

Curriculum Vitae — Tim Ophelders

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Personal Information

Name T. A. E. (Tim) Ophelders
Citizenship Dutch
Address Department of Mathematics and Computer Science
TU Eindhoven
P.O. Box 513
5600MB Eindhoven
the Netherlands
Email *t.a.e.ophelders@tue.nl*
Website *www.win.tue.nl/~tophelde*

Education

2014 – 2018 PhD student
in the Applied Geometric Algorithms group
of the Department of Mathematics and Computer Science
of TU Eindhoven
graduated cum laude (among top 5% at TU Eindhoven)
2012 – 2014 Master's degree in Computer Science and Engineering
at TU Eindhoven
graduated cum laude
Honors program (specializations Algorithms and Visualization)
2009 – 2012 Bachelor's degree in Computer Science and Engineering
at TU Eindhoven

Past Employments

2020 – current Postdoc, TU Eindhoven
Eindhoven, The Netherlands
2018 – 2020 Research Scholar, Michigan State University
East Lansing, Michigan, USA
2014 – 2018 PhD Student, TU Eindhoven
Eindhoven, The Netherlands
2012 Software Engineer, Adversitement
Uden, The Netherlands

Awards & Honors

2020 Best poster award at the International Conference on Advances in Geographic Information Systems (SIGSPATIAL) 2020
2019 Best Institute for Programming research and Algorithmics (IPA) dissertation of 2018
2017 Winner of the international ECR competition for the Lorentz Center Workshop on Movement: New Sensors, New Data, New Challenges
2015 Master's Thesis nominated for the TU/e academic awards

Teaching

2020 – 2021	Lecturer	Topological Data Analysis	TU Eindhoven
	Teaching assistant	Discrete Structures	TU Eindhoven
2017 – 2018	Lecturer	Proving Mini-Course	TU Eindhoven
	Coach	Coaching Bachelor Students	TU Eindhoven
	Teaching assistant	Discrete Structures	TU Eindhoven
2016 – 2017	Coach	Coaching Bachelor Students	TU Eindhoven
	Teaching assistant	Data Structures	TU Eindhoven
2015 – 2016	Teaching assistant	Data Structures	TU Eindhoven
2014 – 2015	Teaching assistant	Data Structures	TU Eindhoven

Supervision

PhD	2020 – present	Yvette Oortwijn	co-supervision
Graduate	2018 – 2020	Erik Amézquita	co-supervision
	2018 – 2019	Mitchell Eithun	co-supervision
Undergraduate	2018 – 2020	Kayla Makela	co-supervision

Professional Service / Activities

PC member	36th Symposium on Computational Geometry SoCG 2020
Editorial	Geometric and Graph-based Approaches to Collective Motion Dagstuhl Seminar 16022
Organization	6th Annual Conference and General Meeting of the Global Young Academy 2016 Local organisation CG Week 2015 Local organisation

Reviewing and Refereeing

Journals

BSMM	Boletín de la Sociedad Matemática Mexicana	(2020)
IPL	Information Processing Letters	(2020)
CGTA	Computational Geometry: Theory and Applications	(2020)
TALG	Transactions on Algorithms	(2017, 2020)
JoCG	Journal of Computational Geometry	(2019, 2020)
	Algorithmica	(2019)
TCS	Theoretical Computer Science	(2015, 2017)

Conferences

STOC	Symposium on Theory of Computing	(2021)
MFCS	Mathematical Foundations of Computer Science	(2020)
InfoVis	Information Visualization	(2020)
EuroCG	European Workshop on Computational Geometry	(2020)
SoSA	Symposium on Simplicity in Algorithms	(2020)
WADS	Algorithms and Data Structures Symposium	(2019)
ESA	European Symposium on Algorithms	(2018, 2019)
SWAT	Scandinavian Symposium and Workshops on Algorithm Theory	(2018)
SoCG	Symposium on Computational Geometry	(2016, 2017, 2018)
CCCG	Canadian Conference on Computational Geometry	(2016, 2018)

Courses and Schools Attended

- October 2016 Fall School on Discrete Geometry and Topology
TU Graz, Graz, Austria
- July 2016 Algorithms and Complexity
Institute for Programming research and Algorithmics (IPA)
Eindhoven, The Netherlands
- November 2015 Fall Days on Algorithms and Models for Real-Life Systems
Institute for Programming research and Algorithmics (IPA)
Herten, The Netherlands
- August 2015 Summer School on Streaming Algorithms
Center for Massive Data Algorithmics (MADALGO)
Aarhus University, Aarhus, Denmark
- November 2014 Fall Days on Software Testing
Institute for Programming research and Algorithmics (IPA)
Oisterwijk, The Netherlands
- September 2014 Summer School on Algorithm Engineering
Karlsruhe Institute of Technology (KIT)
Karlsruhe, Germany

Workshops Attended (by invitation only, small number of participants)

- January 2020 5th Workshop on Applied Geometric Algorithms
Langbroek, The Netherlands
- August 2019 Computation in Low-Dimensional Geometry and Topology
Dagstuhl Seminar 19352
- October 2018 4th Workshop on Applied Geometric Algorithms
Langbroek, The Netherlands
- September 2017 3rd Workshop on Applied Geometric Algorithms
Vierhouten, The Netherlands
- August 2017 Movement: New Sensors, New Data, New Challenges
Lorentz Center, Leiden, The Netherlands
- July 2017 Fields Workshop on Discrete and Computational Geometry
Ottawa, Canada
- February 2017 Applications of Topology to the Analysis of 1-Dimensional Objects
Dagstuhl Seminar 17072
- January 2017 2nd Workshop on Applied Geometric Algorithms
Vierhouten, The Netherlands
- January 2016 Geometric and Graph-based Approaches to Collective Motion
Dagstuhl Seminar 16022
- October 2015 1st Workshop on Applied Geometric Algorithms
Langbroek, The Netherlands

Research Visits

- February 2020 Erin Chambers, Saint Louis University
- January 2020 Bettina Speckmann, TU Eindhoven
- September 2019 Bettina Speckmann, TU Eindhoven
- October 2018 Bettina Speckmann, TU Eindhoven
- August 2016 Erin Chambers, Saint Louis University

Invited Talks

- June 2022 To Be Announced
Mini-Symposium on Graphs Embedded on Surfaces
- 17 February 2020 Continuous Hausdorff Distance and its Computation
Saint Louis University
- 21 January 2020 Continuous Hausdorff Distance and its Computation
TU Eindhoven
- 6 July 2017 Computing the Fréchet Distance between Real-Valued Surfaces
6th Mini-Symposium on Computational Topology

Talks

- 20 September 2019 Homotopy Height, Grid-Major Height and Graph-Drawing Height
27th Symposium on Graph Drawing and Network Visualization (GD)
- 21 June 2019 Convex Polygons in Cartesian Products
35th Symposium on Computational Geometry (SoCG)
- 9 January 2019 SETH Says: Weak Fréchet Distance is Faster, but only if it is Continuous and in One Dimension
30th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)
- 23 March 2018 On Convex Polygons in Cartesian Products
34th European Workshop on Computational Geometry (EuroCG)
- 8 January 2018 On the Complexity of Optimal Homotopies
29th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)
- 4 September 2017 Computing Optimal Homotopies over a Spiked Plane with Polygonal Boundary
25th European Symposium on Algorithms (ESA)
- 28 July 2017 Data Structures for Fréchet Queries in Trajectory Data
29th Canadian Conference on Computational Geometry (CCCG)
- 27 June 2017 Sweeping Surfaces using Short Curves
Computational & Algorithmic Topology (CATS)
- 5 April 2017 Fréchet Isotopies to Monotone Curves
33rd European Workshop on Computational Geometry (EuroCG)
- 19 January 2017 Computing the Fréchet Distance between Real-Valued Surfaces
28th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)
- 9 June 2016 The Complexity of Snake
8th International Conference on Fun with Algorithms (FUN)
- 1 April 2016 Computing the Fréchet Distance between Real-Valued Surfaces
32nd European Workshop on Computational Geometry (EuroCG)
- 14 September 2015 Computing the Similarity Between Moving Curves
23rd European Symposium on Algorithms (ESA)
- 18 March 2015 Computing the Similarity Between Moving Curves
31st European Workshop on Computational Geometry (EuroCG)

Publications

Journals

- **Constructing monotone homotopies and sweepouts**
E. Chambers, G. R. Chambers, A. de Mesmay, T. Ophelders, and R. Rotman
Journal of Differential Geometry (JDG), (to appear).
- **A Note on Equitable Hamiltonian Cycles**
T. Ophelders, R. Lambers, F. Spieksma, and T. Vredeveld
Discrete Applied Mathematics (DAM), (to appear).
- **The Shape of Things to Come: Topological Data Analysis and Biology, from Molecules to Organisms**
E. Amézquita, M. Quigley, T. Ophelders, L. Munch, and D. Chitwood
Journal Developmental Dynamics (Dev Dyn), 248(7), pp. 816–833, 2020.
- **Geometry and Topology of Estuary and Braided River Channel Networks Automatically Extracted from Topographic Data**
M. Hiatt, W. Sonke, E. Addink, W. van Dijk, M. van Kreveld, T. Ophelders, K. Verbeek, J. Vlaming, B. Speckmann, and M. Kleinmans
Journal of Geophysical Research: Earth Surface (JGRES), 125(1):e2019JF005206, 2020.
- **Computing Representative Networks for Braided Rivers**
M. Kleinmans, M. van Kreveld, T. Ophelders, W. Sonke, B. Speckmann, and K. Verbeek
Journal of Computational Geometry (JoCG), pp. 423–443, 2019.
- **The Complexity of Snake and Undirected NCL Variants**
M. De Biasi and T. Ophelders
Theoretical Computer Science (TCS), 748, pp. 55–65, 2018.
(Special issue of TCS devoted to FUN 2016)
- **Computing the Similarity Between Moving Curves**
K. Buchin, T. Ophelders, and B. Speckmann
Computational Geometry - Theory and Applications (CGTA), 73, pp. 2–14, 2018.
(Special issue of CGTA devoted to EuroCG 2015)
- **Visual Analytics of Delays and Interaction in Movement Data**
M. Konzack, T. J. McKetterick, T. Ophelders, M. Buchin, L. Giuggioli, J. Long, T. Nelson, M. A. Westenberg, and K. Buchin
International Journal of Geographical Information Science (IJGIS), 31(2), pp. 320–345, 2017.

Formally Reviewed Conference Proceedings

- **Volume from Outlines on Terrains**
M. van Kreveld, T. Ophelders, W. Sonke, B. Speckmann, and K. Verbeek
Proc. 11th International Conference on Geographic Information Science (GIScience), pp. 16:1-16:15, 2021.
- **Between Shapes, Using the Hausdorff Distance**
M. van Kreveld, T. Miltzow, T. Ophelders, W. Sonke, and J. L. Vermeulen
Proc. 31st International Symposium on Algorithms and Computation (ISAAC), pp. 13:1-13:16, 2020.
- **Route-preserving Road Network Generalization**
M. van de Kerkhof, I. Kostitsyna, M. van Kreveld, M. Löffler, and T. Ophelders
Proc. 28th International Conference on Advances in Geographic Information Systems, (SIGSPATIAL), pp. 381-384, 2020.
(Winner of the Best Poster Award)
- **Planar Emulators for Monge Matrices**
H.-C. Chang and T. Ophelders
Proc. 32nd Canadian Conference on Computational Geometry (CCCG), pp. 141-147, 2020.

- **Homotopy Height, Grid-Major Height and Graph-Drawing Height**
T. Biedl, E. Chambers, D. Eppstein, A. de Mesmay, T. Ophelders
Proc. 27th Symposium on Graph Drawing and Network Visualization (GD), pp. 468-481, 2019.
- **Convex Polygons in Cartesian Products**
J. L. De Carufel, A. Dumitrescu, W. Meulemans, T. Ophelders, C. Pennarun, C. D. Tóth, S. Verdonshot
Proc. 35th Annual Symposium on Computational Geometry (SoCG), pp. 22:1-22:17, 2019.
- **Topological Mapper for 3D Volumetric Images**
D. H. Chitwood, M. Eithun, E. Munch, and T. Ophelders
Proc. 14th International Symposium on Mathematical Morphology (ISMM), pp. 84-95, 2019.
- **SETH Says: Weak Fréchet Distance is Faster, but only if it is Continuous and in One Dimension**
K. Buchin, T. Ophelders, and B. Speckmann
Proc. 30th Annual Symposium on Discrete Algorithms (SODA), pp. 2887-2901, 2019.
- **Volume-based Similarity of Linear Features on Terrains**
W. Sonke, M. van Kreveld, T. Ophelders, B. Speckmann, K. Verbeek
Proc. 26th International Conference on Advances in Geographic Information Systems (SIGSPATIAL), pp. 444-447, 2018.
- **On the Complexity of Optimal Homotopies**
E. Chambers, A. de Mesmay, and T. Ophelders
Proc. 29th Annual Symposium on Discrete Algorithms (SODA), pp. 1121-1134, 2018.
- **Computing Optimal Homotopies over a Spiked Plane with Polygonal Boundary**
B. A. Burton, E. Chambers, M. van Kreveld, W. Meulemans, T. Ophelders, and B. Speckmann
Proc. 25th Annual European Symposium on Algorithms (ESA), pp. 23:1-23:14, 2017.
- **Data Structures for Fréchet Queries in Trajectory Data**
M. de Berg, A. D. Mehrabi, and T. Ophelders
Proc. 29th Canadian Conference on Computational Geometry (CCCG), pp. 214-219, 2017.
- **Computing Representative Networks for Braided Rivers**
M. Kleinhan, M. van Kreveld, T. Ophelders, W. Sonke, B. Speckmann, and K. Verbeek
Proc. 33rd International Symposium on Computational Geometry (SoCG), pp. 48:1-48:16, 2017.
- **Computing the Fréchet Distance between Real-Valued Surfaces**
K. Buchin, T. Ophelders, and B. Speckmann
Proc. 28th Annual Symposium on Discrete Algorithms (SODA), pp. 2443-2455, 2017.
- **The Complexity of Snake**
M. De Biasi and T. Ophelders
Proc. 8th International Conference on Fun with Algorithms (FUN), pp. 11:1-11:13, 2016.
- **Computing the Similarity Between Moving Curves**
K. Buchin, T. Ophelders, and B. Speckmann
Proc. 23rd Annual European Symposium on Algorithms (ESA), pp. 928-940, 2015.

Weakly Refereed Conference Proceedings and Workshop Abstracts

- **The Continuous Hausdorff Distance and its Computation**
T. Ophelders
Poster at Algebraic Topology: Methods, Computation, and Science (ATMCS), 2020.
- **Quantifying barley morphology using the Euler characteristic curves**
E. Amezcuita, D. Chitwood, L. Munch, T. Ophelders, and M. Quigley
Poster at Algebraic Topology: Methods, Computation, and Science (ATMCS), 2020.
- **Between Two Shapes, Using the Hausdorff Distance**
M. van Kreveld, T. Miltzow, T. Ophelders, W. Sonke, and J. Vermeulen
Abstr. 36th European Workshop on Computational Geometry (EuroCG), pp. 52:1-42:7, 2020.

- **Improved data structures for Fréchet distance queries**
M. Buchin, I. van der Hoog, T. Ophelders, L. Schlipf, R. Silveira, and F. Staals
Abstr. 36th European Workshop on Computational Geometry (EuroCG), pp. 65:1-65:7, 2020.
- **Fréchet Distance Data Structures**
M. Buchin, I. van der Hoog, T. Ophelders, L. Schlipf, R. Silveira, and F. Staals
Report from Dagstuhl Seminar 19352, p. 90, 2019.
- **Combinatorial Homotopies**
E. Chambers, H.-C. Chang, V. Despré, L. Kleist, F. Lazarus, A. Lubiw, T. Ophelders, H. Parlier, S. Schleimer, S. Tillmann, B. Vogtenhuber, and C. Wenk
Report from Dagstuhl Seminar 19352, pp. 94-95, 2019.
- **Minimum Area Homotopies**
H-C. Chang, E. Chambers, V. Despré, F. Lazarus, A. Lubiw, T. Ophelders, H. Parlier, and C. Wenk
Report from Dagstuhl Seminar 19352, pp. 101-102, 2019.
- **Nice Morphs and Isotopic Fréchet Distance**
E. Chambers, V. Despré, L. Kleist, M. Löffler, A. Lubiw, T. Ophelders, H. Parlier, S. Tillmann, B. Vogtenhuber, and C. Wenk
Report from Dagstuhl Seminar 19352, pp. 103-105, 2019.
- **Kinetic Volume-Based Persistence for 1D Terrains**
T. Ophelders, W. Sonke, B. Speckmann, and K. Verbeek
Abstr. 35th European Workshop on Computational Geometry (EuroCG), pp. 38:1-38:7, 2019.
- **A KDS for Discrete Morse-Smale Complexes**
T. Ophelders, W. Sonke, B. Speckmann, and K. Verbeek
Abstr. Computational Geometry: Young Researchers Forum (CG:YRF), pp. 3:1-3:2, 2018.
- **On Convex Polygons in Cartesian Products**
J.-L. De Carufel, A. Dumitrescu, W. Meulemans, T. Ophelders, C. Pennarun, C. Tóth, and S. Verdonshot
Abstr. 34th European Workshop on Computational Geometry (EuroCG), pp. 39:1-39:6, 2018.
- **Homotopy Height**
B. A. Burton, E. Chambers, M. van Kreveld, W. Meulemans, T. Ophelders, and B. Speckmann
Report from Dagstuhl Seminar 17072, pp. 74-76, 2017.
- **Fréchet Isotopies to Monotone Curves**
K. Buchin, E. Chambers, T. Ophelders, and B. Speckmann
Abstr. 33rd European Workshop on Computational Geometry (EuroCG), pp. 41-44, 2017.
- **Computing Representative Networks for Braided Rivers**
M. Kleinhans, M. van Kreveld, T. Ophelders, W. Sonke, B. Speckmann, and K. Verbeek
Abstr. 33rd European Workshop on Computational Geometry (EuroCG), pp. 45-48, 2017.
- **Computing Wave Impact in Self-Organised Mussel Beds**
J. van de Koppel, M. Löffler, and T. Ophelders
Abstr. 33rd European Workshop on Computational Geometry (EuroCG), pp. 169-172, 2017.
- **Computing the Fréchet Distance between Real-Valued Surfaces**
K. Buchin, T. Ophelders, and B. Speckmann
Abstr. 32nd European Workshop on Computational Geometry (EuroCG), pp. 239-242, 2016.
- **Detecting Interactions given Trajectory Information**
S. Dodge, B. T. Fasy, T. Ophelders, N. Ouellette, and K. Verbeek
Report from Dagstuhl Seminar 16022, p. 64, 2016.
- **Mussel Bed Connectivity and its Influence on Survival**
J. van de Koppel, M. Löffler, and T. Ophelders
Report from Dagstuhl Seminar 16022, p. 66, 2016.
- **Computing the Similarity Between Moving Curves**
K. Buchin, T. Ophelders, and B. Speckmann
Abstr. 31st European Workshop on Computational Geometry (EuroCG), pp. 208-211, 2015.

Theses

- **Continuous Similarity Measures for Curves and Surfaces**
Tim Ophelders
PhD thesis, TU Eindhoven, 2018.
- **Algorithms for Comparing Moving Complex Shapes**
Tim Ophelders
Master's thesis, TU Eindhoven, 2014.