Reyan Ahmed

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Research Area: Graph Algorithms, Network Visualization, Data Science

Education

2016-2021	Ph.D. in Computer Science (minor in Mathematics) – University of Arizona Dissertation: Multi-level Graph Spanners Advisers: Stephen Kobourov, David Glickenstein, Alon Efrat, John Kececioglu
2014-2016	M.Sc. in Computer Science – Bangladesh University of Engineering and Technology Thesis: Online Algorithms for Facility Assignment Problem Adviser: Md. Saidur Rahman
2008-2012	Bachelor's in Computer Science – Bangladesh University of Engineering and Technology

Research and Development Experience

Oct 2021- Current	Visiting Assistant Professor Colgate University
July 2021- Sep 2021	Visiting Instructor Colgate University
Jan 2020- May 2021	Graduate Research Associate University of Arizona
Aug 2016- Dec 2019	Graduate Research Assistant University of Arizona
Summer 2018, Summer 2019	Optimization Software Engineer Intern Hexagon Mining
Nov 2015 - Jan 2016	Web Developer Bangladesh University of Engineering and Technology
Feb 2013 - Mar 2015	Software Engineer Reve Systems, Bangladesh

Teaching Experience

Summer 2021, Summer 2020	Instructor, University of Arizona Course: Analysis of Discrete Structures (CSc 345)
Summer 2017	Graduate Teaching Assistant University of Arizona Instructor: Elon Efrat; Course: Algorithms (CSc 445)

Journal Publications

- Reyan Ahmed, Patrizio Angelini, Faryad Darabi Sahneh, Alon Efrat, David Glickenstein, Martin Gronemann, Niklas Heinsohn, Stephen G. Kobourov, Richard Spence, Joseph Watkins, and Alexander Wolff. **Multi-level Steiner trees**, *J. Exp. Algorithmics*, 2019.
- Reyan Ahmed, Md. Saidur Rahman, Stephen Kobourov, **Online facility assignment**, *Theoretical Computer Science*, 2019.

Conference Publications

- Reyan Ahmed, Greg Bodwin, Keaton Hamm, Stephen Kobourov, and Richard Spence. **On additive spanners in weighted graphs with local error**, *In Proceedings of the 47th International Workshop on Graph-Theoretic Concepts in Computer Science*, (also arXiv:2103.09731), 2021.
- Reyan Ahmed, Greg Bodwin, Keaton Hamm, Stephen Kobourov, Faryad Darabi Sahneh, and Richard Spence. **Multi-level Weighted Additive Spanners**, *In Proceedings of the 20th International Symposium on Experimental Algorithms,* (also arXiv:2102.05831), 2021.
- Reyan Ahmed, Felice De Luca, Sabin Devkota, Stephen Kobourov, and Mingwei Li. **Graph Drawing via Gradient Descent, (GD)^2**, *In Proceedings of the 28th International Symposium on Graph Drawing and Network Visualization*, (also arXiv:2008.05584), 2020. (**best paper award**)
- Reyan Ahmed, Greg Bodwin, Stephen Kobourov, Faryad Darabi Sahneh, and Richard Spence. **Weighted Additive Spanners**, *In Proceedings of the 46th International Workshop on Graph-Theoretic Concepts in Computer Science*, (also arXiv:2002.07152), 2020.
- Reyan Ahmed, Keaton Hamm, Stephen Kobourov, Faryad Darabi Sahneh, and Richard Spence. **Kruskal-based approximation algorithm for the multi-level Steiner tree problem**, *In Proceedings of the 28th Annual European Symposium on Algorithms*, (also arXiv:2002.06421), 2020.
- Sabin Devkota, Reyan Ahmed, Felice De Luca, Kate Isaacs, Stephen Kobourov. **Stress-Plus-X (SPX) Graph Layout**, *In Proceedings of the 27th International Symposium on Graph Drawing and Network Visualization,* (also arXiv:1908.01769), 2019.
- Reyan Ahmed, Keaton Hamm, Mohammad Javad Latifi Jebelli, Stephen Kobourov, Faryad Darabi Sahneh, and Richard Spence. **Approximation algorithms and an integer program for multi-level graph spanners**, *In Proceedings of the 18th International Symposium on Experimental Algorithms* (also arXiv:1904.01135), 2019.
- Reyan Ahmed, Patrizio Angelini, Faryad Darabi Sahneh, Alon Efrat, David Glickenstein, Martin Gronemann, Niklas Heinsohn, Stephen G. Kobourov, Richard Spence, Joseph Watkins, and Alexander Wolff. **Multi-level Steiner trees**, *In Proceedings of the 17th International Symposium on Experimental Algorithms* (also arXiv:1804.02627), 2018.
- Reyan Ahmed, Md. Saidur Rahman and Stephen Kobourov, **Online Facility Assignment**, *In Proceedings of the 12th International Workshop on Algorithms and Computation*, 2018. (**best paper award**)
- Reyan Ahmed, Md. Mazharul Islam and Md. Saidur Rahman, **On acyclic colorings of graphs**. *In Proceedings of the 15th International Conference on Computer and Information Technology*, 2012.

Other Publications

- Reyan Ahmed, Felice De Luca, Sabin Devkota, Stephen Kobourov, Mingwei Li, **Multicriteria Scalable Graph Drawing via Stochastic Gradient Descent, (SGD)^2**, arXiv:2112.01571, 2021.
- Reyan Ahmed, Md Asadullah Turja, Faryad Darabi Sahneh, Mithun Ghosh, Keaton Hamm, Stephen Kobourov, **Computing Steiner Trees using Graph Neural Networks**, arXiv:2108.08368, 2021.

- Kathryn Gray, Mingwei Li, Reyan Ahmed, Stephen Kobourov, **Visualizing Evolving Trees**, arXiv:2106.08843, 2021.
- Kathryn Gray, Mingwei Li, Reyan Ahmed, Md. Khaledur Rahman, Ariful Azad, Stephen Kobourov, Katy Börner, **Scalable Methods for Readable Tree Layouts**, Submitted to HICSS (available in https://tiga1231.github.io/zmlt/demo/doc/paper.pdf), 2021.
- Saad Al Muttakee, Reyan Ahmed, and Md. Saidur Rahman. **New Results and Bounds on Online Facility Assignment Problem**, arXiv:2009.01446, 2020.
- Reyan Ahmed, Greg Bodwin, Keaton Hamm, Mohammad Javad Latifi Jebelli, Stephen Kobourov, Faryad Darabi Sahneh, and Richard Spence. **Graph Spanners: A Tutorial Review**, *Computer Science Review,* 37, p.100253 (also arXiv:1909.03152), 2020.
- Reyan Ahmed, Keaton Hamm, Mohammad Javad Latifi Jebelli, Stephen Kobourov, Faryad Darabi Sahneh, and Richard Spence. **Multi-Level Graph Sketches via Single-Level Solvers**, arXiv:1905.00536, 2019.
- Reyan Ahmed, Felice De Luca, Sabin Devkota, Alon Efrat, Md Iqbal Hossain, Stephen Kobourov, Jixian Li, Sammi Abida Salma and Eric Welch, **L-Graphs and Monotone L-Graphs**, arXiv:1703.01544, 2017.

Presentations

- Conference presentation in the 20th International Symposium on Experimental Algorithms 2021 (virtual conference). Topic: Multi-level Weighted Additive Spanners.
- Conference presentation in the 28th International Symposium on Graph Drawing and Network Visualization 2020 (virtual conference). Topic: Graph Drawing via Gradient Descent, $(GD)^2$.
- Conference presentation in the 28th Annual European Symposium on Algorithms, 2020 (virtual conference). Topic: Kruskal-based approximation algorithm for the multi-level Steiner tree problem.
- Conference presentation in the 46th International Workshop on Graph-Theoretic Concepts in Computer Science, 2020 (virtual conference). Topic: Weighted additive spanners.
- Invited speaker in the SIAM student seminar, the department of mathematics, the University of Arizona, 2020 (virtual presentation). Topic: Multi-level Graph Spanners.
- Poster presentation in TRIPODS conference, 2019. Topic: Approximation algorithms and an integer program for multi-level graph spanners.
- Conference presentation in the 12th International Workshop on Algorithms and Computation, 2018. Topic: Online facility assignment.

Mentoring

- Ahmad Musa, Ph.D. Student, University of Arizona, 2018.
- Kathryn Gray, Ph.D. Student, University of Arizona, 2019.

Teaching Assistants

- Anh Nguyen Phung, undergraduate student, University of Arizona, Summer 2021.
- Hung Tran, undergraduate student, University of Arizona, Summer 2021.
- Hoang Nguyen Hung, Ph.D. Student, University of Arizona, Summer 2020.
- Ash Reed, undergraduate student, University of Arizona, Summer 2020.

Community Engagement

- Volunteer activities in Hack Arizona, 2019.
- Mentored students in TRIPODS Machine Learning Literacy Project, 2020.
- Peer-reviewed 12 conference/journal papers.
- Maintain web pages: gama.cs.arizona.edu, walcom-conference.org

Miscellaneous

- Won 3rd place in the Graph Drawing Competition at the 26th Symposium on Graph Drawing, 2018.
- Placed in 5th position in the Fake News Challenge (in a field of 50 international teams), 2017.

Scholarship and Other Awards

- CS Spring 2021 Graduate Scholarship (Research) Award, University of Arizona, 2021.
- Best paper award, Graph Drawing via Gradient Descent, $(GD)^2$, The 28th International Symposium on Graph Drawing and Network Visualization, 2020.
- Galileo Circle Scholarship, University of Arizona, 2020.
- Best paper award, Online Facility Assignment, The 12th International Workshop on Algorithms and Computation, 2018.
- Dean's list award, Bangladesh University of Engineering and Technology, 2012.
- Board Scholarship, Bangladesh University of Engineering and Technology, 2010.
- Gold medal, Secondary school certificate, Bangladesh International School, Jeddah, 2005.