Curriculum Vitae

Xiuwen Liu

March 06, 2022

General Information

University address: Computer Science
College of Arts and Sciences
LOVE BUILDING 0166
Florida State University
Tallahassee, Florida 32306-4530

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Professional Preparation

1999 Doctor of Philosophy, Ohio State University-Main Cam. Major: Computer and Information Science. Supervisor: DeLiang Wang.

Xiuwen Liu. (1999). *Computational investigation of feature extraction and image organization*. Unpublished doctoral dissertation, Ohio State University-Main Cam. Retrieved from http://fsvision.fsu.edu/publications/thesis.html.

1996 M.S., Ohio State Univesity. Major: Computer and Information Science.

1995 M.S., Ohio State Univesity. Major: Geodetic Science and Surveying.

1989 B.Eng., Tsinghua University, Beijing, China. Major: Computer Science and Technology.

Professional Experience

2020–present Professor and Chair, Computer Science, Florida State University.

2012–present Professor, Computer Science, Florida State University.

2006–2012 Associate Professor, Computer Science, Florida State University.

2000–2006 Assistant Professor, Department of Computer Science, Florida State University.

1999–2000	Research Scientist, Department of Computer and Information Science, Ohio State University.
1999–2000	Adjunct Professor, Department of Computer Science, Franklin University.
1989–1993	Assistant Lecturer, Department of Computer Science and Technology, Tsinghua University, Beijing, China.

Honors, Awards, and Prizes

Developing Scholarship Award, Florida State University (2008). ($10,000).
Best Paper Award, International Conference on Computer Vision Theory and Applications (2007).
Young Investigator Award, International Neural Network Society (2004).
Best Presentation Awards, International Joint Conference on Neural Networks (1999).
Marr Prize Nomination, International Conference on Computer Vision (1999).
Outstanding Research Award, Department of Computer and Information Science, The Ohio State University (1999).
Travel Fellowship, International Joint Conference on Neural Networks (1999). ($1,000).
Travel Fellowship Award, Annual Conference on Neural Information Processing Systems (1999). ($2,000).
Travel Fellowship Award, International Joint Conference on Neural Networks (1998).
Royalties Payments, Sedona GeoServices, Inc (1997). ($2,000).
Royalties Payments, Sedona GeoServices, Inc (1996). ($2,000).

Fellowship(s)

Presidential Fellowship, Ohio State University (1998–1999).

Current Membership in Professional Organizations

IEEE Computational Intelligence Society
IEEE Computer Society
IEEE Engineering in Medicine and Biology Society
IEEE Signal Processing Society
Institute of Electrical and Electronics Engineers

Teaching

Courses Taught

Deep and Reinforcement Learning Fundamentals (CAP5619)
Directed Individual Study (CIS6900)
Directed Individual Study (CIS5900)
Introduction to Software Reverse Engineering and Malware Analysis (CIS4138)
Software Reverse Engineering and Malware Analysis (CAP5137)
Internship in Computer Science (CIS5949)
Computer Organization I (CDA3100)
Directed Individual Study (CIS4900)
CTF (CIS5900)
DEFENSE CYBER ACEDEMY (CIS5900)
FBI INTERNSHIP (CIS5900)
Graduate Software Project (CIS5915)
Honors Work (CIS4933)
BOOT2ROOT (CIS5900)
CRYPTO CHALLENGES (CIS5900)
CYBER SECURITY CERTIFICATE (CIS5900)
CYBER SECURITY RESEARCH (CIS5900)
DATABASE SECURITY (CIS5900)
GIAC FORENSICS (CIS5900)
SECURITY PLUS (CIS5900)
DEEP LEARNING (CIS6900)
APPLIED CYBER FORENSICS (CIS5930)
Selected Topics in Computer Science (CIS5930)
Special Topics in Computer Science (CIS4930)
Pattern Recognition (CAP5638)
Principles of Computer Organization (CGS5267)
APPLICATION TESTING EXCHANGE (CIS5900)
Principles and Algorithms of Computer Vision (CAP5415)
SFTW RESERVE ENGINEERING/MALWA (CIS4930)
SFTW REVERSE ENGINEER/MALWARE (CIS5930)
COMPUTER VISION WITH NEURAL NT (CIS5900)
RESEARCH IN NEURAL NETWORKS (CIS5900)
REVERSE ENGINEERING STUDY (CIS5900)
COMPUTER VISION (CIS5900)
MALWARE RESEARCH (CIS5900)
OFFENSIVENET. SECURITY (CIS5900)
VISUALIZATION OF COMPUTING (CIS5900)
CYBER PHYSICAL SYSTEMS (CIS5900)
OFFENSIVE COMPUTER SECURITY (CIS4930)
OFFENSIVE COMPUTER SECURITY (CIS5930)
SECURITY RESEARCH (CIS5900)
COMPUTER VISION IN REMOTE SENS (CIS6900)
VULNERABILITY RESEARCH (CIS5900)
COMPUTATIONAL RESILIENCE (CIS6900)

REMOTE SENSING USING COMP VIS (CIS6900)
WIRELESS SECURITY (CIS6900)
Computer Security (CIS5370)
COMPUTER VISION RESEARCH (CIS5900)
DEEP LEARNING NETWORK (CNN) (CIS5900)
MACHINE LEARNING STUDY (CIS6900)
RESEARCH IN SECURITY (CIS5900)
NETWORK STUDY (CIS5900)
Introduction to Computer Graphics (CAP5726)
Computer Graphics (CAP4730)
Directed Individual Study (MAT6908)
Introduction to UNIX (COP3353)
Theoretical Foundations of Computer Vision (CAP6417)
Artificial Neural Networks (CAP5615)
Operating Systems and Concurrent Programming (COP4610)
Principles of Operating Systems (CGS5765)
Advanced Topics in Computer Science (CIS6930)
Operating Systems (COP5611)

New Course Development

Deep & Reinforcement Learning (2018)
Offensive Network Security (2017)
Sotware Reverse Engineering (2016)
Sotware Reverse Engineering (2016)
Offensive Computer Security (2015)
Offensive Computer Security (2015)
Computer Graphics (2008)
Intelligent System Design (2004)
Pattern Recognition (2002)
Principles and Algorithms for Computer Vision (2002)
Theoretical Foundations of Computer Vision (2002)

Doctoral Committee Chair

Podkorytov, M. D., graduate. (2021).
Alshahrani, A. F. M., graduate. (2021).
Bose, S., graduate. (2020).
Atharva, F., graduate. (2018).
Kanel, P., graduate. (2017).
Yang, J., graduate. (2016).
Zhao, N., graduate. (2015).
Zhang, Y., graduate. (2014).

Yuan, J., graduate. (2014).
Cortes, A. D., graduate. (2011).
Wu, Y., graduate. (2010).
Zhu, Y., graduate. (2010).
Bis, D., doctoral candidate.
Salman, S., doctoral candidate.
Sodek, M., doctoral candidate.
Brodhead, K., doctoral student.

Doctoral Committee Cochair

Zhang, C., graduate. (2020).
Banerjee Mukherjee, C., graduate. (2017).
Cai, J., doctoral candidate.

Doctoral Committee Member

Liang, Y., graduate. (2021).
Ren, Y., graduate. (2021).
Roy Choudhury, A., graduate. (2021).
Alahmadi, M. D., graduate. (2020).
Alzaid, Z. S., graduate. (2020).
Ghaffari Dehkordi, S. M., graduate. (2020).
Khandaker, M. R., graduate. (2020).
Thrasher, W. J., graduate. (2020).
Zhang, B., graduate. (2020).
Dorai, G., graduate. (2019).
Abrishami, S., graduate. (2019).
Bayousef, M. S., graduate. (2019).
Parajuli, B., graduate. (2019).
Mukherjee, A., graduate. (2018).
Chen, Y., graduate. (2018).
Akbas, E., graduate. (2017).
Mukherjee, T., graduate. (2016).
Redwood, W. O., graduate. (2016).
Marshall, J. B., graduate. (2015).
Jenkins, J. W., graduate. (2015).
Karabiyik, U., graduate. (2015).
Xu, Q., graduate. (2015).
Bates, J. R., graduate. (2013).
Fincher, J. A., graduate. (2012).
Li, Y., graduate. (2012).
Zhang, W., graduate. (2012).

Yu, H., graduate. (2011).
Connor, M. F., graduate. (2011).
Weir, C. M., graduate. (2010).
Alsolami, M., doctoral candidate.
Banerjee, S., doctoral candidate.
Bhattacharya, A. R., doctoral candidate.
Liu, W., doctoral candidate.
Mainuddin, M., doctoral candidate.
Nath, A. K., doctoral candidate.
Parra Rodriguez, E., doctoral candidate.
Shao, Y., doctoral candidate.
Singh, A., doctoral candidate.

Doctoral Committee University Representative

Al Amer, F. M., graduate. (2021).
Lai, F., graduate. (2021).
Payrovnaziri, S. N., graduate. (2021).
Huang, H., graduate. (2021).
Shen, C., graduate. (2021).
Wang, C., graduate. (2021).
Hao, J., graduate. (2020).
Lo, Chun-Chao, graduate. (2020).
Kakareko, G., graduate. (2019).
Lung, Pei-Yau, graduate. (2019).
Greenwood, M. A., graduate. (2019).
Fan, H., graduate. (2018).
Amirinia, G., graduate. (2017).
Hu, Z., graduate. (2017).
Lester, D. T., graduate. (2017).
Rahman, S., graduate. (2017).
Yao, K. D., graduate. (2016).
Shi, D., graduate. (2016).
Qiu, M., graduate. (2015).
Qin, Z., graduate. (2014).
Ding, L., graduate. (2013).
Osborne, D. E., graduate. (2012).
Coyle, E. J., graduate. (2010).
Crane, M. A., graduate. (2010).
Ordonez, C., graduate. (2010).
Shen, J., graduate. (2010).
Hoang, H., graduate. (2010).
Alinejad, N., doctoral candidate.
Han, Q., doctoral candidate.

Mou, H., doctoral candidate.
Sun, H., doctoral candidate.
Wang, W., doctoral candidate.
Zhang, J., doctoral candidate.
Zhang, Z., doctoral candidate.
Sui, X., doctoral candidate.

Master's Committee Chair

Ashraf, S., graduate. (2021).
Ickes, C., graduate. (2021).
Peng, Kuan-Chieh, graduate. (2020).
Hasarali, T. D., graduate. (2019).
Katti, A. G., graduate. (2019).
Gonzalez, L., graduate. (2018).
Hennenfent, D. M., graduate. (2018).
Schmidt, M. P., graduate. (2018).
Stone, S. A., graduate. (2018).
Patel, A. S., graduate. (2017).
Banerjee Mukherjee, C., graduate. (2017).
Chen, Z., graduate. (2017).
Mudrick, E. M., graduate. (2017).
Ty, S., graduate. (2012).
Monfort, M. A., graduate. (2011).
Grant, B. E., graduate. (2010).
Kaya, G., graduate. (2010).
Hekimian-Williams, C. B., graduate. (2009).

Master's Committee Cochair

Kakareko, G., graduate. (2019).
Ryasnianskiy, Y., graduate. (2019).

Master's Committee Member

Chen, X., graduate. (2021).
Conde Curuchet, J. P., graduate. (2021).
Karapateas, A. X., graduate. (2021).
Jeong, H., graduate. (2021).
Mussman, J., graduate. (2019).
Patel, N. H., graduate. (2019).
Yohn, D., graduate. (2019).

Hernandez Romero, M., graduate. (2018).
Powell, C. K., graduate. (2018).
Parsons, J. W., graduate. (2018).
Stokes, M. W., graduate. (2018).
Castilla, R., graduate. (2018).
Michaels, I. D., graduate. (2018).
Parker, A. R., graduate. (2018).
Torvi, V. G., graduate. (2018).
Wang, Y., graduate. (2017).
Qiao, Y., graduate. (2016).
Xie, N., graduate. (2016).
Clayton, T. J., graduate. (2016).
George, K., graduate. (2016).
Ajith, A. K., graduate. (2016).
Kechkin, Y. Y., graduate. (2015).
McLaughlin, J. C., graduate. (2015).
Timmarajus, S. S. S., graduate. (2015).
Garg, S., graduate. (2015).
Kim, S., graduate. (2015).
Liu, M., graduate. (2015).
Nguyen, J. G., graduate. (2014).
Porrello, D. J., graduate. (2014).
Travis, T. J., graduate. (2014).
Wood, C. W., graduate. (2014).
Kilaru, G., graduate. (2013).
Li, L., graduate. (2012).
Keeton, R. K., graduate. (2011).
Mann, T. F., graduate. (2011).
Merchant, A. M., graduate. (2011).
Brailsford, F. S., graduate. (2010).
Volkova, P. V., graduate. (2009).
Dutta, T., student.

Research and Original Creative Work

Complete research work in computer science is often published in conferences.

Program of Research and/or Focus of Original Creative Work

My main areas of research are computer vision, pattern recognition, image analysis, shape analysis, and their applications in computational biology, security, and video analysis.

Publications

Invited Journal Articles

Liu, X., Burmester, M., Redwood, W. O., Wilder, F., & Bulter, J. (2014). Zero-day vulnerabilities: What to do when it is too late to prevent an attack. *Proceedings of the Marine Safety & Security Council, the Coast Guard Journal of Safety at Sea*, *71*, 28-33. Retrieved from http://www.uscg.mil/proceedings/archive/2014/Vol71_No4_Wint2014.pdf

Refereed Journal Articles

Ghaffari, M., Srinivasan, A., Liu, X., & Chakraborty, S. (2021). High-resolution home location prediction from Twitter activities using consensus deep learning. *Social Network Analysis and Mining*, *11*, 1-12.

Vol. 11 (1).

Whalley, D., Yuan, X., & Liu, X. (2021). The domestic computer science graduate students are there, we just need to recruit them. *Communications of the ACM*, *84*, 39-43.

Vol. 64 (8).

Payrovnaziri, S. N., Chen, Z., Rengifo-Moreno, P., Miller, T., Bian, J., Chen, J. H., Liu, X., & He, Z. (2020). Explainable Artificial Intelligence Models Using Real-World Electronic Health Records Data: a Systematic Scoping Review. *Journal of the American Medical Informatics Association*, *27*(7), 1173–1185. Retrieved from https://academic.oup.com/jamia/article-abstract/27/7/1173/5838471?redirectedFrom=fulltext

Pan, F., Zhang, Y., Lo, C. C., Liu, X., & Zhang, J. (2020). Protein Loop Modeling using Deep Neural Networks Enhanced by Reinforcement Learning. *Biophysical Journal*, *118*(3):43a. Retrieved from DOI: 10.1016/j.bpj.2019.11.418

Zhang, C., Biś, , D., Liu, X., & He, Z. (2019). Biomedical Word Sense Disambiguation with Bidirectional Long Short-Term Memory and Attention-based Neural Networks. *BMC Bioinformatics*, *20*(Suppl 16), 502-516. Retrieved from https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-019-3079-8 doi:doi:10.1186/s12859-019-3079-8

Zhang, Y, Chen, Y., Wang, C., Lo, C-C., Liu, X., Wu, W., & Zhang, J. (2019). ProDCoNN: Protein design using a convolutional neural network. *Proteins*, 1-11. Retrieved from https://onlinelibrary.wiley.com/doi/full/10.1002/prot.25868 doi:DOI: 10.1002/prot.25868

Zhang, Y., Chen, Y., Wang, C., Lo, C. C., Liu, X., Wu, W., & Zhang, J. (2019). ProDCoNN: Protein design using a convolutional neural network. *Proteins Structure Function and Bioinformatics*, *88*(7), 819-829. Retrieved from https://doi.org/10.1002/prot.25868

Banerjee, C., Dutta, M., Liu, X., Roux, K., & Taylor, K. (2019). Segmentation by classification: A novel and reliable approach for semiautomatic selection of HIV/SIV envelope spikes. *Journal of Structural Biology*, *209*(1). Retrieved from https://www.sciencedirect.com/science/article/pii/S1047847719302527 doi:https://doi.org/10.1016/j.jsb.2019.107426

Chen, Z., He, Z., Liu, X., & Bian, J. (2018). Evaluating Semantic Relations in Neural Word Embeddings with Biomedical and General Domain Knowledge Bases. *BMC Medical Informatics and Decision Making*, *18*, 15. Retrieved from https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-018-0630-x doi:https://doi.org/10.1186/s12911-018-0630-

Sharma, A., Liu, X., & Yang, X. (2018). Land Cover Classification from Multi-temporal, Multi-spectral, Remotely Sensed Imagery using Patch-Based Recurrent Neural Networks. *Neural Networks*, *105*, 346-355. Retrieved from https://www.sciencedirect.com/science/article/pii/S0893608018301813 doi:https://doi.org/10.1016/j.neunet.2018.05

Sharma, A., Liu, X., Yang, X., & Shi, D. (2017). A patch-based convolutional neural network for remote sensing image classification. *Neural Networks*, *95*, 19-28. Retrieved from https://www.sciencedirect.com/science/article/pii/S0893608017301806 doi:https://doi.org/10.1016/j.neunet.2017.07

Wisse, L. E. M., Daugherty, A. M., Olsen, R. K., Berron, D., Carr, V. A., Stark, C. E. L., Amaral, R. S. C., Amunts, K., Augustinack, J. C., Full author list, in the comment, & Liu, X. (2016). A harmonized segmentation protocol for hippocampal and parahippocampal subregions: Why do we need one and what are the key goals? *Hippocampus*, *27*(1), 3-11. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/hipo.22671/abstract doi:10.1002/hipo.22671

Full author list: Wisse, Laura E.M. and Daugherty, Ana M. and Olsen, Rosanna K. and Berron, David and Carr, Valerie A. and Stark, Craig E.L. and Amaral, Robert S.C. and Amunts, Katrin and Augustinack, Jean C. and Bender, Andrew R. and Bernstein, Jeffrey D. and Boccardi, Marina and Bocchetta, Martina and Burggren, Alison and Chakravarty, M. Mallar and Chupin, Marie and Ekstrom, Arne and de Flores, Robin and Insausti, Ricardo and Kanel, Prabesh and Kedo, Olga and Kennedy, Kristen M. and Kerchner, Geoffrey A. and LaRocque, Karen F. and Liu, Xiuwen and Maass, Anne and Malykhin, Nicolai and Mueller, Susanne G. and Ofen, Noa and Palombo, Daniela J. and Parekh, Mansi B. and Pluta, John B. and Pruessner, Jens C. and Raz, Naftali and Rodrigue, Karen M. and Schoemaker, Dorothee and Shafer, Andrea T. and Steve, Trevor A. and Suthana, Nanthia and Wang, Lei and Winterburn, Julie L. and Yassa, Michael A. and Yushkevich, Paul A. and la Joie, Renaud.

Ho, S., Hancock, H., Booth, C., & Liu, X. (2016). Computer-Mediated Deception: Strategies Revealed by Language-Action Cues in Spontaneous Communication. *Journal of Management Information Systems*, *33*, 393-420. Retrieved from http://www.tandfonline.com/doi/pdf/10.1080/07421222.2016.1205924?needAccess=true doi:10.1080/07421222.2016.1205924

Cui, H., Kong, D., Liu, X., & Hao, Y. (2014). SCARECROW, SCR-like 23 and SHORTROOT control bundle sheath cell fate and function in Arabidopsis thaliana. *The Plant Journal*, *78*, 319-327. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/tpj.12470/epdf

doi:doi: 10.1111/tpj.12470

Bhattacharya, R. N., Ellingson, L. A., Liu, X., Patrangenaru, V., & Crane, M. A. (2012). Extrinsic analysis on manifolds is computationally faster than intrinsic analysis, with applications to quality control by machine vision. *Applied Stochastic Models in Business and Industry*, *28*(3), 222-235.

Ordonez, C., Chuy, O. Y., Collins, E. G., & Liu, X. (2011). A laser based rut detection and following system for autonomous ground vehicles. *Journal of Field Robotics*, *28*, 158-179.

Donate, A., Liu, X., & Collins, E. (2011). Efficient path based stereo matching with sub-pixel accuracy. *IEEE Transactions on on Systems, Man, and Cybernetics, Part B*, *41*, 183-195.

Shirley J. W., Ty S., Takebayashi S., Liu X., & Gilbert D. M. (2011). FISH Finder: A high-throughput tool for analyzing FISH images. *Bioinformatics*, *27*, 933-938.

Lin W., Jin H., Liu X., Hampton K., & Yu H. (2011). Scc2 regulates gene expression by recruiting cohesin to the chromosome as a transcriptional activator during yeast meiosis. *Molecular Biology of the Cell*, *22*, 1985-1996.

Liu, X., Shi, Y., Dinov, I., & Mio W. (2010). A computational model of multidimensional shape. *International Journal of Computer Vision*, *89*, 69-83.

Patrangenaru, V., Liu, X., & Sugathadasa S. (2010). Nonparametric 3D projective shape estimation from pairs of 2D images - I. *Journal of Multivariate Analysis*, *101*, 11-31.

Balan, V., Crane, M., Patrangenaru, V., & Liu, X. (2009). Projective shape manifolds and coplanarity of landmark configurations. *Balkan Journal of Geometry and Its Applications*, *14*, 1-10.

Mio W., Bowers, J. C., & Liu X. (2009). Shape of Elastic Strings in Euclidean Space. *International Journal of Computer Vision*, *82*, 96-112.

Wu, Y., Liu, X., & Mio W. (2008). Learning representations for object recognition using multi-stage optimal component analysis. *Neural Networks*, *110*, 91-101.

Wu, Y., Liu, X., Mio, W., & Gallivan K. A. (2008). Two stage optimal component analysis via dimensional reduction. *Computer Vision and Image Understanding*, *21*, 214-221.

Mio, W., Srivastava, A., & Liu, X. (2006). Contour Inferences for Image Understanding. *International Journal of Computer Vision*, *69*, 137-144.

Srivastava, A., Liu, X., & Hesher, C. (2006). Face recognition using optimal linear components of range images. *Image and Vision Computing*, *24*, 291-299.

Liu, X., & Wang, D. L. (2006). Image and Texture Segmentation Using Local Spectral Histograms. *IEEE Transactions on Image Processing*, *15*, 3066-3077.

Waring, C., & Liu, X. (2005). Face detection using spectral histograms and SVM. *IEEE Transactions on Systems, Man and Cybernetics - Part B*, *35*, 467-476.

Srivastava, A., Joshi, S. H., Mio, W., & Liu, X. (2005). Statistical shape analysis: Clustering, learning and testing. *IEEE Transactions on Pattern Recognition and Machine Intelligence*, *27*, 590-602.

Srivastava, A., & Liu, X. (2005). Tools for application-driven dimension reduction. *Neurocomputing*, *67*, 136-160.

Liu, X., Srivastava, A., & Gallivan, K. (2004). Optimal linear representations of images for object recognition. *IEEE Transactions on Pattern Recognition and Machine Intelligence*, *26*, 662-666.

Liu, X., & Cheng, L. (2003). Independent spectral representations of images for recognition. *Journal of the Optical Society of America, A*, *20*, 1271-1282.

Liu, X., Srivastava, A., & Wang, D. L. (2003). Intrinsic generalization analysis of low dimensional representations. *Neural Networks*, *16*, 537-545.

Srivastava, A., & Liu, X. (2003). Statistical hypothesis pruning for face recognition from IR images. *Image and Vision Computing*, *21*, 651-661.

Liu, X., & Wang, D. L. (2003). Texture classification using spectral histograms. *IEEE Transactions on Image Processing*, *12*, 661--670.

Zhu, S. C., & Liu, X. (2002). `Learning in Gibbsian fields:How accurate and how fast can it be? *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *24*, 1001-1006.

Liu, X., & Wang, D. L. (2002). A spectral histogram model for texton modeling and texture discrimination. *Vision Research*, *42*, 2617-2634.

Wang, D. L., & Liu, X. (2002). Scene analysis by integrating primitive segmentation and associative memory. *IEEE Transactions on Systems, Man, and Cybernetics*, *32*, 254-268.

Srivastava, A., Liu, X., & Grenander, U. (2002). Universal analytical forms for modeling image probabilities. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *24*, 1200-1214.

Liu, X., Chen, K., & Wang, D. L. (2001). Extraction of hydrographic regions from remote sensing images using an oscillator network with weight adaptation. *IEEE Transactions*

On GeoScience and Remote Sensing, *39*, 207-211.

Liu, X., Wang, D. L., & Ramirez, J. R. (2000). Boundary detection by contextual nonlinear smoothing. *Pattern Recognition*, *33*, 263-280.

Wu, Y. N., Zhu, S. C., & Liu, X. (2000). Equivalence of Julesz ensembles and Gibbs models. *International Journal of Computer Vision*, *38*, 247-265.

Zhu, S. C., Liu, X., & Wu, Y. N. (2000). Exploring texture ensembles by efficient Markov chain Monte Carlo - Toward a `trichromacy' theory of texture. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *22*, 554-569.

Chen, K., Wang, D. L., & Liu, X. (2000). Weight adaptation and oscillatory correlation for image segmentation. *IEEE Transactions on Neural Networks*, *11*, 1106-1123.

Liu, X., & Wang, D. L. (1999). Range image segmentation using an a relaxation oscillator network. *IEEE Transactions on Neural Networks*, *10*, 564-573.

Refereed Book Chapters

Liu, X., & Donate, A. (2010). Three Dimensional Information Extraction and Applications to Video Analysis. In Schonfeld, D., Shan, C., Tao, D., & Wang, L. (Eds.), *Video Search and Mining* (pp. 85-114). Springer-Verlag.

Refereed Proceedings

Payrovnaziri, S. N., Xing, A., Shaeke, S., Liu, X., Bian, J., & He, Z. (2021). Assessing the Impact of Imputation on the Interpretations of Prediction Models: A Case Study on Mortality Prediction for Patients with Acute Myocardial Infarction. In *AMIA 2021 Informatics Summit* (pp. 10). American Medical Informatics Association.

Acceptance rate: roughly 35% (reported by Zhe He; not publicly available).

Podkorytov, M., Biś, D., & Liu, X. (2021). How Can the [MASK] Know? The Sources and Limitations of Knowledge in BERT. In *IJCNN 2021*. IEEE. Retrieved from https://ieeexplore.ieee.org/document/9534299

Acceptance rate: 59.3%.

Alshahrani, A., Ghaffari. M., Amirizirtol, K., & Liu, X. (2021). Optimism/Pessimism Prediction of Twitter Messages and Users Using BERT with Soft Label Assignment. In *2021 International Joint Conference on Neural Networks (IJCNN)* (pp. 1-8). IEEE. Retrieved from https://ieeexplore.ieee.org/abstract/document/9534100

Acceptance rare: 59.3%.

Biś, D., Podkorytov, M., & Liu, X. (2021). Too much in common: Shifting of embeddings in transformer language models and its implications. In *Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies* (pp. 5117-5130). ACL. Retrieved from https://aclanthology.org/2021.naacl-main.403/

Acceptance rate: 26%.

Salman, S., Payrovnaziri, S., Liu, X., Rengifo-Moreno, P., & He, Z. (2020). DeepConsensus: Consensus-based Interpretable Deep Neural Networks with Application to Mortality Prediction. In *2020 International Joint Conference on Neural Networks (IJCNN 2020)* (pp. 1-8). IEEE. Retrieved from https://ieeexplore.ieee.org/abstract/document/9206678

Acceptance rate: 57%.

Podkorytov, M., Bis, D., Cai, J., Amirizirtol, K., & Liu, X. (2020). Effects of Architecture and Training on Embedding Geometry and Feature Discriminability in BERT. In *2020 International Joint Conference on Neural Networks (IJCNN 2020)* (pp. 1-9). IEEE.

Acceptance rate: 57%.

Bose, S., Barao, T., & Liu, X. (2020). Explaining AI for Malware Detection: Analysis of Mechanisms of MalConv. In *2020 International Joint Conference on Neural Networks (IJCNN 2020)* (pp. 1-8). IEEE.

Acceptance rate: 57%.

Alshahrani, A., Ghaffari, M., Amirizirtol, K., & Liu, X. (2020). Identifying Optimism and Pessimism in Twitter Messages Using XLNet and Deep Consensus. In *2020 International Joint Conference on Neural Networks (IJCNN 2020)* (pp. 1-8). IEEE.

Acceptance rate: 57%.

Salman, S., Zhang, C., Liu, X., & Mio, W. (2020). Towards Quantifying Intrinsic Generalization of Deep ReLU Networks. In *2020 International Joint Conference on Neural Networks (IJCNN 2020)* (pp. 1-9). IEEE.

Acceptance rate: 57%.

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Acceptance rate 52.4% (803/1532).

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Nonrefereed Journal Articles

Zhang, C., & Liu, X. (2020). Preserving the hypernym tree of wordnet in dense embeddings. *arXiv Preprint*. Retrieved from arXiv:2004.10863

Sharma, A., Liu, X., & Yang, X. (2017). Land Cover Classification from Multi-temporal, Multi-spectral Remotely Sensed Imagery using Patch-Based Recurrent Neural Networks. *arXiv.org*, 10. Retrieved from https://arxiv.org/abs/1708.00813 doi:arXiv:1708.00813

Nonrefereed Proceedings

Josef D. Allen, Liu, X., Yuan, J., & Rahmes, M. (2011). A compressed sensing method with analytical results for lidar feature classification. In *Proceedings of SPIE*. SPIE.

Allen, J. D., Zhao, N., Yuan, J., & Liu, X. (2011). Unsupervised tattoo segmentation combining bottom-up and top-down cues. In *Proceedings of SPIE*. SPIE.

Liu, X. (2004). A computational framework for real-time scene interpretation. In *In the Proceeding of the Applied Imagery Pattern Recognition Workshop* (pp. 229-234). IEEE.

Wall, G., Iqbal, F., Isaacs, J., Liu, X., & Foo, S. (2004). Real-time texture classification using FPGA. In *In the Proceeding of the Applied Imagery Pattern Recognition Workshop* (pp.

130-135). IEEE.

Gallivan, K., Srivastava, A., Liu, X., & van Dooren, P. (2003). Efficient algorithms for inferences on Grassmann manifolds. In *In the Proceedings of the 12th IEEE Workshop on Statistical Signal Processing* (pp. 301-304). IEEE.

Liu, X., & Zhang, Q. (2003). Spectral histogram representations for visual modeling. In *In the Proceedings of Applied Imagery Pattern Recognition Workshop* (pp. 199-204). IEEE.

Presentations

Nonrefereed Papers at Symposia

Liu, X. (presented 2004). A computational framework for real-time scene interpretation. In *In the Proceeding of the Applied Imagery Pattern Recognition Workshop*. Symposium conducted at the meeting of IEEE. (International)

Wall, G., Iqbal, F., Isaacs, J., Liu, X., & Foo, S. (presented 2004). Real-time texture classification using FPGA. In *In the Proceeding of the Applied Imagery Pattern Recognition Workshop*. Symposium conducted at the meeting of IEEE. (International)

Gallivan, K., Srivastava, A., Liu, X., & Dooren, P. V. (presented 2003). Efficient algorithms for inferences on Grassmann manifolds. In *In the Proceedings of the 12th IEEE Workshop on Statistical Signal Processing*. Symposium conducted at the meeting of IEEE. (International)

Liu, X., & Zhang, Q. (presented 2003). Spectral histogram representations for visual modeling. In *In the Proceedings of Applied Imagery Pattern Recognition Workshop*. Symposium conducted at the meeting of IEEE. (International)

Invited Presentations at Conferences

Liu, X., & Allen, J. D. (accepted). *Cyber-Physical Systems and Security*. Presentation to be given at MILITARY COMMUNICATIONS CONFERENCE, IEEE, Orlando. (International)

I prepared about 131 slides to give a two-hour tutorial on cyber-physical systems and security. However, the conference was cancelled three days before the conference; at that point, I have preparred everything.

Invited Lectures and Readings of Original Work

Liu, X. (2011, August). *Distributed Cyber-Physical Approaches to Defending Against Cascading Events*. Delivered at Oak Ridge National Laboratory, Oak Ridge National Laboratory. (National)

Liu, X. (2010). *Intrinsic Steganalysis*. Delivered at Florida Insititute of Technology, Melbourne, Florida. (Local)

Liu, X. (2003). *Optimal Component Analysis*. Delivered at State Key Laboratory of Intelligent Technology and Systems and Department of Computer Science and Technology, Tsinghua University, Beijing, China. (Local)

Contracts and Grants

Contracts and Grants Funded

Liu, Xiuwen (PI). (Jan 2022–Jan 2023). *PG:High Fidelity Deep Learning For Critical Applications*. Funded by FSU CRC. (None). Total award $24,796.

Liu, Xiuwen (Co-PI), & Burmester, Michael V D (PI). (Sep 2021–Dec 2022). *Cyber Defense Education at Florida State*. Funded by National Security Agency. (H98230-21-1-0266). Total award $268,744.

Liu, Xiuwen (PI). (Sep 2021–Aug 2022). *Data Management Support for Complex HPC Workflows*. Funded by Lawrence Livermore National Laboratory. (B648220). Total award $74,814.

Whalley, David B (Co-PI), Liu, Xiuwen (Co-PI), Wang, An-I A (PI), Perez-Felkner, Lara Christina (Co-PI), & Haiduc, Sonia (Co-PI). (Oct 2020–Sep 2025). *Using Fine-Grained Quantitative and Qualitative Data to EnhanceCurricula and Broaden Participation in Computer Science*. Funded by National Science Foundation. (2030070). Total award $999,848.

Liu, Xiuwen (PI). (Aug 2020–Sep 2021). *CCSF AIML: Embedding-based Knowledge Graphs for Critical Biomedical Applications*. Funded by FSU. (None). Total award $24,836.

Erlebacher, Gordon (Co-PI), Liu, Xiuwen (PI), & Metcalfe, Shuyuan (Co-PI). (May 2020–Aug 2020). *CCSF Covid:Achieving Economic Freedom and Public Health Through Deep Learning and Contact Tracing*. Funded by FSU. (None). Total award $19,520.

Liu, Xiuwen (PI). (Feb 2020–Dec 2030). *Liu- PI Research Support*. Funded by FSU. (None). Total award $614.

Liu, Xiuwen (PI). (Oct 2019–Sep 2022). *Robust High Order Meshing and Analysis for Design Pipeline Automation*. Funded by National Science Foundation. (1910486). Total award $276,722.

Liu, Xiuwen (Co-PI), & Jung, Sungmoon (PI). (Aug 2019–Jul 2022). *Effect of Heterogeneous*

Terrain on Wind Loads on Buildings. Funded by National Science Foundation. (1856205). Total award $451,993.

Liu, Xiuwen (Co-PI), Burmester, Michael V D (PI), & Yu, Ming (Co-PI). (Aug 2019–Nov 2020). *Florida State University CySP Grant*. Funded by National Security Agency. (H98230-19-1-0309). Total award $285,902.

Liu, Xiuwen (Co-PI), & Burmester, Michael V D (PI). (Jul 2019–Dec 2020). *Analyzing and Securing Vehicular Control and Embedded Devices*. Funded by University of West Florida. (221257). Total award $37,500.

Yuan, Xin (PI), & Liu, Xiuwen (Co-PI). (Sep 2018–May 2021). *Applying Reinforcement Learning Techniques in the Interconnect Topology and Routing Design*. Funded by Los Alamos National Laboratory. (497357). Total award $180,303.

Liu, Xiuwen (Co-PI), & Burmester, Michael V D (PI). (Aug 2018–Aug 2019). *Cyber Defense Education At Florida State*. Funded by National Security Agency. (H98230-18-1-0299). Total award $66,107.

Liu, Xiuwen (PI). (Jul 2018–Dec 2019). *Collaborative Seed Award*. Funded by University of South Florida. (3910-1006-02-A). Total award $37,500.

Liu, Xiuwen (Co-PI), Burmester, Michael V D (PI), & Yu, Ming (Co-PI). (Sep 2017–Sep 2019). *Cybersecurity Workforce Education - CNAP Initiatives*. Funded by National Security Agency. (H98230-17-1-0322). Total award $289,027.

Liu, Xiuwen (PI), & Burmester, Michael V D (Co-PI). (Sep 2017–Sep 2019). *Florida State University CyberSecurity Curricula Development*. Funded by National Security Agency. (H98230-17-1-0419). Total award $168,721.

Whalley, David B (Co-PI), Liu, Xiuwen (Co-PI), Burmester, Michael V D (PI), & Yang, Jie (Co-PI). (Sep 2016–Aug 2022). *CYBERCORPS: Scholarship For Service At FSU*. Funded by National Science Foundation. (1565215). Total award $4,599,546.

Liu, Xiuwen (PI). (May 2016–Dec 2017). *Toward Critical Infrastructure Resilience Against Cyber-Induced Attacks*. Funded by University of South Florida. (2108-1072-10-I). Total award $41,165.

Liu, Xiuwen (Co-PI), Burmester, Michael V D (PI), & Yu, Ming (Co-PI). (Sep 2015–Sep 2016). *A Resiliency Framework for Electrical Grids Based on Vulnerability Analysis and HIL Testing*. Funded by National Security Agency. (H98230-15-1-0285). Total award $291,312.

Liu, Xiuwen (PI), & Yang, Xiaojun (Co-PI). (Feb 2015–Jan 2016). *MDS: A Scalable Probabilistic Spatiotemporal Inference Framework for Natural Ecosystem Monitoring by*

Remote Sensing. Funded by FSU CRC. (None). Total award $25,000.

Whalley, David B (Co-PI), Liu, Xiuwen (Co-PI), Burmester, Michael V D (PI), & Hay, Carter H (Co-PI). (Sep 2013–Aug 2018). *Scholarships For Service For FSU MS, CC, And CNSA Students*. Funded by National Science Foundation. (1241525). Total award $2,524,498.

Liu, Xiuwen (Co-PI), & Burmester, Michael V D (PI). (Sep 2013–Sep 2014). *DOD Information Assurance - Information Security Grant Program*. Funded by United States Department of Defense. (H98230-13-1-0410). Total award $53,342.

Liu, Xiuwen (Co-PI), Burmester, Michael V D (Co-PI), & Metcalfe, Shuyuan (PI). (Sep 2013–Aug 2015). *EAGER:Collab Research: Language-Action Causal Graphs for Trustworthiness Attribution in Computer-Mediated Communications*. Funded by National Science Foundation. (1347113). Total award $119,998.

Liu, Xiuwen (Co-PI), & Burmester, Michael V D (PI). (Sep 2012–Sep 2013). *DOD Information Assurance - Information Security Grant Program*. Funded by United States Department of Defense. (H98230-12-1-0442). Total award $38,984.

Liu, Xiuwen (Co-PI), Burmester, Michael V D (PI), Aggarwal, Sudhir (Co-PI), & Li, Feifei (Co-PI). (Sep 2010–Aug 2016). *Scholarships for Service at Florida State University*. Funded by National Science Foundation. (1027217). Total award $1,853,894.

Mio, Washington (Co-PI), & Liu, Xiuwen (PI). (May 2010–Jun 2010). *Defeating Minimum Distortion Techniques*. Funded by L3Harris Technologies, Inc. Total award $15,000.

Mio, Washington (PI), & Liu, Xiuwen (Co-PI). (Sep 2007–Aug 2012). *Novel Computational Methods for the Analysis, Synthesis and Simulation of Shapes of Surfaces*. Funded by National Science Foundation. (0713012). Total award $667,981.

Collins, Emmanuel G (PI), & Liu, Xiuwen (Co-PI). (Sep 2007–Dec 2008). *Human-Robot Collaboration And Interaction Based On Dynamic Models*. Funded by University of Central Florida. (135254). Total award $139,500.

Mio, Washington (Co-PI), Houle, David C (PI), Liu, Xiuwen (Co-PI), & Deng, Wu Min (Co-PI). (Aug 2007–Jul 2010). *Developmental Origin of Phenotypic Variation In Drosophila Melanogaster*. Funded by University of California, Los Angeles. (1581 G JB151). Total award $513,248.

Liu, Xiuwen (PI), & Kumar, Piyush (Co-PI). (Dec 2006–Nov 2007). *Automap3D: A Prototype System for Constructing Annotated 3D Maps and Images and LIDAR*. Funded by FSU CRC. (None). Total award $12,000.

Mio, Washington (PI), Srivastava, Anuj (Co-PI), & Liu, Xiuwen (Co-PI). (Jun 2005–Jun 2009). *Algorithmic Riemanian Geometry for the Statistical Analysis of Images*. Funded by

National Science Foundation. (CCF-0514743). Total award $300,397.

Mio, Washington (Co-PI), Klassen, Eric P (Co-PI), Srivastava, Anuj (PI), & Liu, Xiuwen (Co-PI). (Aug 2004–Sep 2009). *Research on Statistical Shape Theory for Applicati*. Funded by United States Army Robert Morris Acquisition Center. (W911NF-04-1-0268). Total award $372,684.

Mio, Washington (Co-PI), Baker, Theodore P (Co-PI), Srivastava, Anuj (PI), & Liu, Xiuwen (Co-PI). (May 2004–Apr 2006). *A Laboratory for Real Time Computer Vision Applica*. Funded by United States Army Robert Morris Acquisition Center. (W911NF-04-1-0113). Total award $346,719.

Mio, Washington (PI), Klassen, Eric P (Co-PI), Srivastava, Anuj (Co-PI), & Liu, Xiuwen (Co-PI). (Sep 2003–Aug 2004). *Stochastic Shape Analysis for Recognizing and Trac*. Funded by National Science Foundation. (DMS-0345242). Total award $100,000.

Srivastava, Anuj (Co-PI), & Liu, Xiuwen (PI). (Aug 2003–Aug 2007). *Seeking Optimal Representations, Classifiers, and*. Funded by National Science Foundation. (IIS-0307998). Total award $342,329.

Srivastava, Anuj (PI), & Liu, Xiuwen (Co-PI). (Mar 2001–Jul 2004). *Computational Models and Algorithms for Automated*. Funded by National Institute for Global Environmental Change. (NMA201-01-1-2010). Total award $287,522.

Contracts and Grants Pending

Whalley, David B (Co-PI), Liu, Xiuwen (Co-PI), Wang, An-I A (PI), Perez-Felkner, Lara Christina (Co-PI), & Haiduc, Sonia (Co-PI). (Apr 2020). *Broadening Participation in Computer Science*. Submitted to National Science Foundation.

Service

Florida State University

FSU University Service

Member, Degree Program Common Prerequisite Committee (2019–present).

Review CIP requests for CIP 11.0103 for FSU.

Alternate member, University Sabbatical Committee (2009–2010).

FSU College Service

Dean's Representative, Chair Search Committee for Neuroscience Program (2010–2011).

FSU Department Service

ABET Coordinator, ABET (2019–present).

Revise curricula, prepare ABET reports, coordinate ABET visits, and prepare post-visit reports.

Associate Chair, Associate Chair (2019–present).

Help the chair to deal with departmental issues.

Member, ABET liason (2014–2015).

Working with the chair to provide documents requested by ABET.

Lead Chair, Financial Aid and Admissions Committee (2014–2015).

I reviewed applications for Spring 2015 and are reviewing applications for Fall 2015 and summer 2013 of applicants from countries other than India and China. I also try to help students in the program to resolve issues when possible. I also oversee the application evaluation from India and China. With others, I also worked on a policy to directly recruit students.

Chair, Faculty Recruitment Committee (2014–2015).

Reviewed faculty applications, answered questions from applicants, organized evaluation meetings, coordinated candidate interviews, and hosted one candidate.

Member, PhD Portfolio & Quals (2014–2015).

Chair, Financial Aid and Admissions Committee (2013–2014).

I reviewed applications for Spring 2013 and are reviewing applications for Fall 2013 and summer 2013. I try to help students in the program to resolve issues when possible. I expect to review over 250 graduate students applications for Fall/Summer 2013.

Chair, Financial Aid and Admissions Committee (2012–2013).

I reviewed applications for Spring 2013 and are reviewing applications for Fall 2013 and summer 2013. I try to help students in the program to resolve issues when possible. I expect to review over 250 graduate students applications for Fall/Summer 2013.

Member, Faculty Recruitment Committee (2012–2013).

Reviewed every faculty applicant and provided comments. Participated in recruitment meetings and discussions. Hosted one candidate and were involved in most recruiting.

Chair, Financial Aid and Admissions Committee (2001–2012).

I reviewed every graduate stiudent application and ask the committee to provide additional evaluations for good international and domestic ones. I tried to identify students for faculty who like to hire graduate

students. I aslo replied to students' inquiries quickly in an effort to attract as many as qualified students as possible to the graduate programs. I also work with others to meet speciial needs of degree programs.

Member, Chair Search Committee (2010–2011).

Chair, Financial Aid and Admissions Committee (2007–2011).

Review and coordinate all graduate application folders; Update and review related documents, policies, and procedures.

The Profession

Editor for Refereed Journals

Neural Networks (2015–2017).

Serve as an associate editor for Neural Networks and are responsible for coordinating reviewing about five papers per year for the journal.

Neural Networks (2012–2014).

Serve as an associate editor for Neural Networks and are responsible for coordinating reviewing about five papers per year for the journal.

Editorial Board Membership(s)

Neural Networks (2012–2014).

On the editorial board of the Neural Networks as an associate editor.

Guest Reviewer for Refereed Journals

Journal of Electronic Imaging (2006–11).

Computer Vision and Image Understanding (2000–11).

IEEE Transactions on Image Processing (2000–11).

IEEE Transactions on Neural Networks (2000–11).

IEEE Transactions on Pattern Analysis and Machine Intelligence (2000–11).

IEEE Transactions on Signal Processing (2000–11).

International Journal of Computer Vision (2000–11).

Reviewer for Textbooks

Image Processing for Mahcine Vision (2011).

Reviewed the textbook for Computer Vision.

Reviewer or Panelist for Grant Applications

National Science Foundation (2012).

Served on an NSF panel; reviewed for about 10 proposals and coordindated the reviews for three.

National Science Foundation (2005).

Served as a panel member.

Service to Professional Associations

Committee Member, Serve as a committee member to review papers, International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition (2012–2013).

Committee Member, IEEE International Conference on RFID (2010–2011).

Committee Member, International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition (2005–2011).

Technical co-chair and organizer, I created the workshop and organized the first one with my student Arturo Donate, IEEE Workshop on Three Dimensional Information Extraction for Video Analysis and Mining (2010).

Technical Committee Member, International Conference on Image Processing (2007–2009).

Technical Committee Member and Chair of Vision and Image Processing Task Force, IEEE Computational Intelligence Society Neural Networks Technical Committee (2004–2007).

Co-chair, IEEE Workshop on Learning in Computer Vision and Pattern Recognition (2005).

Session chair, Joint Statistics Meeting (2005).

Committee Member, IEEE International Conference on Tools with Artificial Intelligence (2004).

Committee Member, IEEE Workshop on Learning in Computer Vision and Pattern Recognition (2004).

Committee Member, Joint International Conference on Neural Networks (2003).

The Community

Member, A Member of the APPLICATION PROCESS AND ADJUDICATION RUBRIC (APAR) - WORKING GROUP (WG); worked on the new National Centers of Academic Excellence in Cybersecurity CAE 2021 Proposed Designation Requirements and Application Process For CAE-Cyber Defense (CAE-CD); reviewed different versions and proposed changes and provided comments, NSA-CAE (2019–present).

Program Committee Member, Paper Review and Coordination, The International Conference on Computer Vision Theory and Applications (2017–present).

Review 5-20 papers per year at different submission stages.

School Board Memeber, Attending monthly meetings; involved in school planning and policy issues, Hawks Rise Elementary School (2012–2013).

School Board Memeber, Attending monthly meetings; involved in school planning and policy issues, Hawks Rise Elementary School (2011–2012).

School Board Memeber, Attending monthly meetings; involved in school planning and policy issues, Hawks Rise Elementary School (2009–2011).

Volunteer for Sunshine Math, Hawks Rise for Sunshine (2008–2011).

Mentor for Sereyvathana Ty at Oak Ridge National Lab.

Liu, X. (2011). *As a mentor, I visited Oak Ridge National Lab., spent a week therefore to collaborate with Dr. Allen and gave a presentation*. Oak Ridge National Lab.