

# CURRICULUM VITAE

## S M Ferdous

### Personal Information

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*Place and Date of Birth:* Dhaka, Bangladesh | 25 December 1988

*Address:* 2550 Yeager Road, Apt 2-5, West Lafayette, In-47906, USA

*Phone:* +1(765)-409-8632

*Email:* [sm.ferdous@pnnl.gov](mailto:sm.ferdous@pnnl.gov); [ferdous.csebuett@gmail.com](mailto:ferdous.csebuett@gmail.com)

🏠 : <https://smferdous1.github.io> | **in** : <http://bit.ly/linkedin-smf> | **g** : <http://bit.ly/scholar-smf>

### Professional Appointments

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*Oct'23 – Current* **Data Scientist**

Data Science and Machine Intelligence Group  
Pacific Northwest National Lab  
WA, USA

*Jun'22 – Oct'23* **Pauling Postdoc Fellow**

Data Science and Machine Intelligence Group  
Pacific Northwest National Lab  
WA, USA

*2022(Jan – Jun)* **Post-Doctoral Research Associate**

Department of Computer Science  
School of Science  
Purdue University, USA

*2015 – 2021* **Graduate Research Assistant**

Department of Computer Science  
School of Science  
Purdue University, USA.

*2021(Jun – Aug)* **PhD Intern**

Data Science and Machine Intelligence Group  
Pacific Northwest National Lab  
WA, USA.

*2019(Jun – Aug)* **PhD Intern**

ENSA Group  
Nokia Bell Labs  
NJ, USA.

- 2017(May – Aug) **PhD Intern**  
Data Science and Machine Intelligence Group  
Pacific Northwest National Lab  
WA, USA.
- 2015(Mar – Jul) **Assistant Professor**  
Department of Computer Science and Engineering  
Ahsanullah Univ. of Science and Technology  
Dhaka, Bangladesh.
- 2011 – 2015 **Lecturer**  
Department of Computer Science and Engineering  
Ahsanullah Univ. of Science and Technology  
Dhaka, Bangladesh.

## Education

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- 2015 – 2021 **PhD in Computer Science**, Purdue University, West Lafayette, Indiana  
*Thesis*: “Algorithms for degree-constrained subgraphs and applications”  
*Advisor*: Prof. Dr. Alex Pothen | *GPA*: 3.93/4.00.
- 2011 – 2014 **MSc Engg. in Computer Science and Engineering**  
Bangladesh University of Engineering and Technology (BUET)  
*Thesis*: “Practically Efficient Algorithms for Minimum String Cover and Minimum Common String Partition”  
*Advisor*: Prof. Dr. M. Sohel Rahman | *GPA*: 3.33/4.00.
- 2006 – 2011 **BSc Engg. in Computer Science and Engineering**, BUET  
9/138, *Degree with Honours* | *GPA*: 3.89/4.00.

## Fellowships

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- 2022 – Current **Linus Pauling Distinguished Fellowship** at Pacific Northwest National Lab.
- 2020 – 2021 **John R. Rice Fellowship** for Scientific Computing, Department of Computer Science, Purdue University.
- 2015 – 2016 **Ross Fellowship** for incoming graduate student at Purdue University.
- 2006 – 2011 **Dean’s list** and **merit scholarship** in each of the four academic years in undergrad for excellent academic results at Bangladesh University of Engineering and Technology.

## Awards & Honors


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- 2021 **Selected for participation** in week long *ARGONNE TRAINING PROGRAM ON EXTREME-SCALE COMPUTING (ATPESC)* 2021.

- 2018 **Travel grant** for attending SIAM Combinatorial Scientific Computing Workshop in Bergen, Norway.
- 2017 **Third best prize** on SIAM Computational Science and Engineering student poster competition at Purdue University.
- 2016 **Travel and accommodation grant** for attending Week long SAMSI summer school on optimization at Research Triangle Park, NC.
- 2008 **Tenth among 50 teams** in ACM Inter Collegiate Programming Contest Regional Dhaka Site.

## Publications

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Full list in my Google Scholar:  : <http://bit.ly/scholar-smf>

## Under Submission

- 2024 Shivaram Gopal, **SM Ferdous**, Hemanta K. Maji, and Alex Pothen. *GreedyML: A Parallel Algorithm for Maximizing Submodular Functions*. 2024. arXiv: [2403.10332](https://arxiv.org/abs/2403.10332) [cs.DC]. URL: <https://arxiv.org/abs/2403.10332>
- 2024 Reet Barik, Wade Cappa, **SM Ferdous**, Marco Minutoli, Mahantesh Halappanavar, and Ananth Kalyanaraman. *GreedyRIS: Scalable Influence Maximization using Distributed Streaming Maximum Cover*. 2024. arXiv: [2408.10982](https://arxiv.org/abs/2408.10982) [cs.DC]. URL: <https://arxiv.org/abs/2408.10982>

## Conference proceedings

- 2024 Michael Mandulak, Sayan Ghosh, **SM Ferdous**, Mahantesh Halappanavar, and George Slota. *Efficient Weighted Graph Matching on GPUs*. To appear in SC 2024. 2024
- 2024 **SM Ferdous**, Bhargav Samineni, Alex Pothen, Mahantesh Halappanavar, and Bala Krishnamoorthy. *Semi-Streaming Algorithms for Weighted  $k$ -Disjoint Matchings*. To appear in ESA 2024. 2024. arXiv: [2311.02073](https://arxiv.org/abs/2311.02073) [cs.DS]. URL: <https://arxiv.org/abs/2311.02073>
- 2024 Siddhartha Shankar Das, **SM Ferdous**, Mahantesh M. Halappanavar, Edoardo Serra, and Alex Pothen. “AGS-GNN: Attribute-guided Sampling for Graph Neural Networks”. In: *Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*. KDD ’24. Barcelona, Spain: Association for Computing Machinery, 2024, pp. 538–549. ISBN: 9798400704901. DOI: [10.1145/3637528.3671940](https://doi.org/10.1145/3637528.3671940). URL: <https://doi.org/10.1145/3637528.3671940>

- 2024 **SM Ferdous**, Reece Neff, Bo Peng, Salman Shuvo, Marco Minutoli, Sayak Mukherjee, Karol Kowalski, Michela Becchi, and Mahantesh Halappanavar. “Picasso: Memory-Efficient Graph Coloring Using Palettes With Applications in Quantum Computing”. In: *2024 IEEE International Parallel and Distributed Processing Symposium (IPDPS)*. IEEE. 2024, pp. 241–252. DOI: [10.1109/IPDPS57955.2024.00029](https://doi.org/10.1109/IPDPS57955.2024.00029)
- 2024 **SM Ferdous**, Alex Pothén, and Mahantesh Halappanavar. “Streaming Matching and Edge Cover in Practice”. In: *22nd International Symposium on Experimental Algorithms (SEA 2024)*. Schloss Dagstuhl–Leibniz-Zentrum für Informatik. 2024. DOI: [10.4230/LIPICS.SEA.2024.12](https://doi.org/10.4230/LIPICS.SEA.2024.12)
- 2023 Lizhi Xiang, Arif Khan, **SM Ferdous**, Sr Aravind, and Mahantesh Halappanavar. “CuAlign: Scalable Network Alignment on GPU Accelerators”. In: SC-W ’23. Denver, CO, USA: Association for Computing Machinery, 2023, pp. 747–755. ISBN: 9798400707858. DOI: [10.1145/3624062.3625129](https://doi.org/10.1145/3624062.3625129). URL: <https://doi.org/10.1145/3624062.3625129>
- 2023 Pasqua D’Ámbra, Fabio Durastante, **SM Ferdous**, Salvatore Filippone, Mahantesh Halappanavar, and Alex Pothén. “AMG Preconditioners based on Parallel Hybrid Coarsening and Multi-objective Graph Matching”. In: *2023 31st Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP)*. 2023, pp. 59–67. DOI: [10.1109/PDP59025.2023.00017](https://doi.org/10.1109/PDP59025.2023.00017)
- 2021 **SM Ferdous**, Alex Pothén, Arif Khan, Ajay Panyala, and Mahantesh Halappanavar. “A parallel approximation algorithm for submodular  $b$ -matching”. In: *Proceedings of the First SIAM Conference on Applied and Computational Discrete Algorithms (ACDA)*. SIAM, 2021. DOI: [10.1137/1.9781611976830.5](https://doi.org/10.1137/1.9781611976830.5)
- 2021 Beomyeol Jeon, **SM Ferdous**, Muntasir Raihan Rahman, and Anwar Walid. *Privacy-preserving Decentralized Aggregation for Federated Learning*. 2021. DOI: [10.1109/INFOCOMWKSHP51825.2021.9484437](https://doi.org/10.1109/INFOCOMWKSHP51825.2021.9484437)
- 2018 Arif Khan, Krzysztof Choromanski, Alex Pothén, **SM Ferdous**, Mahantesh Halappanavar, and Antonino Tumeo. “Adaptive anonymization of data using  $b$ -edge cover”. In: *SC18: International Conference for High Performance Computing, Networking, Storage and Analysis*. IEEE. 2018, pp. 743–753. DOI: [10.5555/3291656.3291735](https://doi.org/10.5555/3291656.3291735)
- 2018 Arif Khan, Alex Pothén, and **SM Ferdous**. “Parallel algorithms through approximation:  $b$ -edge cover”. In: *2018 IEEE International Parallel and Distributed Processing Symposium, IPDPS 2018, Vancouver, BC, Canada, May 21-25, 2018*. IEEE Computer Society, 2018, pp. 22–33. DOI: [10.1109/IPDPS.2018.00013](https://doi.org/10.1109/IPDPS.2018.00013)
- 2018 **SM Ferdous**, Alex Pothén, and Arif Khan. “New Approximation Algorithms for Minimum Weighted Edge Cover”. In: *Proceedings of the Eighth SIAM Workshop on Combinatorial Scientific Computing, CSC 2018, Bergen, Norway, June 6-8, 2018*. SIAM, 2018, pp. 97–108. DOI: [10.1137/1.9781611975215.10](https://doi.org/10.1137/1.9781611975215.10)

- 2016 **SM Ferdous**, Md Mustafizur Rahman, and Mahmuda Naznin. “Finding network connectivity failure in a Wireless Sensor Network”. In: *2016 Wireless Days (WD)*. IEEE. 2016, pp. 1–6. DOI: [10.1109/WD.2016.7461522](https://doi.org/10.1109/WD.2016.7461522).
- 2015 **SM Ferdous** and M Sohel Rahman. “A metaheuristic approach for application partitioning in Mobile System”. In: *2015 International Conference on Networking Systems and Security (NSysS)*. IEEE. 2015. DOI: [10.1109/NSysS.2015.7043520](https://doi.org/10.1109/NSysS.2015.7043520).
- 2013 **SM Ferdous** and M Sohel Rahman. “Solving the Minimum Common String Partition Problem with the Help of Ants”. In: *Advances in Swarm Intelligence, 4th International Conference, ICSI 2013*. Springer, 2013, pp. 306–313. DOI: [10.1007/978-3-642-38703-6\\_36](https://doi.org/10.1007/978-3-642-38703-6_36).
- 2012 **SM Ferdous**, Anindya Das, M Sohel Rahman, and Md Mustafizur Rahman. “An Ant Colony Optimization approach to solve the minimum string cover problem”. In: *2012 International Conference on Informatics, Electronics & Vision (ICIEV)*. IEEE. 2012, pp. 741–746. DOI: [10.1109/ICIEV.2012.6317422](https://doi.org/10.1109/ICIEV.2012.6317422).
- 2011 Mirfat Akter Sharmin, Md Mizanur Rahman, Syed Ishtiaque Ahmed, Md Mustafizur Rahman, and **SM Ferdous**. “Teaching intelligible speech to the autistic children by interactive computer games”. In: *Proceedings of the 2011 ACM Symposium on Applied Computing*. ACM. 2011, pp. 1208–1209. DOI: [10.1145/1982185.1982450](https://doi.org/10.1145/1982185.1982450).
- 2010 Anika Anwar, Md Mustafizur Rahman, **SM Ferdous**, Samiul Alam Anik, and Syed Ishtiaque Ahmed. “A computer game based approach for increasing fluency in the speech of the autistic children”. In: *2011 IEEE 11th International Conference on Advanced Learning Technologies*. IEEE. 2011, pp. 17–18. DOI: [10.1109/ICALT.2011.13](https://doi.org/10.1109/ICALT.2011.13).
- 2010 Md Mustafizur Rahman, **SM Ferdous**, and Syed Ishtiaque Ahmed. “Increasing intelligibility in the speech of the autistic children by an interactive computer game”. In: *2010 IEEE International Symposium on Multimedia*. IEEE. 2010, pp. 383–387. DOI: [10.1109/ISM.2010.64](https://doi.org/10.1109/ISM.2010.64)

## Journals

- 2021 Seher Acer, Ariful Azad, Erik G. Boman, Aydın Buluç, Karen D. Devine, **SM Ferdous**, Nitin Gawande, Sayan Ghosh, Mahantesh Halppanavar, Ananth Kalyanaraman, Arif Khan, Marco Minutoli, Alex Pothen, Sivasankaran Rajamanickam, Oguz Selvitopi, Nathan R. Tallent, and Antonino Tumeo. “EXAGRAPH: Graph and Combinatorial Methods for Enabling Exascale Applications”. In: *The International Journal of High Performance Computing Applications* (2021), p. 10943420211029299. DOI: [10.1177/10943420211029299](https://doi.org/10.1177/10943420211029299).
- 2019 Alex Pothen, **SM Ferdous**, and Fredrik Manne. “Approximation algorithms in combinatorial scientific computing”. In: *Acta Numerica* 28 (2019), pp. 541–633. DOI: [10.1017/S0962492919000035](https://doi.org/10.1017/S0962492919000035).

- 2017 **SM Ferdous** and M Sohel Rahman. “Solving the Minimum Common String Partition Problem with the Help of Ants”. In: *Math. Comput. Sci.* 11.2 (2017), pp. 233–249. DOI: [10.1007/s11786-017-0293-5](https://doi.org/10.1007/s11786-017-0293-5).
- 2015 **SM Ferdous** and M. Sohel Rahman. “An Integer Programming Formulation of the Minimum Common String Partition Problem”. In: *PLOS ONE* 10.7 (July 2015), pp. 1–16. DOI: [10.1371/journal.pone.0130266](https://doi.org/10.1371/journal.pone.0130266).
- 2011 Mustafizur Rahman, **SM Ferdous**, Syed Ishtiaque Ahmed, and Anika Anwar. “Speech development of autistic children by interactive computer games”. In: *Interactive Technology and Smart Education* 8.4 (2011), pp. 208–223. DOI: [10.1108/17415651111189450](https://doi.org/10.1108/17415651111189450).

## Technical posters

- 2020 **SM Ferdous** and Alex Pothén. “Assignment using Lagrangian relaxation and application in ordering sparse matrices”. Presented in SIAM CSC 2020, Seattle, WA. 2020.
- 2016 **SM Ferdous** and Alex Pothén. “On bounding the weight of b-matching on graphs”. Presented in SIAM CSC 2016, Albuquerque, NM. 2016.

## Technical talks

- 2024 **SM Ferdous**. “Semi-streaming algorithms for weighted k-Disjoint matching”. Presented in SIAM Discrete Math 2024, Spokane, WA. 2024.
- 2021 **SM Ferdous** and Alex Pothén. “Locality Matters! Efficient algorithms for submodular b-matching”. Presented in SIAM CSE 2021, Happened virtually. 2021.
- 2019 **SM Ferdous** and Alex Pothén. “Efficient Algorithms for Degree Constrained Subgraphs with Applications”. Presented in SIAM CSE 2019, Spokane, WA. 2019.
- 2018 **SM Ferdous** and Alex Pothén. “New Approximation Algorithms for Minimum Weight Edge Cover”. Presented in SIAM AN 2018, Portland, OR. 2018

## Others

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### Review Services

- Journal Reviewer: PLoS ONE, ACM TOPC, IEEE TPDPS, and Springer JOCO.
- Conference Committee Member: IPDPS 2024
- Conference sub-reviewer: SIAM ACDA 2021, SIAM ACDA 2023, SRDS 2022, Symposium of Experimental Algorithm (SEA) 2022, European Symposium on Algorithms (ESA) 2024 and WALCOM 2019.

### Community Services

- 2018 – 2019* Served as **General Secretary**, Bangladesh Students association, Purdue University.
- 2017 – 2018* Served as **Web Master**, Bangladesh Students association, Purdue University.