Darshana L. Weerawarne

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Education

2017 Ph.D, Physics, State University of New York at Binghamton, New York, USA
2014 M.S, Physics, State University of New York at Binghamton, New York, USA
2010 B.Sc (Hons), Engineering Physics, University of Colombo, Colombo, Sri Lanka

Research Interest: Printed flexible electronics, Applied optics, Numerical simulations of laser pulse propagation and laser assisted heating

Research Experience

Key Collaborators - NextFlex, General Electric, Lockheed Martin, MIT, Cornell University, Columbia University

2017-2019 Postdoctoral Research - Flexible Electronics
Center for Advanced Microelectronics Manufacturing, Binghamton University
- Substrate and conductive material characterization for flexible electronics
- Design, fabrication, and testing of flexible electronics
- Laser assisted thermal processing of nanoparticle inks
- Optical metrology to assess reliability of printed electronics

2013-2017 Doctoral Research - Nonlinear Propagation of Ultrashort Laser Pulses
Femtosecond Spectroscopy and Smart Energy Laser Lab, Binghamton University
- Low-order time-resolved harmonic generation
- Digital in-line holography and optical imaging
- Femtosecond/nanosecond laser sintering of nanoparticle inks
- Mathematical simulations of ultrashort laser pulse propagation and laser assisted heating (C++, Matlab, Mathematica)

2010-2012 Postgraduate Research - Sustainable Computing and Electronics
Sustainable Computing Research Group, University of Colombo School of Computing, Sri Lanka
- Wireless Ad-Hoc and Sensor Networks communication
- Smart home systems and electronics

2008-2010 Undergraduate Research - Lightning Induced Electric Field Detection
Atmospheric and Lightning Research Group, University of Colombo, Sri Lanka
- Lightning induced electric field detection and antenna systems

Teaching Experience

2012-2017 Graduate Teaching Assistant

State University of New York at Bingamton, USA

- General Physics, Computational Physics (using Mathematica)

2010-2012 Visiting Lecturer

University of Colombo School of Computing, Sri Lanka

- Analogue and Digital Electronics (for BSc in Computer Science)

2011-2012 Teaching Assistant

University of Colombo School of Computing, Sri Lanka

- Wireless Ad-hoc and Sensor Networks, High Performance Computing (For MSc and BSc in Computer Science)

2010-2011 Temporary Instructor, Teaching Assistant

Department of Physics, University of Colombo, Sri Lanka

- Electronic Instrumentation Laboratory, Computational and Simulation Laboratory (For BSc in Physics and MSc in Applied Electronics)

Professional Service

2019- Member, SLAAS

2019- Member, IPSL

2019- Member, SLAYS

2015-2018 Member of the outreach program

Physics Outreach Program (POP), Binghamton University

2013-2016 Graduate volunteer

Broome County Promise Zone (a university-community partnership)

2012 Lecturer

Robotics, Embedded systems, and Wireless Sensor Networks

IEEE student branch, University of Colombo School of Computing, Sri Lanka

2011-2012 Team member

National Peoples' Registry project, Defence Ministry, Sri Lanka

2012 Team member

Network and Security audit, Cooperate Insurance, Sri Lanka

2011 Member of the Logistics Committee

International Conference on Advances in ICT for Emerging Regions (ICTer) 2011 – Colombo Sri Lanka

Selected List of Publications

Google Scholar, Citations 288, h-index 7, i10-index 5

[1] R. R. Salary, I. Lombardi, Jack P., D. L. Weerawarne, P. K. Rao, and M. D. Poliks, "A Computational Fluid Dynamics (CFD) Study of Pneumatic Atomization in Aerosol Jet Printing (AJP) Process," vol. Volume 2A: Advanced Manufacturing of *ASME International Mechanical Engineering Congress and Exposition*, 11 2019.

[2] M. Alhendi, L. Cestarollo, G. S. Khinda, D. L. Weerawarne, and M. D. Poliks, "Laser sintering of aerosol jet printed interconnects on flexible substrate," in *International Symposium on Microelectronics*, vol. 2019, pp. 000404–000408, International Microelectronics Assembly and Packaging Society, 2019.

[3] B. Garakani, K. U. Sandakelum Somarathna, D. L. Weerawarne, M. D. Poliks, and A. Alizadeh, "Reliability of screen-printed conductors and resistors during fatigue cycling on flexible substrate," in *International Symposium on Microelectronics*, vol. 2019, pp. 000139–000146, International Microelectronics Assembly and Packaging Society, 2019.

[4] R. R. Salary, J. P. Lombardi, D. L. Weerawarne, P. K. Rao, and M. D. Poliks, "Toward defect-free additive fabricating of flexible and hybrid electronics: Physics-based computational modeling and control of aerosol jet printing," in *International Conference on Applied Human Factors and Ergonomics*, pp. 351–361, Springer, Cham, 2019.

[5] J. P. Lombardi, R. R. Salary, D. L. Weerawarne, P. K. Rao, and M. D. Poliks, "Image-based closed-loop control of aerosol jet printing using classical control methods," *Journal of Manufacturing Science and Engineering*, vol. 141, no. 7, p. 071011, 2019.

[6] G. S. Khinda, M. Strohmayer, D. L. Weerawarne, J. P. Lombardi III, N. Tokranova, J. Castracane, C. A. Ventrice, Jr, M. D. Poliks, and I. A. Levitsky, "Transparent conductive printable meshes based on percolation patterns," *ACS Applied Electronic Materials*, 2019.

[7] R. R. Salary, J. P. Lombardi, D. L. Weerawarne, P. K. Rao, and M. D. Poliks, "A computational fluid dynamics (CFD) study of material transport and deposition in aerosol jet printing (AJP) process," in *ASME 2018 International Mechanical Engineering Congress and Exposition*, pp. V002T02A057–V002T02A057, American Society of Mechanical Engineers, 2018.

[8] M. Alhendi, J. P. Lombardi III, G. S. Khinda, M. Z. Kokash, D. L. Weerawarne, P. Borgesen, M. D. Poliks, N. C. Stoffel, and J. Iannotti, "Fatigue cycling of electrical interconnects dispensed on flexible substrate," in *International Symposium on Microelectronics*, vol. 2018, pp. 000543–000548, International Microelectronics Assembly and Packaging Society, 2018.

[9] R. R. Salary, J. P. Lombardi, D. L. Weerawarne, M. S. Tootooni, P. K. Rao, and M. D. Poliks, "In situ functional monitoring of aerosol jet-printed electronic devices using a combined sparse representation-based classification (SRC) approach," in *ASME 2018 13th International Manufacturing Science and Engineering Conference*, pp. V001T01A040–V001T01A040, American Society of Mechanical Engineers, 2018.

[10] J. P. Lombardi, R. R. Salary, D. L. Weerawarne, P. K. Rao, and M. D. Poliks, "In-situ image-based monitoring and closed-loop control of aerosol jet printing," in *ASME 2018 13th International Manufacturing Science and Engineering Conference*, pp. V001T01A039–V001T01A039, American Society of Mechanical Engineers, 2018.

[11] R. S. Sivasubramony, N. Adams, M. Alhendi, G. S. Khinda, M. Z. Kokash, J. P. Lombardi, A. Raj, S. Thekkut, D. L. Weerawarne, M. Yadav, *et al.*, "Isothermal fatigue of interconnections in flexible hybrid electronics based human performance monitors," in *2018 IEEE 68th Electronic Components and Technology Conference (ECTC)*, pp. 896–903, IEEE, 2018.

[12] R. I. Grynko, D. L. Weerawarne, and B. Shim, "Effects of higher-order nonlinear processes on harmonic-generation phase matching," *Physical Review A*, vol. 96, no. 1, p. 013816, 2017.

[13] D. L. Weerawarne, *Study of Nonlinear Propagation of Ultrashort Laser Pulses and Its Application to Harmonic Generation*. PhD thesis, State University of New York at Binghamton, 2017.

[14] R. I. Grynko, D. L. Weerawarne, X. Gao, H. Liang, H. J. Meyer, K.-H. Hong, A. L. Gaeta, and B. Shim, "Multi-filament inhibition and resulting solitary wave formation in condensed matter," in *Frontiers in Optics*, pp. FF2C–1, Optical Society of America, 2016.

[15] 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," *Optics letters*, vol. 41, no. 17, pp. 4064–4067, 2016.

[16] J. Luo, W. Zhao, S. Shan, J. Lombardi, D. Weerawarne, T. Rovere, N. Kang, Z. Skeete, Y. Xu, A. Vargas, *et al.*, "Understanding low-temperature sintering and adhesion properties of metal nanoparticles printed sensor devices," in *Abstracts of Papers of the American Chemical Society*, vol. 252, Amer Chemical Soc 1155 16th St, NW, Washington, DC 20036 USA, 2016.

[17] 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*, vol. 3, no. 7, pp. 678–681, 2016.

[18] H. Liang, P. Krogen, D. Weerawarne, C.-J. Lai, R. Grynko, B. Shim, F. X. Kärtner, and K.-H. Hong, "Mid-IR laser filamentation in air at a khz repetition rate," in *Mid-Infrared Coherent Sources*, pp. MT2C–5, Optical Society of America, 2016.

[19] W. Zhao, T. Rovere, D. Weerawarne, G. Osterhoudt, N. Kang, P. Joseph, J. Luo, B. Shim, M. Poliks, and C.-J. Zhong, "Nanoalloy printed and pulse-laser sintered flexible sensor devices with enhanced stability and materials compatibility," *ACS nano*, vol. 9, no. 6, pp. 6168–6177, 2015.

[20] D. L. Weerawarne, R. I. Grynko, H. J. Meyer, and B. Shim, "Significant enhancement of third-and fifth-harmonic generation in air via two-color, time-resolved methods," in *2015 Conference on Lasers and Electro-Optics (CLEO)*, pp. 1–2, IEEE, 2015.

[21] 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, "Mid-IR filamentation in dielectrics: 3-octave-spanning supercontinuum generation and sub-2-cycle self-compression," in *2015 Conference on Lasers and Electro-Optics (CLEO)*, pp. 1–2, IEEE, 2015.

[22] 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," *Optics letters*, vol. 40, no. 6, pp. 1069–1072, 2015.

[23] D. L. Weerawarne, X. Gao, A. L. Gaeta, and B. Shim, "Higher-order nonlinearities revisited and their effect on harmonic generation," *Physical review letters*, vol. 114, no. 9, p. 093901, 2015.

[24] 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, "3-octave supercontinuum generation and sub-2-cycle self-compression of mid-ir filaments in dielectrics," in *Advanced Solid State Lasers*, pp. ATu5A–4, Optical Society of America, 2014.

[25] D. Clark, V. Senthilkumar, C. Le, D. Weerawarne, B. Shim, J. Jang, J. Shim, J. Cho, Y. Sim, M.-J. Seong, *et al.*, "Strong optical nonlinearity of CVD-grown MoS 2 monolayer as probed by wavelength-dependent second-harmonic generation," *Physical Review B*, vol. 90, no. 12, p. 121409, 2014.

[26] D. L. Weerawarne, X. Gao, A. L. Gaeta, and B. Shim, "Test of higher-order nonlinearity via low-order harmonic generation revisited," in *2014 Conference on Lasers and Electro-Optics (CLEO)-Laser Science to Photonic Applications*, pp. 1–2, IEEE, 2014.

[27] L. Weerawarne, A. Sayakkara, D. Fernando, C. Suduwella, and K. De Zoysa, "Tikiripower-using tikiridbabstraction on smart home systems," in *International Conference on Advances in ICT for Emerging Regions (ICTer2012)*, pp. 75–81, IEEE, 2012.