

Aleksandr Popov

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My research interests primarily lie in *computational geometry*. I develop algorithms that solve geometric problems; the particular problems I am working on lend themselves well to applications in geographic information systems.

WORK EXPERIENCE

PhD: Algorithms for Uncertain Trajectories, TU/e October 2019–October 2023
In this project, carried out under supervision of prof. dr. Kevin Buchin, I developed practical algorithms and obtained new theoretical results for analysis of trajectories under different uncertainty models.

Internship in Deep Learning, Achmea November 2018–April 2019
In this project I designed and implemented deep learning models for object detection in the context of locating damaged parts of glasshouses after a hailstorm.

EDUCATION

Master of Science September 2017–September 2019
Computer Science and Engineering at TU Eindhoven, The Netherlands
Major: Data Science in Engineering
GPA: 8.78 (Dutch scale, 1–10), cum laude

Bachelor of Science September 2014–August 2017
Computer Science and Engineering at TU Eindhoven, The Netherlands
Major: Software Science
GPA: 9.11 (Dutch scale, 1–10), cum laude

Bachelor of Science September 2012–June 2014
Information Security at ITMO University, Saint Petersburg, Russia
Studied for two years out of four, no diploma
GPA: 5.00 (Russian scale, 1–5), ranking in the group: 1 out of 90 students

General Secondary Education September 2001–June 2012
Gymnasium 'Alma Mater', Saint Petersburg, Russia
Graduated with gold medal (honours) for exceptional academic performance
GPA: 5.00 (Russian scale, 1–5)

LANGUAGE SKILLS

Native **Russian** speaker, fluent in **English**, proficient in **Dutch** and **German**.

TEACHING

Data Structures

2021–2023

I assisted in a first-year bachelor's course on data structures and algorithms, given by prof. dr. Bettina Speckmann and dr. ir. Marcel Roeloffzen.

Seminar Algorithms

2021

I supported a master's-level seminar on geometric approximation algorithms, given by prof. dr. Kevin Buchin.

Foundations of Computing

2019–2020

I gave instructional sessions in a broad first-year bachelor's course on computer science, given by dr ir. Wouter Meulemans.

SUPERVISION

I co-supervised a master's student for their final project, as well as a student's honours project, both with prof. dr. Kevin Buchin.

SCHOLARSHIPS

1. TU/e Excellence Scholarship, the Netherlands, 2017–2019
2. Increased State Scholarship for Excellent Studies, Russia, 2013–2014
3. Special Scholarship of the Government of Saint Petersburg, Russia, 2012–2013

CONFERENCE TALKS

1. ISAAC (International Symposium on Algorithms and Computation), December 2022
2. DCCG (Dutch Computational Geometry Day), December 2021
3. WADS (Algorithms and Data Structures Symposium), August 2021
4. MFCS (International Symposium on Mathematical Foundations of Computer Science), August 2021
5. ICALP (International Colloquium on Automata, Languages, and Programming), June 2020
6. EuroCG (European Workshop on Computational Geometry), March 2020, April 2021, March 2022, April 2023

WORKSHOP PARTICIPATION

I attended the Dagstuhl Seminar 23221 on Computational Geometry in May 2023. I also worked on the Dagstuhl report for the seminar.

RESEARCH VISITS

I had the pleasure of visiting prof. dr. Joachim Gudmundsson and dr. André van Renssen at the University of Sydney in October–December 2022, working on map matching and graph spanners.

REVIEWS

I have subreviewed articles for IJGIS, SoCG, ESA, Stacs, WADS, and EuroCG.

PUBLICATIONS

DBLP: <https://dblp.org/pid/245/9061-1>

- [1] Kevin Buchin, Maike Buchin, Joachim Gudmundsson, Aleksandr Popov, and Sampson Wong. ‘Map-Matching Queries under Fréchet Distance on Low-Density Spanners’. In: *Proceedings of the 40th International Symposium on Computational Geometry (SoCG 2024)*. Ed. by Wolfgang Mulzer and Jeff M. Phillips. Leibniz International Proceedings in Informatics 293. Wadern, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2024, 22. In press.
- [2] Kevin Buchin, Maike Buchin, Joachim Gudmundsson, Aleksandr Popov, and Sampson Wong. *Map-Matching Queries under Fréchet Distance on Low-Density Spanners*. Presented at EuroCG 2023, Barcelona, Spain. 2023. URL: https://dccg.upc.edu/eurocg23/wp-content/uploads/2023/05/Booklet_EuroCG2023.pdf (visited on 05/10/2023).
- [3] Kevin Buchin, Chenglin Fan, Maarten Löffler, Aleksandr Popov, Benjamin Raichel, and Marcel Roeloffzen. ‘Fréchet Distance for Uncertain Curves’. In: *ACM Transactions on Algorithms* 19.3, 29 (2023). ISSN: 1549-6325. DOI: [10.1145/3597640](https://doi.org/10.1145/3597640).
- [4] Kevin Buchin, Joachim Gudmundsson, Antonia Kalb, Aleksandr Popov, Carolin Rehs, André van Renssen, and Sampson Wong. ‘Oriented Spanners’. In: *Proceedings of the 31st Annual European Symposium on Algorithms (ESA 2023)*. Ed. by Inge Li Gørtz, Martin Farach-Colton, Simon J. Puglisi, and Grzegorz Herman. Leibniz International Proceedings in Informatics 274. Wadern, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2023, 26. ISBN: 978-3-95977-295-2. DOI: [10.4230 / LIPIcs.ESA.2023.26](https://doi.org/10.4230/LIPIcs.ESA.2023.26).
- [5] Kevin Buchin, Joachim Gudmundsson, Antonia Kalb, Aleksandr Popov, Carolin Rehs, André van Renssen, and Sampson Wong. *Oriented Spanners*. Presented at EuroCG 2023, Barcelona, Spain. 2023. URL: https://dccg.upc.edu/eurocg23/wp-content/uploads/2023/05/Booklet_EuroCG2023.pdf (visited on 05/10/2023).
- [6] Kevin Buchin, Maarten Löffler, Tim Ophelders, Aleksandr Popov, Jérôme Urhausen, and Kevin Verbeek. ‘Computing the Fréchet Distance between Uncertain Curves in One Dimension’. In: *Computational Geometry: Theory & Applications* 109, 101923 (2023). ISSN: 0925-7721. DOI: [10.1016/j.comgeo.2022.101923](https://doi.org/10.1016/j.comgeo.2022.101923).
- [7] Aleksandr Popov. ‘Algorithms for Imprecise Trajectories’. PhD thesis. TU Eindhoven, 2023. ISBN: 978-90-386-5841-4. URL: <https://apopov.win.tue.nl/thesis-screen.pdf> (visited on 10/12/2023).
- [8] Kevin Buchin, Bram Custers, Ivor van der Hoog, Maarten Löffler, Aleksandr Popov, Marcel Roeloffzen, and Frank Staals. ‘Segment Visibility Counting Queries in Polygons’. In: *Proceedings of the 33rd International Symposium on Algorithms and Computation (ISAAC 2022)*. Ed. by Sang Won Bae and Heejin Park. Leibniz International Proceedings in Informatics 248. Wadern, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2022, 58. ISBN: 978-3-95977-258-7. DOI: [10.4230 / LIPIcs.ISAAC.2022.58](https://doi.org/10.4230/LIPIcs.ISAAC.2022.58).
- [9] Kevin Buchin, Bram Custers, Ivor van der Hoog, Maarten Löffler, Aleksandr Popov, Marcel Roeloffzen, and Frank Staals. *Segment Visibility Counting Queries in Polygons*. Presented at EuroCG 2022, Perugia, Italy. 2022. URL: <https://eurocg2022.unipg.it/booklet/EuroCG2022-Booklet.pdf> (visited on 05/10/2023).

- [10] Kevin Buchin, Maarten Löffler, Tim Ophelders, Aleksandr Popov, Jérôme Urhausen, and Kevin Verbeek. ‘Computing the Fréchet Distance between Uncertain Curves in One Dimension’. In: *Proceedings of the 17th International Symposium on Algorithms and Data Structures (WADS 2021)*. Ed. by Anna Lubiw, Mohammad Salavatipour, and Meng He. Lecture Notes in Computer Science 12808. Berlin, Germany: Springer, 2021, pp. 243–257. ISBN: 978-3-030-83507-1. DOI: [10.1007/978-3-030-83508-8_18](https://doi.org/10.1007/978-3-030-83508-8_18).
- [11] Kevin Buchin, Maarten Löffler, Aleksandr Popov, and Marcel Roeloffzen. ‘Uncertain Curve Simplification’. In: *Proceedings of the 46th International Symposium on Mathematical Foundations of Computer Science (MFCS 2021)*. Ed. by Filippo Bonchi and Simon J. Puglisi. Leibniz International Proceedings in Informatics 202. Wadern, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2021, 26. ISBN: 978-3-95977-201-3. DOI: [10.4230/LIPIcs.MFCS.2021.26](https://doi.org/10.4230/LIPIcs.MFCS.2021.26).
- [12] Kevin Buchin, Maarten Löffler, Aleksandr Popov, and Marcel Roeloffzen. *Uncertain Curve Simplification*. Presented at EuroCG 2021, Saint Petersburg, Russia. 2021. URL: <http://eurocg21.spbu.ru/wp-content/uploads/2021/04/proceedings.pdf> (visited on 05/10/2023).
- [13] Milutin Brankovic, Kevin Buchin, Koen Klaren, André Nusser, Aleksandr Popov, and Sampson Wong. ‘ (k, ℓ) -Medians Clustering of Trajectories Using Continuous Dynamic Time Warping’. In: *Proceedings of the 28th International Conference on Advances in Geographic Information Systems (SIGSPATIAL 2020)*. Ed. by Chang-Tien Lu, Fusheng Wang, Goce Trajcevski, Yan Huang, Shawn Newsam, and Li Xiong. New York, NY, USA: Association for Computing Machinery, 2020, pp. 99–110. ISBN: 978-1-4503-8019-5. DOI: [10.1145/3397536.3422245](https://doi.org/10.1145/3397536.3422245).
- [14] Kevin Buchin, Chenglin Fan, Maarten Löffler, Aleksandr Popov, Benjamin Raichel, and Marcel Roeloffzen. ‘Fréchet Distance for Uncertain Curves’. In: *Proceedings of the 47th International Colloquium on Automata, Languages, and Programming (ICALP 2020)*. Ed. by Artur Czumaj, Anuj Dawar, and Emanuela Merelli. Leibniz International Proceedings in Informatics 168. Wadern, Germany: Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2020, 20. ISBN: 978-3-95977-138-2. DOI: [10.4230/LIPIcs.ICALP.2020.20](https://doi.org/10.4230/LIPIcs.ICALP.2020.20).
- [15] Kevin Buchin, Maarten Löffler, Aleksandr Popov, and Marcel Roeloffzen. *Fréchet Distance Between Uncertain Trajectories: Computing Expected Value and Upper Bound*. Presented at EuroCG 2020, Würzburg, Germany. 2020. URL: <https://www1.pub.informatik.uni-wuerzburg.de/eurocg2020/data/uploads/eurocg20-proceedings.pdf> (visited on 05/10/2023).
- [16] Aleksandr Popov. ‘Similarity of Uncertain Trajectories’. MSc thesis. TU Eindhoven, 2019. URL: https://research.tue.nl/files/142608440/thesis_A.A._Popov.pdf (visited on 10/12/2023).