

# Aaron J. Pung, Ph.D.

Website: <http://aaronjpung.com>

Phone: (316) 516-3776

E-mail: [aaron.pung@gmail.com](mailto:aaron.pung@gmail.com)

## Summary

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Motivated computer scientist with an extensive and diverse background. Research experience includes remote sensing, target detection, thermo-optical detonation modeling, electromagnetic coupling, and micro-photonics. Fluent in Python, C++, and MATLAB.

## Skill Highlights

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- Experienced in team leadership
- Strong decision maker
- Complex problem solver
- Innovative
- Driven and self-motivated
- Adaptable

## Experience

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**Computer Scientist** - 01/2015 to Present

**Sandia National Laboratories**, Albuquerque, NM

- Sub-pixel target detection and background estimation analysis
- Geo-spatial data interpolation
- Hyperspectral image analysis, image registration, and pixel detection
- Source-to-sensor radiometric model development for probability detection analysis
- Electromagnetic coupling and shielding effectiveness analysis
- Transient thermo-optical detonation modeling
- Micro-resonator characterization and sensor development
- Verification, Validation, and error analysis for next-generation electromagnetic modeling codes

## Education

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Bachelor of Science:	<b>Physics</b>	Kansas State University	2008
Master of Science:	<b>Optical Engineering</b>	University of North Carolina	2012
Doctorate of Philos.:	<b>Optical Engineering</b>	Clemson University	2014

## Certifications

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Certified Scrum Master (CSM)

Programming Languages: Python, C++, MATLAB

## Affiliations

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Optical Society of America (OSA)

International Society of Optics & Photonics (SPIE)

Sigma Pi Sigma (SPS)

International Union of Radio Science (URSI)

## Publications (Journal)

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S. Campione, **A. J. Pung**, L. K. Warne, W. L. Langston, T. Mei, and H. G. Hudson, "Validation of Shielded Cable Modeling in Xyce Based on Transmission-Line Theory," *Progress In Electromagnetics Research Letters*, Vol. 87, 51-57, 2019.

**Pung, A.J.**; Goldflam, M.D.; Burckel, D.B.; Brener, I.; Sinclair, M.B.; Campione, S. Enhancing Absorption Bandwidth through Vertically Oriented Metamaterials. *Appl. Sci.* 2019, 9, 2223.

S. Melgaard, N. K. Grady, N. Bikhazi, **A. J. Pung**, J. A. Mercier, "Microscale Transient Detection.", United States: N. p., 2017.

M. J. Byrd, **A. J. Pung**, E. G. Johnson, K. Lee, R. Magnusson, P. Binun, K. McCormick. "Wavelength Selection and Polarization Multiplexing of Blue Laser Diodes." *IEEE Photonics Technology Letters*, vol. 27, no. 20, 2015, pp. 2166–2169.

M. J. Byrd, R. H. Woodward, **A. J. Pung**, E. G. Johnson, K. J. Lee, R. Magnusson, P. Binun, and K. McCormick, "Blue Laser Diode Wavelength Selection With a Variable Reflectivity Resonant Mirror," *IEEE Photonics Technology Letters*, vol. 26, no. 23, pp. 2311–2314, Jan. 2014.

L. N. Taylor, A. K. Brown, **A. J. Pung**, E. G. Johnson, J. J. Talghader.. "Continuous-Wave laser damage of uniform and nanolaminate hafnia and titania optical coatings." *Optics Letters*, vol. 38, no. 21, 2013, p. 4292.

**A. J. Pung**, S. R. Carl, I. Raghu Srimathi, E. G. Johnson. "Method of Fabrication for Encapsulated Polarizing Resonant Gratings." *IEEE Photonics Technology Letters*, vol. 25, no. 15, 2013, pp. 1432–1434.

I. Raghu Srimathi, **A. J. Pung**, Y. Li, R. C. Rumpf, E. G. Johnson.. "Fabrication of metal-Oxide nano-Hairs for effective index optical elements." *Optics Express*, vol. 21, no. 16, 2013, p. 18733.

Y. Li, I. Raghu Srimathi, R. H. Woodward, **A. J. Pung**, M. K. Poutous, R. K. Shori, E. G. Johnson. "Guided-Mode Resonance Filters for Wavelength Selection in Mid-Infrared Fiber Lasers." *IEEE Photonics Technology Letters*, vol. 24, no. 24, 2012, pp. 2300–2302.

Z. A. Roth, P. Srinivasan, M. K. Poutous, **A. J. Pung**, R. C. Rumpf, E. G. Johnson. "Azimuthally Varying Guided Mode Resonance Filters." *Micromachines*, vol. 3, no. 4, 2012, pp. 180–193.

**A. J. Pung**, M. K. Poutous, R. C. Rumpf, Z. A Roth, E. G. Johnson, "Two-Dimensional guided mode resonance filters fabricated in a uniform low-Index material system." *Optics Letters*, vol. 36, no. 16, 2011, p. 3293.

Menelaos K. Poutous, **Aaron J. Pung**, Pradeep Srinivasan, Zachary A. Roth, and Eric G. Johnson, "Polarization selective, graded-reflectivity resonance filter, using a space-varying guided-mode resonance structure," *Opt. Express* 18, 27764-27776 (2010)

## Publications (Conference)

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A. Tauke-Pedretti, M. Goldflam, J. Kim, E. Anderson, T. Fortune, J. Klem, S. Hawkins, P. Davids, S. Campione, **A. Pung**, P. Webster\*, P. Weiner, P. Finnegan, J. Wendt, M. Wood, C. Haines, M. Sinclair, W. Coon, J. Olesberg, E. Shaner, C. Kadlec, T. Beechem, D. Peters, 2019, 'Nanoantenna-enabled Detector Arrays for High-Efficiency in the Long Wavelength Infrared', MSS Parallel Conference (Passive, BSD, and M&D), Orlando, FL. MD4A09.

D. Peters, M. Goldflam, S. Campione, P. Finnegan, J. Kim, M. Sinclair, **A. Pung**, C. Alford, W. Coon, A. Tauke-Pedretti, J. Wendt, M. Wood, P. Weiner, S. Hawkins, P. Davids, L. Warne, E. Anderson, T. Fortune. (2018). *Resonant Ultrathin Infrared Detectors Enabling High Quantum Efficiency*. 1-3. 10.1109/RAPID.2018.8509017.

## Publications (Conference, cont.)

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**A. Pung** *et al.*, "Parametric Analysis of Vertically Oriented Metamaterials for Wideband Omnidirectional Perfect Absorption" *2018 IEEE International Symposium on Antennas and Propagation & USNC/URSI National Radio Science Meeting*, Boston, MA, 2018.

D. B. Burckel, **A. J. Pung** and S. Campione, "Challenges and opportunities in modeling and optimization of 3D optical metasurfaces," *2018 International Applied Computational Electromagnetics Society Symposium (ACES)*, Denver, CO, 2018.

W. Langston, J. Kotulski, R. Coats, R. Jorgenson, S. Blake, S. Campione, **A. Pung**, and B. Zinser, "Massively parallel frequency domain electromagnetic simulation codes", *2018 International Applied Computational Electromagnetics Society Symposium (ACES)*, Denver, CO, 2018.

D. Anderson, A. Bapst, J. Coon, **A. Pung**, M. Kudenov, "Supervised non-negative tensor factorization for automatic hyperspectral feature extraction and target discrimination", Proc. SPIE 10198, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXIII, 101980Q (5 May 2017).

J. Baghdady, M. Byrd, W. Li, K. Morgan, **A. Pung**, K. Miller, E. Johnson, "Spatial multiplexing for blue lasers for undersea communications", Proc. SPIE 9459, Ocean Sensing and Monitoring VII, 945905 (6 July 2015).

E. G. Johnson, J. Baghdady, M. Byrd, W. Li, K. Morgan, **A. Pung**, K. Miller. "Space division multiplexing of blue lasers for undersea communications." *2015 IEEE Photonics Conference (IPC)*, 2015.

M. Byrd, J. Baghdady, **A. J. Pung**, E. Johnson, K. Lee, R. Magnusson, P. Binun, K. McCormick, "Design and fabrication of a resonant mirrors for locking blue laser diodes", Proc. SPIE 9374, Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII, 93740Z (13 March 2015).

**A. Pung**, I. Raghu Srimathi, Y. Li, E. Johnson, M. D. Shinn, K. J. Lee, R. Magnusson, J. Talghader, L. Taylor, L. Shah, M. Richardson, "High-power laser testing of 3D meta-optics", Proc. SPIE 8885, Laser-Induced Damage in Optical Materials: 2013, 88850K (14 November 2013).

**A. J. Pung**, I. Raghu Srimathi, Y. Li, E. G. Johnson. "Fabrication method for encapsulation of low-Index, narrowband guided-Mode resonance filters." *2013 IEEE Photonics Conference*, 2013.

I. Raghu Srimathi, **A. J. Pung**, E. G. Johnson. "Optical nano-Hairs for micro-Optical applications." *2013 IEEE Photonics Conference*, 2013.

Eric G. Johnson, Yuan Li, Indumathi Raghu Srimathi, Ryan H. Woodward, Menelaos K. Poutous, **Aaron J. Pung**, Martin Richardson, Lawrence Shah, Ramesh Shori, Robert Magnusson, "Resonant optical devices for IR lasers", Proc. SPIE 8599, Solid State Lasers XXII: Technology and Devices, 85991G (1 April 2013).

**A. J. Pung**, M. K Poutous, R. C. Rumpf, Z. A. Roth, E. G. Johnson, "Fabrication of optically monolithic, low-index guided mode resonance filters", Proc. SPIE 8249, Advanced Fabrication Technologies for Micro/Nano Optics and Photonics V, 82490F (8 February 2012).

Lawrence Shah, R. Andrew Sims, Pankaj Kadwani, Christina C. C. Willis, Joshua B. Bradford, Zachary Roth, **Aaron Pung**, Menelous Poutous, Eric G. Johnson, Martin Richardson, "Integrated 100 W thulium fiber MOPA system", Proc. SPIE 8381, Laser Technology for Defense and Security VIII, 83810Z (7 May 2012).

I. Raghu Srimathi, M. K. Poutous. **A. J. Pung**, Y. Li, R. H. Woodward, E. G. Johnson, R. Magnusson. "Mid-Infrared Guided-Mode Resonance reflectors for applications in high power laser systems." *IEEE Photonics Conference 2012*, 2012.

Y. Li, R. H. Woodward, I. Raghu Srimathi, **A. J. Pung**, M. K. Poutous, E. G. Johnson, R. K. Shori. "2.78  $\mu\text{m}$  fluoride glass fiber laser using guided mode resonance filter as external cavity mirror." *IEEE Photonics Conference 2012*, 2012.

## Publications (Conference, cont.)

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L. Shah, A. Sims, P. Kadwani, C. Willis, J. Bradford, Z. Roth, **A. Pung**, M. Poutous, E. Johnson, M. Richardson, "Integrated 100-W polarized narrow linewidth thulium fiber MOPA system", Proc. SPIE 8237, Fiber Lasers IX: Technology, Systems, and Applications, 82371M (16 February 2012).

**A.Pung**, M. K. Poutous, Z. A. Roth, E. G. Johnson. "Fabrication of Low Contrast Homogenous Guided Mode Resonance Filters." *CLEO:2011 - Laser Applications to Photonic Applications*, 2011, doi:10.1364/cleo\_at.2011.jtui24.

M. Poutous, Z. Roth, K. Buhl, **A. Pung**, R. Rumpf, E. Johnson, "Correlation of fabrication tolerances with the performance of guided-mode-resonance micro-optical components", Proc. SPIE 7205, Advanced Fabrication Technologies for Micro/Nano Optics and Photonics II, 72050Y (24 February 2009).

## Volunteer Work

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### Optical Society of America (OSA)

- Photonic Metamaterials Technical Group (2018 – Present)
- Environmental Sensing Technical Group (2018 – Present)

### International Society of Optics & Photonics (SPIE)

- Advanced Fabrication Techniques (committee member) (2016 – Present)

### Sigma Pi Sigma (SPS):

- Adopt-a-Physicist (2016 – Present)

### University of Texas at El Paso (UTEP):

- ECE Advisory Board (2018 – Present)

### Other

- Letters to a Pre-Scientist (2015 – Present)
- Civil Air Patrol (2017 – Present)