

Darshana L. Weerawarne

w: <https://dlweerawarne.github.io/>

Google Scholar

e: dweerawa@phys.cmb.ac.lk

e: dlweerawarne@gmail.com

p: +94717593337

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/wearable electronics: Design, Fabrication, Characterization, and Reliability

Novel materials for flexible electronics

Research Experience

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

Grants

2021 The World Academy of Sciences (TWAS) Research Grant USD 40,000

2021 SPIE, the international society for optics and photonics USD 2,500

Teaching Experience

- 2020- Senior Lecturer II
Department of Physics, University of Colombo, Sri Lanka
- Robotics and Automation, Electromagnetic Fields, Data Acquisition and Signal Processing
- 2019-2020 Temporary Lecturer
Department of Physics, University of Colombo, Sri Lanka
- Robotics and Automation, Electromagnetic Fields
- 2012-2017 Graduate Teaching Assistant
State University of New York at Binghamton, 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 and Outreach Service

- 2020- Founder, Science Bus outreach program
- 2019- Member, Sri Lanka Association for the Advancement of Science (SLAAS)
- 2019- Member, Institute of Physics Sri Lanka (IPSL)
- 2019- Member, Sri Lankan Academy of Young Scientists (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

List of Publications - Darshana L. Weerawarne

[Google Scholar](#), Citations 454, h-index 9, i10-index 9

- [1] L. Weerawarne, A. Sayakkara, D. Fernando, C. Suduwella, and K. De Zoysa. “TikiriPower-Using TikiriDB abstraction on Smart Home systems”. In: *International Conference on Advances in ICT for Emerging Regions (ICTer2012)*. IEEE. 2012, pp. 75–81.
- [2] 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 MoS₂ monolayer as probed by wavelength-dependent second-harmonic generation”. In: *Physical Review B* 90.12 (2014), p. 121409.
- [3] 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*. Optical Society of America. 2014, ATu5A–4.
- [4] 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*. IEEE. 2014, pp. 1–2.
- [5] D. Clark, V. Senthilkumar, C. Le, D. Weerawarne, B. Shim, J. Jang, J. Shim, J. Cho, Y. Sim, M.-J. Seong, et al. “Erratum: Strong optical nonlinearity of CVD-grown MoS₂ monolayer as probed by wavelength-dependent second-harmonic generation [Phys. Rev. B 90, 121409 (R)(2014)]”. In: *Physical Review B* 92.15 (2015), p. 159901.
- [6] H. Liang. “H. Liang, P. Krogen, R. Grynko, O. Novak, C.-L. Chang, GJ Stein, D. Weerawarne, B. Shim, FX Kärtner, and K.-H. Hong, Opt. Lett. 40, 1069 (2015).” In: *Opt. Lett.* 40 (2015), p. 1069.
- [7] H. K. Liang, P. R. Krogen, R. Grynko, O. Novak, C.-L. L. Chang, G. J. Stein, D. Weerawarne, B. Shim, F. Kaernter, and K.-H. Hong. “Mid-IR filamentation in dielectrics: 3-Octave-spanning supercontinuum generation and sub-2-cycle self-compression”. In: *CLEO: QELS_Fundamental Science*. Optical Society of America. 2015, FTu4D–2.
- [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”. In: *Optics letters* 40.6 (2015), pp. 1069–1072.
- [9] D. L. Weerawarne, X. Gao, A. L. Gaeta, and B. Shim. “Higher-order nonlinearities revisited and their effect on harmonic generation”. In: *Physical review letters* 114.9 (2015), p. 093901.
- [10] 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)*. IEEE. 2015, pp. 1–2.
- [11] 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”. In: *ACS nano* 9.6 (2015), pp. 6168–6177.
- [12] 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”. In: *Optics letters* 41.17 (2016), pp. 4064–4067.

- [13] 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*. Optical Society of America. 2016, FF2C–1.
- [14] 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*. Optical Society of America. 2016, MT2C–5.
- [15] 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”. In: *Optica* 3.7 (2016), pp. 678–681.
- [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] R. I. Grynko, D. L. Weerawarne, and B. Shim. “Effects of higher-order nonlinear processes on harmonic-generation phase matching”. In: *Physical Review A* 96.1 (2017), p. 013816.
- [18] 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.
- [19] 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. 1. International Microelectronics Assembly and Packaging Society. 2018, pp. 000543–000548.
- [20] J. P. Lombardi III, 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: *International Manufacturing Science and Engineering Conference*. Vol. 51357. American Society of Mechanical Engineers. 2018, V001T01A039.
- [21] R. Salary, J. P. Lombardi III, 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 International Mechanical Engineering Congress and Exposition*. Vol. 52019. American Society of Mechanical Engineers. 2018, V002T02A057.
- [22] R. Salary, J. P. Lombardi III, 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: *International Manufacturing Science and Engineering Conference*. Vol. 51357. American Society of Mechanical Engineers. 2018, V001T01A040.
- [23] 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)*. IEEE. 2018, pp. 896–903.

- [24] 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. 1. International Microelectronics Assembly and Packaging Society. 2019, pp. 000404–000408.
- [25] M. Alhendi, R. S. Sivasubramony, J. Lombardi, D. L. Weerawarne, P. Borgesen, M. D. Poliks, and A. Alizadeh. “Laser sintering of aerosol jet printed conductive interconnects on paper substrate”. In: *2019 IEEE 69th Electronic Components and Technology Conference (ECTC)*. IEEE. 2019, pp. 1581–1587.
- [26] 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. 1. International Microelectronics Assembly and Packaging Society. 2019, pp. 000139–000146.
- [27] G. Khinda, M. Kokash, M. Alhendi, M. Yadav, J. Lombardi, D. Weerawarne, M. D. Poliks, P. Borgesen, and N. C. Stoffel. “Effects of Oven and Laser Sintering Parameters on the Electrical Resistance of IJP Nano-Silver Traces on Mesoporous PET Before and During Fatigue Cycling”. In: *2019 IEEE 69th Electronic Components and Technology Conference (ECTC)*. IEEE. 2019, pp. 1946–1951.
- [28] 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”. In: *ACS Applied Electronic Materials* 1.7 (2019), pp. 1290–1294.
- [29] 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”. In: *Journal of Manufacturing Science and Engineering* 141.7 (2019).
- [30] R. R. Salary, J. P. Lombardi III, D. L. Weerawarne, P. K. Rao, and M. D. Poliks. “A state-of-the-art review on aerosol jet printing (AJP) additive manufacturing process”. In: *International Manufacturing Science and Engineering Conference*. Vol. 58745. American Society of Mechanical Engineers. 2019, V001T01A035.
- [31] 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*. Springer, Cham. 2019, pp. 351–361.
- [32] R. Salary, J. P. Lombardi III, 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”. In: *ASME International Mechanical Engineering Congress and Exposition*. Vol. 59377. American Society of Mechanical Engineers. 2019, V02AT02A065.
- [33] M. Alhendi, R. S. Sivasubramony, D. L. Weerawarne, J. Iannotti, P. Borgesen, and M. D. Poliks. “Assessing Current-Carrying Capacity of Aerosol Jet Printed Conductors”. In: *Advanced Engineering Materials* (2020), p. 2000520.
- [34] M. Alhendi, A. Umar, E. M. Abbara, R. Cadwell, N. Huang, D. L. Weerawarne, P. Borgesen, J. Iannotti, N. Stoffel, and M. D. Poliks. “A Comparative Study of Aerosol Jet Printing on Polyimide and Liquid Crystal Polymer Substrates for RF

- Applications”. In: *2020 IEEE 70th Electronic Components and Technology Conference (ECTC)*. IEEE. 2020, pp. 1579–1585.
- [35] J. P. Lombardi, D. L. Weerawarne, R. E. Malay, M. D. Poliks, J. H. Schaffner, H. J. Song, M.-H. Huang, S. C. Pollard, and T. Talty. “Fabrication of Transparent Antennas on Flexible Glass”. In: *Flexible, Wearable, and Stretchable Electronics*. CRC Press, 2020, pp. 283–302.
- [36] R. R. Salary, J. P. Lombardi, D. L. Weerawarne, M. S. Tootooni, P. K. Rao, and M. D. Poliks. “A Sparse Representation Classification Approach for Near Real-Time, Physics-Based Functional Monitoring of Aerosol Jet-Fabricated Electronics”. In: *Journal of Manufacturing Science and Engineering* 142.8 (2020).
- [37] B. G. Stewart, G. Cahn, D. Samet, M. J. Misner, A. Burns, D. L. Weerawarne, M. D. Poliks, C. Lapinski, S. Dugan, O. Pierron, et al. “Mechanical Deformation Study of Flexible Leadset Components for Electromechanical Reliability of Wearable Electrocardiogram Sensors”. In: *2020 IEEE 70th Electronic Components and Technology Conference (ECTC)*. IEEE. 2020, pp. 532–540.
- [38] L. Cestarollo, M. Alhendi, R. S. Sivasubramony, G. S. Khinda, D. L. Weerawarne, P. Borgesen, M. D. Poliks, N. C. Stoffel, and J. Iannotti. “Precision Dispensed Die Fillets as Nonconformal Surfaces for Printed Interconnects: Characterization, Optimization, and Mechanical Performance Assessment”. In: *IEEE Transactions on Components, Packaging and Manufacturing Technology* 11.4 (2021), pp. 683–689.
- [39] R. Salary, J. P. Lombardi, D. L. Weerawarne, P. Rao, and M. D. Poliks. “A Computational Fluid Dynamics Investigation of Pneumatic Atomization, Aerosol Transport, and Deposition in Aerosol Jet Printing Process”. In: *Journal of Micro-and Nano-Manufacturing* 9.1 (2021), p. 010903.
- [40] K. Somarathna, B. Garakani, D. Weerawarne, G. Khinda, A. Burns, A. Alizadeh, and M. Poliks. “Screen-printed Water-soluble Resistors for Wearable Electronics: An Analysis of the Fabrication Process”. In: *2021 IEEE 71st Electronic Components and Technology Conference (ECTC)*. IEEE. 2021, pp. 2285–2292.