Assefaw H. Gebremedhin

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Research Interests

Data science and AI. High-performance computing. Graph algorithms. Pervasive computing. Bio and health informatics. Cybersecurity.

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

Awards

- 2021 George Pólya Prize in Applied Combinatorics (for joint work with Fredrik Manne and Alex Pothen), 2021
- National Science Foundation CAREER Award, 2016
  (Project title: *Fast and Scalable Combinatorial Algorithms for Data Analyitics*)
- Innovation Award, Graph Challenge, IEEE High Performance Extreme Computing Conference (HPEC 2019 and HPEC 2018)
- My student Helen Catanese won the 2019 #ElevatingMath Video Competition conducted by the National Academies of Science, Engineering and Medicine, 2019.
- Founding member and co-investigator in the Combinatorial Scientific Computing and Petascale Simulations Institute (CSCAPES), a multi-institution project funded by the Department of Energy under the SciDAC-2 program, 2006–2012
- L. Meltzer's Student Award for Outstanding Talent, University of Bergen, 2001 and 2003
- Doctoral Fellowship, University of Bergen, 1999–2003

Google Scholar Citation Profile (Google Scholar, Aug 2021):

- H-index: 23 i10-index: 39
- Total citations: 1,990 Citations since 2016: 1,134

Publications List

Edited Volumes

1. A.H. Gebremedhin, E. Boman and B. Ucar (Eds.), *Proceedings of the Seventh SIAM Workshop on Combinatorial Scientific Computing*, 2016, SIAM.
2. 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.

Magazine Articles

3. 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.

Book Chapters

4. 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.
5. 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

6. Y. Du, G. Warnell, A. 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
7. 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.
8. 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.
9. 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.
10. 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.

11. 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
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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.
22. 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.
23. 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.
24. 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.

25. 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.
26. 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.
27. 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.
28. 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.
29. A.H. Gebremedhin and F. Manne, *Scalable Parallel Graph Coloring Algorithms*, Concurrency: Practice and Experience, Vol 12, pp 1131–1146, 2000.

Conference Proceedings

30. 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.
31. X. Liu, M. Halappanavar, K. Baker, A. Lumsdaine and A.H. Gebremedhin, *Direction-optimizing Label Propagation and its Application to Community Detection*, Computing Frontiers, 2020.
32. 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.
33. 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.
34. 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**].
35. 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
36. 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
37. 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)

38. 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.

39. 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

40. 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

41. 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

42. 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).

43. 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**].

44. 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

45. 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

46. 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

47. 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

48. 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

49. H. 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

50. 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

51. 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.

52. 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.

53. 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.

54. 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.

55. S.H.K. Narayanan, B. Norris, P. Hovland, D. Nguyen and A.H. Gebremedhin, *Sparse Jacobian Computation using ADIC2 and ColPack*, Procedia Computer Science, 4:2115–2123, 2011. Proceedings of the International Conference on Computational Science, ICCS 2011.

56. U. Catalyurek, F. Dobrian, A.H. Gebremedhin, M. Halappanavar and A. Pothen, *Distributed-memory Parallel Algorithms for Matching and Coloring*, 2011 IEEE International Symposium on Parallel and Distributed Processing Workshops and Phd Forum, Shanghai, 2011, pp. 1971-1980. doi: 10.1109/IPDPS.2011.360

57. 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.

58. E.G. Boman, D. Bozdağ, U. Catalyurek, K. Devine, A.H. Gebremedhin, P. Hovland and A. Pothen, *Combinatorial Algorithms for Computational Science and Engineering*, Journal of Physics: Conference Series 125 (2008) 012071. SciDAC 2008.

59. 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.

60. 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.

61. 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.
62. 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.
63. 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.
64. 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.
65. 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
66. 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.
67. 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

68. E. Boman, A. Gebremedhin and S. Toledo, *SIAM Workshop on Combinatorial Scientific Computing Inaugurates Proceedings and Best Paper Award*, SIAM News Dec 2016.
69. 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.
70. A.H. Gebremedhin, *The Third SIAM Workshop on Combinatorial Scientific Computing*, SIAM News Vol 40, No 4, May 2007.

Workshop Short Papers/Extended Abstracts

71. 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.
72. 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.
73. 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.
74. 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.

75. 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.
76. 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.
77. 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.
78. 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

79. 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.
80. A.H. Gebremedhin, *Parallel Graph Coloring*, MS (Cand.scient) thesis, Dept of Informatics, University of Bergen, May 1999. Advisor: Fredrik Manne.

Media

- Gebremedhin receives prestigious international applied mathematics prize, WSU INSIDER, February 23, 2021.
- SIAM AN21 Prize Spotlight, SIAM News, July 1, 2021.
- WSU to lead cybersecurity education and research institute, WSU INSIDER, July 16, 2021.
- Determining the role of health care settings in a pandemic, WSU INSIDER, March 18, 2021.
- Connecting AI research, WSU INSIDER, January 30, 2020.
- Understanding bacterial pathogens, WSU INSIDER, March 11, 2019.
- Beating the crowds – with data science, WSU INSIDER, September 14, 2018.
- Transfer students in computer science prove successful, WSU INSIDER, May 11, 2018.
- Software improves ability to catalog bacterial pathogen, WSU INSIDER, June 27, 2016. This story was a WSU press release. Several news outlets followed up with their own stories on the topic. Examples include:
  - Puget Sound Business Journal
  - Science Daily
  - Becker's Healthcare
  - News Medical
  - Seattle Suntimes
  - Phys.org
  - Technobahn
  - Infection Control Today
  - Bioscience Technology
  - Buffalo Breeze
  - Health Canal
  - Big News Network

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

- *Northwest Virtual Institute for CyberSecurity Education & Research (CySER).* Department of Defense, 06/17/2021 – 06/17/2023. Total: $1.5M, WSU share: $1M.
  B. Van Wie (PI), A. Gebremedhin (Co-PI), N. Schulz (Co-PI), A. Kalyanaraman (Co-PI).
- *RAPID: Curtailing Nosocomial Amplifcation of COVID-19.* National Science Foundation, 02/01/2021 – 01/21/2022. Total: $200K.
  E. Lofgren (PI), A. Gebremedhin (Co-PI) and S. Rhea (Co-PI).
- *PNNL-WSU Distinguished Graduate Research Program.* Awarded to support my PhD student Xu (Tony) Liu. 2018–2021. Total: $200K.
- *CAREER: Fast and Scalable Combinatorial Algorithms for Data Analytics.* National Science Foundation, 2016–2022. Total: $520K. A. Gebremedhin (Single PI).
- *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.
  Role: WSU Co-PI (joined the project after it was funded).
  Share: $100K for Oct 2018 – Sept 2020.
- *Smart Environments: National Science Foundation Research Experience for Under Graduate Students (REU).* 2015–2017; 2018–2020; PI: Larry Holder. Role: Senior Personnel.
- *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).
- *Combinatorial Algorithms to Enable Derivative Computations on Multicore Architectures.* National Science Foundation, 2012–2015. Total: $300K.
  A. Pothen (PI) and A. Gebremedhin (co-PI).

- *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).
- *Empowering Computational Science and Engineering via Automatic Differentiation.*
  National Science Foundation, 2008–2011. Total: $200K.
  A. Pothen (PI) and A. Gebremedhin (co-PI).

Teaching: at WSU

- *Automata and Formal Languages*, CptS 317. Spring 2020, Spring 2021.
- *Data Science*, CptS 475/575. Fall 2015, 2016, 2017, 2018, 2019, 2020, 2021.
  (Fall 2015–17 offered under the course number CptS 483).
  Designed course.
- *Elements of Network Science*, CptS 591. Spring 2015, 2016, 2017, 2018, 2019, 2020, 2021.
  (Spring 2015–2017 offered under the course number CptS 580).
  Designed course.
- *Data Analytics Capstone*, CptS/STAT 424. Spring 2019.
  Very first offering in the new BS in Data Analytics program.

Advising: graduated students (PhD (4) and MS-Thesis (2))

- Xu (Tony) Liu, PhD, Graduated July 2021. Tony was WSU-PNNL Distiguished Graduate Research Program (DGRP) fellow (first co-hort), and was co-advised by Andrew Lumsdaine.
  Thesis Title: *Structure Detection in Graphs and Hypergraphs*
  Current Position: Postdoc at University of Washington.
- 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.
- Sayan Ghosh, PhD, Graduated April 2019.
  Thesis Title: *Supporting Efficient Graph Analytics and Scientific Computation using Asynchronous Distributed-Memory Programming Models*
  Current Position: Staff Scientist at PNNL.
- Ramyar Saeedi, PhD, Graduated July 2018.
  Thesis Title: *Efficient Machine Learning Algorithms for Automatic Reconfiguration of Mobile Health Monitoring Systems*
  Current Position: Data Scientist at Hitachi America.
- 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: Product Engineern at Bigstream.
- Helen Catanese, MS, Graduated May 2017.
  Thesis Title: *RepeatAnalyzer: A Tool for Analyzing and Managing Short-Sequence Repeat*

Data
Current Position: PhD Student at WSU (on leave for Spring and Fall 2021).

Advising: former postdoc

- Ramyar Saeedi, Postdoc, Sept 2018 – July 2019.
  Accepted position in industry in Aug 2019.

Advising: current PhD Students (5)

- Olufunso Oje, PhD student, Fall 2021 – present. Topic: Health data science.
- Jarren Briscoe, PhD student, co-advised with Diane Cook, Fall 2021 – present. Topic: AI and Machine Learning.
- James Halvorsen, PhD student, Summer 2020 – present. Topic: Cybersecurity.
- Shruti Sunil Patil, PhD student, Fall 2020 – present. Topic: Network science.
- Helen Catanese, PhD student, Jan 2017 – present. Topic: Bioinformatics.
  Passed Prelim Exam in Summer 2019. (On leave for Spring and Fall 2021)

Undergraduate Mentoring

- Nathan Waltz (WSU, Computer Science), Machine Learning and Cybersecurity, Summer 2021 – present.
- Aaron Brookhouse (Michigan State Univ.), NSF REU in Smart Environments, Summer 2020. After the completion of the REU project, Aaron has continued to work with me and collaborators in the school of biological sciences on another project.
- Kyla Mallory (WSU, Data Analytics Major), Honors Thesis Advisee, Spring 2019 – Fall 2019.
- Nathaniel Burley (WSU, Math), Deep Learning, Fall 2018–present.
- Zachary Cutler (University of Utah), NSF REU in Smart Environments, Summer 2019.
- Sunny Chiu (Colorado College), NSF REU in Smart Environments, Summer 2018.
- Skyler Norgaard (Kalamazoo College), NSF REU in Smart Environments, Summer 2017. Skyler's summer project led to a conference publication.
- Jonathan Squibb (University of Illinois at Chicago), NSF REU in Smart Environments, Summer 2016.
- Faculty mentor for over 30 (annually) Computer Science majors at EECS, Fall 2014–present.

Advising: MS Non-Thesis Students

- Graduated: 18 (in the period 2018–2021)
- Current: 4

PhD Thesis Committee (graduated; 12)

- Sumit Purohit, Graph Mining, Advisor: Larry Holder
  Final defense passed in Spring 2021
- Peng Lin, Graph Databases, Advisor: Yinghui Wu
  Final defense passed in Fall 2020
- Qi Song, Graph Mining, Advisor: Yinghui Wu
  Final defense passed in Fall 2020

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

PhD Thesis Committee (current; 4)

- Arman Ahmed, Power Engineering, Advisor: Anurag Srivastava
  Passed Prelim Exam in Fall 2020
- Niloy Patari, Power Engineering, Advisor: Anurag Srivastava
  Passed Prelim Exam in Fall 2020
- Lusha Wang, Power Engineering, Advisors: Noel Schulz and Anamika Dubey
  Passed Prelim Exam in Fall 2020
- Carla de Lira, Learning Analytics, Advisor: Chris Hundhausen
  Passed Prelim Exam in Fall 2020

MS Thesis Committee (Graduated; 6)

- Mohammed Mustafa Hussain, Power Engineering, Advisor: Anurag Srivastava.
  Graduated in Summer 2021.
- Zhilla Esna Ashari Esfahani, Active Learning, Advisor: Hassan Ghasemzadeh.
  Graduated in Fall 2019.
- Marjan Nourollahi Darabad, Embedded Systems, Advisor: Hassan Ghasemzadeh.
  Graduated in Summer 2019.
- Nathan Wendt, Social Network Analysis, Advisor: Sandip Roy.
  Graduated in Spring 2019.
- Gabriel De la cruz, Robotics, Advisor: Matt Taylor.
  Graduated in Spring 2019.
- Viresh Duvvuri, Robotics, Advisor: Matt Taylor.
  Graduated in Summer 2017.

University Service (at WSU)

University Level

- Member, Courses Committee for PhD in Data Science/Data Analytics, Summer 2021
- Point-of-Contact, WSU AI Research, Oct 2019 – present
- Member, Data Analytics Curriculum Committee, Jan 2020 – present
- Member, Faculty Senate Academic Affairs Committee (AAC), 2017–2020.
- Co-organizer, Distinguished Seminar Series in Data Science, 2015–2016.
- Faculty Mentor, PNW Louis Stokes Alliance for Minority Participation (LSAMP) at WSU, 2015–present.

College Level

- Member, VCEA Faculty Committee for Undergrad Recruitment, Spring 2020–present.
- Member, Governance Committee of the Voiland College of Engineering and Architecture HPC cluster Aeolus, 2016–2020.
- Faculty Advisor, National Society of Black Engineers (NSBE) WSU Student Chapter, 2015–2020.

School Level

- Lead, EECS Undergrad Recruiting Committee, 2019–present.
- Member, EECS Graduate Studies Committee (GSC), 2019–present.
- Member, 2021 CS Faculty Search Committee, EECS, Pullman campus.
- Member, 2021 EE Faculty Search Commmitee, EECS, Pullman campus.
- Contributor, Curriculum development for the Data Science Track in the Computer Science program at EECS, WSU, 2015–2017.
- Member, 2014 Faculty Search Committee for multiple tenure-track positions in Data Science at EECS, WSU Pullman campus.

Professional Service

- **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`

- **Virtual Summit on AI**

  Organizer and moderator, Advancing AI at WSU: a Virtual AI Summit, held as a featured event at the 2020 WSU Research Week, October 14, 2020. Event info including videos of presentations available at `https://research.wsu.edu/ai/advancing-ai-wsu/`.

- **Proposal Review/Panel Service**
  - Panelist, U.S. National Science Foundation: 2021, 2020, 2019, 2018, 2017, 2016, 2015. (Multiple panels in some years)

- Reviewer, U.S. Department of Energy: 2021, 2020, 2019, 2018, 2017, 2016, 2009. (Multiple panels in some years)
- Reviewer, *Netherland's Organization for Scientific Research*: 2014, 2008.
- Reviewer, *The French National Research Agency*: 2010.

- **Select Recent Conference Program Committee Service**

  NeurIPS 2021 Workshop on Differentiable Programming (Organizing Committee)
  AAAI 2022 (Senior Program Committee);
  The WEB Conference/WWW (2021, 2020, 2019, 2018);
  SIAM Conference on Applied and Computational Discrete Algorithms (ACDA 2021);
  SIAM Workshop on Combinatorial Scientific Computing (2020, 2018, 2016 (Co-Chair));
  SIAM Data Mining (2021, 2020, 2019);
  IEEE Int. Parallel and Distributed Processing Symposium (IPDPS) (2018, 2017, 2015);
  IEEE BigData (2018, 2017, 2016);
  IEEE International Conference on High Performance 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)

  SIAM Journal on Scientific Computing. SIAM Journal on Matrix Analysis. ACM Transactions on Mathematical Software. ACM Transactions on Parallel Computing. ACM Journal on Experimental Algorithmics. IEEE Transactions on Parallel and Distributed Systems. IEEE Transactions on Multi-scale Computing Systems. IEEE Transactions on Knowledge and Data Engineering. Discrete Applied Math. *PLOS One. The Very Large Databases (VLDB) Journal. Parallel Computing.*

- **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 Panels

- Speaker, Tutorial on Introduction to Combinatorial Scientific Computing at the inaugural 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.
- 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, Context-aware Disaggregation of Behind-the-Meter PV/Load Using Machine Learning, *UI-ASSIST Webinar*, May 30, 2019.

- 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, 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.
- 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.*

Professional Membership

- Member of ACM
- Member of IEEE
- 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.
- Member of Black In AI