (2012).
48. A. V. Sergienko, A.M. Fraine, O.V. Minaeva, R. Egorov and D. S. Simon, "High-resolution Quantum Interferometry Meets Telecom Industry Needs", 11th International Conference on Quantum Communication, Measurement, and Computing, July 30-Aug. 3 (2012).
49. A. V. Sergienko, Andrew Fraine. Olga Minaeva, David Simon, and Roman Egorov, "Quantum Technology Meets Industry: High Resolution Measurement of Polarization Mode Dispersion in Discrete Telecom Devices using Quantum Interferometry", 6th International Workshop on Advances in Foundations of Quantum Mechanics and Quantum Information with Atoms and Photons, INRIM, Turin, Italy, May 20-25 (2012).
50. A. V. Sergienko, Andrew Fraine. Olga Minaeva, David Simon, and Roman Egorov, "High Resolution Measurement of Polarization Mode Dispersion in Discrete Telecom Devices using Quantum Interferometry", Quantum Information and Measurement (QIM 2012).
51. Alexander Sergienko, David S. Simon, Olga V. Minaeva, "Dispersion Cancellation and Precise Measurement with Quantum Interferometry", FIO/LS - OSA Annual Meeting, San Jose, CA, October 16-20 (2011).
52. A. V. Sergienko, A. M. Fraine, R. Egorov, O. V. Minaeva, D. S. Simon, "Quantum Technology Meets Industry", Quantum Science Symposium, Quantum Biology and Quantum Information, Computing & Communication, Cambridge, MA, September 26-27 (2011).
53. Andrew Fraine, Roman Egorov, David Simon, Olga Minaeva and Alexander Sergienko, "High Resolution Measurement of Polarization Mode Dispersion with Quantum Interferometry", 2011 IEEE PS Summer Topicals, Montreal, July 18-20 (2011).
54. Andrew Fraine, Roman Egorov, Olga Minaeva, David Simon, Alexander Sergienko, "High Resolution Measurement of Polarization Mode Dispersion with Quantum Interferometry", International Conference on Quantum Information (ICQI), at the University of Ottawa, June 6-8 (2011).
55. D.S. Simon, A.V. Sergienko, "Correlated Imaging with Aberration Cancellation", International Conference on Quantum Information (ICQI), at the University of Ottawa, June 6-8 (2011).
56. D.S. Simon, A.V. Sergienko, "Correlated Imaging with Aberration Cancellation", Conference on Lasers and Electro-Optics (CLEO), Baltimore, May 1-6 (2011).
57. D.S. Simon, A.V. Sergienko, "Twin-Photon Correlated Confocal Microscopy", to be given at Conference on Lasers and Electro-Optics (CLEO), Baltimore, May 1-6 (2011).
58. D.S. Simon, A.V. Sergienko, "Correlated Confocal Microscopy", technical session, NSF Center for Biophotonic Sensors and Systems Industrial University Cooperative Research Center (CBSS IUCRC), Boston University Photonics Center, April 28 (2011).
59. Alexander V. Sergienko, David Simon, Olga Minaeva, "Ghost imaging with aberration cancellation", SPIE Optics + Photonics, San Diego, California, August 1-5 (2010).
60. A.V. Sergienko, D.S. Simon, O. Minaeva, B.E. Saleh, C. Bonato, "Dispersion Cancellation in Quantum Interferometry and Quantum Imaging", Workshop on Single and Entangled Photons: Sources, Detectors, Components, and Applications, NIST Boulder, CO, Nov. 3-6, (2009).
61. A.V. Sergienko, O. Minaeva, D.S. Simon, B.E.A. Saleh, C. Bonato, "Quantum Dispersion Cancellation in Frequency and in Space", CLEO/Europe-IQEC, 19th International Congress on Photonics in Europe, Munich Germany, June 14-19 (2009).
62. D.S. Simon, A.V. Sergienko, T.B. Bahder, "Effect of Dispersion on Fidelity of Quantum Interferometer", Quantum Entanglement and Decoherence: 3rd International Conference on Quantum Information (ICQI), Boston MA, July 13-16 (2008).

DOCTORAL DISSERTATIONS:

1. ***Applications of Correlation and Quantum Entanglement to Optical Measurement***, D.S. Simon, PhD Dissertation, Dept. of Electrical and Computer Engineering, Boston University, Dec. 2010.

2. **Effective Potentials and Semiclassical Determinants of Schrodinger Operators for Particles in External Gauge Fields**, D.S. Simon, PhD Dissertation, Dept. of Physics and Astronomy, Johns Hopkins University, 1993.

EDITORIAL WORK

- **Editorial Board Member** for *Quantum Reports* (2018-present)
- **Guest editor** for special issue of the journal *Entropy*. Issue topic: *Photonic Walks and Related Issues* (2018/2019)

PEER REVIEW

Scientific Journals:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Applied Intelligence • Applied Mathematics and Computation • Applied Physics Letters • Axiom • Entropy • European Journal of Physics • Frontiers in Physics • International Journal of Optics • Inverse Problems in Science and Engineering • J. of Electromagnetic Waves & Apps. /Prog. in Electromagnetic Research • Journal of Imaging • Journal of Lightwave Technology • The Journal of Microscopy • Journal of the European Optical Society • Journal of the Optical Soc. of America A • Journal of Optics • Journal of Optics and Laser Technology • Journal of Physics A: Mathematical and General | <ul style="list-style-type: none"> • Journal of Physics: Condensed Matter • Journal of Physics Communications • Journal of Quantum Information Science • Nature Communications • Nuclear Science and Techniques • Optics and Laser Technology • Optics Express • Optics Letters (Outstanding Reviewer Award, 2016) • Optika • Particles • Photonics • Physics Letters A (<i>Outstanding Reviewer</i>, 2015) • Quantum Information and Computation • Quantum Information Processing • Quantum Reports • Science • Scientific Reports • Symmetry |
|---|--|

Conferences, funding agencies, and other:

- **Los Alamos e-print archive:** Endorser of papers in optics and quantum mechanics (ongoing)
- **Romanian National Council for Research and Development.** Reviewed grant proposals, Executive Agency for Higher Education, Research, Development, and Innovation (2012 and 2016)
- **2011 International Conference on Bioinformatics & Computational Biology (BIOCOMP 2011)**, July 18-21, 2011 in Las Vegas, NV.
- **Peer review of textbook, College Physics**, 2nd ed., Giambattista, Richardson, Richardson, McGraw-Hill publishing, 2004

COURSES TAUGHT

Astronomy

- Introduction to Astronomy
- Topics in Astronomy and Cosmology

Physics

- Computation in Physics
- General Physics I and II

- Electromagnetism
- Independent Research in Physics
- Introduction to Biophysics
- Intro. to Chaos and Fractals
- Intro. to Mechanics
- Intro. to Optics
- Intro. to Photonics

- Intro. to Quantum Optics
- Modern Physics I & II (relativity & quantum physics)
- Particle Physics (Directed study)
- Physics Problem Solving I, II, III, IV
- Quantum Physics
- Quarks & Quanta: Exploring the Subatomic World
- Semiconductor materials & devices
- Statistical Physics

Mathematics

- Applied Statistics
- Calculus I
- Pre-calculus
- Probability and Statistics
- Tensor geometry (Directed study)
- Topics in Mathematics I and II
- Trigonometry

PROFESSIONAL MEMBERSHIPS

- American Physical Society (APS)
- Optica (formerly the Optical Society of America, OSA)
- International Society for Optics and Photonics (SPIE)
- Sigma Xi, The Scientific Research Honor Society

ACADEMIC COMMITTEES

- Rank and Tenure committee, 2018-present (Stonehill)
 - Committee chair, 2021-2023
- Search committee for engineering faculty, 2023 (Stonehill).
- Curriculum committee, 2015-2018 (Stonehill).
- Search committees for physics faculty (permanent or visiting), 2015, 2018, 2019, 2020,2021 (Stonehill).
- Served on 2-4 faculty review committees per year, 1995-2007 (NSU).
- Internal Review Committee, Doctor of Optometry program, 2005 (NSU).
- Search committee for 3 Math and Statistics faculty, 2004 (NSU).
- Admissions committee, 1997-1998 and 2002-2003 (NSU).
- Rank and promotion committee (Chair), 1999-2001 (NSU).
- Master's committee thesis (oceanographic center), 1999 (NSU).
- Search committee for Math and Statistics faculty (Chair), 2000 (NSU).
- Search committee for Math and Statistics faculty, 1999 (NSU).
- Committee to redesign science ed. major for middle school teachers (NSU, 1999).
- Search committee for Physics faculty (Chair), 1998 (NSU).
- Search committee for Math and Statistics faculty (Chair), 1997 (NSU).
- Search committee for Chemistry faculty, 1997 (NSU).
- Faculty Development committee, 1995-1997 (NSU).
- Search committee, psychology faculty, 1996 (NSU).
- Search committee, assistant dean, 1995 (NSU).
- Commencement committee, 1994-1995 (NSU).

RESEARCH STUDENTS

- Chris Schwarze, PhD dissertation committee member (Boston University, 2022-present)
- Shuto Osawa, 2nd advisor for PhD thesis, *Photonic Quantum Information Processing Based on Directionally-Unbiased Linear-Optical Multiports* (Boston University 2021)
- Yen Pham, co-advisor for senior thesis, *A Linear-Optical System for Secure Communications* (Boston University 2019).
- Sonam Ghosh, co-advisor for senior engineering design thesis, *Quantum Simulation of Benzene Using Directionally Unbiased Linear-Optical Multiports* (Boston University 2018)

- Casey Fitzpatrick, 2nd advisor for PhD thesis, *High-Dimensional Quantum Information Processing with Linear Optics* (Boston University 2017)
- Michael Maggio, Praveen Jain, Mark Hamalian, supervisor for undergraduate research projects
 - Bessel Beams and Light Petals (Stonehill College 2016)
 - Making Twisted Light Immune to Turbulence (Stonehill College 2015)

GRANTS

- M. Benker, X. Lu, G. Gu, D. S. Simon, NASA Small Business Technology Transfer, Applied NanoFemto Technologies/Stonehill College, \$64,070 proposal: development of optical antenna-coupled quantum dot (QD) phased-entangled photon emitter, proposal submitted 2024.
- G. Gu, C. Schnitzer, D. Simon D., R. Hirst, M212 capital equipment proposal, Mass. State/DOD, 2018 \$3,811,716, **successfully funded**.
- G. Gu, C. Schnitzer, D. Simon, R. Hirst, A. Massarotti, and M. Horne, “Bold Ideas: Think, Act, Lead Integrated Photonics-LEAP into the 21st Century” BOLD Ideas, 2018, \$1,900,000, **approved by Stonehill College Board of Trustees, advanced to full funding campaign**.
- D. Simon, SURE (Stonehill Undergraduate Research Experience) Program: Proposal to supervise summer student research project, “*Bessel beam and Light Petals*”. Funding covered student room and board, student salary, faculty stipend, and expenses for 10 weeks. **Successfully funded** (2016).
- D. Simon, SURE (Stonehill Undergraduate Research Experience) Program: Proposal to supervise summer student research project, “*Making Twisted Light Immune to Turbulence*”. Funding covered student room and board, student salary, faculty stipend, and expenses for 10 weeks. **Successfully funded** (2015).
- Gu, G.; Schnitzer, C.; Simon D.; 2019 AIM Academy call for curriculum proposal: “Materials and Methods for Photonics Packaging”, \$44,550. Not funded.

ADDITIONAL ACTIVITIES AND ACHIEVEMENTS

- Arranged public lecture by prominent physicist Lev Vaidman, on the many-worlds interpretation of quantum mechanics, Stonehill 2021.
- **Editor’s suggestion:** The paper *Controllable entangled state distribution in a dual-rail reconfigurable optical network*, Phys. Rev. A 104, 012617 (2021) was selected as an Editor’s Suggestion, to “direct readers to interesting, important, and well-written articles”.
- **Editor’s Pick:** The paper *Experimental Demonstration of Directionally-Unbiased Linear-Optical Multiphoton*, Opt. Expr. **26**, 27201 (2018) was highlighted in recognition of its “excellent scientific quality”.
- Co-designed new programs (Stonehill College):
 - Certificate in Advanced Manufacturing and Photonics (2018), served as program manager(2018-present)
 - BA, BS, minor in photonics (2019-2020)
- Designed and taught new courses: *Quantum Optics* (taught 2022), *Semiconductor Materials and Devices* (taught 2021), *Optics* (first taught Spring 2018) and *Photonics* (first taught spring 2020) , *Quarks and Quanta: Exploring the Subatomic World* (Fall 2013) (Stonehill)
- Named Outstanding Reviewer:
 - Institute of Physics (2016)
 - Journal of Physics (2015)
- Supervising research through **SURE** (Stonehill Undergraduate Research Experience) program.
 - Topic: Bessel Beams and Light Petals (Stonehill, summer 2016)
 - Topic: Making Twisted Light Immune to Turbulence (Stonehill, summer 2015)
- Taught two directed study courses (Stonehill College):
 - (Differential geometry (2016)
 - Advanced quantum mechanics (2013))
- Supervised two independent research courses
 - Philosophy of particle physics (2015)
 - Building a cosmic ray detector (2015)
- Supervised **student project:** Construction and Use of Cosmic Ray Detector (Stonehill, summer 2015)
- **Who’s Who** in America since 2014, and American Men and Women of Science since 2004.
- Created a set of **new lab experiments** for General Physics I/II (Stonehill), 2011/2012.
- **Dean’s Fellowship**, Boston University College of Engineering, 2007/2008.

- Developed and won approval for **new physics minor** at Nova Southeastern University (NSU), 2003.
- **Advisor** of student clubs at NSU:
 - Society of Physics Students (2005 –2007)
 - Astronomy Club (2002 – 2007).
- **Supervised student projects** (NSU, 2001-2004):
 - Construction of cosmic ray telescope (muon detector): won 1st prize for content in poster session at NSU Student Research Symposium
 - 36-inch rocket
 - Radio telescope
 - Simple electrocardiograph
- **Awards** from NSU's Farquhar College of Arts and Sciences:
 - *Heart and Soul Award* (2003)
 - *Faculty Member of the Month* (October 2001).
- **Co-organizer** of NSU math and science seminars, 1994 – 2005.
- Member of **local organizing committee**: 7th International Workshop on Matrices and Statistics, held at NSU, Dec. 1998.
- **Arranged public lectures** by a number of visiting speakers on science-related topics (NSU, 1998-2003), including:
 - Robert W. Wilson (Astronomer, Nobel laureate)
 - James Hunter (Astronomer)
 - James Randi (Magician, author, science educator)
 - Taner Edis (Physicist and author)
- Created **new courses** (NSU):
 - Intro. to Chaos and Fractals, Intro. to Biophysics, Intro. to Astronomy, Modern Physics I, Modern Physics II, Topics in Astronomy and Cosmology, Intro. to Mechanics, Concepts in the Physical Sciences*
- Winter semester 2001: **sabbatical**, working on research and writing (NSU).
- **Wrote 40-page booklet** on trigonometry, used as supplement to textbook in *Topics in Mathematics II* (NSU, 1994).