

# Rostislav I. Grynko

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Web: <https://rossgrynko.com/>

**Objective:** Seeking optical science research/engineering role.

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## EDUCATION

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### State University of New York at Binghamton

Ph.D Physics (Nonlinear Optics); GPA of 3.95/4.000

Aug 2014 – Dec 2018

B.A. Physics; major GPA of 3.91/4.000

Aug 2010 – May 2014

B.S. Integrative Neuroscience; major GPA of 3.91/4.000

Evolutionary Biology minor

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## WORK EXPERIENCE/RESEARCH

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### Onto Innovation, Hillsboro, OR

*Senior Systems Engineer*

Jan 2019 – Present

- Lead engineering and research/development of Aspect<sup>®</sup> Mid-IR ellipsometry system:
  - Developed product for semiconductor metrology in Gen7 3D NAND, among other applications.
  - Implemented Mueller/Jones matrix formalism for extracting spectra on target applications, enabling RCWA-based modeling of Critical Dimension data.
  - Major involvement in optical/hardware design and implementation, from proof-of-concept to production phase.
    - Vendor interaction for identifying core optical components and prototype alignment.
    - On-site install at customer fab, validation of product accuracy, precision, and tool-to-tool matching.
    - Direct engagement with customers for engineering support/product evaluation.
    - Training manufacturing team for high volume production.
  - Interfaced with a large team of optical scientists, hardware and software engineers, and management for successful rollout of Aspect product.

### Physics Department, Binghamton University, NY

*Ph.D researcher at Dr. Bonggu Shim's Femtosecond Laser Lab*

Aug 2014 – Dec 2018

- Investigated experimental methods to control and characterize ultrafast nonlinear events:
  - Laser filamentation in solids and gases, inhibition of stochastic multi-filamentation, solitary wave generation.
  - Dual-frequency femtosecond-time-resolved pump-probe experiments for harmonic generation.
  - Femtosecond-laser-written waveguide fabrication in flexible Corning<sup>®</sup> Willow<sup>®</sup> glass.
  - Second-harmonic generation polarimetry for crystal structure characterization of novel multiferroics (BiFeO<sub>3</sub>).
- Developed visualization tools for measuring ultrafast nonlinear events:
  - Digital in-line holography and numerical reconstruction algorithm for femtosecond-time-resolved measurements of plasma density generated by laser filamentation.
  - Single-shot Michelson interferometry for measuring refractive index time-evolution during femtosecond laser-written waveguide fabrication.
  - Tomographic interferometry for extracting 3D refractive index profiles of waveguides and optical fibers.
  - Frequency-domain holography for single-shot measurements of nonlinear laser-matter interactions.

- Modeled nonlinear laser pulse propagation by numerically solving unidirectional pulse propagation equation (UPPE) in C++:
  - Corroborated experimental work on harmonic generation and laser filamentation.
  - Confirmed experimental work of collaborators on mid-infrared filamentation in solids and gases.
  - Published research predicting light bullet generation in solids in the long-wavelength infrared.

**American Environments Company, Inc.,** Medford, NY

*Electromagnetic Compatibility (EMC) Test Engineer*

Apr 2014 – Aug 2014

- Tested radiated/conducted emissions and susceptibility against common standards (e.g., MIL-STD-461, EN 50081, etc.).
- Maintained and calibrated EMI units, including scalar network analyzers, spectrum analyzers and line impedance stabilization networks.

**Binghamton University,** Binghamton, NY

*Undergraduate Research Assistant for Dr. Michael Nizhnikov*

Sep 2012 – Jun 2013

- Studied the effects of prenatal alcohol exposure on rat behavior and brain development.
- Applied daily intragastric administrations of ethanol to pregnant rat dams.
- Analyzed kappa opioid receptor expression in mesolimbic brain regions of rat pups using Western Blot.

*Undergraduate Research Assistant for Dr. Charles Nelson*

Jun 2013 – Jun 2014

- Theoretically investigated empirical absence of particles obeying parastatistics in high-energy collider experiments.
- Analyzed paraparticle processes using supersymmetric statistics portal Lagrangian and associated tree diagrams.

**HONORS/AWARDS**

**Award for Excellence in Research**

*Binghamton University*

Mar 2018

- Honors important contributions that graduate students make to research at the University and the approaches they take to the advancement of knowledge. Awards are given once a year to 10 -15 graduate students (among a pool of over 2000 students).

**Semiconductor Packaging Best Oral Presentation Award**

*The International Microelectronics Assembly and Packaging Society (IMAPS)*

Jun 2017

- My research talk, titled “*Fabrication and characterization of femtosecond laser-written waveguides in flexible glass*”, was chosen as the best student oral presentation at the 2017 IMAPS conference.

**George E. Moore Award for Academic Excellence in Physics**

*Binghamton University Department of Physics, Applied Physics, and Astronomy*

May 2014

- This award is given to a senior undergraduate student for his or her excellent academic achievement. It is a cash prize and is presented at the end of the spring semester (scholarship provided).

**PUBLICATIONS/POSTERS**

**Publications**

- (1) G. Antonelli, N. Keller, T. Ribaldo, F. Wong, W. Ming, H. Ding, Z. Chen, **R. Grynko**, A. Fumani, Z. Liu, S. Takabayashi, J. Hauck, J. Frederick, D. Engelhard, B. Ng, B. Ong, and L. Liang, “Ellipsometric critical dimension metrology employing mid-infrared wavelengths for high-aspect-ratio channel hole module etch processes,” *Proc. SPIE* 11611 (2021).
- (2) D. Dempsey, G. C. Nagar, C. K. Renskers, **R. I. Grynko**, J. S. Sutherland, and Bonggu Shim, “Single-shot ultrafast visualization and measurement of laser–matter interactions in flexible glass using frequency domain holography,” *Opt. Lett.* 45, 1252 (2020).
- (3) **R. I. Grynko**, “Control and Visualization of Highly Nonlinear Processes,” Binghamton University Dissertation (2018).

- (4) **R. I. Grynko**, G. C. Nagar, and B. Shim, “Wavelength-scaled laser filamentation in solids and plasma-assisted sub-cycle light bullet generation in the long-wavelength infrared,” *Phys. Rev. A* 98, 023844 (2018).
- (5) **R. I. Grynko**, D. L. Weerawarne, and B. Shim, “Effects of higher-order nonlinear processes on harmonic-generation phase matching,” *Phys. Rev. A* 96, 013816 (2017).
- (6) **R. I. Grynko**, D. L. Weerawarne, X. Gao, H. Liang, H. J. Meyer, K.-H. Hong, A. L. Gaeta, and B. Shim, “Inhibition of multi-filamentation of high-power laser beams,” *Opt. Lett.* 41, 4064 (2016).
- (7) H. Liang, D. L. Weerawarne, P. Krogen, **R. I. Grynko**, C.-J. Lai, B. Shim, F. X. Kärtner, and K.-H. Hong, “Mid-infrared laser filaments in air at a kilohertz repetition rate,” *Optica* 3, 678 (2016).
- (8) H. Liang, P. Krogen, **R. Grynko**, O. Novak, C.-L. Chang, G. J. Stein, D. Weerawarne, B. Shim, F. X. Kärtner, and K.-H. Hong, “Three-octave-spanning supercontinuum generation and sub-two-cycle self-compression of mid-infrared filaments in dielectrics,” *Opt. Lett.* 40 (6), 1069 (2015).

### Conference papers:

- (1) **R. I. Grynko**, G. C. Nagar, and B. Shim, “Sub-cycle light bullets in the long-wavelength infrared,” in *CLEO: 2018, OSA Technical Digest* (online) (Optical Society of America, 2018), paper JTU2A.132.
- (2) **R. I. Grynko**, D. L. Weerawarne, X. Gao, H. Liang, H. J. Meyer, K. Hong, A. L. Gaeta, and B. Shim, “Multi-filament Inhibition and Resulting Solitary Wave Formation in Condensed Matter,” in *FIO: 2016, OSA Technical Digest* (online) (Optical Society of America, 2016), paper FF2C.1.
- (3) G. C. Nagar, D. Dempsey, J. S. Sutherland, **R. I. Grynko**, and B. Shim, “Laser direct writing of waveguides in flexible glass and ultrafast visualization of its dynamics via time-resolved interferometry,” in *CLEO: 2018, OSA Technical Digest* (online) (Optical Society of America, 2018), paper JTU2A.3.
- (4) D. Weerawarne, **R. Grynko**, H. J. Meyer, and B. Shim, “Significant Enhancement of Third- and Fifth-Harmonic Generation in Air via Two-Color, Time-Resolved Methods,” in *CLEO: 2015, OSA Technical Digest* (online) (Optical Society of America, 2015), paper FM3D.4.

### Posters/talks:

- (1) **R. I. Grynko**, “Studying crystal structures of ferroelectric materials using nonlinear optics,” Physics Journal Club Meeting at Binghamton University (2018). (talk)
- (2) **R. I. Grynko**, “Fabrication and characterization of femtosecond laser-written waveguides in flexible glass,” IMAPS Advances in Semiconductor Packaging Symposium (2017). (talk, *won award for best student presentation*)
- (3) **R. I. Grynko**, D. L. Weerawarne, and B. Shim, “How can we control nonlinear propagation of high-intensity, ultrashort laser pulses?”, CREATES Science to Technology Day at Binghamton University (2016). (poster)
- (4) **R. I. Grynko**, D.L. Weerawarne, X. Gao, H. Liang, H.J. Meyer, K. Hong, A.L. Gaeta, B. Shim, “Solitary wave propagation in condensed matter,” ACS Northeast Regional Meeting (2016). (talk)
- (5) **R. I. Grynko**, “Butterfly effect in high-power, ultrashort laser propagation,” Physics Journal Club Meeting at Binghamton University (2015). (talk)

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## SKILLS/INTERESTS

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<b>Language</b>	Bilingual: English   Ukrainian; New York State Regents Proficiency: Spanish   French   Italian
<b>Computer</b>	C++   Python   Matlab   Mathematica   Arduino   Machine learning
<b>Interests</b>	Scientific outreach, robotics, artificial intelligence, medicine.
<b>Web</b>	<a href="https://rossgrynko.com/">https://rossgrynko.com/</a>
<b>Projects</b>	Binance-based decentralized finance application: <a href="https://www.moontrust.net/">https://www.moontrust.net/</a>

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## REFERENES

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**Dr. Bonggu Shim**, Assistant Professor, Binghamton University, Physics Department (my PhD advisor)  
Telephone: (607) 777-4362; Email: bshim@binghamton.edu

**Dr. Kyung-Han (Kyle) Hong**, Principal Research Scientist, Massachusetts Institute of Technology (MIT)  
Research Laboratory of Electronics (collaborator in publications 7 and 8)  
Telephone: (617) 452-5093; Email: kyunghan@mit.edu

**Dr. Charles Nelson**, Professor & Physics Graduate Director, Binghamton University, Physics Department  
(my undergraduate professor in mechanics and independent study on parastatistics).  
Telephone: (607) 777-4317; Email: cnelson@binghamton.edu