

## Walter J. Scheirer

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Google Scholar Profile: <http://goo.gl/tmFCY>

### Education

**University of Colorado**, Colorado Springs, CO

Ph.D. in Engineering, Concentration in Computer Science, May 2009

Thesis Title: *Improving the Privacy, Security, and Performance of Biometric Systems*

Advisor: Prof. Terrance Boulton

**Lehigh University**, Bethlehem, PA

M.S. in Computer Science, January 2006

Thesis Title: *Syntax Versus Semantics: Two Competing Approaches to Dynamic Network Intrusion Detection Systems*

B.A., *cum laude*, in Computer Science and International Relations, June 2004

### Research Interests

Primary interests in Artificial Intelligence, Computer Vision, Machine Learning, Human Biometrics, and Digital Humanities. Specific areas of research include Open Set Recognition, Extreme Value Theory Models for Visual Recognition, Biologically-inspired Learning Algorithms, and Stylometry. Secondary track of research in the History of Technology.

### Work Experience

Dennis O. Doughty Collegiate Professor of Eng.

Associate Professor (with tenure)

Assistant Professor

University of Notre Dame

July 2021 – Present

August 2020 – June 2021

July 2015 – July 2020

Notre Dame, IN

Appointment in the Department of Computer Science & Engineering. Affiliated with the Computer Vision Research Laboratory. Leading research connected to the fundamental problem of recognition in sensory processing and language understanding. Further work in cultural criticism and the history of technology, commenting on the social context of emerging technologies from the realistic perspective of a computer scientist. Teaching courses related to computer vision, machine learning, artificial intelligence, security, and technology ethics.

Research Associate

Harvard University

July 2015 – July 2019

Cambridge, MA

Appointment in the Department of Molecular & Cellular Biology. Affiliated with the CoxLab. Working with experimentalists to design wet lab experiments and process data from behavioral measurements and 2-photon microscopy in rodents to support the development of biologically-informed machine learning algorithms.

Postdoctoral Fellow

Harvard University

October 2012 – July 2015

Cambridge, MA

Appointments in the Department of Molecular & Cellular Biology, School of Engineering and Applied Sciences, and Center for Brain Science, working with Prof. David Cox. Research includes investigating the computational underpinnings of visual object recognition, biologically-inspired approaches to machine learning, and parallel processing techniques for large-scale vision applications.

Assistant Professor Adjoint  
University of Colorado, Colorado Springs  
Conducted computer vision and digital humanities related research at the Vision and Security Technology Lab in the College of Engineering & Applied Science. Additional responsibilities included advising students, as well as raising research money.

September 2009 – July 2015

Colorado Springs, CO

Director of Research & Development  
Securics, Inc.

August 2007 – September 2012

Colorado Springs, CO

Responsible for all research and development activities within Securics, Inc. Led advanced research in template protection systems for biometrics, multi-biometric fusion, and face recognition technology. Oversaw the design and implementation of commercial products utilizing the developed technology. Coordinated business development activities, which brought in over 4.1 million dollars in revenue.

Research Assistant

August 2006 – January 2008

Vision and Security Technology Lab

University of Colorado, Colorado Springs

Worked on the construction of a large scale, distributed steganography detection framework as part of an AFRL research program. Other work included the design and implementation of template protection systems for biometrics, and low-cost spectrometer design.

Research Assistant

August 2004 – May 2006

Wireless Internet and Network Security Lab

Lehigh University

Worked with Prof. Mooi Choo Chuah. Investigated dynamic approaches to network intrusion detection. As part of the DARPA DTN program, implemented security features to the bundle protocol for delay tolerant networks.

System Administrator

June 2004 – August 2004

Department of Computer Science and  
Engineering

Lehigh University

Deployed hardware development tools (Cadence, Mentor Graphics, ISE Tools) on a research network. Maintained a heterogeneous (Unix/Microsoft) network environment.

Research Assistant

May 2002 – June 2004

Vision and Software Technology Lab

Lehigh University

Worked with Prof. Terrance Boulton, CSE department chair. Carried out a large-scale biometric security experiment involving facial recognition under varying weather conditions. Implemented a network interface for an experimental vision tracking system. Created custom vision tracking security systems for a private vendor.

## Publications

### Journal Articles

J.45. E. Shahbazi, T. Ma, M. Pernus, W. Scheirer, and Arash Afraz, “Perceptography Unveils the Causal Contribution of Inferior Temporal Cortex to Visual Perception,” to appear in *Nature Communications*, accepted for publication March 2024.

J.44. J. Dulay, S. Poltoratski, T. Hartmann, S. Anthony, and W. Scheirer, “Informing Machine Perception with Psychophysics,” to appear in *The Proceedings of the IEEE*, accepted for publication March 2024.

J.43. J. Huang, D. Prijatelj, J. Dulay, and W. Scheirer, “Measuring Human Perception to Improve Open Set Recognition,” appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 45, No. 9, September 2023.

- J.42. S. Grieggs, J. Lockhart, A. Atiya, G. Tilahun, S. Conklin Akbari, E. Derillo, J. Jacobs, C. Kwon, M. Gervers, S. Delamarter, A. Gillespie, and W. Scheirer, “Automated Transcription of Gə’əz Manuscripts Using Deep Learning,” appears in *Digital Humanities Quarterly*, Vol. 17, No. 3, August 2023.
- J.41. S. Grieggs, B. Shen, G. Rauch, P. Li, J. Ma, D. Chiang, B. Price, and W. Scheirer, “Measuring Human Perception to Improve Handwritten Document Transcription,” appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 44, No. 10, October 2022.
- J.40. D. Moreira, J. P. Cardenuto, R. Shao, S. Baireddy, D. Cozzolino, D. Gragnaniello, W. Abdelmageed, P. Bestagini, S. Tubaro, A. Rocha, W. Scheirer, L. Verdoliva, and E. Delp, “SILA: A System for Scientific Image Analysis,” appears in *Scientific Reports*, Vol. 12, No. 18306, October 2022.
- J.39. S. Mandelli, D. Cozzolino, E. D. Cannas, J. P. Cardenuto, D. Moreira, P. Bestagini, W. Scheirer, A. Rocha, L. Verdoliva, S. Tubaro, and E. J. Delp, “Forensic Analysis of Synthetically Generated Western Blot Images,” appears in *IEEE Access*, Vol. 10, May 2022.
- J.38. N. Okuda, J. Kinnison, P. Burns, N. Coffee, and W. Scheirer, “The Tesseract Intertext Service,” appears in *Digital Humanities Quarterly*, Vol. 16, No. 1, April 2022.
- J.37. D. Prijatelj, M. McCurrie, S. Anthony, and W. Scheirer, “A Bayesian Evaluation Framework for Subjectively Annotated Visual Recognition Tasks,” appears in *Pattern Recognition*, Vol. 123, March 2022.
- J.36. S. Banerjee, R. VidalMata, Z. Wang, and W. Scheirer, “Report on UG<sup>2</sup>+ Challenge Track 1: Assessing Algorithms to Improve Video Object Detection and Classification from Unconstrained Mobility Platforms,” appears in *Computer Vision and Image Understanding (CVIU)*, Vol. 213, December 2021.
- J.35. R. VidalMata, S. Banerjee, B. RichardWebster, M. Albright, P. Davalos, S. McCloskey, B. Miller, A. Tambo, S. Ghosh, S. Nagesh, Y. Yuan, Y. Hu, J. Wu, W. Yang, X. Zhang, J. Liu, Z. Wang, H.-T. Chen, T.-W. Huang, W.-C. Chin, Y.-C. Li, M. Lababidi, C. Otto, and W. Scheirer, “Bridging the Gap Between Computational Photography and Visual Recognition,” appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 43, No. 12, December 2021.
- J.34. J. Brogan, A. Bharati, D. Moreira, A. Rocha, K. Bowyer, P. Flynn, and W. Scheirer, “Fast Local Spatial Verification for Feature-Agnostic Large-Scale Image Retrieval,” appears in *IEEE Transactions on Information Processing (T-IP)*, Vol. 30, July 2021.
- J.33. B. Meden, P. Rot, P. Terh rst, N. Damer, A. Kuijper, W. Scheirer, A. Ross, P. Peer and V.  truc, “Privacy-Enhancing Face Biometrics: A Comprehensive Survey,” appears in *IEEE Transactions on Information Forensics and Security (T-IFS)*, Vol. 16, July 2021.
- J.32. S. Banerjee, L. Alvey, P. Brown, S. Yue, L. Li, and W. Scheirer, “An Assistive Computer Vision Tool to Automatically Detect Changes in Fish Behavior In Response to Ambient Odor,” appears in *Scientific Reports*, Vol. 11, No. 1002, January 2021.
- J.31. A. Bharati, D. Moreira, P. Flynn, A. Rocha, K. Bowyer, and W. Scheirer, “Transformation-Aware Embeddings for Image Provenance,” appears in *IEEE Transactions on Information Forensics and Security (T-IFS)*, Vol. 16, January 2021.

- J.30. K. Bowyer, M. King, W. Scheirer, and K. Vangara, “The ‘Criminality from Face’ Illusion,” appears in *IEEE Transactions on Technology and Society (T-TS)*, Vol. 1, No. 4, December 2020.
- J.29. W. Yang, Y. Yuan, W. Ren, J. Liu, W. Scheirer, Z. Wang, *et al.*, “Advancing Image Understanding in Poor Visibility Environments: A Collective Benchmark Study,” appears in *IEEE Transactions on Image Processing (T-IP)*, Vol. 29, March 2020.
- J.28. K. Grm, W. Scheirer, and V. Štruc, “Face Hallucination Using Cascaded Super-Resolution and Identity Priors,” appears in *IEEE Transactions on Image Processing (T-IP)*, Vol. 29, October 2019.
- J.27. B. RichardWebster, S. Anthony, and W. Scheirer, “PsyPhy: A Psychophysics Driven Evaluation Framework for Visual Recognition,” appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 41, No. 9, September 2019.
- J.26. S. Banerjee, W. Scheirer, and L. Lei, “An Extreme Value Theory Model of Cross-Modal Sensory Information Integration in Modulation of Vertebrate Visual System Functions,” appears in *Frontiers in Computational Neuroscience*, Vol. 13, February 2019.
- J.25. D. Moreira, A. Bharati, J. Brogan, A. Pinto, M. Parowski, K. Bowyer, P. Flynn, A. Rocha, and W. Scheirer, “Image Provenance Analysis at Scale,” appears in *IEEE Transactions on Image Processing (T-IP)*, Vol. 27, No. 12, December 2018.
- J.24. B. Shen, C. Forstall, A. Rocha, and W. Scheirer, “Practical Text Phylogeny for Real-World Settings,” appears in *IEEE Access*, Vol. 6, No. 1, December 2018.
- J.23. M. McCurrie, F. Beletti, L. Parzianello, A. Westendorp, S. Anthony, and W. Scheirer, “Convolutional Neural Networks for Subjective Face Attributes,” appears in *Image and Vision Computing (IVC)*, Vol. 78, October 2018.
- J.22. A. Shahbazi, J. Kinnison, R. Vescovi, M. Du, R. Hill, M. Joesch, M. Takeno, H. Zeng, N. da Costa, J. Grutzendler, N. Kasthuri, W. Scheirer, “Flexible Learning-Free Segmentation and Reconstruction of Neural Volumes,” appears in *Scientific Reports*, Vol. 8, No. 14247, September 2018.
- J.21. J. Brogan and W. Scheirer, “Facial Frontalization and Smart Matching Via Pose,” appears in *IEEE Intelligent Systems*, Vol. 33, No. 3, May / June 2018.
- J.20. N. Sünderhauf, O. Brock, W. Scheirer, R. Hadsell, D. Fox, J. Leitner, B. Upcroft, P. Abbeel, W. Burgard, M. Milford, and P. Corke, “The Limits and Potentials of Deep Learning for Robotics,” appears in *International Journal of Robotics Research (IJRR)*, Vol. 37, No. 4-5, April 2018.
- J.19. R. Fong\*, W. Scheirer\*, and D. D. Cox, “Using Human Brain Activity to Guide Machine Learning,” appears in *Scientific Reports*, Vol. 8, No. 5397, March 2018. \*Co-first authors.
- J.18. E. Rudd, L. Jain, W. Scheirer, and T. Boulton, “The Extreme Value Machine,” appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 40, No. 3, March 2018.
- J.17. A. Rocha\*, W. Scheirer\*, C. Forstall, T. Cavalcante, A. Theophilo, B. Shen, A. Carvalho, and E. Stamatatos, “Authorship Attribution for Social Media Forensics,” appears in *IEEE Transactions on Information Forensics and Security (T-IFS)*, Vol. 12, No. 1, January 2017. \*Co-first authors.

- J.16. M. Joesch, D. Mankus, M. Yamagata, A. Shahbazi, R. Schalek, A. Suissa-Peleg, M. Meister, J. Lichtman, W. Scheirer, and J. Sanes, "Reconstruction of Genetically Identified Neurons Imaged by Serial-Section Electron Microscopy," appears in *eLife*, Vol. 5, e15015, 2016.
- J.15. J. Papa, W. Scheirer, and D. D. Cox, "Fine-tuning Deep Belief Networks Using Harmony Search," appears in *Applied Soft Computing*, Vol. 46, September 2016.
- J.14. W. Scheirer, C. Forstall, and N. Coffee, "The Sense of a Connection: Automatic Tracing of Intertextuality by Meaning," appears in *Digital Scholarship in the Humanities (DSH)*, Vol. 31, No. 1, April 2016.
- J.13. A. Rattani, W. Scheirer, and A. Ross, "Open Set Fingerprint Spoof Detection Across Novel Fabrication Materials," appears in *IEEE Transactions on Information Forensics and Security (T-IFS)*, Vol. 10, No. 11, November 2015.
- J.12. J. Papa, G. Rosa, A. Marana, W. Scheirer, and D. D. Cox, "Model Selection for Discriminative Restricted Boltzmann Machines Through Meta-heuristic Techniques," appears in *Journal of Computational Science*, Vol. 9, July 2015.
- J.11. W. Scheirer\*, L. Jain\*, and T. Boulton, "Probability Models for Open Set Recognition," appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 36, No. 11, November 2014. \*Co-first authors.
- J.10. M. Milford, E. Vig, W. Scheirer, and D. D. Cox, "Vision-based SLAM in Changing Outdoor Environments," appears in the *Journal of Field Robotics (JFR)*, Vol. 31, No. 5, September / October 2014.
- J.9. W. Scheirer\*, S. Anthony\*, K. Nakayama, and D.D. Cox, "Perceptual Annotation: Measuring Human Vision to Improve Computer Vision," appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 36, No. 8, August 2014. \*Co-first authors.
- J.8. W. Scheirer, M. Wilber, M. Eckmann, and T. Boulton, "Good Recognition is Non-Metric," appears in *Pattern Recognition*, Vol. 47, No. 8, August 2014.
- J.7. F. Costa, E. Silva, M. Eckmann, W. Scheirer, and A. Rocha, "Open Set Source Camera Attribution and Device Linking," appears in *Pattern Recognition Letters (PRL)*, Vol. 39, April 2014.
- J.6. W. Scheirer, A. Rocha, A. Sapkota, and T. Boulton, "Towards Open Set Recognition," appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 35, No. 7, July 2013.
- J.5. W. Scheirer, A. Rocha, J. Parris, and T. Boulton, "Learning for Meta-Recognition," appears in *IEEE Transactions on Information Forensics and Security (T-IFS)*, Vol. 7, No. 4, August 2012.
- J.4. A. Rocha, W. Scheirer, T. Boulton, and S. Goldenstein, "Vision of the Unseen: Current Trends and Challenges in Digital Image and Video Forensics," appears in *ACM Computing Surveys*, Vol. 33, No. 4, October 2011.
- J.3. C. Forstall, S. Jacobson, and W. Scheirer, "Evidence of Intertextuality: Investigating Paul the Deacon's *Angustae Vitae*," appears in *Literary and Linguistic Computing (LLC)*, Vol. 26, No. 3, September 2011.

J.2. W. Scheirer, A. Rocha, R. Micheals, and T. Boulton, “Meta-Recognition: The Theory and Practice of Recognition Score Analysis,” appears in *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, Vol. 33, No. 8, August 2011.

J.1. W. Scheirer and M. Chuah, “Syntax vs. Semantics: Competing Approaches to Dynamic Network Intrusion Detection,” appears in the *International Journal of Security and Networks (IJSN)*, Vol. 3 No. 1, 2008.

### Refereed Conference Papers

C.62. L. Conwill, S. Anthony, and W. Scheirer, “Has the Virtualization of the Face Changed Facial Perception? A Study of the Impact of Photo Editing and Augmented Reality on Facial Perception,” to appear in the Late-Breaking Work Track at the *ACM Conference on Human Factors in Computing Systems (CHI)*, May 2024, Honolulu, Hawaii.

C.61. W. Theisen and W. Scheirer, “C-CLIP: Contrastive Image-Text Encoders to Close the Descriptive-Commentative Gap,” presented at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2024)*, January 2024, Waikoloa, Hawaii.

C.60. Z. Carmichael, S. Lohit, A. Cherian, M. Jones, and W. Scheirer, “Pixel-Grounded Prototypical Part Networks,” presented at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2024)*, January 2024, Waikoloa, Hawaii.

C.59. A. Bernal, W. Scheirer, and J. Cleland-Huang, “NOMAD: A Natural, Occluded, Multi-scale Aerial Dataset, for Emergency Response Scenarios,” presented at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2024)*, January 2024, Waikoloa, Hawaii.

C.58. S. Grieggs, C. Henderson, S. Sobecki, A. Gillespie, and W. Scheirer, “The Paleographer’s Eye *ex machina*: Using Computer Vision to Assist Humanists in Scribal Hand Identification,” presented at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2024)*, January 2024, Waikoloa, Hawaii.

C.57. B. RichardWebster, J. Dulay, A. DiFalco, E. Caldesi, and W. Scheirer, “Psychophysical-Score: A Behavioral Measure for Assessing the Biological Plausibility of Visual Recognition Models,” presented at *CogSci 2023*, July 2023, Sydney, Australia.

C.56. Z. Carmichael and W. Scheirer, “On the Objective Evaluation of Post Hoc Explainers,” oral presentation at the *AAAI Conference on Artificial Intelligence (AAAI 2023)*, February 2023, Washington D.C.

C.55. W. Theisen, D. Gonzalez Cedre, Z. Carmichael, D. Moreira, T. Weninger, and W. Scheirer, “Motif Mining: Finding and Summarizing Remixed Image Content,” presented at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2023)*, January 2023, Waikoloa, Hawaii.

C.54. S. Banerjee, W. Scheirer, K. Bowyer, and P. Flynn, “Analyzing the Impact of Shape & Context on the Face Recognition Performance of Deep Networks,” presented at the *17th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2023)*, January 2023, Waikoloa, Hawaii.

C.53. B. Shen, B. RichardWebster, K. Bowyer, A. O’Toole, and W. Scheirer, “A Study of the Human Perception of Synthetic Faces,” presented at the *16th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2021)*, December 2021.

- C.52. D. Prijatelj, S. Grieggs, F. Yumoto, E. Robertson, and W. Scheirer, “Handwriting Recognition with Novelty,” presented at the *International Conference on Document Analysis and Recognition (ICDAR 2021)*, September 2021, Lausanne, Switzerland.
- C.51. W. Theisen, J. Brogan, P. Bilo Thomas, D. Moreira, P. Phoa, T. Weninger, and W. Scheirer, “Automatic Discovery of Political Meme Genres with Diverse Appearances,” presented at the *International AAAI Conference on Web and Social Media (ICWSM 2021)*, June 2021.
- C.50. T. Boulton, P. Grabowicz, D. Prijatelj, R. Stern, L. Holder, J. Alspector, M. Jafarzadeh, T. Ahmad, A. Dhamija, C. Li, S. Cruz, A. Shrivastava, C. Vondrick, and W. Scheirer, “A Unifying Framework for Formal Theories of Novelty,” presented in the Senior Member Track at the *AAAI Conference on Artificial Intelligence (AAAI 2021)*, February 2021.
- C.49. R. Vidal Mata, W. Scheirer, D. D Cox, A. Kukleva, and H. Kuehne, “Joint Visual-Temporal Embedding for Unsupervised Learning of Actions in Untrimmed Sequences,” presented at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2021)*, January 2021.
- C.48. M. McCurrie, H. Nicholson, W. Scheirer, and S. Anthony, “Modeling Score Distributions and Continuous Covariates: A Bayesian Approach,” presented at the *IAPR/IEEE International Joint Conference on Biometrics (IJCB 2020)*, September 2020.
- C.47. J. Dumford and W. Scheirer, “Backdooring Convolutional Neural Networks via Targeted Weight Perturbations,” presented at the *IAPR/IEEE International Joint Conference on Biometrics (IJCB 2020)*, September 2020.
- C.46. A. Agrawal, S. Abraham, M. Vierhauser, R. Bauer, S. Cox, B. Burger, C. Christine, L. Fraser, J. Hoeksema, S. Hwang, E. Travnik, S. Kumar, W. Scheirer, and J. Cleland-Huang, “The Next Generation of Human-Drone Partnerships: Co-Designing an Emergency Response System,” presented at the *ACM Conference on Human Factors in Computing Systems (CHI)*, April 2020. Honorable Mention Award.
- C.45. S. Banerjee, W. Scheirer, K. Bowyer, and P. Flynn, “On Hallucinating Context and Background Pixels from a Face Mask using Multi-scale GANs,” presented at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2020)*, March 2020, Snowmass, CO.
- C.44. N. Blanchard, J. Kinnison, B. RichardWebster, P. Bashivan, and W. Scheirer, “A Neurobiological Cross-domain Evaluation Metric for Predictive Coding Networks,” presented at the *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2019)*, June 2019, Long Beach, CA.
- C.43. J. Kinnison, M. Trokielewicz, C. Carballo, A. Czajka, and W. Scheirer, “Learning-free Iris Segmentation Revisited: A First Step Toward Fast Volumetric Operation Over Video Samples,” presented at the *12th IAPR/IEEE International Conference on Biometrics (ICB 2019)*, June 2019, Crete, Greece.
- C.42. K. Tornai and W. Scheirer, “Gesture-based User Identity Verification as an Open Set Problem for Smartphones,” presented at the *12th IAPR/IEEE International Conference on Biometrics (ICB 2019)*, June 2019, Crete, Greece.
- C.41. T. Boulton, S. Cruz, A. Dhamija, M. Gunther, J. Henrydoss, and W. Scheirer, “Learning and the Unknown: Surveying Steps Toward Open World Recognition,” presented at the Senior Member Track at the *AAAI Conference on Artificial Intelligence (AAAI 2019)*, January 2019, Honolulu, Hawaii.

- C.40. A. Bharati, D. Moreira, J. Brogan, P. Hale, P. Flynn, K. Bowyer, A. Rocha, and W. Scheirer, “Beyond Pixels: Image Provenance Analysis Leveraging Metadata,” presented at the *IEEE Winter Conference on Applications of Computer Vision (WACV 2019)*, January 2019, Waikoloa, Hawaii.
- C.39. N. Blanchard, K. Skinner, A. Kemp, W. Scheirer, and P. Flynn, “Keep me in, Coach!: a Computer Vision Perspective on Assessing ACL Injury Risk in Female Athletes,” presented at the *IEEE Winter Conference on Applications of Computer Vision (WACV 2019)*, January 2019, Waikoloa, Hawaii.
- C.38. S. Banerjee, W. Scheirer, K. Bowyer, and P. Flynn, “Fast Training-free Face Image Synthesis,” presented at the *IEEE Winter Conference on Applications of Computer Vision (WACV 2019)*, January 2019, Waikoloa, Hawaii.
- C.37. B. RichardWebster, S. Kwon, C. Clarizio, S. Anthony, and W. Scheirer, “Visual Psychophysics for Making Face Recognition Algorithms More Explainable,” presented at the *15th European Conference on Computer Vision (ECCV 2018)*, September 2018, Munich, Germany.
- C.36. R. Metoyer, Q. Zhi, and B. Janczuk, and W. Scheirer, “Coupling Story to Visualization: Using Textual Analysis as a Bridge Between Data and Interpretation,” presented at the *ACM International Conference on Intelligent User Interfaces (IUI 2018)*, March 2018, Tokyo, Japan.
- C.35. J. Kinnison, N. Kremer-Herman, D. Thain, and W. Scheirer, “SHADHO: Massively Scalable Hardware-Aware Distributed Hyperparameter Optimization,” presented at the *IEEE Winter Conference on Applications of Computer Vision (WACV 2018)*, March 2018, Lake Tahoe, Nevada.
- C.34. R. Vidal Mata, S. Banerjee, K. Grm, V. Štruc, and W. Scheirer, “UG<sup>2</sup>: a Video Benchmark for Assessing the Impact of Image Restoration and Enhancement on Automatic Visual Recognition,” presented at the *IEEE Winter Conference on Applications of Computer Vision (WACV 2018)*, March 2018, Lake Tahoe, Nevada.
- C.33. S. Banerjee, J. Brogan, A. Bharati, B. RichardWebster, V. Štruc, P. Flynn, and W. Scheirer, “To Frontalize or Not to Frontalize: Do We Really Need Elaborate Pre-processing to Improve Face Recognition?,” presented at the *IEEE Winter Conference on Applications of Computer Vision (WACV 2018)*, March 2018, Lake Tahoe, Nevada.
- C.32. S. Banerjee, J. Bernhard, W. Scheirer, K. Bowyer, and P. Flynn, “SREFI: Synthesis of Realistic Example Face Images,” presented at the *IAPR/IEEE International Joint Conference on Biometrics (IJCB 2017)*, October 2017, Denver, Colorado.
- C.31. A. Jacobson, W. Scheirer, and M. Milford, “Deja vu: Scalable Place Recognition Using Mutually Supportive Feature Frequencies,” oral presentation at the *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017)*, September 2017, Vancouver, Canada.
- C.30. J. Chen, S. Banerjee, A. Grama, W. Scheirer, and D. Z. Chen, “Neuron Segmentation Using Deep Complete Bipartite Networks,” presented at the *20th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2017)*, September 2017, Quebec City, Canada.
- C.29. J. Brogan, P. Bestagini, A. Bharati, A. Pinto, D. Moreira, K. Bowyer, P. Flynn, A. Rocha, and W. Scheirer, “Spotting the Difference: Context Retrieval and Analysis for Improved Forgery Detection and Localization,” presented at the *IEEE International Conference on Image Processing (ICIP 2017)*, September 2017, Beijing, China.



- C.28. A. Bharati, D. Moreira, A. Pinto, J. Brogan, K. Bowyer, P. Flynn, W. Scheirer, and A. Rocha, “U-Phylogeny: Undirected Provenance Graph Construction in the Wild,” oral presentation at the *IEEE International Conference on Image Processing (ICIP 2017)*, September 2017, Beijing, China.
- C.27. A. Pinto, D. Moreira, A. Bharati, J. Brogan, K. Bowyer, P. Flynn, W. Scheirer, and A. Rocha, “Provenance Filtering for Multimedia Phylogeny,” oral presentation at the *IEEE International Conference on Image Processing (ICIP 2017)*, September 2017, Beijing, China.
- C.26. M. McCurrie, F. Beletti, L. Parzianello, A. Westendorp, S. Anthony, and W. Scheirer, “Predicting First Impressions with Deep Learning,” oral presentation at the *12th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2017)*, May 2017, Washington, D.C.
- C.25. V. Fragoso, W. Scheirer, J. Hespanha, and M. Turk, “One-Class Slab Support Vector Machine,” presented at the *23rd International Conference on Pattern Recognition*, December 2016, Cancun, Mexico.
- C.24. W. Scheirer, P. Flynn, C. Ding, G. Guo, V. Štruc, M. Al Jazaery, K. Grm, S. Dobrisek, D. Tao, Y. Zhu, J. Brogan, S. Banerjee, A. Bharati, and B. RichardWebster, “Report on the BTAS 2016 Video Person Recognition Evaluation,” oral presentation at the *Eighth IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2016)*, September 2016, Niagara, NY.
- C.23. S. Fernandes, W. Scheirer, D. D Cox, J. Papa, “Improving Optimum-Path Forest Classification Using Confidence Measures,” presented at the *Iberoamerican Congress on Pattern Recognition*, October 2015, Montevideo, Uruguay.
- C.22. G. Rosa, J. Papa, A. Marana, W. Scheirer, D. D. Cox, “Fine-tuning Convolutional Neural Networks Using Harmony Search,” presented at the *Iberoamerican Congress on Pattern Recognition*, October 2015, Montevideo, Uruguay.
- C.21. J. Papa, G. Rosa, K. Costa, N. Marana, W. Scheirer, and D. D. Cox, “On the Model Selection of Bernoulli Restricted Boltzmann Machines Through Harmony Search,” presented at the *Annual Conference on Genetic and Evolutionary Computation*, July 2015, Madrid, Spain.
- C.20. L. Jain, W. Scheirer, and T. Bout, “Multi-Class Open Set Recognition Using Probability of Inclusion,” presented at the *13th European Conference on Computer Vision (ECCV 2014)*, September 2014, Zurich, Switzerland.
- C.19. M. Milford, W. Scheirer, E. Vig, A. Glover, O. Baumann, J. Mattingley, and D.D. Cox, “Condition-Invariant, Top-Down Visual Place Recognition,” oral presentation at the *IEEE International Conference on Robotics and Automation (ICRA 2014)*, June 2014, Hong Kong, China.
- C.18. M. Milford, E. Vig, W. Scheirer, and D. D. Cox, “Towards Condition-Invariant, Top-Down Visual Place Recognition,” presented at the *Australasian Conference on Robotics and Automation (ACRA 2013)*, December 2013, Sydney, Australia. Best Paper Finalist.
- C.17. R. C. Johnson, T. Boulton, and W. Scheirer, “Voice Authentication Using Short Phrases: Examining Accuracy, Security and Privacy Issues,” oral presentation at the *Sixth IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2013)*, September 2013, Washington D.C. Best Reviewed Paper.
- C.16. B. Hefflin, W. Scheirer, and T. Boulton, “Detecting and Classifying Scars, Marks, and Tattoos Found in the Wild,” oral presentation at the *Fifth IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2012)*, September 2012, Washington D.C.

- C.15. F. Costa, M. Eckmann, W. Scheirer, and A. Rocha, “Open-set Source Camera Attribution,” presented at *Sibgrapi 2012 (XXV Conference on Graphics, Patterns and Images)*, August 2012, Ouro Preto, Brazil. Best Student Paper Award.
- C.14. W. Scheirer, N. Kumar, P. Belhumeur, and T. Boulton, “Multi-Attribute Spaces: Calibration for Attribute Fusion and Similarity Search,” presented at the *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2012)*, June 2012, Providence, RI.
- C.13. W. Scheirer, N. Kumar, K. Ricanek, P. Belhumeur, and T. Boulton, “Fusing with Context: a Bayesian Approach to Combining Descriptive Attributes,” oral presentation at the *IAPR/IEEE International Joint Conference on Biometrics (IJCB 2011)*, October 2011, Washington D.C.
- C.12. B. Heflin, B. Parks, W. Scheirer, and T. Boulton, “Single Image Deblurring for a Real-Time Face Recognition System,” oral presentation at the *36th Annual Conference of the IEEE Industrial Electronics Society (IECON 2010)*, November 2010, Phoenix, AZ.
- C.11. B. Heflin, W. Scheirer, and T. Boulton, “Correcting Rolling-Shutter Distortion of CMOS Sensors using Facial Feature Detection,” oral presentation at the *Fourth IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2010)*, September 2010, Washington D.C. Best Student Paper Award Runner Up.
- C.10. V. Iyer, W. Scheirer, and T. Boulton, “Face System Evaluation Toolkit: Recognition is Harder Than it Seems,” presented at the *Fourth IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2010)*, September 2010, Washington D.C.
- C.9. W. Scheirer, A. Rocha, R. Micheals, and T. Boulton, “Robust Fusion: Extreme Value Theory for Recognition Score Normalization,” presented at the *11th European Conference on Computer Vision (ECCV 2010)*, September 2010, Crete, Greece.
- C.8. C. Forstall and W. Scheirer “Features from Frequency: Authorship and Stylistic Analysis Using Repetitive Sound,” oral presentation at the *4th Annual Chicago Colloquium on Digital Humanities and Computer Science*, Chicago, IL, November 2009.
- C.7. W. Scheirer, A. Rocha, B. Heflin, and T. Boulton, “Difficult Detection: A Comparison of Two Different Approaches to Eye Detection for Unconstrained Environments,” oral presentation at the *Third IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2009)*, September 2009, Washington, D.C.
- C.6. W. Scheirer and T. Boulton, “Bipartite Biotokens: Definition, Implementation, and Analysis,” oral presentation at the *3rd IAPR/IEEE International Conference on Biometrics (ICB 2009)*, June 2009, Alghero, Italy.
- C.5. W. Scheirer and T. Boulton, “A Fusion Based Approach to Enhancing Multi-Modal Biometric Recognition System Failure Prediction and Overall Performance,” presented at the *Second IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2008)*, September 2008, Washington, D.C.
- C.4. W. Scheirer and T. Boulton, “Bio-Cryptographic Protocols with Bipartite Biotokens,” oral presentation at the *2008 Biometrics Symposium*, held in conjunction with the *Biometrics Consortium Conference (BCC 2008)*, September 2008, Tampa, FL.
- C.3. W. Scheirer and T. Boulton, “Cracking Fuzzy Vaults and Biometric Encryption,” oral presentation at the *2007 Biometrics Symposium*, held in conjunction with the *Biometrics Consortium Conference (BCC 2007)*, September 2007, Baltimore, MD.

C.2. T. Boulton, W. Scheirer, and R. Woodworth, “Revocable Fingerprint Biotokens: Accuracy and Security Analysis,” presented at the *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2007)*, June 2007, Minneapolis, MN.

C.1. D. Lopresti, S. Maas, D. Drake, R. Kaushal, S. Hookway, W. Scheirer, M. Strohmaier, and C. Wojciechowski, “A Bioinformatics Approach to Identify Recoding Events of A-to-I RNA Editing,” presented at the *Computational Systems Bioinformatics Conference*, August 2006, Palo Alto, CA.

### **Refereed Workshop Papers**

W.22. S. Abraham, S. Cruz, S. You, J. Hauenstein, and W. Scheirer, “Multi-Objective Hyperparameter Optimization with Homotopy-Based Strategies for Enhanced Automatic Target Recognition Models,” presented at the *SPIE Defense + Commercial Sensing Symposium*, April 2024, National Harbor, MD. Best Student Paper Award.

W.21. Z. Carmichael and W. Scheirer, “How Well Do Feature-Additive Explainers Explain Feature-Additive Predictors?” presented at the *XAI in Action: Past, Present, and Future Applications Workshop*, co-located with NeurIPS 2023, December 2023, New Orleans, LA.

W.20. S. Abraham, K. Maduranga, J. Kinnison, J. Hauenstein, and W. Scheirer, “NCQS: Non-linear Convex Quadrature Surrogate Hyperparameter Optimization,” oral presentation at the *1st Workshop on Resource Efficient Deep Learning for Computer Vision*, co-located with ICCV 2023, October 2023, Paris, France.

W.19. S. Abraham, J. Kinnison, Z. Miksis, D. Poster, S. You, J. Hauenstein, and W. Scheirer, “Efficient Hyperparameter Optimization for ATR Using Homotopy Parametrization,” presented at the *SPIE Defense + Commercial Sensing Symposium*, April 2023, Orlando, FL. Best Student Paper Award.

W.18. S. Abraham, Z. Carmichael, R. Vidal Mata, S. Banerjee, A. Agrawal, M. N. Al Islam, W. Scheirer, and J. Cleland-Huang, “Adaptive Autonomy in Human-on-the-Loop Vision-Based Robotics Systems,” presented at the *1st Workshop on AI Engineering* co-located with ICSE 2021, May 2021.

W.17. B. Shen, B. Li, and W. Scheirer, “Automatic Virtual 3D City Generation for Synthetic Data Collection,” presented at the *1st Autonomous Vehicle Vision Workshop* co-located with WACV 2021, January 2021.

W.16. S. Biderman and W. Scheirer, “Pitfalls in Machine Learning Research: Reexamining the Development Cycle,” presented at the *I Can’t Believe It’s Not Better! Workshop (ICBINB@NeurIPS 2020)*, December 2020.

W.15. K. Murray, J. Kinnison, T. Q. Nguyen, W. Scheirer, and D. Chiang, “Auto-Sizing the Transformer Network: Improving Speed, Efficiency, and Performance for Low-Resource Machine Translation,” presented at the *3rd Workshop on Neural Generation and Translation (WNGT 2019)*, November 2019, Hong Kong.

W.14. K. Grm, M. Pernuš, L. Cluzel, W. Scheirer, S. Dobrišek, and V. Štruc, “Face Hallucination Revisited: An Exploratory Study on Dataset Bias,” presented at the *IEEE Computer Society Workshop on Biometrics*, June 2019, Long Beach, CA.

W.13. N. Blanchard, A. Bharati, D. Moreira, and W. Scheirer, “Getting the Subtext Without the Text: Scalable Multimodal Sentiment Classification from Visual and Acoustic Modalities,” presented at the First Workshop and Grand Challenge on Computational Modeling of Human Multimodal Language, July 2018, Melbourne, Australia.

- W.12. R. C. Johnson, W. Scheirer, and T. Boulton, “Secure Voice Based Authentication for Mobile Devices: Vaulted Voice Verification,” presented at the *SPIE Defense, Security and Sensing Symposium*, May 2013, Baltimore MD.
- W.11. M. Wilber, W. Scheirer, P. Leitner, B. Heflin, J. Zott, D. Reinke, D. Delaney, and T. Boulton, “Animal Recognition in the Mojave Desert: Vision Tools for Field Biologists,” presented at the *IEEE Workshop on Applications of Computer Vision (WACV 2013)*, January 2013, Clearwater Beach, FL. Best Paper Award (selected by conference attendees).
- W.10. M. Wilber, W. Scheirer, and T. Boulton, “PRIVV: Private Remote Iris-authentication with Vaulted Verification,” presented at the *IEEE Computer Society Workshop on Biometrics*, June 2012, Providence, RI.
- W.9. B. Heflin, W. Scheirer, and T. Boulton, “For Your Eyes Only,” presented at the *IEEE Workshop on Applications of Computer Vision (WACV 2012)*, January 2012, Breckenridge, CO.
- W.8. W. Scheirer, B. Bishop, and T. Boulton, “Beyond PKI: The Biocryptographic Key Infrastructure,” oral presentation at the *IEEE International Workshop on Information Forensics and Security (WIFS 2010)*, December 2010, Seattle, WA.
- W.7. A. Sapkota, B. Parks, W. Scheirer, and T. Boulton, “FACE-GRAB: Face Recognition with General Region Assigned to Binary Operator,” oral presentation at the *IEEE Computer Society Workshop on Biometrics*, June 2010, San Francisco, CA.
- W.6. V. Iyer, S. Kirkbride, B. Parks, W. Scheirer, and T. Boulton, “A Taxonomy of Face Models for System Evaluation,” presented at the *IEEE Workshop on Analysis and Modeling of Faces and Gestures (AMFG 2010)*, June, 2010, San Francisco, CA.
- W.5. W. Scheirer, R. White, and T. Boulton, “Privacy Enhancement via Adaptive Cryptographic Embedding,” oral presentation at the *National Homeland Defense Foundation’s Emerging Technology Day*, October 2008, Colorado Springs, CO.
- W.4. W. Scheirer, A. Bendale, and T. Boulton, “Predicting Biometric Facial Recognition Failure With Similarity Surfaces and Support Vector Machines,” oral presentation at the *IEEE Computer Society Workshop on Biometrics*, June 2008, Anchorage, AK.
- W.3. T. Boulton, W. Scheirer, and R. Woodworth, “FAAD: Face at a Distance,” oral presentation at the *SPIE Defense and Security Symposium*, March 2008, Orlando FL.
- W.2. W. Scheirer, S. Kirkbride, and T. Boulton, “INSPEC<sup>2</sup>T: Inexpensive Spectrometer Color Camera Technology,” presented at the *IEEE Workshop on Applications of Computer Vision (WACV 2008)*, January 2008, Copper Mountain, CO.
- W.1. W. Scheirer and M. Chuah, “Network Intrusion Detection with Semantics-Aware Capability,” oral presentation at the *2nd International Workshop on Security in Systems and Networks (SSN 2006)*, April 2006, Rhodes, Greece.

### Book Chapters

- B.9. T. Boulton, D. Prijetelj, and W. Scheirer, “A Unifying Framework for Novelty,” in T. Boulton and W. Scheirer, editors, *A Unifying Framework for Formal Theories of Novelty: Discussions, Guidelines, and Examples for Artificial Intelligence*. Springer Nature, 2023.

- B.8. A. Shrivastava, P. Kumar, Anubhav, C. Vondrick, W. J. Scheirer, D. Prijatelj, M. Jafarzadeh, T. Ahmad, S. Cruz, R. Rabinowitz, A. Al Shami, T. E. Boulton, “Novelty in Image Classification,” in T. Boulton and W. Scheirer, editors, *A Unifying Framework for Formal Theories of Novelty: Discussions, Guidelines, and Examples for Artificial Intelligence*. Springer Nature, 2023.
- B.7. D. Prijatelj, S. Grieggs, F. Yumoto, E. Robertson, and W. Scheirer, “Novelty in Handwriting Recognition,” in T. Boulton and W. Scheirer, editors, *A Unifying Framework for Formal Theories of Novelty: Discussions, Guidelines, and Examples for Artificial Intelligence*. Springer Nature, 2023.
- B.6. D. Moreira, W. Theisen, W. Scheirer, A. Bharati, J. Brogan, and A. Rocha, “Image Provenance Analysis,” in H. T. Sencar, L. Verdoliva, and N. Memon, editors, *Multimedia Forensics*. Springer, 2022.
- B.5. M. Yankoski, W. Theisen, E. Verdeja, and W. Scheirer, “Artificial Intelligence for Peace: An Early Warning System for Mass Violence,” in T. Keskin and R. D. Kiggins, editors, *Towards an International Political Economy of Artificial Intelligence*. Palgrave Macmillan, Cham, 2021.
- B.4. G. Rosa, J. Papa, and W. Scheirer, “Person Identification Using Handwriting Dynamics and Convolutional Neural Networks,” in R. Singh and M. Vatsa, editors, *Deep Learning in Biometrics*. CRC / Taylor & Francis Press, 2018.
- B.3. W. Scheirer, B. Bishop, and T. Boulton, “Beyond PKI: The Biocryptographic Key Infrastructure,” in P. Campisi editor, *Security and Privacy in Biometrics*. Springer-Verlag, 2013.
- B.2. B. Heflin, W. Scheirer, A. Rocha, and T. Boulton, “A Look at Eye Detection for Unconstrained Environments,” in P. Wang editor, *Pattern Recognition, Machine Intelligence and Biometrics*. Higher Education Press & Springer-Verlag, 2011.
- B.1. T. Boulton and W. Scheirer, “Long Range Facial Image Acquisition and Quality,” in M. Tistarelli, S. Li and R. Chellappa, editors, *Biometrics for Surveillance and Security*. Springer-Verlag, 2009.

### **Edited Volumes**

- E.4. T. Boulton and W. Scheirer (eds.), *A Unifying Framework for Formal Theories of Novelty: Discussions, Guidelines, and Examples for Artificial Intelligence*, Springer Nature, 2023.
- E.3. I. Kakadiaris, A. Kumar, and W. Scheirer (eds.), *Biometric and Surveillance Technology for Human and Activity Identification XII*, Proc. of SPIE Vol. 9457, 2015.
- E.2. I. Kakadiaris, W. Scheirer, and C. Busch (eds.), *Biometric and Surveillance Technology for Human and Activity Identification XI*, Proc. of SPIE Vol. 9075, 2014.
- E.1. I. Kakadiaris, W. Scheirer, and L. Hassebrook (eds.), *Biometric and Surveillance Technology for Human and Activity Identification X*, Proc. of SPIE Vol. 8712, 2013.

### **Monographs**

- M.4. L. Conwill, M. Levis, and W. Scheirer, *Virtue in Virtual Spaces: Catholic Social Teaching and Technology*, Under Contract at Liturgical Press, Anticipated Release in 2024.
- M.3. W. Scheirer, *A History of Fake Things on the Internet*, Stanford University Press, 2023.
- M.2. C. Forstall and W. Scheirer, *Quantitative Intertextuality*, Springer Nature, 2019.

M.1. W. Scheirer, *Extreme Value Theory-based Methods for Visual Recognition*, Morgan & Claypool Publishers, 2017.

### Periodicals

P.9. W. Scheirer “Chi Ha Paura Dei Deepfake?” essay in translation in *WIRED Italia*, March 2024.

P.8. W. Scheirer, “The Strange History — and Even Stranger Future — of Digital Deception,” *Next Big Idea Club Magazine* website story, December 21st, 2023.

P.7. W. Scheirer, “Unlocking Digital Doors: On the Hacker Group That Told Congress They Could Take Down the Internet,” *Literary Hub* website story, December 7th, 2023.

P.6. W. Scheirer, “The Human in AI: Competitor to Us, or Extension of Us?” *Comment Magazine* website story, August 9th, 2023.

P.5. M. Yankoski, W. Scheirer, and T. Weninger, “Meme Warfare: AI Countermeasures to Disinformation Should Focus on Popular, not Perfect, Fakes,” appears in *Bulletin of the Atomic Scientists*, Vol. 77, No. 3, May 2021.

P.4. W. Scheirer, “How to Make AI Less Racist,” *Bulletin of the Atomic Scientists* website story, August 9th, 2020.

P.3. W. Scheirer, “A Pandemic of Bad Science,” appears in *Bulletin of the Atomic Scientists*, Vol. 76, No. 4, July 2020.

P.2. M. Yankoski, T. Weninger, and W. Scheirer, “An AI Early Warning System to Monitor Online Disinformation, Stop Violence, and Protect Elections,” appears in *Bulletin of the Atomic Scientists*, Vol. 76, No. 2, March 2020.

P.1. M. Milford, S. Anthony, and W. Scheirer, “Self-Driving Vehicles: Key Technical Challenges and Progress Off the Road,” appears in *IEEE Potentials*, Vol. 39, No. 1, January-February 2020.

### Non-Refereed Papers

N.5. A. Freytag, V. Ferrari, M. Fritz, U. Franke, T. Boulton, J. Gall, W. Scheirer, A. Yao, and E. Rodner, “Workshop on Interactive and Adaptive Learning in an Open World,” in Proc. of the *15th European Conference on Computer Vision (ECCV 2018)*, September 2018, Munich, Germany.

N.4. A. Rocha and W. Scheirer, “Large-Scale Learning for Media Understanding,” Editorial introducing special issue of same name in *EURASIP Journal on Image and Video Processing*, Vol. 2015.

N.3. W. Scheirer, N. Kumar, V. Iyer, T. Boulton, and P. Belhumeur, “How Reliable are Your Visual Attributes?” Invited Paper at the *SPIE Defense and Security Symposium*, May 2013, Baltimore MD.

N.2. W. Scheirer, A. Rocha, T. Boulton, and S. Goldenstein, “The Unseen Challenge Data Sets,” Invited Paper at the *First IEEE Workitorial on Vision of the Unseen*, June 2008, Anchorage, AK.

N.1. W. Scheirer and M. Chuah, “The Strength of Syntax Based Approaches to Dynamic Network Intrusion Detection,” Invited Paper at the *40th Annual Conference on Information Sciences and Systems (CISS 2006)*, March 2006, Princeton, NJ.

## Patents

U.S. Patent: Systems and Methods for Machine Learning Enhanced by Human Measurements, Patent #US 9,792,532 B2, Issued October 2017.

U.S. Patent: Bio-Cryptography: Secure Cryptographic Protocols with Bipartite Biotokens, Patent #US 8,838,990 B2, Issued September 2014.

U.S. Patent Pending: Method and System for Authenticating Remote Users, Application #US 13/853,783, Filed March 2013.

U.S. Patent Pending: System and Apparatus for Failure Prediction and Fusion in Classification and Recognition, Application #US 12/766,283, Filed April 2010.

## Current Research Support

PI, “Effects of Social Media Filters on Face Recognition,” FBI Programs Research and Standards Unit (via West Virginia University), \$232,881 for 2023 – 2024.

PI, “Multi-Objective Meta-Learning for Integrating Machine Learning and Domain Knowledge,” Army Research Office, \$1,300,847 for 2020 – 2025. Joint work with Jonathan Hauenstein in the Applied and Computational Mathematics and Statistics Department at Notre Dame.

Lead Co-PI (Notre Dame), “A Data-driven Integrated Approach for Semantic Inconsistencies Verification,” DARPA SemaFor Program, \$701,843 for 2020 – 2024. Large consortium project with Purdue (lead institution), University of Siena, University Federico II of Naples, and Politecnico di Milano.

PI, “Learning at the Edge: an Extreme Value Theory for Visual Recognition,” NSF Faculty Early Career Development Program (CAREER), \$531,738 for 2020 – 2025.

Co-PI (with Jane Cleland-Huang in the Dept. of Computer Science and Engineering), “Human-Drone Partnerships in Emergency Response Scenarios,” NSF Cyber-Physical Systems Grant, \$1,186,394 for 2019 – 2023.

Co-PI (with Tim Weninger in the Dept. of Computer Science and Engineering), “Advancing Media Literacy for New Digital Arrivals in Developing Countries,” U.S. Agency for International Development (USAID), \$2,542,898 for 2018 – 2025.

Lead Co-PI (Notre Dame), “Analyzing The Integrity of Scientific Images,” DARPA, \$350,000 for 2021 – 2024. Consortium project with Purdue (lead institution), USC, University Federico II of Naples, and Politecnico di Milano.

## Past Research Support

Co-PI (Notre Dame), “Novelty Methods for General Online Object Deep (Good) Tracking,” DARPA Phase 2 SBIR, \$216,450 for 2022 – 2023. Consortium project with Kitware (lead institution) and the University of Colorado.

Co-PI (Notre Dame), “FLOW: Formalized Learning for Open Worlds,” DARPA SAIL-ON Program, \$485,331 for 2019 – 2022. Consortium project with Kitware (lead institution) and the University of Colorado.

Lead Co-PI (Notre Dame), “Forensic Analysis of Scientific Images,” DARPA Seedling Program, \$313,000 for 2018 – 2022. Consortium project with Purdue (lead institution), USC, and Politecnico di Milano.

PI, “Psychophysical Studies of the Human Perception of Synthetic Faces,” FBI Biometric Center of Excellence (via West Virginia University), \$226,726 for 2020 – 2021.

PI, “Unconstrained Text Optical Character Recognition,” FBI Biometric Center of Excellence (via West Virginia University), \$194,846 for 2019 – 2020.

Co-PI (with Adam Czajka in the Dept. of Computer Science and Engineering), “Contactless Fingerprint Collection,” FBI Biometric Center of Excellence (via West Virginia University), \$219,973 for 2019 – 2020.

Co-PI (with Lei Li in the Dept. of Biological Sciences at Notre Dame), “Increase of Visual Sensitivity by Integration of Multi-Sensory Information,” Department of Army, \$125,000 for 2018 – 2020.

Lead Co-PI (Notre Dame), “Media Forensics Integrity Analytics,” DARPA MediFor Program, \$1,163,391 for 2016 – 2020. Large consortium project with Purdue (lead institution), USC, NYU, University of Siena, and Politecnico di Milano.

PI, “Tesseract Intertext Service: Intertextual Search Access to Digital Collections in the Humanities,” NEH Digital Humanities Advancement Grant, \$279,609 for 2018 – 2020. Joint work between University at Buffalo and Notre Dame (lead institution).

Co-PI (Notre Dame), “CI-New: Collaborative Research: COVE: Computer Vision Exchange for Data, Annotation and Tools,” NSF CISE Research Infrastructure Grant, \$200,686 for 2016 – 2020. Consortium project with University of Michigan (lead institution) and Boston University.

Co-PI (with Patrick Flynn in the Dept. of Computer Science and Engineering), “Synthesis of Example Face Videos,” FBI Biometric Center of Excellence (via West Virginia University), \$247,391 for 2018 – 2019.

PI, “*Verba Volant, Scripta Manent*: Automatic Manuscript Analysis for the Vatican Secret Archives,” Notre Dame Grant from Notre Dame Research, the College of Arts and Letters, the Medieval Institute, and the Office of Mission Engagement, and the Office of Digital Learning, \$32,000 for 2017 – 2019.

PI, “Restoration and Enhancement Techniques for Images Acquired by Small Unmanned Aerial Vehicles,” IARPA Office of Smart Collection, \$556,643.93 for 2016 – 2019.

Co-PI (with multiple PIs in the Dept. of Computer Science and Engineering), “Infrastructure for Supporting Biomedical Application Algorithms, Runtime Development and Resource Management,” NSF CISE Research Infrastructure Grant, \$500,000 for 2016 – 2019.

Co-PI (with Patrick Flynn in the Dept. of Computer Science and Engineering and Kyle Skinner in the Dept. of Athletics), “Markerless Video Analytics for Athletic Performance Characterization,” Notre Dame FRSP Regular Grant, \$99,961 for 2016 – 2019.

Co-PI (Notre Dame), “Algorithms for Representation and Inference informed by the Acquisition of Data from Neuroscience Experiments (ARIADNE),” IARPA MICrONS Program, \$392,442 for 2016 – 2018. Large consortium project with Harvard (lead institution), MIT, University of Chicago, NYU, and the Rockefeller University.

NVIDIA Corporation, Hardware Grant, 2015, 2016, 2017 (Notre Dame).

Co-PI (with Lei Li in the Dept. of Biological Sciences at Notre Dame), “Melatonin Modulation of the Olfacto-Retinal Centrifugal Visual Pathway,” Department of Army, \$50,000 for 2016 – 2017.



Co-PI (UCCS), “Tesserae: A Search Engine for Allusion,” National Endowment for the Humanities Start-up Grant, \$49,835 for 2012–2014 (\$10,000 to UCCS). Joint work with the University at Buffalo.

PI, “AACTIONS: Automated Animal Classification and Tracking in Outdoor Niche Settings,” Air Force Phase II SBIR, \$749,961 for 2012 (project concluded in 2015).

PI, “Forensic Facial Image Analysis Providing 3D Mapping, Metatagging, Comparative Operation and Search System,” Army Phase II SBIR, \$729,800 for 2012 (project concluded in 2014). Joint work with InCadence Strategic Solutions and Intelligent Software Solutions.

PI, “Standoff-Biometric for Non-Cooperative Moving Subjects,” Army Phase II SBIR, \$730,000 for 2012 (project concluded in 2014). Joint work with Animetrics, Inc. and the CGI Group.

PI, “FaceTracer: Organization, Search and Manipulation of Large Databases of Face Images,” Office of Naval Research Phase II SBIR, \$750,000 for 2011–2012. Joint work with Automatic Face Systems, Inc.

PI, “Forensic Facial Image Analysis Providing 3D Mapping, Metatagging, Comparative Operation and Search System,” Army Phase I SBIR, \$120,000 for 2011–2012.

PI, “Standoff-Biometric for Non-Cooperative Moving Subjects,” Army Phase I SBIR, \$120,000 for 2011–2012. Joint work with Animetrics, Inc.

PI (UCCS), “Group Travel Grant for the Doctoral Consortium at the IEEE Conference on Computer Vision and Pattern Recognition,” NSF Grant, \$14,525 for 2011–2012.

PI, “Improving Privacy and Security in Biometrics,” National Science Foundation Phase II STTR, \$656,692 for 2008–2011.

PI, “AACTIONS: Automated Animal Classification and Tracking in Outdoor Niche Settings,” Air Force Phase I SBIR, \$100,000 for 2010.

PI, “FaceTracer: Organization, Search and Manipulation of Large Databases of Face Images,” Office of Naval Research Phase I SBIR, \$70,000 for 2009–2010. Joint work with Automatic Face Systems, Inc.

PI, “Optimizing Remote Capture of Biometrics for Screening Processes,” Department of Homeland Security Phase I SBIR, \$100,000 for 2008.

PA Digital Greenhouse. Awarded \$8,000 for network intrusion detection research. (Fall 2004 - Spring 2005)

### Technical Skills

Programming Languages: Python, C/C++, Java, Matlab, R, perl, Assembly Language (x86, MIPS), Bash, SQL, HTML

Operating Systems: Linux, MacOS, 4.4BSD (OpenBSD, NetBSD, FreeBSD), Microsoft Windows

Software Development: gcc/g++, git, vagrant, virtual box, Java SE, Visual Studio

System Administration: Over 25 years of experience building and maintaining Unix networks.

Document Publishing: L<sup>A</sup>T<sub>E</sub>X, Google Docs, iWork, Microsoft Office

## Professional Activities

### Professional and Academic Membership:

Senior Member of the IEEE, IEEE Computer Society, IEEE Signal Processing Society, Association for Computing Machinery, Society for Neuroscience, Association for Computers and the Humanities, Society of Catholic Scientists

### Academic Service:

General Chair, IEEE/CVF ICCV 2027  
General Chair, IEEE/CVF CVPR 2024  
General Chair, IEEE/CVF WACV 2022  
General Chair, IEEE WACV 2012  
Program Chair, IEEE/CVF WACV 2020  
Program Chair, IEEE WACV 2013, 2014  
Program Chair, IAPR/IEEE IJCB 2017  
Program Chair, IEEE AMFG 2015  
Program Chair, SIBGRAPI 2014  
Chair, SPIE Conference on Biometric and Surveillance Technology for Human and Activity Identification, 2013, 2014, 2015  
Area Chair, ECCV 2022  
Area Chair, IEEE/CVF CVPR 2023  
Area Chair, IEEE/CVF ICCV 2021  
Area Chair, IAPR/IEEE ICB 2015, 2016  
Area Chair, IEEE ICIP 2016  
Area Chair, IEEE FG 2018  
Area Chair, IEEE WACV 2019  
Area Chair, IAPR/IEEE IJCB 2020  
Finance Chair, IEEE BTAS 2015  
Finance Chair, IEEE/CVF CVPR 2019–2021, 2025  
Finance Chair, IEEE CVPR 2011, 2012, 2013, 2017, 2018  
Finance Chair, IEEE FG 2011, 2013, 2015, 2017  
Finance Chair, IEEE/CVF ICCV 2025  
Finance Chair, IEEE ICCV 2017  
Industry Chair, IEEE ICCV 2017  
Corporate Relations Chair, Doctoral Consortium Chair, IEEE CVPR 2011  
Computer Vision Foundation Liaison, IEEE CVPR 2015  
Publications Chair, IEEE BTAS 2012  
Publications Chair, IEEE WIFS 2011  
Publications Chair, IEEE WACV 2008  
Publications Chair, IEEE ICCV 2007  
Competition Chair, IAPR/IEEE IJCB 2014  
Tutorial Chair, IEEE ISBA 2016  
Publicity Chair, IEEE BTAS 2016  
Publicity Chair, IEEE IVPR 2020  
Publicity Chair, IEEE FG 2021  
Awards Committee Chair, WACV 2024  
International Liaison, SIBGRAPI 2018  
Doctoral Consortium Mentor, IEEE BTAS 2015, 2016  
Doctoral Consortium Mentor, IEEE WACV 2018  
Organizer, Video Person Recognition Evaluation, BTAS 2016  
Advisory Board, The UG<sup>2</sup>+ Prize Challenge Workshop, IEEE/CVF CVPR 2020-present  
Organizer, The UG<sup>2</sup>+ Prize Challenge Workshop, IEEE/CVF CVPR 2019  
Organizer, The UG<sup>2</sup> Prize Challenge Workshop, IEEE CVPR 2018  
Organizer, Interactive and Adaptive Learning in an Open World Workshop, ECCV 2018  
Organizer, 1st MSU-ND Computer Vision and Biometrics Workshop, 2019

Organizer, 2nd Workshop on Dealing with the Novelty in Open Worlds, WACV 2023  
 Organizer, Catholic Social Teaching and Technology: Reimagining the Internet, SPIRE 2024  
 Planning Committee, NSF Experts Meeting on *Fostering Collaborative Breakthroughs in Heritage Science Through Machine Learning and Data Science*, 2022  
 Working Group, NEH Project on *Communicating Revealed Text: Best Practices for Born-Digital Editions Using Enhanced Imaging*, 2023–2024  
 Working Group, Mozilla Foundation Responsible Computing Challenge Project on *An Interdisciplinary, Intersectional Community of Practice to Teach Responsible Computing Across the Undergraduate Curriculum*, 2023–2024  
 Member, IEEE Biometrics Council Conference Committee, 2011–2016, 2019–present  
 Member, IEEE Biometrics Council Young Biometrics Researcher Committee, 2017–present  
 Elected Member, IEEE IFS-TC, Term 2015–2017  
 Member, IEEE CAI Steering Committee, 2023–present  
 Member, IAPR Governing Board, 2022–present  
 Chief Technical Officer, Computer Vision Foundation  
 Communication Officer, IEEE PAMI-TC, 2010–2019  
 Vice Chair, IEEE PAMI-TC, 2019–2022  
 Member-at-Large, IEEE Computer Society Technical & Conference Activities Board Executive Committee, 2023–present  
 Member, IEEE Computer Society Emerging Tech Committee  
 Member, IEEE/CVF CVPR ICCV Steering Committee (Ex Officio, Non-Voting), 2023–present  
 Member, IEEE/CVF WACV Steering Committee, 2023–present  
 Member, IEEE/CVF DEI Initiative Executive Committee, 2023–present  
 Member, IEEE PAMI-TC Executive Committee (Ex Officio), 2022–present  
 Chair, IEEE PAMI-TC, 2022–present

#### **Conference/Workshop Reviewing:**

Reviewer, IEEE/CVF CVPR 2019  
 Reviewer, IEEE CVPR 2010–2016, 2018  
 Reviewer, IEEE/CVF ICCV 2019  
 Reviewer, IEEE/CVF ICCV 2013, 2015  
 Reviewer, IEEE/CVF WACV 2023  
 Reviewer, IEEE WACV 2009, 2011, 2012, 2015–2018  
 Reviewer, ECCV 2012, 2014, 2016, 2018  
 Reviewer, NeurIPS 2020  
 Reviewer, AAAI 2021  
 Reviewer, BMVC 2015, 2016  
 Program Committee, ACCV 2012, 2014  
 Program Committee, IEEE FG 2013, 2015, 2017  
 Program Committee, IAPR/IEEE ICB 2013, 2015, 2016, 2019  
 Program Committee, IEEE BTAS 2012, 2013, 2015, 2016, 2019  
 Reviewer, IAPR/IEEE International Joint Conference on Biometrics, 2011, 2014  
 Program Committee, International Workshop on Biometrics in The Wild, 2015, 2017  
 Reviewer, IEEE WBCV 2011  
 Reviewer, IEEE ICIP 2015, 2016, 2017  
 Reviewer, IEEE ICASSP 2016, 2017  
 Reviewer, SIBGRAPI 2016  
 Reviewer, NSF Data Science Workshop at UW, 2015  
 Program Committee, Computer Vision Winter Workshop, 2016  
 Program Committee, IEEE WIFS 2011, 2012, 2015, 2016, 2019  
 Program Committee, IEEE ICME 2012 (Academic Track)  
 Program Committee, IEEE ICME 2011 (Academic & Industrial Track)  
 Program Committee, First IEEE Intl. Conference on Biometrics, Identity and Security, 2009  
 Reviewer, Biometrics Symposium, 2008

Program Committee, First IEEE Workitorial on *Vision of the Unseen*, 2008

**Journal Reviewing:**

Reviewer, IEEE Transactions on Pattern Analysis and Machine Intelligence  
Reviewer, IEEE Transactions on Information Forensics & Security  
Reviewer, IEEE Transactions on Image Processing  
Reviewer, IEEE Transactions on Medical Imaging  
Reviewer, IEEE Transactions on Multimedia  
Reviewer, IEEE Transactions on Systems, Man, and Cybernetics  
Reviewer, IEEE Transactions on Circuits and Systems for Video Technology  
Reviewer, IEEE Transactions on Neural Networks and Learning Systems  
Reviewer, IEEE Transactions on Aerospace and Electronic Systems  
Reviewer, IEEE Transactions on Human-Machine Systems  
Reviewer, IEEE Signal Processing Letters  
Reviewer, IEEE Multimedia Magazine  
Reviewer, IEEE Access  
Reviewer, IEEE Journal of Selected Topics in Signal Processing  
Reviewer, PLOS Computational Biology  
Reviewer, International Journal of Computer Vision  
Reviewer, Pattern Recognition  
Reviewer, Pattern Recognition Letters  
Reviewer, Image and Vision Computing  
Reviewer, Computer Vision and Image Understanding  
Reviewer, EURASIP Journal on Advances in Signal Processing  
Reviewer, International Journal of Remote Sensing  
Reviewer, Journal of Visual Communication and Image Representation  
Reviewer, Neurocomputing  
Reviewer, Information Fusion  
Reviewer, Signal Processing  
Reviewer, Machine Learning  
Reviewer, Digital Humanities Quarterly  
Reviewer, Digital Scholarship in the Humanities  
Reviewer, Psychological Science  
Reviewer, Nature Machine Intelligence  
Reviewer, The Classical Quarterly  
Reviewer, Journal of Advanced Military Studies  
Reviewer, Journal of Machine Learning Research

**Editorships:**

Associate Editor, IEEE Transactions on Pattern Analysis and Machine Intelligence, 2021–present  
Associate Editor, IEEE Transactions on Information Forensics and Security, 2020–2024  
Associate Editor in Chief, Pattern Recognition, 2023–present  
Interim Associate Editor in Chief, Pattern Recognition, 2021–2022  
Associate Editor, Pattern Recognition, 2019–2022  
Editorial Board Member, Scientific Reports, 2019–2021  
Editorial Board Member, IEEE Biometrics Compendium, 2016–2019

Guest Editor, EURASIP International Journal of Image and Video Processing, Special Issue on Large Scale Learning for Media Understanding (<http://jivp.eurasipjournals.com/series/LSLMU>), Vol. 2015.

**Book Reviews:**

Reviewer, Edited Volume, Security and Privacy in Biometrics, Springer 2012

**Proposal Review Panels:**

Ad Hoc Reviewer, National Science Foundation (Robust Intelligence), 2021  
Reviewer, National Science Foundation (Robust Intelligence), 2018, 2019  
Reviewer, National Science Foundation (SBIR/STTR), 2017, 2018, 2020  
Reviewer, National Science Foundation (Secure and Trustworthy Cyberspace), 2019  
Reviewer, Israel Science Foundation, 2016  
Reviewer, Maine Technology Institute, 2014  
Reviewer, King Abdulaziz City for Science and Technology, 2013  
Reviewer, National Science Foundation (Robust Intelligence, SBIR), 2012  
Reviewer, National Institute of Justice, 2011

**Other Review Panels:**

Washington Editorial Review Board Reader, National Institute of Standards and Technology, 2017

**University Service:**

Co-Organizer, *Hackers' Roundtable: A Conversation on Computing, Security, and Culture*, September 2023

Co-Host of the Notre Dame Alumni Association's ThinkND series the *Ethics at Work Podcast*, 2023

Co-Founder and Co-Director, the Ethics at Work Project, 2021–present

Advisory Board of the Notre Dame Institute for Advanced Study, 2019–2023

Digital Humanities Steering Committee, 2018–present

Faculty Search Committee, Department of Computer Science and Engineering, University of Notre Dame, 2021–present; chair of committee in 2023-2024 academic year

Graduate Studies Committee, Department of Computer Science and Engineering, University of Notre Dame, 2021–2022

Bachelor of Arts in Computer Science Implementation Committee, 2020–present

Committee on Appointments and the Committee on Reappointments, Promotion, and Tenure, Department of Computer Science and Engineering, University of Notre Dame, 2020–present

Graduate Student Admissions Committee, Department of Computer Science and Engineering, University of Notre Dame, 2016–2020; 2022

Undergraduate Curriculum Committee, Department of Computer Science and Engineering, University of Notre Dame, 2017, 2018

Social Media Task Force (Chair), Department of Computer Science and Engineering, University of Notre Dame, 2022–present

Research Experiences for Teachers (RET) in Engineering and Computer Science Mentor, Department of Computer Science and Engineering, University of Notre Dame, 2016

Data Intensive Scientific Computing (DISC) Research Experience for Undergraduates Mentor, Department of Computer Science and Engineering, University of Notre Dame, 2018

**University Center and Program Affiliations:**

Center for Social Concerns Faculty Fellow

Kroc Institute for International Peace Studies Faculty Fellow

Notre Dame Technology Ethics Center (ND-TEC) Affiliate

Lucy Family Institute for Data & Society Affiliate

Neuroscience and Behavior Program Affiliate

Sheedy Family Program in Economy, Enterprise, and Society Affiliate

### **Invited and Refereed Talks**

“From Ancient Memes to Modern Myth Cycles: A Reconsideration of Fake Things on the Internet,” invited talk for the Institute for the Study of the Ancient World, New York University, Virtual Event, April 2024.

“Dealing with Disinformation: Lessons from the Past for the Digital Age,” roundtable discussion sponsored by the German Consulate General in New York and the American Council on Germany, Virtual Event, April 2024.

“Photoshop Fantasies,” invited talk for the Notre Dame Club of Hungary, Virtual Event, April 2024.

“Photoshop Fantasies,” guest lecture at Fordham University, Virtual Class Event, April 2024.

“What Is Contemporary AI’s Relationship to the Human Person?” invited Hesburgh Lecture for the Notre Dame Club of Palm Springs and Xavier College Preparatory High School, Palm Desert, CA, March 2024.

“What Is Contemporary AI’s Relationship to the Human Person?” invited talk at *Catholic Social Teaching and Technology: Reimagining the Internet*, a *SPIRE* conference sponsored by the Center for Social Concerns at Notre Dame, Mumbai, India, March 2024.

“Virtue in Virtual Spaces: Catholic Social Teaching and the Internet,” with L. Conwill and M. Levis, invited panel talk at *Catholic Social Teaching and Technology: Reimagining the Internet*, a *SPIRE* conference sponsored by the Center for Social Concerns at Notre Dame, Mumbai, India, March 2024.

“Photoshop Fantasies,” invited Hesburgh Lecture for the Notre Dame Club of Central New Jersey, Martinsville, NJ, February 2024.

“A History of Fake Things on the Internet,” book launch event at the University of Notre Dame, sponsored by the Lucy Family Institute for Data & Society and the John J. Reilly Center for Science, Technology, and Values, February 2024.

“Innovation in Computer Vision: What Works and What Doesn’t,” plenary panelist at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, Waikoloa, HI, January 2024.

“Using AI to Study Semantics in Classical Literature: Perspectives from the Field of Computer Science,” with A. Swenor and N. Coffee, invited talk for the “Future Most Vivid: Creating the Conditions for Human-AI Collaboration in Classical Studies” panel at the *Society for Classical Studies Annual Meeting*, January 2024.

“Photoshop Fantasies,” invited virtual talk for the Recod.ai Laboratory at Universidade Estadual de Campinas, December 2023.

“What Is Contemporary AI’s Relationship to the Human Person?” refereed talk at the *de Nicola Center’s 23rd Annual Fall Conference ‘Dust of the Earth’: On Persons*, University of Notre Dame, November 2023.

“Photoshop Fantasies,” invited talk at *Guardians 2023*, Virtual Conference, sponsored by Brain Health Alliance, Inc., October 2023.

“Photoshop Fantasies: Putting Altered and Synthetic Imagery on the Internet into Context,” invited talk for the *The Center for Global Security Research Lecture Series*, Virtual Research Seminar, sponsored by Lawrence Livermore National Laboratory, September 2023.

“Photoshop Fantasies,” invited talk at the *Notre Dame Data Science Alumni Conference*, Notre Dame, IN, August 2023.

“Perceptography: Unveiling Visual Perceptual Hallucinations Induced by Optogenetic Stimulation of the Inferior Temporal Cortex,” with A. Shahbazi, M. Pernus, T. Ma, and A. Afraz, refereed talk at the *European Conference on Visual Perception 2023*, Paphos, Cyprus, August 2023.

“Photoshop Fantasies,” keynote talk at the *11th ACM Workshop on Information Hiding and Multimedia Security (IH&MMSEC 2023)*, Chicago, IL, June 2023.

“Restyling Reality: How the Internet Shapes Facial Perception,” invited talk at the *Workshop on Humans, Deep Networks & Face Recognition*, University of Notre Dame’s London Global Gateway, London, UK, March 2023.

“Measuring Human Perception to Improve Handwritten Document Transcription,” invited talk at Saint Louis University, Virtual Research Seminar, sponsored by the Department of Computer Science, November 2022.

“Using Catholic Social Teaching to Create Virtuous Social Technologies,” with L. Conwill, M. Levis, and P. Blaschko, refereed talk at the *de Nicola Center’s 22nd Annual Fall Conference ‘And It Was Very Good’: On Creation*, University of Notre Dame, November 2022.

“Using Catholic Social Teaching to Create Virtuous Social Technologies,” with L. Conwill, M. Levis, and P. Blaschko, refereed talk at the *SW/Cyber Engineering Ethics Conference (SWEEC) Virtue in a Virtual World*, Franciscan University of Steubenville, October 2022.

“Developing AI Systems to Fight Online Hoaxes and Rumors,” invited talk for the USAID Center for Democracy, Human Rights, and Governance, Virtual Colloquium, August 2022.

“Document Analysis: There is More Work to be Done,” invited talk at the NSF Experts Meeting on Fostering Collaborative Breakthroughs in Heritage Science Through Machine Learning and Data Science, J. Paul Getty Museum, Los Angeles, CA, July 2022.

“Image Provenance Analysis for Disinformation Detection,” with D. Moreira, invited talk for the Red Hat Research Days event series, July 2022.

“A Unifying Framework for Formal Theories of Novelty in Visual Perception,” invited talk at the *IEEE/CVF Conference on Computer Vision (CVPR) Workshop, “Open World Vision,”* New Orleans, LA, June 2022.

“Restyling Reality: How We Should Think About Fake Things on the Internet,” book talk at the Notre Dame Institute for Advanced Study’s *Resilience* Conference, Notre Dame, IN, April 2022.

“Organizing Politically Salient Visual Disinformation,” invited talk for The Hub for Hybrid Communications in Peacebuilding, Virtual Colloquium, March 2022.

“Organizing Politically Salient Visual Disinformation,” invited talk at the Marine Corps University, Virtual Colloquium, March 2022.

“Visual Psychophysics for Making Face Recognition Algorithms More Explainable,” keynote talk at the *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshop “Explainable and Interpretable AI for Biometrics (xAI4Biometrics)”*, Waikoloa, HI, January 2022.

“The ‘Criminality from Face’ Illusion,” invited talk at the University of Zurich, Virtual Research Seminar, December 2021.

“Organizing Politically Salient Visual Disinformation,” invited talk at the U.S. Department of State’s Bureau of Conflict and Stabilization Operations, Virtual Colloquium, October 2021.

“Making an Impact: RE Where it Matters!,” panelist at the *IEEE International Requirements Engineering Conference*, Notre Dame, IN, September 2021.

“Image Provenance Analysis at Scale,” keynote talk at the *9th IEEE International Workshop on Biometrics and Forensics (IWBF 2021)*, Virtual Conference, May 2021.

“Understanding the Provenance of Visual Disinformation Targeting Science,” invited talk at the *Computational Research Integrity Conference (CRI-CONF 2021)*, Virtual Conference, March 2021.

“Representational Dissimilarity Analysis as a Tool for Neural Network Model Search,” keynote talk at the *AAAI-21 First International Workshop on Meta-Learning for Computer Vision (MeL4CV)*, Virtual Conference, February 2021.

“The ‘Criminality from Face’ Illusion,” invited talk at the *IEEE International Symposium on Technology and Society Virtual Conference*, November 2020.

“Statistical Methods for Open Set Recognition,” invited talk at the From Data Analysis to High-Performance Computing Virtual Conference, hosted by Pázmány Péter Catholic University, October 2020.

“Subjective Face Attributes: the Impossible and Possible,” invited talk at the *European Conference on Computer Vision (ECCV 2020) Workshop, “ChaLearn Fair Face Recognition and Analysis,”* Virtual Conference, August 2020.

“Visual Psychophysics as an Evaluation Regime for Object Recognition,” invited talk at the *European Conference on Computer Vision (ECCV 2020) Workshop, “Beyond mAP: Reassessing the Evaluation of Object Detectors,”* Virtual Conference, August 2020.

“Brain Informed Machine Learning,” invited talk at the Queensland University of Technology, sponsored by the School of Electrical Engineering and Computer Science, Brisbane, Australia, March 2020.

“Visual Psychophysics for Making Face Recognition Algorithms More Explainable,” keynote talk at the *Winter Conference on Applications of Computer Vision (WACV) Workshop, “Vision Applications & Solutions to Biased or Scarce Data,”* Snowmass, CO, March 2020.



“Representational Dissimilarity Analysis as a Tool for Neural Network Model Search,” invited talk at the *Winter Conference on Applications of Computer Vision (WACV) Workshop, “Neural Architecture Search for Computer Vision in the Wild,”* Snowmass, CO, March 2020.

“Measuring Human Perception to Improve Handwritten Document Transcription,” invited talk at Brigham Young University, sponsored by the Department of Computer Science, Provo, UT, February 2020.

“Artificial Intelligence for a Violence Early Warning System,” with M. Yankoski, E. Verdeja, A. Bharati, S. Gregory, and T. Weninger, roundtable discussion at the *Building Sustainable Peace Conference*, Notre Dame, IN, November 2019.

“New Perspectives on Digital Media Integrity,” invited talk at the Humanity and Legal Governance in the Digital Era panel at the *Beijing Forum*, Beijing, China, November 2019.

“The Limits and Potentials of Deep Learning for Facial Analysis,” invited talk at Lehigh University, sponsored by the Department of Computer Science and Engineering, Bethlehem, PA, October 2019.

“The Limits and Potentials of Deep Learning for Facial Analysis,” keynote talk at the *18th International Conference of the Biometrics Special Interest Group (BIOSIG 2019)*, Darmstadt, Germany, September 2019.

“Backdooring Convolutional Neural Networks with Targeted Weight Perturbations,” talk at the DEF CON 27 AI Village, Las Vegas, NV, August 2019.

“What Can We Learn From Human Vision to Make Computer Vision Better?,” invited talk at Indiana University, sponsored by the School of Informatics, Computing, and Engineering, Bloomington, IN, April 2019.

“Statistical Methods for Open Set Recognition,” invited talk at the *Symposium on Big Data Challenges for Predictive Modeling of Complex Systems*, University of Hong Kong, Hong Kong, November 2018.

“*Verba Volant, Scripta Manent*: Approaching the Automatic Transcription of Medieval Manuscripts,” with S. Grieggs, B. Shen, H. Müller, C. Ascik, E. Ellis, M. McKenny, N. Churik, and E. Mahan, refereed talk at the *13th Annual Chicago Colloquium on Digital Humanities and Computer Science*, Chicago, IL, November 2018.

“What Can We Learn From Human Vision to Make Computer Vision Better?,” invited talk at Texas A&M University, sponsored by the Computer Science and Engineering Department, College Station, TX, October 2018.

“What Can We Learn From Human Vision to Make Computer Vision Better?,” invited talk at the *European Conference on Computer Vision (ECCV 2018) Workshop, “Bias Estimation in Face Analytics,”* Munich, Germany, September 2018.

“What Can We Learn From Human Vision to Make Computer Vision Better?,” invited talk at the Air Force Research Laboratory, Rome, NY, August 2018.

“Combining Research and Entrepreneurship: Two Computer Vision Case Studies,” invited talk at the Pontificia Universidad Católica de Chile, Santiago, Chile, July 2018.

“*Verba Volant, Scripta Manent*: An Open Source Platform for Collecting Data to Train OCR Models for Manuscript Studies,” with S. Grieggs, B. Shen, H. Müller, C. Ascik, E. Ellis, M. McKenny, N. Churik, and E. Mahan, refereed talk at Digital Humanities 2018, Mexico City, Mexico, June 2018.

“A Psychophysics Driven Evaluation Framework for Visual Recognition,” invited talk at the *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2018) Workshop “Real-World Challenges and New Benchmarks for Deep Learning in Robotic Vision,”* Salt Lake City, UT, June 2018.

“Computer Vision, Bodies and Brains,” invited talk at the *Midwest Computer Vision Workshop*, Ann Arbor, MI, March 2018.

“*Verba Volant, Scripta Manent*: Automatic Manuscript Analysis for the Vatican Secret Archives,” invited talk for the Digital Humanities Speaker Series, sponsored by the College of Arts and Letters, the Medieval Institute, the Hesburgh Libraries, Notre Dame Research, and the Office of Digital Learning, Notre Dame, IN, February 2018.

“Using Human Behavior and Brain Activity to Guide Machine Learning,” invited talk at the University of Kentucky, sponsored by the Computer Science Department, Lexington, KY, November 2017.

“Using Human Behavior and Brain Activity to Guide Machine Learning,” invited talk at Amazon, Seattle, WA, October 2017.

“Using Human Behavior and Brain Activity to Guide Machine Learning,” invited talk at the University of Colorado Colorado Springs, sponsored by the Department of Computer Science, Colorado Springs, CO, September 2017.

“Bipartisan Briefing on Brain Mapping,” briefing to the Congressional Neuroscience Caucus and the Congressional R&D Caucus, Washington D.C., June 2017.

“Visual Psychophysics for Facial Analysis,” keynote talk at *Biometrics in the Wild 2017*, held in conjunction with *IEEE FG 2017*, Washington D.C., June 2017.

“Quantitative Intertextuality: Analyzing the Markers of Information Reuse,” with C. Forstall, invited talk at *Cultural Analytics 2017*, Notre Dame, IN, May 2017.

“Scalable Strategies for Image Analysis in Neuroscience,” invited talk at West Virginia University, sponsored by the Lane Department of Computer Science and Electrical Engineering, Morgantown, WV, April 2017.

Panelist, *Notre Dame Data Security Conference*, sponsored by the John J. Reilly Center for Science, Technology and Values, University of Notre Dame Law School, Notre Dame, IN, February 2017.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” invited talk at the University of Michigan, sponsored by the Department of Electrical Engineering and Computer Science, Ann Arbor, MI, December 2016.

“The Lannisters Send Their Regards: Intertextual Tools and Theory in the Age of Fandom,” with C. Forstall, talk based on extended abstract at the *11th Annual Chicago Colloquium on Digital Humanities and Computer Science*, Chicago, IL, November 2016.

“Quantitative Intertextuality for Texts Ancient and Modern,” with C. Forstall, invited talk at the College of the Holy Cross, Department of Classics, October 2016.

“The Impact of the Open Set Recognition Problem on Deep Learning,” invited talk at the Di-Carlo Lab, Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, MA, June 2016.

“The Impact of the Open Set Recognition Problem on Deep Learning,” invited talk at the *Robotics: Science and Systems (RSS 2016) Workshop “Are the Sceptics Right? Limits and Potentials of Deep Learning in Robotics,”* Ann Arbor, MI, June 2016.

“Scalable Strategies for Image Analysis in Neuroscience,” invited talk at Argonne National Laboratory, sponsored by the X-Ray Science Division, Lemont, IL, June 2016.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” invited talk at Michigan State University, sponsored by the Department of Computer Science and Engineering, East Lansing, MI, April 2016.

“On the Automatic Tracing of Intertextuality by Meaning,” invited talk at the Faculté de Lettres, Unité de Latin, Université de Genève, Geneva, Switzerland, May 2015.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” invited talk at the Centre Universitaire D’Informatique, Université de Genève, Geneva, Switzerland, May 2015.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” invited talk at the University of South Florida, sponsored by the Department of Computer Science and Engineering, Tampa, FL, January 2015.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” invited talk at the University of California, Santa Barbara, sponsored by the Department of Computer Science, Santa Barbara, CA, December 2014.

“Using Brain Function to Fuel Advances in Computer Vision,” invited talk at the Johns Hopkins University Applied Physics Laboratory, sponsored by the Applied Neuroscience team, Laurel, MD, December 2014.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” invited talk at the University of Notre Dame, sponsored by the Department of Computer Science and Engineering, South Bend, IN, October 2014.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” invited talk at Xerox Research Centre Europe, Grenoble, September 2014.

“Emerging Work in Open Set Recognition for Vision and Language,” invited talk at Fundação Getulio Vargas, sponsored by the Escola de Matemática Aplicada, Rio de Janeiro, August 2014.

“Perceptual Annotation: Measuring Human Vision to Improve Computer Vision,” talk delivered at the Samsung Research Institute Brazil and the Universidade Estadual de Campinas as part of the Samsung Distinguished Speaker Program, Campinas, August 2014.

“Biocryptographic Authentication,” with T. Boulton and R.C. Johnson, talk based on extended abstract at the *Who are you?! Adventures in Authentication: WAY Workshop*, Menlo Park, CA, July 2014.

“Towards Open Set Recognition,” with A. Rocha, A. Sapkota, and T. Boulton, talk based on extended abstract at the *2nd Workshop on Web-scale Vision and Social Media (VSM)*, Columbus, OH, June 2014.

“The Open Set Recognition Problem,” invited talk at the Queensland University of Technology, sponsored by the School of Electrical Engineering and Computer Science, December 2013.

“An Extreme Value Theory Approach to Visual Attributes,” invited talk at Universidade Estadual de Campinas, sponsored by the Instituto de Computação, August 2013.

“Meta-Recognition: Score Analysis and Calibration for Recognition Problems,” invited talk at Boston University, hosted by the Department of Computer Science, April 2013.

“A Snapshot of Security and Privacy in Biometrics,” invited talk at *ICMedia: the International Conference on Multimedia Forensics, Surveillance, and Security*, sponsored by the Polícia Federal, Brasília, September 2012.

“Meta-Recognition: Score Analysis and Calibration for Recognition Problems,” invited talk at the University at Buffalo, hosted by the Computer Science and Engineering Department, May 2012.

“Meta-Recognition, Machine Learning and the Open Set Problem,” invited talk at Universidade Estadual de Campinas, sponsored by the Instituto de Computação, December 2011.

“Biometrics: New Solutions for Privacy and Security,” invited talk at Colorado State University, hosted by the Department of Computer Science, March 2011.

“Literary and Linguistic Computing: Motivation and a Prodigious Case Study,” invited talk at the University at Buffalo, sponsored by the Digital Humanities Initiative and Department of Classics, April 2010.

“Issues in Non-Cooperative Face Recognition,” invited talk at *ROBUST 2008*, Honolulu, HI, November 2008.

“The Integration of the Bundle Security Protocol Features into DTN2,” invited talk at the DTN2RG meeting at IETF 65 in Dallas, TX, March 2006.

“Comparison of Three Sliding-Window Based Worm Signature Generation Schemes,” invited talk at the Lehigh University Network/Computer Security Workshop, August 2005.

## Poster Presentations

“Has the Virtualization of the Face Changed Facial Perception? A Study of the Impact of Augmented Reality on Facial Perception,” with L. Conwill, poster presentation at the *Workshop on Humans, Deep Networks & Face Recognition*, University of Notre Dame’s London Global Gateway, London, UK, March 2023.

“Perceptography: Reconstruction of Perceptual Perturbations Induced by Stimulation of the Inferior Temporal Cortex,” with A. Afraz, E. Shahbazi, and T. Ma, poster presentation at the *22nd Annual Meeting of the Vision Sciences Society*, St. Pete Beach, FL, May 2022. Abstract appears in *Journal of Vision* 22(14):3737.

“Integrating Intertextual Search into Your Web Application: The Tesseract Intertext Service API,” with N. Okuda, J. Kinnison, and N. Coffee, poster presentation at *Digital Humanities 2020*, Virtual Conference, July 2020.

“A Novel Computer Vision Tool to Infer Fish Behavior in Response to Odor Stimulation,” with S. Banerjee and L. Li, poster presentation at the *49th Annual Meeting of the Society for Neuroscience*, Chicago, IL, October 2019.

“*Verba Volant, Scripta Manent*: AI Assisted Manuscript Analysis Supporting the Study of the History of Catholicism,” with S. Grieggs, B. Shen, P. Li, T. Weninger, and David Chiang, poster presentation at the *Third Annual Conference of the Society of Catholic Scientists*, Notre Dame, IN, June 2019.

“Tesseract Intertext Service: Intertextual Search Access to Digital Collections in the Humanities,” with J. Kinnison, N. Okuda, J. O. Gawley, C. Haas, A. C. Diddams, C. Forstall, and Neil Coffee, poster presentation at the *13th Annual Chicago Colloquium on Digital Humanities and Computer Science*, Chicago, IL, November 2018.

“*Verba Volant, Scripta Manent*: Automatic Transcription of Mediaeval Latin Manuscripts,” with S. Grieggs, B. Shen, J. Nolan, L. Song, I. Wang, C. Ascik, E. Ellis, M. McKenny, N. Churik, E. Mahan, and H. Müller, poster presentation at the *2018 Midwest Speech and Language Days*, Notre Dame, IN, May 2018.

“Tesseract Intertext Service: Intertextual Search Access to Digital Collections in the Humanities,” with J. Kinnison, N. Okuda, J. O. Gawley, C. Haas, A. C. Diddams, C. Forstall, and Neil Coffee, poster presentation at the *2018 Midwest Speech and Language Days*, Notre Dame, IN, May 2018.

“Fast Learning-free 2D Segmentation and 3D Reconstruction Software for Sparse Neuronal Circuit Tracing,” with A. Shahbazi, J. Kinnison, M. Joesch, and N. Kasthuri, poster presentation at the *47th Annual Meeting of the Society for Neuroscience*, Washington D.C., November 2017.

“Using Human Brain Activity to Guide Machine Learning,” with R. Fong and D. D. Cox, poster presentation at the *11th Annual Women in Machine Learning Workshop*, Barcelona, December 2016.

“Cross-modal Sensory Information Integration in Modulation of Vertebrate Visual System Functions,” with S. Banerjee and L. Li, poster presentation at the *46th Annual Meeting of the Society for Neuroscience*, San Diego, CA, November 2016.

“Use of Shallow, Non-invariant Representations in High-level Face Perception Tasks,” with S. Anthony, poster presentation at the *15th Annual Meeting of the Vision Sciences Society*, St. Pete Beach, FL, May 2015. Abstract appears in *Journal of Vision* 15(12):934.

“Euterpe’s Hidden Song: Patterns in Elegy,” with C. Forstall, poster presentation at *Digital Humanities 2014*, École Polytechnique Fédérale De Lausanne, July 2014.

“Real-World Computer Vision Applications Are Open, So Should Your Recognition,” with L. Jain and T. Boulton, poster presentation at *The International Workshop on Large Scale Visual Recognition and Retrieval (BigVision 2014)*, Columbus, OH, June 2014.

“Judgments of Personality Traits from Real-World Face Images,” with S. Anthony and K. Nakayama, poster presentation at the *14th Annual Meeting of the Vision Sciences Society*, St. Pete Beach, FL, May 2014. Abstract appears in *Journal of Vision* 14(10):1280.

“Using Brain Structure and Function to Fuel Advances in Machine Learning,” with D. D. Cox, C.-Y. Tsai and N. Kasthuri, *IARPA Machine Intelligence from Cortical Networks Workshop*, Arlington, VA, February 2014.

“Mind the Gap: Creating A Rosetta Stone for Unbiased Comparison of Cell Types and Connectivity between Primate and Mouse Brains,” with N. Kasthuri, D. D. Cox, C.-Y. Tsai, R. Schalek, D.-I. Lee, D. Berger and J. Lichtman, *IARPA Machine Intelligence from Cortical Networks Workshop*, Arlington, VA, February 2014.

“Modelling the Interpretation of Literary Allusion with Machine Learning Techniques,” with N. Coffee, J. Gawley, C. Forstall, D. Johnson, J. Corso and B. Parks, poster presentation at *Digital Humanities 2013*, University of Nebraska-Lincoln, July 2013. Presentation also appears in *The Journal of Digital Humanities*, Vol. 3, No. 1 Spring 2014.

“Human and Computer Face Detection Under Occlusion,” with S. Anthony, D.D. Cox and K. Nakayama, poster presentation at the *13th Annual Meeting of the Vision Sciences Society*, Naples, FL, May 2013. Student Poster Award.

“What makes an Allusion? A Digital Approach,” with C. Forstall, N. Coffee and J. Gawley, poster presentation at the *Digital Classics Association Conference*, Buffalo, NY, April 2013.

“Revealing Hidden Patterns in the Meter of Homer’s *Iliad*,” with C. Forstall, poster presentation at the *7th Annual Chicago Colloquium on Digital Humanities and Computer Science*, Chicago, IL, November 2012.

“Visualizing Sound as Functional n-grams in Homeric Greek Poetry,” with C. Forstall, poster presentation at *Digital Humanities 2011*, Stanford University, June 2011.

“Aspects of Digital Criticism,” with C. Forstall and N. Coffee, installation at E-Poetry [2011]: International Digital Language | Media | Arts Festival, University at Buffalo, May 2011.

“A Statistical Study of Latin Elegiac Couplets,” with C. Forstall, poster presentation at the *5th Annual Chicago Colloquium on Digital Humanities and Computer Science*, Chicago, IL, November 2010.

“Evidence of Intertextuality: Investigating Paul the Deacon’s *Angustae Vitae*,” with C. Forstall and S. Jacobson, poster presentation at *Digital Humanities 2010*, King’s College London, July 2010.

“A Bioinformatics Approach to Identify Recoding Events of A-to-I RNA Editing,” poster presentation at the Greater Philadelphia Bioinformatics Alliance 3rd Annual Retreat, Great Valley, PA, October 2005.

## Tutorials and Seminars

Tutorial Speaker, “Distributed Hyperparameter Optimization and Model Search with Examples using SHADHO,” *IEEE/CVF Winter Conference on Applications of Computer Vision*, Snowmass, CO, March 2020.

Tutorial Speaker, “Statistical Methods for Open Set Recognition,” Pontificia Universidad Católica de Chile, Santiago, Chile, August 2018.

Tutorial Author, “The Open Set Recognition Problem and Its Implications and Opportunities in Visual Computing, Forensics and Security,” *IEEE International Conference on Image Processing*, Phoenix, AZ, September 2016.

Tutorial Speaker, “Statistical Methods for Open Set Recognition,” *IEEE Conference on Computer Vision and Pattern Recognition*, Las Vegas, NV, June 2016.

Tutorial Speaker, “The Open Set Recognition Problem in Information Forensics and Security,” *IEEE International Workshop on Information Forensics and Security*, Roma Tre University, Italy, November 2015.

Tutorial Speaker, “Biometrics: Practical Issues in Privacy and Security,” *IAPR/IEEE International Joint Conference on Biometrics*, Washington D.C., October 2011.

Tutorial Speaker, “Face Recognition: Long-Range and Surveillance,” *IEEE Conference on Automatic Face and Gesture Recognition*, Santa Barbara, CA, March 2011.

Tutorial Author, “Biometrics: Privacy and Social Acceptance,” IEEE Expert Now Series, online course material available in the IEEE eLearning Library, December 2010.

Tutorial Author, “Face Biometrics for Security: Long-Range and Surveillance,” IEEE Expert Now Series, online course material available in the IEEE eLearning Library, December 2010.

Tutorial Speaker, “Biometrics: Understanding Advances in Privacy and Security,” *IEEE Conference on Computer Vision and Pattern Recognition*, San Francisco, CA, June 2010.

Tutorial Speaker, “Template Protection,” *First IEEE International Conference on Biometrics, Identity and Security*, held in conjunction with the *Biometrics Consortium Conference*, Tampa, FL, September 2009.

Tutorial Speaker, “Biometrics: Ethics, Privacy, and Security,” *3rd IAPR/IEEE International Conference on Biometrics*, Alghero, Italy, June 2009.

Tutorial Speaker, First IEEE Workitorial on *Vision of the Unseen*, Anchorage, AK, June 2008.

Seminar Instructor, “Unix-based Forensics Training for Law Enforcement,” led a comprehensive seminar series at Lehigh University for law enforcement encompassing several months of lectures and laboratory exercises, Fall 2004.

## **Student Advising**

### **Doctoral Committees**

Giovani Chiachia (UNICAMP, Ph.D. defended August 2013)  
Archana Sapkota (UCCS, Ph.D. defended November 2013)  
R.C. Johnson (UCCS, Ph.D. defended March 2014)  
Victor Fragoso (UCSB, Ph.D. defended December 2014)  
Abdullah Albahdal (UCCS, Ph.D. defended February 2015)  
Lalit Jain (UCCS, Ph.D. defended April 2015)  
Hamdan Alzahrani (UCCS, Ph.D. defended April 2016)  
Ethan Rudd (UCCS, Ph.D. defended April 2017)  
Fattaneh Bayatbabolghani (Notre Dame, Ph.D. defended May 2017)  
Jianxu Chen (Notre Dame, Ph.D. defended June 2017)  
Lin Yang (Notre Dame, Ph.D. defended July 2018)  
Andrey Kuelkamp (Notre Dame, Ph.D. defended August 2018)  
Svati Dhamija Bendale (UCCS, Ph.D. defended November 2018)  
James Henrydoss (UCCS, Ph.D. defended January 2019)  
Antonios Anastasopoulos (Notre Dame, Ph.D. defended January 2019)  
Sandipan Banerjee (Notre Dame, Ph.D. defended May 2019)  
Yinhao Zhu (Notre Dame, Ph.D. defended August 2019)  
James Gawley (UB, Ph.D. defended September 2019)  
Kenton Murray (Notre Dame, Ph.D. defended December 2019)  
Yizhe Zhang (Notre Dame, Ph.D. defended December 2019)  
Pei Li (Notre Dame, Ph.D. defended January 2020)  
Tianchen Wang (Notre Dame, Ph.D. defended May 2020)  
Toan Nguyen (Notre Dame, Ph.D. defended June 2021)  
Ryan Karl (Notre Dame, Ph.D. defended November 2021)  
Hao Zheng (Notre Dame, Ph.D. defended December 2021)  
Shawn Gu (Notre Dame, Ph.D. defended January 2022)  
Basemah Alshemali (UCCS, Ph.D. defended February 2022)

Jun Han (Notre Dame, Ph.D. expected March 2022)  
 Suraj Mishra (Notre Dame, Ph.D. defended April 2022)  
 Lauren Hensley-Partin (Notre Dame, Ph.D. defended April 2022)  
 Mohammad Izadi (Notre Dame, Ph.D. defended May 2022)  
 Aidan Boyd (Notre Dame, Ph.D. defended February 2023)  
 Brian DuSell (Notre Dame, Ph.D. defended March 2023)  
 Trenton Ford (Notre Dame, Ph.D. defended June 2023)  
 Hongxiao Wang (Notre Dame, Ph.D. defended July 2023)  
 Peixian Liang (Notre Dame, Ph.D. defended July 2023)  
 Clemens Schafer (Notre Dame, Ph.D. defended September 2023)  
 Xinrong Hu (Notre Dame, Ph.D. defended January 2024)  
 Nathan Vance (Notre Dame, Ph.D. defended April 2024)  
 Shreyas Shivakumar (University of Pennsylvania, Ph.D. expected Spring 2024)  
 Dewen Zeng (Notre Dame, Ph.D. expected Summer 2024)  
 Mingxuan Ju (Notre Dame, Ph.D. expected Spring 2025)

### **Doctoral Proposal Reader**

Tariq Iqbal (Notre Dame, Ph.D. proposed April 2016 at Notre Dame, finished at UCSD)  
 Qiuwen Lou (Notre Dame, Ph.D. proposed December 2017)  
 Yu Wang (Notre Dame, Ph.D. proposed March 2020)

### **Master's Committees**

Chris Eberle (UCCS, Master's defended March 2014)

### **Graduate Advising (Visiting)**

Otávio Penatti (UNICAMP, Summer 2012)  
 Klemen Grm (University of Ljubljana, Fall 2016)  
 Martin Pernuš (University of Ljubljana, Fall 2019)

### **Graduate Advising**

Ali Shahbazi (Notre Dame, Ph.D. defended July 2018, now a postdoc at the NIMH)  
 Jacob Dumford (Notre Dame, Master's completed July 2018, now a software engineer at AWS)  
 Nathaniel Blanchard (Notre Dame, Ph.D. defended March 2019, now an assistant professor at Colorado State University)  
 Jeffery Kinnison (Notre Dame, Master's completed April 2019, now a software engineer at Predibase)  
 Joel Brogran (Notre Dame, co-Advised with Kevin Bowyer, Ph.D. defended June 2019, now a postdoc at Oak Ridge National Laboratory)  
 Aparna Bharati (Notre Dame, co-Advised with Kevin Bowyer, Ph.D. defended July 2020, now an assistant professor at Lehigh University)  
 Brandon Richard Webster (Notre Dame, NSF GRFP winner, Fulbright Future Scholarship winner, Ph.D. defended February 2021, now a senior R&D engineer at Kitware)  
 Sreya Banerjee (Notre Dame, Ph.D. defended September 2021, now a postdoc at Harvard Medical School / Massachusetts General Hospital)  
 Bingyu Shen (Notre Dame, Ph.D. defended September 2021, now a software engineer at Pinterest)  
 Timothy Inzitari (Notre Dame, Master's completed December 2022, now a data scientist at Goodyear)  
 Rosaura Vidal Mata (Notre Dame, Ph.D. defended July 2023, co-Advised with Kevin Bowyer, now a mobile AI researcher at Lenovo)  
 Samuel Grieggs (Notre Dame, Ph.D. defended July 2023, now an assistant professor at Indiana University of Pennsylvania)  
 Zachariah Carmichael (Notre Dame, Ph.D. defended March 2024)  
 William Theisen (Notre Dame, Ph.D. defended April 2024, now an assistant teaching professor at the University of Notre Dame)



Justin Dulay (Notre Dame, Master's completed April 2024, now a machine learning engineer at CAPSULE)  
Derek Prijatelj (Notre Dame, Summer 2018 - present)  
Sophia Abraham (Notre Dame, Summer 2019 - present)  
Jin Huang (Notre Dame, Summer 2019 - present)  
Louisa Conwill (Notre Dame, Fall 2021 - present)  
Abigail Swenor (Notre Dame, Summer 2022 - present)  
Arturo Russell (Notre Dame, Summer 2022 - present, co-Advised with Jane Cleland-Huang)

### **Undergraduate Advising**

Kimberly Wilber (UCCS, Fall 2009 - Spring 2013, NSF GRFP winner)  
Jessica Tolbert (Oberlin, Summer 2013)  
Shantanu Sinha (IIT Bombay, Summer 2013)  
Vanessa Tan (Harvard, Summer 2013 - Fall 2013)  
Chase Morrin (Harvard, Summer 2014)  
Anupa Murali (Harvard, Fall 2014 - Spring 2015)  
Amna Hashmi (Harvard, Spring 2015)  
Ruth Fong (Harvard, Spring 2014 - Summer 2015, Rhodes Scholarship winner)  
James Bowyer (Notre Dame, Fall 2015, CSE 48901 Independent Study)  
Kevin Shin (Notre Dame, Spring 2015)  
Zachary Janicki (Notre Dame, Spring 2015)  
Mel McMcCurrie (Notre Dame, Spring 2016, CSE 48901 Independent Study; Summer 2016, RA)  
Fernando Beletti (Notre Dame, Summer 2016)  
Lucas Parzianello (Notre Dame, Summer 2016)  
Matthew Staffelbach (Notre Dame, Fall 2016, Spring 2017, CSE 48901 Independent Study)  
Michael O'Malley (Notre Dame, Fall 2016 - Spring 2017)  
Christopher Clarizio (Notre Dame, Spring 2017, CSE 48901 Independent Study)  
So Yon Kwon (Notre Dame, Spring 2017)  
Michael Parowski (Notre Dame, Fall 2017, CSE 48901 Independent Study)  
Anthony DiFalco (Notre Dame, Fall 2017, CSE 48901 Independent Study)  
Elisabetta Caldesi (Notre Dame, Fall 2017, CSE 48901 Independent Study)  
Patricia Hale (Notre Dame, Spring 2018, CSE 48901 Independent Study)  
William Badart (Notre Dame, Spring 2018, CSE 48901 Independent Study)  
Antonio Minondo (Notre Dame, Spring 2018, CSE 48901 Independent Study)  
Kelly Malecki (Notre Dame, Spring 2018, CSE 48901 Independent Study)  
John Nolan (Notre Dame, Spring 2018, CSE 48901 Independent Study)  
Luke Song (Notre Dame, Spring 2018, CSE 48901 Independent Study)  
Thomas Marshall (Notre Dame, Spring 2018, CSE 48901 Independent Study; Spring 2020)  
Kevin Choy (University of Texas at Austin, Summer 2018)  
Richard Stefanik (Notre Dame, Summer 2018)  
Camila Carballo (Notre Dame, Summer 2018; CSE 48901 Independent Study, Fall 2018)  
Christopher Clarizio (Notre Dame, Spring 2017 and Fall 2018, CSE 48901 Independent Study)  
Chad Cocco (Notre Dame, Fall 2018, CSE 48901 Independent Study)  
Andrew Litteken (Notre Dame, Spring 2019)  
Lauren Alvey (Notre Dame, co-Advised with Lei Li in Biological Sciences, Summer 2019)  
John Hoeksema (Notre Dame, Fall 2019)  
Eamon Lopez Marmion (Notre Dame, Fall 2019)  
Michael Eisemann (Notre Dame, Fall 2019)  
Noah Yoshida (Notre Dame, Fall 2019)  
Riley Griffith (Notre Dame, Fall 2019, CSE 48901 Independent Study)  
Carolyn Davin (Notre Dame, Fall 2020, NDIAS Undergraduate Research Fellow)  
Aderogba Ayoola (Notre Dame, Fall 2020, NDIAS Undergraduate Research Fellow)  
Christine Kwon (Notre Dame, Spring / Fall 2021, CSE 48901 Independent Study)  
Daniel Yu (Notre Dame, Fall 2022 - Spring 2023)

### High School Mentoring

Michael Gohde (Harvard Intern, Spring 2015)

Paula Brown (Notre Dame Intern, co-Advised with Lei Li in Biological Sciences, Summer 2019)

### Postdoctoral Fellows Advised

Christopher Forstall (Notre Dame, Fall 2016 - Summer 2017, now an associate professor at Mount Allison University)

Daniel Moreira (Notre Dame, Summer 2016 - Summer 2020, now assistant professor at Loyola University Chicago)

Michael Yankoski (Notre Dame, Fall 2020 - Spring 2022, co-advised by Tim Weninger, now a postdoctoral associate at the Davis Institute for Artificial Intelligence, Colby College)

K. D. Gayan Maduranga (Notre Dame, Summer 2020 - Summer 2022, co-advised by Jonathan Hauenstein in ACMS, now assistant professor at Tennessee Tech University)

Megan Levis (Notre Dame, Summer 2021 - Summer 2023, now a professor of the practice at the University of Notre Dame)

Zachary Miksis (Notre Dame, Summer 2022 - Summer 2023, now a postdoc at Temple University)

Steve Cruz (Notre Dame, Fall 2023 - present)

### Teaching (Notre Dame)

CSE 40537/60537 Biometrics, Fall 2015

CSE 40567/60567 Computer Security, Spring 2016–2020

CSE 44567 Computer Security, Spring 2018

CSE 40171 Artificial Intelligence, Fall 2018, 2019

CSE 40175 Ethical & Professional Issues, Fall 2021, Spring 2022, Fall 2022, Fall 2023

CSE 20176 The Archeology of Hacking, Spring 2023, 2024 (Notre Dame Core Integration Course)

### Awards & Honors

PAMI Mark Everingham Prize (2022)

Top 10% Reviewer for NeurIPS (2020)

Notre Dame Institute for Advanced Study Faculty Fellow (2020–2021)

NSF CAREER Award (2020)

CHI Honorable Mention Award (2020)

Samsung Distinguished Speaker (2014)

IJCB Best Reviewer Award (2014)

CVPR Outstanding Reviewer Award (2013, 2015, 2019)

ICB Best Reviewer Award (2013)

ECCV Outstanding Reviewer Award (2012, 2014)

ACCV Best Reviewer Award (2012, 2014)

ICME Quality Reviewer Award (2011)

Outstanding Ph.D. Student of the Year, Department of Computer Science, University of Colorado, Colorado Springs (2009)

Chancellor’s Scholarship, University of Colorado, Colorado Springs (2006)

Lehigh University Fellowship (2005)

### Press Coverage

49. “The Simpsons’ Image Showing Bridge Collapse is Fabrication, Not From Show,” *USA Today*, April 2 2024.

48. “Does AI Dream?” interview on Wisconsin Public Radio’s *To the Best of Our Knowledge* (aired nationally on NPR), March 30 2024.

47. “Misinformation Took Over Social Media After the Key Bridge Collapse. Why is This Now a Regular Occurrence — And What Can be Done to Stop it?” *Yahoo News*, March 29 2024.

46. “Image of Hands for Sale as Meat in Grocery Store is AI-generated,” *USA Today*, March 27 2024.
45. “Royal Troll Targets,” interview in *The Sun*, March 19 2024.
44. “Image of Donald Trump Leading Crowd Down Flag-Lined Street is AI-generated,” *USA Today*, March 15 2024.
43. “Computer Vision Book: A History of Fake Things on the Internet,” interview in *Computer Vision News*, March 2024.
42. “A History of Fake Things on the Internet,” interview on the *Ride the Omnibus* podcast, Feb. 28 2024.
41. “Walter Scheirer. Future Vision: On the Internet, Technopanic, and the Limits of AI,” Cover Story, *Red Hat Research Quarterly*, Vol. 5, No. 4, Feb. 2024.
40. “X Post Involving Blue Creek Construction,” WCBS Newsradio 880 New York City, Feb. 22 2024.
39. “Interlaken Construction Company Denies Claim by ‘X’ Post Regarding Middle East Work,” *Asbury Park Press*, Feb. 22 2024.
38. “AI Bots Told My Dad I Was Dead. My Fake Obituaries Sent Me On a Quest For Answers,” *Los Angeles Times*, Feb. 12 2024.
37. “Episode 04 — Dr. Walter Scheirer,” interview on *LOG OFF* podcast, Jan. 26 2024.
36. “Internet Imagination Running Amok,” review of *A History of Fake Things on the Internet* in *The Bulwark*, Jan. 26 2024.
35. “It’s Only a Matter of Time Before Disinformation Leads to Disaster,” *Financial Times*, *FT Magazine*, Jan. 25 2024.
34. “Deepfakes v Democracy,” interview on *The Media Show*, BBC Radio 4, Jan. 24 2024.
33. “Image of Donald Trump, Jeffrey Epstein On Private Jet is AI generated,” *USA Today*, Jan. 12 2024.
32. “From Blueboxing to LLMs via Network Security at Google,” *Google Cloud Security Podcast*, Jan. 8 2024.
31. “Im Chat mit Trump,” review of *A History of Fake Things on the Internet* in *Süddeutsche Zeitung*, Jan. 7 2024.
30. “Mythmaking Online,” review of *A History of Fake Things on the Internet* in *Catholic Herald* (UK), January 2024.
29. “Having Coffee With... Walter Scheirer,” *Notre Dame Magazine*, Winter 2023-24.
28. “A History of Fake Things on the Internet,” interview on WGN 9 Chicago, Dec. 29 2023.
27. “Notre Dame Professor Weighs in On Creative Uses for Artificial Intelligence,” interview on WSBT CBS 22 South Bend, Dec. 26 2023.

26. “Stop Worrying About Deepfakes,” interview in *Nautilus Magazine*, Dec. 20 2023.
25. “The Best Books of 2023,” *A History of Fake Things on the Internet* was selected as one of the best books of the year by *The New Yorker*, Dec. 20 2023.
24. “Fakes: Not an Internet Thing, a Human Thing,” interview in *IEEE Spectrum*, Dec. 15 2023.
23. “A History of Fake Things on the Internet,” interview on Global News Radio 980 CKNW Vancouver, Canada, Dec. 8 2023.
22. “iHeart Radio Premiere Radio Tour with Walter Scheirer,” appeared live and in recorded segments on 12 iHeart radio programs across the country, Dec. 6 2023.
21. “Yes, People Lie Online. But it May Matter Less Than We Fear,” review of *A History of Fake Things on the Internet* in *The Washington Post*, Dec. 2 2023.
20. “Editors’ Picks: Best History Books of December,” *Amazon*, Dec. 1 2023.
19. “We’ve Been Wrong to Worry About Deepfakes (So Far),” *The Political Scene* podcast, Nov. 15 2023.
18. “What the Doomsayers Get Wrong About Deepfakes,” review of *A History of Fake Things on the Internet* in *The New Yorker*, Nov. 13 2023.
17. “The Next Big Idea Club’s December 2023 Must-Read Books,” *A History of Fake Things on the Internet* was selected as a must-read book of December by *Next Big Idea Club*, Oct. 12 2023.
16. Expert source. *Check Your Fact*, Mar. 2023–present.
15. “Limits to Growth: Can AI’s Voracious Appetite for Data Be Tamed?” *Undark Magazine*, Oct. 18 2021.
14. “How can the Biden administration reduce scientific disinformation? Slow the high-pressure pace of scientific publishing,” *Bulletin of the Atomic Scientists*, Jan. 12 2021.
13. “Prof Said Jade Amulets May Block COVID — and Became a Science Supervillain,” *Daily Beast*, Nov. 29 2020.
12. “AI Weekly: AI Phrenology is Racist Nonsense, So of Course it Doesn’t Work,” *VentureBeat*, June 12 2020.
11. “US Military Face Recognition System Could Work from 1 Kilometre Away,” *New Scientist Magazine*, Feb. 15 2020.
10. “How CVPR 2019 Conference — Tech’s Premier Event for Computer Vision — Broke Records on All Fronts,” *IEEE Computer*, July 2 2019.
9. “Teaching Self-Driving Cars to Read Minds,” *The Boston Globe*, Aug. 23 2018.
8. “The US Military is Funding an Effort to Catch Deepfakes and other AI Trickery,” *MIT Technology Review*, May 23 2018.
7. “Facing Facts: Artificial Intelligence and the Resurgence of Physiognomy,” *Undark Magazine*, Nov. 8 2017.

6. "MRI Brain Scans Train Machines to See the World More Like Us," *New Scientist Magazine*, March 29 2017.
5. "Machine-Vision Algorithm Learns to Judge People by Their Faces," *MIT Technology Review*, Nov. 1 2016.
4. "Using Mobile Devices in Fieldwork," *National Wildlife*, May 28 2014.
3. "Smartphones Make Identifying Endangered Animals Easy," *New Scientist Magazine*, Issue 2899, Jan. 10 2013.
2. "The Rise of Voice Biometrics for Mobile Phones," *MIT Technology Review*, Dec. 5 2012.
1. "Computer IDs Culprits with Tattoo Recognition," *Innovation News Daily*, appeared in NBC News, Yahoo News, and Discovery News, Sept. 6 2012.

### **Biographical Information**

Citizenship: United States

Co-organizer and co-founder of the Dream Ride (<http://www.dream-ride.org>), a yearly bicycle ride for charity. Since 2007, the organization has raised over \$78,000 for humanitarian causes in the developing world including education for women, health care, and vaccine research.

Hobbies: Literature, Classical Music, Traveling, Cooking, Cycling, Hiking, Skiing, Golf