

Dr. Senem Velipasalar

4-206 Center for Science and Technology
Dept. of Electrical Engineering & Computer Science
Syracuse University
Syracuse, NY 13244

E-mail: svelipas@syr.edu
Phone: (315) 443-4418 (office)
Web:
<http://ecs.syr.edu/faculty/velipasalar/>

EDUCATION

- | | |
|--|-----------|
| Princeton University , Princeton, NJ
Ph.D., Electrical Engineering, January 2007 | 2002-2006 |
| Princeton University , Princeton, NJ
Master of Arts, Electrical Engineering Dept., May 2004.
GPA: 3.92 / 4.0 | 2002-2004 |
| Brown University , Providence, RI
Master of Science,
Electrical Sciences and Computer Engineering, May 2001.
GPA: 4.0 / 4.0 | 1999-2002 |
| Bogazici University , Istanbul, Turkey
Bachelor of Science, Electrical and Electronics Engineering, June 1999
Graduated with high honors. | 1994-1999 |
-

APPOINTMENTS

- | | |
|--|----------------------------------|
| • Syracuse University , Dept. of EECS, Syracuse, NY
Professor | Aug. 2020 - present |
| • Syracuse University , Dept. of EECS, Syracuse, NY
Associate Professor | Aug. 2015 – Aug. 2020 |
| • Syracuse University , Dept. of EECS, Syracuse, NY
Assistant Professor | Aug. 2011 - Aug. 2015 |
| • University of Nebraska-Lincoln , Dept. of Electrical Eng.
Assistant Professor | Jan. 2007 - Aug. 2011 |
| • Princeton University , Dept. of Electrical Eng., Princeton, NJ
Research Assistant | 2002-2006 |
| • Princeton University , Dept. of Electrical Eng., Princeton, NJ
Teaching Assistant | 9/2004-12/2004
9/2003-12/2003 |
| • IBM T.J. Watson Research Center , Hawthorne, NY
Technical Co-op in the Exploratory Computer Vision Group | Summers of 2001-2005 |
| • Brown University , Dept. of Electrical Sciences & Computer Eng.
Providence, RI. Research Assistant | 1999-2002 |
-

HONORS AND AWARDS (since 2005)

1. National Science Foundation (NSF) CAREER Award, 2011.
2. The Annual Conference on Innovative Applications of Artificial Intelligence (IAAI) Deployed Application Award, 2021.
3. 2017 IEEE Green Communications & Computing Technical Committee Best Journal Paper Award for our paper titled "Analysis of Energy Efficiency in Fading Channels under QoS Constraints"
4. Top 25 most downloaded IEEE Sensors Journal paper in the months of Jan-Sept. 2017 (for 9 consecutive months), for June, Sept., Nov., Dec. 2018, and for January, March, Apr. and June 2019.
5. 2nd place Poster Award at the 17th Annual SyracuseCoE Symposium Student Poster Competition for our work titled "Heat Mapping Drones", October 2017.

6. 2014 Excellence in Graduate Education Faculty Recognition Award.
 7. Graduate School All University Doctoral Prize, received by my former Ph.D. student Natalie Sommer, 2021.
 8. Graduate School All University Doctoral Prize, received by my former Ph.D. student Yantao Lu, 2020.
 9. Graduate School All University Doctoral Prize, received by my former Ph.D. student Akhan Almagambetov, 2014.
 10. Nunan Research Day Poster Competition EECS Departmental Winner Award, received by Danushka Bandara (co-advised by Dr. Hirshfield), 2014.
 11. Intelligent Transportation Society (ITS) of NY Best ITS Student Essay Award, received by my former Ph.D. student Akhan Almagambetov, based on our research on vehicle taillight tracking and alert signal detection, May 2013.
 12. The college-wide award for “Applicability of Research to Business and Industry,” received by my former Ph.D. student Akhan Almagambetov, Nunan Lecture and Research Day, 2013.
 13. Third place paper award at the ACM/IEEE International Conference on Distributed Smart Cameras for the paper titled “Energy-efficient Feedback Tracking on Embedded Smart Cameras by Hardware-level Optimization”, 2011.
 14. University of Nebraska-Lincoln (UNL) Research Council Award, 2010.
 15. EPSCoR (Experimental Program to Stimulate Competitive Research) First Award, 2009.
 16. UNL Layman Award as PI in 2007, and as Co-PI in 2009.
 17. Best Student Paper Award at the IEEE Int’l Conf. on Multimedia & Expo (ICME) for the paper titled “Design and Verification of Communication Protocols for Peer-to-Peer Multimedia Systems,” 2006.
 18. IBM Patent Application Award, 2005.
-

SYNERGISTIC / PROFESSIONAL ACTIVITIES

1. NSF Panelist, 2009, 2010, 2011, 2012 (twice), 2013, 2015 (twice), 2016, 2018, 2019, 2020 and 2021.
 2. Associate Editor for IEEE Transactions on Image Processing.
 3. Associate Editor, Springer Journal of Signal Processing Systems.
 4. Co-Chair of the Aerospace/Communications/Signal Processing Chapter of the IEEE Syracuse Section, and senior member of the IEEE.
 5. Technical Program Co-Chair of the 2018 Int’l Conf. on Distributed Smart Cameras and 2016 IEEE Int’l Conf. on Advanced Video and Signal Based Surveillance (AVSS), member of the AVSS Steering Committee, Technical Program Chair of the 2014 and 2011 ACM/IEEE Int’l Conf. on Distributed Smart Cameras (ICDSC), Area Chair of the 2015 IEEE Winter Conf. on Applications of Computer Vision (WACV), Area Chair of the 2014, 2013 and Publicity Chair of the 2012 IEEE AVSS, General Co-Chair of the 2013 AAMS-PS (Advances in Automated Multimedia Surveillance for Public Safety) Workshop (held in conjunction with IEEE ICME 2013), Finance Chair and Registration Chair of the 2010 IEEE Int’l Conf. on AVSS, Tutorial Chair of the 2010 ACM/IEEE ICDSC, Technical Program Committee Member for the 2017 IEEE WACV, 2016 ICDSC, 2009, 2011, 2012 and 2014 IEEE AVSS, 2013 IEEE Workshop on Camera Networks and Wide Area Scene Analysis (in conjunction with CVPR).
 6. Invited talk on Mobile Camera Applications, IEEE AVSS 2016 Workshop on Surveillance for Location-aware Data Protection, Aug. 2016, Invited tutorial lecture “Smart Cameras Getting Smarter” at the ACM/IEEE Int’l Conf. on Distributed Smart Cameras (ICDSC), Oct. 2012.
-

RESEARCH INTERESTS

Machine learning applications, including deep learning-based obstacle detection and classification, human activity classification from egocentric videos, 3D object classification and classification of emotion and cognitive load using brain blood flow data, wearable camera applications including activity detection, UAV and UGV-mounted camera applications, driver assistance applications, lightweight algorithm design, energy efficiency for battery-powered embedded cameras, cooperative object tracking and composite event detection, image understanding and multimedia, machine learning, signal processing, information theory.

PUBLICATIONS

Books Edited

[B1] Shuvra Bhattacharyya, Miodrag Potkonjak and Senem Velipasalar, "Embedded, Cyber-Physical, and IoT Systems - Essays Dedicated to Marilyn Wolf," Springer, DOI: <https://doi.org/10.1007/978-3-030-16949-7>, e-book available, 2020.

[B2] Christophe Bobda and Senem Velipasalar, "Distributed Embedded Smart Cameras: Architectures, Design and Applications," Springer, 273 pages, 2014.

ISBN: 978-1-4614-7704-4 (Print) 978-1-4614-7705-1 (Online).

<http://www.springer.com/us/book/9781461477044>

Book Chapters

[BC1] C. Zhong, M. C. Gursoy and S. Velipasalar, "Mode Selection in Cellular Underlay D2D," in "5G REF: The Essential 5G Reference Online ", Editor: Rahim Tafazolli, Wiley, 2020.

[BC2] M. C. Gursoy, C. Zhong, and S. Velipasalar, "Deep Multi-Agent Reinforcement Learning for Cooperative Edge Caching", in "Machine Learning for Future Wireless Communications", Editor: Fa-Long Luo, Wiley/IEEE, pp. 439-457, Dec. 2019.

[BC3] Yantao Lu and Senem Velipasalar, "Wearable Sensor Applications: Processing of Egocentric Videos and Inertial Measurement Unit Data", in "Embedded, Cyber-Physical, and IoT Systems - Essays Dedicated to Marilyn Wolf " Editors: Shuvra Bhattacharyya, Miodrag Potkonjak and Senem Velipasalar, Springer, DOI: <https://doi.org/10.1007/978-3-030-16949-7>, pp. 149-173, 2020.

[BC4] Akhan Almagambetov and Senem Velipasalar, "Autonomous Tracking of Vehicle Taillights and Alert Signal Detection by Embedded Smart Cameras", in "Distributed Embedded Smart Cameras: Architectures, Design and Applications," Editors: Christophe Bobda and Senem Velipasalar, Springer, 273 pages, ISBN: 978-1-4614-7704-4 (Print), June 2014.

[BC5] Koray Ozcan, Anvith Malabahagiri l and Senem Velipasalar, "Automatic Fall Detection and Activity Classification by a Wearable Camera", in "Distributed Embedded Smart Cameras: Architectures, Design and Applications, Editors: Christophe Bobda and Senem Velipasalar, Springer, 273 pages, ISBN: 978-1-4614-7704-4 (Print), June 2014.

[BC6] Senem Velipasalar and Mauricio Casares, "Resource-efficient Foreground Detection with Embedded Smart Cameras" in "Background Modeling and Foreground Detection for Video Surveillance," Editors: Thierry Bouwmans, Fatih Porikli, Benjamin Hferlin, Antoine Vacavant, Chapman and Hall/CRC, July 25, 2014.

Selected Peer-Reviewed Journal Papers

1. Y. Zheng, Y. Lu, and S. Velipasalar, "An Effective Adversarial Attack on Person Re-identification in Video Surveillance via Dispersion Reduction," IEEE Access Journal, vol. 8, pp. 183891 – 183902, Sept. 2020.
2. N. Sommer, S. Velipasalar, L. Hirshfield, Y. Lu and B. Kakillioglu, "Simultaneous and Spatiotemporal Detection of Different Levels of Activity in Multidimensional Data," IEEE Access Journal, vol. 8, pp. 118205 - 118218, June 2020.
3. D. Bandara, T. Grant, L. Hirshfield and S. Velipasalar, "Identification of Potential Task Shedding Events Using Brain Activity Data," Augmented Human Research, 5. 10.1007/s41133-020-00034-y, 2020.
4. B. Kakillioglu, A. Ren, Y. Wang and S. Velipasalar, "3D Capsule Networks for Object Classification with Weight Pruning," IEEE Access Journal, vol. 8, pp. 27393 – 27405, February 2020.
5. M. Cornacchia and S. Velipasalar, "Autonomous Selective Parts-Based Tracking," IEEE Transactions on Image Processing, vol. 29, pp. 4349 – 4361, January 2020.
6. C. Zhong, M. C. Gursoy, and S. Velipasalar, "Deep Reinforcement Learning Based Edge Caching in Wireless Networks," IEEE Trans. on Cognitive Communications and Networking, vol. 6, issue 1, pp. 48-61, March 2020.

7. Y. Hu, Y. Li, M. C. Gursoy, S. Velipasalar and A. Schmeink, "Throughput Analysis of Low-Latency IoT Systems with QoS Constraints and Finite Blocklength Codes," *IEEE Transactions on Vehicular Technology*, vol. 69, issue 3, pp. 3093-3104, March 2020.
8. C. Zhong, Z. Lu, M. C. Gursoy, and S. Velipasalar, "A Deep Actor-Critic Reinforcement Learning Framework for Dynamic Multichannel Access," *IEEE Transactions on Cognitive Communications and Networking*, vol. 5, issue 4, pp. 1125-1139, Dec. 2019.
9. Y. Lu and S. Velipasalar, "Autonomous Human Activity Classification from Wearable Multi-Modal Sensors," *IEEE Sensors Journal*, vol. 19, issue: 23, pp. 11403-11412, Dec. 2019.
10. D. Qiao, M. C. Gursoy, and S. Velipasalar, "Throughput-Delay Tradeoffs with Finite Blocklength Coding over Multiple Coherence Blocks," *IEEE Trans. on Comm.*, vol. 67, issue: 8, pp. 5892-5904, Aug. 2019.
11. C. Ye, M. C. Gursoy, and S. Velipasalar, "Power Control for Wireless VBR Video Streaming: From Optimization to Reinforcement Learning," *IEEE Trans. on Communications*, vol. 67, issue: 8, pp. 5629-5644, Aug. 2019.
12. D. Bandara, L. Hirshfield, and S. Velipasalar, "Classification of Affect Using Deep Learning on Brain Blood Flow Data," *Journal of Near Infrared Spectroscopy*, doi: 10.1177/0967033519837986, 2019.
13. L. Hirshfield, P. Bobko, A. Barelka, N. Sommer, and S. Velipasalar, "Toward Interfaces that Help Users Identify Misinformation Online: Using fNIRS to Measure Suspicion," *Springer Journal of Augmented Human Research*, 4:1, April 2019.
14. Y. Li, C. Zhong, M. C. Gursoy, and S. Velipasalar, "Learning-Based Delay-Aware Caching in Wireless D2D Caching Networks," *IEEE Access*, vol. 6, pp. 77250 – 77264, Nov. 2018.
15. M. Cornacchia, B. Kakillioglu, Y. Zheng and S. Velipasalar, "Deep Learning Based Obstacle Detection and Classification with Portable Uncalibrated Patterned Light," *IEEE Sensors Journal*, vol. 18, issue: 20, pp. 8416-8425, Oct 2018.
16. C. Ye, M. C. Gursoy, and S. Velipasalar, "Quality-Driven Resource Allocation for Full-Duplex Delay-Constrained Wireless Video Transmissions," *IEEE Transactions on Communications*, vol. 66, no. 9, pp. 4103-4118, Sept. 2018.
17. C. Ye, M. C. Gursoy, and S. Velipasalar, "Quality-Driven Resource Allocation for Wireless Video Transmissions under Energy Efficiency and Delay Constraints," *IEEE Access*, vol. 6, pp. 43978-43989, Aug. 2018.
18. T. Rakha, A. Liberty, A. Gorodetsky, B. Kakillioglu and S. Velipasalar, "Heat Mapping Drones: An Autonomous Computer Vision-based Procedure for Building Envelope Inspection using Unmanned Aerial Systems (UAS)," *Technology | Architecture + Design (TAD) Journal*, vol. 2, pp. 30-44, 2018.
19. D. Bandara, S. Velipasalar, S. E. Bratt, L. M. Hirshfield, "Building Predictive Models of Emotion with Functional Near-Infrared Spectroscopy", *International Journal of Human-Computer Studies* (2017), doi: 10.1016/j.ijhcs.2017.10.001, vol. 110, pp. 75-85, February 2018.
20. Y. Lu and S. Velipasalar, "Autonomous Footstep Counting and Traveled Distance Calculation by Mobile Devices Incorporating Camera and Accelerometer Data," *IEEE Sensors Journal*, vol. 17, issue: 21, pp. 7157-7166, Nov. 2017.
21. K. Ozcan, S. Velipasalar and P. Varshney, "Autonomous Fall Detection with Wearable Cameras by using Relative Entropy Distance Measure," *IEEE Trans. on Human-Machine Systems*, vol. 47, issue: 1, pp. 31-39, Febr. 2017.
22. M. Cornacchia, K. Ozcan, Y. Zheng and S. Velipasalar, "A Survey on Activity Detection and Classification Using Wearable Sensors," *IEEE Sensors Journal*, vol. 17, issue: 2, pp. 386-403, Jan. 2017. **Top 25 most downloaded IEEE Sensors Journal paper for nine consecutive months in 2017.**
23. Y. Li, G. Ozcan, M. C. Gursoy, and S. Velipasalar, "Energy Efficiency of Hybrid-ARQ under Statistical Queuing Constraints," *IEEE Trans. on Communications*, vol. 64, no. 10, pp. 4253-4267, Oct. 2016.
24. Y. Li, M. C. Gursoy, and S. Velipasalar, "On the Throughput of Multi-Source Multi-Destination Relay Networks with Queuing Constraints," *IEEE Transactions on Wireless Communications*, vol. 15, issue: 8, pp. 5368-5383, Aug. 2016.

25. F. Erden, S. Velipasalar, A. Z. Alkar, A. Enis Cetin, "Sensors in Assisted Living: A Survey of Signal and Image Processing Methods," *IEEE Signal Processing Magazine*, vol. 33, issue:2, pp. 36-44, 2016.
26. K. Ozcan and S. Velipasalar, "Wearable Camera- and Accelerometer-based Fall Detection on Portable Devices," *IEEE Embedded Systems Letters*, vol. 8, issue: 1, pp. 6-9, March 2016.
27. C. Ye, G. Ozcan, M. C. Gursoy, and S. Velipasalar, "Multimedia Transmission over Cognitive Radio Channels under Sensing Uncertainty," *IEEE Trans. on Signal Processing*, vol. 64, no. 3, pp. 726-741, Feb. 2016.

Selected Peer Reviewed Conference Papers

1. Y. Zheng and S. Velipasalar, "Part-based Feature Squeezing to Detect Adversarial Examples in Person Re-Identification Networks," accepted to appear in the Proc. of the IEEE Int'l Conf. on Image Processing (ICIP), 2021.
2. Y. Lu, X. Du, B. Sun, H. Ren and S. Velipasalar, "Fabricate-Vanish: An Effective and Transferable Black-Box Adversarial Attack Incorporating Feature Distortion," accepted to appear in the Proc. of the IEEE Int'l Conf. on Image Processing (ICIP), 2021.
3. W. Chai, Y. Lu, and S. Velipasalar, "Weighted Average Precision: Adversarial Example Detection for Visual Perception of Autonomous Vehicles," accepted to appear in the Proc. of the IEEE Int'l Conf. on Image Processing (ICIP), 2021.
4. Y. Lu, Y. Jia, J. Wang, B. Li, W. Chai, L. Carin, and S. Velipasalar, "Enhancing Cross-Task Black-Box Transferability of Adversarial Examples with Dispersion Reduction," Proc. of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), pp. 940-949, June 2020.
5. C. Zhong, F. Wang, M. C. Gursoy and S. Velipasalar, "Adversarial Jamming Attacks on Deep Reinforcement Learning Based Dynamic Multichannel Access," Proc. of the 2020 IEEE Wireless Communications and Networking Conference (WCNC), 2020.
6. Y. Jia, Y. Lu, S. Velipasalar, Z. Zhong and T. Wei, "Adversarial Examples that Transfer across Real-World Computer Vision Tasks," presented at the CVPR 2019 Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems, June 2019.
7. B. Kakillioglu, A. Janani, S. Velipasalar and E. Koch, "3D Sensor-Based UAV Localization for Bridge Inspection," Proc. of the Asilomar Conference on Signals, Systems, and Computers, 2019.
8. C. Zhong, M. C. Gursoy, and S. Velipasalar, "Deep Actor-Critic Reinforcement Learning for Anomaly Detection," Proc. of the IEEE Global Communications Conference (Globecom), 2019.
9. Y. Lu and S. Velipasalar, "Autonomous Choice of Deep Neural Network Parameters by a Modified Generative Adversarial Network," Proc. of the 2019 IEEE Int'l Conf. on Image Processing, Sept. 2019.
10. Y. Lu, Y. Li and S. Velipasalar, "Efficient Human Activity Classification from Egocentric Videos incorporating Actor-Critic Reinforcement Learning," Proc. of the 2019 IEEE Int'l Conf. on Image Processing (ICIP), Sept. 2019.
11. Y. Lu and S. Velipasalar, "Autonomous Human Activity Classification from Ego-vision Camera and Accelerometer Data," presented at the Fourth Workshop on Egocentric Perception, Interaction and Computing (EPIC@CVPR2019).
12. C. Zhong, M. C. Gursoy, and S. Velipasalar, "Deep Multi-Agent Reinforcement Learning Based Cooperative Edge Caching in Wireless Networks," Proc. of the 2019 IEEE International Conference on Communications (ICC): Next-Generation Networking and Internet Symposium, 2019.
13. Y. Lu and S. Velipasalar, "Human Activity Classification incorporating Egocentric Video and Inertial Measurement Unit Data," Proc. of the IEEE Global Conf. on Signal and Information Processing, 2018.
14. B. Kakillioglu, A. Ahmad and S. Velipasalar, "Object Classification from 3D Volumetric Data with 3D Capsule Networks," Proc. of the IEEE Global Conf. on Signal and Information Processing, 2018.
15. C. Ye, M. C. Gursoy, and S. Velipasalar, "Deep Learning Based Power Control for Quality-Driven Wireless Video Transmissions," Proc. of the IEEE Global Conference on Signal and Information Processing (GlobalSIP), 2018.