Curriculum Vitæ

Erik Saule

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Personal Information

Last, First, and Middle Names: Saule, Erik, Jonathan.

Date of Birth: 09-14-1984

Place of Birth: Suresnes (Hauts de Seine 92), France

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Business Address: University of North Carolina at Charlotte.
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Education and Professional Experience

Aug 2020-: Associate Chair of Computer Science, University of North Carolina at Charlotte, USA.

Aug 2019-: Associate Professor, University of North Carolina at Charlotte (Dept. Computer Science), USA.

Aug 2013-Aug 2019: Assistant Professor, University of North Carolina at Charlotte (Dept. Computer Science), USA.

Jan 2009-Aug 2013: Post-Doctoral researcher, The Ohio-State University (Dept. Biomedical Informatics). Columbus, Ohio, USA.

Oct 2005-Sep 2008: Teaching Assistant at ENSIMAG, Grenoble, France

Oct 2005-Dec 2008: Ph.D. Computer Science, Grenoble INP. Laboratoire d'Informatique de Grenoble, France.
Thesis: *Approximation Algorithms for Multi-Objective Scheduling. Application to Parallel and Embedded Systems*
Advisor: Prof. Denis TRYSTRAM

2004-2005: Master 2 Research in Computer Science ("Operation Research and Combinatorial Optimization" section), Grenoble INPG, France.
Thesis: *Reliable Schedules for Real-Time Embedded Systems*.
Advisors: Dr. Alain GIRAULT and Prof. Denis TRYSTRAM.

June-September 2004: Four month internship at University of Versailles, France.
Thesis: *Scheduling Arithmetic Instructions On Finite Registers*.
Advisors: Dr. Edith NAUDIN and Prof. William JALBY.

2000-2004: License and Master 1 in Computer Science ; University of Versailles, France

Career highlights

- Secured about $2M of funding in 10 years to conduct research, organize events.
- Graduated 7 students with thesis (3 PhD, 4 MS)
- Developped educational tools that trained about 150 instructors and impacted over 3000 students.
- h-index 26 (as reported by google scholar)
- Developed methods and tools to compute closeness centrality over 200,000x faster than previously possible (see Parco15 paper)
- One of the first scientist to leverage Xeon Phi processors for sparse problems, in particular graph algorithms
- Reformed the PhD program at UNC Charlotte to improve student funding processes, annual reviews, and seminar requirements
- Lead the reform of research labs at UNC Charlotte into structures federating the research activities of multiple faculty members.
- Produced a set of video lectures and associated material to teach parallel computing and minimize instructor preparation time

Research Interest

The technical research I conduct is centered on solving combinatorial problems, efficiently using High Performance Computing systems, improving the education of Computer Science students, and their intersection. My interest includes the following topics : Multi-objective optimization, Models for High Performance Computing, Approximation Algorithm, Scheduling, Load Balancing, Graph Mining, Applications of Graph Algorithms Parallel Graph Algorithm, Distributed Computing and Runtime Systems, CS education, Engagement of CS students, PDC adoption in early CS.

Publications

Journals

[J1] David Burlinson, Matthew Mcquaigue, Alec Goncharow, Kalpathi Subramanian, Erik Saule, Jamie Payton, and Paula Goolkasian. Bridges: Real world data, assignments and visualizations to engage and motivate cs majors. *Education and Information Technologies*, 29:10649–10675, 2023. Tier-1, DOI: 10.1007/s10639-023-11958-4 , PDF.

[J2] Alec Goncharow, Matthew Mcquaigue, Erik Saule, Kalpathi Subramanian, Paula Goolkasian, and Jamie Payton. Cs-materials: A system for classifying and analyzing pedagogical materials to improve adoption of parallel and distributed computing topics in early cs courses. *Journal of Parallel and Distributed Computing*, 157:316–330, 2021. Tier-1, DOI: 10.1016/j.jpdc.2021.05.014 , PDF.

[J3] Pourya Naderi Yeganeh, Christine Richardson, Erik Saule, Ann Loraine, and M. Taghi Mostafavi. Revisiting the use of graph centrality models in biological pathway analysis. *BioData Mining*, 13(5), 2020. Tier-2, DOI: 10.1186/s13040-020-00214-x , PDF.

[J4] Ahmet Erdem Sarıyüce, Kamer Kaya, Erik Saule, and Ümit V. Çatalyürek. Graph manipulations for fast centrality computation. *ACM Transactions on Knowledge Discovery from Data (TKDD)*, 11, 2017. Tier-1, DOI: 10.1145/3022668 , PDF.

[J5] T. Dytrych, P. Maris, K. D. Launey, J. P. Draayer, J. P. Vary, D. Langr, E. Saule, M. A. Caprio, Ü. Çatalyürek, and M. Sosonkina. Efficacy of the su(3) scheme for ab initio large-scale calculations beyond the lightest nuclei. *Computer Physics Communications*, 207:202–210, October 2016. Tier-1, DOI: 10.1016/j.cpc.2016.06.006 .

[J6] Ahmet Erdem Sarıyüce, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Regularizing graph centrality computations. *Journal of Parallel and Distributed Computing*, 76:106–119, February 2015. Tier-1, DOI: 10.1016/j.jpdc.2014.07.006 , PDF.

[J7] Ahmet Erdem Sarıyüce, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Incremental closeness centrality in distributed memory. *Parallel Computing*, 47:3–18, August 2015. Tier-1, DOI: 10.1016/j.parco.2015.01.003 , PDF.

[J8] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Diversifying citation recommendations. *ACM Transactions on Intelligent Systems and Technology*, 5(4):1–21, 2014. Tier-1, DOI: 10.1145/2668106 , PDF.

[J9] Myoungsoo Jung, Ellis H. Wilson III, Wonil Choi, John Shalf, Hasan Metin Aktulga, Chao Yang, Erik Saule, Ümit V. Çatalyürek, and Mahmut Kandemir. Exploring the future of out-of-core computing with compute-local non-volatile memory. *Scientific Programming*, 22(2):125–139, 2014. Tier-2, DOI: 10.3233/SPR-140384 , PDF.

[J10] Pieter Maris, H Metin Aktulga, Sven Binder, Angelo Calci, Ümit V Çatalyürek, Joachim Langhammer, Esmond Ng, Erik Saule, Robert Roth, James P Vary, and Chao Yang. No core ci calculations for light nuclei with chiral 2- and 3-body forces. *Journal of Physics: Conference Series*, 454(1):012063, 2013. Tier-3, DOI: 10.1088/1742-6596/454/1/012063 .

[J11] Onur Küçüktunç, Kamer Kaya, Erik Saule, and Ümit V. Çatalyürek. Fast recommendation on bibliographic networks with sparse-matrix ordering and partitioning. *Social Network Analysis and Mining*, 3(4):1097–1111, December 2013. Tier-1, DOI: 10.1007/s13278-013-0106-z , PDF.

[J12] T. Dytrych, K. D. Launey, J. P. Draayer, P. Maris, J. P. Vary, E. Saule, Ü. Çatalyürek, M. Sosonkina, D. Langr, and M. A. Caprio. Collective modes in light nuclei from first principles. *Physical Review Letters*, 111:252501, December 2013. Tier-2, DOI: 10.1103/PhysRevLett.111.252501 .

[J13] Anne Benoit, Ümit Çatalyürek, Yves Robert, and Erik Saule. A Survey of Pipelined Workflow Scheduling: Models and Algorithms. *ACM Computing Surveys*, 45(4):1–36, August 2013. Tier-1, DOI: 10.1145/2501654.2501664 , PDF.

[J14] Erik Saule, Doruk Bozdag, and Ümit V. Çatalyürek. Optimizing the maximum stretch of independent tasks on a cluster : From sequential tasks to moldable tasks. *Journal of Parallel and Distributed Computing*, 72(4):489–503, April 2012. Tier-1, DOI: 10.1016/j.jpdc.2011.12.007 , PDF.

[J15] Erik Saule, Erdeniz O. Bas, and Umit V. Catalyurek. Load-balancing spatially located computations using rectangular partitions. *Journal of Parallel and Distributed Computing*, 72(10):1201–1214, 2012. Tier-1, DOI: 10.1016/j.jpdc.2012.05.013 , PDF.

[J16] Emmanuel Jeannot, Erik Saule, and Denis Trystram. Optimizing performance and reliability on heterogeneous parallel systems: Approximation algorithms and heuristics. *Journal of Parallel and Distributed Computing*, 72(2):268 – 280, February 2012. Tier-1, DOI: http://dx.doi.org/10.1016/j.jpdc.2011.11.003 , PDF.

[J17] Timothy D. R. Hartley, Erik Saule, and Umit V. Catalyurek. Improving performance of adaptive component-based dataflow middleware. *Parallel Computing*, 38(6-7):289–309, 2012. Tier-1, DOI: 10.1016/j.parco.2012.03.005 , PDF.

[J18] Erik Saule and Denis Trystram. Analyzing scheduling with transient failures. *Information Processing Letters*, 109(11):539–542, May 2009. Tier-2, DOI: http://dx.doi.org/10.1016/j.ipl.2009.01.019 , PDF.

[J19] Alain Girault, Erik Saule, and Denis Trystram. Reliability versus performance for critical applications. *Journal of Parallel and Distributed Computing*, 69(3):326–336, March 2009. Tier-1, DOI: 10.1016/j.jpdc.2008.11.002 , PDF.

Book Chapters

[B1] Erik Saule, Hasan Metin Aktulga, Chao Yang, Esmond G. Ng, and Ümit V. Çatalyürek. *An Out-of-Core Task-based Middleware for Data-Intensive Scientific Computing*. Handbook on Data Centers. Springer, 2015. ISBN 978-1-4939-2091-4, DOI: 10.1007/978-1-4939-2092-1 .

[B2] Pierre-Francois Dutot, Krzysztof Rzadca, Erik Saule, and Denis Trystram. *Multi-objective scheduling*, chapter 9. Introduction to scheduling. Chapman and Hall/CRC Press, November 2009. ISBN: 978-1420072730.

[B3] Xavier Besseron, Slim Bouguerra, Thierry Gautier, Erik Saule, and Denis Trystram. *Fault tolerance and availability awarness in computational grids*, chapter 5. Fundamentals of Grid Computing. Chapman and Hall/CRC Press, December 2009. ISBN: 978-1439803677.

Conference Proceedings

[C1] Matthew McQuaigue, Mack Larson, Philip Smith, Sydney Melech, Kalpathi Subramanian, and Erik Saule. Engaging cs1 students with audio themed assignments. In *Proc. of CCSC NE*, 2024. Tier-3, PDF.

[C2] Matthew Mcquaigue, Erik Saule, Kalpathi Subramanian, and Jamie Payton. Data-driven discovery of anchor points for pdc content. In *Proceedings of SC23 Workshops (SC-W); EduHPC*, pages 335–342, 2023. Tier-2, DOI: 10.1145/3624062.3624099 , PDF.

[C3] Dante Durrman and Erik Saule. Optimizing the critical path of distributed dataflow graph algorithms. In *Proceedings of IPDPS Workshops (IPDPSW); PDCO*, 2023. Tier-2, DOI: 10.1109/IPDPSW59300.2023.00147 , PDF.

[C4] H. Martin Bucker, Jeremiah Corrado, Daniel Fedorin, Diego Garcia-Alvarez, Arturo Gonzalez-Escribano, John Li, Maria Pantoka, Erik Pautsch, Marieke Plesske, Marcelo Ponce, Silvio Rizzi, Erik Saule, Johannes Schoder, George K. Thiruvathukal, Ramses van Zon, Wolf Weber, and David Bunde. Peachy parallel assignments (eduhpc 2023). In *Proceedings of SC23 Workshops (SC-W); EduHPC*, pages 366–373, 2023. Tier-2, DOI: 10.1145/3624062.3625541 , PDF.

[C5] Katheryn Perry, Cedric Sirianni, Owen Bechtel, Kalpathi Subramanian, and Erik Saule. High school bridges: Visualizations of data, data structures, and more. In *Proc. of SIGCSE*, page 1178, 2022. Tier-1, DOI: 10.1145/3478432.3499261 .

[C6] Matthew McQuaigue, Jay Strahler, Kalpathi Subramanian, and Erik Saule. Location based assignments in early cs courses using bridges engages students. In *Proc. of CCSC SE*, 2022. Tier-3, PDF.

[C7] Md Maruf Hossain and Erik Saule. Postmortem graph analysis on temporal graphs. In *Proc of ICPP*, pages 1–11, August 2022. Tier-2, DOI: 10.1145/3545008.3545055 , PDF.

[C8] Dante Durrman and Erik Saule. Coloring the vertices of 9-pt and 27-pt stencils with intervals. In *Proc. of IPDPS*, May 2022. Tier-1, DOI: 10.1109/IPDPS53621.2022.00098 , PDF.

[C9] Erik Saule, Kalpathi Subramanian, and Jamie Payton. We need community effort to achieve PDC adoption! In *IEEE 28th International Conference on High Performance Computing, Data and Analytics Workshop (HiPCW)*, 2021. Tier-3, DOI: 10.1109/HiPCW54834.2021.00013 , PDF.

[C10] Kathryn Perry, Kalpathi Subramanian, and Erik Saule. Some bridges span more than water: Engaging high school java learners with data structure visualizations and real-world data. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*, SIGCSE '21, page 1371, New York, NY, USA, 2021. Association for Computing Machinery. SIGCSE Lightning talk, DOI: 10.1145/3408877.3439558 .

[C11] Md Maruf Hossain and Erik Saule. Impact of AVX-512 instructions on graph partitioning problems. In *50th International Conference on Parallel Processing Workshop; Proc. of P2S2*, 2021. Tier-3, DOI: 10.1145/3458744.3473362 , PDF.

[C12] Alec Goncharow, Matthew Mcquaigue, Erik Saule, Kalpathi Subramanian, Jamie Payton, and Paula Goolkasian. Mapping materials to curriculum standards for design, alignment, audit, and search. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*, SIGCSE '21, page 295–301, New York, NY, USA, 2021. Association for Computing Machinery. Tier-1, DOI: 10.1145/3408877.3432388 , PDF.

[C13] Jason Strahler, Matthew Mcquaigue, Alec Goncharow, David Burlinson, Kalpathi Subramanian, Erik Saule, and Jamie Payton. Real-world assignments at scale to reinforce the importance of algorithms and complexity. In *Proc. CCSC NE*, 2020. Tier-3, PDF.

[C14] Matthew Mcquaigue, Allie Beckman, David Burlinson, Luke Sloop, Alec Goncharow, Erik Saule, Kalpathi Subramanian, and Jamie Payton. An engaging CS1 curriculum using bridges. In *Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, SIGCSE '20, page 1317, New York, NY, USA, 2020. Association for Computing Machinery. SIGCSE Poster, DOI: 10.1145/3328778.3372609 .

[C15] Allie Beckman, Matthew Mcquaigue, Alec Goncharow, David Burlinson, Kalpathi Subramanian, Erik Saule, and Jamie Payton. Engaging early programming students with modern assignments using bridges. In *Proc. CCSC CP*, 2020. Tier-3, PDF.

[C16] Alec Goncharow, Anna Boekelheide, Matthew Mcquaigue, David Burlinson, Erik Saule, Kalpathi Subramanian, and Jamie Payton. Classifying pedagogical material to improve adoption of parallel and distributed computing topics. In *2019 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW); Proc. of EduPar19*, May 2019. Tier-2, DOI: 10.1109/IPDPSW.2019.00060 , PDF.

[C17] David Burlinson, Erik Saule, and Kalpathi Subramanian. Building simple games with bridges. In *Proceedings of the 50th ACM Technical Symposium on Computer Science Education*, SIGCSE '19, pages 1288–1288, New York, NY, USA, 2019. ACM. SIGCSE Demo, DOI: 10.1145/3287324.3293758 .

[C18] Pourya Naderi Yeganeh, Erik Saule, and M. Taghi Mostafavi. Centrality of cancer-related genes in human biological pathways: A graph analysis perspective. In *2018 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pages 214–218, December 2018. Tier-1, DOI: 10.1109/BIBM.2018.8621110 , PDF.

[C19] Erik Saule. Experiences on teaching parallel and distributed computing for undergraduates. In *2018 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW); EduPar18*, pages 361–368, May 2018. EduPar best paper, DOI: 10.1109/IPDPSW.2018.00068 , PDF.

[C20] Matthew Mcquaigue, David Burlinson, Kalpathi Subramanian, Erik Saule, and Jamie Payton. Integrating visualization, assessment and analytics in data structures learning modules. In *SIGCSE '18: Proceedings of the 49th ACM Technical Symposium on Computer Science Education*, pages 864–869, 2018. Tier-1, DOI: 10.1145/3159450.3159460 , PDF.

[C21] Haofeng Jia and Erik Saule. Local is good: A fast citation recommendation approach. In *Proc of ECIR*, pages 758–764, 2018. Tier-1, DOI: 10.1007/978-3-319-76941-7_73 , PDF.

[C22] Haofeng Jia and Erik Saule. Addressing overgeneration error: An effective and efficient approach to keyphrase extraction from scientific papers. In *Proceedings of the 3rd Joint Workshop on Bibliometric-enhanced Information Retrieval and Natural Language Processing for Digital Libraries (BIRNDL 2018)*, pages 60–73, July 2018. Tier-3, PDF.

[C23] Mustafa Kemal Taş, Kamer Kaya, and Erik Saule. Greed is good: Optimistic algorithms for bipartite-graph partial coloring on multicore architectures. In *2017 46th International Conference on Parallel Processing (ICPP)*, pages 503–512, 2017. acceptance rate: 28.4%; Tier-2, DOI: 10.1109/ICPP.2017.59 , PDF.

[C24] Erik Saule, Dinesh Panchananam, Alexander Hohl, Wenwu Tang, and Eric Delmelle. Parallel space-time kernel density estimation. In *2017 46th International Conference on Parallel Processing (ICPP)*, pages 483–492, 2017. acceptance rate: 28.4%; Tier-2, DOI: 10.1109/ICPP.2017.57 , PDF.

[C25] Haofeng Jia and Erik Saule. An analysis of citation recommender systems: Beyond the obvious. In *ASONAM '17: Proceedings of the 2017 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining 2017*, pages 216–223, 2017. Tier-1, DOI: 10.1145/3110025.3110150 , PDF.

[C26] Pierre-Francois Dutot, Erik Saule, Abhinav Srivastav, and Denis Trystram. In *proc of COCOON 2016*, Lecture Notes in Computer Science, pages 483–495, August 2016. Tier-3, DOI: 10.1007/978-3-319-42634-1_39 .

[C27] Pierre-Francois Dutot, Erik Saule, Abhinav Srivastav, and Denis Trystram. Online non-preemptive scheduling to optimize stretch. In *12th Workshop on Models and Algorithms for Planning and Scheduling Problems*, pages 98–100, June 2015. Tier-2.

[C28] Nathanaël Cheriere and Erik Saule. Considerations on distributed load balancing for fully heterogeneous machines: two particular cases. In *29th International Symposium on Parallel and Distributed Processing, Workshops and PhD Forum (IPDPSW), Workshop on Heterogeneity in Computing Workshop (HCW)*, pages 6–16, May 2015. Tier-2, DOI: 10.1109/IPDPSW.2015.36 , PDF.

[C29] Manmohan Chaubey and Erik Saule. Replicated data placement for uncertain scheduling. In *29th International Symposium on Parallel and Distributed Processing, Workshops and PhD Forum (IPDPSW), Workshop on Advances in Parallel and Distributed Computational Models (APDCM)*, pages 464–472, May 2015. Tier-2, DOI: 10.1109/IPDPSW.2015.50 , PDF.

[C30] Ahmet Erdem Sarıyüce, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Hardware/software vectorization for closeness centrality on multi-/many-core architectures. In *28th International Symposium on Parallel and Distributed Processing, Workshops and PhD Forum (IPDPSW), Workshop on Multithreaded Architectures and Applications (MTAAP)*, pages 1386–1395, 2014. Tier-2, DOI: 10.1109/IPDPSW.2014.156 , PDF.

[C31] Ahmet Erdem Sarıyüce, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Computing the closeness centrality of evolving networks on clusters. In *SIAM Workshop on Network Science (NS14)*, July 2014. Tier-2, PDF.

[C32] Gordon Erlebacher, Erik Saule, Natasha Flyer, and Evan Bollig. Acceleration of derivative calculations with application to radial basis function - finite-differences on the Intel MIC architecture. In *ICS '14: Proceedings of the 28th ACM international conference on Supercomputing*, pages 263–272, 2014. Tier-1, DOI: 10.1145/2597652.2597656 , PDF.

[C33] P. Calyam, A. Berryman, Erik Saule, H. Subramoni, P. Schopis, G. Springer, Ümit V. Çatalyürek, and D.K. Panda. Wide-area overlay networking to manage science DMZ accelerated flows. In *Computing, Networking and Communications (ICNC), 2014 International Conference on*, pages 269–275, February 2014. Tier-2, DOI: 10.1109/ICCNC.2014.6785344 .

[C34] Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Performance evaluation of sparse matrix multiplication kernels on Intel Xeon Phi. In *Proc of the 10th Int'l Conf. on Parallel Processing and Applied Mathematics (PPAM)*, pages 559–570, September 2013. Tier-2, DOI: 10.1007/978-3-642-55224-3_52 , PDF.

[C35] Ahmet Erdem Sarıyüce, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Shattering and compressing networks for betweenness centrality. In *Proceedings of the 2013 SIAM International Conference on Data Mining, SDM*, pages 686–694, May 2013. acceptance rate: 25.5%, DOI: 10.1137/1.9781611972832.76 , PDF.

[C36] Ahmet Erdem Sarıyüce, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. STREAMER: a distributed framework for incremental closeness centrality computation. In *2013 IEEE International Conference on Cluster Computing (CLUSTER)*, pages 1–8, September 2013. Tier-2, DOI: 10.1109/CLUSTER.2013.6702680 , PDF.

[C37] Ahmet Erdem Sarıyüce, Kamer Kaya, Erik Saule, and Ümit V. Çatalyürek. Incremental algorithms for closeness centrality. In *2013 IEEE International Conference on Big Data (IEEE BigData)*, pages 487–492, October 2013. Tier-1, DOI: 10.1109/BigData.2013.6691611 , PDF.

[C38] Ahmet Erdem Sarıyüce, Kamer Kaya, Erik Saule, and Ümit V. Çatalyürek. Betweenness centrality on GPUs and heterogeneous architectures. In *Workshop on General Purpose Processing Using GPUs (GPGPU), in conjunction with ASPLOS*, pages 76–85, March 2013. Tier-3, DOI: 10.1145/2458523.2458531 , PDF.

[C39] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Towards a personalized, scalable, and exploratory academic recommendation service. In *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, pages 636–641, August 2013. acceptance rate: 28%, DOI: 10.1109/ASONAM.2013.6785769 , PDF.

[C40] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. TheAdvisor: A webservice for academic recommendation. In *ACM/IEEE Joint Conference on Digital Libraries (JCDL 2013)*, pages 433–434, July 2013. Tier-2, DOI: 10.1145/2467696.2467752 , PDF.

[C41] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Result diversification in automatic citation recommendation. In *iConference Workshop on Computational Scientometrics: Theory and Applications*, page 4, February 2013. Tier-3, PDF.

[C42] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Diversified recommendation on graphs: Pitfalls, measures, and algorithms. In *22nd International World Wide Web Conference (WWW)*, pages 715 – 726, May 2013. Tier-1, DOI: 10.1145/2488388.2488451 , PDF.

[C43] Myoungsoo Jung, Ellis H. Wilson III, Wonil Choi, John Shalf, Hasan Metin Aktulga, Chao Yang, Erik Saule, Ümit V. Çatalyürek, and Mahmut Kandemir. Exploring the future of out-of-core computing with compute-local non-volatile memory. In *SC '13: Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis*, November 2013. acceptance rate: 20%, DOI: 10.1145/2503210.2503261 .

[C44] Anas Abu-Doleh, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Masher: Mapping long(er) reads with hash-based genome indexing on GPUs. In *BCB'13: Proceedings of the International Conference on Bioinformatics, Computational Biology and Biomedical Informatics*, page 341–350, September 2013. Tier-1, DOI: 10.1145/2506583.2506641 , PDF.

[C45] Zheng Zhou, Erik Saule, Hasan Metin Aktulga, Chao Yang, Esmond G. Ng, Pieter Maris, James P. Vary, and Ümit V. Çatalyürek. An out-of-core eigensolver on SSD-equipped clusters. In *Proc. of IEEE Cluster*, pages 248–256, September 2012. Tier-2, DOI: 10.1109/CLUSTER.2012.76 , PDF.

[C46] Zheng Zhou, Erik Saule, Hasan Metin Aktulga, Chao Yang, Esmond G. Ng, Pieter Maris, James P. Vary, and Ümit V. Çatalyürek. An out-of-core dataflow middleware to reduce the cost of large scale iterative solvers. In *2012 International Conference on Parallel Processing (ICPP) Workshops, Fifth International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2)*, pages 71–80, September 2012. DOI: 10.1109/ICPPW.2012.13 , PDF.

[C47] Erik Saule and Ümit V. Çatalyürek. An early evaluation of the scalability of graph algorithms on the Intel MIC architecture. In *26th International Symposium on Parallel and Distributed Processing, Workshops and PhD Forum (IPDPSW), Workshop on Multithreaded Architectures and Applications (MTAAP)*, pages 1629–1639, 2012. Tier-2, DOI: 10.1109/IPDPSW.2012.204 , PDF.

[C48] Ahmet Erdem Sarıyüce, Erik Saule, and Umit V. Catalyurek. Scalable hybrid implementation of graph coloring using MPI and OpenMP. In *26th International Symposium on Parallel and Distributed Processing, Workshops and PhD Forum (IPDPSW), Workshop on Parallel Computing and Optimization (PCO)*, pages 1744–1753, May 2012. Tier-2, DOI: 10.1109/IPDPSW.2012.216 , PDF.

[C49] Y.A. Omelchenko, H. Karimabadi, M. Brown, U. V. Catalyurek, and E. Saule. Adaptive multiscale electromagnetic particle simulations. In *Bulletin of the American Physical Society, 52nd Annual Meeting of the APS Division of Plasma Physics, Volume 55, Number 15*, November 2012. (poster).

[C50] Pieter Maris, H Metin Aktulga, Mark A Caprio, Ümit V. Çatalyürek, Edmong Ng, Dossay Oryspayev, Hugh Potter, Erik Saule, Masha Sosonkina, James P Vary, Chao Yang, and Zheng Zhou. Large-scale ab initio configuration interaction calculations for light nuclei. In *Journal of Physics: Conference Series. HITES 2012: 'Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics'*, volume 403, 2012. Tier-2, DOI: doi:10.1088/1742-6596/403/1/012019 .

[C51] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Direction awareness in citation recommendation. In *Proceedings of the 6th International Workshop on Ranking in Databases (DBRank'12) in conjunction with VLDB'12*, page 6, 2012. Tier-3, PDF.

[C52] Onur Küçüktunç, Kamer Kaya, Erik Saule, and Ümit V. Çatalyürek. Fast recommendation on bibliographic networks. In *IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM)*, pages 480–487, August 2012. Tier-1, DOI: 10.1109/ASONAM.2012.82 , PDF.

[C53] Kamer Kaya, Erik Saule, Onur Küçüktunç, and Umit Catalyurek. Algorithms for offline tracking of connected components in large evolving networks. In *Proceeding of the first SDM Workshop on Dynamic Network Analysis (DNA-SDM)*, April 2012. Tier-3, PDF.

[C54] Erik Saule, Erdeniz O. Bas, and Umit V. Catalyurek. Partitioning spatially located computations using rectangles. In *the 25th IEEE International Parallel and Distributed Processing Symposium*, pages 709–720, 2011. Tier-1, DOI: 10.1109/IPDPS.2011.72 , PDF.

[C55] Ahmet Erdem Sarıyüce, Erik Saule, and Umit V. Catalyurek. Improving graph coloring on distributed memory parallel computers. In *18th Annual International Conference on High Performance Computing*, pages 1–10, 2011. Tier-2, DOI: 10.1109/HiPC.2011.6152726 , PDF.

[C56] Y.A. Omelchenko, H. Karimabadi, M. Brown, U. V. Catalyurek, and E. Saule. Asynchronous multidimensional hybrid simulations of magnetized plasmas. In *Bulletin of the American Physical Society, 53rd Annual Meeting of the APS Division of Plasma Physics, Volume 56, Number 16*, November 2011. (poster).

[C57] Erik Saule, Doruk Bozdag, and Ümit V. Çatalyürek. A moldable online scheduling algorithm and its application to parallel short sequence mapping. In Springer, editor, *15th Workshop on Job Scheduling Strategies for Parallel Processing*, volume 6253 of *LNCS*, pages 93–109, 2010. Tier-1, DOI: 10.1007/978-3-642-16505-4_6 , PDF.

[C58] Y. A. Omelchenko, H. Karimabadi, E. Saule, and U. V. Catalyurek. Parallel Event-Driven Global Magnetospheric Hybrid Simulations. In *AGU Fall Meeting Abstracts*, page A1756, December 2010. (abstract).

[C59] Timothy D. R. Hartley, Erik Saule, and Umit V. Catalyurek. Automatic dataflow application tuning for heterogeneous systems. In *Proceedings of The 17th International Conference on High Performance Computing (HiPC 2010)*, pages 1–10, 2010. Tier-2, DOI: 10.1109/HIPC.2010.5713173 , PDF.

[C60] Florent Blachot, Guillaume Huard, Jonathan Pecero, Erik Saule, and Denis Trystram. Scheduling instructions on hierarchical machines. In *The 11th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing (PDSEC 2010)*, pages 1–8, April 2010. Tier-3, DOI: 10.1109/IPDPSW.2010.5470711 , PDF.

[C61] Brice Videau, Erik Saule, and Jean-François Méhaut. PaSTeL : Parallel runtime and algorithms for small datasets. In *proc of MuCoCos*, pages 651–656, March 2009. Tier-3, DOI: 10.1109/CISIS.2009.76 .

[C62] Erik Saule and Denis Trystram. Multi-users scheduling in parallel systems. In *Proc. of IEEE International Parallel and Distributed Processing Symposium 2009*, pages 1–9, May 2009. Tier-1, DOI: 10.1109/IPDPS.2009.5161037 , PDF.

[C63] Y. Omelchenko, H. Karimabadi, U. Catalyurek, E. Saule, and M. R. Brown. HYPERS: First Ever Multi-Dimensional Asynchronous Hybrid Simulations. page A1316, December 2009. (abstract).

[C64] Y.A. Omelchenko, H. Karimabadi, M. Brown, U. V. Catalyurek, and E. Saule. Enabling global kinetic simulations of the magnetosphere via petascale computing. In *Bulletin of the American Physical Society, 51st Annual Meeting of the APS Division of Plasma Physics, Volume 54, Number 15*, November 2009. (poster).

[C65] Erik Saule and Brice Videau. PaSTeL. Une implantation parallèle de la STL pour les architectures multi-coeurs : une analyse des performances. In *Proceedings électronique de RenPar 18*, February 2008. Tier-3, PDF.

[C66] Erik Saule, Pierre-François Dutot, and Gregory Mounié. Scheduling With Storage Constraints. In *2008 IEEE International Symposium on Parallel and Distributed Processing*, pages 1–8, April 2008. Tier-1, DOI: 10.1109/IPDPS.2008.4536292 , PDF.

[C67] Emmanuel Jeannot, Erik Saule, and Denis Trystram. Bi-objective approximation scheme for makespan and reliability optimization on uniform parallel machines. In *Euro-Par 2008*, volume 5168 of *LNCS*, pages 877–886. Springer, August 2008. Tier-2, DOI: 10.1007/978-3-540-85451-7_94 , PDF.

[C68] Jack J. Dongarra, Emmanuel Jeannot, Erik Saule, and Zhiao Shi. Bi-objective scheduling algorithms for optimizing makespan and reliability on heterogeneous systems. In *SPAA '07: Proceedings of the nineteenth annual ACM symposium on Parallelism in algorithms and architectures*, pages 280–288. ACM press, June 2007. acceptance rate: 28%, DOI: 10.1145/1248377.1248423 , PDF.

[C69] Florent Blachot, Guillaume Huard, Jonathan Pecero, Erik Saule, and Denis Trystram. Scheduling instructions on processors with incomplete bypass. In *Proceedings of 8th Workshop on Models and Algorithms for Planning and Scheduling Problems*. Koç University, July 2007. Tier-2, PDF.

Tutorials

Invited Talks

[T1] Erik Saule. Optimizing distributed graph coloring. Inria Bordeaux Seminar, May 2024.

[T2] Erik Saule. Optimizing distributed graph coloring. New Challenges in Scheduling Theory, May 2024.

[T3] Erik Saule. Coloring graphs with intervals. The 16th Scheduling for Large Scale Systems Workshop, May 2023.

[T4] Erik Saule. Parallel space-time kernel density estimation. LIG Seminar, April 2018.

[T5] Erik Saule. Parallel space-time kernel density estimation. The 12th Scheduling for Large Scale Systems Workshop, May 2017.

[T6] Erik Saule. Computing graph centrality. SIAM CSE 2017, March 2017.

[T7] Erik Saule. Time-cost trade-offs of pipelined dataflow applications. New Challenges in Scheduling Theory, April 2016.

[T8] Erik Saule. GPU-accelerated network centrality. GPU Technology Conference, March 2015.

[T9] Erik Saule. Centrality of evolving networks. IEEE seminar at North Carolina A&T State University, November 2015.

[T10] Erik Saule. Parallel dataflow graph coloring. Dagstuhl seminar on Algorithms and Scheduling Techniques for Exascale Systems, September 2013.

[T11] Erik Saule. Large scale graph analysis. UMass Boston seminar, March 2013.

[T12] Erik Saule. Large scale graph analysis. UNCC seminar, February 2013.

[T13] Erik Saule. Academic recommendation using citation analysis with theAdvisor. Keynote talk at "Computational Scientometics: Theory and Applications", February 2013.

[T14] Erik Saule. Partitioning spatially located load with rectangles: Algorithms and simulations. New Challenges on Scheduling Theory, September 2010.

[T15] Erik Saule. Optimizing the maximum stretch of online tasks on a parallel system without preemption. 3rd "Scheduling in Aussois" Workshop, June 2010.

[T16] Erik Saule. Load balancing of spatially located computation - the one dimensional case. GRAAL group meeting, March 2010.

[T17] Erik Saule. Multi-objective optimization/approximation in scheduling. Workshop/Summer school on Algorithms and Techniques for Scheduling on Clusters and Grids (ASTEC), June 2009.

[T18] Erik Saule. The multi user scheduling problem. Journée GOThA, January 2009.

[T19] Erik Saule. A moldable online scheduling algorithm and its application to parallel short sequence mapping. Scheduling for large-scale systems, May 2009.

[T20] Erik Saule. User centered scheduling for multi-users parallel systems. New Challenges on Scheduling Theory, May 2008.

[T21] Erik Saule. Scheduling instructions on processors with incomplete bypass. Journée GOThA, April 2008.

[T22] Erik Saule. Scheduling instructions on processors with incomplete bypass. IPIPAN hpc group meeting, December 2007.

[T23] Emmanuel Jeannot and Erik Saule. Ordonnancement sur machine heterogene a but de makespan et de fiabilite. Journée Mao, January 2007.

[T24] Erik Saule. Une approche d'équilibrage de charge par théorie des jeux. Journées Théorie des jeux AlGorithmique et Applications Dans les réseAux (TAGADA), February 2006.

[T25] Erik Saule. Reliability versus performance for embedded real-time applications. Scheduling Algorithms for new Emerging Applications, June 2006.

Research Reports

[R1] Haofeng Jia and Erik Saule. Graph embedding for citation recommendation. Technical Report abs/1812.03835, CoRR, 2018. PDF.

[R2] Erik Saule, Dinesh Panchananam, Alexander Hohl, Wenwu Tang, and Eric Delmelle. Parallel space-time kernel density estimation. Technical Report arXiv:1705.09366, ArXiv, May 2017. PDF.

[R3] Ahmet Erdem Sarıyüce, Erik Saule, and Ümit V. Çatalyürek. On distributed graph coloring with iterative recoloring. Technical Report arXiv:1407.6745, ArXiv, July 2014. PDF.

[R4] Hugh Potter, Dossay Oryspayev, Pieter Maris, Masha Sosonkina, James Vary, Sven Binder, Angelo Calci, Joachim Langhammer, Robert Roth, Ümit Çatalyürek, and Erik Saule. Accelerating ab initio nuclear physics calculations with gpus. Technical Report arXiv:1412.5989, ArXiv, December 2014.

[R5] Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Performance evaluation of sparse matrix multiplication kernels on intel xeon phi. Technical Report arXiv:1302.1078, ArXiv, February 2013. PDF.

[R6] Ahmet Erdem Sarıyüce, Kamer Kaya, Erik Saule, and Ümit V. Çatalyürek. Incremental algorithms for network management and analysis based on closeness centrality. Technical Report arXiv:1303.0422, ArXiv, February 2013. PDF.

[R7] Ahmet Erdem Sarıyüce, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Shattering and compressing networks for centrality analysis. Technical Report arXiv:1209.6007, ArXiv, September 2012. PDF.

[R8] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Recommendation on academic networks using direction aware citation analysis. Technical Report arXiv:1205.1143, ArXiv, April 2012. PDF.

[R9] Onur Küçüktunç, Erik Saule, Kamer Kaya, and Ümit V. Çatalyürek. Diversifying citation recommendations. Technical Report arXiv:1209.5809, ArXiv, September 2012. PDF.

[R10] Erik Saule, Erdeniz O. Bas, and Ümit V. Çatalyürek. Load-balancing spatially located computations using rectangular partitions. Technical Report arXiv:1104.2566v1, ArXiv, April 2011. PDF.

[R11] Anne Benoit, Umit Catalyurek, Yves Robert, and Erik Saule. A Survey of Pipelined Workflow Scheduling: Models and Algorithms. Technical Report RR-LIP-2010-28, LIP, ENS Lyon, France, September 2010. PDF.

[R12] Brice Videau, Erik Saule, and Jean-François Méhaut. PaSTeL : Parallel Runtime and Algorithms for Small Datasets. Technical Report 6650, INRIA, 2008. PDF.

Funding

Active

- National Science Foundation (NSF); DUE-2142381; Addressing Preparation Gaps and Promoting Culturally Relevant Teaching to Support Diverse Groups in Computing Courses; 02/01/2022-01/31/2025 ; $465,882 (with Kalpathi Subramanian, PI; with Temple University, co-PI Payton)
- National Science Foundation (NSF); OAC-1924057; Collaborative Proposal: CyberTraining: Pilot: Aligning Learning Materials with Curriculum Standards to Integrate Parallel and Distributed Computing Topics in Early CS Education ; 08/01/2019-07/31/2024 ; $249,469 (with Kalpathi Subramanian, co-PI; with Temple University, co-PI Payton)

Inactive

- National Science Foundation (NSF); DUE-1726809; Collaborative Research: Retaining and Engaging Computer Science majors By Solving and Visualizing Algorithmic Problems on Real-world Data Sets; 08/15/2017-07/31/2023 ; $541,616 (with Kalpathi Subramanian, PI; with Temple University, co-PI Payton)
- National Science Foundation (NSF); CCF-1652442; CAREER: Machine and Structure Oblivious Graph Analytics ; 04/15/2017-04/14/2023 ; $499,645
- National Science Foundation (NSF); CNS-1740398; NSF/CISE Computer Systems Research 2017 PI Meeting ; 04/15/2017-03/31/2018; $212,946

- National Consortium for Data Science (NCDS); Toward Machine and Problem Oblivious Graph Analysis ; 01/01/2015-12/31/2016 ; $50,000
- NVIDIA; Densifying Sparse Computation for Efficient GPU Execution ; 05/01/2014-04/30/2015; $1,489

Scientific Community Service

2024

- Local Organizer for CybertTraining/SCIPE/CSSI PI meeting 2024
- vice PC chair for EduHPC 2024
- PC member for HiPC24
- NSF CISE panelist (times 2)
- Program Commmitee member for CCGrid'2024
- IPDPS 24 PC member
- SC24 SRC poster member

2023

- IPDPS track chair for Parallel and Distributed Algorithms for Computational Science
- PC member for EduHPC 2023

2022

- Special Program Committee member for IPDPS 2022

2021

- JPDC area editor
- IEEE TCPP Chair election committee
- SC21 program committee member (Algorithm Track)
- Workshops chair for IPDPS 2021
- IEEE TCPP vice chair
- Panelist for an NSF CISE program
- JPDC Special Issue editor

2020

- Workshops chair for IPDPS 2020
- IEEE TCPP vice chair
- ICPP 2020 Algorithm track PC member
- SC 2020 Algorithm track PC member
- Steering Committee member for HCW 2020
- Panelist for an(other) NSF CISE program
- Panelist for an NSF CISE program

2019

- Workshops chair for IPDPS 2019
- Graduate Poster committee member for SC19
- TPC member for the algorithm track of SC19
- Steering Committee member for HCW 2019
- PC member for EduHPC 2019
- Panelist for an(other) NSF CISE program
- Panelist for an NSF CISE program

2018

- Program Chair for EduHPC 2018
- Workshops chair for IPDPS 2018
- PC member for International Conference on Contemporary Computing (IC3 2018)
- PC member for the 16th International Workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms (HeteroPar 2018)

2017

- General Chair for Heterogeneity in Computing Workshop (HCW 2017)
- Chair of the HPC 4 Undergraduate program of SC17 (HPC4UG17)
- Vice-chair of workshop for IPDPS 2017
- Organizer of the NSF/CISE Computer Systems Research 2017 PI Meeting
- PC member for the International Symposium on Computer Architecture and High Performance Computing SBAC-PAD 2017
- PC member for Cluster 17

- PC member for High Performance Graph Data Mining and Machine Learning Workshop HPGDML17
- PC member for IEEE International Conference on High Performance Computing HiPC17
- PC member for IEEE International Conference on High Performance Computing and Communications HPCC17
- PC member for International Workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms Heteropar 2017
- PC member for International Conference on Parallel Processing (ICPP 2017)
- PC member for IEEE International Parallel & Distributed Processing Symposium (IPDPS 2017)
- PC member for International Workshop on High Performance Computing for Big Data (HPC4BD 2017)
- PC member for The International Conference on High Performance Computing, Network, Storage and Analysis (SC 2017)
- PC member for First Workshop on the Intersection of Graph Algorithms and Machine Learning (GRAML'17)
- PC member for Workshop on Irregular Applications: Architectures and Algorithms (IAˆ3 2017)
- PC member for International Conference on Contemporary Computing (IC3 2017)
- PC member for Edu-HPC 2017
- Panelist for an NSF CISE program
- Panelist for an NSF CISE program

2016

- Program Chair for Heterogeneity in Computing Workshop (HCW 2016)
- Vice-chair of the HPC 4 Undergraduate program of SC16 (HPC4UG16)
- Co vice chair of the algorithm track of HiPC 2016
- PC member for International ACM Conference on Management of Digital EcoSystems (MEDES 2016)
- PC member for IEEE International Parallel & Distributed Processing Symposium (IPDPS 2016)
- PC member for International Workshop on High Performance Computing for Big Data (HPC4BD 2016)
- PC member for International Workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms (HeteroPar'2016)
- PC member for Euro-Par 2016
- PC member for The International Conference on High Performance Computing, Network, Storage and Analysis (SC 2016)
- PC member for Edu-HPC 2016
- PC member for Workshop on Irregular Applications: Architectures and Algorithms (IAˆ3 2016)
- Panelist for an NSF CISE program

2015

- PC member for IEEE International Parallel & Distributed Processing Symposium (IPDPS 2015)
- PC member for International Workshop on High Performance Computing for Big Data (HPC4BD 2015)
- PC member for IEEE International Conference on High Performance Computing (HiPC 2015)
- PC member for International Workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms (HeteroPar'2015)
- PC member for Workshop on Irregular Applications: Architectures and Algorithms (IA^3 2015)
- PC member for Euro-Par 2015
- PC member for The International Conference on High Performance Computing, Network, Storage and Analysis (SC 2015)
- PC member for Edu-HPC 2015
- PC member for BigGraphs 2015

2014

- PC member for IEEE International Parallel & Distributed Processing Symposium (IPDPS 2014)
- PC member for International Workshop on High Performance Computing for Big Data (HPC4BD 2014)
- PC member for IEEE International Conference on High Performance Computing (HiPC 2014)
- PC member for International Workshop on Algorithms, Models and Tools for Parallel Computing on Heterogeneous Platforms (HeteroPar'2014)
- PC member for Workshop on Irregular Applications: Architectures and Algorithms (IA^3 2014)

2013

- PC member for IEEE International Conference on High Performance Computing and Communications (HPCC 2013)
- PC member for International Conference on Parallel Processing (ICPP 2013)
- PC member for IEEE International Parallel & Distributed Processing Symposium (IPDPS 2013)
- PC member for IEEE International Conference on High Performance Computing (HiPC 2013)

2012

- PC member for IEEE International Conference on Advanced Information Networking and Applications (AINA 2012)
- PC member for International Conference on Parallel Processing (ICPP 2012)

2011

- PC member for International Conference on Contemporary Computing (IC3 2011)
- PC member for International Conference on Parallel Processing (ICPP 2011)

2008

- Local organization of the NCST workshop (International workshop on New Challenges in Scheduling Theory) in 2008. http://www-id.imag.fr/NCST08/index.php

2005-2008

- Organization of MAO meeting (Model, Algorithm and Scheduling), sub-group of the french national research group ASR: twice a year 2005-2008. http://mao.imag.fr/

Reviews

I frequently review communications for the following journals and conference.
Journals:

- CLUSTER : Journal of Cluster Computing
- FGCS : Journal on Future Generation Computing Systems
- GRID : Journal of Grid Computing
- IPL : Information Processing Letters
- IJHPCA : International Journal of High Performance Computing Applications
- JoSh : Journal of Scheduling
- JoSC : Journal of SuperComputing
- JPDC : Journal of Parallel and Distributed Computing
- ParCo : Parallel Computing
- TPDS : IEEE Transaction on Parallel and Distributed Systems

Teaching

I taught for 3 years at ENSIMAG from October 2005 to September 2008 while I was holding a Teaching Assistant position. I was mainly giving lecture, recitations and projects in database and recitations and projects in Operating Systems. Since August 2013, I am teaching at UNC Charlotte. The following table summarizes my teaching.

Year	Title	Audience	Institution	Enrollment
Spring 2024	ITCS 6/8114: Algorithms and Data Structures	G	UNC Charlotte	28
Fall 2023	ITCS 4/5182 Introduction to High Performance Computing	UG/G	UNC Charlotte	9
Spring 2023	ITCS 5145: Parallel Computing	G	UNC Charlotte	16
Fall 2022	ITCS 6115/8115: Advanced Algorithms	G	UNC Charlotte	6
Spring 2022	ITCS 5145: Parallel Computing	G	UNC Charlotte	24
Fall 2021	ITCS 3145: Parallel and Distributed Programming	UG	UNC Charlotte	43
Spring 2021	ITCS 5145: Parallel Computing	UG	UNC Charlotte	28
Fall 2020	ITCS 6/8114: Algorithms and Data Structures	G	UNC Charlotte	15
Spring 2020	ITCS 6/8115: Advanced Topics in Algorithms and Data Structures	G	UNC Charlotte	22
Fall 2019	ITCS 3145: Parallel and Distributed Programming	UG	UNC Charlotte	52
Fall 2019	ITCS 4/5182: Introduction to High Performance Computing	UG/G	UNC Charlotte	20
Spring 2019	ITCS 3145: Parallel and Distributed Programming	UG	UNC Charlotte	58
Fall 2018	ITCS 3145: Parallel and Distributed Programming	UG	UNC Charlotte	35
Fall 2018	ITCS 5145: Parallel Computing	G	UNC Charlotte	39
Spring 2018	ITCS 3145: Parallel and Distributed Programming	UG	UNC Charlotte	57
Fall 2017	ITCS 3145: Parallel and Distributed Programming	UG	UNC Charlotte	53
Fall 2017	ITCS 5145: Parallel Computing	UG	UNC Charlotte	38
Spring 2017	ITCS 4182: Introduction to HPC	UG	UNC Charlotte	9
Fall 2016	ITCS 5145: Parallel Computing	G	UNC Charlotte	10
Fall 2016	ITCS 3145: Intro to Parallel Programming	UG	UNC Charlotte	39
Spring 2016	ITCS 4010/5010: Special Topics: Performance Optimization	UG/G	UNC Charlotte	6
Fall 2015	ITCS 6114/8114: Algorithms and Data Structures	G	UNC Charlotte	7
Fall 2015	ITCS 2214: Data Structures	UG	UNC Charlotte	39
Spring 2015	ITCS 2215: Design and Analysis of Algorithms	UG	UNC Charlotte	32
Fall 2014	ITCS 6114/8114: Algorithms and Data Structures	G	UNC Charlotte	34
Spring 2014	ITCS 6010/8010: Special Topics: High Performance Computing	G	UNC Charlotte	13
Fall 2013	ITCS 6114/8114: Algorithms and Data Structures	G	UNC Charlotte	30
2006-2008	Principles of DataBase Management Systems (Lectures)	4th Y	ENSIMAG	70
2006-2007	Introduction to UNIX (Applications)	3rd Y	ENSIMAG	70
2006-2007	Introduction to Networking (Applications)	3rd Y	ENSIMAG	70
2006-2007	Operating Systems and Concurrent Programming (Lesson)	4th Y	ENSIMAG	70
2005-2006	Principles of DataBase Management Systems (Applications)	4th Y	ENSIMAG	70
2003-2004	Tutorials on Computers	1st Y	UVSQ	30

Student Mentored in Research

0.0.1 Thesis students

These are students I serve as thesis advisor

PhD

- Shrabani Ghosh (2023-)
- Dante Durrman (2020-2024)
- Maruf Hossain (2017-2022)
- Haofeng Jia (2013-2018)

MS

- Evan Unmann (2019-2021)
- Matthew McQuaigue (2018-2019)
- Abhishek Chandrate (2015-2017)
- Mahmohan Chaubbey (2012-2014)

0.0.2 Non-Thesis Students

These are students I significantly advised on projects even though it did not lead to a thesis, or I wasn't the advisor on the thesis.

PhD

- Matthew McQuaigue (RA 2020-2024)
- David Burlinson (RA 2016-2019)

MS

- Liam Custer (Volunteer, 2023-2024)
- Alec Goncharow (RA; 2020-2022)
- Jay Strahler (RA; 2020-2021)
- Luna Lucadou (RA 2020-2021)
- Paige Weber (RA; 2019-2021)
- Dinesh Panchananam (RA. 2016-2017)

BS

- Sydney Melech (RA; 2023-)
- Christian Klepper (RA; 2023-2024)
- Mack Larson (RA; 2022-)
- Philip Smith (RA; 2022-)
- Dylan Halstead (Capstone; 2023-2024)
- Ronni Elhalddidy (Capstone; 2023-2024)
- Micah Lasalla (capstone 2023-2024)
- Anjali Jutl (OUR 2023-2024)
- Elif Su (URI; 2023-2024)
- Davis Spradling (URI; RA; 2023-2024)
- Maisha Alam (URI; 2023-2024)
- Ayemhenre Isikhuemhen (URI; 2023-2024)
- Caleb Brohman (OUR; 2023-2024)
- William Owen (RA; 2022-2023)
- Alexander Palmer (URI 2022-2023)
- Sashank Pyndi (OUR; 2022-2023)

- Hunter Kepley (capstone 2021-2022)
- Dagen Gilbreath (capstone 2021-2022)
- Zack Clements (RA; 2021-2022)
- Eduardo Gomez (RA; 2020-2021)
- Carlos Lopez (capstone, 2019-2020)
- David Allemang (capstone, 2019-2020)
- Kyle Reto (RA; 2019-2020)
- Da'sean Brown (RA; 2019-2020)
- Jay Strahler (RA; 2019-2020)
- Luke Sloop (RA; 2019-2020)
- Allie Beckman (RA; 2018-2019)
- Alec Goncharow (RA; 2018-2020)
- Anna Boekelheide (RA; 2017-2018)
- Matthew McQuaigue (RA; 2016-2018)
- Brendan Kerr (capstone 2016-2017)

Academic Service at UNC Charlotte

Major Service

In 2023-2024, I have served as chair of the CCI Faculty Search committee. It was for 7 positions, the ads being posted late created significant work overhead and lead to 67 zoom interview, 20 on campus interview. At time of writting, it is unclear how many new faculty hire will join (expected more than 3). A report/how to manual was written for future faculty search committee chairs to prevent re-inventing processes.

In 2023-2024, as associate chair of the CS department, I was one of the designers of the curriculum revision for all CS concentrations. This involved creating an initial proposal for concentration revisions. It was handed off to the concentration cohorts for discussion and formal proposal. The effort lead to major changes in our concentation, reflected by over 40 curriculog proposals out of the CS department that year.

As CCI Faculty President in AY 2022-2023, I lead the way to pass by-laws revision, organized monthly College Faculty meetings, and wrote the first "how to be CCI Faculty president" for the future president to get up to speed quicker.

As CS track coordinator for the CaIS program, in AY 2022-2023, I lead the revision of graduate seminar requirements from a synchronous once-a week college-wide model to a distributed lab model. This was very well received by students.

As associate chair of the CS department, I helped shape the research agenda of the department in 2021-2022 by designing an undergraduate research initiative. After designing it, it was handed off to a faculty (Dr. Dai in 2022-2024, Dr. Allen 2024-) for implementation. This has lead to an additional 10 to 15 students entering the research pipeline every semester, has lead to some students transitioning to

graduate school (both MS and PhD, and both at UNC Charlotte, and in other universities). This also lead to the creation in AY2023-2024 of more dedicated research courses for undergraduates.

As PhD track coordinator for CS (an associate chair of the department), we streamlined in 2021-2022 the review process of PhD students. As a result, we can now review each PhD student with a higher frequency (now every semester) with a more systemic approach which reduces the advisor-dependent variability and which consumes less faculty time thanks to a mostly data-driven approach.

As associate chair of the CS department, I helped shape the research agenda of the department in 2020-2021 by reorganizing faculty and their lab. By forming two groups around AI and Systems, we are fostering interaction between research students, and creating communication channels between faculty. These two groups have submitted proposals as groups toward higher funding.

As associate chair of the CS department (and PhD track coordinator for CS), I designed and implemented in 2020-2021 processes to make sure that PhD students supported by the department received their contracts in time. This involves building a process and timeline for faculty to declare the intended funding for each student and communicate that information to staff who process hiring and ensure the process unfold in a timely fashion. This includes building funding models for future semester to enable fiscally responsible decision by the department.

As chair of the CCI ad hoc committee on post graduate education and then associate chair of the CS department (2018-2021), we defined a strategy for the college to recruit students without a computing background into graduate certificates. Different certificate will cater to different students. In particular, CS has create an online certificate in Applied AI catering to working professional wanting to reskill in Artificial Intelligence. This certificate has been

As college representative on the University College Faculty Council (2016-2018), I have advocated for the inclusion of ITCS 1110 (a CS0 course similar to highschool Computer Science Principles) as an option to satisfy part of the general education math and logic requirement.

As member and chair of the CS graudate committee (2015-2017), we revamped the requirement of the MS in CS program. The new structure provides more visibility to the areas of expertise of the department. It also enables student to focus more on research activities if they chose to. And finally it removes multiple advising and scheduling bottlenecks which streamlines departmental operations and reduces faculty load.

As a member of the college's infrastructure commitee (2014-2017), we helped clarified the funding model for HPC research clusters for the university; and I advocated for the creation of HPC educational cluster to help train our student to use real HPC systems.

2023-2024

- Chair of CCI Faculty Search
- Member of CCI Distinguished Faculty Search
- Member of CS DRC
- Ex-officio Member of CS PhD recruitment and Review committee
- Ex-officio member of CS Graduate Education Committee
- Ex-officio member of CS Research Committee
- CS Track Coordinator for the CaIS PhD program
- Associate Chair of CS Department

2022-2023

- CCI Faculty President
- Chair of CCI Faculty Executive Committee
- Member of CCI Leadership Council
- Member of UNC Charlotte Faculty Council
- Member of UNC Charlotte Faculty Executive Council
- Chair of CS Graduate education committee
- Ex-officio Member of CS PhD recruitment and Review committee
- Ex-officio member of CS Graduate Education Committee
- Chair of the CS Ad Hoc PhD Recruitment Strategic Planning Committee
- CS Track Coordinator for the CaIS PhD program
- Associate Chair of CS Department

2021-2022

- Member of CS DRC
- Member of CCI Research committee
- Chair of CCI post-graduate task force
- Member of CS PhD recruitement and Review committee
- CCI Faculty President Elect
- Member of UNC Charlotte Faculty Competitive Grant Committee
- CS Track Coordinator for the CaIS PhD program
- Associate Chair of CS Department

2020-2021

- Member of CS DRC
- Member of CCI Research committee
- Member of CS Graduate committee
- Chair of CCI post-graduate task force
- Member of UNC Charlotte Faculty Competitive Grant Committee
- CS Track Coordinator for the CaIS PhD program
- Associate Chair of CS Department

2019-2020

- Member of CS Special Faculty DRC
- Member of CS DRC
- Member of CS Graduate Education committee
- Member of CCI Research committee
- Member of CS Computing and Facilities
- CS Track Coordinator for the CaIS PhD program

2018-2019

- Member of CCI Research committee
- CCI representative on the University College Faculty Council

Note: From 2018, I stopped keeping track of MS and PhD committee memberships

2017-2018

- Member of the (CS) faculty search committee
- Member of the (CS) Graduate Education Committee
- Member of the CCI Technology and Infrastructure Committee
- Member of the CCI ad hoc committee on security for all
- CCI representative on the University College Faculty Council
- CS representative on the faculty council
- CCI representative on the Faculty Information and Technology Services Advisory Committee
- Member of the (CS) committee for concentration Software, Systems, and Network
- Member of the (CS) Computing Facilities Committee
- Member of Saman Mostafavi (ECE) PhD Dissertation Proposal committee
- Member of Arnab Ardhendu Purkayastha (ECE) PhD Qualifier committee
- Member of Abhinav Mohanty (SIS) PhD Qualifier committee
- Member of Pourya Naderi Yeganeh (CS) PhD Dissertation Proposal committee
- Member of Abhishek Nikam (ECE) MS Thesis committee
- Member of Shalaka Thombare (CS) MS Thesis committee
- Member of Suhas Ashok Shiddibhavi (ECE) MS Thesis committee
- Chair of the MS thesis committee of Abhishek Chandrate (CS)

2016-2017

- Member of the (CS) faculty search committee
- Member of the (CS) Graduate Education Committee
- Member of the (CS) committee for concentration Software, Systems, and Network
- Member of the (CCI) Faculty Executive Committe
- Chair of the CCI Technology and Infrastructure Committee
- CCI representative on the University College Faculty Council

2015-2016

- Member of the (CS) Graduate Education Committee
- Member of the (CS) PhD Admission and Review Committee
- Member of the (CS) faculty search committee
- Member of the (CS) committee for concentration Software, Systems, and Network
- Member of the CCI Technology and Infrastructure Committee

2014-2015

- Member of the (CS) PhD Admission and Review Committee
- Member of the CCI Technology and Infrastructure Committee
- Member of the (CCI) ad hoc UG subcommittee on 3181, 3155, 3146

2013-2014

- Member of the (CS) PhD Admission and Review Committee

Leadership Statement

To me leadership is about actions that one performs that modifies their environment through the transformed actions of other people around them. I am fond of three main strategies to transform the action of people around me, leading by example, leading by policy and process setting, and leading by program development. The goal is often to improve a particular aspect of academic life, by leveraging data that we have, in a way that minimizes mindless effort by faculty.

I have lead the PhD program at UNC Charlotte by seeking to reform funding procedures, annual reviews, and seminar. Funding of PhD student was a very adhoc process when I took over as PhD track coordinator in 2019. By 2020, we set policies on when faculty should indicate how student should get funded, when contract should be submitted to HR. This enabled the department to plan its budget better, to answer comfortably student funding requests, and to make sure every student got contract on time, and only requires a few minutes of faculty time every semester.

Annual reviews of PhD students was not done uniformly in the department prior to 2019. The main problem was that individual PhD advisors were responsible for generating letters that went to students. This lead to underadvised student not receiving meaningful feedback from the program. We shifted the

burden to the PhD review committee. And to minimize their workload, we provide extensive description of how the student review letters should be formated and written out of academic record of the student and a handful of surveys.

Graduate seminar was seen by the student as box they have to check as part of their program. It seemed that the core issue was that the seminar was run at the college level. And wide scope of research conducted in the college meant that for particular student, they would only see seminars in their topic less than twice in a year. This highly frustrated students. We organized in the HPC lab a regular seminar that we required our own student to attend. The example of a regularly running seminar inspired the AI lab to do the same. With two labs runnign seminars regularly and some centers in the college having seminars, we were now in a position to reform how seminars were being required of the students. Instead of a single seminar, the PhD students can now chose which seminar to attend each week as they are requiered to attend 15 in a semester, they will still see a variety of talks in a semester.

The undergraduate research initiative came of results of surveys of students and of faculty. Students were saying that they were interested in conducting research but they did not know where to start. Faculty on the other hand seemed to be under the impression that mentoring undergrads in research was not a useful utilization of their time and grant funding. Yet undergraduate research could be a solution to graduate student recruitment problems. I designed the undergraduate research initiative to solve these problems. The strategy was simple: start small, in one lab, with a model that cost little resources. By offering a research experience as a class, we were able to save grant funding for committed student/faculty pairs. We offered small research projects to some students for class credit. And organized some seminars and activities by the TA for the class. This kept cost low both in terms of fudning and time, enabled to screen and train some students, and still deploy at a scale where we could show some success. Surely we were able to get students to write papers for major conference, converted some students to undergraduate RAs, and to graduate students. The effort has been succesfull as the program is now expanded to more labs, outgrew the scope of the CS department. And faculty who were saying that undergraduates were a waste of their time are not asking how to get in on the program.

Research Statement

I do two kinds of research. One that is technical, and one that educational.

In my technical research, I mostly ask questions about how do we make more efficient use of our computational capabilities more from an algorithmic, system, and performance aspect, in support to science, analysis, and application. Because of that I tend to paint myself as a high performance computing person. I do work at different level of the tech stack ranging from leveraging hardware with low level instruction, to middleware for programming and performance analysis, to algorithm design. I tend to mostly look at the space of graph algorithms and sparse linear algebra.

To leverage computer architectures, I have looked GPU, CPU, and storage systems. For instance, I was one of the first scientist to look at the Xeon Phi architecture and published early benchmarks and applications to spare problems (MTAAP12, PPAM13). We investigated how to deploy scientific problems on the platform (ICS14), and diverse graph analysis (MTAAP14, P2S221) on that architecture. I am currently interested in looking modern architecture with heterogeneous memory architectures like NVIDIA's Grace Hopper systems and future CXL machines.

To enable programming these systems, we do require good middleware to facilitate their programming. I contributed to distributed pipelined workflow middleware with DataCutter where we investigated distributed workstealing (HiPC10) and usability on applications of dynamic graph analysis (ParCo15). We prototyped tasking middlewares for out-of-core sparse linear algebra problems (P2S212, Cluster12, SciProg14). We also looked into some of the low level constructs, mostly SIMD instruction sets, can be leveraged by programmers (JPDC15, P2S221). In the longer term, I want to work more on middleware, in particular trying to address the question of how to enable the composition and automatic

recomposition of parallel methods to dynamically account for change in execution platform and runtime information about problem.

To improve performance, the most reliable tool to date remains algorithmic improvement. I think about algorithms with two types of targets. probably the longest stream of research I conduct are on algorithms that help manage the platform, system, middleware; they often target a combinatorial problem that manipulates the state of the middleware by scheduling tasks and are often important to optimize the performance of wide classes of systems (JPDC09, JSSPP10, JPDC12, CSur13, HCW15, APDCM15, IPDPS22, PDCO23). Other algorithmic improvements are targetting precisely the improvement of a particular application and even though they are not as generally applicable they usually deliver massive improvement (SDM13, NS14, ICPP17, ECIR18, BIBM18, IPDPS22, PDCO23). In the future, I want to investigate models that enable to compose different code base to save the same problem, maybe from basic algorithm that have different tradeoff in terms of resource utilization.

One can not understand performance in a vacuum, you study performance issues by studying how applications use computers. I have looked at applications and their performance from a wide range of fields: from physics and engineering (APS12, PRL13, JoP13) to geography (ICPP17), from biology (BCB13, BDM20) to social networks (ASONAM13, ASONAM17, ECIR18). One of the things I want to focus on in the next few years is to identify where the performance problems are in application of graph problems. While we have designed techniques for trillion edge graphs and optimized various graph kernels on hardware platform. It seems to me that the applications of these techniques are lagging behind. And I want to identify where the real needs are, not from the imagination of performance people, but from the needs of application experts.

As I was working on technical research, it became obvious that broader impact of my expertise could be achieved by transitioning some of my research activities towards educational research and outreach. That would also contribute to improving system education which surely would help with recruiting students into systems topics.

My education research focuses on two types of problems. The first is addressed by the BRIDGES project and consist in developing assignments for early CS courses that leverage visualization and real world data set to engage the student body. We are studying the impact of these assignments on the student body (SIGCSE18, SIGCSE20, EIT23) and conducted various outreach and diffusion at regional conferences (CCSCCP20, CCSCNE20, CCSCSE21, CCSCNE24). To date, through the BRIDGES project, we have trained about 100 instructors, the project has been deployed in over a dozen of universities, and has directly been used by over 3000 students. The future of the BRIDGES project lies in expanding the project further than purely assignments, and enabling the project to transition to a financial model that is independent from federal funding.

We also conduct research on the structure of courses themselves through the CS Material project. The project enables to classify courses against curriculum ontologies such as the guidelines published by ACM and IEEE. This enables to share materials between instructors, to study the structure of courses, and to establish different way to teach particular courses (EduPar19, JPDC21, SIGCSE21). Outreach activities enabled us to train over 30 instructors in course alignment and modern course design. The future of the project is to transform the tool into a national instrument to observe and measure how CS course are taught globally.

Teaching Statement

In classes, I try to engage students by asking them questions, bringing them to the board for presentation of solutions. Something that really worked in online teaching during COVID was to have comments, questions, discussion come in text channel live. Students like not having to acknowledge verbally that they do not know, but it is also good to have instant feedback as an instructor to splice answer to questions when they make sense. I am still to figure out how to achieve that during in-person classes.

In universities, I believe that we tend to think of teaching in too restrictive terms. We tend to think of teaching in terms of what we do in class. And while we do in classes matter, it is only the performative part of our teaching activities. One would not think of a musician's activity as only the 30-minute they spend on stage for a concerto performance.

An important part of how to teach effectively happens during class preparation. I believe it is a piece of activity where we, as faculty, tend to not effective use our time, mostly because we tend to not collaborate with one another and share material, content, and advice. When I was teaching at ENSIMAG, the classes were designed collectively by a set of faculty that was setting curriculum for the classes in their classes in term of learning objective, topics, lecture materials, assignments, and project. And then faculty and TAs were allocated to parts of the class.

At UNC Charlotte, I have worked on creating more effective usage of our time in class preparations in multiple ways. In research, I worked on the CS Material project that aims to enable sharing widely materials between instructors. I also worked on the BRIDGES project where we design an share widely sets of carefully-designed highly-engaging assignments for early CS courses. Knowledge of these projects was disseminated through workshops conducted at conferences and at UNC Charlotte.

I worked on promoting these ideas at UNC Charlotte. Most importantly, I have created and shared materials on the parallel computing courses (previously 3145, 5145; now 4145, 6145) with all the instructors. This includes slides, scaffolded assignments, tutorials, video lectures. This provides some level of consistency for students across different instructors, but also reduces the time to prepare class for instructors and enable them to focus on their strength in updating the class content. But I also have advocated for a more cohort level discussion of our courses (through the Open CS initiative), and organized group discussion around our graduate algorihtm class (ITCS 6114/8114) in recent semesters when I taught it.

It is important to remember that we, as faculty, are responsible for any student that walk out of our doors; whether they are in a class we teach or not, in a program we administer or not. One of the way we can do that as faculty is by setting curriculum. I served on the University College Faculty Council for a few years and helped set reform curriculum around math requirements and enabling math pathways. I also pushed the including of out CS0 course (ITSC 1110) as satisfying the general education requirement for "math, statistics, or deductive reasoning".

Finally, we also contribute to the education of our students by enabling culture and social structures. I enable social structure by serving as the faculty advisor for the ACM student organization; and also by implementing a restructuring of research labs to increase communication between research active students in our department. Establishing culture can be more difficult, I seek out opportunities to talk to student, not only about the latest due assignment. As part of that, I contributed to our professional development courses 1600/2600 by recording my perspective on what students should know in programming in a video call "Programming Matters" that get presented in these courses with an associated panel of faculty.

Misc.

Hobbies Woodworking, Dancing, Cooking, Science Fiction

Languages French (native), English (fluent), Korean(beginner)