Assefaw H. Gebremedhin

Curriculum Vitae

Current Position

Associate Professor, School of Electrical Engineering and Computer Science,
Washington State University, Pullman, WA
Email: `assefaw.gebremedhin@wsu.edu`
Website: `http://www.eecs.wsu.edu/~assefaw`

Leadership Roles

- *Director*, Scalable Algorithms for Data Science Laboratory (SCADS)
  Website: `http://scads.eecs.wsu.edu`
- *Director and Lead PI*, VICEROY Institute for Cybersecurity Education and Research (CySER)
  Website: `https://cyser.wsu.edu`
- *Director*, CyberCorps Scholarship for Service (SFS) Program at WSU
  Website: `https://cyser.wsu.edu/sfs`
- *Program Director*, Graduate Training Program in AI and Data Science for Complex Engineering Applications, Graduate Assistance in Areas of National Need (GAANN)
  Website: `http://scads.eecs.wsu.edu/gaann`
- *Advancing AI Faculty Fellow* – AI Research Working Group Lead, WSU (2024-25)

Research Interests

- Combinatorial scientific computing
- High-performance computing
- Machine learning and artificial intelligence
- Cybersecurity
- Bio and health informatics
- Power grid analytics

Education

PhD	Computer Science	University of Bergen, Norway	2003
MS	Computer Science	University of Bergen, Norway	1999
BS	Computer Science	University of Bergen, Norway	1996
BS	Electrical Engineering	Addis Ababa University, Ethiopia	1992

Appointment History

08/20–present	*Associate Professor*, School of EECS, Washington State University
2014–2020	*Assistant Professor*, School of EECS, Washington State University
2010–2014	*Research Assistant Professor*, Dept. of Computer Science, Purdue University
2008–2010	*Research Assistant Professor*, Computing Research Institute, Purdue University
2006–2008	*Research Scientist*, Dept. of Computer Science, Old Dominion University
2004–2006	*Postdoctoral Fellow*, Dept. of Computer Science, Old Dominion University
1999–2003	*Doctoral Fellow*, Dept. of Informatics, University of Bergen, Norway

Professional Development

- Completed the Fall 2022–Spring 2023 Research Leadership Program organized by WSU Office of Research. The fall program consisted of an 8-session research leadership course led by the AtKisson Training Group (ATG).

Awards

- 2025: Nominee for Sahlin Faculty Excellence Award for Outreach and Engagement
- 2024: EECS Outstanding Program Leadership Award for contributions to cybersecurity
- 2022: VCEA Reid Miller Teaching Excellence Award
- 2022: EECS Teaching Excellence Award
- 2021: George Pólya Prize in Applied Combinatorics
  (for joint work with Fredrik Manne and Alex Pothen)
- 2016: National Science Foundation CAREER Award
  (Project title: *Fast and Scalable Combinatorial Algorithms for Data Analyitics*)
- 2021: Nominee for Best Paper Award, IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC 2021).
- 2019: Innovation Award, Graph Challenge, IEEE High Performance Extreme Computing Conference (HPEC 2019)
- 2018: Innovation Award, Graph Challenge, IEEE High Performance Extreme Computing Conference (HPEC 2018)
- 2006–2012: Founding member and co-investigator in the Combinatorial Scientific Computing and Petascale Simulations Institute (CSCAPES), Department of Energy, SciDAC-2 program
- 2001 & 2003: L. Meltzer's Student Award for Outstanding Talent, University of Bergen
- 1999–2003: Doctoral Fellowship, University of Bergen

Awards won by my students

- 2025: My graduate student Olufunso Oje won VCEA Outstanding Teaching Assistant award
- 2025: My graduate student Olufunso Oje won EECS Outstanding Teaching Assistant award
- 2019: My graduate student Helen Catanese won the 2019 ElevatingMath Video Competition conducted by the National Academies of Science, Engineering and Medicine
- 2024: A team of undergraduate students I mentor won first place in the national VICEROY Spectral Cloak competition
- 2023: A team of undergraduate students I mentor won first place in the Spokane CyberCup regional competition
- 2023: A team of undergraduate students I mentor won second place in the national VICEROY Dr. Boom competition
- 2024: A team of undergraduate students I mentor won second place in the Spokane CyberCup regional competition
- 2022–2024: Teams of undergraduate students I mentor placed in the top 15% of more than 500 ranked universities and colleges in National Cyber League competions in each of the years 2022, 2023, and 2024

Google Scholar Citation Profile (Google Scholar, Mar 2025):

- H-index: 28 i10-index: 55
- Total citations: 2,975 Citations since 2020: 1,442

Publications

WSU graduate-student coauthors whom I advise or co-advise are underlined, and undergraduate-student coauthors are marked with asterisk*.

Magazine Articles

M3. J. Crabb, C. Izurieta, B. Van Wie, O. Adesope and A. Gebremedhin, *Cybersecurity Education: Insights From A Novel Cybersecurity Summer Workshop*, IEEE Security & Privacy, vol 22, pp 89-98, Nov-Dec 2024.

M2. J. Crabb and A. Gebremedhin, *Cybersecurity Education and Research: Experiences in Training the Next Generatun of Cyber Professionals*, CYBER Magazine, MCPA, May 2024.

M1. H. Catanese, C. Hauser and A.H. Gebremedhin, *Evaluation of Native and Transfer Students' Success in a Computer Science Course*, ACM Inroads, 9(2), 53–57, 2018.

Edited Volumes

V2. A.H. Gebremedhin, E. Boman and B. Ucar (Eds.), *Proceedings of the Seventh SIAM Workshop on Combinatorial Scientific Computing*, 2016, SIAM.

V1. T. Sørevik, F. Manne, R. Moe, and A.H. Gebremedhin (Eds.), *New Paradigms for High Performance Computing in Industry and Academia*, Para 2000, Workshop on Applied Parallel Computing, Lecture Notes in Computer Science 1947, 2001, Springer.

Book Chapters

B2. A.H. Gebremedhin, M. Patwary and F. Manne, *Paradigms for Effective Parallelization of Inherently Sequential Graph Algorithms on Multi-Core Architectures* in Handbook of Research on Methodolgies and Applications of Supercomputing, edited by V. Milutinovic and M. Kotlar, IGI Global, 2021.

B1. M. Ilic, R. Jaddivada and A.H. Gebremedhin, *Unified Modeling for Emulating Electric Energy Systems: Toward Digital Twin That Might Work* in Handbook of Research on Methodolgies and Applications of Supercomputing, edited by V. Milutinovic and M. Kotlar, IGI Global, 2021.

Journal Papers

J38. C. Soss, A. Rajam, J. Layne, E. Serra, M. Halappanavar, and A. Gebremedhin, *ScaWL: Scaling k-WL (Weisfeler-Leman) Algorithms in Memory and Performance on Shared and Distributed-Memory Systems*, ACM Transactions on Architecture and Code Optimization, 26 pages. Accepted. Dec 2024. https://dl.acm.org/doi/10.1145/3715124

J37. O. Oje, T. Stirewalt, O. Amram, P. Hystad, S. Amiri and A. Gebremedhin, *HierGP: Hierarchical Grid Partitioning for Scalable Geospatial Data Analytics*, ACM Transactions on Spatial Algorithms and Systems, 20 pages. Accepted. Sep 2024. https://dl.acm.org/doi/10.1145/3699511

J36. O. Oje, O. Amram, P. Hystad, A. Gebremedhin, and P. Monsivais, *Use of Individual Google Location History Data to Identify Consumer Encounters with Food Outlets*, International Journal of Health Geographics (2025) 24:1. https://doi.org/10.1186/s12942-025-00387-w

J35. O. Amram, O. Oje, A. Larkin, K. Baokye, A. Avery, A. Gebremedhin, B. Wiliams, G. Duncan, and P. Hystad, *Smartphone Google Location History: A Novel Approach to Outdoor Physical Activity Research*, Journal of Physical Activity and Health, pp. 19, 2024. https://doi.org/10.1123/jpah.2024-0360.

J34. S. Patil, S. Roberts and A. Gebremedhin, *Network Analysis of Driver Genes in Human Cancers*, Frontiers in Bioinformatics, Vol 4, 2024. https://doi.org/10.3389/fbinf.2024.1365200.

J33. J. Halvorsen, C. Izurieta, H. Cai and A. Gebremedhin, *Applying Generative Machine Learning to Intrusion Detection: A Systematic Mapping Study and Review*, ACM Computing Surveys, Volume 56, Issue 10, Article No. 257, pages 1-33, 2024. https://doi.org/10.1145/3659575

J32. J. Halvorsen and A. Gebremedhin, *Generative Machine Learning for Cyber Security*, Military Cyber Affairs, Vol 7, Iss. 1, Article 4, 2024.

J31. J. Briscoe, C. DeSmet, K. Wuestney, A. Gebremedhin, R. Fritz, and D.J. Cook *Exploring Geriatric Clinical Data and Mitigating Bias with Multi-Objective Synthetic Data Generation for Equitable Health Predictions*, Journal of Biomedical Engineering and Biosciences, 2024.

J30. P. Hystad, O. Amram, O. Oje, A. Larkin, K. Boakye, A. Avery, A. Gebremedhin and G. Duncan, *Bring Your Own Location Data: Use of Google Smartphone Location History Data for Environmental Health Research*, Environmental Health Perspectives 130:11 CID: 117005. 2022. https://doi.org/10.1289/EHP10829

J29. X. Liu, M. Halappanavar, K. Barker, A. Lumsdaine and A.H. Gebremedhin, *Direction-Optimizing Label Propagation Framework for Structure Detection in Graphs: Design, Implementation, and Experimental Analysis*, ACM Journal of Experimental Algorithmics, Vol 27, Article No 1.12, pp 1-31, 2022. https://doi.org/10.1145/3564593

J28. S. Patil, H. Catanese, K. Brayton, E. Lofgren and A.H. Gebremedhin. *Sequence Similarity Network Analysis Provides Insight into the Temporal and Geographical Distribution of Mutations in SARS-CoV-2 Spike Protein*, Viruses 2022, 14, 1672. https://doi.org/10.3390/v14081672.

J27. L. Wang, J. Halvorsen, S. Pannala, A. Srivastava, A.H. Gebremedhin and N. Schulz, *CP-SyNet: A Tool for Generating Customized Cyber-Power Synthetic Network for Distribution System with Distributed Energy Resources*, IET Smart Grid, 5(6), 463-477 (2022).

J26. L. Wang, A. Dubey, A.H. Gebremedhin, A. Srivastava and N. Schulz, *MPC-Based Decentralized Voltage Control in Power Distribution Systems with EV and PV Coordination*, IEEE Transactions on Smart Grid, vol. 13, no. 4, pp. 2908-2919, July 2022. doi: 10.1109/TSG.2022.3156115.

J25. J. Stachofsky, A.H. Gebremedhin and R. Crossler, *Cast to Vote: A Socio-technical Network Analysis of an Election Smartphone Application*, Digital Government: Research and Practice, Volume 3, Issue 1, January 2022, Article No 3, pp 117. https://doi.org/10.1145/3501031

J24. Y. Du, G. Warnell, A.H. Gebremedhin, P. Stone and M. Taylor, *Lucid Dreaming for Experience Replay: Refreshing Past States with Current Policy*, Neural Computing and Applications (2021). https://doi.org/10.1007/s00521-021-06104-5

J23. R. Saeedi, K.S. Sajan, K. Davies, A. Srivastava and A.H. Gebremedhin, *An Adaptive Machine Learning Framework for Behind-the-Meter Load/PV Disaggregation*, IEEE Transaction on Industrial Informatics, Vol 17, No 10, pp 7060-7069, 2021.

J22. R. Saeedi, K. Sasani and A.H. Gebremedhin, *Collaborative Multi-Expert Active Learning for Mobile Health Monitoring: Archictectures, Algorithms and Evaluation*, Sensors, 20(7), 1932, 2020.

J21. S. Norgaard*, R. Saeedi and A.H. Gebremedhin, *Multi-Sensor Time Series Classification for Activity Tracking Under Variable Length*, IEEE Sensors Journal, Vol 20, No 5, 2701–2709, 2020.

J20. R. Saeedi and A.H. Gebremedhin, *A Signal-level Transfer Learning Framework for Autonomous Reconfiguration of Wearable Systems*, IEEE Transactions on Mobile Computing, Vol 19, Number 3, 513–527, 2020. DOI: 10.1109/TMC.2018.2878673.

J19. A.H. Gebremedhin and A. Walther, *An Introduction to Algorithmic Differentiation*, WIREs Data Mining and Knowledge Discovery, 2020; 10:e1334. https://doi.org/10.1002/widm.1334

J18. Y. Du, M. Taylor and A.H. Gebremedhin, *Analysis of University Fitness Center Data Uncovers Interesting Patterns, Enables Prediction*, IEEE Transactions on Knowledge and Data Engineering, Vol 31, Issue 8, 1478–1490, 2019.

J17. H. Catanese, K. Brayton and A.H. Gebremedhin, *A Nearest-neighbors Network Model for Sequence Data Reveals New Insight into Genotype Distribution of a Pathogen*, BMC Bioinformatics (2018) 19:475. https://doi.org/10.1186/s12859-018-2453-2.

J16. H. Lu, M. Halappanavar, D. Chavarrí a Miranda, A.H. Gebremedhin, A. Panyala and A. Kalyanaraman, *Algorithms for Balanced Graph Colorings with Applications in Parallel Computing*, IEEE Transactions on Parallel and Distributed Systems, 28(5), 1240–1256, 2017.

J15. H.N. Catanese, K.A. Brayton and A.H. Gebremedhin, *RepeatAnalyzer: A Tool for Analyzing and Managing Short-Sequence Repeat Data*, BMC Genomics 2016 17:422. DOI: 10.1186/s12864-016-2686-2.

J14. Z.T.H. Khumalo, H.N. Catanese, N. Leisching, P. Hove, N.E. Collins, M.E. Chaisit, A.H. Gebremedhin, M.C. Oosthuizen and K.A. Brayton, *Characterization of Anaplasma marginale subspecies centrale using msp1aS genotyping reveals wildfire reservoir*, Journal of Clinical Microbiology, 2016, 54:10, 2503-2512.

J13. M. Wang, A.H. Gebremedhin and A. Pothen, *Capitalizing on Live Variables: New Algorithms for Efficient Hessian Computation via Automatic Differentiation*, Mathematical Programming Computation, 8(4), 393–433, 2016. DOI = 10.1007/s12532-016-0100-3.

J12. R.A. Rossi, D.F. Gleich and A.H. Gebremedhin, *Parallel Maximum Clique Algorithms with Applications to Network Analysis*, SIAM Journal on Scientific Computing, Vol 37, Issue 5, pages C589–C618, 2015.

J11. B. Pattabiraman, M.M.A. Patwary, A.H. Gebremedhin, W.K. Liao and A. Choudhary, *Fast Algorithms for the Maximum Clique Problem on Massive Graphs with Applications to Overlapping Community Detection*, Internet Mathematics, Vol 11, No 4-5, pp 421–448, 2015.

J10. A.H. Gebremedhin, D. Nguyen, M.M.A. Patwary and A. Pothen, *ColPack: Software for Graph Coloring and Related Problems in Scientific Computing*, ACM Transactions on Mathematical Software, Vol 40, No 1, pp 1–31, 2013.

J9. U. Catalyurek, J. Feo, A.H. Gebremedhin, M. Halappanavar and A.Pothen, *Graph Coloring Algorithms for Multi-core and Massively Multithreaded Architectures*, Parallel Computing, Vol 38, pp 576-594, 2012.

J8. D. Bozdağ, U. Catalyurek, A.H. Gebremedhin, F. Manne, E.G. Boman and F. Özgüner, *Distributed-memory Parallel Algorithms for Distance-2 Coloring and Related Problems in Derivative Computation*, SIAM Journal on Scientific Computing, Vol 32, Issue 4, pp 2418–2446, 2010.

J7. A.H. Gebremedhin, A. Pothen, A. Tarafdar and A. Walther, *Efficient Computation of Sparse Hessians using Coloring and Automatic Differentiation*, INFORMS Journal on Computing, Vol 21, No 2, pp 209–223, 2009.

J6. D. Bozdağ, A.H. Gebremedhin, F. Manne, E.G. Boman and U. Catalyurek, *A Framework for Scalable Greedy Coloring on Distributed Memory Parallel Computers*, Journal of Parallel and Distributed Computing, Vol 68, No 4, pp 515–535, 2008.

J5. A.H. Gebremedhin, A. Tarafdar, F. Manne and A. Pothen, *New Acyclic and Star Coloring Algorithms with Applications to Hessian Computation*, SIAM Journal on Scientific Computing, Vol 29, No 3, pp 1042–1072, 2007.

J4. A.H. Gebremedhin, M. Essaidi, I. Guerin Lassous, J. Gustedt, and J.A. Telle, *PRO: A Model for the Design and Analysis of Efficient and Scalable Parallel Algorithms*, Nordic Journal of Computing, Vol 13, pp 1–25, 2006.

J3. A.H. Gebremedhin, F. Manne and A. Pothen, *What Color Is Your Jacobian? Graph Coloring for Computing Derivatives*, SIAM Review Vol 47, No 4, pp 629–705, 2005.

J2. A.H. Gebremedhin, I. Guérin Lassous, J. Gustedt and J.A. Telle, *Graph Coloring on Coarse Grained Multicomputers*, Discrete Applied Math, Vol 131/1, pp 179–198, 2003.

J1. A.H. Gebremedhin and F. Manne, *Scalable Parallel Graph Coloring Algorithms*, Concurrency: Practice and Experience, Vol 12, pp 1131–1146, 2000.

Conference Papers

C49. J. Briscoe, G. Kepler, D. Deford, and A. Gebremedhin, *Algorithmic Accountability in Small Data: Reliability and Fairness in Classification Metrics*, International Conference on Artificial Intelligence and Statistics (AISTATS), 2025

C48. J. Halvorsen, Y. Yan, and A. Gebremedhin, *Denoising Diffusion Implicit Models for Generating Cyber Defense Network Traffic*, IEEE International Conference on Communications (ICC), 2025.

C47. J. Briscoe and A. Gebremedhin, *Facets of Disparate Impact: Evaluating Legally Consistent Bias in Machine Learning*, ACM International Conference on Information and Knowledge Management (CIKM), 2024 https://doi.org/10.1145/3627673.3679925

C46. J. Crabb, C. Hundhausen and A. Gebremedhin, *A Critical Review of Cybersecurity Education in the United States*, ACM Techical Symposium on Computer Science Education (SIGCSE), 2024. https://doi.org/10.1145/3626252.3630757

C45. J. Brsicoe, C. DeSmet, K. Wuestney, A. Gebremedhin, R. Fritz, and D.J. Cook *Reducing Sample Selection Bias in Clinical Data through Generation of Multi-Objective Synthetic Data*, The 11th International Conference on Biomedical Engineering and Systems (ICBES), 2024.

C44. X. Liu, J. Firoz, S. Aksoy, I. Amburg, A. Lumsdaine, C. Joslyn, B. Praggastis and A.H. Gebremedhin, *High-order Line Graphs of Non-uniform Hypergraphs: Algorithms, Applications, and Experimental Analysis*, 2022 IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2022, pp. 784-794, doi: 10.1109/IPDPS53621.2022.00081.

C43. X. Liu, J. Firoz, A.H. Gebremedhin and A. Lumsdaine, *NWHy: A Framework for Hypergraph Analytics: Representations, Data structures, and Algorithms*, 2022 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), 2022, pp. 275-284, doi: 10.1109/IPDPSW55747.2022.00057.

C42. X. Liu, J. Firoz, A. Lumsdaine, C. Joslyn, S. Aksoy, B. Praggastis and A.H. Gebremedhin, *Parallel Algorithms for Efficient Computation of High-Order Line Graphs of Hypergraphs*, 2021 IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC), 2021, pp. 312-321, doi: 10.1109/HiPC53243.2021.00045. [**Nominated for Best Paper Award**]

C41. G. Krishnamoorthy, A. Dubey and A. H. Gebremedhin, *An Open-source Environment for Reinforcement Learning in Power Distribution Systems*, 2022 IEEE Power & Energy Society General Meeting (PESGM), 2022, pp. 1-5, doi: 10.1109/PESGM48719.2022.9916862.

C40. G. Krishnamoorthy, A. Dubey and A.H. Gebremedhin, *Reinforcement Learning for Battery Energy Storage Dispatch Augmented with Model-based Optimizer*, 2021 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm), 2021, pp. 289-294, doi: 10.1109/SmartGridComm51999.2021.9632292.

C39. J. Briscoe, A. Gebremedhin, L. Holder and D. Cook, *Adversarial Creation of a Smart Home Testbed for Novelty Detection*, AAAI Spring Symposium Series, March 2022.

C38. S. Ghosh, Y. Guo, P. Balaji and A.H. Gebremedhin, *RMACXX: An Efficient High-Level C++ Interface over MPI-3 RMA*, IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGrid 2021), May 10-13, 2021, Melbourne, Australia.

C37. X. Liu, M. Halappanavar, K. Barker, A. Lumsdaine and A.H. Gebremedhin, *Direction-optimizing Label Propagation and its Application to Community Detection*, Computing Frontiers, 2020.

C36. Y. Du, G. Warnell, A.H. Gebremedhin, P. Stone and M. Taylor, *Work-in-Progress: Corrected Self Learning via Demostrations*, Proceedings of the Adaptive and Learning Agents Workshop at AAMAS. May 2020.

C35. S. Ghosh, M. Halappanavar, A. Kalyanaraman, A. Khan and A.H. Gebremedhin, *Exploring MPI Communication Models for Graph Applications Using Graph Matching as a Case Study*, IEEE International Parallel and Distributed Processing Symposium (IPDPS 2019), May 2019, Rio de Janerio, Brazil, 10 pages.

C34. X. Liu, J. Firos, M. Zalewski, M. Halappanavar, K. Baker, A. Lumsdaine and A.H. Gebremedhin, *Distributed Direction-optimizing Label Propagation for Community Detection*, 2019 IEEE High Performance Extreme Computing Conference (HPEC), Waltham, MA, USA, 2019, pp1–6. [**2019 Graph Challenge Innovation Award**].

C33. E. Khaledian, A.H. Gebremedhin, K. Brayton and S. Broschat, *A Network Science Approach for Determining the Ancestral Phylum of Bacteria*, In Proceedings of the 2018 ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics (BCB '18). ACM, New York, NY, USA, 398-403. DOI: https://doi.org/10.1145/3233547.3233575

C32. S. Ghosh, M. Halappanavar, A. Tumeo, A. Kalyanaraman, H. Lu, D. Chavarria-Miranda, A. Khan and A. H. Gebremedhin, *Distributed Louvain Algorithm for Graph Community Detection*, 2018 IEEE International Parallel and Distributed Processing Symposium (IPDPS), Vancouver, BC, 2018, pp. 885-895. doi: 10.1109/IPDPS.2018.00098

C31. S. Ghosh, M. Halappanavar, A. Tumeo, A. Kalyanaraman and A.H. Gebremedhin, *miniVite: A Graph Analytics Benchmarking Tool for Massively Parallel Systems*, 2018 IEEE/ACM Performance Modeling, Benchmarking and Simulation of High Performance Computer Systems (PMBS), Dallas, TX, USA, 2018, pp. 51-56. doi: 10.1109/PMBS.2018.8641631 (Supercomputing'18 Workshop)

C30. K. Sasani, M. Namaki and A.H. Gebremedhin, *Network Similarity Prediction in Time-evolving Graphs: A Machine Learning Approach*, 2018 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), Vancouver, BC, 2018, pp. 1184-1193. doi: 10.1109/IPDPSW.2018.00183.

C29. S. Norgaard*, R. Saeedi, K. Sasani and A.H. Gebremedhin, *Synthetic Sensor Data Generation for Health Applications: A Supervised Deep Learning Approach*, 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Honolulu, HI, 2018, pp. 1164-1167. doi: 10.1109/EMBC.2018.8512470

C28. R. Saeedi, K. Sasani, S. Norgaard* and A.H. Gebremedhin, *Personalized Human Activity Recognition using Wearables: A Manifold Learning-based Knowledge Transfer*, 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Honolulu, HI, 2018, pp. 1193-1196. doi: 10.1109/EMBC.2018.8512533

C27. K. Sasani, M. Namaki, Y. Wu and A.H. Gebremedhin, *Multi-metric Graph Query Perfromance Prediction*, In: Pei J., Manolopoulos Y., Sadiq S., Li J. (eds) Database Systems for Advanced Applications. DASFAA 2018. Lecture Notes in Computer Science, vol 10827. Springer, Cham. https://doi.org/10.1007/978-3-319-91452-7_19

C26. M. H. Namaki, K. Sasani, Y. Wu and A.H. Gebremedhin, *Performance Prediction for Graph Queries*, In Proceedings of the 2nd International Workshop on Network Data Analytics (NDA'17), Akhil Arora, Shourya Roy, and Arnab Bhattacharya (Eds.). ACM, New York, NY, USA, Article 4, 9 pages. DOI: https://doi.org/10.1145/3068943.3068947 (Workshop at the ACM SIGMOD International Conference on Management of Data).

C25. S. Ghosh, M. Halappanavar, A. Tumeo, A. Kalyanaraman and A.H. Gebremedhin, *Scalable Distributed-memory Community Detection using Vite*, IEEE High Performance Extreme Computing Conference (HPEC 2018), September 2018, Waltham, MA, 8 pages. DOI: 10.1109/HPEC.2018.8547534 **[2018 Graph Challenge Student Innovation Award]**.

C24. R. Saeedi, S. Norgaard*, A.H. Gebremedhin, *A Closed-loop Deep Learning Architecture for Robust Activity Recognition using Wearable Sensors*, 2017 IEEE International Conference on Big Data (Big Data), Boston, MA, 2017, pp. 473-479. doi: 10.1109/BigData.2017.8257960

C23. R. Saeedi, K. Sasani and A.H. Gebremedhin, *Co-MEAL: Cost-Optimal Multi-Expert Active Learning Architecture for Mobile Health Monitoring*, In Proceedings of the 8th ACM International Conference on Bioinformatics, Computational Biology,and Health Informatics (ACM-BCB '17). ACM, New York, NY, USA, 432-441. DOI: https://doi.org/10.1145/3107411.3107430

C22. R. Saeedi, H. Ghasemzadeh and A.H. Gebremedhin, *Transfer Learning Algorithms for Autonomous Configuration of Wearable Systems*, 2016 IEEE International Conference on Big

Data (Big Data), Washington, DC, 2016, pp. 563-569. doi: 10.1109/BigData.2016.7840648

C21. S. Ghosh and A.H. Gebremedhin, *Parallelization of Bin Packing on Multicore Systems*, 2016 IEEE 23rd International Conference on High Performance Computing (HiPC), Hyderabad, 2016, pp. 311-320. doi: 10.1109/HiPC.2016.044

C20. S. Ghosh, J.R. Hammond, A.J. Pena, P. Balaji, A.H. Gebremedhin and B. Chapman, *One-sided Interface for Matrix Operations using MPI-3 RMA: A Case Study with Elemental*, 2016 45th International Conference on Parallel Processing (ICPP), Philadelphia, PA, 2016, pp. 185-194. doi: 10.1109/ICPP.2016.28

C19. X. Lu, M. Halappanavar, D. Chavarrí a Miranda, A.H. Gebremedhin and A. Kalyanaraman, *Balanced Coloring for Parallel Computing Applications*, 2015 IEEE International Parallel and Distributed Processing Symposium, Hyderabad, 2015, pp. 7-16. doi: 10.1109/IPDPS.2015.113

C18. R.A. Rossi, D.F. Gleich, A.H. Gebremedhin and M.M.A. Patwary, *Fast Maximum Clique Algorithms for Large Graphs*, In Proceedings of the 23rd International Conference on World Wide Web (WWW '14 Companion). ACM, New York, NY, USA, 365-366. DOI: https://doi.org/10.1145/2567948.2577283

C17. B. Pattabiraman, M.M.A. Patwary, A.H. Gebremedhin, W.K. Liao and A. Choudhary, *Fast Algorithms for the Maximum Clique Problem on Massive Sparse Graphs*, In: Bonato A., Mitzenmacher M., Praat P. (eds) Algorithms and Models for the Web Graph. WAW 2013. Lecture Notes in Computer Science, vol 8305. Springer, Cham. https://doi.org/10.1007/978-3-319-03536-9_13.

C16. B. Letschert, K. Kulshreshtha, A. Walther, D. Nguyen, A.H. Gebremedhin and A. Pothen, *Exploiting Sparsity in Automatic Differentiation on Multicore Architectures*, In S. Forth et al. (Eds.), Recent Advances in Algorithmic Differentiation (AD2012), Lecture Notes in Computational Science and Engineering, vol 87. Springer, Berlin, Heidelberg. DOI: 10.1007/978-3-642-30023-3_14.

C15. S.H.K. Narayanan, B. Norris, P. Hovland and A.H. Gebremedhin, *Implementation of Partial Separability in a Source to Source Transformation AD Tool*, In S. Forth et al. (Eds.), Recent Advances in Algorithmic Differentiation (AD2012), Lecture Notes in Computational Science and Engineering, vol 87. Springer, Berlin, Heidelberg. DOI: 10.1007/978-3-642-30023-3_31.

C14. M.M.A. Patwary, A.H. Gebremedhin and A. Pothen, *New Multithreaded Ordering and Coloring Algorithms for Multicore Architectures*, In E. Jeannot, R. Namyst and J. Roman (Eds.), Euro-Par 2011, Lecture Notes in Computer Science 6853, Part II, pp 250–262, 2011.

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C11. A.H. Gebremedhin, A. Pothen and A. Walther, *Exploiting Sparsity in Jacobian Computation via Coloring and Automatic Differentiation: a Case Study in a Simulated Moving Bed process*, In C. Bischof et al. (Eds.), Advances in Automatic Differentiation (AD2008), Lecture Notes in Computational Science and Engineering 64, pp 339–349, 2008.

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C9. E.G. Boman, D. Bozdağ, U. Catalyurek, K. Devine, A.H. Gebremedhin, P. Hovland, A. Pothen and M.M. Strout, *Enabling High Performance Computational Science through Combinatorial Algorithms*, Journal of Physics: Conference Series 78 (2007) 012058. SciDAC 2007.

C8. S. Bhomwick, E.G. Boman, K. Devine, A.H. Gebremedhin, B. Hendrickson, P. Hovland, T. Munson and A. Pothen, *Combinatorial Algorithms Enabling Computational Science: Tales from the Front*, Journal of Physics: Conference Series 46 (2006), 453–457, SciDAC 2006.

C7. D. Bozdağ, U. Catalyurek, A.H. Gebremedhin, F. Manne, E.G. Boman and F. Özgüner, *A Parallel Distance-2 Graph Coloring Algorithm for Distributed Memory Computers*, In L.T. Yang et al. (Eds.): HPCC 2005, Lecture Notes in Computer Science 3726, pp 796–806, 2005.

C6. E.G. Boman, D. Bozdağ, U. Catalyurek, A.H. Gebremedhin and F. Manne, *A Scalable Parallel Graph Coloring Algorithm for Distributed Memory Computers*, In J. Cunba and P. Medeiros (Eds.): EuroPar 2005, Lecture Notes in Computer Science 3648, pp 241–251, 2005.

C5. A.H. Gebremedhin, F. Manne and T. Woods, *Speeding up Parallel Graph Coloring*, In J. Dongarra, K. Madsen, and J. Wasniewski (Eds.): Para 2004, Lecture Notes in Computer Science 3732, pp 1079–1088, 2005.

C4. A.H. Gebremedhin, F. Manne and A. Pothen, *Parallel Distance-k Coloring Algorithms for Numerical Optimization*, In B. Monien and R. Feldmann (Eds.): EuroPar 2002, Lecture Notes in Computer Science 2400, pp 912-921, 2002.

C3. A.H. Gebremedhin, I. Guérin Lassous, J. Gustedt and J.A. Telle, *PRO: a Model for Parallel Resource-Optimal Computation*, IEEE International Symposium on High Performance Computing Systems and Applications, pp 106–113, 2002

C2. A.H. Gebremedhin, I. Guérin Lassous, J. Gustedt and J.A. Telle, *Graph Coloring on a Coarse Grained Multiprocessor*, In U. Brandes and D. Wagner (Eds.): WG 2000, Lecture Notes in Computer Science 1928, pp 184–195, 2000.

C1. A.H. Gebremedhin and F. Manne, *Parallel Graph Coloring Algorithms using OpenMP*, EWOMP 99, First European Workshop on OpenMP, Sept 1999, Lund, Sweden.

News Journal Articles

N3. E. Boman, A. Gebremedhin and S. Toledo, *SIAM Workshop on Combinatorial Scientific Computing Inaugurates Proceedings and Best Paper Award*, SIAM News Dec 2016.

N2. A. Pothen, A.H. Gebremedhin, F. Dobrian; E.G. Boman, K.D. Devine, B.A. Hendrickson; P. Hovland, B. Norris, J. Utke; U. Catalyurek; M.M. Strout; *Combinatorial Algorithms for Petascale Science*, SciDAC Review, Issue 5, pp 26–35, Fall 2007.

N1. A.H. Gebremedhin, *The Third SIAM Workshop on Combinatorial Scientific Computing*, SIAM News Vol 40, No 4, May 2007.

Workshop Short Papers/Extended Abstracts

W8. M. Wang, A.H. Gebremedhin and A. Pothen, *Performance Evaluation of Automatic Differentiation Algorithms for Hessian Computation*, The Seventh International Conference on Algorithmic Differentiation (AD 2016), Christ Church Oxford, UK, September 2016.

W7. M. Wang, A.H. Gebremedhin and A. Pothen, *An Efficient Automatic Differentiation Algorithm for Hessians: Working With Live Variables*, The Sixth SIAM Workshop on Combinatorial Scientific Computing (CSC14), Lyons, France, July 2014.

W6. A.H. Gebremedhin and A. Pothen, *Combinatorial Mathematics and Algorithms at Exascale: Challenges and Promising Directions*, SIAM Workshop on Exascale Applied Mathematics Challenges and Opportunities (EX14), Chicago, Illinois, USA, July 2014.

W5. R. A. Rossi, D.F. Gleich and A.H. Gebremedhin, *Triangle Core Decomposition and Maximum Cliques*, SIAM Workshop on Network Science (NS13), San Diego, CA, July 2013.

W4. A.H. Gebremedhin, U. Catalyurek, J. Feo, M. Halappanavar and A.Pothen, *Multithreaded Graph Coloring Algorithms*, The Fifth SIAM Workshop on Combinatorial Scientific Computing (CSC11), Dramstadt, Germany, May 2011.

W3. A.H. Gebremedhin, D. Nguyen, A. Tarafdar, and A. Pothen, *Ordering for Coloring and More*, The Fourth SIAM Workshop on Combinatorial Scientific Computing (CSC09), Monterey, CA, 2009.

W2. A.H. Gebremedhin, *The Enabling Power of Graph Coloring Algorithms in Automatic Differentiation and Parallel Processing*, In U. Naumann, O. Schenk, H. Simon and S. Toledo (eds), Combinatorial Scientific Computing, Dagstuhl Seminar Proceedings, Number 09061, Dagstuhl, Germany, Feb 2009, URL: http://drops.dagstuhl.de/opus/volltexte/2009/2093.

W1. A.H. Gebremedhin, A. Pothen, A. Tarafdar, and A. Walther, *Sparse Hessian Computation using Automatic Differentiation*, The Third SIAM Workshop on Combinatorial Scientific Computing (CSC07), Costa Mesa, CA, Feb 2007.

Theses

T2. A.H. Gebremedhin, *Practical Parallel Algorithms for Graph Coloring Problems in Numerical Optimization*, PhD (Dr.scient) thesis, Dept of Informatics, University of Bergen, Feb 2003. Advisor: Fredrik Manne.

T1. A.H. Gebremedhin, *Parallel Graph Coloring*, MS (Cand.scient) thesis, Dept of Informatics, University of Bergen, May 1999. Advisor: Fredrik Manne.

Press

1. NSF grant to support cybersecurity training, WSU INSIDER, December 23, 2024
2. WSU CyberCougs place first at national competition, WSU INSIDER, December 11, 2024
3. Researchers improve search for cancer drivers, WSU INSIDER, September 11, 2024.
4. How Is AI Being Used in Day-to-Day Life? Washington State Steps Ahead, The Bellingham Herald, May 20, 2024.
5. Summer workshop brings cybersecurity education and research to Pullman campus, WSU INSIDER, May 13, 2024.
6. Cybersecurity education varies widely in US, WSU INSIDER, May 6, 2024.
7. Students get real-world learning in cybersecurity, WSU INSIDER, July 12, 2023.
8. Degree in cybersecurity gets underway, WSU INSIDER, June 15, 2023.
9. CyberCougs place first at regional competition, WSU INSIDER, March 15, 2023.

10. Gebremedhin receives prestigious international applied mathematics prize, WSU INSIDER, February 23, 2021.
11. SIAM AN21 Prize Spotlight, SIAM News, July 1, 2021.
12. Training students at the intersection of power engineering and computer science, WSU INSIDER, November 4, 2021.
13. WSU Team To Train Doctoral Students In AI, Data Science To Meet Energy Needs, Northwest Public Broadcasting, November 10, 2021.
14. WSU to lead cybersecurity education and research institute, WSU INSIDER, July 16, 2021.
15. Determining the role of health care settings in a pandemic, WSU INSIDER, March 18, 2021.
16. Connecting AI research, WSU INSIDER, January 30, 2020.
17. Understanding bacterial pathogens, WSU INSIDER, March 11, 2019.
18. Beating the crowds – with data science, WSU INSIDER, September 14, 2018.
19. Transfer students in computer science prove successful, WSU INSIDER, May 11, 2018.
20. Software improves ability to catalog bacterial pathogen, WSU INSIDER, June 27, 2016.

Software

- **RepeatAnalyzer**, a software tool for tracking, managing, analyzing and cataloguing short-sequence repeats and genotypes using Anaplasma marginale as a model species. Code available at `https://bitbucket.org/repeatgroup/repeatanalyzer`
- **SuperGAN**, a Generative Adversarial Networks-based Python software tool for generating realistic, synthetic, labeled time-series data (in lieu of sensor data). Work-in-progress. Preliminary code available at `https://scads.eecs.wsu.edu/index.php/software/#SGAN`
- **LivarH**, a Live-variables based Hessian computation via Automatic Differentiation (implemented in ADOL-C). Code available at `https://github.com/CSCsw/LivarH`
- **PMC**, a fast, parallel maximum clique finder. Further information available at `https://github.com/ryanrossi/pmc`
- **ColPack**, a C++ library consisting of implementations of algorithms for a variety of graph coloring and related problems enabling scientific computations. Further information available at `http://www.eecs.wsu.edu/~assefaw/software/software.html`.
- ColPack is interfaced with the operator overloading AD tool **ADOL-C** (housed at the University of Paderborn, Germany) and the source-to-source transformation AD tool *ADIC2* (housed at Argonne National Laboratory).
- Implementations of several distributed-memory coloring algorithms developed together with colleagues are included in **Zoltan**, a load balancing toolkit of Sandia National Laboratories.

Research Funding

Current Projects:

1. *CyberCorps Scholarship for Service: Developing the Next-generation Cyber Workforce.* National Scince Foundation, 01/01/2025 - 12/31/2029. Total: $3.6M
   A. Gebremedhin (PI), J. Doppa (Co-PI), M. Hasan (Co-PI), F. Liu (Co-PI).
2. *VICEROY Northwest Institute for CyberSecurity Education & Research (CySER).* Department of Defense, 06/17/2021 – 09/15/2025. Total: $2.7M
   A. Gebremedhin (PI), B. Van Wie (Co-PI), N. Schulz (Co-PI), S. Adesope (Evaluator).
3. *Secure Distributed Energy Resource Management and Operation: A Holistic Zero-Trust Architecture for 5G-enabled Power Systems (ZTAPS).* Department of Energy (CESER Program), 12/2024 - 12/2027. Total: $2.7M. A. Gebremedhin (PI), A. Dubey (Co-PI), M. Hasan (Co-PI), N. Schulz (Co-PI). (Under award negotiation.)
4. *Hierarchical Software Quality Assurance.* Department of Homeland Security, 10/01/2022 – 09/15/2025. Total: $4.5M. Lead University: Montana State University (MSU) with Cleme Izurieta as PI. WSU Subcontract from MSU: $862K.
   A. Gebremedhin (WSU PI), V. Arnaoudova (WSU Co-PI).
5. *Interdisciplinary Graduate Training Program in AI and Data Science for Complex Engineering Applications.* Department of Education, Graduate Assistance in Areas of National Need (GAANN) Program, October 2021 – October 2025. Total: $1.2M.
   A. Gebremedhin (PI), V. Arnaoudova (Co-PI), A. Dubey (Co-PI), N. Schulz (Co-PI).
6. *Collaborative Research: EarthCube Capabilities: ICESpark: An Open-Source Big Data Platform for Science Discoveries in the New Arctic and Beyond.* National Science Foundation, 09/01/2021 – 08/31/2025. Collaborative Research with University of Maryland. WSU Share: $293K. A. Gebremedhin (Current PI), J. Yu (Former PI).
7. *Forecasting and Surveillance of Infectious Threats and Epidemics (ForeSITE).* Centers for Disease Control (CDC), 09/30/2023 – 09/29/2028. CDC Networks team led by University of Utah. WSU Share: $4.5M
   E. Lofgren (PI), M. Fernandez (Co-I), A. Gebremedhin(Co-I), A. Kalyanaraman (Co-I), E. Schwartz (Co-I), S. Seifert (Co-I), E. Weybright (Co-I).
8. *Harnessing Machine Learning and Social Determinants of Health to Reduce Dementia-related Hospitalizations among Native American and Hispanic People.* Department of Health and Human Services (HHS), 9/16/2024 – 9/15/2025. Total: $150K.
   S. Amiri (PI) and A. Gebremedhin (Co-PI).

Completed Projects:

9. *RAPID: Curtailing Nosocomial Amplifcation of COVID-19.* National Science Foundation, 02/01/2021 – 01/21/2023. Total: $200K.
   E. Lofgren (PI), A. Gebremedhin (Co-PI) and S. Rhea (Co-PI).
10. *CAREER: Fast and Scalable Combinatorial Algorithms for Data Analytics.* National Science Foundation, 2016–2022. Total: $520K. A. Gebremedhin (Single PI).
11. *US-India Collaborative for Smart Distribution System with Storage (UI-ASSIST).*
    Department of Energy, 2017–2022. Lead (Team US): N. Schulz, Co-Lead: A. Srivastava. Total US Share: $7.5M. Role: WSU Co-PI (joined the project after it was funded).

12. *PNNL-WSU Distinguished Graduate Research Program.* Awarded to support my PhD student Xu (Tony) Liu. 2018–2021. Total: $300K.
13. *Smart Environments: National Science Foundation Research Experience for Under Graduate Students (REU).* 2015–2017; 2018–2020; PI: Larry Holder. Role: Senior Personnel.
14. *Combinatorial Algorithms to Enable Scientific Computing on Multithreaded Architectures.* Department of Energy, Office of Science, 2013–2015. Total: $300K.
A. Pothen (PI) and A. Gebremedhin (co-PI).
15. *Combinatorial Algorithms to Enable Derivative Computations on Multicore Architectures.* National Science Foundation, 2012–2015. Total: $300K.
A. Pothen (PI) and A. Gebremedhin (co-PI).
16. *Combinatorial Scientific Computing and Petascale Simulations (CSCAPES) Institute.* Department of Energy, SciDAC program, 2006–12. Total: $7M.
A. Pothen (Lead PI), A. Gebremedhin (co-PI), F. Dobrian (co-PI);
E. Boman (Sandia PI), K. Devine (co-PI), B. Hendrickson (co-PI);
P. Hovland (Argonne PI), B. Norris (co-PI), J. Utke (Co-PI); U. Catalyurek (Ohio State PI).
17. *Empowering Computational Science and Engineering via Automatic Differentiation.* National Science Foundation, 2008–2011. Total: $200K.
A. Pothen (PI) and A. Gebremedhin (co-PI).

Teaching (Courses)

- **CptS 317: Automata and Formal Languages**.
An introduction to theory of computation course that is a required core course in most of the majors in EECS, including BS in Computer Science, BS in Software Engineering, and BS in Cybersecurity. Also taken by Computer Engineering, Electrical Engineering, and other majors. Taught the course regularly every Spring semester since 2020 and in Fall 2024.

- **CpS 475/575: Data Science** (*Designed course*).
A course I designed from scratch covering fundamental topics in data science. Topics covered include: the Data Science Process, Exploratory Data Analysis, Data Wrangling, Linear Regression, Classification, Principal Components Analysis, Data Visualization, Time-Series Data Mining, Deep Learning, and Data and Ethics. The course was offered as a special topics course under the course number CptS 483 for three semesters from Fall 2015 to Fall 2017. It became a conjoint undergraduate and graduate course under the course number CptS 475/575 in Fall 2018 and has been taught every Fall semester since then. Course participants included upper-level undergraduate students (taking the course as 475) from Computer Science and graduate students (taking the course as 575) from Computer Science, Electrical Engineering, and a wide variety of engineering, physical sciences, biological sciences, and business disciplines from various colleges. CptS 575 is a required core course in the Data Science track of the MS and PhD programs in CS at EECS.

- **CptS 591: Elements of Network Science** (*Designed course*).
This graduate-level interdisciplinary course introduces fundamental elements of the science of complex networks, with emphasis on social and information networks. Students learn about select mathematical and computational methods used to analyze networks, models used to

understand and predict behavior of networked systems, and theories used to reason about network dynamics. Students are also exposed to current research in the field, and they are given an opportunity to explore a chosen topic through a semester project. Topics covered include: Graph Theory Refresher, Network Properties, Random Graphs, Spectral Graph Theory, Centrality, Ranking, Similarity, Signed Networks, Cascading Behaviors, Epidemic Models, Influence Maximization, Community Identification, and Temporal Networks. Students taking the course come from different backgrounds. In a typical semester, I would have most students come from either computer science or electrical engineering and some from disciplines such as sociology, biology and biological systems engineering.

- **CptS/STAT 424: Data Analytics Capstone** (*Designed course*), Spring 2019.
  Designed this inaugural offering of the capstone course for the WSU Data Analytics major. The course aims at providing students with an opportunity to integrate and apply the algorithms, methods, and tools they have learned throughout the program to solve real-world problems that have an interdisciplinary nature. Students conduct a team-based project that involves the main aspects of the data analytics process. The projects for the Spring 2019 inaugural offering were sponsored by United Airlines. Two teams of students (each consisting of four students) worked on two exciting projects, one on prediction of operations injuries and another on employee fatigue analysis. As part of the project the students traveled to San Francisco to visit United's facilities at the airport and better understand the project, the datasets involved, and the business operation of United. They also had the opportunity to travel to Chicago at the end of the semester to present their findings to United executives. Both trips were paid for by United.

Curriculum Design

- **BS in Cybersecurity**
  Led the effort to design the new BS in Cybersecurity degree program at WSU launched in Fall 2023. The curriculum emphasizes hands-on coursework and experiential learning and covers topics on security related to data, software, hardware, connection, cyber systems, and cybersecurity threats impacting organizations and society.
- **Certificate Programs in Cybersecurity**
  Designed three novel certificate programs to formalize the training students receive in the CySER education and training program. In addition to coursework requirements, the certificates involve requirements on participation in seminars, mentored research, summer workshop, and internship.
  - *CySER CAE-CO Fundamentals Certificate*: Targeted for BS in Computer Science (or Software Engineering) students interested in specializing in cybersecurity OR students in the new BS in Cybersecurity program.
  - *CySER Basics Certificate*: Targeted for non-CS majors interested in cybersecurity.
  - *CySER Advanced Certificate*: Targeted for MS and PhD Students who are involved in CySER mentoring activities and whose research has significant focus on cybersecurity.

Computer Science Senior Design Projects Sponsored

- **CodeVersion**: A tool for generating multiple versions of a given C/C++ or Python source code file (Fall 2024–Spring 2025)
  Team: Bryan Frederickson and Samantha Brewer
- **Aversarial Habituation Attacks**: Develop and assess habituation attacks on Network Intrusion Detection Systems (Fall 2024–Spring 2025)
  Team: Alex Hagood, Guinevere Fish, Zachary Werle, and Yannik Castro
- **Delphi Web Tool**: Designing a web-based tool for conducting Delphi studies to collect Subject Matter Expert input on cybersecurity course design (Fall 2024–Spring 2025)
  Team: William Heinecke and Griffin Gerry

Graduated students (4 PhD, 3 MS-Thesis, 1 Postdoc)

1. James Crabb, MS, Graduated Dec 2023.
   Thesis Title: *Critical Review of Cybersecurity Education in the United States.*
   Current Position: Post-doc (50% in the SCADS Lab, 50% in the CySER Institute).
2. Xu (Tony) Liu, PhD, Graduated July 2021.
   Tony was WSU-PNNL Distiguished Graduate Research Program (DGRP) fellow (first cohort), and was co-advised by Andrew Lumsdaine.
   Thesis Title: *Structure Detection in Graphs and Hypergraphs*
   Current Position: SDE II at AWS (Amazon).
3. Yunshu Du, PhD, co-advised with Matt Taylor. Graduated April 2021.
   Thesis Title: *Transfer in Deep Reinforcement Learning: How an Agent Can Leverage Knowledge from Another Agent, a Human, or Itself.*
   Current Position: Data Scientist at Sony AI.
4. Sayan Ghosh, PhD, Graduated April 2019.
   Thesis Title: *Supporting Efficient Graph Analytics and Scientific Computation using Asynchronous Distributed-Memory Programming Models*
   Current Position: Computer Scientist at PNNL.
5. Ramyar Saeedi, PhD, Graduated July 2018.
   Thesis Title: *Efficient Machine Learning Algorithms for Automatic Reconfiguration of Mobile Health Monitoring Systems*
   Current Position: ML Engineer at Uber.
6. Keyvan Sasani, MS, Graduated Dec 2018.
   Thesis Title: *Machine Learning for Predicting Performance of Graph Algorithms with Applications in Graph Databases and Network Similarity*
   Current Position: Data Engineer at Meta.
7. Helen Catanese, MS, Graduated May 2017.
   Thesis Title: *RepeatAnalyzer: A Tool for Analyzing and Managing Short-Sequence Repeat Data.* Current Position: Senior Software Engineer at Addium
8. Ramyar Saeedi, Postdoc, Sept 2018 – July 2019.
   Accepted position in industry in Aug 2019.

Current Graduate Students (8 PhD; 2 MS; 1 Post-doc)

1. James Crabb, Postdoc, January 2024 – present.
   Topic: Cybersecurity education; Software security.
2. Tashi Stirewalt, PhD student, Fall 2023 – present.
   Topic: Cybersecurity and graph algorithms.
   Status: Passed PhD Qualifying Exam.
3. Harrison Greenlee, PhD student, Spring 2023 – present.
   Topic: AI and computational epidemiology.
   Status: Passed PhD Qualifying Exam.
4. Olufunso Oje, PhD student, Fall 2021 – present.
   Topic: Data science and environmental health.
   Status: Scheduled to take PhD Prelim Exam in Spring 2025.
5. Jarren Briscoe, PhD student, co-advised with Diane Cook, Fall 2021 – present.
   Topic: Fair AI and Machine Learning.
   Status: Passed PhD Prelim Exam.
6. James Halvorsen, PhD student, Summer 2020 – present.
   Topic: Cybersecurity and generative ML.
   Status: Passed PhD Prelim Exam.
7. Shruti Sunil Patil, PhD student, Fall 2020 – present.
   Topic: Network science and bioinformatics.
   Status: Passed PhD Prelim Exam.
8. Coby Soss, PhD student, Fall 2021 – present.
   Topic: AI and graph algorithms.
   Status: Scheduled to take PhD Prelim Exam in Spring 2025.
9. Stephanie Kane, PhD student (Independent Interdisciplinary Program),
   co-advised with Jan Dasgupta, Fall 2022 – present.
   Topic: Responsible Data science.
   Status: Passed PhD Qualifying Exam.
10. Deven Biehler, MS student, January 2024 – present.
    Topic: Geospatial data management and analysis.
11. Zayn Abou-Harb, MS student, August 2024 – present.
    Topic: Geospatial data management and analysis.

Undergraduate Research and Mentoring

1. Current and past CySER mentees (20):
   Genevieve Kochel, Collin Bale, Ralph Lewis, Freeman Trader, Douglas Takada, Emily West, Fredy Fernandez, Guinevere Fish, Alexander Hagood, Bryan Fredrickson, Samantha Brewer, Zachary Werle, William Heinecke, Griffin Gerry, Nathan Waltz, Kaitlin White, Cai Haught, Andrew Fritz, Jose Sainz, James Minteer.
2. Tyler Coffey (WSU, Computer Science), Cybersecurity.
   Spring 2024.

3. Zayn Ahmad Abou-Harb (WSU, Computer Science), Geospatial data management and analysis. Spring 2024.
   Zayn joined my group as an MS students starting Fall 2024.
4. Harrison Greenlee (WSU, Computer Science), Open-source Reinforcement Learning Tool for Power Applications, Spring 2022.
   Harrison joined my group as a PhD student starting Spring 2023.
5. Navroop Kaur (WSU, Computer Science), Wearables and Health Applications, Spring 2022.
6. Nathan Waltz (WSU, Computer Science), Machine Learning and Cybersecurity, 2021 – 2023.
7. Hillary Zhang (WSU, Computer Science), Cybersecurity, Fall 2021 – Summer 2022.
8. Aaron Brookhouse (Michigan State Univ.), NSF REU in Smart Environments, Summer 2020.
   After the completion of the REU project, Aaron continued to work with me and collaborators in the school of biological sciences on another project for over a year.
9. Kyla Mallory (WSU, Data Analytics Major), Honors Thesis Advisee, Spring 2019 – Fall 2019.
10. Nathaniel Burley (WSU, Math), Deep Learning, Fall 2018–present.
11. Zachary Cutler (University of Utah), NSF REU in Smart Environments, Summer 2019.
12. Sunny Chiu (Colorado College), NSF REU in Smart Environments, Summer 2018.
13. Skyler Norgaard (Kalamazoo College), NSF REU in Smart Environments, Summer 2017.
    Skyler's summer project led to a conference publication.
14. Jonathan Squibb (University of Illinois at Chicago), NSF REU in Smart Environments, Summer 2016.
15. Faculty mentor for over 30 (annually) Computer Science majors at EECS, Fall 2014–present.

PhD Thesis Committee (current: 3; graduated: 16)

1. Ninad Gaikwad, Power Engineering, Advisor: Anamika Dubey
   Current
2. Sajjad Mahmud, Power Engineering, Advisor: Anamika Dubey
   Current
3. Daniel Glover, Power Engineering, Advisor: Anamika Dubey
   Current
4. Carla De Lira, Computer Science Education, Advisor: Shira Broschat
   Graduated: Final defense Passed in Spring 2024
5. Arman Ahmed, Power Engineering, Advisor: Anurag Srivastava
   Graduated: Final defense Passed in Fall 2022
6. Lusha Wang, Power Engineering, Advisors: Noel Schulz and Anamika Dubey
   Graduated: Final defense Passed in Jan 2022
7. Niloy Patari, Power Engineering, Advisor: Anurag Srivastava
   Graduated: Final defense passed in Fall 2021
8. Sumit Purohit, Graph Mining, Advisor: Larry Holder
   Graduated: Final defense passed in Spring 2021
9. Peng Lin, Graph Databases, Advisor: Yinghui Wu
   Graduated: Final defense passed in Fall 2020

10. Qi Song, Graph Mining, Advisor: Yinghui Wu
    Graduated: Final defense passed in Fall 2020
11. Ehdieh Khaledian, Bioinformatics, Advisor: Shira Broschat
    Graduated: Final defense passed in Fall 2020
12. Mohammad Hossein Namaki, Graph Databases, Advisor: Yinghui Wu
    Graduated: Final defense passed in Fall 2019
13. Abu Chowdhury, Anti Microbial Resistance, Advisor: Shira Broschat
    Graduated: Final defense passed in Fall 2019
14. Zhaodong Wang, Transfer Learning, Advisor: Matthew Taylor
    Graduated: Final defense passed in Fall 2019
15. Niloofar Hezarjaribi, Diet monitoring, Advisor: Hassan Ghasemzadeh
    Graduated: Final defense passed in Fall 2019
16. Daniel Olivares, Human-Computer Interaction, Advisor: Chris Hundhausen
    Graduated: Final defense passed in Spring 2019
17. Seyed Ali Rokni, Embedded and Pervasive Computing, Advisor: Hassan Ghasemzadeh
    Graduated: Final defense passed in Summer 2018
18. Paola G. Pesantez Cabrera, Graph Algorithms, Advisor: Ananth Kalyanaraman
    Graduated: Final defense passed in Spring 2018
19. Hao Lu, Parallel Computing, Advisor: Ananth Kalyanaraman.
    Graduated: Final defense passed in Spring 2017

MS Thesis Committee (Current: 1; Graduated: 6)

1. Yi Chou, Cybersecurity, Advisor: Monowar Hasan.
   Current
2. Mohammed Mustafa Hussain, Power Engineering, Advisor: Anurag Srivastava.
   Graduated in Summer 2021.
3. Zhilla Esna Ashari Esfahani, Active Learning, Advisor: Hassan Ghasemzadeh.
   Graduated in Fall 2019.
4. Marjan Nourollahi Darabad, Embedded Systems, Advisor: Hassan Ghasemzadeh.
   Graduated in Summer 2019.
5. Nathan Wendt, Social Network Analysis, Advisor: Sandip Roy.
   Graduated in Spring 2019.
6. Gabriel De la cruz, Robotics, Advisor: Matt Taylor.
   Graduated in Spring 2019.
7. Viresh Duvvuri, Robotics, Advisor: Matt Taylor.
   Graduated in Summer 2017.

University Service (at WSU)

School Level

- Lead, Cybersecurity Curriculum Committee, 2022–present.
- Lead, Assessment of the BS in Cybersecurity major, 2023–present.
- Lead, EECS Undergrad Recruiting Committee, 2019–2023.
- Member, Computer Sciences Curriculum Committee, 2023–present.
- Member, EECS Assessment Committee, 2023–present.
- Member, EECS Graduate Studies Committee (GSC), 2019–2024.
- Member, Cybersecurity Faculty Search Committee, EECS, Pullman campus, 2024–2025.
- Co-Chair, Cybersecurity Faculty Search, Tri-Cities campus, 2023–2025.
- Member, CS Faculty Search Commmitee, EECS, Pullman campus, 2021–2023.
- Member, EE Faculty Search Commmitee, EECS, Pullman campus, 2021–2023, 2019-2020
- Member, CS Faculty Search Committee, EECS, Pullman campus, 2015–16.
- Member, Mentoring Committee of several faculty at EECS:
  Monowar Hasan (since 2023), Xu Lin (since 2023), Tom Gilray (since 2024)

College Level

- Faculty Advisor, the **Cyber Security Group** student club, 2021–present.

  The CSG is a very active student club. Teams from the student club participated in every season of the National Cyber League (NCL) competition since 2022, where they qualified to be ranked and placed in the top 15% of 500 ranked schools. One of the teams won first place in the 2024 VICEROY Spectral Cloak national competition.
- Faculty Advisor, National Society of Black Engineers (NSBE) WSU Chapter, 2015–present.
- Member, VCEA Faculty Committee for Undergrad Recruitment, 2020–2023.
- Member, Governance Committee of the Voiland College of Engineering and Architecture HPC cluster Aeolus, 2016–2020.

University Level

- Lead, WSU's application for National Centers of Academic Excellence in Cybersecurity – Research (CAE-R) designation, 2024–2025.
- Lead, WSU's application for National Centers of Academic Excellence in Cybersecurity – Cyber Defense (CAE-CD) designation, 2023–2024.
- Lead, AI Research Working Group, 2024–2025.
- Coordinator, WSU Cybersecurity initiatives, 2022–2024.
- Member, Faculty Senate Academic Affairs Committee (AAC), 2017–2020.
- Member, Committee for PhD in Data Science/Data Analytics, 2021–2023.
- Point-of-Contact, WSU AI Research, 2019 – 2022.
- Member, Data Analytics Faculty Advisory Board, 2020–2022.
- Co-organizer, Distinguished Seminar Series in Data Science, 2015–2016.

- Faculty Mentor, WSU Team Mentoring Program (TMP), 2023–present.
- Faculty Mentor, PNW Louis Stokes Alliance for Minority Participation (LSAMP) at WSU, 2015–present.

Professional Service

Major Outreach and Engagement Activities

- Organizer, *CySER Seminar Series*, Fall 2021 – present

  Bi-weekly virtual seminar series held every semester since Fall 2021. Features cybersecurity expert speakers from government, industry, and academia. The series has thus far run for 8 semesters featuring more than 40 seminars. Slides and recordings of all the seminars are made available on YouTube and the CySER website. More information available at `https://cyser.wsu.edu/seminars`.

- Organizer, *CySER Summar Workshops*, 2022–2024

  A two-week intensive summer workshop held in the second half of May. Three such workshops have been held in the past three years (2024, 2023, 2022). Each workshop featured a wide variety of presentations, tutorials, panels, and hands-on experiential learning activities on a range of cybersecurity topics. The workshops also featured field trips to locations of interest to the CySER program. Field trips taken in 2024 include visits to Pacific Northwest National Labs in Richland, Schweitzer Engineering Laboratories (SEL) in Pullman, and Fairchild Air Force Base outside Spokane. Each workshop was held in-person in the Pullman campus of WSU with an option for people to participate virtually. Slides, related material, and recordings of all sessions that took place at each workshop are made available at the CySER website: `https://cyser.wsu.edu/summer-workshop`.

- Panelist, *VICEROY Symposium 2024*

  Gave a presentation about CySER at the symposium and participated in a panel discussion about VICEROY Virtual Institutes.

- Moderator, *AI Expo at NCESD STEM Summit 2021*

  Moderated a panel discussion titled *AI Jobs of the Future: A conversation about emerging AI jobs and preparing the next generation for these roles.* Video recordings of the panel discussion is available at: `https://youtu.be/29JNBCkFvvY`

- Organizer, *Virtual Summit on AI*, 2020

  Organized and moderated the event *Advancing AI at WSU: a Virtual AI Summit*, held as a featured event at the 2020 WSU Research Week, October 14, 2020.

Proposal Review/Panel Service

- Panelist, *U.S. National Science Foundation (CISE, ENG, and several cross-cutting programs)*: nearly every year from 2015–2024 (Multiple panels in some years).
- Panelist/Reviewer, *U.S. Department of Energy, Office of Advanced Computing Research*: 2016–2024, 2009. (Multiple panels in some years).
- Reviewer, *Netherland's Organization for Scientific Research*: 2014, 2008.
- Reviewer, *The French National Research Agency*: 2010.

Recent Conference Program Committee Service

- International European Conference on Parallel and Distributed Computing (EuroPar) (2024)
- 2023 SIAG/ACDA Early Career Prize (Prize Selection Committee Member)
- ACM International Conference on Web Search and Data Mining (WSDM) (2023)
- The WEB Conference/WWW (2023, 2022, 2021, 2020, 2019, 2018)
- Supercomputing 2023
- SIAM Data Mining (2024, 2021, 2020, 2019)
- AAAI 2022 (Senior Program Committee)
- SIAM Conf. on Applied and Computational Discrete Algorithms (ACDA) (2023, 2021)
- Supercomputing I3A Workshop (2021, 2020)
- NeurIPS 2021 Workshop on Differentiable Programming (Organizing Committee)
- SIAM Workshop on Combinatorial Scientific Computing (2020, 2018, 2016 (Co-Chair))
- IEEE Int'l Parallel and Distributed Processing Sym.(IPDPS) (2023, 2018, 2017, 2015)
- IEEE BigData (2018, 2017, 2016)
- IEEE Int'l Conf. on High Perf. Computing, Data, and Analytics (HiPC) (2018, 2017)
- IEEE International Conference on Machine Learning and Applications (ICMLA) (2018)
- ACM Conference on Bioinformatics, Computational Biology and Health Informatics (ACM BCB) (2017)

Select Journal Paper Review (numerous times for most journals)

- *ACM Transactions on Parallel Computing.*
- *ACM Journal on Experimental Algorithmics.*
- *ACM Transactions on Mathematical Software.*
- *ACM Inroads*
- *IEEE Transactions on Parallel and Distributed Systems.*
- *IEEE Transactions on Knowledge and Data Engineering.*
- *IEEE Transactions on Power Systems.*
- *IEEE Transactions on Multi-scale Computing Systems.*
- *SIAM Journal on Scientific Computing.*
- *SIAM Journal on Matrix Analysis and Applications.*
- *The Very Large Databases (VLDB) Journal.*
- *Journal of Parallel and Distributed Computing.*
- *Parallel Computing.*
- *PLOS One.*
- *PLOS Computational Biology.*
- *Concurrency and Computation: Practice and Experience.*
- *Optimization Methods and Software.*

- *Discrete Applied Math.*
- *Algorithms.*
- *European Journal of Operations Research.*

Book Review

- Chapman & Hall/CRC Press, Statistical Sciences Series, 2017
- Springer Nature, Advanced Information and Knowledge Processing Series, 2016
- SIAM, Frontiers in Applied Mathematics, 2008

Select Invited Presentations at Conferences, Workshops, and Colloquia

- Speaker, CyberCorps Scholarship for Service Program at WSU, *CySER Virtual Seminar Series*, Feb 2025.
- Speaker, Algorithmic Accountability in Small Data, *Math and Stat of AI Seminar Series*, WSU, Feb 2025.
- Speaker, Grid Analytics and Cybersecurity, *AGI Day 2024*, Richland, WA, Aug 2024.
- Panelist, VICEROY Symposium 2024, University of Texas San Antonio, March 2024.
- Speaker, CySER Overview and Machine Learning, *CySER Virtual Seminar Series*, Oct 2021.
- Tutorial Speaker, Introduction to Combinatorial Scientific Computing, *SIAM Conference on Applied and Computational Discrete Algorithms* (ACDA 21), July 2021.
- Panelist, Diversity and Inclusion Panel, *The 11th ACM Conference on Bioinformatics, Computational Biology, and Health Informatic (ACM BCB 2020)*, Sep 21–24, 2020.
- Participant, *NSF Workshop "Forging Connections between Machine Learning, Data Science and Power Systems Research"*, March 5–6, 2020, Alexandria, VA.
- Speaker, Context-aware Disaggregation of Behind-the-Meter PV/Load Using Machine Learning, *UI-ASSIST Webinar*, May 30, 2019.
- Speaker, Asynchronous, One-sided Communication: Programming Support for Distributed-memory Scientific Applications, Minisymosium titled "Towards Graph Algorithms and Analytics for Exascale Applications" organized by A. Pothen, *SIAM Conference on Parallel Processing for Scientific Computing* (SIAM PP), Tokyo, Japan, March 2018.
- Panel co-chair, Scalability of Data Analytics Approaches, *NSF Workshop on Real Time Data Analytics for the Resilient Electric Grid*, Portland, OR, August 2018.
- Speaker, Algorithms and Software for Efficient Computation of Sparse Derivative Matrices, Special Session on "Geometry and Optimization in Computer Vision" organized by Bala Krishnamoorthy (WSU) and Sudipta Sinha (Microsoft), *American Mathematical Society Spring Western Sectional Meeting*, Washington State University, Pullman, WA, April 22-23, 2017.
- Speaker, Effective Parallelization of Graph Algorithms in Computing Applications, *Frontiers of Research Computing in Academic Environments, CIRC Workshop*, Washington State University, October 30-31, 2017.
- Presenter, Accelerating Vaccine Development with Software Tool, *SciTech Northwest 2016*, Seattle, WA, November 2016.

- Presenter, Transfer Learning Approaches for Autonomous Reconfiguration of Wearable Systems, *Workshop on Algorithms for Modern Massive Data Sets (MMDS 2016), University of California Berkley*, July 2016.
- Presenter, Towards A More Asynchronous GraphBLAS, *SIAM Workshop on Combinatorial Scientific Computing (CSC16)*, Albuquerque, NM, October 2016.
- Speaker, Exploiting Sparsity in Derivative Computation, Minisymposium on Automatic Differentiation and Nonlinear Optimization organized by A. Gebremedhin, *SIAM Annual Meeting, July 9–13, 2012, Minneaplois, Minnesota.*
- Speaker, The ColPack Software Library for Graph Coloring to Enable Derivative Computations, Minisymposium on Automatic Differentiation Software organized by Bradley Bell, *International Congress on Industrial and Applied Mathematics (ICIAM 2011)*, Vancouver, BC, Canada, July 18–22, 2011.
- Speaker, Multithreaded Graph Coloring Algorithms for Scientific Computing, Minisymposium on Combinatorial Scientific Computing organized by Ali Pinar and Alex Pothen, *International Congress on Industrial and Applied Mathematics (ICIAM 2011).*
- Speaker, Algorithms and Software for Sparse Derivative Computation and Beyond, *LANS Seminar Series, Argonne National Laboratory*, December 1, 2010, Argonne, IL.
- Speaker, Graph Coloring Software for Computational Science and Engineering, *Computer Science Research Institute, Sandia National Laboratories*, Oct. 21, 2010, Albuquerque, NM.
- Speaker, ColPack: A Graph Coloring Package for Sparse Derivative Computation, Minisymposium on Automatic Differentiation and Applications organized by Paul Hovland and A. Gebremedhin, *SIAM Conference on Computational Science and Engineering, March 2–6, 2009, Miami, FL.*
- Speaker, The Enabling Power of Graph Coloring Algorithms in Automatic Differentiation, *Dagstuhl Seminar on Combinatorial Scientific Computing, Feb 1–6, 2009, Germany.* Organizers: Uwe Naumann, Olaf Schenk, Horst Simon and Sivan Toledo.
- Speaker, Novel Acyclic and Star Coloring Algorithms and Their Application to Efficient Hessian Computation via Automatic Differentiation, Minisymposium on Combinatorial Algorithms organized by Paul Hovland, *SIAM Conference on Optimization, May 10–13, 2008, Boston, MA.*
- Speaker, A Scalable Algorithmic Framework for Parallel Graph Coloring on Distributed Memory Computers, Minisymposium organized by Rob Bisseling and Fredrik Manne, *SIAM Conference on Parallel Processing for Scientific Computing, March 12–14, 2008, Atlanta, GA.*
- Speaker, Graph Coloring for Computing Derivatives: A Unifying Framework, Minisymposium organized by Andrea Walther, *SIAM Conference on Optimization, May 2005, Stockholm, Sweden.*
- Speaker, What Color Is Your Jacobian? Graph Coloring for Computing Derivatives, Minisymposium organized by Iain Duff, *SIAM Annual Meeting, July 2004, Portland, OR.*
- Speaker, Parallel Algorithms for Graph Coloring Problems in Numerical Optimization, Minisymposium organized by Ali Pinar, *SIAM Conference on Parallel Processing for Scientific Computing, Feb 2004, San Francisco, CA.*

Professional Membership

- Senior Member of IEEE
- Member of ACM
- Member of the Society for Industrial and Applied Mathematics (SIAM)
- Member of the SIAM activity groups on: (1) Supercomputing; (2) Applied and Computational Discrete Algorithms; and (3) Data Science.