

Willem Diepeveen

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[in willem-diepeveen](#) | [G wdiepeveen](#) | [TW WillemDiepev1](#)

EDUCATION

- **PhD Mathematics** Oct 2020 - June 2024
University of Cambridge Cambridge, UK
 - Thesis: Riemannian Geometry for Inverse Problems in Cryogenic Electron Microscopy
 - Advisor: Carola-Bibiane Schönlieb. Examiners: Martin Rumpf, Matthew Colbrook
- **MSc Applied Mathematics and MSc Scientific Computing** Sept 2018 - Sept 2020
TU Delft & TU Berlin (double degree 140 ECTS) Delft, Netherlands & Berlin, Germany
 - GPA Delft: 8.9/10 (cum laude), GPA Berlin: 1.3/6
- **BSc Applied Mathematics and BSc Applied Physics** Sept 2014 - Aug 2017
TU Delft (double degree 218 ECTS) Delft, Netherlands
 - GPA: 9.1/10 (cum laude 2x)

EXPERIENCE

- **Hedrick Assistant Adjunct Professor in Computational and Applied Mathematics** July 2024 - present
Department of Mathematics, University of California, Los Angeles Los Angeles, CA, USA
 - Mentors: Deanna Needell & Andrea Bertozzi
- **Visiting Postdoctoral Fellow** July 2025 - Sept 2025
John A. Paulson School of Engineering and Applied Sciences, Harvard Cambridge, MA, USA
 - Host: Melanie Weber
- **Visiting PhD Student** Jan 2023 - Mar 2023
Department of Mathematics, University of California, Los Angeles Los Angeles, CA, USA
 - Host: Andrea Bertozzi
- **IPAM Fellow** Oct 2022 - Dec 2022
Institute for Pure and Applied Mathematics (IPAM) Los Angeles, CA, USA
 - Long Program: Computational Microscopy (Fall 2022)
- **Visiting Master Student** Mar 2020 - Aug 2020
Institute of Mathematics and Image Computing, University of Lübeck Lübeck, Germany
 - Host: Jan Lellmann

GRANTS & RESEARCH SUPPORT

Current

- **AMS Simons Travel Grant (PI), \$5000 (share 100%)** July 2025 - June 2027
Title: Riemannian Geometry for Interpretable Machine Learning

PUBLICATIONS

[Google Scholar](#)

Submitted and Working papers

- [1] Willem Diepeveen and Deanna Needell. “Riemannian Archetypal Analysis: Interpretable non-linear data analysis on deformed star distributions”. Under review at JMLR. 2026.
- [2] Willem Diepeveen and Oscar Leong. “Riemannian AmbientFlow: Towards Simultaneous Manifold Learning and Generative Modeling from Corrupted Data”. Under review at SIIMS. 2026.
- [3] Willem Diepeveen and Melanie Weber. “Iso-Riemannian Optimization on Learned Data Manifolds”. Preprint. 2025.
- [4] Willem Diepeveen and Deanna Needell. “Manifold Learning with Normalizing Flows: Towards Regularity, Expressivity and Iso-Riemannian Geometry”. Under review at SIMODS. 2025.
- [5] Joyce Chew, Willem Diepeveen, and Deanna Needell. “Curvature Corrected Nonnegative Manifold Data Factorization”. Preprint. 2025.
- [6] Willem Diepeveen. “Pulling Back Symmetric Riemannian Geometry for Data Analysis”. Under review at SIMODS. 2024.

Journal Articles

- [7] Willem Diepeveen, Jon Schwenk, and Andrea L. Bertozzi. “Latent Diffeomorphic Dynamic Mode Decomposition”. In: *Applied Mathematics Letters* 172 (2026), p. 109701. ISSN: 0893-9659.
- [8] Willem Diepeveen, Joyce Chew, and Deanna Needell. “Curvature-corrected Tangent Space-based Approximation of Manifold-valued Data”. In: *Information and Inference: A Journal of the IMA* 14.4 (2025), iaaf031. ISSN: 2049-8772.
- [9] Willem Diepeveen, Carlos Esteve-Yagüe, Jan Lellmann, Ozan Öktem, and Carola-Bibiane Schönlieb. “Riemannian Geometry for Efficient Analysis of Protein Dynamics Data”. In: *Proceedings of the National Academy of Sciences* 121.33 (2024), e2318951121.
- [10] Willem Diepeveen, Jan Lellmann, Ozan Öktem, and Carola-Bibiane Schönlieb. “Regularizing Orientation Estimation in Cryogenic Electron Microscopy Three-Dimensional Map Refinement through Measure-Based Lifting over Riemannian Manifolds”. In: *SIAM Journal on Imaging Sciences* 16.3 (2023), pp. 1440–1490.
- [11] Carlos Esteve-Yagüe, Willem Diepeveen, Ozan Öktem, and Carola-Bibiane Schönlieb. “Spectral Decomposition of Atomic Structures in Heterogeneous Cryo-EM”. In: *Inverse Problems* 39.3 (2022), p. 034003.
- [12] Willem Diepeveen and Jan Lellmann. “An Inexact Semismooth Newton Method on Riemannian Manifolds with Application to Duality-Based Total Variation Denoising”. In: *SIAM Journal on Imaging Sciences* 14.4 (2021), pp. 1565–1600.

Conference Papers

- [13] Willem Diepeveen, Georgios Batzolis, Zakhar Shumaylov, and Carola-Bibiane Schönlieb. “Score-based Pullback Riemannian Geometry: Extracting the Data Manifold Geometry using Anisotropic Flows”. In: *Forty-second International Conference on Machine Learning*. 2025.
- [14] Friso de Kruiff, Erik J Bekkers, Ozan Öktem, Carola-Bibiane Schönlieb, and Willem Diepeveen. “Pullback Flow Matching on Data Manifolds”. In: *ICML 2025 Generative AI and Biology (GenBio) Workshop*. 2025.
- [15] Jonathan Krook, Willem Diepeveen, and Ozan Öktem. “Direct Atomistic Reconstruction in Homogeneous Cryo-EM Using Protein Geometry Regularization”. In: *International Conference on Scale Space and Variational Methods in Computer Vision*. Springer. 2025, pp. 173–184.
- [16] Victor Prins, Willem Diepeveen, Erik J Bekkers, and Ozan Öktem. “Physics-informed Geometric Regularization of Heterogeneous Reconstructions in Cryo-EM”. In: *ICLR 2024 Workshop on generative and Experimental Perspectives for Biomolecular Design*. 2024.

TALKS (RECENT)

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| • Invited Talk, MOPTA
<i>Mini-symposium</i> | Aug 2026
Bethlehem, PA, USA |
| • Contributed Talk, SIAM Conference on Optimization
<i>Mini-symposium</i> | June 2026
Edinburgh, UK |
| • Invited Talk, Mini-Workshop on Approximation of Manifold-Valued Functions
<i>Workshop</i> | Dec 2025
Oberwolfach, Germany |
| • Contributed Talk, Southern California Applied Mathematics Symposium
<i>Workshop</i> | April 2025
Riverside, CA, USA |
| • Contributed Talk, Mathematics of Data, Dynamics and Life Sciences
<i>Workshop</i> | Mar 2025
Irvine, CA, USA |
| • Invited Seminar, University of British Columbia
<i>Host: Khanh Dao Duc</i> | Nov 2023
Virtual |
| • Invited Seminar, KTH
<i>Host: Ozan Öktem</i> | Nov 2023
Virtual |
| • Invited Talk, International Congress on Industrial and Applied Mathematics
<i>Mini-symposium</i> | Aug 2023
Tokyo, Japan |
| • Invited Talk, Applied Inverse Problems Conference
<i>Mini-symposium</i> | Sept 2023
Göttingen, Germany |

TEACHING

- **Machine Learning (Undergraduate)**

Math 156, Instructor, University of California, Los Angeles

- Fall 2025

- **Optimization (Undergraduate)**

Math 164, Instructor, University of California, Los Angeles

- Fall 2024, Spring 2025, Spring 2026

- **Calculus of Several Variables (Undergraduate)**

Math 32B, Instructor, University of California, Los Angeles

- Winter 2025, Winter 2026

- **Mathematics of Deep Learning (Graduate)**

Part III, Co-Instructor, University of Cambridge

- Easter 2023, Lent 2024

MENTORING

PhD Students

- **Joyce Chew, Mathematics**

University of California, Los Angeles

- Research: Decomposition of Manifold-valued Data
- Co-advisor: Deanna Needell (UCLA)

Mar 2023 - June 2025

- **Jonathan Krook, Mathematics**

KTH

- Research: Riemannian Geometry for Cryo-EM Reconstruction
- Co-advisor: Ozan Öktem (KTH)

Dec 2023 - Jan 2025

MSc Students

- **Honglei Brinkmann, Mathematics**

University of Aachen

- Research: Pullback Manifold Learning
- Co-advisors: Georgios Batzolis (Cambridge)

Dec 2025 - present

- **Lucas Ng, Engineering**

University of Cambridge

- Research: Pullback Manifold Learning
- Co-advisors: Georgios Batzolis (Cambridge)

Dec 2025 - present

- **Friso de Kruiff, Mathematics & Scientific Computing**

KTH

- Research: Generative Modeling on Pullback Manifolds
- Co-advisors: Ozan Öktem (KTH), Erik Bekkers (UvA)

Jan 2024 - Aug 2024

- **Jan Kociniak, Computer Science**

University of Amsterdam

- Research: Learning Riemannian Geometry through Normal Neural Fields
- Co-advisor: Erik Bekkers (UvA)

Nov 2023 - July 2024

- **Victor Prins, Computer Science**

University of Amsterdam

- Research: Riemannian Geometric Regularized Machine Learning in Cryo-EM Reconstruction
- Co-advisors: Ozan Öktem (KTH), Erik Bekkers (UvA)

Nov 2022 - July 2023

Undergraduate Students

- **Zihao Sun, Mathematics** July 2026 - present
UCLA
 - Research: Geometry of Language
- **Ryan Zhou, Mathematics** Oct 2025 - present
Harvard University
 - Research: Iso-Riemannian Optimization on Learned Data Manifolds
 - Co-advisor: Melanie Weber (Harvard)
- **Daniel Kaddaj, Mathematics** July 2022 - Aug 2022
University of Cambridge
 - Research: Sampling on Riemannian Manifolds
 - Co-advisor: Randolph Altmeyer (Cambridge)

PROFESSIONAL COMMUNITY SERVICE AND OUTREACH

University Service

- **Organizer Mathematics of Information Seminar** Jan 2022 - June 2022
Faculty of Mathematics, University of Cambridge Cambridge, UK
- **Board of Studies Member** Sept 2017 - Aug 2018
Department of Applied Physics, TU Delft Delft, Netherlands

Service to Professional Organizations

- **Organizer Mini-symposium at SIAM Conference on Optimization (SIOP26)** June 2026
Organized "Optimization with Learned Geometric Structure" with Melanie Weber (Harvard) Edinburgh, UK
- **Member of the Inverse Problems Young Academy** July 2025 - present
Participated in initiatives to promote inverse problem research, including seminar organization. Remote

Outreach

- **Internship Social Coordinator for the Philippa Fawcett and Open internship Programs** July 2023 - Aug 2023
Organized activities for women and non-binary students in mathematics Cambridge, UK

Open Source Service

- **Software Developer for Manopt.jl** June 2022 - July 2022
Promoted accessibility of scientific open source software for manifold-valued data processing Remote

Technical Reviewing

Journals: SIAM Journal on Imaging Sciences, Journal of Scientific Computing, IMA Journal of Numerical Analysis

Conferences: International Conference on Learning Representations (ICLR), Sampling Theory and Applications (SAMPTA)