Hsueh-Ti Derek Liu

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Curriculum Vitæ

Research/Academic Positions

Senior Research Scientist 2024 - Present
Roblox Inc., Vancouver, Canada

Adjunct Professor 2023 - Present
The University of British Columbia, Vancouver, Canada

Research Scientist 2022 - 2024
Roblox Inc., Vancouver, Canada

Education

University of Toronto 2017 - 2022
PhD, Computer Science
Advisor: Alec Jacobson

Carnegie Mellon University 2015 - 2017
MS, Mechanical Engineering
Advisors: Levent Burak Kara, Keenan Crane

National Taiwan University 2010 - 2014
BS, Engineering Science and Ocean Engineering

Publications

1. Kinematic Kitbashing 2026
   Minghao Guo, Victor Zordan, Sheldon Andrews, Wojciech Matusik, Maneesh Agrawala, **Hsueh-Ti Derek Liu**
   ACM SIGGRAPH

2. Solid-Shell Labeling for Discrete Surfaces 2025
   Siqi Wang, Janos Meny, Izak Grguric, Mehdi Rahimzadeh, Denis Zorin, Daniele Panozzo, **Hsueh-Ti Derek Liu**
   ACM SIGGRAPH Asia

3. Simplifying Textured Triangle Meshes in the Wild 2025
   Hsueh-Ti Derek Liu, Xiaoting Zhang, Cem Yuksel
   ACM SIGGRAPH Asia

4. CageNet: A Meta-Framework for Learning on Wild Meshes 2025
   Michal Edelstein, **Hsueh-Ti Derek Liu**, Mirela Ben-Chen
   ACM SIGGRAPH

5. Designing 3D Anisotropic Frame Fields with Odeco Tensors 2025
Haikuan Zhu, Hongbo Li, **Hsueh-Ti Derek Liu**, Wenping Wang, Jing Hua, Zichun Zhong
ACM SIGGRAPH

6. Level-of-Detail for Geometry Processing and Simulation 2025
Jiayi Eris Zhang, **Hsueh-Ti Derek Liu**
ACM SIGGRAPH Course

7. Controlling Quadric Error Simplification with Line Quadrics 2025
Hsueh-Ti Derek Liu, Mehdi Rahimzadeh, Victor Zordan
Eurographics Symposium on Geometry Processing (SGP)

8. Cube: A Roblox View of 3D Intelligence 2025
Roblox
Technical Report

9. Trust-Region Eigenvalue Filtering for Projected Newton 2024
Honglin Chen, **Hsueh-Ti Derek Liu**, Alec Jacobson, David I.W. Levin, Changxi Zheng
ACM SIGGRAPH Asia

10. Actuators Á La Mode: Modal Actuations for Soft Body Locomotion 2024
Otman Benchekroun, Kaixiang Xie, **Hsueh-Ti Derek Liu**, Eitan Grinspun, Sheldon Andrews, Victor Zordan
ACM SIGGRAPH Asia

11. An Intrinsic Vector Heat Network 2024
Alexander Gao, Maurice Chu, Mubbasir Kapadia, Ming Lin, **Hsueh-Ti Derek Liu**
ICML

12. Stabler Neo-Hookean Simulation: Absolute Eigenvalue Filtering for Projected Newton 2024
Honglin Chen, **Hsueh-Ti Derek Liu**, David I.W. Levin, Changxi Zheng, Alec Jacobson
ACM SIGGRAPH

13. A Unified Differentiable Boolean Operator With Fuzzy Logic 2024
Hsueh-Ti Derek Liu, Maneesh Agrawala, Cem Yuksel, Tim Omernick, Vinith Misra, Stefano Corazza, Morgan McGuire, Victor Zordan
ACM SIGGRAPH

14. Constructive Solid Geometry on Neural Signed Distance Fields 2023
Zoë Marschner, Silvia Sellán, **Hsueh-Ti Derek Liu**, Alec Jacobson
ACM SIGGRAPH Asia

15. Differentiable Heightfield Path Tracing with Accelerated Discontinuities 2023
Xiaochun Tong, **Hsueh-Ti Derek Liu**, Yotam Gingold, Alec Jacobson
ACM SIGGRAPH

16. Surface Simplification using Intrinsic Error Metrics 2023
Hsueh-Ti Derek Liu, Mark Gillespie, Benjamin Chislett, Nicholas Sharp, Alec Jacobson, Keenan Crane
ACM SIGGRAPH

17. Learning Smooth Neural Functions via Lipschitz Regularization 2022
Hsueh-Ti Derek Liu, Francis Williams, Alec Jacobson, Sanja Fidler, Or Litany
ACM SIGGRAPH

18. Kubric: A scalable dataset generator 2022
Klaus Greff, Francois Belletti, Lucas Beyer, Carl Doersch, Yilun Du, Daniel Duckworth, David J. Fleet, Dan Gnanapragasam, Florian Golemo, Charles Herrmann, Thomas Kipf, Abhijit Kundu, Dmitry Lagun, Issam Laradji, **Hsueh-Ti Derek Liu**, Henning Meyer, Yishu Miao, Derek Nowrouzezahrai, Cengiz Oztireli, Etienne Pot, Noha Radwan, Daniel Rebain, Sara Sabour, Mehdi S. M. Sajjadi, Matan Sela, Vincent Sitzmann, Austin Stone, Deqing Sun, Suhani Vora, Ziyu Wang, Tianhao Wu, Kwang Moo Yi, Fangcheng Zhong, Andrea Tagliasacchi
CVPR

19. Surface Multigrid via Intrinsic Prolongation 2021
Hsueh-Ti Derek Liu, Jiayi Eris Zhang, Mirela Ben-Chen, Alec Jacobson
ACM SIGGRAPH

20. Normal-Driven Spherical Shape Analogies 2021
Hsueh-Ti Derek Liu, Alec Jacobson
Eurographics Symposium on Geometry Processing (SGP)

21. Chordal Decomposition for Spectral Coarsening 2020
Honglin Chen, **Hsueh-Ti Derek Liu**, Alec Jacobson, David I.W. Levin
ACM SIGGRAPH Asia

22. Neural Subdivision 2020
Hsueh-Ti Derek Liu, Vladimir G. Kim, Siddhartha Chaudhuri, Noam Aigerman, Alec Jacobson
ACM SIGGRAPH

23. Spectral Mesh Simplification 2020
Thibault Lescoat, **Hsueh-Ti Derek Liu**, Jean-Marc Thiery, Alec Jacobson, Tamy Boubekeur, Maks Ovsjanikov
Eurographics

24. Cubic Stylization 2019
Hsueh-Ti Derek Liu, Alec Jacobson
ACM SIGGRAPH Asia

25. Spectral Coarsening of Geometric Operators 2019
Hsueh-Ti Derek Liu, Alec Jacobson, Maks Ovsjanikov
ACM SIGGRAPH

26. Beyond Pixel Norm-Balls: Parametric Adversaries using an Analytically Differentiable Renderer 2019
Hsueh-Ti Derek Liu, Michael Tao, Chun-Liang Li, Derek Nowrouzezahrai, Alec Jacobson
ICLR

27. Paparazzi: Surface Editing by way of Multi-View Image Processing 2018
Hsueh-Ti Derek Liu, Michael Tao, Alec Jacobson
ACM SIGGRAPH Asia

28. A Dirac Operator for Extrinsic Shape Analysis 2017
Hsueh-Ti Derek Liu, Alec Jacobson, Keenan Crane
Eurographics Symposium on Geometry Processing (SGP)

Awards

Eurographics PhD Thesis Award	2022
The Alain Fournier Dissertation Award	2022
Robert E. Lansdale / Okino Computer Graphics Graduate Fellowship	2020, 2021
Adobe Research Fellowship	2020
Mary H. Beatty Fellowship	2019
Mitacs Globalink Research Award	2018

Conference Talks

1. ACM SIGGRAPH, Los Angeles, United States — August 2023
   Surface Simplification using Intrinsic Error Metrics
2. Graphics Interface, Victoria, Canada — June 2023
   Algorithms for Data-Driven Geometric Stylization & Acceleration
3. ACM SIGGRAPH, Vancouver, Canada — August 2022
   Learning Smooth Neural Functions via Lipschitz Regularization
4. ACM SIGGRAPH (Labs Demo), Vancouver, Canada — August 2022
   Learning Smooth Neural Functions via Lipschitz Regularization
5. ACM SIGGRAPH, Virtual — August 2021
   Surface Multigrid via Intrinsic Prolongation
6. Symposium on Geometry Processing, Virtual — July 2021
   Normal-Driven Spherical Shape Analogies
7. EUROGRAPHICS, Virtual — May 2021
   3D Modeling for Everyone
8. ACM SIGGRAPH, Virtual — August 2020
   Neural Subdivision
9. ACM SIGGRAPH Asia, Brisbane, Australia — November 2019
   Cubic Stylization
10. ACM SIGGRAPH, Los Angeles, United States — August 2019
    Spectral Coarsening of Geometric Operators
11. Graphics Interface, Kingston, Canada — May 2019
    Spectral Coarsening of Geometric Operators
12. International Conference on Learning Representation, New Orleans, United States — May 2019
    Beyond Pixel Norm-Balls: Parametric Adversaries using an Analytically Differentiable Renderer
13. ACM SIGGRAPH Asia, Tokyo, Japan — December 2018
    Paparazzi: Surface Editing by way of Multi-View Image Processing
14. ACM SIGGRAPH Asia (Doctoral Consortium), Tokyo, Japan — December 2018
    Operator-Preserving Algebraic Coarsening

15. Symposium on Geometry Processing, London, United Kingdom — July 2017
A Dirac Operator for Extrinsic Shape Analysis

Research Experiences

1. *Consultant* — December 2021 - August 2022
Urus Entertainment, Burbank, United States

2. *Research Intern* — July 2021 - September 2021
NVIDIA AI, Toronto, Canada
Mentor: Sanja Fidler

3. *Research Intern* — February 2021 - April 2021
NVIDIA AI, Toronto, Canada
Mentor: Sanja Fidler

4. *Research Intern* — June 2019 - August 2019
Adobe Research, Seattle, United States
Mentors: Noam Aigerman, Siddhartha Chaudhuri, Vova Kim

5. *Visiting Researcher* — June 2018 - January 2019
École Polytechnique, Palaiseau, France
Mentor: Maks Ovsjanikov

Invited Talks

1. Simon Fraser University — November 2024
Differentiable Constructive Solid Geometry and Fuzzy Logic

2. University of British Columbia — October 2023
Level of Detail for Geometry Computation

3. International Conference on Machine Learning — July 2023
Geometric Learning on Discrete Surface Meshes

4. Brown University — November 2022
Generative Models for Stylized Geometry

5. Simon Fraser University — November 2022
Generative Models for Stylized Geometry

6. Adobe Research — October 2022
Learning Smooth Neural Functions via Lipschitz Regularization

7. Technion - Israel Institute of Technology — July 2022
3D Content Creation Made Fast & Easy

8. Talking Papers Podcast — May 2022
Learning Smooth Neural Functions via Lipschitz Regularization

9. Roblox — April 2022
3D Content Creation Made Fast & Easy

10. McGill — March 2022
3D Content Creation Made Fast & Easy

11. Amazon — March 2022
3D Content Creation Made Fast & Easy

12. Toronto Geometry Colloquium — March 2022
3D Content Creation Made Fast & Easy

13. Université de Montréal — February 2022
3D Content Creation Made Fast & Easy

14. Massachusetts Institute of Technology — May 2021
Towards Scalable Geometry Processing

15. Autodesk AI — March 2021
Generative Models for Stylized Geometry

16. NVIDIA AI, Toronto — October 2020
3D Modeling for Everyone

17. GAMES, China — September 2020
3D Modeling for Everyone

18. TOMOGRAPH, Waterloo, ON — December 2019
Neural Subdivision

19. Autodesk Research, Toronto, ON — November 2019
Cubic Stylization

20. Adobe Research, Seattle, WA — August 2019
Spectral Coarsening of Geometric Operator

21. University of Washington, Seattle, WA — July 2019
Spectral Coarsening of Geometric Operators

22. Fields Institute, Toronto, ON — May 2019
Paparazzi: Surface Editing by way of Multi-View Image Processing

23. Vector Institute, Toronto, ON — March 2019
Beyond Pixel Norm-Balls: Parametric Adversaries using an Analytically Differentiable Renderer

24. École Polytechnique, Palaiseau, France — October 2018
Paparazzi: Surface Editing by way of Multi-View Image Processing

25. Google — August 2018
A Differentiable Renderer for Image-Driven Shape Optimization

26. École Polytechnique, Palaiseau, France — July 2018
A Differentiable Renderer for Image-Driven Shape Optimization

27. University of Toronto, Toronto, ON — April 2017
From Intrinsic to Extrinsic Shape Analysis

Teaching

1. University of British Columbia: CPSC 524 Computer Graphics: Modelling 2025
   Guest Lecture: A More Than Introduction to Progressive Meshes
2. University of British Columbia: CPSC 314 Computer Graphics 2025
   Guest Lecture: Introduction to Neural Implicit Shape Representations
3. University of British Columbia: CPSC 524 Computer Graphics: Modelling 2024
   Guest Lecture: Convolution on Discrete Surfaces
4. University of British Columbia: CPSC 314 Computer Graphics 2023
   Guest Lecture: Introduction to Geometric Modeling
5. Summer Geometry Institute July 2022
   Shape Deformation
6. SIGGRAPH August 2021
   An Introduction to Deep Learning on Meshes
7. Symposium on Geometry Processing July 2021
   An Introduction to Geometry Processing Programming in MATLAB with gptoolbox
8. Summer Geometry Institute July 2021
   Shape Deformation
9. University of Toronto: CSC2520 Geometry Processing 2021
   Guest Lecture: Convolution on Discrete Surfaces
10. University of Toronto: CSC2521 Seminar in Geometry and Animation 2020
    Guest Lecture: Convolution on Discrete Surfaces

Professional Activities

Toronto Geometry Colloquium `https://toronto-geometry-colloquium.github.io`
Co-organizing a weekly webseries to promote young researchers and researchers from underrepresented communities.

Program Committees
ACM SIGGRAPH, ACM SIGGRAPH Asia, Eurographics, Pacific Graphics, Shape Modelling International, Graphics Interface

Reviewer
ACM SIGGRAPH, ACM SIGGRAPH Asia, ACM Symposium on User Interface Software and Technology, ACM Transactions on Graphics, Computer-Aided Design, Computer Animation and Virtual Worlds, Computer Graphics and Applications, Computer Graphics Forum, CVPR, Eurographics, Graphics Interface, IEEE Transactions on Visualization and Computer Graphics, Pacific Graphics, Shape Modelling International, ICCV, International Conference on 3D Vision