

Debajyoti Mondal

Personal Information

Affiliation: Postdoctoral Fellow at Cheriton School of Computer Science,
University of Waterloo, Waterloo, ON, Canada N2L 3G1
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Residency: Canada (Permanent Resident), Bangladesh (Citizen)

Education

University of Manitoba Sept. 2012 - Aug. 2016
Ph.D. in Computer Science Winnipeg, MB, CA

Thesis Title: Visualizing Graphs: Optimization and Trade-offs.

Advisor: Dr. Stephane Durocher

Thesis Committee: Dr. Prosenjit Bose (Carleton University), Dr. David Wood (Monash University), and Dr. Andriy Praymak (University of Manitoba).

GPA: 4.5 out of 4.5.

University of Manitoba Sept. 2010 - Aug. 2012
M.Sc. in Computer Science Winnipeg, MB, CA

Thesis Title: Embedding a Planar Graph on a Given Point Set.

Advisor: Dr. Stephane Durocher

Thesis Committee: Dr. Ellen Gethner (University of Colorado Denver), Dr. Helen Cameron (University of Manitoba), and Dr. Michael Domaratzki (University of Manitoba).

GPA: 4.5 out of 4.5.

Bangladesh University of Engineering and Technology Sept. 2004 - Aug. 2009
B.Sc. in Computer Science and Engineering Dhaka, Bangladesh

Advisor: Dr. Md. Saidur Rahman

GPA: 3.9 out of 4.

Research Interest

- Graph drawing and its applications in practical domains, e.g., network analysis and VLSI layout.
- Information visualization including cartography and visual analytics of big data.
- Computational geometry and topological aspects of graph theory.
- Interdisciplinary research that integrates geometric concepts into software analysis, bioinformatics, and geographic routing.

Experience

University of Waterloo Sept. 2016 - Present
Course Instructor at Cheriton School of Computer Science
 Waterloo, ON, CA
 Course: Elementary Algorithm Design and Data Abstraction (Winter 2017).

Bangladesh University of Engineering and Technology Oct. 2009 - Aug. 2010
Lecturer at Department of Computer Science and Engineering
 Dhaka, Bangladesh
 Courses: Mathematical Analysis for Computer Science (Winter 2010), Database Sessional (Winter 2010), Software Engineering and Information System Design Sessional (Summer 2010), Algorithms Sessional (Summer 2010).

Bangladesh-Korea Information Access Center Oct. 2009 - Aug. 2010
Course Instructor
 Dhaka, Bangladesh
 Courses: Web Application Development (Winter 2010), Database Management and Administration (Summer 2010).

University of Manitoba Sept. 2010 - Aug. 2016
Grader/Marker
 Winnipeg, MB, CA
 Courses: Graph Drawing (Fall 2016), Analysis of Algorithms and Data Structures (Winter 2016), Computational Geometry (Fall 2015), Introductory Computer Science (Winter 2011, Winter 2012).

Qualifications

Microsoft Research May 2015 - Sept. 2015
Research Intern
 Redmond, WA, USA
 Worked at Research in Software Engineering (RiSE) Lab to develop Microsoft Automatic Graph Layout under the supervision of Dr. Lev Nachmanson.

Centre for Teaching Excellence November 2016
Completed Teaching Development Seminar Series
 Waterloo, ON, CA
 Teaching Development Certificate Program (CTE), see (<https://uwaterloo.ca/centre-for-teaching-excellence/programming-postdoctoral-fellows>).

Awards

- NSERC Postdoctoral Fellowship (\$90,000), 2016-2018.
- Microsoft Intern TUP Award (\$10,000), Microsoft Research, 2015-2016.
- Manitoba Graduate Scholarship (\$18,000), University of Manitoba, 2012-2015.
- University of Manitoba Fellowship (\$18,000, Declined), University of Manitoba, 2012-2015.
- University of Manitoba GFP (\$20,000), University of Manitoba, 2012-2016.
- Clarence Bogardus Memorial Scholarship (\$14,275), University of Manitoba, 2012–2013.
- International Graduate Student Scholarship (\$2,000), University of Manitoba, 2012-2013.
- Clarence Bogardus Memorial Scholarship (\$14,275), University of Manitoba, 2011–2012.

- Manitoba Graduate Scholarship (\$14,000), University of Manitoba, 2011-2012.
- University of Manitoba GFP (\$16,000), University of Manitoba, 2010-2012.
- University of Manitoba Fellowship (\$14,000, Declined), University of Manitoba, 2011-2012.
- International Graduate Student Scholarship (\$2,000), University of Manitoba, 2010-2011.
- Gordon P. Osler Graduate Scholarship, University of Manitoba, 2013.
- Dean's Award, Bangladesh University of Engineering and Technology (BUET), 2006-2009.

Service and Research Collaboration

- I have been invited to serve on the program committee of the 12th International Workshop on Algorithms and Computation (WALCOM 2018).
- Reviewer at Mathematical Reviews, American Mathematical Society, (2012 - Present).
- I was selected and served as a member of the Graduate Studies Committee, Department of Computer Science, University of Manitoba (2014-2015).
- Took a major role in organizing the 4th International Workshop on Algorithms and Computation (WALCOM, 2010).
- Worked as an external reviewer for the following international conferences:
 - Symposium on Graph Drawing (GD),
 - Symposium on Algorithms and Computation (ISAAC),
 - Workshop on Combinatorial Algorithms (IWOCA),
 - Latin American Symposium on Theoretical Informatics (LATIN),
 - Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM),
 - Symposium on Theoretical Aspects of Computer Science (STACS),
 - Scandinavian Symposium and Workshops on Algorithm Theory (SWAT),
 - Symposium on Algorithms and Data Structures (WADS),
 - Workshop on Algorithms and Computation (WALCOM), and
 - Workshop on Graph-Theoretic Concepts in Computer Science (WG).
- Worked as an external reviewer for the following journals:
 - Algorithmica,
 - Computational Geometry: Theory and Applications,
 - Discrete Mathematics,
 - Discrete Mathematics, Algorithms and Applications,
 - Information Processing Letters,
 - Journal of Discrete Algorithms,
 - Journal of Computer and System Sciences,
 - Journal of Graph Algorithms and Applications, and
 - Journal of Combinatorial Optimization.
- I was invited three times to the Computational Geometry Research Workshop at Bellairs Research Institute organized by Dr. Sue Whitesides (2012, 2013, 2015), and to the Discrete Math Workshop supported by PIMS (May 2016). I was invited to visit the following research labs.
 - Graph Drawing and Information Visualization Lab, BUET, Bangladesh, (December 2016).
 - Discrete Mathematics group, University of Berlin, Germany, (September 2014).
 - Graphs and Map Algorithms Lab, University of Arizona, USA (July 2013).
 - Computational Geometry Lab, University of Victoria, Canada (July 2012, June 2011).

Journal Publications

With the exception of [4, 9, 11, 13, 14], authors are ordered alphabetically, as is the norm in theoretical computer science.

1. Muhammad Jawaherul Alam, Stephen G. Kobourov, and Debajyoti Mondal. Orthogonal layout with optimal face complexity. *Computational Geometry: Theory and Applications*, 2017. Accepted (In press). <http://dx.doi.org/10.1016/j.comgeo.2017.02.005>
2. William S. Evans, Stefan Felsner, Michael Kaufmann, Stephen G. Kobourov, Debajyoti Mondal, Rahnuma Islam Nishat, and Kevin Verbeek. Table cartograms. *Computational Geometry: Theory and Applications*, 2017. Accepted (In press)
3. Stephane Durocher and Debajyoti Mondal. Drawing planar graphs with reduced height. *Journal of Graph Algorithms and Applications*, 21(4):433–453, 2017
4. Md. Iqbal Hossain, Sammi Abida Salma, Md. Saidur Rahman, and Debajyoti Mondal. A necessary condition and a sufficient condition for pairwise compatibility graphs. *Journal of Graph Algorithms and Applications*, 21(3):341–352, 2017
5. Stephane Durocher, Ellen Gethner, and Debajyoti Mondal. Thickness and colorability of geometric graphs. *Computational Geometry: Theory and Applications*, 56:1–18, 2016
6. Stephane Durocher, Debajyoti Mondal, and Md. Saidur Rahman. On graphs that are not PCGs. *Theoretical Computer Science*, 571:78–87, 2015
7. Stephane Durocher and Debajyoti Mondal. Plane 3-trees: Embeddability and approximation. *SIAM Journal on Discrete Mathematics*, 29(1):405–420, 2015
8. Stephane Durocher, Debajyoti Mondal, Rahnuma Islam Nishat, and Sue Whitesides. A note on minimum-segment drawings of planar graphs. *Journal of Graph Algorithms and Applications*, 17(3):301–328, 2013
9. Md. Iqbal Hossain, Debajyoti Mondal, Md. Saidur Rahman, and Sammi Abida Salma. Universal line-sets for drawing planar 3-trees. *Journal of Graph Algorithms and Applications*, 17(2):59–79, 2013
10. Debajyoti Mondal, Rahnuma Islam Nishat, Md. Saidur Rahman, and Sue Whitesides. Acyclic coloring with few division vertices. *Journal of Discrete Algorithms*, 23:42–53, 2013
11. Debajyoti Mondal, Rahnuma Islam Nishat, Sudip Biswas, and Md. Saidur Rahman. Minimum-segment convex drawings of 3-connected cubic plane graphs. *Journal of Combinatorial Optimization*, 25(3):460–480, 2013
12. Stephane Durocher, Pak Ching Li, Debajyoti Mondal, Frank Ruskey, and Aaron Williams. Cool-lex order and k -ary catalan structures. *Journal of Discrete Algorithms*, 16:287–307, 2012
13. Debajyoti Mondal, Rahnuma Islam Nishat, Sue Whitesides, and Md. Saidur Rahman. Acyclic colorings of graph subdivisions revisited. *Journal of Discrete Algorithms*, 16:90–103, 2012
14. Rahnuma Islam Nishat, Debajyoti Mondal, and Md. Saidur Rahman. Point-set embeddings of plane 3-trees. *Computational Geometry: Theory and Applications*, 45(3):88–98, 2012

15. Rahnuma Islam Nishat, Debajyoti Mondal, and Md. Saidur Rahman. Visibility drawings of plane 3-trees with minimum area. *Mathematics in Computer Science*, 5(1):119–132, 2011
16. Debajyoti Mondal, Rahnuma Islam Nishat, Md. Saidur Rahman, and Muhammad Jawaherul Alam. Minimum-area drawings of plane 3-trees. *Journal of Graph Algorithms and Applications*, 15(2):177–204, 2011

Conference Publications

With the exception of [6, 14, 25, 31–33, 35], authors are ordered alphabetically, as is the norm in theoretical computer science.

1. Stephane Durocher and Debajyoti Mondal. Relating graph thickness to planar layers and bend complexity. In *43rd International Colloquium on Automata, Languages, and Programming, ICALP 2016, July 11-15, 2016, Rome, Italy*, volume 55 of *LIPICs*, pages 10:1–10:13. Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, 2016
2. Yeganeh Bahoo, Stephane Durocher, J. Mark Keil, Saeed Mehrabi, Sahar Mehrpour, and Debajyoti Mondal. Polygon simplification by minimizing convex corners. In *Proceedings of the 22nd Annual International Conference on Computing and Combinatorics (COCOON)*, volume 9797 of *LNCS*, pages 547–559. Springer, 2016
3. David Eppstein, Philipp Kindermann, Stephen G. Kobourov, Giuseppe Liotta, Anna Lubiw, Aude Maignan, Debajyoti Mondal, Hamideh Vosoughpour, Sue Whitesides, and Stephen K. Wismath. On the planar split thickness of graphs. In *Proceedings of the 12th Latin American Symposium on Theoretical Informatics (LATIN)*, volume 9644 of *LNCS*, pages 403–415. Springer, 2016
4. Muhammad Jawaherul Alam, Stephen G. Kobourov, and Debajyoti Mondal. Orthogonal layout with optimal face complexity. In *Proceedings of the 41st International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM)*, volume 9587 of *LNCS*, pages 121–133. Springer, 2016
5. Stephane Durocher, Ellen Gethner, and Debajyoti Mondal. On the biplanar crossing number of K_n . In *Proceedings of the 28th Annual Canadian Conference on Computational Geometry (CCCG)*, pages 93–100, 2016
6. Debajyoti Mondal, Hadi Hemmati, and Stephane Durocher. Exploring test suite diversification and code coverage in multi-objective test case selection. In *Proceedings of the 8th IEEE International Conference on Software Testing, Verification and Validation (ICST)*, pages 1–10. IEEE Computer Society, 2015
7. Prosenjit Bose, Stephane Durocher, Debajyoti Mondal, Maxime Peabody, Matthew Skala, and Mohammad Abdul Wahid. Local routing in convex subdivisions. In *Proceedings of the 41st International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM)*, volume 8939 of *LNCS*, pages 140–151. Springer, 2015
8. Laurie J. Heyer, Anna Lubiw, Debajyoti Mondal, Ulrike Stege, and Sue Whitesides. Reconfiguring a chain of cubes. In *Proceedings of the 27th Annual Canadian Conference on Computational Geometry (CCCG)*, pages 94–100, 2015

9. Stephane Durocher, Robert Fraser, Travis Gagie, Debajyoti Mondal, Matthew Skala, and Sharma V. Thankachan. Indexed geometric jumbled pattern matching. In *Proceedings of the 25th Annual Symposium on Combinatorial Pattern Matching (CPM)*, volume 8486 of *LNCS*, pages 110–119. Springer, 2014
10. Stephane Durocher and Debajyoti Mondal. Trade-offs in planar polyline drawings. In *Proceedings of the 22nd International Symposium on Graph Drawing (GD)*, volume 8871 of *LNCS*, pages 306–318. Springer, 2014
11. Stephane Durocher and Debajyoti Mondal. Drawing planar graphs with reduced height. In *Proceedings of the 22nd International Symposium on Graph Drawing (GD)*, volume 8871 of *LNCS*, pages 392–403. Springer, 2014
12. Stephane Durocher, Stefan Felsner, Saeed Mehrabi, and Debajyoti Mondal. Drawing hv-restricted planar graphs. In *Proceedings of the 11th Latin American Symposium on Theoretical Informatics (LATIN)*, volume 8392 of *LNCS*, pages 156–167. Springer, 2014
13. Stephane Durocher and Debajyoti Mondal. Drawing plane triangulations with few segments, pp. 40–45. In *Proceedings of the 26th Annual Canadian Conference on Computational Geometry (CCCG)*, pages 40–45, 2014
14. Debajyoti Mondal, Yang Wang, and Stephane Durocher. Robust solvers for square jigsaw puzzles. In *Proceedings of the 10th Conference on Computer and Robot Vision (CRV)*, pages 249–256. IEEE Computer Society, 2013
15. William S. Evans, Stefan Felsner, Michael Kaufmann, Stephen G. Kobourov, Debajyoti Mondal, Rahnuma Islam Nishat, and Kevin Verbeek. Table cartograms. In *Proceedings of the 21st Annual European Symposium on Algorithms (ESA)*, volume 8125 of *LNCS*, pages 421–432. Springer, 2013
16. Stephane Durocher and Debajyoti Mondal. On balanced +-contact representations. In *Proceedings of the 21st International Symposium on Graph Drawing (GD)*, volume 8242 of *LNCS*, pages 143–154. Springer, 2013
17. William Lenhart, Giuseppe Liotta, Debajyoti Mondal, and Rahnuma Islam Nishat. Planar and plane slope number of partial 2-trees. In *Proceedings of the 21st International Symposium on Graph Drawing (GD)*, volume 8242 of *LNCS*, pages 412–423. Springer, 2013
18. Stephane Durocher and Debajyoti Mondal. Plane 3-trees: Embeddability and approximation. volume 8037 of *LNCS*, pages 291–303. Springer, 2013
19. Stephane Durocher, Debajyoti Mondal, and Md. Saidur Rahman. On graphs that are not PCGs. In *Proceedings of the 7th International Workshop on Algorithms and Computation (WALCOM)*, volume 7748 of *LNCS*, pages 310–321. Springer, 2013
20. Stephane Durocher, Ellen Gethner, and Debajyoti Mondal. Thickness and colorability of geometric graphs. In *Proceedings of the 39th International Workshop on Graph-Theoretic Concepts in Computer Science (WG)*, volume 8165 of *LNCS*, pages 237–248. Springer, 2013
21. Luis Barba, Stephane Durocher, Robert Fraser, Ferran Hurtado, Saeed Mehrabi, Debajyoti Mondal, Jason Morrison, Matthew Skala, and Mohammad Abdul Wahid. On k -enclosing objects in a coloured point set. In *Proceedings of the 25th Annual Canadian Conference on Computational Geometry (CCCG)*, pages 229–234, 2013

22. Sudip Biswas, Stephane Durocher, Debajyoti Mondal, and Rahnuma Islam Nishat. Hamiltonian paths and cycles in planar graphs. In *Proceedings of the 6th International Conference on Combinatorial Optimization and Applications (COCOA)*, volume 7402 of *LNCS*, pages 83–94. Springer, 2012
23. Stephen G. Kobourov, Debajyoti Mondal, and Rahnuma Islam Nishat. Touching triangle representations for 3-connected planar graphs. In *Proceedings of the 20th International Symposium on Graph Drawing (GD)*, volume 7704 of *LNCS*, pages 199–210. Springer, 2012
24. Debajyoti Mondal, Rahnuma Islam Nishat, Md. Saidur Rahman, and Sue Whitesides. Acyclic coloring with few division vertices. In *Proceedings of the 23rd International Workshop on Combinatorial Algorithms (IWOCA)*, volume 7643 of *LNCS*, pages 86–99. Springer, 2012
25. Md. Iqbal Hossain, Debajyoti Mondal, Md. Saidur Rahman, and Sammi Abida Salma. Universal line-sets for drawing planar 3-trees. In *Proceedings of the 6th International Workshop on Algorithms and Computation (WALCOM)*, volume 7157 of *LNCS*, pages 136–147. Springer, 2012
26. Stephane Durocher and Debajyoti Mondal. On the hardness of point-set embeddability. In *Proceedings of the 6th International Workshop on Algorithms and Computation (WALCOM)*, volume 7157 of *LNCS*, pages 148–159. Springer, 2012
27. Stephane Durocher, Saeed Mehrabi, Debajyoti Mondal, and Matthew Skala. Realizing site permutations. In *Proceedings of the 23rd Annual Canadian Conference on Computational Geometry (CCCG)*, pages 355–360, 2011
28. Stephane Durocher, Debajyoti Mondal, Rahnuma Islam Nishat, and Sue Whitesides. A note on minimum-segment drawings of planar graphs. In *Proceedings of the 23rd Annual Canadian Conference on Computational Geometry (CCCG)*, pages 303–308, 2011
29. Stephane Durocher, Debajyoti Mondal, Rahnuma Islam Nishat, Md. Saidur Rahman, and Sue Whitesides. Embedding plane 3-trees in \mathbb{R}^2 and \mathbb{R}^3 . In *Proceedings of the 18th International Symposium on Graph Drawing (GD)*, volume 7034 of *LNCS*, pages 39–51. Springer, 2011
30. Stephane Durocher, Pak Ching Li, Debajyoti Mondal, and Aaron Williams. Ranking and loopless generation of k -ary dyck words in cool-lex order. In *Proceedings of the 22nd International Workshop on Combinatorial Algorithms (IWOCA)*, volume 7056 of *LNCS*, pages 182–194. Springer, 2011
31. Debajyoti Mondal, Rahnuma Islam Nishat, Sue Whitesides, and Md. Saidur Rahman. Acyclic colorings of graph subdivisions. In *Proceedings of the 22nd International Workshop on Combinatorial Algorithms (IWOCA)*, volume 7056 of *LNCS*, pages 247–260. Springer, 2011
32. Debajyoti Mondal, Muhammad Jawaherul Alam, and Md. Saidur Rahman. Minimum-layer drawings of trees. In *Proceedings of the 5th International Workshop on Algorithms and Computation (WALCOM)*, volume 6552 of *LNCS*, pages 221–232. Springer, 2011
33. Debajyoti Mondal, Rahnuma Islam Nishat, Md. Saidur Rahman, and Md. Jawaherul Alam. Minimum-area drawings of plane 3-trees. In *Proceedings of the 22nd Annual Canadian Conference on Computational Geometry (CCCG)*, pages 191–194, 2010

34. Sudip Biswas, Debajyoti Mondal, Rahnuma Islam Nishat, and Md. Saidur Rahman. Minimum-segment convex drawings of 3-connected cubic plane graphs. In *Proceedings of the 16th Annual International Conference on Computing and Combinatorics (COCOON)*, volume 6196 of *LNCS*, pages 182–191. Springer, 2010
35. Rahnuma Islam Nishat, Debajyoti Mondal, and Md. Saidur Rahman. Point-set embeddings of plane 3-trees. In *Proceedings of the 18th International Symposium on Graph Drawing (GD)*, volume 6502 of *LNCS*, pages 317–328. Springer, 2010