Jennifer L. Newman
Curriculum Vitae

Associate Professor
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RESEARCH INTERESTS:
Mathematical image processing and algorithm development; texture analysis and synthesis; neural networks and other machine learning applications; steganography, steganalysis, camera identification, statistical digital image forensics with an emphasis on applications.

EDUCATION

Ph.D.	Mathematics	University of Florida, Gainesville, FL	1989
M.S.	Mathematics	University of Florida, Gainesville, FL	1986
B.A.	Physics	Mount Holyoke College, South Hadley, MA	1979

EMPLOYMENT HISTORY

DATE	TITLE	EMPLOYER
8/2004 – present	Associate Professor, Mathematics	Iowa State University, Ames, IA
1/2010 – 12/2017	Associate Chair, Mathematics	Iowa State University, Ames, IA
8/1995 – 7/2004	Associate Professor, Electrical & Computer Engineering	Iowa State University, Ames, IA
8/1989-7/1995	Assistant Professor, Electrical & Computer Engineering	Iowa State University, Ames, IA
5/1991-7/2004	Adjunct Associate Professor, Mathematics	Iowa State University, Ames, IA
8/2004 – present	Adjunct Associate Professor, Electrical & Computer Engineering	Iowa State University, Ames, IA
		Iowa State University, Ames, IA
1/2002–10/2002	Senior Research Scientist. Performed research reviews face recognition, steganography, and biometrics.	Internatl. Simulation & Training Systems, Des Moines, IA
Summer 1992	Participant, Air Force Office of Science Research, Summer Faculty Research Prog, Eglin Air Force Base, FL	Air Force Office of Science Research, US Government
1983-1989	Graduate Teaching and Research Assistant, Mathematics	Univ. of Florida, Gainesville, FL
7/1982 - 5/1983	Computer Systems Analyst, Univ. of Florida Foundation, Inc., Gainesville, FL.	Univ. of Florida Foundation, Inc., Gainesville, FL
6/1981 - 8/1982	Associate Geophysicist. Data processing group & field acquisition. Processed seismic data, simulated geophone array responses.	Texaco's Bellaire Research Laboratories, Inc., Houston, TX.
January 1979	Intern. Conducted analysis of solar energy air collector panels through computer simulation on existing software.	Total Environmental Action, Inc. Harrisville, NH

HONORS AND AWARDS

8/2021 – 8/2024	Scott Hanna Faculty Fellow in Mathematics ($30,000)
March 2019	Elevated to IEEE Senior membership in IEEE, March 5, 2019.

7/2017-12/2017	Faculty Professional Development Application ("Sabbatical"), at Carnegie Mellon University.
2001-2002	Iowa State University Provost award, "Study in a Second Discipline," to study molecular biology for applications in bioinformatics (only 6 awarded at ISU).
8/1995	1995 College of Engineering Award, Iowa State University, for "Young Engineering Faculty Research," $500 honorarium.
5/1993	Iowa State University Foundation Award for Early Achievement in Research. One award per year by Iowa State University, $1000 honorarium.
8/1989 - 8/1992	Rockwell Excellence Award to promote professional development ($11,250). Awarded through College of Engineering, Iowa State University, Ames, Iowa.
6/1987 - 8/1989	U.S. Air Force PhD Fellowship, nationally competitive. Through the Armament Laboratory at Eglin Air Force Base, FL.

Funding (over $24 million dollars in grants)

1. RTG: Combinatorics, Computation and Applications at Iowa State, National Science Foundation. PI: L. Hogben. Co-PIs: B. Lidicky, R. Martin, M. Young, J. **Newman**, $1,942,491. 5/1/2019-4/30/2024.
2. NIST Forensic Science Center of Excellence, NIST Centers of Excellence, Department of Commerce, PI: Alicia Carriquiry, Co-PIS: D. Ommen, Y. Guan, K. De Brabanter, H. Hofmann, J. **Newman**, $19,996,320. June 1, 2020 – May 31, 2025.
3. Improved Diagnosis of Severe Wind Occurrence through Machine Learning, NOAA, PI W. Gallus (ISU), Co-PIs: Dutta (Stat), Maitra (Stat), **Newman** (Math), Weber (Math). 7/1/19-6/30/22, $652,194.
4. J. **Newman**, Y. Guan. StegoDB: An Image Dataset for Benchmarking Steganalysis Algorithms. Center for Statistics and Forensic Evidence (CSAFE/NIST), PI (internal) J. Newman; Co-PI (Internal): Y. Guan (CprE). $199,162, July 1, 2016- June 30, 2017. $244,305, July 1, 2017-June 30, 2018. $187,500 July 1, 2018-June 30, 2019. $87,221 July 1, 2019-May 30, 2020. Total: $711,474.
5. Reverse Engineer of Android Stego Apps, Center for Statistics and Forensic Evidence (CSAFE/NIST), PI (Internal): J. **Newman**; Co-PI: Y. Guan (CprE). $27,941, Jan. 19, 2017-June 30, 2017.
   (*) Engineering LAS Online, Iowa State University. Internal funding to revise Math 535 for asynchronous online delivery, for Spring 2017 offering, funded Sep. 2016-Dec. 2016.
6. Y. Guan, J. **Davidson**, S. Kim, J. Wong. A Semi-automated Framework for Mission Assurance Modeling and Performance Impact Analysis, Security and Software Engineering Research Center (S2ERC). Awarded $53,556 for Jan. 1, 2012-Dec. 31, 2012.
7. **Davidson, J**. A Steganalyzer Package for Forensic Applications. National Institute of Justice, through Midwest Forensics Resource Center, $58,200, Jan. 1, 2009 – Dec. 31, 2009.
8. Bergman, C. and **Davidson, J**. An Artificial Neural Network for Wavelet Steganalysis, Midwest Forensics Resource Center, $79,000, Oct. 1, 2004 – Sep. 30, 2005. Extended through 6/2006.
9. **Davidson, J.L.,** Administrator of subcontract, for Dr. R. Barton, Principal Investigator, National Science Foundation, Career Grant, $8,670, Fall 2000.
10. **Davidson, J.L.,** Principal Investigator, with Dr. R. Barton, Co-PI, Office of Naval Research, "Multiresolution Representation and Analysis of Partially Ordered Markov Models," $292,986. January 1, 1999 - December 31, 2001.
11. **Davidson, J.L.,** Co-Investigator, with Dr. R. Barton, PI, Iowa State University, "Multiresolution Gray-Scale Representation for Partially-Ordered Markov Models," $15,122. January 1, 1999 - June 30, 2000.
12. **Davidson, J. L.**, Adjunct Faculty on "Application for Establishment of a Center of Academic Excellence in Information Assurance Education at Iowa State University," National Security Agency, D. Jacobson and J. Davis, Co-Directors, 1999.
13. **Davidson, J. L.**, Co-Investigator, with Dr. N. Cressie, PI, Office of Naval Research, "Inference for Spatial Stochastic Processes," $488,818. October 1995 - September 1998.

14. **Davidson, J. L.**, Co-Investigator, with Dr. N. Cressie, PI, Office of Naval Research, "Spatial Stochastic Processes with Image Algebra," $251,359. October 1992 - September 1995.
15. **Davidson, J. L.**, Co-Investigator, with Dr. N. Cressie, PI, National Science Foundation, "Spatial Statistics with Image Algebra," $95,013. September 1992 - August 1995.
16. **Davidson, J. L.**, Co-Principal Investigator with P. Mohapatra, ISU Carver Trust Grant, "Analysis of an Integrated Measure of Performance and Reliability of Multiprocessor Systems," $15,000, May 15, 1994 - July 31, 1995.
17. **Davidson, J. L.**, Co-Investigator, with Dr. N. Cressie, PI, National Security Agency, "The Development of Statistical Image Algebra," $74,918. June 1992 - May 1994.
18. **Davidson, J. L.**, Principal Investigator, Air Force Office of Scientific Research (AFOSR), Research Initiation Program, "Performing Target Classification Using Fuzzy Morphology Neural Networks," $19,999. January 1993 -December 1993.
19. **Davidson, J. L.**, Principal Investigator, ISU EECPE Dept., Research & Teaching Software Support Grant, $575, May 1993.
20. **Davidson, J. L.**, Principal Investigator, Project Vincent Proposal for Workstations 1993-94, requested 2 workstations, EECPE Department received a block of 18, 1993.
21. **Davidson, J. L.**, Principal Investigator, National Science Foundation Initiation Award, "Applications of Lattice Theory to Transform Decomposition and Neural Networks," $69,950. June 15, 1990 - Nov. 30, 1992.
22. **Davidson, J. L.**, Principal Investigator, "Parallelizing FORTRAN Code Using Image Algebra (An Equipment Request)," Engineering Research Institute, Iowa State University, $1350. October 1991 - June 1992.
23. **Davidson, J. L.**, Co-Principal Investigator with G. Sheblé, "An Application of Artificial Neural Networks to Analyze the Security of a Transient-Voltage Limited Network," Electric Power Research Center, $20,100. January 1991 - December 1991.
24. **Davidson, J. L.**, Principal Investigator, with N. Cressie, Statistics. University Research Grant. "A Proposal for the Development of Statistical Image Algebra," $7,500. June 1, 1990 - December 31, 1990.
25. **Davidson, J. L.**, "Application of Neural Networks and Image Algebra to Flaw Characterization," Engineering Research Institute at Iowa State University, $3105. September 1989 - June 1990.
26. **Davidson, J. L.**, Principal Investigator, Air Force Office of Scientific Research (AFOSR), "The Development of Image Complexity Measures and Their Use in Selection of Optimum Edge Detection Algorithms." Advisor, Dr. G. X. Ritter, was Co-PI on this grant. $18,765. May 1987 - December 1987.

PUBLICATIONS

Refereed journal articles: (* = Student)

1. Reinders, S, Guan, Y, Ommen, D, Newman, J. Source-anchored, trace-anchored, and general match score-based likelihood ratios for camera device identification. *J Forensic Sci*. 2022; 67: 975– 988 (14 pages). https://doi.org/10.1111/1556-4029.14991
2. Steenhoek, L, Misra, M., Batchelor, W., **Davidson, J.** "Probabilistic Neural Networks for Segmentation of Features in Corn Kernel Images," Applied Engineering in Agriculture, **17** (2), pp. 225-234 (10 pgs), (2001).
3. **Davidson, J. L.**, Cressie, N., and Hua,* X., "Texture Synthesis and Pattern Recognition for Partially Ordered Markov Models," special issue on *Random Sets*, Pattern Recognition, **32**, pp. 1475-1505 (10 pgs), (1999).
4. Cressie, N. and **Davidson, J. L.** "Image Analysis with Partially Ordered Markov Models," Computational Statistics and Data Analysis, **29**, pp. 1-26 (26 pgs), (1998).
5. Meyer,* T., Davis, J., and **Davidson, J. L.**, "Analysis of Load Average and its Relationship to Program Run Time on Networks of Workstations," Journal of Parallel and Distributed Computing, **44**, pp. 141-146 (6 pgs), (1997).
6. Helterbrand,* J. D., Cressie, N., and **Davidson, J. L.**, "Optimal Closed Boundary Identification in Gray-Scale Imagery," Journal of Mathematical Imaging and Vision, **5** (3), pp. 179-206, September (28 pgs), (1995).

7. Helterbrand,* J. D., Cressie, N., and **Davidson, J. L.**, "A Statistical Approach to Identifying Closed Object Boundaries in Images," Advances in Applied Probability, **26**, pp. 831-854 (24 pgs), (1994).
8. Zhou,* Q**., Davidson, J. L.**, and Fouad, A. A., "Application of Artificial Neural Networks in Power System Security and Vulnerability Assessment," IEEE Trans. on Power Systems, **9** (1), pp. 525-532, (8 pgs), February (1994).
9. **Davidson, J. L.**, "Classification of Lattice Transformations in Image Processing," Computer Vision, Graphics, and Image Processing/Image Understanding, **57** (3), pp. 293-306, (14 pgs), May (1993).
10. **Davidson, J. L**. and Hummer,* F., "Morphology Neural Nets: An Introduction with Applications," Circuits, Systems, and Signal Processing special issue on Networks for Neural Processing, **12** (2), pp. 177-210, (34 pgs), (1993).
11. **Davidson, J. L.**, "Nonlinear Matrix Decompositions and an Application to Parallel Processing," Journal of Mathematical Imaging and Vision, **1** (2), pp. 169-192, (24 pgs), July (1992).
12. **Davidson, J. L.** and Sun,* K., "Opening Template Learning in Morphological Neural Nets," Heuristics, the Journal of Knowledge Engineering, **5** (2), pp. 28-36, (9 pgs), Summer (1992).
13. Ritter, G.X., Wilson, J. N., and **Davidson, J. L.**, "Image Algebra: An Overview," Journal for Computer Vision, Graphics, and Image Processing, **49** (3), pp. 297-331, (35 pgs), March (1990).

Book Chapters
1. **Davidson, J. L.**, "Thinning and Skeletonizing," a book chapter in Image Processing: Fundamentals and Applications, pp. 143-166, E. Dougherty, ed., Marcel Dekker, NY, 1994. (24 pages)
2. **Davidson, J. L.**, "Foundation and Applications of Lattice Transforms in Image Processing," a book chapter in "Advances in Electronics and Electron Physics," P. Hawkes, ed., Vol. 84, pp. 61-130. Academic Press, 1992. (70 pages)

Encyclopedia Entries
1. Cressie, N. and **Davidson, J. L**. Image processing: An entry in the Encyclopedia of Statistical Sciences (Update). Encyclopedia of Statistical Sciences, Update Vol. 2, eds. S. Kotz, C.B. Read, and D.L. Banks. Wiley, NY, pp. 691- 699, 1998. (Also appears as Statistical Laboratory Preprint No. 95-31, Iowa State University, Ames, IA.)

Proceedings – Refereed Extended Abstract with full paper published, with presentations:
1. Stephanie Reinders, Li Lin, Wenhao Chen, Yong Guan, Jennifer Newman, "Score-based likelihood ratios for camera device identification" in Proc. IS&T Int'l. Symp. on Electronic Imaging: Media Watermarking, Security, and Forensics, 2020, pp 215-1 - 215-8, https://doi.org/10.2352/ISSN.2470-1173.2020.4.MWSF-215
2. Jennifer Newman, Li Lin, Wenhao Chen, Stephanie Reinders, Yangxiao Wang, Min Wu, Yong Guan, "StegoAppDB: a Steganography Apps Forensics Image Database" in Proc. IS&T Int'l. Symp. on Electronic Imaging: Media Watermarking, Security, and Forensics, 2019, pp 536-1 - 536-12, https://doi.org/10.2352/ISSN.2470-1173.2019.5.MWSF-536
3. Stephanie Reinders*, Li Lin, Yong Guan, Min Wu, Jennifer Newman, "Algorithm Mismatch in Spatial Steganalysis" in Proc. IS&T Int'l. Symp. on Electronic Imaging: Media Watermarking, Security, and Forensics, 2019, pp 535-1 - 535-11, https://doi.org/10.2352/ISSN.2470-1173.2019.5.MWSF-535
4. Li Lin*, Jennifer Newman, Stephanie Reinders, Yong Guan, Min Wu, "Domain Adaptation in Steganalysis for the Spatial Domain" in Proc. IS&T Int'l. Symp. on Electronic Imaging: Media Watermarking, Security, and Forensics, 2018, pp 319-1 - 319-9, https://doi.org/10.2352/ISSN.2470-1173.2018.07.MWSF-319

Refereed proceeding publications – major conferences
1. W. Chen*, L. Li, J. Newman, Y. Guan. Automatic Detection of Android Steganography Apps via Symbolic Execution and Tree Matching, 9th IEEE Conference on Communications and Network Security (CNS 2021), (9 pgs), virtual conference, 2021. (around 30% acceptance rate)

2. L. Lin*, W. Chen, Y. Wang, S. Reinders, M. Wu, Y. Guan, J. Newman. "The Impact of Exposure Settings in Digital Image Forensics," *2018 25th IEEE International Conference on Image Processing (ICIP),* Athens, Greece, pp. 540-544, (5 pgs), 2018. (30% acceptance rate)

3. W. Chen*, L. Lin, M. Wu, Y. Guan, and J. Newman. "Tackling Android Stego Apps in the Wild," *2018 Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC)*, Honolulu, HI, pp. 1564-1573, (10 pgs), 2018.

4. W. Chen, Y. Wang, Y. Guan, J. Newman, L. Lin, and S. Reinders*. "Forensic analysis of android steganography apps," In G. Peterson and S. Shenoi, eds., Advances in Digital Forensics XIV, Cham. Springer Int'l. Publishing, pp. 293-312, (20 pgs), 2018.

5. **J. Davidson presented,** P. Paranjape, Double-compressed jpeg detection in a steganalysis system. 2012 ADFSL Conference on Digital Forensics, Security and Law, Richmond, VA, May, 2012.

6. **J. Davidson presented,** Jalan, J. Steganalysis using Partially Ordered Markov Models, 12th Information Hiding Conference, Calgary, Canada, LNCS, Volume 6387/2010, pp. 118-132, (15 pgs), 2010.

7. **Davidson, J**., Jalan*, J. Canvass - A Steganalysis forensic tool for JPEG images, 2010 ADFSL Conference on Digital Forensics, Security and Law, St. Paul, MN, May 2010 (10 pgs).

8. **J. Davidson presented,** Jalan, J. Feature Selection for Steganalysis using the Mahalanobis Distance Measure, Proceedings of SPIE - The International Society for Optical Engineering, vol. 7541, Media Forensics and Security XII, San Jose, CA, 2010 (12 pgs).

9. **J. Davidson presented,** Bergman, C., and Bartlett, E. An artificial neural network for wavelet steganalysis, Proceedings of SPIE - The International Society for Optical Engineering, vol. 5916, Mathematical Methods in Pattern and Image Analysis, 2005, pp. 1-10. (10 pgs).

10. **Davidson, J presented**, Minimax eigenvector decomposition for data hiding, Mathematics of Data/Image Coding, Compression, and Encryption VIII, with Applications, Proc. SPIE Vol. 5915, San Diego, CA, pp. 59150T1-10, (10 pgs), (2005).

11. Bergman, C., **Davidson, J. presented**, Unitary embedding for data hiding with the SVD, Security, Steganography, and Watermarking of Multimedia Contents VII, SPIE Vol. 5681, San Jose, CA, pp. 619-630 (12 pgs), (2005).

12. **Davidson**, J, Ashlock, D., Thompson,* R., Protein Structure Matching by Genetic Algorithm, 2000 International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences, Las Vegas, pp. 225-231 (7 pgs), (2000).

13. Ashlock*, D and **Davidson J.**, Texture Synthesis with Tandem Genetic Algorithms using Nonparametric Partially Ordered Markov Models, Proceedings of the 1999 Congress on Evolutionary Computation, Washington, D.C., pp. 1157-1163 (7 pgs), (1999).

14. Steenhoek*, L, Misra, M, Batchelor, W. and **Davidson, J.**, Probabilistic Neural Networks for Segmentation of Features in Corn Kernel Images, Paper No. 99-3198, 1999 American Society of Agricultural Engineers/Canadian Society of Agricultural Engineers-ASAE/CSAE/SGCR Annual International Meeting, 2950 Niles Rd., St. Joseph, MI 49085-9659, July (1999).

15. **Davidson, J.L presented**., Ashlock, D.. Lexicodes of foot patterns for mine detection, in Mathematical Modeling and Estimation Techniques in Computer Vision, F. Prêteux, J. Davidson, E. Dougherty, Eds., Proceedings of SPIE Vol. 3457, pp. 242-250 (9 pgs), (1998).

16. **Davidson, J.L.**, and Allen*, C. Steganography using the Minimax Eigenvalue Decomposition, in Mathematical Methods of Data Coding, Compression, and Encryption, M. Schmalz, Ed., Proceedings of SPIE Vol. 3456, pp. 13-24 (12 pgs), (1998).

17. Ashlock, D. and **Davidson, J.L**. **presented**, Lexicodes in the space of foot patterns for image classification, Proceedings of the 1998 IEEE Southwest Symposium on Image Analysis and Interpretation, Tucson, AZ, pp. 97-102 (6 pgs), (1998).

18. Hua,* X**., Davidson, J.** and Cressie, N., "Mine Boundary Detection using Partially Ordered Markov Models," in Statistical and Stochastic Methods in Image Processing II, F. Prêteux, J. Davidson, E. Dougherty, Eds., Proceedings of SPIE Vol. 3167, pp. 152-163 (12 pgs), (1997).

19. Ashlock, D., and **Davidson, J. presented**, "Genetic Algorithms for Automated Texture Classification," in Statistical and Stochastic Methods in Image Processing II, F. Prêteux, J. Davidson, E. Dougherty, Eds., Proceedings of SPIE Vol. 3167, pp. 140-151, (12 pgs), (1997).
20. Engebretson*, C., **Davidson, J. L.**, and Ashlock, D., "Genetic Algorithms for Texture Model Identification and Synthesis," in Statistical and Stochastic Methods for Image Processing, E. Dougherty, F. Prêteux, J. Davidson, Eds., Proceedings of SPIE Vol. 2823, pp. 20-31, (12 pgs), (1996).
21. **Davidson, J. L.**, Hua,* X., and Ashlock, D., "A Comparison of Genetic Algorithm, Regression, and Newton's Method of Parameter Estimation of Texture Model," Proceedings of the IEEE Southwest Symposium on Image Analysis and Interpretation, San Antonio, TX, pp. 201-206 (7 pgs), (1996).
22. **Davidson, J. L.**, Hua,* X., and Ashlock, D., "Texture Analysis Using Genetic Algorithms and Partially Ordered Markov Models," Neural, Morphological, and Stochastic Methods in Image and Signal Processing, E. Dougherty, F. Prêteux, S. Shen, eds., Proc. SPIE Vol. 2568, pp. 197-208 (12 pgs), (1995).

Refereed proceeding publications – major conferences

1. **Davidson, J. L.**, Hua, X.*, and Cressie, N., "Mine Boundary Detection Using Markov Random Field Models, Detection Technologies for Mines and Minelike Targets, A. Dubey, I. Cindrich, J. Ralston, K. Rigano, eds., Proc. SPIE Vol. 2496, pp. 626-636 (11 pgs), (1995).
2. Talukder,* A. and **Davidson, J. L.**, "Model Selection and Texture Segmentation using Partially Ordered Markov Models," Proc. of the International Conference on Acoustics, Speech, and Signal Processing, pp. 2527-2530, (4 pgs), Detroit, MI (1995).
3. **Davidson, J. L.**, Talukder,* A., and Cressie, N.A.C., "Texture Analysis using Partially Ordered Markov Models," First IEEE International Conference on Image Processing, Vol. III. pp. 402-406, (5 pgs), Austin, TX, November 1994.
4. Srivastava,* R. and **Davidson, J. L.** "Fuzzy Image Algebra Neural Net for Target Classification," P.D. Gader, E. R. Dougherty, and M. Schmitt, eds., Proceedings of the SPIE's Symp. on Image Alg. and Morph. Image Proc. V., Vol. 2300, pp. 145-156, (12 pgs), San Diego, CA, July 1994.
5. **Davidson, J. L presented.** and Cressie, N. A. C., "Markov Pyramid Models in Image Analysis," P. D. Gader, E. R. Dougherty, and J. C. Serra, eds., SPIE Symp. on Image Alg. and Morph. Image Proc IV, Vol. 2030, pp. 179-190, (12 pgs), San Diego, CA, 1993.
6. Fouad, A. A., Zhou,* Q., **and Davidson, J. L.**, "Security/Vulnerability Assessment of a Stability-Limited Power System Using Artificial Neural Networks," 11th Power Systems Computation Conference, pp. 487-493, (7 pgs), Avignon, France, August 1993.
7. **Davidson, J. L. presented**, "Simulated Annealing and Morphology Neural Networks," SPIE Symposium on Image Algebra and Morphological Image Processing III, pp. 119-127, (9 pgs), San Diego, CA, 1992.
8. Sun,* K. and **Davidson, J. L.**, "Opening Template Learning in Morphological Neural Nets," Intelligent Engineering Systems through Artificial Neural Networks, Proceedings of Art. Neural Net. in Eng. (ANNIE '91), ASME Press, pp. 229-234, (6 pgs), St. Louis, Missouri, November 1991.
9. **Davidson, J. L.** and Sun,* K., "Template Learning in Morphological Neural Nets," Proceedings, SPIE's 1991 International Symposium, Image Algebra and Morphological Image Processing II, Vol. 1568, pp. 176-187, (12 pgs), San Diego, CA, July 1991.
10. **Davidson, J. L. presented** and Cressie, N. A. C., "Statistical Image Algebra: A Bayesian Approach," Proceedings, SPIE's 1991 International Symposium on Optical and Optoelectronic Applied Sci. and Eng., Vol. 1569, pp. 288-297, (10 pgs), San Diego, CA, July 1991.
11. Meyer,* T**.**, and **Davidson, J. L.,** "An Image Algebra Preprocessor for the Maspar Parallel Computer," Proceedings, SPIE's 1991 International Symposium, Image Algebra and Morphological Image Processing II, Vol. 1568, pp. 125-136, (12 pgs), San Diego, CA, July 1991.
12. Ritter,* G. X. and **Davidson, J. L.**, "Recursion and Feedback in Image Algebra," SPIE's 19th AIPR Workshop on Image Understanding in the 90's, Vol. 1406, pp. 74-86, (13 pgs), Wash., D.C., October 1990.

13. **Davidson, J. L.**, **presented** " Local Decompositions of Invariant Lattice Transform," Proceedings, SPIE's 1990 Int'l Symp. on Optical and Optoelectronic Applied Sci. and Eng., Vol. 1350, pp. 443-454, (12 pgs), San Diego, CA, July 1990.
14. Meyer,* T., Freeman,* P., and **Davidson, J. L.**, "Modeling of Neural Net Chips Using Image Algebra," Proceedings, SPIE's 1990 Int'l Symp. on Optical and Optoelectronic Applied Sci. and Eng., Vol. 1350 pp. 296-307, (12 pgs), San Diego, CA, July 1990.
15. **Davidson, J. L. presented**, and Ritter, G. X., "A Theory of Morphological Neural Networks," Proceedings of SPIE's OE/LASE 1990 Optics, Electro-Optics, and Laser Applic. in Sci. and Eng., Vol. 1215, pp. 378-388, (11 pgs), Los Angeles, CA, Jan. 1990.
16. **Davidson, Jennifer L. presented**, "Minimax Techniques for Non-Linear Image Processing Transforms," Proceedings, SPIE's 1989 Tech. Symposium on Optics, Electro-Optics & Sensors, Vol. 1098, pp. 122-133, (12 pgs), Orlando, FL, March 1989.
17. Ritter*, G. X., Wilson, J. N., and **Davidson, Jennifer L.**, "Image Algebra Application to Image Measurement and Feature Extraction," Proceedings of the SPIE Symp. on Image Understanding and the Man-Mach. Interface II, Vol. 1076, pp. 146-153, (8 pgs), Los Angeles, CA, 1989.
18. Ritter,* G. X., Wilson, J. N., and **Davidson, Jennifer L.**, "Image Algebra Application to Multisensor and Multidata Image Manipulation," Proceedings, SPIE's 1988 Tech. Symposium, Multispectral Image Proc. and Enhancement, Vol. 933, pp. 2-7, (6 pgs), Orlando, FL, April 1988.
19. Ritter,* G. X., **Davidson, Jennifer L.**, and Wilson, J. N., "Beyond Mathematical Morphology," (paper and talk), Proceedings, SPIE's Visual Communications and Image Proc. II, Vol. 845, pp. 260-269, (10 pgs), Cambridge, MA, October 1987.
20. Ritter,* G. X., Wilson, J. N., and **Davidson, Jennifer L.**, "Data Compression of Multispectral Images," Proceedings, SPIE's 31st Annual Int'l Tech. Symp. on Optical and Optoelectronic Applied Sci. and Eng., Vol. 829, pp. 58-64, (7 pgs), San Diego, CA, August 1987.
21. Wilson,* D. C. and **Davidson, Jennifer L.**, "Labeling the Topographic Features of a Grey Level Image," Proceedings, Conf. of Intelligent Machines and Sys., pp. 97-102, Rochester, NY, April 1986.
22. Ritter,* G. X. and Davidson, **Jennifer L.**, "Automated Bridge Detection in FLIR Images," Refereed, Proceedings. Eighth Int'l Conf. on Pattern Recognition, pp. 862-864, (3 pgs), Paris, France, 1986.

Presentations Only at Conferences with Refereed Abstracts
1. Pal, S. (presented), E. Tirone, W. A. Gallus, S. Dutta, R. Maitra, J. L. Newman and E. Weber, "Blowin' in the wind" - Diagnosing the Probability that a Severe Thunderstorm Wind Report is Truly Due to Severe Intensity Wind Event. American Meteorological Society (AMS) Annual Meeting 2022 (virtual Houston) - *21st Conference on Artificial Intelligence for Environmental Science*. **Winner of the Outstanding Student Presentation Award: Honorable Mention. $500.**
2. Tirone, E. A. (presented), S. Pal, S. Dutta, R. Maitra, W. A. Gallus, J. L. Newman and E. Weber, 2022: Evaluating meteorological environments of severe wind report classifications by a machine learning tool. American Meteorological Society (AMS) Annual Meeting 2022 (virtual New Orleans) - *31st Conference on Weather Analysis and Forecasting (WAF)/27th Conference on Numerical Weather Prediction (NWP)*.
3. A. Martin (presented), with L. Lin, W. Chen, S. Pierre, Y. Guan, J. Newman. A response to the threat of Stegware. American Academy of Forensic Sciences (AAFS), 2021. February 2021. Virtual Presentation.
4. S. Pierre (presented), L. Lin, A. Martin, J. Newman. Detecting steganography in images from mobile stego apps using random statistical properties, International Conference on Forensic Inference and Statistics (ICFIS) 2020. London, England. Virtual presentation.
5. L. Lin (presented), with W. Chen, S. Reinders, Y. Guan, M. Wu, J. Newman. A Wild Manhunt for Stego Images Created by Mobile Apps, American Academy of Forensic Sciences 71st Annual Scientific Meeting (AAFS), Anaheim, CA, February 2020.
6. **J. Newman, presented,** L. Lin, W. Chen, S. Reinders, Y. Guan. Can StegoAppDB help answer how prevalent mobile steganography is? American Academy of Forensic Sciences 71st Annual Scientific Meeting, Baltimore, MD, February 2019.

7. **J. Newman, presented,** StegoAppDB: a smartphone camera image database for benchmarking image forensics. Lecture at International Association for Identification Educational Conference 2018 (IAI 2018), San Antonio, TX, July 2018.
8. **J. Newman, presented,** Detection of stego images from a mobile phone steganography app, presented talk at International Conference on Forensic Inference and Statistics 2017 (ICFIS 2017). Minneapolis, MN, September 2017.
9. **J. Newman, presented,** Can stego images from a mobile phone stego app be detected? Presentation at NIST_FBI 2nd International Symposium on Forensic Science Error Management, Gaithersburg, MD, July 26, 2017.
10. **Davidson, J**., **presented**, Barton, R. Texture Synthesis and Classification using POMM Multiresolution Modeling, First SIAM (Society for Industrial and Applied Mathematics) Conference on Imaging Science, Target Recognition Minisymposium, Boston, Sep. 22-24, 2001. **Postponed to Mar. 4-6, 2002 due to Sep. 11 2001 terrorist attacks.**
11. **Davidson, J., presented**, Barton, R. Texture Modeling using Self-Similar Wavelets and POMMs, The 33rd Symposium on the Interface of Computer Science and Statistics, Costa Mesa, CA, June, 2001.
12. Barton*, R., **Davidson, J.**, Multiresolution Partially-Ordered Markov Models for Texture Synthesis and Classification, International Union of Radio Science Conference, Mathematics of Imaging, Boulder, CO, Jan. 2001.
13. Barton*, R., **Davidson, J.,** Chen, L. Wan, F., Multiresolution Stochastic Models for Object Recognition in Self-similar Texture Images, 32nd Symposium on the Interface: Computing Science and Statistics, New Orleans, LA. April (2000).

Poster only at Conferences with Refereed Abstracts.
1. Tirone, E. A., S. Pal, W. A. Gallus, S. Dutta, R. Maitra, J. L. Newman and E. Weber, 2022: Verifying Storm Prediction Center 1630 UTC day 1 wind outlooks using a machine learning-based weighting method. *American Meteorological Society Annual Meeting 2022 (virtual Houston) - 21st Conference on Artificial Intelligence for Environmental Science, 2022.*
2. S. Pierre, A. Martin, L. Lin, J. Newman. StegFinder, a Forensic Tool to Detect Messages Hidden in Images, International Association for Identification Educational Conference 2021 (IAI 2021). Nashville, Tennessee. Virtual poster presentation.
3. E. Tirone (presented), W. A. Gallus, Jr., S. Pal, S. Dutta, R. Maitra, J. L. Newman, and E. S. Weber. The use of machine learning to provide probabilities that thunderstorm wind damage reports are truly due to severe intensity winds. Poster 970, Severe Local Storms Symposium, Amer. Meteor. Soc., Boston, MA, Jan. 13-16, with, 2020.
4. Tirone, E. A. (presented), W. A. Gallus, S. Pal, S. Dutta, R. Maitra, J. L. Newman, and E. Weber, 2020: A machine learning tool to provide probabilities that thunderstorm wind damage reports are due to severe intensity winds. American Meteorological Society (AMS) Annual Meeting 2020, Severe Local Storms Symposium.
5. L. Lin, W. Chen, S. Reinders, Y. Guan, J. Newman. StegoAppDB: A steganography apps forensics image database. Poster presentation in addition to paper presentation at IS&T Int'l. Symp. on Electronic Imaging, Media Watermarking, Security, and Forensics 2019, Burlingame, CA, 2019.
6. L. Lin, W. Chen, S. Reinders, Y. Guan, J. Newman. Poster presentation at Forensics@NIST, StegoAppDB: A Benchmark Database for Mobile Steganography, National Institute of Standards and Technology (NIST), Gaithersburg, MD, Nov. 7-8, 2018.
7. L. Lin, W. Chen, S. Reinders, Y. Guan, J. Newman. StegoDB: A Benchmark Database for image Forensics. Poster presentation at IS&T Int'l. Symp. on Electronic Imaging (EI), Burlingame, CA, v. 7, January 2018.

Products – software products, apps (3). At current rank.
1. **Cameraw**, software product. A mobile camera app for image data acquisition. Developers Wenhao Chan (Android) and Yangxiao Wang (Apple). Mobile app created for two operating systems, iOS and Android, to assist in bulk data collection to create StegoAppDB database. Several versions available.

2. **CamSnap**, software product. A mobile camera app for image data acquisition.
3. **Canvass**: **A Steganographic Forensic tool for JPEG images**, software product. A cross-platform software for detecting steganography using multi-class detection, with J. Jalan, 2010.

Other Product: Database
4. **StegoAppDB: A Forensics Image Database for Mobile Steganography**, a SQL database with 961,160 images from stego apps from mobile phones. Publicly available, searchable, richly annotated and provenanced, and copyright free. Team led by Jennifer Newman, other members who contributed significantly: Li Lin, Wenhao Chen, Yangxial Wang, Stephanie Reinders, Dr. Min Wu (University of Maryland College Park), and Dr. Yong Guan (ISU). CSSM at ISU also helped by creating the SQL database and webpage for querying. URL: https://forensicstats.org/stegoappdb/

Media-Related Events, Press Releases. All at current rank.
1. Acknowledgement for Dr. Jennifer Newman as Steganalysis Expert, pg. 341, by forensic anthropologist and *#1 New York Times Bestselling author, Dr. Kathy Reichs*: "A Conspiracy of Bones," Simon & Schuster, 2020. (Reichs was the medical consultant on the TV series "Bones" and is also a member of the American Academy of Forensic Sciences.)
2. Team Member Spotlight: Dr. Newman's Adventures in Steganography; CSAFE Newsletter May 2020. URL: https://forensicstats.org/news-posts/team-member-spotlight-dr-newmans-adventures-in-steganography/
3. ISU research to help uncode hidden messages, in the Ames Tribune (amestrib.com), by Grayson Schmidt, 2/16/2018.
4. Virtual Case Notes: Steganalysis Database Will Help Find Hidden Files in 'Innocent' Images, in online Forensic Magazine (forensicmag.com), by Laura French. 2/23/2018.
5. Database will help build foundation for steganalysis of forensic evidence, by Iowa State University News Service (news.iastate.edu), Elizabeth Peterson, 2/12/2018.
6. Unhidden, article appearing in Innovate Magazine, Iowa State University, online at http://innovate .engineering.iastate.edu/2010/04/09/unhidden-mathematician-works-to-combat-child-pornography/
7. Interviewed for article that appeared in the IEEE Computer magazine, "New System Fights Steganography," August 2006, pp. 25.
8. News article, Iowa Daily Newspaper (on-campus publication), "ISU researchers develop software to detect hidden messages," Andrea Fier/Daily Staff Writer, 10-31-06, pg. 3. URL: http://www.iowastatedaily.com/media/storage/paper818/news/2006/10/31/News/Isu-Researchers.Develop.Software.To.Detect.Hidden.Messages-2411046.shtml?norewrite200701121453&sourcedomain=www.iowastatedaily.com
9. News article, "Invisible research," Dave Gieseke, http://www.las.iastate.edu/newnews/math1030.shtml
10. News article, Des Moines Register newspaper, "Pair teach software to detect secret data in photos," Lisa Rossi, Sunday, November 19, 2006, page 1B &3B.
11. C. Bergman and J. Davidson, local Fox television station, interview on steganalysis research, May 2006.
12. D. Bergman and J. Davidson, local Channel 13 television station, interview on steganalysis research, May 2006.
13. Press release, "Finding computer files hidden in plain site," Ames Laboratory, 5/24/06, http://www.external.ameslab.gov/final/News/2006rel/Steganalysis.htm
14. News article, "Hiding in plain side," Kerry Gibson, Ames Laboratory annual publication of research news, http://www.external.ameslab.gov/final/News/Images/Inquiry2006.pdf and "Insider," Newsletter, Vol. 17, No. 8, Sep. 2006.
15. J. Davidson, Interview by local television station, Channel 5, for work in steganography. Appeared as "Top Story" on Channel 5 news, 5:00 PM Friday, Sep. 29, 2001. Also appeared on 10:00 PM news same night.

Invited papers, presentations, panels

1. Newman, J. Invited Keynote Speaker, The Second International Workshop on Open Media Forensics Challenge (OpenMFC 2022), Dec. 7 -10, 2022.
2. Newman, J. Invited speaker, The Impact of Mobile Steganography Apps on Steganalysis. Troyes University of Technology, June 8, 2022.
3. Newman, J. Invited Keynote Speaker, The First International Workshop on Open Media Forensics Challenge (OpenMFC 2021), Dec. 7 -10, 2021.
4. Newman, J. "Hiding in plain sight: What a good steganography database will get you," Invited seminar at the Department of Mathematics, University of Nebraska-Lincoln, September 10, 2021.
5. Newman, J. Invited Panelist at IINSPIRE (Iowa Illinois Nebraska STEM Partnership for Innovation in Research and Education) LSAMP (Louis Stokes Alliance for Minority Participation) 2018-2019 annual conference, **"**Mathematics Is All Around Us: This is why you should study it." February 1-2, 2019.
6. Newman, J. What's in a Picture: Steganography and Digital Image Forensics. Midwest Mathematics Inclusion and Diversity Workshop for Undergraduates, Iowa State University, Ames, IA, Oct. 20-21, 2018.
7. Newman, J. Criticality of data for more practical steganography detection in images. Workshop on Role of Data, Databases and Expert Knowledge in Forensic Inference, September 10-11, 2017, Baker Hall, Department of Statistics, Carnegie Mellon University, CSAFE (Anjali Mazumder and William Eddy).
8. Newman, J. A steganography database: are we doing it right? CMU Database Seminar, Carnegie Mellon University, Pittsburgh, PA, September 20, 2017.
9. Newman, J. Steganography Detection and Datasets, CSAFE Digital Evidence Workshop, Arlington, VA May 8-9, 2017.
10. **Davidson, J.,** Sukhinen, V., Wong, J., Yong, G., Multari, N. Performance Assessment for Complex System Models using Probabilistic Formal Concept Analysis, First International Symposium on Resilient Cyber Systems, part of IEEE International Symposium on Resilient Control Systems (ISRCS). San Francisco, CA, Aug. 2013. (presentation only)
11. **Davidson, J.** Invited speaker, Forensic Lab Directors Annual Meeting. Canvass: a Steganalysis Forensic Software for JPEG Images. Hosted by Midwest Forensic Resource Center, at Mackinac Island, MI, May, 2010.
12. **Davidson, J.** Steganography and Steganalysis. Information Assurance, Network, Database and Software Security Symposium, November 2, 2007, St. Cloud State University, St. Cloud, MN.
13. **Davidson, J.** Image Processing and Optimization in Texture Analysis and Bioinformatics, College of Engineering, Idaho State University, Pocatello, ID, April 30, 2001.
14. **Davidson, J**. Protein Structure Matching by Genetic Algorithm, Department of Computer Science, Texas A&M, College Station, Mar. 30, 2001.
15. **Davidson, J**. Multiresolution Stochastic Models for Modeling Self-Similar Texture Images, Department of Computer and Electronics Engineering, University of Nebraska/Lincoln at Omaha, Jan. 23, 2001.
16. Cressie, N.A.C. and **Davidson, J. L.**, "Spatial Stochastic Processes with Image Algebra," (talk only) Invited Participant. Vision and Optical Image Processing Workshop, Sponsored by ONR and Univ. of Maryland, Arlington, VA, April 1994.
17. **Davidson, J. L.** and Cressie, N.A.C., "Partially Ordered Markov Mesh Models in Image Analysis," (talk and paper) Mines Countermeasures Workshop, United States Naval Coastal Systems Station, Panama City, FL., November 1993.
18. **Davidson, J. L.** and Cressie, N. A. C., "Spatial Models for Image Analysis," (talk only), 1993 Joint Statistical Meetings, San Francisco, CA, August 1993.
19. Cressie, N. A. C. and **Davidson, J. L**., "Statistical Image Algebra," (talk only), Amer. Stat. Assoc. 1991 Joint Stat. Meeting, Atlanta, GA, August 1991.
20. **Davidson, J. L.**, "A Decomposition Technique for a Special Case of the Generalized Matrix Product," presented to the Mathematics Department, University of Erlangen, W. Germany, July 1990 (invited talk).
21. **Davidson, J. L.**, "Linear and Non-Linear Subalgebras in Image Algebra," invited talk, University of Erlangen, W. Germany, July 1989.

Undergraduate Students - Mentored in research

Name	Program	Dates	Expected graduation date
Akhilesh Nevatia	Honors	8/2022-present	Spring 2025
Liliana Delgado	Math- McNair Scholar	8/2019 – 5/2021	Spring 2021
Liliana received the Dean's High Impact Award for Undergraduate Research in 8/2020			
Seth Pierre	Electrical Engineering	1/2019 – 5/2020	Spring 2022
Katlyn Heylmun	Mathematics	8/2019 – 12/2019	Fall 2019
Jacob Heeren	Mathematics	1/2019 - 5/2019	Spring 2020
Joey Bingham	Mathematics	8/2017-5/2018	Spring 2018

Masters – As major professor: 25 total

Name & Program	Thesis Title	Grad. Date
Seth Pierre (EE)	TBD	Spring 2023
Kollin Poindexter (Math)	Using the Longest Common Subsequence Algorithm to Identify Steganography Signatures	Spring 2022
Gabriela Lara (Math)	Brief Comparison of Two Metrics for Camera Source Identification	Spring 2022
Kurt Kabriel, InfAs (MATH)	Statistical models to predict exposure settings using two different iPhone camera apps	Spring 2020
Stephanie Reinders (Math)	(no thesis)	Summer 2019
Bhanu Venkata, (CprE) (CC)	Implementation of image quality assessment algorithms for descriptive statistics and deep learning on StegoAppDB	Summer 2019
Lindsey Trotter InfAs (CprE)	A case study involving creating and detecting steganographic images shared on social media sites	Fall 2019
Aaron Rodriguez, Mathematics	Estimating the number of covering relations in a formal concept lattice	Spring 2015
Donald Peterson, Mathematics	Using predictable pseudo-random number generators to improve steganographic embedding efficiencies and decrease detectability	Fall 2012
Pooja Paranjape, EE	A Canvass Steganalyzer for Double-compressed JPEG Images	Summer 2011
Jaikishan Jalan, Computer Science	Feature selection, statistical modeling and its applications to universal JPEG steganalyzer	Fall 2009
Dan Wengerhoff (InfAs/Math)	Using the singular value decomposition for image steganography	Fall 2006
Lori Murray (IA/Math)	A Survey of Steganalysis Techniques for LSB and Wavelet Transform Embedding	Fall 2004
David Kuan, EE	Steganography using an Interlaced Minimax Eigenvalue Decomposition Algorithm	Spring 2004
Xiyi Pang, Mathematics	Applications of Artificial Neural Networks to Forecasting of Home Mortgage Applications	Fall 2003
Cesar Mendoza, CprE	Authentication and Data Integrity of Images using the Minimax Eigenvalue Decomposition	Fall 1999
Chaka Allen, CprE	Using the Minimax Eigenvalue Decomposition for Steganography	Spring1998
Fan Zhang, Mathematics	Applying Genetic Algorithms to Binary Object Detection	Spring 1997

Pubali Banerjee, EE	Parameter Estimation for Texture Modeling Using Simulated Annealing and Genetic Algorithm	Spring 1997
Lauren Knutson, Electrical Engineering)	CLASS: A Nondestructive Evaluation Flaw Classification System	Summer 1995
Naomi Pegors, Mathematics	Three-Dimensional Boundary Detection in Medical Images	Summer 1995
Ashit Talukder, Electrical Engineering	Partially Ordered Markov Models for Texture Synthesis and Classification	Summer 1994
Rashmi Srivastava, Electrical Engineering	A Fuzzy Image Algebra Neural Network for Target Classification	Summer 1994
Brian Schmidt (Co-Major with T.V. Ramabadran) (EE)	Comparison of Feature Vectors for Speech Recognition Using the Time Delay Neural Network	Fall 1993
Trevor Meyer (CprE)	An Image Algebra Preprocessor for the MasPar Computer	Spring 1992

Masters – As committee member: 58 total

Ph.D. – As major professor: 7 total, 5 graduated at current rank + 1 not yet graduated:

	Name & Program	Dissertation Title	Grad. Date
1	Abby Martin, Math	TBD	(Spring 2024)
2	Wenhao Chen (CprE), co-major with Y. Guan	Detecting Evidence of Steganography in Android Apps through Program Analysis	Dec 2020
3	Stephanie Reinders, MATH, co-major with Y. Guan	Improved methods for spatial steganalysis and camera device identification	Summer 2020
4	Li Lin, MATH, co-major with Y. Guan	Hunting wild stego images, a domain adaptation problem in digital image forensics	Spring 2020
5	Ni, Jianjun, EE, co-major with Rick Barton, Univ. of Houston	Adaptive Multicoding and Robust Linear-Quadratic Receivers for Uncertain CDMA Frequency-Selective Fading Channels	Fall 2002
6	Meyer, Trevor CprE, co-Major with J. Davis	Monitorable Network and CPU Load Statistics and Applications to Scheduling	Fall 1995
7	Helterbrand, Jeffrey STAT, co-Major with N. Cressie in Statistics	Spatial Dependence Models and Image Analysis	Fall 1993

Post-Docs, at current rank.
1. Mentored post-doc Dr. Li Lin in a research position at the Iowa State University's Center for Statistics and Applications in Forensic Evidence (CSAFE), August 2020 – May 2021.

2. Mentored post-doc Dr. Anna Carter for navigating her career, in the Preparing Future Faculty program at Iowa State University, Fall 2019. Dr. Carter was a postdoctoral research associate in the Department of Ecology, Evolution & Organismal Biology.

TEACHING

Courses I created from scratch and taught

Number	Title
Data Science 303	Concepts and Applications for Machine Learning Core course for Data Science majors
Math 535	Steganography and Digital Image Forensics *Cross-listed in Information Assurance and Computer Engineering, Cyber Security (2022)*
Math 535	Steganography and Watermarking for Digital Data Hiding *Cross-listed in Information Assurance and Computer Engineering*
CprE 592	Steganography and Watermarking**:** Techniques & Countermeasures for Stealth and Intellectual Property Rights *Cross-listed in Electrical Engineering as EE 597*
CprE 310	Theoretical Foundations of Computer Engineering
EE 524	Digital Signal Processing
EE 528	Digital Image Processing
EE 545	Artificial Neural Networks
EE 628	Computer Vision

Teaching past 7 years

Semester/Yr	Course number and title	UG cred.	Grad. cred.
Fall 2022	Data Science 201, Introduction to Data Science	3	
Spring 2022	Math 535, Steganography and Digital Image Forensics		3
	Math 207, Matrices and Linear Algebra	3	
Fall 2021	Math 165, Calculus 1	4	
	Math 207, Matrices and Linear Algebra	3	
Spring 2021	Math 535, Steganography and Digital Image Forensics		3
	Math 165, Calculus 1	4	
Fall 2020	Math 165, Calculus 1, 2 classes	8	
Spring 2020	Math 535, Steganography and Digital Image Forensics		3
	Math 267, Elementary Differential Equations and Laplace Transforms	4	
Fall 2019	Data Science 303, Concepts and Applications for Machine Learning	3	
Spring 2019	Math 535, Steganography and Digital Image Forensics		3
Fall 2018	Math 267, Elementary Differential Equations and Laplace Transforms, 2 classes	8	
**Spring 2018	Math 535, Steganography and Digital Image Forensics		3
Fall 2017	No teaching, FPDA		
**Spring 2017	Math 535, Steganography and Digital Image Forensics		3
**Fall 2016	Math 267, Elementary Differential Equations and Laplace Transforms	4	
**Spring 2016	Math 535, Steganography and Digital Image Forensics (major revision)		3
**Fall 2015	Math 166, Calculus II	4	

** My teaching load was reduced when I worked as Associate Chair

Number	Title	Semesters taught
Electrical and Computer Engineering		
CprE 310	Theoretical Foundations of Computer Engineering	Spring & Fall 1994-1995, Fall 1996
EE 205	Electric Circuits I	F 1992, F 1993
EE 321	Continuous Signals & Systems	S 2000
EE 424	Digital Signal Processing	F 2001, F 2002, F 2003
EE 374	Linear Systems	S 1991, F 1991, S 1992
CprE 592	Steganography and Watermarking: Techniques & Countermeasures for Stealth and Intellectual Property Rights	Spring 2003
EE 524	Digital Signal Processing	F 1989, F 1997
EE 528	Digital Image Processing	Spring 1993, Spring 1996, Spring & Fall 1998, Spring 1999
EE 545	Artificial Neural Networks	Springs 1990-1996
EE 590C	Special Topics - Neural Networks	S 1989
EE 590C	Special Topics - Computer Vision & Neural Networks	F 1992
EE 628	Computer Vision	Fall 1990-1991, Fall 1993-1994, Fall 1999
Data Science		
Data Science 201	Introduction to Data Science	F 2022
Data Science 303	Concepts and Applications for Machine Learning	Fall 2019
Mathematics		
Math 165	Calculus 1	F 2004, F 2006, F 2009, F 2010, F 2011, F 2012, S 2015, F 2020, S 2021, F 2021
Math 166	Calculus II	F 2005, F 2007, F 2008, F 2015
Math 201	Introduction to Proofs	F 2012
Math 267	Elementary Differential Equations and Laplace Transforms	
Math 535	Steganography and Digital Image Forensics	Spring 2011-2012, 2016-2022
Math 535	Steganography and Watermarking for Digital Data Hiding	Spring 2004-2010

Service and outreach

Professional Society membership

8/2022-present, 1987-2010		SPIE: International Society for Optics & Photonics
5/2022-present, 2001-2005		Association for Computing Machinery
2018-present, 1986-2002		IEEE Society, Communications Area
2019	Senior Member	IEEE Society
1987-2008, 2016-present	Member	Society for Industrial & Applied Mathematics (SIAM)
1986-2002, 2018-present	Member	IEEE Society, Signal Processing Society area
2018-2019	Member	International Association for Identification

2017-2020	Member	The Society for Imaging Science and Technology
Sept 1984-2005	Member	Mathematical Assoc. of America (MAA)
Aug 1988-2002	Member	Association for Women in Mathematics (AWM)

Professional panels/reviews; Committee Work

National Institutes of Health
November 2001. Selected to serve on Scientific Review Special Emphasis Panel for grant applications to NIH program "Innovations in Biomedical Information Science and Technology Innovation Award (BISTI)."

National Science Foundation
Served as a panel member to evaluate proposals for the following NSF programs:
1. Professional Opportunities for Women in Research and Education (POWRE), Aug. 12, 1997.
2. Instrumentation and Laboratory Improvement Program, Division of Undergraduate Education, Jan. 24-27, 1996.

Other Review Panels
3. Educational Testing Service, GRE Mathematical Reasoning Test Prototype, Feb. 28-Mar. 1, 1996.

At previous rank:
National Science Foundation
4. Instrumentation and Laboratory Improvement Program, Division of Undergraduate Education, Jan. 25-28, 1995.
5. Research Initiation Grants and Research Equipment Grants, May 3, 1995.
6. Instrumentation and Laboratory Improvement Program, Division of Undergraduate Education, Jan 19-22, 1994.
7. Research Initiation Grants and Research Equipment Grants, May 3, 1994.
8. Research Experience for the Undergraduate, Dec. 9, 1991.

Other Conference Work
(Local) General Chair, Fourth Annual Midwest Electro-Technology Conference, 1994-1995.
(Local) Organizational Committee, Midwest Electro-Technology Conference, 1992-1994.

UNIVERSITY ACTIVITIES

Faculty Contact for Mathematics, Center for Cybersecurity Innovation and Outreach (CYIO) in the College of Engineering. (Spring 2021)
Member, Provost's Panel to review "Study in a Second Discipline" proposals, Spring 2002, Spring 2003.
Member, Bioinformatics and Computational Biology (BCB) Advisory Committee, Fall 1999 – Spring 2000.
Chair, Graduate Recruitment Committee for BCB Program, ISU, Fall 1999 – Spring 2000.

COMMITTEES

University Committees

2004-2007	Graduate Faculty Membership Committee, LAS representative
At previous rank:	
Oct. 1991-Oct. 1992	University Committee on Women

College Committees

F 2022	Mathematics representative, Data Science Curriculum Committee
F 2019 - Sp 2022	Ad-hoc member of Data Science Curriculum Committee
F 2018 - Sp 2019	Dept. of Statistics, Forensic Statistics Faculty Search.
2013 – 2018	LAS College Representative Assembly, Mathematics representative.
Spring 1995	Member of College of Engineering "Four-Year College Dual Degree Program" study.

Department Committees

2022-2023	Member, Internal P&T Committee for Claus Kadelka promotion and tenure
8/2021-present	Member Ad-hoc committee, Mathematics Department Faculty Awards
Sp 2020-Sp 2021	Member Ad-hoc committee, Promotion & Tenure, Jonas Hartwig, Mathematics Dept.
F 2019 – Sp 2022	Member, Graduate Committee, Mathematics Department
F 2019	Member, Ad-hoc Committee to add data science content to Math 397, Teaching Secondary Mathematics Using University Mathematics
Spr 2019	Member, Committee to review applicants for the Postbaccalaureate Certificate Program in Mathematics
Fall 2019	Internal Review Team, Dr. Man Basnet promotion from Assistant Teaching Professor to Associate Teaching Professor.
2014	Member, Committee to interview for Math's position: Admin Spec III
2014 Spr	Ad-hoc Lecturer Hiring Comm
2013	IRT – Tim McNicholl
2010-2017	Advisory Committee.
2010-2017	Undergraduate Committee.
2011-2012; Spr 2016	Lecturer Search Committee, Chair.
2014-5	Chair, promotion to Senior Lec. For Brenda Diesslin.
2012-3	Chair, promotion to Senior Lec. For Jun Pan.
2005	Member, promotion to Senior Lec. For Gail Johnston.
2011-2013	Untenured Faculty Review Committee
2011-2014, 05-07	Lecturer Review Committee
Fall 2012	Chair, Ad-Hoc Committee to Review Math 265 Final Exam Conflict.
S 2009	Lecturer Review and Evaluation Committee, member
F 2008	Internal Review Committee for Dr. Ling Long
F 2008	Wolfe Award Committee, Chair
S 2008	Non Tenure Review Committee
2006-2007	Ad-Hoc Review of Departmental Placement Exam
Lecturer Review Comm	Review of lecturers, 2005-2007, 2013-2014, member

Aug. 2002 – present	Information Assurance and Security committee member
Mar. 1999 – Spring 2000	CSP representative on Curriculum Committee
Mar. 1997 - Aug. 1998	Chair, Electromagnetics/NDE/SP Area Committee
Mar. 1997-Aug. 1998	Advisory Committee
Mar. 1997 -Aug. 1998	Strategic Plan Ad-hoc Subcommittee
AY 1996	Ad-Hoc Committee on Computer Structure
Fall 1995	Ad-Hoc Monitoring Committee for Workload Issue
Spring 1995	Ad-Hoc Faculty Search Committee, Female Minority
1992 - 1994	Promotion and Tenure Committee, Assistant Prof. Representative
Spring 1994, 1995	Ad-hoc Faculty Search Committee
1994 - 1996	Computer Engineering Area Subcommittee member
AY 1993	CSP Seminar Organizer (with J. Doherty)
1991, 1993	Ad-Hoc Committee to Select Controls Area Faculty Candidate
1991 - 1993	1992 Election Committee
1991 - 1992	DEO Evaluation Committee
1989 - 2004	Communications & Signal Processing Area Subcommittee

OUTREACH ACTIVITIES

Scientific Working Group on Digital Evidence (SWGDE). Participant at several meetings from 2018-2020. Discontinued attendance due to Covid-19. Part of my grant responsibilities with CSAFE include outreach activities. Represented CSAFE to communicate with forensic practitioners in imaging to build community with the audience for CSAFE products and services.

OTHER ACTIVITIES
Attended First-Year Large-Section STEM Instructor Support Program ("LSISP"), directed by Prof. Raj Raman, 5 sessions. Iowa State University, Fall 2018.

1992-1993, 1994-1995	Participant in University-wide Spatial Statistics Seminar
August 1992-December 1992	Seminar Organizer for the Artificial Life/Neural Network/Artificial Intelligence Meetings (University-wide attendance)