Daniel P. Lopresti
Curriculum Vitae
January 2023

A. Biographical Information

Name: Daniel P. Lopresti

Home Address: 1518 Noah's Circle
Hellertown, PA 18055
Email: dpl@alumni.princeton.edu

Business Address: Mountaintop Building C 337
113 Research Drive
Lehigh University
Bethlehem, PA 18015
Phone: (610) 758-5782
Email: lopresti@lehigh.edu

Homepage: http://www.cse.lehigh.edu/~lopresti
ORCID: 0000-0003-2129-4223

Educational History

- A.B. (Bachelor of Arts), Mathematics and Engineering Science, Dartmouth College, Hanover, NH, June 1982.

- M.S.E. (Master of Science in Engineering), Electrical Engineering and Computer Science, Princeton University, Princeton, NJ, June 1983.

- M.A. (Master of Arts), Electrical Engineering and Computer Science, Princeton University, Princeton, NJ, June 1984.

- Ph.D. (Doctor of Philosophy), Computer Science, Princeton University, Princeton, NJ, January 1987.

Professional Experience

- Assistant Professor of Computer Science, Brown University, Providence, RI, September 1986 – May 1991.

- Principal Scientist, Matsushita Information Technology Laboratory, Princeton, NJ, June 1991 – October 1997.

- Member of Technical Staff, Bell Labs, Lucent Technologies, Murray Hill, NJ, October

1997 – December 2002.

- Visiting Research Scientist, Palo Alto Research Center, Palo Alto, CA, December 2002 – June 2003.

- Research Fellow, Information Security Institute, Johns Hopkins University, Baltimore, MD, February 2003 – June 2003.

- Visiting Research Associate Professor, Electrical, Computer & Systems Engineering, Rensselaer Polytechnic Institute, Troy, NY, February 2003 – June 2003.

- Associate Professor, Computer Science & Engineering, Lehigh University, Bethlehem, PA, July 2003 – May 2009. Class of 1961 Professorship, September 2005 – May 2007.

- Professor, Computer Science & Engineering, Lehigh University, Bethlehem, PA, May 2009 – present.

- Department Chair, Computer Science & Engineering, Lehigh University, Bethlehem, PA, July 2009 – June 2012 (first term), July 2012 – June 2014 (second term), July 2015 – June 2019 (third term).

- Interim Dean, P. C. Rossin College of Engineering and Applied Science, Lehigh University, Bethlehem, PA, July 2014 – June 2015.

- Director, Data X Strategic Initiative, Lehigh University, Bethlehem, PA, July 2015 – June 2020.

B. Publications and Creative Activities

Books Edited

E1. *Document Recognition V*, Proceedings of SPIE Vol. 3305, D. Lopresti and J. Zhou (editors), January 1998.

E2. *Document Recognition and Retrieval VI*, Proceedings of SPIE Vol. 3651, D. Lopresti and J. Zhou (editors), January 1999.

E3. *Document Recognition and Retrieval VII*, Proceedings of SPIE Vol. 3967, D. Lopresti and J. Zhou (editors), January 2000.

E4. *Document Recognition and Retrieval VIII*, Proceedings of SPIE Vol. 4307, P. Kantor, D. Lopresti, and J. Zhou (editors), January 2001.

E5. *Document Analysis Systems V*, Lecture Notes in Computer Science Vol. 2423, D.

Lopresti, J. Hu, and R. Kashi (editors), Springer-Verlag, January 2002.

E6. *Human Interactive Proofs*, Lecture Notes in Computer Science Vol. 3517, H. Baird and D. Lopresti (editors), Springer-Verlag, May 2005.

E7. *Proceedings of the Second Workshop on Analytics for Noisy Unstructured Text Data*, ACM International Conference Proceeding Series (ACM Digital Library), D. Lopresti, S. Roy, K. Schulz, and L. V. Subramaniam (editors), July 2008.

E8. *Proceedings of the Third Workshop on Analytics for Noisy Unstructured Text Data*, ACM International Conference Proceeding Series (ACM Digital Library), D. Lopresti, S. Roy, K. Schulz, and L. V. Subramaniam (editors), July 2009.

E9. *Proceedings of the Ninth IAPR International Workshop on Document Analysis Systems*, ACM International Conference Proceeding Series (ACM Digital Library), D. Doermann, V. Govindaraju, D. Lopresti, and P. Natarajan (editors), June 2010.

E10. *Proceedings of the Fourth Workshop on Analytics for Noisy Unstructured Text Data*, ACM International Conference Proceeding Series (ACM Digital Library), R. Basili, D. Lopresti, C. Ringlstetter, S. Roy, K. Schulz, and L. V. Subramaniam (editors), October 2010.

E11. *Proceedings of the Joint Workshop on Multilingual OCR and Analytics for Noisy Unstructured Text Data*, ACM International Conference Proceeding Series (ACM Digital Library), L. Dey, V. Govindaraju, D. Lopresti, P. Natarajan, C. Ringlstetter, and S. Roy (editors), September 2011.

E12. *Proceedings of the Eleventh International Conference on Document Analysis and Recognition*, IEEE Xplore Digital Library, T. Breuel, D. Lopresti, and C. L. Tan (program co-chairs), September 2011.

E13. *Reproducible Research in Pattern Recognition: Second International Workshop*, Lecture Notes in Computer Science Vol. 11455, B. Kerautret, M. Colom, D. Lopresti, P. Monasse, and H. Talbot (editors), Springer Nature, 2019.

E14. *Proceedings of the Fourteenth IAPR International Workshop on Document Analysis Systems*, Vol. 12116, X. Bai, D. Karatzas, and D. Lopresti (editors), Springer Nature, 2020.

E15. *Reproducible Research in Pattern Recognition: Third International Workshop*, Lecture Notes in Computer Science Vol. 12636, B. Kerautret, M. Colom, A. Krähenbühl, D. Lopresti, P. Monasse, and H. Talbot (editors), Springer Nature, 2021.

E16. *Proceedings of the Sixteenth International Conference on Document Analysis and*

Recognition, Lecture Notes in Computer Science Vols. 12821-12824, J. Lladós, D. Lopresti, and S. Uchida (editors), Springer Nature, 2021.

Chapters in Books

B1. "FPGA Implementation of Systolic Sequence Alignment," D. Hoang and D. Lopresti, in *Field-Programmable Gate Arrays: Architectures and Tools for Rapid Prototyping*, H. Grunbacher and R. W. Hartenstein, eds., Berlin: Springer-Verlag, 1992, pp. 183-191.

B2. "Computing in the Ink Domain," D. Lopresti and A. Tomkins, *Advances in Human Factors/Ergonomics: Symbiosis of Human and Artifact*, vol. 20A, Y. Anzai, K. Ogawa, and H. Mori, eds., Amsterdam: Elsevier, 1995, pp. 543-548.

B3. "Using Consensus Sequence Voting to Correct OCR Errors," D. Lopresti and J. Zhou, *Document Analysis Systems*, A. L. Spitz and A. Dengel, eds., Singapore: World Scientific, 1995, pp. 157-168.

B4. "Ink as a First-Class Datatype in Multimedia Databases," W. Aref, D. Barbará, D. Lopresti, and A. Tomkins, *Multimedia Databases: Issues and Research Directions*, S. Jajodia and V. S. Subrahmanian, eds., Berlin: Springer-Verlag, 1996, pp. 113-163.

B5. "Algorithms for Matching Hand-Drawn Sketches," D. Lopresti, A. Tomkins, and J. Zhou, *Progress in Handwriting Recognition*, A. C. Downton and S. Impedovo, eds., Singapore: World Scientific, 1997, pp. 549-556.

B6. "Online Handwriting Recognition," R. Plamondon, D. Lopresti, L. Schomaker, and R. Srihari, *Wiley Encyclopedia of Electrical and Electronics Engineering*, vol. 15, 1999, pp. 123-146.

B7. "A Tabular Survey of Automated Table Processing," D. Lopresti and G. Nagy, *Graphics Recognition: Recent Advances*, A. K. Chhabra and D. Dori, eds., Berlin: Springer-Verlag, 2000, pp. 93-120.

B8. "Applications of Graph Probing to Web Document Analysis," D. Lopresti and G. Wilfong, *Web Document Analysis: Challenges and Opportunities*, A. Antonacopoulos and J. Hu, eds., Singapore: World Scientific, 2003, pp. 19-38.

B9. "Exploiting WWW Resources in Experimental Document Analysis Research," D. Lopresti, *Web Document Analysis: Challenges and Opportunities*, A. Antonacopoulos and J. Hu, eds., Singapore: World Scientific, 2003, pp. 273-292.

B10. "Multi-character Field Recognition for Arabic and Chinese Handwriting," D. Lopresti, G. Nagy, S. Seth, and X. Zhang, *Arabic and Chinese Handwriting Recognition*, D. Doermann and S. Jaeger, eds., Springer-Verlag, 2008, pp. 218-

230.

B11. "The Role of Document Image Analysis in Trustworthy Elections," G. Nagy and D. Lopresti, invited chapter in *Advances in Digital Document Processing and Retrieval*, B. B. Chaudhuri and S. K. Parui, eds., special volume commemorating the Platinum Jubilee of the Indian Statistical Institute, Singapore: World Scientific, 2013, pp. 51-81.

Articles in Refereed Journals

J1. "P–NAC: A Systolic Array for Comparing Nucleic Acid Sequences," D. Lopresti, *Computer*, vol. 20, no. 7, July 1987, pp. 98-99 (also appears in Selected Reprints from Computer Society Magazines).

J2. "SPLASH – Experience Building and Programming a Highly Parallel Programmable Logic Array," M. Gokhale, W. Holmes, A. Kopser, S. Lucas, R. Minnich, D. Sweely, and D. Lopresti, *Computer*, January 1991, pp. 81-89. *Voted into the TCFPGA Hall of Fame Class of 2018.

J3. "I/O Overhead and Parallel VLSI Architectures for Lattice Computations," M. Nodine, D. Lopresti, and J. Vitter, *IEEE Transactions on Computers*, vol. 40, no. 7, July 1991, pp. 843-852.

J4. "Interval Methods for Modeling Uncertainty in RC Timing Analysis," C. Harkness and D. Lopresti, *IEEE Transactions on Computer-Aided Design*, vol. 11, no. 11, November 1992, pp. 1388-1401.

J5. "On Handling Electronic Ink," W. Aref, I. Kamel, and D. Lopresti, *ACM Computing Surveys*, vol. 27, no. 4, December 1995, pp. 564-567.

J6. "Validation of Image Defect Models for Optical Character Recognition," Y. Li, D. Lopresti, G. Nagy, and A. Tomkins, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 18, no. 2, February 1996, pp. 99-108.

J7. "Using Consensus Sequence Voting to Correct OCR Errors," D. Lopresti and J. Zhou, *Computer Vision and Image Understanding*, vol. 67. no. 1, July 1997, pp. 39-47.

J8. "Improving Classifier Performance through Repeated Sampling," J. Zhou and D. Lopresti, *Pattern Recognition*, vol. 30, no. 10, October 1997, pp. 1637-1650.

J9. "Block Edit Models for Approximate String Matching," D. Lopresti and A. Tomkins, *Theoretical Computer Science*, vol. 181, 1997, pp. 159-179.

J10. "Ink Matching of Cursive Chinese Handwritten Annotations," D. Lopresti, M. Ma, P. Wang, and J. Crisman, *International Journal of Pattern Recognition and*

Artificial Intelligence, vol. 12, no. 1, January 1998, pp. 119-141.

J11. "Spatial Sampling of Printed Patterns," P. Sarkar, G. Nagy, J. Zhou, and D. Lopresti, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 20, no. 3, March 1998, pp. 344-351.

J12. "Locating and Recognizing Text in WWW Images," D. Lopresti and J. Zhou, *Information Retrieval*, vol. 2, nos. 2/3, May 2000, pp. 177-206.

J13. "String Techniques for Detecting Duplicates in Document Databases," D. Lopresti, *International Journal on Document Analysis and Recognition*, vol. 2, no. 4, June 2000, pp. 186-199.

J14. "A Comparison of Text-Based Methods for Detecting Duplication in Scanned Document Databases," D. Lopresti, *Information Retrieval*, July 2001, vol. 4, no. 2, pp. 153-173.

J15. "Evaluating the Performance of Table Processing Algorithms," J. Hu, R. Kashi, D. Lopresti, and G. Wilfong, *International Journal on Document Analysis and Recognition*, vol. 4, no. 3, March 2002, pp. 140-153.

J16. "A Text-to-Speech Platform for Variable Length Optimal Unit Searching Using Perceptual Cost Functions," M. Lee, D. Lopresti, and J. Olive, *International Journal of Speech Technology*, vol. 6, no. 4, October 2003, pp. 347-356.

J17. "A Fast Technique for Comparing Graph Representations with Applications to Performance Evaluation," D. Lopresti and G. Wilfong, *International Journal on Document Analysis and Recognition*, vol. 6, no. 4, April 2004, pp. 219-229.

J18. "Table Processing Paradigms: A Research Survey," D. Embley, M. Hurst, D. Lopresti, and G. Nagy, *International Journal on Document Analysis and Recognition*, vol 8, no. 2-3, June 2006, pp. 66-86.

J19. "Forgery Quality and its Implications for Behavioral Biometric Security," L. Ballard, D. Lopresti, and F. Monrose, *IEEE Transactions on Systems, Man and Cybernetics, Part B*, vol. 37, no. 5, October 2007, pp. 1107-1118.

J20. "Balancing the Role of Priors in Multi-Observer Segmentation Evaluation," Y. Zhu, X. Huang, W. Wang, D. Lopresti, R. Long, S. Antani, Z. Xue, and G. Thoma, *Journal of Signal Processing Systems*, vol. 55, nos. 1-3, April 2009, pp. 185-207.

J21. "Optical Character Recognition Errors and Their Effects on Natural Language Processing," D. Lopresti, *International Journal on Document Analysis and Recognition*, vol. 12, no. 3, October 2009, pp. 141-151.

J22. "Handwriting Recognition Research: Twenty Years of Achievement … and

Beyond," M. Cheriet, M. El Yacoubi, H. Fujisawa, D. Lopresti, and G. Lorette, *Pattern Recognition*, vol. 42, no. 12, December 2009, pp. 3131-3135.

J23. "Genome-wide Evaluation and Discovery of Vertebrate A-to-I RNA Editing Sites," S. Maas, C. P. Godfried Sie, I. Stoev, D. E. Dupuis, J. Latona, A. Porman, B. Evans, P. Rekawek, V. Kluempers, M. A. Mutter, W. M. Gommans, and D. Lopresti, *Biochemical and Biophysical Research Communications*, vol. 412, no. 3, September 2011, pp. 407-412.

J24. "Secure Speech Biometric Templates for User Authentication," K. Inthavisas and D. Lopresti, *IET Biometrics*, vol. 1, no. 1, pp. 46-54, 2012, DOI: 10.1049/iet-bmt.2011.0008.

J25. "Model-Based Ruling Line Detection in Noisy Handwritten Documents," J. Chen and D. Lopresti, *Pattern Recognition Letters*, vol. 35, no. 1, January 2014, pp. 34-45.

J26. "Conservative Preprocessing of Document Images," J. Chen, D. Lopresti, and G. Nagy, *International Journal on Document Analysis and Recognition*, vol. 19, no. 4, December 2016, pp 321-333.

J27. "Arbitrarily-Oriented Text Detection in Low Light Natural Scene Images," M. Xue, P. Shivakumara, C. Zhang, Y. Xiao, T. Lu, U. Pal and D. Lopresti, *IEEE Transactions on Multimedia,* vol. 23, pp. 2706-2720, early access August 2020, DOI: https://ieeexplore.ieee.org/document/9162503.

J28. "Deep Invariant Texture Features for Water Image Classification," M. Xue, P. Shivakumara, X. Wu, T. Lu, U. Pal, M. Blumenstein, and D. Lopresti, *SN Applied Sciences*, vol. 2, 19 pages, online access November 2020, DOI: https://doi.org/10.1007/s42452-020-03882-w.

J29. "Graph Attention Network for Detecting License Plates in Crowded Street Scenes," P. N. Chowdhury, P. Shivakumara, S. Kanchan, R. Raghavendra, U. Pal, T. Lu, and D. Lopresti, *Pattern Recognition Letters*, vol. 140, December 2020, pp. 18-25.

J30. "A New Context-Based Feature for Classification of Emotions in Photographs," D. Krishnani, P. Shivakumara, T. Lu, U. Pal, D. Lopresti, and G. H. Kumar, *Multimedia Tools and Applications*, 30 pages, online access February 2021, DOI: https://doi.org/10.1007/s11042-020-10404-8.

J31. "Forged Text Detection in Video, Scene, and Document Images," L. Nandanwar, P. Shivakumara, P. Mondal, K. S. Raghunandan, U. Pal, T. Lu, and D. Lopresti, *IET Image Processing*, 12 pages, online access February 2021, DOI: https://doi.org/10.1049/iet-ipr.2020.0590.

J32. "An Episodic Learning Network for Text Detection on Human Bodies in Sports Images," P. N. Chowdhury, P. Shivakumara, R. Raghavendra, S. Nag, U. Pal, T. Lu, and D. Lopresti, *IEEE Transactions on Circuits and Systems for Video Technology*, vol 32, no. 4, April 2022, pp. 2279-2289, online access June 2021, https://doi.org/10.1109/TCSVT.2021.3092713.

J33. "A Deep Action-Oriented Video Image Classification System for Text Detection and Recognition," A. Chaudhuri, P. Shivakumara, P. N. Chowdhury, U. Pal, T. Lu, D. Lopresti, and G. H. Kumar, *SN Applied Sciences*, vol. 3, 24 pages, October 2021, DOI: https://doi.org/10.1007/s42452-021-04821-z.

Published Reports and Conference Proceedings (all refereed)

C1. "A Systolic Array for Rapid String Comparison," R. Lipton and D. Lopresti, *1985 Chapel Hill Conference on Very Large Scale Integration*, H. Fuchs, ed., Rockville, MD: Computer Science Press, 1985, pp. 363-376.

C2. "Delta Transformations to Simplify VLSI Processor Arrays for Serial Dynamic Programming," R. Lipton and D. Lopresti, *Proceedings of the 1986 International Conference on Parallel Processing*, August 1986, pp. 917-920.

C3. "Comparing Long Strings on a Short Systolic Array," R. Lipton and D. Lopresti, *Systolic Arrays*, W. Moore, A. McCabe, and R. Urquhart, eds., Boston: Adam Hilger, 1987, pp. 181-190.

C4. "Architecture of a Programmable Systolic Array," R. Hughey and D. Lopresti, *International Conference on Systolic Arrays*, K. Bromley, S. Y. Kung, E. Swartzlander, eds., Washington, DC: Computer Society Press, 1988, pp. 41-49.

C5. "The Brown Systolic Array," R. Hughey and D. Lopresti, *Proceedings of the First Annual IEEE Symposium on Parallel and Distributed Processing*, May 1989, pp. 112-113.

C6. "Modeling Uncertainty in RC Timing Analysis," C. L. Harkness and D. Lopresti, *Proceedings of the 1989 International Conference on Computer-Aided Design*, November 1989, pp. 516-519.

C7. "I/O Overhead and Parallel VLSI Architectures for Lattice Computations," M. Nodine, D. Lopresti, and J. Vitter, *International Conference on Computing and Information*, May 1990, pp. 472-476. Also appears in *Advances in Computing and Information*, Lecture Notes in Computer Science Vol. 468, Berlin: Springer-Verlag, 1990, pp. 497-506.

C8. "SPLASH: A Reconfigurable Linear Logic Array," M. Gokhale, W. Holmes, A. Kopser, R. Kunze, D. Lopresti, S. Lucas, R. Minnich, and P. Olsen, *Proceedings of the 1990 International Conference on Parallel Processing*, August 1990, pp.

526-532.

C9. "VLSI Placement Using Uncertain Costs," C. Harkness and D. Lopresti, *Proceedings of the 1990 International Conference on Computer-Aided Design*, November 1990, pp. 340-343.

C10. "A Software Approach to Fault Detection on Programmable Systolic Arrays," R. Hughey and D. Lopresti, *Proceedings of the Second Annual IEEE Symposium on Parallel and Distributed Processing*, December 1990, pp. 523-526.

C11. "Rapid Implementation of a Genetic Sequence Comparator Using Field-Programmable Logic Arrays," D. Lopresti, *Advanced Research in VLSI: Proceedings of the 1991 University of Santa Cruz Conference*, C. H. Sequin, ed., Cambridge: MIT Press, 1991, pp. 138-152 (invited paper).

C12. "B-SYS: A 470 Processor Programmable Systolic Array," R. Hughey and D. Lopresti, *1991 International Conference on Parallel Processing*, August 1991, pp. 580-583.

C13. "FPGA Implementation of Systolic Sequence Alignment," D. Hoang and D. Lopresti, in *Field-Programmable Gate Arrays: Architectures and Tools for Rapid Prototyping*, H. Grunbacher and R. W. Hartenstein, eds., Berlin: Springer- Verlag, 1992, pp. 183-191.

C14. "Pictographic Naming," D. Lopresti and A. Tomkins, *Adjunct Proceedings of the 1993 Conference on Human Factors in Computing Systems (INTERCHI'93)*, April 1993, Amsterdam, The Netherlands, pp. 77-78.

C15. "Approximate Matching of Hand-Drawn Pictograms," D. Lopresti and A. Tomkins, *Proceedings of the Third International Workshop on Frontiers in Handwriting Recognition*, May 1993, Buffalo, NY, pp. 102-111.

C16. "Certifiable Optical Character Recognition," D. Lopresti and J. Sandberg, *Proceedings of the Second International Conference on Document Analysis and Recognition*, October 1993, Tsukuba Science City, Japan, pp. 432-435.

C17. "Classification and Distribution of Optical Character Recognition Errors," J. Esakov, D. Lopresti, and J. Sandberg, *Proceedings of the IS&T/SPIE International Symposium on Electronic Imaging*, February 1994, San Jose, CA, vol. 2181, pp. 204-216.

C18. "Validation of Document Defect Models for Optical Character Recognition" Y. Li, D. Lopresti, and A. Tomkins, *Proceedings of the Third Annual Symposium on Document Analysis and Information Retrieval*, April 1994, Las Vegas, NV, pp. 137-150.

C19. "Issues in Automatic OCR Error Classification," J. Esakov, D. Lopresti, J. Sandberg, and J. Zhou, *Proceedings of the Third Annual Symposium on Document Analysis and Information Retrieval*, April 1994, Las Vegas, NV, pp. 401-412.

C20. "On the Searchability of Electronic Ink," D. Lopresti and A. Tomkins, *Proceedings of the Fourth International Workshop on Frontiers of Handwriting Recognition*, December 1994, Taipei, Taiwan, pp. 156-165.

C21. "The Effects of Document Image Defects on Line Drawing Analysis Algorithms," Y. Chang and D. Lopresti, *Proceedings of the IAPR Workshop on Machine Vision Applications*, December 1994, Kawasaki, Japan, pp. 522-527.

C22. "Repeated Sampling to Improve Classifier Accuracy," J. Zhou and D. Lopresti, *Proceedings of the IAPR Workshop on Machine Vision Applications*, December 1994, Kawasaki, Japan, pp. 346-351.

C23. "Systematic Bias in OCR Experiments," D. Lopresti, A. Tomkins, J. Zhou, and J. Zhou, *Proceedings of the IS&T/SPIE International Symposium on Electronic Imaging*, L. M. Vincent and H. S. Baird, eds., February 1995, San Jose, CA, pp. 196-204.

C24. "Block Edit Models for Approximate String Matching," D. Lopresti and A. Tomkins, *Proceedings of the Second South American Workshop on String Processing*, R. Baeza-Yates and U. Manber, eds., April 1995, Valparaíso, Chile, pp. 11-26.

C25. "The Effects of Sampling Variation on Image Recognition Systems," J. Zhou and D. Lopresti, *Proceedings of the Fifth International Conference on Image Processing and its Applications*, July 1995, Edinburgh, UK, pp. 75-79.

C26. "Spatial Sampling Effects in Optical Character Recognition," D. Lopresti, J. Zhou, G. Nagy, and P. Sarkar, *Proceedings of the Third International Conference on Document Analysis and Recognition*, August 1995, Montréal, Canada, pp. 309-314.

C27. "Temporal-Domain Matching of Hand-Drawn Pictorial Queries," D. Lopresti and A. Tomkins, *Handwriting and Drawing Research: Basic and Applied Issues*, M. L. Simner, C. G. Leedham, and A. J. W. M. Thomassen, eds., Amsterdam: IOS Press, 1996, pp. 387-401.

C28. "A Genetic Approach to the Analysis of Complex Text Formatting," J. Zhou, D. Lopresti, and J. Zhou, *Proceedings of the IS&T/SPIE International Symposium on Electronic Imaging*, L. M. Vincent and J. J. Hull, eds., February 1996, San Jose, CA, pp. 126-137.

C29. "Retrieval Strategies for Noisy Text," D. Lopresti and J. Zhou, *Proceedings of the*

Fifth Annual Symposium on Document Analysis and Information Retrieval, April 1996, Las Vegas, NV, pp. 255-269.

C30. "Robust Retrieval of Noisy Text," D. Lopresti, *Proceedings of the Third Forum on Research and Technology Advances in Digital Libraries*, May 1996, Washington, DC, pp. 76-85.

C31. "Algorithms for Matching Hand-Drawn Sketches," D. Lopresti, A. Tomkins, and J. Zhou, *Proceedings of the Fifth International Workshop on Frontiers in Handwriting Recognition*, September 1996, Colchester, England, pp. 233-238.

C32. "Document Analysis and the World Wide Web," D. Lopresti and J. Zhou, *Proceedings of the IAPR Workshop on Document Analysis Systems*, October 1996, Malvern, PA, pp. 651-671.

C33. "OCR for World Wide Web Images," J. Zhou, D. Lopresti, and Z. Lei, *Proceedings of the IS&T/SPIE International Symposium on Electronic Imaging*, L. M. Vincent and J. J. Hull, eds., February 1997, San Jose, CA, pp. 58-66.

C34. "Semantic Matching of Free-Format Chinese Handwriting," M. Ma, P. Wang, D. Lopresti, and J. Crisman, *Proceedings of the Seventeenth International Conference on Computer Processing of Oriental Languages*, April 1997, Hong Kong, pp. 107-112.

C35. "Approximate Matching of Chinese Handwritten Annotations," D. Lopresti, M. Ma, and J. Zhou, *Proceedings of the Seventeenth International Conference on Computer Processing of Oriental Languages*, April 1997, Hong Kong, pp. 95-100.

C36. "Locating and Recognizing Text in WWW Images," D. Lopresti and J. Zhou, *Proceedings of the Symposium on Document Image Understanding Technology*, April/May 1997, Annapolis, MD, pp. 193-201.

C37. "Spatial Sampling Effects on Scanned 2-D Patterns," J. Zhou, D. Lopresti, P. Sarkar, and G. Nagy, *Advances in Visual Form Analysis*, C. Arcelli, L. P. Cordella, and G. Sanniti di Baja, eds., Singapore: World Scientific, 1997, pp. 666-675.

C38. "Extracting Text from WWW Images," J. Zhou and D. Lopresti, *Proceedings of the Fourth International Conference on Document Analysis and Recognition*, August 1997, Ulm, Germany, pp. 248-252.

C39. "Image Curvelet Feature Extraction and Matching," Z. Lei, Y. Chan, and D. Lopresti, *Proceedings of the IEEE International Conference on Image Processing*, October 1997, Santa Barbara, CA.

C40. "A Feature-Based Approach for Image Retrieval by Sketch," Y. Chan, Z. Lei, D.

Lopresti, and S. Y. Kung, *Proceedings of the SPIE International Symposium on Voice, Video and Data Communications*, November 1997, Dallas, TX, pp. 220-231.

C41. "Finding Text in Color Images," J. Zhou, D. Lopresti, and T. Tasdizen, *Proceedings of Document Recognition V (IS&T/SPIE International Symposium on Electronic Imaging)*, February 1998, San Jose, CA, pp. 130-140.

C42. "Ink as Multimedia Data," D. Lopresti, *Proceedings of the Fourth International Conference on Information, Systems, Analysis and Synthesis*, July 1998, Orlando, FL, pp. 122-128.

C43. "String Techniques for Duplicate Document Detection," D. Lopresti, *Proceedings of the Symposium on Document Image Understanding Technology*, April 1999, Annapolis, MD, pp. 101-112.

C44. "Models and Algorithms for Duplicate Document Detection," D. Lopresti, *Proceedings of the Fifth International Conference on Document Analysis and Recognition*, September 1999, Bangalore, India, pp. 297-300.

C45. "Cross-Domain Approximate String Matching," D. Lopresti and G. Wilfong, *Proceedings of the Sixth International Symposium on String Processing and Information Retrieval*, September 1999, Cancún, Mexico, pp. 120-127.

C46. "Automated Table Processing: An (Opinionated) Survey," D. Lopresti and G. Nagy, *Proceedings of the Third IAPR International Workshop on Graphics Recognition*, September 1999, Jaipur, India, pp. 109-134.

C47. "Medium-Independent Table Detection," J. Hu, R. Kashi, D. Lopresti, and G. Wilfong, *Proceedings of Document Recognition and Retrieval VII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2000, San Jose, CA, pp. 291-302.

C48. "A Comparison of Text-Based Methods for Detecting Duplicates in Document Image Databases," D. Lopresti, *Proceedings of Document Recognition and Retrieval VII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2000, San Jose, CA, pp. 210-221.

C49. "Cross-Domain Searching Using Handwritten Queries," D. Lopresti and G. Wilfong, *Proceedings of the Seventh International Workshop on Frontiers in Handwriting Recognition*, September 2000, Amsterdam, The Netherlands, pp. 3-12.

C50. "Comparing the Utility of Optical Character Recognition and Character Shape Coding in Duplicate Document Detection," D. Lopresti and A. L. Spitz, *Proceedings of the Fourth IAPR International Workshop on Document Analysis*

Systems, December 2000, Rio de Janeiro, Brazil, pp. 439-450.

C51. "A System for Understanding and Reformulating Tables," J. Hu, R. Kashi, D. Lopresti, and G. Wilfong, *Proceedings of the Fourth IAPR International Workshop on Document Analysis Systems*, December 2000, Rio de Janeiro, Brazil, pp. 361-372.

C52. "Table Structure Recognition and Its Evaluation," J. Hu, R. Kashi, D. Lopresti, and G. Wilfong, *Proceedings of Document Recognition and Retrieval VIII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2001, San Jose, CA, pp. 44-55.

C53. "Evaluating Document Analysis Results via Graph Probing," D. Lopresti and G. Wilfong, *Proceedings of the Symposium on Document Image Understanding Technology*, April 2001, Columbia, MD, pp. 201-210.

C54. "A Text-to-Speech Platform for Variable Length Optimal Unit Searching Using Perceptual Cost Functions," M. Lee, D. Lopresti, and J. Olive, *Proceedings of the Fourth ISCA Workshop on Speech Synthesis*, August-September 2001, Perthshire, Scotland, pp. 75-80.

C55. "Issues in Ground-Truthing Graphic Documents," D. Lopresti and G. Nagy, *Proceedings of the Fourth IAPR International Workshop on Graphics Recognition*, September 2001, Kingston, Ontario, Canada, pp. 59-72.

C56. "Applications of Graph Probing to Web Document Analysis," D. Lopresti and G. Wilfong, *Proceedings of the First International Workshop on Web Document Analysis*, September 2001, Seattle, WA, pp. 51-54.

C57. "Why Table Ground-Truthing is Hard," J. Hu, R. Kashi, D. Lopresti, G. Nagy, and G. Wilfong, *Proceedings of the Sixth International Conference on Document Analysis and Recognition*, September 2001, Seattle, WA, pp. 129-133.

C58. "Evaluating Document Analysis Results via Graph Probing," D. Lopresti and G. Wilfong, *Proceedings of the Sixth International Conference on Document Analysis and Recognition*, September 2001, Seattle, WA, pp. 116-120.

C59. "Comparing Semi-Structured Documents via Graph Probing," D. Lopresti and G. Wilfong, *Proceedings of the Seventh Workshop on Multimedia Information Systems*, November 2001, Capri, Italy, pp. 41-50.

C60. "Human Interactive Proofs for Spoken Language Interfaces," D. Lopresti, C. Shih and G. Kochanski, *Proceedings of the Workshop on Human Interactive Proofs*, January 2002, Palo Alto, CA, pp. 30-34.

C61. "Exploiting WWW Resources in Experimental Document Analysis Research," D.

Lopresti, *Document Analysis Systems V*, D. Lopresti, J. Hu, and R. Kashi, eds., Berlin: Springer-Verlag, 2002, pp. 532-543.

C62. "Towards Speech-Generated Cryptographic Keys on Resource-Constrained Devices," F. Monrose, M. Reiter, Q. Li, D. Lopresti, and C. Shih, *Proceedings of the Eleventh USENIX Security Symposium*, August 2002, San Francisco, CA, pp. 283-296.

C63. "A Reverse Turing Test Using Speech," G. Kochanski, D. Lopresti, and C. Shih, *Proceedings of the Seventh International Conference on Spoken Language Processing*, September 2002, Denver, CO, pp. 1357-1360.

C64. "Resource-Optimized Delivery of Web Images to Small-Screen Devices," Y. Wu and D. Lopresti, *Proceedings of Document Recognition and Retrieval X (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2003, Santa Clara, CA, pp. 144-156.

C65. "Summarizing Noisy Documents," H. Jing, D. Lopresti, and C. Shih, *Proceedings of the Symposium on Document Image Understanding Technology,* April 2003, Greenbelt, MD, pp. 111-119.

C66. "Assuring High-Accuracy Document Understanding: Retargeting, Scaling-up, and Adapting," H. Baird, K. Popat, T. Breuel, P. Sarkar, and D. Lopresti, *Proceedings of the Symposium on Document Image Understanding Technology*, April 2003, Greenbelt, MD, pp. 17-29.

C67. "A Nonparametric Classifier for Unsegmented Text," G. Nagy, A. Joshi, M. Krishnamoorthy, Y. Lin, D. Lopresti, S. Mehta, and S. Seth, *Proceedings of Document Recognition and Retrieval XI (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2004, Santa Jose, CA, pp. 102-108.

C68. "Document Analysis Systems for Digital Libraries: Challenges and Opportunities," H. Baird, V. Govindaraju, and D. Lopresti, *Document Analysis Systems VI*, S. Marinai and A. Dengel, eds., Berlin: Springer-Verlag, 2004, pp. 1-16.

C69. "Robust Document Image Understanding Technologies," H. Baird, D. Lopresti, B. Davison, and W. Pottenger, *Proceedings of the First ACM Workshop on Hardcopy Document Processing (in association with Thirteenth Conference on Information and Knowledge Management)*, November 2004, Washington, DC, pp. 9-14.

C70. "Quantifying Information Leakage in Document Redaction," D. Lopresti and A. L. Spitz, *Proceedings of the First ACM Workshop on Hardcopy Document Processing (in association with Thirteenth Conference on Information and Knowledge Management)*, November 2004, Washington, DC, pp. 63-69.

C71. "Information Leakage Through Document Redaction: Attacks and Countermeasures," D. Lopresti and A. L. Spitz, *Proceedings of Document Recognition and Retrieval XII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2005, San Jose, CA, pp. 183-190.

C72. "Chipless ID for Paper Documents," D. Lopresti and G. Nagy, *Proceedings of Document Recognition and Retrieval XII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2005, San Jose, CA, pp. 208-215.

C73. "Performance Evaluation for Text Processing of Noisy Inputs," D. Lopresti, *Proceedings of the 20th Annual ACM Symposium on Applied Computing (Document Engineering Track)*, March 2005, Santa Fe, NM, pp. 759-763.

C74. "Leveraging the CAPTCHA Problem," D. Lopresti, *Proceedings of the Second International Workshop on Human Interactive Proofs*, May 2005, Bethlehem, PA, pp. 97-110.

C75. "The Effectiveness of Generative Attacks on an Online Handwriting Biometric," D. Lopresti and J. Raim, *Proceedings of the International Conference on Audio- and Video-based Biometric Person Authentication*, July 2005, Rye Brook, NY, pp. 1090-1099.

C76. "Mobile Interactive Support System for Time-Critical Document Exploitation," G. Nagy and D. Lopresti, *Symposium on Document Image Understanding Technology,* November 2005, College Park, MD, pp. 111-119.

C77. "Match Graph Generation for Symbolic Indirect Correlation," D. Lopresti, G. Nagy, and A. Joshi, *Document Recognition and Retrieval XIII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2006, San Jose, CA, pages 606706.1-606706.9.

C78. "Notes on Contemporary Table Recognition," D. Embley, D. Lopresti, and G. Nagy, *Proceedings of the Seventh IAPR International Workshop on Document Analysis Systems*, H. Bunke and A. L. Spitz, eds., Berlin: Springer-Verlag, 2006, pp. 164-175.

C79. "A Bioinformatics Approach to Identify Recoding Events of A-to-I RNA Editing," M. Strohmaier, S. Mass, D. Lopresti, R. Kaushal, W. Scheirer, and S. Hookway, *Proceedings of the IEEE 32nd Annual Northeast Bioengineering Conference*, April 2006, Easton, PA, pp. 209-210.

C80. "Interactive Document Processing and Digital Libraries," G. Nagy and D. Lopresti, *Proceedings of the Second International Conference on Document Image Analysis for Libraries*, April 2006, Lyon, France, pp. 2-11.

C81. "Biometric Authentication Revisited: Understanding the Impact of Wolves in

Sheep's Clothing," L. Ballard, F. Monrose, and D. Lopresti, *Proceedings of the Fifteenth USENIX Security Symposium*, July-August 2006, Vancouver, BC, Canada, pp. 29-41.

C82. "A Bioinformatics Approach to Identify Recoding Events of A-to-I RNA Editing," S. Maas, R. Kaushal, D. Lopresti, and M. Strohmaier, *Proceedings of the Computational Systems Bioinformatics Conference*, August 2006, Palo Alto, CA, pages 5 (CD-ROM).

C83. "A Maximum-Likelihood Approach to Symbolic Indirect Correlation," A. Joshi, G. Nagy, D. Lopresti, and S. Seth, *Proceedings of the Eighteenth International Conference on Pattern Recognition*, August 2006, Hong Kong, pp. 99-103.

C84. "Three Computationally Demanding Problems in Search of ASAP Solutions," *Proceedings of the Seventeenth IEEE International Conference on Application-specific Systems, Architectures and Processors*, September 2006, Steamboat Springs, CO, pp. 214-222 (invited paper).

C85. "Multi-Character Field Recognition for Arabic and Chinese Handwriting," D. Lopresti, G. Nagy, S. Seth, and X. Zhang, *Proceedings of the Summit on Arabic and Chinese Handwriting Recognition*, September 2006, College Park, MD, pp. 93-100. An extended version is to appear in Lecture Notes in Computer Science Vol. 4768, Berlin: Springer-Verlag, 2008.

C86. "Evaluating the Security of Handwriting Biometrics," L. Ballard, D. Lopresti, and F. Monrose, *Proceedings of the Tenth International Workshop on Frontiers in Handwriting Recognition*, October 2006, La Baule, France, pp. 461-466.

C87. "Evaluating Biometric Security: Understanding the Impact of Wolves in Sheep's Clothing," D. Lopresti, F. Monrose, and L. Ballard, *Proceedings of the First Korea-Japan Joint Workshop on Pattern Recognition*, November 2006, Jeju, Korea, pp. 15-24 (invited keynote paper).

C88. "Measuring the Impact of Character Recognition Errors on Downstream Text Analysis," D. Lopresti, *Proceedings of Document Recognition and Retrieval XV* (*IS&T/SPIE International Symposium on Electronic Imaging*), January 2008, San Jose, CA, pages 6815.0G.01-6815.0G.11.

C89. "Web-Based Multi-Observer Segmentation Evaluation Tool," Y. Zhu, X. Huang, D. Lopresti, R. Long, S. Antani, Z. Xue, and G. Thoma, *Proceedings of the Twenty-First IEEE International Symposium on Computer-Based Medical Systems*, June 2008, Jyväskylä, Finland, pp. 167-169.

C90. "Optical Character Recognition Errors and Their Effects on Natural Language Processing," D. Lopresti, *Proceedings of the ACM SIGIR Workshop on Analytics for Noisy Unstructured Text Data*, July 2008, Singapore, pp. 9-16.

C91. "Biometric Key Generation Using Pseudo-Signatures," L. Ballard, J. Chen, D. Lopresti, and F. Monrose, *Proceedings of the Eleventh International Conference on Frontiers in Handwriting Recognition*, August 2008, Montréal, Canada, pp. 646-651.

C92. "A Document Analysis System for Supporting Electronic Voting Research," D. Lopresti, G. Nagy, and E. Barney Smith, *Proceedings of the Eighth IAPR International Workshop on Document Analysis Systems*, IEEE Computer Society Press, September 2008, Nara, Japan, pp. 167-174.

C93. "Pseudo-Signatures as a Biometric," J. Chen, D. Lopresti, L. Ballard, and F. Monrose, *Proceedings of the Second IEEE International Conference on Biometrics: Theory, Applications and Systems*, September-October 2008, Arlington, VA, pages 6 (CD-ROM).

C94. "Ballot Mark Detection," E. Barney Smith, D. Lopresti, and G. Nagy, *Proceedings of the Nineteenth International Conference on Pattern Recognition*, December 2008, Tampa, FL, pages 4 (CD-ROM).

C95. "Mark Detection from Scanned Ballots," E. Barney Smith, D. Lopresti, and G. Nagy, *Proceedings of Document Recognition and Retrieval XVI* (*IS&T/SPIE International Symposium on Electronic Imaging*), January 2009, San Jose, CA, pages 7247-26.01-7247-26.10.

C96. "A Classifier Ensemble based on Performance Level Estimation," W. Wang, X. Huang, Y. Zhu, D. Lopresti, Z. Xue, R. Long, S. Antani, and G. Thoma, *Proceedings of the Sixth IEEE International Symposium on Biomedical Imaging*, June-July 2009, Boston, MA, pp. 342-345.

C97. "Interactive Polygons in Region-Based Deformable Contours for Medical Images," Y. Zhu, T. Shen, D. Lopresti, and X. Huang, *Proceedings of the Sixth IEEE International Symposium on Biomedical Imaging*, June-July 2009, Boston, MA, pp. 37-40.

C98. "Tools for Monitoring, Visualizing, and Refining Collections of Noisy Documents," D. Lopresti and G. Nagy, *Proceedings of the Third Workshop on Analytics for Noisy Unstructured Text Data*, July 2009, Barcelona, Spain, pp. 9-16.

C99. "Document Photography in Vitro," G. Nagy, B. Clifford, A. Berg, G. Saunders, E. Barney Smith, and D. Lopresti, *Proceedings of the Third International Workshop on Camera-Based Document Analysis and Recognition*, July 2009, Barcelona, Spain, pp. 26-33.

C100. "Camera-based Ballot Counter," G. Nagy, B. Clifford, A. Berg, G. Saunders, D.

Lopresti, and E. Barney Smith, *Proceedings of the Tenth International Conference on Document Analysis and Recognition*, July 2009, Barcelona, Spain, pp. 151-155.

C101. "Toward Resisting Forgery Attacks via Pseudo-Signatures," J. Chen, D. Lopresti, and F. Monrose, *Proceedings of the Tenth International Conference on Document Analysis and Recognition*, July 2009, Barcelona, Spain, pp. 51-55.

C102. "Document Analysis Support for the Manual Auditing of Elections," D. Lopresti, X. Zhou, X. Huang, G. Tan, *Proceedings of the Tenth International Conference on Document Analysis and Recognition*, July 2009, Barcelona, Spain, pp. 733-737.

C103. "Style-Based Ballot Mark Recognition," P. Xiu, D. Lopresti, H. Baird, G. Nagy, and E. Barney Smith, *Proceedings of the Tenth International Conference on Document Analysis and Recognition*, July 2009, Barcelona, Spain, pp. 216-220.

C104. "On the Usability and Security of Pseudo-Signatures," J. Chen and D. Lopresti, *Proceedings of Document Recognition and Retrieval XVII* (*IS&T/SPIE International Symposium on Electronic Imaging*), January 2010, San Jose, CA, pp. 7534-08.01 - 7534-08.10.

C105. "Document Analysis Issues in Reading Optical Scan Ballots," D. Lopresti, G. Nagy, and E. Barney Smith, *Proceedings of the Ninth IAPR International Workshop on Document Analysis Systems*, June 2010, Boston, MA, pp. 105-112.

C106. "Ruling Line Removal in Handwritten Page Images," D. Lopresti and E. Kavallieratou, *Proceedings of the Twentieth International Conference on Pattern Recognition*, August 2010, Istanbul, Turkey, pp. 2704-2707.

C107. "A Platform for Storing, Visualizing, and Interpreting Collections of Noisy Documents," B. Lamiroy and D. Lopresti, *Proceedings of the Fourth Workshop on Analytics for Noisy Unstructured Text Data*, October 2010, Toronto, Canada, pp. 11-18.

C108. "The Impact of Ruling Lines on Writer Identification," J. Chen, D. Lopresti, and E. Kavallieratou, *Proceedings of the Twelfth International Conference on Frontiers in Handwriting Recognition*, November 2010, Kolkata, India, pp. 439-444.

C109. "Characterizing Challenged Minnesota Ballots," G. Nagy, D. Lopresti, E. H. Barney Smith, and Z. Wu, *Document Recognition and Retrieval XVIII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2011, San Francisco, CA, pp. 787413-1 - 787413-10.

C110. "Parameter Calibration for Synthesizing Realistic-Looking Variability in Offline Handwriting," W. Cheng and D. Lopresti, *Document Recognition and Retrieval*

XVIII (IS&T/SPIE International Symposium on Electronic Imaging), January 2011, San Francisco, CA, pp. 78740Y-1 - 78740Y-10.

C111. "Using Perturbed Handwriting to Support Writer Identification in the Presence of Severe Data Constraints," J. Chen, W. Cheng, and D. Lopresti, *Document Recognition and Retrieval XVIII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2011, San Francisco, CA, pp. 78740G-1 - 78740G-8.

C112. "Ruling Line Detection and Removal," E. Kavallieratou, D. Lopresti, and J. Chen, *Document Recognition and Retrieval XVIII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2011, San Francisco, CA, pp. 78740V-1 - 78740V-7.

C113. "How Carefully Designed Open Resource Sharing Can Help and Expand Document Analysis Research," B. Lamiroy, D. Lopresti, H. Korth and J. Heflin, *Document Recognition and Retrieval XVIII (IS&T/SPIE International Symposium on Electronic Imaging)*, January 2011, San Francisco, CA, pp. 78740O-1 - 78740O-14.

C114. "Speech Biometric Mapping for Cryptographic Key Generation," K. Inthavisas and D. Lopresti, *Biometric Technology for Human Identification VIII (SPIE Defense, Security, and Sensing)*, April 2011, Orlando, FL, pp. 80291P-1 - 80291P-12.

C115. "Document Analysis Research in the Year 2021," D. Lopresti and B. Lamiroy, in *Modern Approaches in Applied Intelligence: Proceedings of the Twenty-Fourth International Conference on Industrial, Engineering and Other Applications of Applied Intelligent Systems*, June-July 2011, Syracuse, NY (invited paper), Lecture Notes in Artificial Intelligence Vol. 6703, Heidelberg: Springer, pp. 264-274.

C116. "Attacks on Speech Biometric Authentication," K. Inthavisas and D. Lopresti, *Proceedings of the International Conference on Image Processing, Computer Vision, and Pattern Recognition (IPCV 2011)*, July 2011, Las Vegas, NV, pp. 310-316.

C117. "Biometric Template Protection for Dynamic Time Warping-based User Authentication," K. Inthavisas and D. Lopresti, *Proceedings of the International Conference on Image Processing, Computer Vision, and Pattern Recognition (IPCV 2011)*, July 2011, Las Vegas, NV, pp. 303-309.

C118. "A Real-World Noisy Unstructured Handwritten Notebook Corpus for Document Image Analysis Research," J. Chen, D. Lopresti and B. Lamiroy, *Proceedings of the Joint Workshop on Multilingual OCR and Analytics for Noisy Unstructured Text Data (J-MOCR-AND 2011)*, September 2011, Beijing, China, 8 pages,

http://doi.acm.org/10.1145/2034617.2034620.

C119. "When is a Problem Solved?" D. Lopresti and G. Nagy, *Proceedings of the Eleventh International Conference on Document Analysis and Recognition (ICDAR 2011)*, September 2011, Beijing, China, pp. 32-36.

C120. "An Open Architecture for End-to-End Document Analysis Benchmarking," B. Lamiroy and D. Lopresti, *Proceedings of the Eleventh International Conference on Document Analysis and Recognition (ICDAR 2011)*, September 2011, Beijing, China, pp. 42-47.

C121. "Table Detection in Noisy Off-line Handwritten Documents," J. Chen and D. Lopresti, *Proceedings of the Eleventh International Conference on Document Analysis and Recognition (ICDAR 2011)*, September 2011, Beijing, China, pp. 399-403.

C122. "A Model-based Ruling Line Detection Algorithm for Noisy Handwritten Documents," J. Chen and D. Lopresti, *Proceedings of the Eleventh International Conference on Document Analysis and Recognition (ICDAR 2011)*, September 2011, Beijing, China, pp. 404-408.

C123. "Towards Improved Paper-based Election Technology," E. Barney Smith, D. Lopresti, G. Nagy, and Z. Wu, *Proceedings of the Eleventh International Conference on Document Analysis and Recognition (ICDAR 2011)*, September 2011, Beijing, China, pp. 1255-1259.

C124. "Evaluation of Voting with Form Dropout Techniques for Ballot Vote Counting," E. Barney Smith, S. Goyal, R. Scott, and D. Lopresti, *Proceedings of the Eleventh International Conference on Document Analysis and Recognition (ICDAR 2011)*, September 2011, Beijing, China, pp. 473-477.

C125. "Speech Cryptographic Key Regeneration Based on Password," K. Inthavisas and D. Lopresti, *Proceedings of the International Joint Conference on Biometrics (IJCB 2011)*, October 2011, Arlington, VA, 7 pages, DOI: 10.1109/IJCB.2011.6117553.

C126. "The Non-Geek's Guide to the DAE Platform," B. Lamiroy and D. Lopresti, *Proceedings of the Tenth IAPR International Workshop on Document Analysis Systems*, March 2012, Gold Coast, Australia, 6 pages.

C127. "Adapting the Turing Test for Declaring Document Analysis Problems Solved," D. Lopresti and G. Nagy, *Proceedings of the Tenth IAPR International Workshop on Document Analysis Systems (DAS 2012)*, March 2012, Gold Coast, Australia, 5 pages.

C128. "Model-based Tabular Structure Detection and Recognition in Noisy Handwritten

Documents," J. Chen and D. Lopresti, *Proceedings of the Thirteenth International Conference on Frontiers in Handwriting Recognition (ICFHR 2012)*, September 2012, Bari, Italy, pp. 75-80.

C129. "Optimal Data Partitioning for Semi-Automated Labeling," D. Lopresti and G. Nagy, *Proceedings of the Twenty-First International Conference on Pattern Recognition (ICPR 2012)*, November 2012, Tsukuba, Japan, pp. 286-289.

C130. "Exploiting Ruling Line Artifacts in Writer Identification," J. Chen and D. Lopresti, *Proceedings of the Twenty-First International Conference on Pattern Recognition (ICPR 2012)*, November 2012, Tsukuba, Japan, pp. 3737-3740.

C131. "Optimal Policy for Labeling Training Samples," L. Lipsky, D. Lopresti, and G. Nagy, *Proceedings of Document Recognition and Retrieval XX (IS&T/SPIE International Symposium on Electronic Imaging)*, February 2013, San Francisco, CA, pp. 865809-1 – 865809-9.

C132. "Boxy, Semi-Structured Document Elements," G. Nagy, D. W. Embley, and D. P. Lopresti, *Proceedings of the Tenth IAPR International Workshop on Graphics Recognition (GREC 2013)*, August 2013, Bethlehem, PA, 7 pages.

C133. "Alternatives for Page Skew Compensation in Writer Identification," J. Chen and D. Lopresti, *Proceedings of the Twelfth International Conference on Document Analysis and Recognition (ICDAR 2013)*, August 2013, Washington, DC, pp. 927-931.

C134. "The Lehigh Steel Collection: A New Open Dataset for Document Recognition Research," B. Bruno and D. Lopresti, *Proceedings of Document Recognition and Retrieval XXI (IS&T/SPIE International Symposium on Electronic Imaging)*, February 2014, San Francisco, CA, pp. 90210O-1 - 90210O-9.

C135. "Form Similarity via Levenshtein Distance Between Ortho-Filtered Logarithmic Ruling-Gap Ratios," G. Nagy and D. Lopresti, *Proceedings of Document Recognition and Retrieval XXI (IS&T/SPIE International Symposium on Electronic Imaging)*, February 2014, San Francisco, CA, pp. 902106-1 - 902106-8.

C136. "The DAE Platform: A Framework for Reproducible Research in Document Image Analysis," B. Lamiroy and D. Lopresti, *Proceedings of the First International Workshop on Reproducible Research in Pattern Recognition*, December 2016, Cancun, Mexico, Springer LNCS Vol. 10214, pp. 17-29.

C137. "A New Common Points Detection-Based Method for Classification of 2D and 3D Texts in Video/Scene Images," L. Nandanwar, P. Shivakumara, A. Kumar, T. Lu, U. Pal, and D. Lopresti, *Proceedings of the Fourteenth International Workshop on Document Analysis Systems (DAS 2020)*, July 2020, Wuhan, China

(virtual), Springer LNCS Vol. 12116, pp. 512-528.

C138. "A New Context-Based Method for Restoring Occluded Text in Natural Scene Images," A. Mittal, P. Shivakumara, U. Pal, T. Lu, M. Blumenstein, and D. Lopresti, *Proceedings of the Fourteenth International Workshop on Document Analysis Systems (DAS 2020)*, July 2020, Wuhan, China (virtual), Springer LNCS Vol. 12116, pp. 466-480.

C139. "A New Method for Detecting Altered Text in Document Images," L. Nandanwar, P. Shivakumara, U. Pal, T. Lu, D. Lopresti, B. Seraogi, and B. B. Chaudhuri, *Proceedings of the Second International Conference on Pattern Recognition and Artificial Intelligence (ICPRAI 2020)*, October 2020, Zhongshan City, China (virtual), Springer LNCS Vol. 12068, pp. 93-108.

C140. "Reproducibility: Evaluating the Evaluations," D. Lopresti and G. Nagy, *Reproducible Research in Pattern Recognition: Third International Workshop (RRPR 2020)*, January 2021, Milan, Italy (virtual), Springer LNCS Vol. 12636, pp. 12-23.

C141. "Local Gradient Difference Features for Classification of 2D-3D Natural Scene Text Images," L. Nandanwar, S. Palaiahnakote, R. Ramachandra, T. Lu, U. Pal, D. Lopresti, N. B. Anuar, *Proceedings of the Twenty-Fifth International Conference on Pattern Recognition (ICPR 2020)*, January 2021, Milan, Italy (virtual), IEEE Computer Society Press, pp. 1,112-1,119.

C142. "Chebyshev Harmonic Fourier Moments and Deep CNNs for Detecting Forged Handwriting," L. Nandanwar, S. Palaiahnakote, K. Sayani, U. Pal, T. Lu, D. Lopresti, *Proceedings of the Twenty-Fifth International Conference on Pattern Recognition (ICPR 2020)*, January 2021, Milan, Italy (virtual), IEEE Computer Society Press, pp. 6,562-6,569.

C143. "Competition and Collaboration in Document Analysis and Recognition," D. Lopresti and G. Nagy*, Proceedings of the Sixteenth International Conference on Document Analysis and Recognition (ICDAR 2021)*, September 2021, Lausanne, Switzerland (hybrid), Springer LNCS Vol. 12821, pp. 176-187.

Edited Publications and Other Articles (including invited and non-refereed)

O1. "Gene Matching Using Microcomputers," D. Lopresti, *Encyclopedia of Microcomputers*, vol. 7, New York: Marcel Dekker, 1991, pp. 419-431.

O2. Special Issue Editor, *SPIE/IS&T International Electronic Imaging Working Group Newsletter*, vol. 8, no. 2, June 1998.

O3. "Electronic Ink as First-Class Computer Data," D. Lopresti, *1999 McGraw-Hill Yearbook of Science and Technology*, pp. 96-98.

O4. "Information Retrieval," D. Lopresti and G. Wilfong, *2001 McGraw-Hill Yearbook of Science and Technology*, pp. 204-206.

O5. Guest Editor (with J. Hu and R. Kashi), Special Issue on Document Analysis Systems, *International Journal of Document Analysis and Recognition*, vol. 6, no. 3, March 2003.

O6. "Human/Machine Differentiation," H. Baird and D. Lopresti, *2005 McGraw-Hill Yearbook of Science and Technology*, pp. 144-147.

O7. "Act Now to Ensure Safe and Secure Elections," D. Lopresti, op-ed piece, *Lehigh Alumni Bulletin*, Fall 2007, pg. 89.

O8. Guest Editor (with C. Knoblock, S. Roy, and L. V. Subramaniam), Special Issue on Noisy Text Analytics, *International Journal of Document Analysis and Recognition*, vol. 10, nos. 3-4, December 2007.

O9. Guest Editor (with S. Roy, K. Schulz, and L. V. Subramaniam), Special Issue on Noisy Text Analytics, *International Journal of Document Analysis and Recognition*, vol. 12, no. 3, October 2009.

O10. Guest Editor (with J. Lladós and S. Uchida), Special Issue on Advanced Topics in Document Analysis and Recognition, *International Journal of Document Analysis and Recognition*, vol. 24, no. 3, September 2021.

Reviews (Book, Film, Software, Exhibit, Performance, etc.) and Notes

R1. Book review of *Image Description and Retrieval*, Enrico Vicario, ed., Plenum Press, Daniel Lopresti, in *Pattern Analysis & Applications*, vol. 4, no. 1, 2001, pp. 75-76.

Patents

P1. "Certifiable Optical Character Recognition," D. Lopresti, H. Korth, J. Sandberg, and R. Lipton, U.S. Patent No. 5,625,721, issued April 1997.

P2. "Certifiable Optical Character Recognition," D. Lopresti, H. Korth, J. Sandberg, and R. Lipton, U.S. Patent No. 5,703,972, issued December 1997.

P3. "Pictographic Bitmap Naming of Files in Pen-Based Computer Systems," D. Lopresti and A. Tomkins, U.S. Patent No. 5,734,882, issued March 1998.

P4. "A Method and Means for Enhancing Optical Character Recognition of Printed Documents," D. Lopresti and J. Sandberg, U.S. Patent No. 5,748,807, issued May 1998.

P5. "System and Method for Archiving Digital Versions of Documents and for Generating Quality Printed Documents Therefrom," D. Lopresti, J. Esakov, and J. Zhou, U.S. Patent No. 5,754,308, issued May 1998.

P6. "System and Method for Handwriting Matching Using Edit Distance Computation in a Systolic Array Processor," D. Lopresti, U.S. Patent No. 5,757,959, issued May 1998.

P7. "Multimedia Rendering Marker and Method," D. Lopresti and J. Sandberg, U.S. Patent No. 5,793,903, issued August 1998.

P8. "Method of Locating a Penstroke Sequence in a Computer," D. Lopresti and A. Tomkins, U.S. Patent No. 5,809,498, issued September 1998.

P9. "Document Search and Retrieval System with Partial Match Searching of User-Drawn Annotations," D. Lopresti, Y. Ma, and J. Zhou, U.S. Patent No. 5,832,474, issued November 1998.

P10. "Multimedia Rendering Marker and Method," D. Lopresti and J. Sandberg, U.S. Patent No. 5,852,684, issued December 1998.

P11. "A Clock-Free Two-Dimensional Barcode and Method for Printing and Reading the Same," D. Lopresti, J. Esakov, and J. Zhou, U.S. Patent No. 5,862,270, issued January 1999.

P12. "Video User's Environment," D. Lopresti, Y. Ma, A. Tomkins, and J. Zhou, U.S. Patent No. 5,889,506, issued March 1999.

P13. "Title, Caption and Photo Extraction from Scanned Document Images," J. Zhou and D. Lopresti, U.S. Patent No. 5,892,843, issued April 1999.

P14. "Method of Locating a Machine-Readable Two-Dimensional Barcode Within an Image," J. Zhou and D. Lopresti, U.S. Patent No. 5,974,200, issued October 1999.

P15. "Method and Means for Enhancing Optical Character Recognition of Printed Documents," D. Lopresti and J. Sandberg, U.S. Patent No. 6,047,093, issued April 2000.

P16. "A Clock-Free Two-Dimensional Barcode and Method for Printing and Reading the Same," D. Lopresti, J. Esakov, and J. Zhou, U.S. Patent No. 6,115,508, issued September 2000.

P17. "Border-less Clock Free Two-Dimensional Barcode and Method for Printing and Reading the Same," J. Zhou, D. Lopresti, and A. Tomkins, U.S. Patent No. 6,201,901, issued March 2001.

P18. "Storage Management System for Document Image Database," D. Lopresti, U.S. Patent No. 6,298,173, issued October 2001.

P19. "Identification of Logos from Document Images," J. Zhou, D. Lopresti, and P. Sarkar, U.S. Patent No. 6,327,388, issued December 2001.

P20. "Border-less Clock Free Two-Dimensional Barcode and Method for Printing and Reading the Same," J. Zhou, D. Lopresti, and A. Tomkins, U.S. Patent No. 6,418,244, issued July 2002.

P21. "Method for Identifying and Using Table Structures," J. Hu, R. Kashi, D. Lopresti, and G. Wilfong, U.S. Patent No. 7,054,871, issued May 2006.

P22. "Methods and Apparatus for Defending Against Telephone-based Robotic Attacks Using Random Personal Codes," H. Baird, J. Bentley, D. Lopresti, and S.Y. Wang, U.S. Patent No. 7,978,831, issued July 2011.

P23. "Methods and Apparatus for Defending Against Telephone-based Robotic Attacks Using Contextual-based Degradation," H. Baird, J. Bentley, D. Lopresti, and S.Y. Wang, U.S. Patent No. 8,005,197, issued August 2011.

P24. "Methods and Apparatus for Defending Against Telephone-based Robotic Attacks Using Permutation of an IVR Menu," H. Baird, J. Bentley, D. Lopresti, and S.Y. Wang, U.S. Patent No. 8,005,198, issued August 2011.

Patent Publications

PP1. "Method and Apparatus for Filtering E-mail Infected with a Previously Unidentified Computer Virus," M. R. Andrews, G. P. Kochanski, D. P. Lopresti and C. L. Shih, U.S. Patent Publication No. 20030204569A1, October 2003.

PP2. "Method and Apparatus for Providing Resource-Optimized Delivery of Web Images to Resource-Constrained Devices," D. P. Lopresti and Y. Wu, U.S. Patent Publication No. 20040120589A1, June 2004.

C. Honors and Awards

- A.B. Degree magna cum laude, Dartmouth College, 1982.
- Phi Beta Kappa Honorific Society, Dartmouth College, 1982.
- New Jersey Garden State Graduate Fellowship, Princeton University, 1982 – 1986.
- Gordon Bell Prize Honorable Mention (with W. Holmes), IEEE Software, 1989.

- Sigma Xi Honorific Society, 1991.

- Elected Senior Member of Institute of Electrical and Electronics Engineers, 2003.

- Alumni Council Award for Service to Princeton University, 2005.

- Class of 1961 Professorship, Lehigh University, 2005 – 2007.

- Election Verification Network Award (with A. Appel and D. Jones), 2015.

- TCFPGA Hall of Fame Class of 2018 (ACM/SIGDA Technical Committee on FPGAs): "SPLASH – Experience Building and Programming a Highly Parallel Programmable Logic Array," M. Gokhale, W. Holmes, A. Kopser, S. Lucas, R. Minnich, D. Sweely, and D. Lopresti, *IEEE Computer*, January 1991, pp. 81-89.

D. Research Funding and Training Grants

Competitively Awarded Research Grants

- "Research in Parallel VLSI Architectures," Principal Investigator, AT&T Foundation, $20,283, 1987.

- "Systolic Array Architectures for String Comparisons," Principal Investigator, NSF, $70,000, 1987 – 1989.

- "Multiparadigm Design Environments," Co-Principal Investigator (with J. Savage, E. Charniak, T. Doeppner, T. Dean, P. Kanellakis, L. Morgenstern, S. Reiss, A. van Dam, J. Vitter, P. Wegner, K. Zadeck, and S. Zdonik), NSF, $3,451,000, 1988 – 1992.

- "High-Performance Design Environments," Co-Principal Investigator (with J. Savage, E. Charniak, T. Doeppner, J. Hughes, P. Kanellakis, P. Klein, F. Preparata, S. Reiss, R. Tamassia, A. van Dam, P. van Hentenryck, J. Vitter, P. Wegner, K. Zadeck, and S. Zdonik), DARPA, $2,654,835, 1991 – 1994.

- "Investigations in Programmable Systolic Architectures," Principal Investigator, NSF, $180,882, 1991 – 1993.

- "Using Generative Models to Evaluate and Strengthen Biometrically Enhanced Systems," Co-Principal Investigator (with F. Monrose and M. Reiter), NSF, $287,950, 2004 – 2008.

- "Keystone Alliance (KA) for Homeland Security – Cyber Security," Co-Principal Investigator (with H. Korth), The Pennsylvania State University, $25,000, 2004 – 2006.

- "Following the Paper Trail: Reliable Processing of Voting Records for Trustworthy Elections," Co-Principal Investigator (with C. Borick, E. Barney Smith, Z. Munson, and G. Nagy), NSF, $200,000, 2007 – 2009.

- "PLATO: A System for Taming MADCAT (Multilingual Automatic Document Classification, Analysis, and Translation)," Co-Principal Investigator (with H. Baird) prior to 2011, Principal Investigator from 2011 onward, DARPA (via Raytheon BBN Technologies), $813,046 (requested over multiple years), 2007 – 2013.

- "Structuring, Reasoning, and Querying in a Very Large Medical Image Database," Co-Principal Investigator (with X. Huang, G. Tan, and G. Nagy), NSF, $392,000, 2008 – 2010.

Non-competitively Awarded and/or Internal Research Grants

- "Implicit and Multi-Modal CAPTCHAs," Co-Principal Investigator (with H. Baird), Avaya Labs Research, $30,000, 2005 – 2006.

- "Document Understanding: Survey and Evaluation of the State-of-the-Art," Co-Principal Investigator (with H. Baird), DARPA (via BBN Technologies), $115,926, 2005 – 2006.

- "National Resource for Document Analysis and Exploitation," Co-Principal Investigator (with H. Baird), FY2009 Department of Defense Appropriation (Defensewide RDT&E, Information and Communications Technology), $1,600,000, 2009 – 2010.

- "Multidisciplinary & Community Partnership to Develop a Mobile Applications for Enhancing the Provision of Home Visiting to Young Children who Experience Poverty" (with P. Manz, M. C. Chuah, L. Brook Sawyer, S. Woodhouse), Lehigh University Collaborative Research Opportunity Grant, $60,000, 2014 – 2015.

- "Sports and Evolution Lab," Co-Principal Investigator (with J. Pettegrew and Z. Munson), Lehigh Mountaintop Project, $31,500, Summer 2016.

- "Computing Community Consortium III," Co-Principal Investigator (with L. Bradley and A. Drobnis), National Science Foundation Cooperative Agreement (subaward beginning 2020 via Computing Research Association), $7,346,277, 2018 – 2022.

Competitively Awarded Training Grants

- Grant to support the fabrication of VLSI class projects, Principal Investigator, NSF, $2,925, 1989 – 1990.

- Grant to support the fabrication of VLSI class projects, Principal Investigator, NSF,

$3,520, 1990 – 1991.

- "A Facility for the Study of Computational Problems from Molecular and Population Biology," Co-Principal Investigator (with L. Brooks), Committee on Academic Computing, Brown University, $3,368, 1991.

- "1992 Brown/MIT Conference on Advanced Research in VLSI and Parallel Systems," Co-Principal Investigator (with C. Leiserson), NSF, $11,000, 1992.

- "The Undergraduate Science Education Program," Senior Personnel (with N. Simon and V. Ware, Principal Investigators), Howard Hughes Medical Institute, $1,800,000, 2006 – 2010.

- "Integrating Computational and Experimental Methods in the Analysis of Molecular Complexity in Nature," Co-Principal Investigator (with S. Maas), Lehigh Biosystems Dynamics Summer Institute (funding provided by Howard Hughes Medical Institute), Summer 2006.

- "A Combined Bioinformatics and Molecular Biological Approach for the Identification of Post-transcriptional Recoding Events in the Human Transcriptome," Co-Principal Investigator (with S. Maas), Lehigh Biosystems Dynamics Summer Institute (funding provided by Howard Hughes Medical Institute), Summer 2008.

- "Bioinformatics, Butterflies, and Penguins," Co-Principal Investigator (with S. Mullen), Lehigh Biosystems Dynamics Summer Institute (funding provided by Howard Hughes Medical Institute), Summer 2009.

- Pennsylvania Governor's School for Engineering and Technology, Team Pennsylvania Foundation, $120,000, 2014.

- "REU Site: The Lehigh Smart Spaces Project," Senior Personnel (with M. Chuah and J. Spletzer, Principal Investigators), NSF, $340,000, 2014 – 2017.

- "Identification of Driver Mutations in Experimental Evolution," Co-Principal Investigator (with G. Lang), Lehigh Biosystems Dynamics Summer Institute (funding provided by Howard Hughes Medical Institute), $44,375, Summer 2014.

Contract/Consulting Work

- KYOS Systems Inc., Canton, MA, research and development in online handwriting recognition, 2004 – 2007.

- Expert witness on behalf of the plaintiffs, Banfield v. Cortes, No. 922 A.2d 36 (Pa. Commw. Ct., 2007), filed August 2006. Deposed in August 2011. At issue: whether the Pennsylvania Secretary of State properly certified electronic voting equipment used throughout the state. Work with law firm Drinker Biddle & Reath as well as

independent counsels.

- Expert witness on behalf of the plaintiffs, National Association for the Advancement of Colored People State Conference of Pennsylvania, et al. v. Pedro A. Cortés, Secretary of the Commonwealth of Pennsylvania, et al., No. 08-5048 (US District Court, 2008), filed October 2008. At issue: whether emergency paper ballots can be used when less than all of the electronic voting machines in a precinct have failed on election day.

- Testifying expert witness on behalf of the plaintiffs, Nuance Communications v. Abbyy Software, No. 3:08-cv-02912 (U.S. District Court for the Northern District of California), 2008 – 2013. Work with law firms Wilson Sonsini Goodrich & Rosati and Morrison & Foerster. Deposed in January 2013; testified at jury trial in August 2013. In a separate but related matter, work with law firm Wolf, Greenfield & Sacks regarding US Patent Office actions.

- Designated as testifying expert witness on behalf of the plaintiffs, Secured Mail Solutions v. Advanced Image Direct, et al., No. SA-CV-01090 DOC (U.S. District Court for the Central District of California), 2013 – 2014. Work with law firm O'Melveny & Myers.

- Designated as testifying expert witness on behalf of the defendants, Thermo Fisher Scientific Inc., et al. v. Yourway Transport, Inc., et al., No. GD 2011-C-4631 (Common Pleas of Lehigh County, PA, Civil Division), 2013 – 2014. Work with law firms Weir & Partners, Karoly Law Firm, and Robert E. Goldman.

- Designated as testifying expert witness on behalf of the plaintiffs, Modevity LLC v. Findaway World (American Arbitration Association, ARBNo. 14 117 Y00633 13), 2014. Deposed in March 2014. Work with law firm Stradley, Ronin, Stevens & Young.

- Expert witness on behalf of the petitioner, Smartmatic v. Avante, Inter Partes Review before the US Patent and Trademark Office, 2019. Work with law firm DLA Piper.

- Designated as testifying expert witness on behalf of the patent owner, Election Systems & Software LLC v. Hart Intercivic Inc., Inter Partes Review before the US Patent and Trademark Office, Case No. TBD, 2020 – present. Work with law firm Baker Botts. Deposed in February 2021.

- Designated as testifying expert witness on behalf of the petitioner, Google LLC v. Human Differential Intelligence LLC, Inter Partes Review before the US Patent and Trademark Office, 2020. Work with law firm Wolf, Greenfield & Sacks. Settled January 2021.

- Designated as testifying expert witness on behalf of the defendant, Health Discovery Corporation v. Intel Corporation, Civil Action No. 6:20-cv-666, 2021. Work with law

firms King & Spalding and Perkins Coie. Resolved in favor of the defendant December 2021.

- Designated as testifying expert witness on behalf of the petitioner, Google LLC v. Defenders of the American Dream, LLC LLC, Inter Partes Review before the US Patent and Trademark Office, Case No. TBD, 2021 – present. Work with law firm Wolf, Greenfield & Sacks.

- Designated as testifying expert witness on behalf of the petitioner, Google LLC v. Nobots LLC LLC, Inter Partes Review before the US Patent and Trademark Office, Case No. TBD, 2022 – present. Work with law firm Wolf, Greenfield & Sacks.

- Designated as testifying expert witness, Commonwealth of Pennsylvania v. L and M Music, Inc. and Smokin' Joe's Tobacco Shop (Monroe County, PA), 2022. At issue: whether source code analysis is necessary to characterize the operation of a video slot machine.

- Designated as testifying expert witness on behalf of the petitioner, Nike Inc. v. Valmarc Corporation, Inter Partes Review before the US Patent and Trademark Office, Case Nos. IPR2022-01403 and IPR2022-01404, 2022 – present. Work with law firm DLA Piper.

- Designated as testifying expert witness on behalf of the plaintiff, Remi Laba v. JBO Worldwide Supply Pty Ltd, 2022. At issue: authenticity of a signed PDF contract.

- Designated as testifying expert witness on behalf of the defendants, Planner 5D v. Meta Platforms, Inc.; Facebook Technologies, LLC; The Trustees of Princeton University; et al., Case No. 3:19-cv-03132-WHO (SK), Case No. 3:20-cv-08261-WHO (SK) (U.S. District Court for the Northern District of California), 2021 – present. Work with law firms Kirkland & Ellis and Jenner & Block.

- Plus other intellectual property cases not disclosed for reasons of confidentiality.

- Expert witness in several separate academic integrity cases involving alleged programming assignment plagiarism at a large midwestern university, 2020 – 2021.

E. Editor/Editorial Review Board Membership for Scholarly Publications

- Editorial Board, *International Journal of Document Analysis and Recognition*, Springer-Verlag, 1997 – present.

- Co-Editor-in-Chief (with K. Kise and S. Marinai), *International Journal of Document Analysis and Recognition*, Springer-Verlag, 2014 – present.

- Associate Editor, *ACM SIGMOD Digital Symposium Collection (DiSC)*, 2004 – 2006.

- Associate Editor, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2005 – 2010.

- Area Editor, *Computer Vision and Image Understanding*, Elsevier, 2011 – present.

- Review Editor, *Frontiers in Digital Humanities: Cultural Heritage Digitization Section*, Open Access, 2015 – present.

F. Professional Presentations

Invited Presentations / Lectures / Colloquia / Workshops / Performances

- Invited Lectures: although too numerous to list, I estimate I have given 40 to 60 invited talks over my career to date. A recent memorable example surrounds a keynote talk I was invited to give on biometric security at the *First Korea-Japan Joint Workshop on Pattern Recognition* which was held in Jeju, Korea in 2006. While overseas, I gave two more invited technical talks, one at Tokyo University of Agriculture and Technology and another at Hitachi Central Research Laboratory. I was also asked to give an invited talk on the tenure system in the U.S. for high-level administrators, including the president, at Tokyo University of Agriculture and Technology. In June 2013 and May 2014, I delivered invited lectures at the *International Document Image Processing Summer School* in Fourni, Greece. In June 2015, I delivered an invited keynote lecture at the *Seventh Mexican Conference on Pattern Recognition*. In December 2015, I served as an invited panelist at the *Internet of Things World Forum* in Dubai, UAE. In August 2021, I gave an invited talk on "Synergies from Document Analysis" at the *79th Annual General Meeting of the American Society of Questioned Document Examiners*. In December 2021, I will give an invited talk on the societal benefits of AI at the *Forward Research and Innovation Summit* organized by the Puerto Rico Science, Technology and Research Trust.

- Participant in Conference Panel Sessions: I have served on 10 or more conference panel sessions over my career.

Organized or Chaired Sessions / Colloquia / Exhibits / Performances

- Chair of Conference Sessions: I have chaired dozens of conference sessions to date.

- Panel Session Organizer/Moderator, "Meta-Data: What Good is it?" (with F. R. Chen, S. Dennis, D. Doermann, and A. Tomkins), *Document Recognition and Retrieval VI (IS&T/SPIE International Symposium on Electronic Imaging)*, January 1999, San Jose, CA.

- Panel Session Organizer/Moderator, "Synergies Between Document Analysis Research and Digital Libraries" (with H. Baird, A. Downton, Y. LeCun, M. Nakagawa, and M.

Worring), *Sixth International Conference on Document Analysis and Recognition*, September 2001, Seattle, WA.

- Panel Session Organizer, "The E-voting Controversy: What are the Risks?" (with H. Stewart-Gambino, C. Borick, B. Freeman, S. Freeman, and M. A. Gould), Lehigh University Department of Computer Science, April 2006, Bethlehem, PA.

- Panel Session Organizer/Moderator, "Noisy Text Analytics: An Exercise in Futility?" (with S. Balakrishnan, H. T. Ng, and R. Srihari), *IJCAI Workshop on Analytics for Noisy Unstructured Text Data*, January 2007, Hyderabad, India.

- Moderator, Congressional briefing on "Intelligent Infrastructure" for the House Committee on Science, Space and Technology, with panelists H. Schulzrinne (Columbia University), M. Wansley (nuTonomy), N. Bliss (Arizona State University), and E. Mynatt (Georgia Tech), Jan. 30, 2018, Washington, DC.

- Moderator, panel session on ""Rethinking Approaches to Disaster Management and Public Safety With Intelligent Infrastructure" at the Annual Meeting of the American Association for the Advancement of Science, with panelists M. Dunaway (University of Louisiana, Lafayette), R. Murphy (Texas A&M University), and N. Venkatasubramanian (University of California, Irvine), Feb. 16, 2018, Austin, TX.

Other

- Invited Debate Participant, "Defect Models are Important to Advance the State-of-the-Art of Optical Character Recognition" (with H. S. Baird, R. Haralick, and G. Nagy), *Fifth Annual Symposium on Document Analysis and Information Retrieval*, April 1996, Las Vegas, NV.

G. Teaching and Advising

Courses Taught (since joining Lehigh)

- CSE 303, *Operating System Design*, Lehigh University, Fall 2003, 82 students enrolled in course (co-instructor with Donald Hillman).

- CSE 397-497, *Computational Issues in Molecular Biology*, Lehigh University, Spring 2004, 15 students enrolled in course.

- CSE 303, *Operating System Design*, Lehigh University, Fall 2004, 85 students enrolled in course (co-instructor with Donald Hillman).

- CSE 397-497, *Bioinformatics: Issues and Algorithms*, Lehigh University, Spring 2005, 15 students enrolled in course.

- CSE 303, *Operating System Design*, Lehigh University, Fall 2005, 66 students enrolled in course (co-instructor with Donald Hillman).

- CSE 397-497, *Special Topics in Bioinformatics*, Lehigh University, Fall 2005, 5 students enrolled in course.

- CSE 398-498, *Bioinformatics: Issues and Algorithms*, Lehigh University, Spring 2006, 16 students enrolled in course.

- Engr 005, *Introduction to Engineering Practice* (project supervisor), Lehigh University, Fall 2006, 43 students enrolled in project over two sessions.

- CSE 303, *Operating System Design*, Lehigh University, Fall 2006, 38 students enrolled in course.

- CSE 450, *Special Topics in Bioinformatics*, Lehigh University, Fall 2006, 5 students enrolled in course.

- CSE 097, *Intelligent Machine: The Computer in Popular Culture*, Spring 2007, 33 students enrolled in course.

- CSE 308-408, *Bioinformatics: Issues and Algorithms*, Lehigh University, Spring 2007, 19 students enrolled in course.

- Engr 005, *Introduction to Engineering Practice* (project supervisor), Lehigh University, Spring 2007, 38 students enrolled in project over two sessions.

- CSE 303, *Operating System Design*, Lehigh University, Fall 2007, 24 students enrolled in course.

- CSE 308-408, *Bioinformatics: Issues and Algorithms*, Lehigh University, Fall 2007, 8 students enrolled in course.

- CSE 098, *Intelligent Machine: The Computer in Popular Culture*, Spring 2008, 26 students enrolled in course.

- CSE 498, *Computing in My Country*, Spring 2008, 4 students enrolled in course.

- CSE 303, *Operating System Design*, Lehigh University, Fall 2008, 35 students enrolled in course.

- CSE 350-450, *Special Topics in Electronic Voting Systems*, Lehigh University, Fall 2008, 7 students enrolled in course.

- CSE 098, *Intelligent Machine: The Computer in Popular Culture*, Spring 2009, 24 students enrolled in course.

- CSE 308-408, *Bioinformatics: Issues and Algorithms*, Lehigh University, Spring 2009, 9 students enrolled in course.

- CSE 090, *Intelligent Machine: The Computer in Popular Culture*, Fall 2009, 20 students enrolled in course (first-year seminar in College of Arts & Sciences).

- CSE 130, *Technical Presentation*, Lehigh University, Spring 2010, 15 students enrolled in course.

- CSE 308-408, *Bioinformatics: Issues and Algorithms*, Lehigh University, Spring 2010, 8 students enrolled in course.

- CSE 090 / COGS 90, *Intelligent Machine: The Computer in Popular Culture*, Fall 2010, 23 students enrolled in course (first-year seminar in College of Arts & Sciences).

- CSE 303, *Operating System Design*, Lehigh University, Spring 2011, 18 students enrolled in course.

- CSE 497, *Research Methodologies and Tools*, Lehigh University, Fall 2011, 8 students enrolled in course.

- CSE 303, *Operating System Design*, Lehigh University, Spring 2012, 15 students enrolled in course.

- CSE 347-447, *Data Mining*, Lehigh University, Fall 2012, 25 students enrolled in course.

- CSE 252 / STS 252 / EMC 252, *Computers, Internet, and Society*, Lehigh University, Spring 2013, 52 students enrolled in course (co-instructor with Ron Crane).

- CSE 406, *Research Methods*, Lehigh University, Fall 2013, 6 students enrolled in course.

- CSE 347-447, *Data Mining*, Lehigh University, Spring 2014, 46 students enrolled in course.

- CSE 397, *Issues in Cybersecurity*, Fall 2015, 8 students enrolled in course.

- CSE 398-498, *Big Data Analytics*, Spring 2016, 5 students enrolled in course.

- CSE 001, *Breadth of Computing*, Fall 2016, 38 students enrolled in course.

- CSE 098, *Women in Technology*, Spring 2017, 18 students enrolled in course (co-instructor with Samantha Kahoe, Managing Director of Lehigh@NasdaqCenter).

- CSE 350, *Special Topics in Cloud Computing Security*, Spring 2017, 7 students enrolled in course.

- CSE 398-498, *Big Data Analytics*, Spring 2017, 8 students enrolled in course.

- CSE 001, *Breadth of Computing*, Fall 2017, 35 students enrolled in course.

- CSE 098, *Women in Technology*, Spring 2018 (co-instructor with Samantha Dewalt, Managing Director of Lehigh@NasdaqCenter), 14 students enrolled in course.

- CSB 098 / CSE 098, *Software Product Management*, Spring 2018 (co-instructor with Samantha Dewalt, Managing Director of Lehigh@NasdaqCenter), 15 students enrolled in course.

- CSE 398-498, *Big Data Analytics*, Spring 2018, 20 students enrolled in course.

- CSE 001, *Breadth of Computing*, Fall 2018, 34 students enrolled in course.

- CSE 098, *Women in Technology*, Spring 2019 (co-instructor with Samantha Dewalt, Managing Director of Lehigh@NasdaqCenter), 20 students enrolled in course.

- CSE 350-450, *AI for Social Good*, Spring 2019, 14 students enrolled in course.

- CSE 098, *Women in Technology and Innovation*, Spring 2020 (co-instructor with Samantha Walravens, author of *Geek Girl Rising*, and Samantha Dewalt, Managing Director of Lehigh@NasdaqCenter), 10 students enrolled in course.

- CSE 327, *Artificial Intelligence: Theory and Practice*, Spring 2020, 51 students enrolled in course.

- CSE 398, *Applying AI for Social Good*, Spring 2020, 9 students enrolled in course.

- CSE 398-498, *Big Data Analytics*, Fall 2020, 14 students enrolled in course.

- CSE 098, *Women in Technology and Innovation*, Spring 2021 (co-instructor with Samantha Walravens, author of *Geek Girl Rising*, and Samantha Dewalt, Managing Director of Lehigh@NasdaqCenter), 18 students enrolled in course.

- CSE 327, *Artificial Intelligence: Theory and Practice*, Spring 2021, 47 students enrolled in course.

- CSE 398-498, *Big Data Analytics*, Fall 2021, 16 students enrolled in course.

- CSE 327, *Artificial Intelligence: Theory and Practice*, Spring 2022, 47 students enrolled in course.

- CSE 349-449, *Big Data Analytics*, Fall 2022, 11 students enrolled in course.

- CSE 327, *Artificial Intelligence: Theory and Practice*, Spring 2023, 55 students enrolled in course.

Course or Curriculum Development (since joining Lehigh)

- When I first arrived at Lehigh, I revamped our teaching of operating systems (CSE 303) and taught the course a number of times before it was taken over by a newer faculty member. I then developed a new course on bioinformatics algorithms and taught it several times on an experimental basis; it is now a regular offering by the department (CSE 308/408), and was taken over by a colleague. This course is also cross-listed as an elective in the undergraduate Bioengineering program. In Spring 2007, I introduced a new course, titled "Intelligent Machine: The Computer in Popular Culture," which was designed to attract a broad range of students, not just CSE majors. I am also involved as a regular guest lecturer in an innovative survey course in the Life Sciences (BioS 095) as a result of HHMI support Lehigh has received over the years, which was taught for the first time in Fall 2007. In Spring 2008, I introduced another novel course named "Computing in My Country," a seminar that was aimed both at highlighting important advances in the field that are taking place outside of the United States as well as developing communication skills in our graduate students. In Fall 2008, I led a special topics course on electronic voting timed to coincide with the presidential election that year. In Fall 2015, I offered a new seminar course on cybersecurity that integrated technological, business, and policy issues. For Spring 2016, I developed a new course on big data analytics using Apache Spark and the Scala programming language, which has continued each Spring since then. For Spring 2017, I co-developed a new course on Women in Technology working with Samantha Kahoe from Lehigh and Tom Gillis, the co-founder and CEO of Bracket Computing, which was again be repeated in 2018, along with a new course on Software Product Management. Both of these courses made extensive use of a new telepresence room we created during the renovation of Mountaintop Building C, linking us with guest speakers who were experts in their areas in Silicon Valley. I also developed and lead the Software Engineering Track for the highly successful Lehigh Silicon Valley Program (LSV++). For 2018, we visited Lawrence Livermore National Laboratory, OSIsoft, Adobe, Cisco, Google, Plug & Play Tech Center, and Bracket Computing.

Independent Studies Taught (since joining Lehigh)

- Tyler Lund, "Civil War Letter Decryption," Computer Science Senior Project, Fall 2006.

- Joel Reisteter, "Voter Verified Paper Audit Trail: Audit Verification Program," Computer Science Senior Project, Fall 2006.

- Mark Weindling, “Test Procedures for an Electronic Voting System,” Computer Science Senior Project, Fall 2006.

- Semih Demribag, “Dissecting a Voting Machine,” Computer Science Senior Project, Fall 2007.

- Jeffrey Kleeblatt, “A System for 'Blind' Auditing of Paper Ballot Images,” Compuer Science Senior Project, Fall 2007.

- Andrew Plummer, “A Hybrid Voting Machine,” Computer Science Senior Project, Fall 2007.

- Arther Loder, “Advanced Readings in Computational Biology,” Graduate Independent Study, Spring 2004.

- Kris Molendyke, “Research in Speech-Based Computer Security,” Graduate Independent Study, Summer 2004.

- Deepthi Bollu, “A Web-Based Platform to Support Document Analysis Research,” Graduate Independent Study, Spring 2005.

- Mark Strohmaier, “Algorithms and Architectures to Support Investigations in RNA Editing Effects,” Graduate Independent Study, Fall 2006.

- Wen Cheng, “Issues in Bioinformatics,” Graduate Independent Study, Spring 2007.

- Mark Strohmaier, “Algorithms and Architectures to Support Investigations in RNA Editing Effects,” Graduate Independent Study, Spring 2007.

- Wen Cheng, “Grammar-Based Approaches for Describing 2-D RNA Secondary Structure,” Graduate Independent Study, Fall 2007.

- Keerati Inthavisas, “Generative Attacks on Behavioral Biometric Security,” Graduate Independent Study, Fall 2007.

- Nicholas Hinnerschitz, “A Web-Based Synthetic Ballot Generator,” Independent Spring 2008.

- Joseph Siefers, “Firmware Analysis of the Danaher 1242 Electronic Voting Machine,” Independent Study, Spring 2008.

- Paul Beruti, “Data Mining Applied to the Search for RNA Editing Events,” Eckardt Scholar Project, Fall 2008 – Spring 2009.

- Wen Cheng, “Techniques for Amplifying Offline Handwriting Datasets,” Graduate Independent Study, Fall 2008.

- Young Suk and Rebecca Rovner, “Cracking an Unsolved Civil War Cipher,” Computer Science Senior Project, Fall 2008.

- Michael Kott, “Document Analysis and Exploitation User Experience Enhancement,” Independent Study, Spring 2011.

- Barri Bruno, “The Lehigh Steel Collection,” Independent Study, Fall 2013.

- Zachary Daniels, “Solving Cross-Cut Document Shredder Puzzles,” Independent Study, Fall 2013.

- Connor Tench, “Investigations in Free Space Gesture Recognition,” Independent Study, Fall 2013.

- Daniel Andsager and Marc Greenspan, “Remote Sensing Blimp,” Computer Engineering Senior Project, Fall 2015 – Spring 2016.

- Hannah St. Lifer, “Data Mining from Social Network Sources,” CogSci Honors Thesis, Fall 2015 – Spring 2016.

- Casey Caruso, “Stow Away: A Personal Savings App,” Independent Study, Spring 2016.

- Lauren Mentzer, “Anime Tracking Application,” Independent Study, Summer 2016.

- Harry Eaton and Cameron Clifton, “Environmental Monitoring System,” Computer Engineering Senior Project, Fall 2016 – Spring 2017.

- Victoria Campell, JohnDerek Daniels, and Charles Sengor, “Investigations in Text Analytics,” Rapidly Accelerated Research Experience: a focused science immersion program for students from backgrounds underrepresented in STEM fields, funded through Lehigh/HHMI, Summer 2017.

- Robert Salay and Joshua Whitton, “Automatic Music Transcription,” Computer Science Senior Project, Fall 2017 (jointly supervised with Tom Collins, Psychology).

- Andrew Borghesani and Collin Messics, “IoT Automated Terrarium,” Computer Engineering Senior Project, Fall 2017 – Spring 2018.

- Jasmin Cornejo and Rafia Islam, “Interactive Learning Platform for Nano-Human Interfaces,” CSE Department REU, Summer 2020.

- Grant Armstrong, “Stylistic Imitation in First Person Shooter Games using Data Driven Spatial Analytics,” CogSci Honors Thesis, Fall 2020 – Spring 2021.

- Jasmin Cornejo, “Interactive Learning Platform for Nano-Human Interfaces (continuation of Summer REU),” Research Intern, California State University Louis Stokes Alliance For Minority Participation Program, Fall 2020 – Spring 2021.

- Jiageng Zheng, “Reinforcement Learning for the Game of Go,” Independent Study, Summer 2021, Summer 2022.

- Chloe Moros, Marcon Fellow, Summer 2022.

- Rakene Chowdhury, “Investigations in Machine Learning,” Independent Study, Fall 2022.

- Kendra Marable, “Investigations in AI Gaming,” Independent Study, Fall 2022.

Advising, Other than Research Direction (since joining Lehigh): Undergraduate

- Freshman Engineering Advisees: 10 students in 2004 – 2005, 13 students in 2005 – 2006, 13 students in 2006 – 2007, 10 students in 2007 – 2008, 13 students in 2008 – 2009, 12 students in 2009-2010, 11 students in 2010-11.

- CSE Majors (including IBE/CS): 8 students in 2003 – 2004, 8 students in 2004 – 2005, 8 students in 2005 – 2006, 4 students in 2006 – 2007, 11 students in 2007 – 2008, 14 students in 2008 – 2009, 13 students in 2009-2010, 13 students in 2010-11, 14 students in 2013-14.

- Masters in CS: 26 students in 2020 – 2021, 37 students in 2021 – 2022.

Advising, Research Direction (since joining Lehigh): PhD Thesis Committees

- Carolyn Buckley, Lehigh Department of Biological Sciences (advisor J. Schneider), “Metabolic and Hormonal Signals Involved in Food Deprivation Induced Hoarding and Hunger Motivation in Syrian Hamsters,” 2004 – 2006.

- Ashutosh Joshi, Department of Electrical, Computer, and Systems Engineering, Rensselaer Polytechnic Institute (advisor G. Nagy), “Symbolic Indirect Correlation Classifier,” 2004 – 2006.

- Baoning Wu (advisor B. Davison), “Finding and Fighting Search Engine Spam,” 2004 – 2007.

- Lucas Ballard, Department of Computer Science, Johns Hopkins University (advisor F. Monrose), “Secure Biometric Cryptographic Key Generators,” 2007 – 2008.

- Michael Moll (advisor H. Baird), “Voracious Classifiers,” 2006 – 2008.

- Lan Nie (advisor B. Davison), “Mining the Hyperlinks of the Web Graph,” 2006 –

2008.

- Erdem Arslan (advisor I. Laurenzi), Lehigh Department of Chemical Engineering, "Stochastic Approach to Engineering and Analysis of DNA-based Microarray Technology," 2006 – 2008.

- Dylan Dupuis, Lehigh Department of Biological Sciences (advisors S. Maas, M. Kuchka), "Alu Repetitive Elements Transcribed by RNA Polymerase III are A-to-I RNA Editing Targets," 2008 – 2012.

- Na Dai (advisor B. Davison), "Mining Web Dynamics for Search," 2011 – 2013.

- Hongsheng Li (advisor X. Huang), "Mathematical Models for Object Matching and Their Application to Computer Vision and Biomedical Imaging" 2011 – 2012.

- Ting Xu (advisor X. Huang), "Model-based Curvilinear Network Segmentation and Tracking toward Quantitative Microscopy," 2013 – 2016.

- Zobeir Raisi, Department of Systems Design Engineering, University of Waterloo (advisor J. Zelek), "Text Detection and Recognition in the Wild," 2022.

Advising, Research Direction: Master's Students Supervised

- James Meyers, "Automating Multi-Locus Viability Analyses for Human Linkage with 'Emilie'," Brown University, Master's Degree completed July 1991, now President and CEO of Framework, Inc.

- Dishant Patel, "Online Handwriting as a Biometric," completed September 2006.

- Ivan Stoev, "A Machine Learning Approach to Prediction of RNA Editing Events," completed May 2010.

Advising, Research Direction: PhD Students Supervised

- Cheryl Harkness, "An Approach to Uncertainty in VLSI Design," Brown University, PhD degree completed June 1990, first position with Hewlett-Packard Design Technology Center, most recently self-employed.

- Richard Hughey, "An Architecture for Programmable Systolic Arrays," Brown University, PhD degree completed June 1991, most recently Professor and Chair of Computer Engineering at UC Santa Cruz.

- Keerati Inthavisas, "Secure Speech Biometric Templates," PhD degree completed November 2011, most recently Lecturer in Computer Engineering at Rajamangala University of Technology Srivijaya, Thailand.

- Yaoyao Zhu, "Towards More Desirable Segmentations via User Interactions," PhD degree completed September 2012, most recently with Checkpoint Systems (co-advised with X. Huang).

- Jin Chen, "Information Preserving Processing of Noisy Handwritten Document Images," PhD degree completed May 2015, first position with Nuance Communications, most recently with Apple.

- Nathan Kern, "Frameworks and Algorithms for Automated Simulation Data Analysis," Fall 2017 – present (co-advised with W. Im).

Advising, Research Direction: Post-Docs Supervised

- Arti Taneja, "Investigations in Human-in-the-Loop Image Interpretation," Spring 2019 – Spring 2020 (co-advised with M. Harmer).

H. Service

Service to University

- Accompanied President Greg Farrington and other representatives of Lehigh on *Inside Lehigh* west coast fundraising trip, June 2004.

- Represented Lehigh at University of Pittsburgh's kick-off event for "Center of Excellence First Responder Consortium," April 2004.

- Participant in panel session at *Campaign for Lehigh* kick-off event: "Worldwide Threats: Converging Dangers in a Post 9/11 World" (with R. Blum, J. Bially Mattern, P. McHale, and A. Romig), October 2004.

- Faculty Steering Committee, RCEAS Representative, 2006 – 2010; Chair 2008 – 2009.

- Rules and Procedures Subcommittee of the Faculty Steering Committee, 2006 – 2010; Chair, 2007 – 2008.

- Barry M. Goldwater Scholarship Nomination Committee, 2006 – 2016.

- Department of Admissions, various undergraduate recruiting activities including serving as a featured speaker at "Lehigh Life Days" events, 2006 – present.

- Presidential Inauguration Committee, 2006 – 2007. University-wide coordinator for *An Exhibition of Student Research and Scholarship at Lehigh*, held April 12, 2007.

- Lehigh Strategic Thinking Initiative, Co-Chair of the Faculty & Staff Working Group

(with S. Cady), Spring 2008.

- Provost Search Committee, Fall 2008 – Spring 2009.
- Advisory Committee, *2009 Academic Symposium: A Tradition of Excellence*, held April 16, 2009.
- Advisory Committee, Lehigh Howard Hughes Medical Institute program, 2009 – present.
- Department Chairs Executive Committee, 2009 – 2014. 2016 – 2019; Chair, 2011 – 2012.
- Lehigh Strategic Plan Implementation, Co-Chair of the Cluster Development Working Group (with A. Anderson), Spring 2010.
- Lehigh / Universiti Teknologi Petronas (Malaysia) R&D Collaboration Working Committee, 2010 – 2011.
- University Nominations Committee, 2010 – 2013; Chair, 2011 – 2012.
- Lehigh Strategic Plan Implementation, Co-Chair of the Cluster Faculty Hiring Committee (with A. Anderson), Fall 2010 – Spring 2013. Led to the establishment of three faculty-conceived interdisciplinary clusters at Lehigh: Africana Studies, Integrated Networks for Electricity (SmartGrid), and Community Health.
- Accompanied Vice President of International Affairs Mohamed El-Aasser and other representatives of Lehigh on trip to develop research and educational collaborations with Malaysian universities, October 2010.
- Advisory Committee, *2011 Academic Symposium*, held March 29, 2011.
- Board of Trustees Academic Affairs Committee, 2011 – 2012 (faculty representative).
- Advisory Committee, *2013 Academic Symposium*, April 4, 2013.
- Lehigh Mountaintop Development Working Group, 2013 – 2015.
- University E-Security Committee; Governance, Risk Management and Compliance Oversight Group, Fall 2013 – present.
- Lehigh ADVANCE Male Allies for Gender Equity, Fall 2013 – present.
- Lehigh ADVANCE Leadership Team, Spring 2014 – present.
- Academic Infrastructure Working Group, 2016 – 2018.

- Consulting Committee, NEH Next Generation Humanities Ph.D. Planning Grant (awarded to Lehigh Departments of English and History), 2016 – 2017.

- As Director of the Data X Initiative, I provide support to strategic interdisciplinary faculty hiring activities across the university with emphasis on computing and data analytics and particular focus in the areas of data mining, cybersecurity, computer systems, consumer analytics, digital media, and connected health. I am also the primary faculty lead for the large-scale renovation of a massive former industrial building on Lehigh's Mountaintop campus to serve as the new home for Data X.

- Creator and leader of the Software Engineering Track for the highly successful Lehigh Silicon Valley Program (LSV++), 2017 – 2019.

- Steering Committee, IDEAS Program (Integrated Degree in Engineering, Arts, and Sciences), 2020 – present.

Service to College and Interdisciplinary Programs

- Bioengineering Graduate Program Committee, 2004 – 2019.

- RCEAS Bio, Environmental, and Molecular Engineering Advisory Council, 2006 – 2019.

- RCEAS Faculty Retreat Planning Committee, 2008 – 2009.

- RCEAS Workshop on Computational Engineering & Science Organizing Committee, October 2009.

- Global Citizenship Faculty Seminar participant, January 2007 – April 2007.

- Diversity Across the Curriculum Faculty Seminar participant, April 2009 – May 2009.

- RCEAS Council of Chairs, 2009 – 2019.

- RCEAS Professorship Appointment Committee, 2013.

- Co-leader of the Nano/Human Interfaces Presidential Engineering Research Initiative (with Martin Harmer, Jeffrey Rickman, Anand Jagota, and Kate Arrington), 2017 – present.

- Co-Chair, Bioengineering Department Chair Search Committee (with Xuanhong Cheng), Spring 2018.

- Bioengineering Department Chair Search Committee, Fall 2019 – Spring 2020.

- Master's Program Incentives Ad Hoc Committee, Fall 2020.

Service to Department

- CSE Department Faculty Recruiting Committee, where I helped to recruit Professor Henry Baird to Lehigh, 2003 – 2004.

- CSE Department Graduate Program Committee, where I helped to craft a major overhaul of our PhD program qualifier requirements designed to strengthen the quality of our pool of graduate students, 2003 – 2004.

- Chair of CSE Department Community Committee, which has instituted a series of successful "study breaks" to bring together faculty and students (especially undergraduates), 2004 – 2005.

- CSE Department Colloquium Committee, where I have invited and served as host for a number of speakers in our department seminar series, 2004 – 2005.

- I established a weekly "brown bag lunch" series that brings together faculty, staff, and students with interests in the area of digital libraries, 2004 – 2006.

- I have participated in Candidates' Day, Parents' Day, and information sessions for high school students considering Lehigh, 2004 – present.

- Chair of CSE Department Colloquium Committee, where I conceived and organized our Distinguished Seminar Series, 2005 – 2006.

- CSE Department Faculty Recruiting Committee, where I helped to recruit Professor Xiaolei Huang to Lehigh, 2005 – 2006.

- Chair of CSE Department Publicity and Undergraduate Recruiting Committee, 2006 – 2007, where I have organized outreach activities to local schools.

- Chair of CSE Department Faculty Recruiting Committee, where I helped to recruit Professor Gang Tan to Lehigh, 2007 – 2008.

- CSE Department Faculty Recruiting Committee, 2008 – 2009.

- CSE Department Graduate Admissions Committee, 2020 – present.

- Masters in Computer Science program: Director, 2020 – 2022; Co-Director (with C. Montella), 2023 – present.

- CSE Department Student Honors and Awards Committee: Chair, 2022 – present.

Professional: Offices and Committee Memberships Held in Professional Organizations

- Local Arrangements Chair, *Brown/MIT Conference on Advanced Research in VLSI and Parallel Systems*, Providence, RI, March 1992.

- Co-Chair (with J. Zhou), *Document Recognition V (IS&T/SPIE International Symposium on Electronic Imaging)*, San Jose, CA, January 1998.

- Local Arrangements Chair, Document Understanding Working Group Meeting, Murray Hill, NJ, August 1998.

- Co-Chair (with J. Zhou), *Document Recognition and Retrieval VI (IS&T/SPIE International Symposium on Electronic Imaging)*, San Jose, CA, January 1999

- Co-Chair (with J. Zhou), *Document Recognition and Retrieval VII (IS&T/SPIE International Symposium on Electronic Imaging)*, San Jose, CA, January 2000.

- Co-Chair (with P. Kantor and J. Zhou), *Document Recognition and Retrieval VIII (IS&T/SPIE International Symposium on Electronic Imaging)*, San Jose, CA, January 2001.

- Co-Chair (with J. Hu and R. Kashi), *Fifth International Workshop on Document Analysis Systems*, Princeton, NJ, August 2002.

- Co-Chair (with H. Baird), *Second International Workshop on Human Interactive Proofs*, Bethlehem, PA, May 2005.

- Founding Co-Chair (with C. Knoblock, S. Roy, and L. V. Subramaniam), *Workshop on Analytics for Noisy Unstructured Text Data (in association with the Twentieth International Joint Conference on Artificial Intelligence)*, Hyderabad, India, January 2007.

- Co-Chair (with S. Roy, K. Schulz, and L. V. Subramaniam), *Second Workshop on Analytics for Noisy Unstructured Text Data (in association with the Thirty-First International ACM SIGIR Conference)*, Singapore, July 2008.

- Co-Chair (with S. Roy, K. Schulz, and L. V. Subramaniam), *Third Workshop on Analytics for Noisy Unstructured Text Data (in association with the Tenth International Conference on Document Analysis and Recognition)*, Barcelona, Spain, July 2009.

- Program Co-Chair (with S. Chaudhury), *Second International Workshop on Multilingual OCR (in association with the Tenth International Conference on Document Analysis and Recognition)*, Barcelona, Spain, July 2009.

- Co-Chair (with P. Natarajan, V. Govindaraju, and D. Doermann), *Nineth International*

Workshop on Document Analysis Systems, Cambridge, MA, June 2010.

- Co-Chair (with R. Basili, C. Ringlstetter, S. Roy, K. Schulz, and L. V. Subramaniam), *Fourth Workshop on Analytics for Noisy Unstructured Text Data (in association with the Nineteenth ACM International Conference on Information and Knowledge Management)*, Toronto, Canada, October 2010.

- Co-Chair (with S. Chaudhury, L. Day, V. Govindaraju, P. Natarajan, C. Ringlstetter, and S. Roy), *Joint Workshop on Multilingual OCR and Analytics for Noisy Unstructured Text Data (in association with the Eleventh International Conference on Document Analysis and Recognition)*, Beijing, China, September 2011.

- Founding Chair, *IAPR 2011 Doctoral Consortium (in association with the Eleventh International Conference on Document Analysis and Recognition)*, Beijing, China, September 2011.

- Program Co-Chair, *Eleventh International Conference on Document Analysis and Recognition*, Beijing, China, September 2011.

- Track Co-Chair (with K. Kise), *Twenty-First International Conference on Pattern Recognition*, Tsukuba Science City, Japan, November 2012.

- Co-Chair (with C. Ringlstetter, L. Day, S. Roy, and L. V. Subramaniam), *Sixth Workshop on Analytics for Noisy Unstructured Text Data (in association with the Twenty-Fourth International Conference on Computational Linguistics)*, Mumbai, India, December 2012.

- Local Arrangements Chair, *Tenth IAPR International Workshop on Graphics Recognition*, Bethlehem, PA, August 2013.

- Executive Co-Chair, *Twelfth International Conference on Document Analysis and Recognition*, Washington, DC, August 2013.

- Program Co-Chair (with J. LLadós and M. Blumenstein), *Twelfth International Workshop on Document Analysis Systems*, Santorini, Greece, April 2016.

- Area Chair (Document Analysis, Biometrics and Pattern Recognition Applications), *Twenty-Third International Conference on Pattern Recognition*, Cancun, Mexico, December 2016.

- Program Co-Chair (with M. Liwicki, M. Coustaty, and B. Lamiroy), *International Workshop on Open Services and Tools for Document Analysis*, Kyoto, Japan, November 2017.

- Program Co-Chair (with D. Karatzas and C.V. Jawahar), *Fourteenth International Conference on Document Analysis and Recognition*, Kyoto, Japan, November 2017.

- WiDS Ambassador, Lehigh livestream for *Stanford Women in Data Science Conference*, March 2018, March 2019.

- Program Co-Chair (with B. Gatos, J-M Ogier, and K. Kise), *Thirteenth International Workshop on Document Analysis Systems*, Vienna, Austria, April 2018.

- Co-Chair (with B. Kerautret, M. Colom, B. Lamiroy, P. Monasse, J-M Morel, and H. Talbot), *Second Workshop on Reproducible Research in Pattern Recognition*, Beijing, China, August 2018.

- Area Chair (Document Analysis and Recognition), Publications Chair, *Twenty-Fourth International Conference on Pattern Recognition*, Beijing, China, August 2018.

- International Advisory Committee, *Third International Conference on Computer Vision & Image Processing*, Jabalpur, India, September-October 2018.

- Organizing Committee, *Code 8.7 Conference on Using Computational Science and Artificial Intelligence to End Modern Slavery*, UN Headquarters, New York, NY, February 2019.

- Tutorials Co-Chair (with J. Lladós), *Fifteenth International Conference on Document Analysis and Recognition*, Sydney, Australia, September 2019.

- Workshop Co-Chair, *CCC / Code 8.7 Workshop on Applying AI in the Fight Against Modern Slavery*, Washington, DC, March 2020.

- Program Co-Chair (with X. Bai and D. Karatzas), *Fourteenth International Workshop on Document Analysis Systems*, Wuhan, China (virtual), July 2020.

- Tutorials Chair, *Seventeenth International Conference on Frontiers in Handwriting Recognition*, Dortmund, Germany, September 2020.

- International Advisory Committee, *Fifth International Conference on Computer Vision & Image Processing*, Allahabad, India, October 2020.

- Area Chair (Document Analysis and Recognition), *Twenty-Fifth International Conference on Pattern Recognition*, Milan, Italy, January 2021.

- Co-Chair (with B. Kerautret, M. Colom, P. Monasse, J-M Morel, and H. Talbot), *Third Workshop on Reproducible Research in Pattern Recognition*, Milan, Italy, January 2021.

- Program Co-Chair (with J. Lladós and S. Uchida), *Sixteenth International Conference on Document Analysis and Recognition*, Lausanne, Switzerland, September 2021.

- International Advisory Committee, *Sixth International Conference on Computer Vision & Image Processing*, Punjab, India, December 2021.

- Doctoral Consortium Co-Chair (with V. Elgin), *Third International Conference on Pattern Recognition and Artificial Intelligence*, Paris, France, June 2022.

- International Advisory Committee, *International Conference on Computer Vision & Machine Intelligence*, Allahabad, India, August 2022.

- Co-Chair (with B. Kerautret, M. Colom, P. Monasse, J-M Morel, B. Perret, H. Talbot, and B. Yildiz), *Fourth Workshop on Reproducible Research in Pattern Recognition*, Montréal, Canada, August 2022.

- International Advisory Committee, *Seventh International Conference on Computer Vision & Image Processing*, Nagpur, India, November 2022.

- Doctoral Consortium Co-Chair (with V. Elgin), *Twenty-Seventh International Conference on Pattern Recognition*, Kolkata, India, December 2024.

- Scientific Advisory Board, KYOS Systems Inc., Canton, MA, June 2005 – 2007.

- Lehigh University Chapter of Sigma Xi Honorific Society: Secretary-Elect, 2005 – 2006; Secretary, 2006 – 2007.

- Board of Directors, Manufacturer's Resource Center, Allentown, PA, Sept. 2014 – Sept. 2016.

- Appointed Member, Northampton County Election Commission, First Term Jan. 2020 – Dec. 2021, Second Term Jan. 2022 – Dec. 2023.

- Leadership Team (Seed Fund Steering Committee), Northeast Big Data Innovation Hub, 2020 – 2021.

- International Association for Pattern Recognition (IAPR)*

  Conferences and Meetings Committee, 2003 – 2018, Chair 2014 – 2018; Technical Committee 11 ("Reading Systems") Chair 2009 – 2013; Treasurer (elected) 2018 – 2021; President (elected) 2021 – 2022; Past-President 2022 – present; Executive Committee 2018 – present; Advisory Committee 2022 – present; Ad Hoc Committee on IAPR 50th Anniversary Celebration, Chair 2022 – present.

  * *The IAPR is an international association of non-profit, scientific, and professional organizations (national, multi-national, or international in scope) concerned with research in pattern recognition, computer vision, and image processing. IAPR was established in January 1978 and currently consists of 50 national societies, bringing together nearly 10,000 researchers in these fields. The organizational structure of IAPR include 13 Standing Committees and 17 Technical Committees. IAPR sponsors or endorses several dozen conferences and workshops annually for the benefit of the*

international scientific community.

- Computing Research Association (CRA)*

  Board of Directors (ex officio), 2022 – present; Finance Committee, 2022 – present; Subcommittee on Socially Responsible Computing, 2023 – present.

  ** The Computing Research Association (CRA) has origins dating back to 1972 as the Computer Science Board. CRA counts among its members more than 200 North American organizations active in computing research: academic departments of computer science and computer engineering; laboratories and centers in industry, government, and academia; and affiliated professional societies (AAAI, ACM, CACS/AIC, IEEE Computer Society, SIAM, and USENIX).*

- Computing Research Association's Computing Community Consortium (CCC)*

  CCC Council, 2015 – present; Nominations Committee, 2017, Chair 2020 – 2022; Executive Committee, 2017 – present; Intelligent Infrastructure Task Force, Co-Chair with B. Zorn, 2017 – 2018, Co-Chair with E. Mynatt, 2018 – 2019; Cybersecurity and Cybercrime Task Force, 2018 – 2019, Chair 2019 – 2020; Roadmap for Artificial Intelligence Research Steering Committee, 2018 – 2019; Technology for a Connected and Distributed Life Task Force, 2020 – 2021; Visioning Workshop Ad Hoc Committee, Chair 2020 – 2021; CCC Council Vice Chair, 2020 – 2022; Computing Innovation Fellows Selection Committee, 2021; Security, Integrity, and Trust Task Force, 2021 – present; CCC Council Chair, 2022 – present.
- "Systems Computing Challenges in the Internet of Things" (CCC Whitepaper), R. Alur, E. Berger, A. W. Drobnis, L. Fix, K. Fu, G. D. Hager, D. Lopresti, K. Nahrstedt, E. Mynatt, S. Patel, J. Rexford, J. A. Stankovic, and B. Zorn, September 2015.
- "Smart Communities Internet of Things" (CCC Whitepaper), K. Nahrstedt, D. Lopresti, B. Zorn, A. W. Drobnis, E. Mynatt, S. Patel, and H. V. Wright, January 2016.
- "The Future of Computing Research: Industry-Academia Collaborations" (CCC Whitepaper), N. Boules, K. Douglas, S. Feldman, L. Fix, G. Hager, B. Hailpern, M. Hebert, D. Lopresti, B. Mynatt, Chris Rossbach, and Helen Wright, May 2016.
- "Safety, Security, and Privacy Threats Posed by Accelerating Trends in the Internet of Things" (CCC Whitepaper), K. Fu, T. Kohno, D. Lopresti, E. Mynatt, K. Nahrstedt, S. Patel, D. Richardson, and B. Zorn, February 2017.
- "Computing Community Consortium (CCC) Response to NITRD 'Smart Cities and Communities Federal Strategic Plan: Exploring Innovation Together'" (CCC Whitepaper), E. Mynatt, D. Lopresti, K. Nahrstedt, S. Patel, J. Rexford, and B. Zorn, March 2017.
- "A National Research Agenda for Intelligent Infrastructure" (CCC Whitepaper), E. Mynatt, J. Clark, G. Hager, D. Lopresti, G. Morrisett, K. Nahrstedt, G. Pappas, S. Patel, J. Rexford, H. Wright, and B. Zorn, March 2017.
- "Research Agenda in Intelligent Infrastructure to Enhance Disaster Management, Community Resilience and Public Safety" (CCC Whitepaper), M. Dunaway, R. Murphy, N. Venkatasubramanian, L. Palen, and D. Lopresti, March 2017.
- "Rethinking Approaches to Disaster Management and Public Safety with Intelligent Infrastructure" (AAAS Panel Session), M. Dunaway, R. Murphy, and N. Venkatasubramanian, with D. Lopresti moderator, Annual Meeting of the American Association for the Advancement of Science, Austin, TX, February 2018.

- Featured guest on several CCC Catalyzing Computing Podcasts, 2019.
- "Artificial Intelligence Research: A Community Roadmap" (AAAS Panel Session), Y. Gil, B. Selman, and D. Lopresti, with A. Drobnis moderator, Annual Meeting of the American Association for the Advancement of Science, Seattle, WA, February 2020.
- Co-Chair (with N. Bliss, M. Briers, A. Eckstein, J. Goulding, A. Mazumder, and G. Smith), CCC / Code 8.7 Workshop on Applying AI in the Fight Against Modern Slavery, Washington, DC, March 2020.
- "Computing Research Challenges in Next Generation Wireless Networking" (CCC Whitepaper), E. Bertino, D. Bliss, D. Lopresti, L. Peterson, and H. Schulzrinne, October 2020.
- "A Research Ecosystem for Secure Computing" (CCC Whitepaper), N. Bliss, L. A. Gordon, D. Lopresti, F. Schneider, and S. Venkatasubramanian, November 2020.
- "Pandemic Informatics: Preparation, Robustness and Resilience" (CCC Whitepaper), E. Bradley, W. Gropp, D. Lopresti, M. Marathe, and M. Moses, November 2020. Also addenda: "Pandemic Informatics: Vaccine Distribution, Logistics, and Prioritization," March 2021; "Pandemic Informatics: Variants of Concern (VOC)," April 2021.
- "Artificial Intelligence and Cooperation" (CCC Whitepaper), E. Bertino, F. Doshi-Velez, M. Gini, D. Lopresti, and D. Parkes, November 2020.
- "Next Wave Artificial Intelligence: Robust, Explainable, Adaptable, Ethical, and Accountable" (CCC Whitepaper), O. C. Jenkins, D. Lopresti, and M. Mitchell, November 2020.
- "A National Research Agenda for Intelligent Infrastructure: 2021 Update" (CCC Whitepaper), D. Lopresti and S. Shekhar, December 2020.
- "A National Discovery Cloud: Preparing the US for Global Competitiveness in the New Era of 21st Century Digital Transformation" (CCC Whitepaper), I. Foster, D. Lopresti, B. Gropp, M. Hill, and K. Schuman, April 2021.
- "CCC / Code 8.7 Applying AI in the Fight Against Modern Slavery" (CCC Whitepaper), D. Lopresti, N. Bliss, M. Briers, A. Eckstein, J. Goulding, A. Mazumder, and G. Smith, June 2021.
- CCC Liaison for Workshop on Artificial Intelligence / Operations Research, co-sponsored by CCC, INFORMS, and SIGAI, Virtual, September 2021.
- Co-Chair (with S. Banerjee, M. Gini, and H. Yanko), CCC Hybrid Workshop on Best Practices for Hybrid Workshops, Multiple Sites and Virtual, October 2021.
- "Response to RFI on Public and Private Sector Uses of Biometric Technologies" (CCC RFI Response), D. Danks, M. Gini, O. C. Jenkins, D. Lopresti, M. Mitchell, and K. Siek, January 2022.
- "Intelligent Infrastructure for All: Challenges and Opportunities" (AAAS Panel Session), M. Ryerson, A. Tomer, and C. Krintz, with S. Shekhar moderator and D. Lopresti co-organizer, Annual Meeting of the American Association for the Advancement of Science, Philadelphia, PA, February 2022.
- "Response to RFI to the Update of the National Artificial Intelligence Research and Development Strategic Plan" (CCC RFI Response), D. Danks, M. Gini, O. C. Jenkins, S. Koenig, D. Lopresti, M. Mitchell, K. Siek, U. Topcu, H. Yanco, and M. Hunter, March 2022.
- "'Meta Hybrid' Visioning Activity Report Out" (CCC Visioning Workshop Report), S. Banerjee, M. Gini, D. Lopresti, and H. Yanco, March 2022.

- "Reboot!" (CCC Panel Session at 2022 CRA Conference at Snowbird), S. Banerjee, N. Bliss, L. Bradley, W. Gropp, and D. Lopresti, July 2022.

  ** CCC was established in 2006 in response to an NSF solicitation indicating a desire to establish a Computing Community Consortium. The CCC proposal received letters of support from 132 Ph.D.-granting academic programs, 16 leading corporations, seven major national laboratories and research centers, and five professional societies in the field. CCC operates through a cooperative agreement between NSF and CRA, the Computing Research Association. Today, the CCC Council has 20 members serving 3-year staggered terms, representing the diverse nature of the computing research field. The mission of the CCC is to enable the pursuit of innovative, high-impact computing research that aligns with pressing national and global challenges. CCC is a major programmatic committee of the CRA.*

- Member of Conference Program Committees for: Second IAPR Workshop on Document Analysis Systems (October 1996), Third IAPR Workshop on Document Analysis Systems, (November 1998), Fifth International Conference on Document Analysis and Recognition (September 1999), IEEE Conference on Computer Vision and Pattern Recognition (June 2000), Seventh International Workshop on Frontiers in Handwriting Recognition (August 2000), Fourth IAPR Workshop on Document Analysis Systems (December 2000), International Workshop on Web Document Analysis (September 2001), Sixth International Conference on Document Analysis and Recognition (September 2001), Seventh International Workshop on Multimedia Information Systems (November 2001), Document Recognition and Retrieval IX (January 2002), Fourth International Workshop on Multimedia Information Retrieval (December 2002), Document Recognition and Retrieval X (January 2003), Workshop on Document Image Analysis and Retrieval (June 2003), Seventh International Conference on Document Analysis and Recognition (August 2003), Second International Workshop on Web Document Analysis (August 2003), Document Recognition and Retrieval XI (January 2004), International Workshop on Document Analysis for Digital Libraries (January 2004), Sixth International Workshop on Document Analysis Systems (September 2004), Document Recognition and Retrieval XII (January 2005), 20th Annual ACM Symposium on Applied Computing (March 2005), Third International Workshop on Web Document Analysis (August 2005), Eighth International Conference on Document Analysis and Recognition (August 2005), Third International Conference on Advances in Pattern Recognition (September 2005), International Conference on Cognition and Recognition (December 2005), Document Recognition and Retrieval XIII (January 2006), Seventh International Workshop on Document Analysis Systems (February 2006), 21st Annual ACM Symposium on Applied Computing (April 2006), 18th International Conference on Pattern Recognition (August 2006), Workshop on Analytics for Noisy Unstructured Text Data (January 2007), Document Recognition and Retrieval XIV (January-February 2007), 22nd Annual ACM Symposium on Applied Computing (March 2007), International Workshop on Advances in Pattern Recognition (July 2007), Ninth International Conference on Document Analysis and Recognition (September 2007), Document Recognition and Retrieval XV (January 2008), 23rd Annual ACM Symposium on Applied Computing (March 2008), 11th International Conference on Frontiers in Handwriting Recognition (August 2008), Eighth International Workshop

on Document Analysis Systems (September 2008), 19th International Conference on Pattern Recognition (December 2008), Document Recognition and Retrieval XVI (January 2009), 10th International Conference on Document Analysis and Recognition (July 2009), Document Recognition and Retrieval XVII (January 2010), 25th Annual ACM Symposium on Applied Computing (March 2010), 22nd International Conference on Tools with Artificial Intelligence (October 2010), 12th International Conference on Frontiers in Handwriting Recognition (November 2010), Document Recognition and Retrieval XVIII (January 2011), 26th Annual ACM Symposium on Applied Computing (March 2011), 11th International Conference on Document Analysis and Recognition (September 2011), 23rd International Conference on Tools with Artificial Intelligence (November 2011), Document Recognition and Retrieval XIX (January 2012), 27th Annual ACM Symposium on Applied Computing (March 2012), 10th IAPR International Workshop on Document Analysis Systems (March 2012), LREC Workshop: @NLP can u tag #user_generated_content ?! (May 2012), 13th International Conference on Frontiers in Handwriting Recognition (September 2012), 24th International Conference on Tools with Artificial Intelligence (November 2012), Document Recognition and Retrieval XX (February 2013), Biometric and Surveillance Technology for Human and Activity Identification X (Apr.-May 2013), 25th International Conference on Tools with Artificial Intelligence (November 2013), Document Recognition and Retrieval XXI (February 2014), 11th IAPR International Workshop on Document Analysis Systems (April 2014), Biometric and Surveillance Technology for Human and Activity Identification XI (April 2014), 22nd International Conference on Pattern Recognition (August 2014), 14th International Conference on Frontiers in Handwriting Recognition (September 2014), 26th International Conference on Tools with Artificial Intelligence (November 2014), Document Recognition and Retrieval XXII (February 2015), Biometric and Surveillance Technology for Human and Activity Identification XII (April 2015). 13th International Conference on Document Analysis and Recognition (August 2015), 27th International Conference on Tools with Artificial Intelligence (November 2015), Document Recognition and Retrieval XXIII (February 2016), 15th International Conference on Frontiers of Handwriting Recognition (October 2016), 23rd International Conference on Pattern Recognition (December 2016), Computing Research: Addressing National Priorities and Societal Needs (October 2017), International Workshop on Open Services and Tools for Document Analysis (November 2017), 14th International Conference on Document Analysis and Recognition (November 2017), 13th International Workshop on Document Analysis Systems (April 2018), 24th International Conference on Pattern Recognition (August 2018), First IEEE International Conference on Artificial Intelligence for Industries (September 2018), 15th International Conference on Document Analysis and Recognition (September 2019), Second IEEE International Conference on Artificial Intelligence for Industries (September 2019), Fifth Asian Conference on Pattern Recognition (November 2019), 17th International Conference on Frontiers in Handwriting Recognition (September 2020), Third IEEE International Conference on Artificial Intelligence for Industries (September 2020), International Symposium on Geometry and Vision (November 2020), 25th International Conference on Pattern Recognition (January 2021), Fourth International Conference on Artificial Intelligence for Industries (September 2021), 15th International Workshop on

Document Analysis Systems (May 2022), Third International Conference on Pattern Recognition and Artificial Intelligence (June 2022) 26th International Conference on Pattern Recognition (August 2022), Fifth International Conference on Artificial Intelligence for Industries (September 2022), First International Workshop on Election Infrastructure Security (September 2022), 29th IEEE International Conference on Image Processing (October 2022), 18th International Conference on Frontiers in Handwriting Recognition (December 2022), 17th International Conference on Document Analysis and Recognition (August 2023).

Other Non-Lehigh Committees, Commissions, Panels, etc.

- Department of Electrical and Computer Engineering, University of Miami, Industrial Advisory Committee, 2002.

- Department of Computer Science and Engineering, University of Notre Dame, External Assessment Committee, Fall 2013.

- Invited panelist, "The Benefits of ABET Accreditation to a Quality Computing Program," *ACM Technical Symposium on Computer Science Education (SIGCSE 2014)*, Atlanta, GA, March 2014.

- Invited panelist, "Nuts and Bolts of Managing a Department," *Computing Research Association (CRA) Conference at Snowbird*, Snowbird, UT, July 2014.

- Invited participant, Engineering Deans and Minority Engineering Program Strategic Retention Roundtable, *National Society of Black Engineers (NSBE) 41st Annual Convention*, Anaheim, CA, March 2015.

- Special Award Judge, *Intel International Science and Engineering Fair*, Pittsburgh, PA, May 2015.

- Panelist, "Perspectives and Practical Skills for Men as Advocates for Gender Equity (with R. Green, E. Holloway, A. Holmes, B. Kirkmeyer, K. Kokini, and Y, A. Minerick)," *122nd ASEE Annual Conference & Exposition*, Seattle, WA, June 2015.

- External Assessor in Image Processing and Artificial Intelligence, University of Malaya, Kuala Lumpur, Malaysia, 2015 – 2018.

- Department of Computer Science & Information Systems, Bradley University, Academic Program Review Committee, Spring 2018.

- Member of Steering Committee for City of Allentown's Comprehensive and Economic Development Plan, 2018 – 2019.

- Code 8.7 Organizing Committee, Using Computational Science and Artificial Intelligence to End Modern Slavery, 2019 – 2022.

- Advisor to University of Tampa on development of new Department of Computer Science, Fall 2019.

- External Evaluator to SUNY Polytechnic on development of new M.S. in Data Science

and Analytics degree program, Spring 2020.

- Department of Computer Science and Engineering, University of Notre Dame, External Assessment Committee, Fall 2020 (postponed due to COVID-19).

- George Mason University, Thematic Hires in Computing Proposal Review Committee, Fall 2020.

- Dartmouth College Harold C. Ripley ’29 Society, 2009 – present; Bartlett Tower Society, 2021 – present.

- Association of Princeton Graduate Alumni (APGA)*

  Governing Board, 1997 – 2011; Treasurer, 1998 – 2000; Vice President, 2004 – 2006; President, 2006 – 2008; Departmental Affairs Committee, Chair 2001 – 2003; Nominations and Awards Committee, 2004 – 2011; Executive Committee, 1998 – 2008; Andrew Fleming West Society, 2012 – present.

  ** APGA was founded in 1949 and is focused on building a strong community of Princeton graduate alumni. There are over 30,000 living graduate alumni, representing 30% of Princeton's total alumni body. The APGA connects and supports graduate alumni in scholarship, fellowship, and leadership, in the Nation's service and the service of humanity. The Governing Board of the APGA is responsible for developing, promoting, and executing APGA programs with the help of committee volunteers. To recognize the distinction of Graduate School alumni and parallel the undergraduate alumni presence at Alumni Day, the APGA established the James Madison Medal. First awarded in 1973, the Madison Medal recognizes an alumnus of the Graduate School who has had a distinguished career, advanced graduate education, and/or public service. At the same time the APGA continues to serve graduate alumni, it has also increased its support of current graduate students.*

- Princeton University Alumni Council

  Technology Advisory Committee, 1998 – 2017, Vice Chair 1999 – 2001, Chair 2001 – 2003; Alumni Council Executive Committee, 1999 – 2008, 2010 – 2011, 2021 – present; Planning & Review Committee, 2001 – 2003; Maclean Society, 2001 – present; Alumni Schools Committee, 2002 – present; Committee to Nominate Alumni Trustees*, 2008 – 2011; Chair 2010 – 2011; Service of Remembrance Committee, 2008 – present; Princetoniana Committee, 2019 – present, Vice Chair 2021 – present.

  ** First graduate alumnus ever selected to Chair the Committee to Nominate Alumni Trustees.*

- Princeton University Reunions

  P-rade Marshal, 2003 – present; P-rade Grand Marshal*, 2016 – 2018; P-rade FitzRandolph Gate Gatekeeper, 2019, 2022; Society of the Claw, 2016 – present.

  ** First graduate alumnus ever selected as the P-rade Grand Marshal.*

- Princeton University Stewardship Advisory Committee, 2008 – 2013.

- Princeton University Ad Hoc Committee on Leadership Engagement, 2014 – 2015.

- Princeton University Search Committee, Deputy Vice President for Alumni Affairs, 2018.

- Princeton University 1746 Society, 2021 – present.

Review Service Activities Not Listed Above

- Research Grant Review Service: American Association for the Advancement of Science; NSF Trustworthy Computing Panels; NSF CISE Instrumentation Panel; NSF Computing Research Infrastructure Panel; NSF Information and Intelligent Systems Panel; NSF Disrupting Operations of Illicit Supply Networks – Human Trafficking Panel; NSF Microelectronic Systems Architecture; NSF Experimental Systems; NSF Partnerships for Innovation – Cybersecurity Panel; NSF Civic Innovation Challenge; NSF Pathways to Enable Open-Source Ecosystems; Puerto Rico Science, Technology, and Research Trust; United States – Israel Binational Science Foundation; NIH Bridge to Artificial Intelligence (Bridge2AI); United States – Israel Binational Industrial Research and Development (BIRD) Foundation; NSF Partnerships for Innovation – Digital Health Panel.

- Journal Article Review Service: ACM Computing Surveys, ACM Transactions on Algorithms, ACM Transactions on Asian Language Information Processing, IEEE Transactions on Computers, IEEE Transactions on Medical Imaging, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on VLSI Systems, International Journal on Document Analysis and Recognition, Journal of the Association for Computing Machinery, Journal of Discrete Algorithms, Journal of Electronic Imaging, Journal of Image and Vision Computing, Journal of Parallel and Distributed Computing, Journal of Supercomputing, Journal of Visual Languages and Computing, Journal of VLSI Signal Processing, Journal of Web Engineering, Machine Vision and Applications Journal.

- Conference Paper Review Service: ACM Symposium on Applied Computing, American Association for the Advancement of Science Annual Meeting, Design Automation Conference, Document Recognition and Retrieval Conference, IEEE Conference on Computer Vision and Pattern Recognition, IEEE International Conference on Image Processing, IEEE International Symposium on Computer-Based Medical Systems, International Conference on Advances in Computing, International Conference on Computer Engineering & Systems, International Conference on Computer Processing of Oriental Languages, International Conference on Document Analysis and Recognition, International Conference on Parallel Processing, International Conference on Pattern Recognition, International Workshop on Document Analysis Systems, International Workshop on Document Image Analysis for Digital Libraries, International Workshop on Frontiers in Handwriting Recognition, International Workshop on Multimedia Information Retrieval, International Workshop on Multimedia Information Systems, International Workshop on Web Document Analysis, Workshop on Document Image Analysis and Retrieval, Biometric and Surveillance Technology for Human and Activity Identification, ASEE Collaborative Network for Engineering and Computing Diversity Conference.

- Other Review Service: AAAS 2022 Scientific Sessions Panels, AAAS 2023 Scientific

Sessions Panels.

Media

- Guest technical expert on electronic voting systems, WNJC's (1360AM) “Voice of the Voters” radio show hosted by Mary Ann Gould, October 25, 2006.

- Guest panelist for a discussion on electronic voting systems (with M. A. Gould and J. Passarella), NBC 10's (Philadelphia) “Live at Issue” hosted by Steve Highsmith, September 23, 2007.

- Guest technical expert on electronic voting systems, WNJC's (1360AM) “Voice of the Voters” radio show hosted by Mary Ann Gould, December 19, 2007.

- Guest panelist for a discussion on electronic voting systems (with S. Sterner, K. Kraft, S. Bannon-Shillea, and A. Brau), WFMZ 69's “Business Matters” hosted by Tony Iannelli, May 12, 2008.

- Radio interview on electronic voting systems, WDHP 1620 AM (Reef Broadcasting, U.S. Virgin Islands) hosted by Mario Moorhead, May 3, 2012.

- Quoted as an expert on document analysis in AP news story “Media Sometimes Try, Fail to Keep NSA's Secrets” by Raphael Satter, February 8, 2014.

- Quoted as an expert on cybersecurity in Morning Call news story “Hackers may have attacked Las Vegas Sands websites through Bethlehem's portal” by Matt Assad, February 18, 2014.

- Quoted as an expert on cybersecurity in Morning Call news story “Data breaches likely as hackers stay a step ahead” by Peter Hall, March 8, 2014.

- Quoted as an expert on cybersecurity in Morning Call column “Heartbleed computer bug shouldn't be dismissed” by Paul Muschick, April 16, 2014.

- Quoted as an expert on curricular development in data science in Information Week column “Universities Expand Curriculum To Meet Data Scientist Demand” by Lisa Morgan, December 16, 2015.

- Quoted as an expert on electronic voting in PCWorld column “If the election is hacked, we may never know” by Patrick Thibodeau, October 5, 2016.

- Quoted as an expert on electronic voting in Network World column “Technology confirms election ballot error is less than .001%” by Steven Max Patterson, October 20, 2016.

- Quoted as an expert on electronic voting in Philadelphia Inquirer online article “Most

Pa. voting machines are old, hackable, and will likely be used to count the 2020 votes" by Katlyn Alo and Jackie Botts, March 30, 2018. See also Peninsula Press article "Amid concerns over election interference, most Pennsylvania counties will continue to use vulnerable voting machines" by the same authors, April 2, 2018.

- Quoted as an expert on AI in the fight against human trafficking in Parentology online article "AI is Turning the Tables on Sex Traffickers" by Carmelo Spatazza, June 3, 2019.

- Quoted as an expert on electronic voting in a widely syndicated AP News story "Reliability of pricey new voting machines questioned" by Frank Bajak, February 23, 2020.

- Quoted as an expert on electronic voting in a Lifewire story "Voting Machines on eBay Could Pose Security Risk" by Sascha Brodsky, October 27, 2020.

- Quoted as an expert on cybersecurity in New England In-House story "Work-from-home creates new cybersecurity risk" by Melinda Rizzo, November 11, 2020.

- Radio interview on the impact of artificial intelligence, WDIY 88.1 FM (Lehigh Valley Public Radio) hosted by Prathysha Kothare, May 7, 2021.

- Quoted as an expert on technology for public safety in State Tech story "Radio Backhaul Could Enhance Police Data-Transfer Capability" by Adam Stone, February 16, 2022.

- Quoted as an expert on technology for public safety in WLVR / WITF / WESA (NPR) story "'COVID Alert PA' will be removed from app stores by end of July" by Megan Frank, July 12, 2022.

- Quoted as an expert on computer security in Wired story "Redacted Documents Are Not as Secure as You Think" by Matt Burgess, November 25, 2022.