Justin Solomon

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Somerville, MA 02144

Education

2010-2015   **Ph.D. in Computer Science, Stanford University** (Advisor: Leonidas Guibas)   *Stanford, CA*
Geometric Computing Group, Department of Computer Science
- Dissertation: "Transportation Techniques for Geometric Data Processing"
- Distinction in Teaching (completed 2013)
- Hertz Foundation Graduate Fellowship, National Science Foundation (NSF) Graduate Research Fellowship, and National Defense Science & Engineering Graduate (NDSEG) Fellowship

2010-2012   **Master of Science in Computer Science, Stanford University** (Advisor: Leonidas Guibas)   *Stanford, CA*
Qualifying exam in Computer Science Theory (topic: "PDE Approaches to Graph Analysis")

2006-2010   **Bachelor of Science, Stanford University** (Advisors: Leonidas Guibas and Richard Schoen)   *Stanford, CA*
Double major in Computer Science (honors) and Math (honors); GPA: 4.138

2002-2006   **Thomas Jefferson High School for Science and Technology (TJHSST)**   *Alexandria, VA*

Research Experience

2016-Present   **MIT, Department of Electrical Engineering & Computer Science**   *Cambridge, MA*
X-Consortium Career Development Assistant Professor (2016-2020), Associate Professor (2020-2023), Associate Professor with Tenure (2023-present): Lead the Geometric Data Processing group in MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL), studying processing, analysis, and editing of geometric data; teach and develop undergraduate and graduate courses.

2015-2016   **Princeton University, Program in Applied & Computational Mathematics**   *Princeton, NJ*
Postdoctoral fellow: Helped design optimization algorithms for cryo-electron microscopy (PI: A. Singer); research and collaboration in geometry processing, computer graphics, machine learning, and other disciplines; presented findings at academic conferences and symposia.

2010-2015   **Stanford University, Geometric Computing Group**   *Stanford, CA*
Graduate Research Assistant: Developed algorithms for geometry processing, machine learning, and graphics using techniques from continuous differential geometry, partial differential equations, and optimization; collaborated with researchers at Stanford and other universities; presented findings at academic conferences and group meetings; led instruction and development of course materials.

2014   **University of Southern California, Department of Computer Science**   *Los Angeles, CA*
Visiting Research Fellow: Studied numerics for Markov chain Monte Carlo (MCMC) sampling and performance capture with machine learning and graphics groups; led seminars and discussions on optimal transportation and geometric PDE; guest lecturer in introductory computer graphics course.

2007-2012   **Pixar Animation Studios, Tools Research Group**   *Emeryville, CA*
Summer Intern (2007, 2008, 2009), Part Time Research Assistant (2008-10, 2012): Designed efficient algorithms for image processing using local histograms; examined alternatives to the bilateral filter for computational photography, stylization, and painterly rendering; implemented filters on the GPU and in Pixar's compositing software; prepared SIGGRAPH submissions and other papers. *Summer Intern (2007):* Designed specialized linear solvers with fast rates of convergence for cloth simulation; demonstrated these algorithms using Pixar's physics simulation system.

2008-2010   **Stanford University, Geometric Computing Group**   *Stanford, CA*
Research Assistant: Formulated methods for replicating regular surface features and detecting intrinsic symmetries; developed algorithms for approximating Killing vector fields to represent continuous surface self-isometries using machinery from discrete and continuous Riemannian geometry.

2010   **British Library Sound Archive, Edison Fellowship Program**   *London, UK*
Visiting Researcher: Studied the history of Elgar's Cello Concerto using traditional and computerized techniques; developed software to visualize differences between various cellists' interpretations of the concerto.

2007-2008   **Stanford University, Fedkiw Group**   *Stanford, CA*
Research Assistant: Supported research in hair simulation by implementing hair rendering and reflectance models; contributed to testing frameworks for computational geometry methods.

2006   **Mitsubishi Electric Research Laboratory, Computer Vision Applications & Devices**   *Cambridge, MA*
Summer Intern: Designed multilinear models for representing face shape and reflectance simultaneously.

2005-2007   **MITRE Corporation**   *McLean, VA*
Technology Intern (part time on call): Developed a framework for iris recognition using multi-camera input; presented the system to engineers consulting for the US Department of Homeland Security.

2005   **Massachusetts Institute of Technology (MIT), Computer Graphics Group**   *Cambridge, MA*

Mentorship (Research Science Institute): Applied multilinear modeling to face shape estimation from reflectance/video.

2005   **Computer Science Department, George Mason University**   *Fairfax, VA*
Computer Vision Mentorship: Proposed and implemented methods estimating obstacle rate of approach from video.

2004   **Naval Research Laboratory, Virtual Reality Department**   *Washington, DC*
Summer Intern: Devised algorithms for surface analysis for face recognition from shape.

Teaching Experience

Modeling with Machine Learning (6.C01)   *MIT*
Co-Instructor (Spring 2024): Gave lectures and co-led large-scale introductory course on machine learning for a broad audience.

Applied Numerical Algorithms (6.S955)   *MIT*
Instructor (Fall 2023): Designed, organized, and presented a new course on design and applications of numerical algorithms, including numerical linear algebra, optimization, and differential equations.

Shape Analysis (6.838)   *MIT*
Instructor (Spring 2017, Spring 2019, Spring 2021, Spring 2023): Designed, organized, and presented a new course on low- and high-dimensional geometric algorithms including topics from graphics, vision, and machine learning.

Introduction to Computer Graphics (6.837)   *MIT*
Co-Instructor (Fall 2016), Instructor (Fall 2017, Fall 2018, Fall 2019, Fall 2020, Fall 2021, Fall 2022): Gave weekly course lectures; managed two course assistants (with W. Matusik in 2016, M. Konaković-Luković in 2022).

Introduction to Algorithms (6.006)   *MIT*
Co-Instructor (Spring 2020): Gave lectures and problem sessions, alternating with other instructors; assisted in problem set and exam design (with E. Demaine and J. Ku).

Modeling and Optimization for Machine Learning   *MIT Professional Education*
Co-Instructor (Summer 2018, 2019, 2020, 2021, 2022): Taught a week-long course covering large-scale optimization and modeling strategies for machine learning; included lectures, interactive demonstrations, and group laboratories (with S. Sra).

Introduction to Machine Learning (6.036)   *MIT*
Co-Instructor (Spring 2018): Part of team of four faculty instructors; lead two sections through interactive exercises; assisted in course material revision and development.

Symposium on Geometry Processing Graduate School   *Several locations*
Lecturer (Summer 2020): Introduced algorithms for spectral shape analysis in a tutorial "PDE and Spectral Approaches to Geometry Processing." *Lecturer (Summer 2015, 2016, 2019)* Introduced modern optimization algorithms applied to shape analysis in a tutorial "Optimization Techniques for Geometry Processing" (with D. Bommes, S. Claici). *Lecturer (Summer 2014):* Introduced applications of the Laplace-Beltrami operator in a tutorial "Laplace-Beltrami: The Swiss Army Knife of Geometry Processing" (with K. Crane and E. Vouga). *Lecturer (Summer 2012):* Introduced shape descriptors and matching to new researchers in geometry processing.

Mathematical Methods for Computer Vision, Robotics, and Graphics (CS 205A)   *Stanford University*
Instructor (Fall 2013, Spring 2015): Redesigned and developed new materials for a course on numerical techniques with applications focus; gave weekly lectures; managed four course assistants; wrote comprehensive course notes that have been expanded into a textbook (40+ students in 2013, 100+ students in 2015).

Differential Geometry for Computer Science (CS 468)   *Stanford University*
Co-instructor (Spring 2013): Developed and taught research-level course; weekly lecturer on discrete differential geometry, alternating with theoretical discussions; developed practical and written assignments to accompany lectures (15 students, with A. Butscher).

Computer Graphics: Geometric Modeling (CS 348A)   *Stanford University*
Course assistant (Winter 2013): Led weekly section and office hours; redesigned assignments and project to reflect developments in geometry processing; guest lecture on polar forms, derivatives, and continuity.

Introduction to Computer Graphics and Imaging (CS 148)   *Stanford University*
Instructor (Summer 2012): Reorganized course to reflect a broader view of graphics; created assignments, lectures, and exams; mentored students after end of the course in research; managed course assistants; held office hours; included speakers from industry; shared materials with colleagues seeking new graphics curriculum (32 students).

Computer Graphics: Geometric Modeling (CS 348A)   *Stanford University*
Course assistant (Winter 2012): Led weekly section on class material, student questions, and extensions (e.g. shared structure between Bézier curves and elliptic curve cryptography; Plücker coordinates; subdivision); held office hours; guest lecturer on parameterization.

Programming Methodology (CS 106A)   *Stanford University*
Section leader (Winter 2009): Led weekly section (~10 students); met individually with students to discuss assignments.

Publications

Textbook

Numerical Algorithms, Justin Solomon (published by AK Peters/CRC Press, 2015; 392 pages)

Papers and Articles

L. Mattos Da Silva, S. Sellán, & JS. **Through the Looking Glass: Mirror Schrödinger Bridges.** *ArXiv* 2410.07003, 2024.

A. Lukoianov, H. Borde, K. Greenewald, V. Guizilini, T. Bagautdinov, V. Sitzmann, & JS. **Score Distillation via Reparametrized DDIM**. NeurIPS 2024, Vancouver.

C. Scarvelis & JS. **Nuclear Norm Regularization for Deep Learning**. NeurIPS 2024, Vancouver.

T. Shnitzer, A. Ou, M. Silva, K. Soule, Y. Sun, JS, N. Thompson, & M. Yurochkin. **Large Language Model Routing with Benchmark Datasets**. Conference on Language Modeling 2024, Philadelphia.

R. Gabrielsson, J. Zhu, O. Bhardwaj, L. Choshen, K. Greenewald, M. Yurochkin, & JS. **Compress then Serve: Serving Thousands of LoRA Adapters with Little Overhead**. Efficient Systems for Foundation Models (ICML workshop), 2024.

L. Mattos Da Silva, O. Stein, & JS. **A Framework for Solving Parabolic Partial Differential Equations on Discrete Domains**. *ACM Transactions on Graphics*, 2024 (to appear).

D. Palmer, A. Chern, & JS. **Lifting Directional Fields to Minimal Sections.** SIGGRAPH 2024 (journal), Denver.

J. Zhu, K. Greenewald, K. Nadjahi, H. Borde, R. Gabrielsson, L. Choshen, M. Ghassemi, M. Yurochkin, & JS. **Asymmetry in Low-Rank Adapters of Foundation Models**. International Conference on Machine Learning (ICML) 2024, Vienna.

K. Nadjahi, K. Greenewald, R. Brüel Gabrielsson, & JS. **Slicing Mutual Information Generalization Bounds for Neural Networks.** ICML 2023 Workshop on Neural Compression, Honolulu. International Conference on Machine Learning (ICML) 2024, Vienna.

R. Gabrielsson, M. Yurochkin, & JS. **Rewiring with Positional Encodings for Graph Neural Networks.** *Transactions on Machine Learning Research*, 2023.

D. Klebe, T. Shnitzer, M. Yurochkin, L. Karlinsky, & JS. **GeRA: Label-Efficient Geometrically Regularized Alignment**. *ArXiv* 2310.00672, 2023.

C. Scarvelis, H. Borde, & JS. **Closed-Form Diffusion Models**. *ArXiv* 2310.12395, 2023.

A. Dodik, O. Stein, V. Sitzmann, & JS. **Variational Barycentric Coordinates**. SIGGRAPH Asia 2023 (journal), Sydney.

L. Li, S. Hurault, & JS. **Self-Consistent Velocity Matching of Probability Flows.** NeurIPS 2023, New Orleans.

K. Greenewald, A. Gu, M. Yurochkin, JS, & E. Chien. k-**Mixup Regularization for Deep Learning via Optimal Transport.** *Transactions on Machine Learning Research*, 2023.

Y. Wang, M. Guo, & JS. **Variational Quasi-harmonic Maps for Computing Diffeomorphisms.** SIGGRAPH 2023 (journal), Los Angeles.

P. Zhang, Z. Marschner, JS, & R. Tamstorf. **Sum-of-squares Collision Detection for Curved Shapes and Paths.** SIGGRAPH 2023 (conference), Los Angeles.

M. Edelstein, N. Guillen, JS, & M. Ben-Chen. **A Convex Optimization Framework for Regularized Geodesic Distances.** SIGGRAPH 2023 (conference), Los Angeles.

N. Sharp, C. Romero, A. Jacobson, E. Vouga, P. Kry, D. Levin, & JS. **Data-Free Learning of Reduced-Order Kinematics.** SIGGRAPH 2023 (conference), Los Angeles.

R. Brüel-Gabrielsson, T. Wang, M. Baradad, & JS. **Deep Augmentation: Enhancing Self-Supervised Learning through Transformations in Higher Activation Space.** *ArXiv* 2303.14537, 2023.

L. Li, Q. Liu, A. Korba, M. Yurochkin, & JS. **Sampling with Mollified Interaction Energy Descent.** International Conference on Learning Representations (ICLR) 2023, Kigali.

L. Li, N. Aigerman, V. Kim, J. Li, K. Greenewald, M. Yurochkin, & JS. **Learning Proximal Operators to Discover Multiple Optima.** International Conference on Learning Representations (ICLR) 2023, Kigali.

C. Scarvelis & JS. **Riemannian Metric Learning via Optimal Transport.** International Conference on Learning Representations (ICLR) 2023, Kigali.

S. Abulnaga, O. Stein, P. Golland, & JS. **Symmetric Volume Maps: Order-Invariant Volumetric Mesh Correspondence with Free Boundary.** *Transactions on Graphics* 42.3, 2023.

Y. Zeng, K. Greenewald, K. Lee, JS, & M. Yurochkin. **Outlier-Robust Group Inference via Gradient Space Clustering.** *ArXiv* 2210.06759, 2022.

X. Huang, Y. Wang, V. Guizilini, R. Ambrus, A. Gaidon, & JS. **Representation Learning for Object Detection from Unlabeled Point Cloud Sequences.** CoRL 2022, Auckland.

P. Zhang, D. Smirnov, & JS. **Wassersplines for Neural Vector-Field Controlled Animation.** Symposium on Computer Animation 2022, Durham.

T. Shnitzer, M. Yurochkin, K. Greenewald, & JS. **Log-Euclidean Signatures for Intrinsic Distances Between Unaligned Datasets.** International Conference on Machine Learning 2022, Baltimore.

D. Palmer,[*] D. Smirnov,[*] S. Wang, A. Chern, & JS. **DeepCurrents: Learning Implicit Representations of Shapes with Boundaries.** Computer Vision and Pattern Recognition (CVPR) 2022, New Orleans.

S. Abulnaga, E. Abaci Turk, M. Bessmeltsev, P. Grant, JS, & P. Golland. **Volumetric Parameterization of the Placenta to a Flattened Template.** *IEEE Transactions on Medical Imaging* 41.4, 2022.

H. Zhao, M. Willsey, A. Zhu, C. Nandi, Z. Tatlock, JS, & A. Schulz. **Co-Optimization of Design and Fabrication Plans for Carpentry.** *Transactions on Graphics* 41.3, 2022.

O. Stein, J. Li, & JS. **A Splitting Scheme for Flip-Free Distortion Energies.** *SIAM Journal on Imaging Sciences* 15.2, 2022.

F. Stutz, T. Olsen, J. Groen, N. Aage, O. Sigmund, J. Bærentzen, & JS. **Synthesis of Frame Field-Aligned Multi-Laminar Structures.** *Transactions on Graphics* 41.5, 2022.

JS, K. Greenewald, & H. Nagaraja. k-**Variance: A Clustered Notion of Variance.** *SIAM Journal on Mathematics of Data Science*, 2022.

E. Najt, D. DeFord, & JS. **Empirical Sampling of Connected Graph Partitions for Redistricting.** *Physical Review E* 104.6, 2021.

Y. Wang & JS. **Object DGCNN: 3D Object Detection using Dynamic Graphs.** NeurIPS 2021, online.

A. Korotin, L. Li, A. Genevay, JS, A. Filippov, & E. Burnaev. **Do Neural Optimal Transport Solvers Work? A Continuous Wasserstein-2 Benchmark.** NeurIPS 2021, online.

P. Mokrov, A. Korotin, L. Li, A. Genevay, JS, & E. Burnaev. **Large-Scale Wasserstein Gradient Flows.** NeurIPS 2021, online.

D. Smirnov, M. Gharbi, M. Fisher, V. Guizilini, A. Efros, & JS. **MarioNette: Self-Supervised Sprite Learning.** NeurIPS 2021, online.

Y. Wang, V. Guizilini, T. Zhang, Y. Wang, H. Zhao, & JS. **DETR3D: 3D Object Detection from Multi-view Images via 3D-to-2D Queries**. CoRL 2021, online.

Z. Marschner, P. Zhang, D. Palmer, & JS. **Sum-of-Squares Geometry Processing**. SIGGRAPH Asia 2021, Tokyo.

L. Li, P. Zhang, D. Smirnov, M. Abulnaga, & JS. **Interactive All-Hex Meshing via Cuboid Decomposition**. SIGGRAPH Asia 2021, Tokyo.

D. Palmer, O. Stein, & JS. **Frame Field Operators.** Symposium on Geometry Processing (SGP) 2021, online.

G. Beugnot, A. Genevay, K. Greenewald, & JS. **Improving Approximate Optimal Transport Distances using Quantization.** Conference on Uncertainty in AI (UAI) 2021, online.

D. Mukherjee, A. Guha, JS, Y. Sun, & M. Yurochkin. **Outlier-Robust Optimal Transport.** International Conference on Machine Learning (ICML) 2021, online.

D. Smirnov & JS. **HodgeNet: Learning Spectral Geometry on Triangle Meshes.** SIGGRAPH 2021, online.

Y. Wang & JS. **Fast Quasi-Harmonic Weights for Geometric Data Interpolation.** SIGGRAPH 2021, online.

L. Makatura, M. Guo, A. Schulz, JS, & W. Matusik. **Pareto Gamuts: Exploring Optimal Designs Across Varying Contexts.** SIGGRAPH 2021, online.

N. Girard, D. Smirnov, JS, & Y. Tarabalka. **Regularized Building Segmentation by Frame Field Learning.** Computer Vision and Pattern Recognition (CVPR) 2021, online.

D. Smirnov, M. Bessmeltsev, & JS. **Learning Manifold Patch-Based Representations of Man-Made Shapes.** International Conference on Learning Representations (ICLR) 2021, online.

A. Korotin, L. Li, JS, & E. Burnaev. **Continuous Wasserstein-2 Barycenter Estimation without Minimax Optimization.** International Conference on Learning Representations (ICLR) 2021, online.

D. DeFord, M. Duchin, & JS. **Recombination: A Family of Markov Chains for Redistricting.** *Harvard Data Science Review* 3.1, 2021.

A. Becker & JS. **Redistricting Algorithms.** Chapter in *Political Geometry*, 2021.

R. Barnes & JS. **Gerrymandering and Compactness: Implementation Flexibility and Abuse**. *Political Analysis*, 2021.

L. Li, A. Genevay, M. Yurochkin, & JS. **Continuous Regularized Wasserstein Barycenters.** NeurIPS 2020, online.

Y. Wang, A. Fathi, J. Wu, T. Funkhouser, & JS. **Multi-Frame to Single-Frame: Knowledge Distillation for 3D Object Detection.** ECCV Workshop on Perception for Autonomous Driving 2020, online.

Y. Wang, A. Fathi, A. Kundu, D. Ross, C. Pantofaru, T. Funkhouser, & JS. **Pillar-Based Object Detection for Autonomous Driving.** European Conference on Computer Vision (ECCV) 2020, online.

Z. Marschner, P. Zhang, D. Palmer, & JS. **Hexahedral Quality Evaluation via SOS Relaxations.** Symposium on Geometry Processing (SGP) 2020, online.

P. Zhang, D. DeFord, & JS. **Medial Axis Isoperimetric Profiles.** Symposium on Geometry Processing (SGP) 2020, online.

S. Claici, M. Yurochkin, S. Ghosh, & JS. **Model Fusion with Kullback–Leibler Divergence.** International Conference on Machine Learning (ICML) 2020, online.

N. Girard, D. Smirnov, JS, & Y. Tarabalka. **Regularized Building Segmentation by Frame Field Learning.** IEEE International Geoscience and Remote Sensing Symposium (IGARSS) 2020, Waikoloa.

D. DeFord, M. Duchin, & JS. **A Computational Approach to Measuring Vote Elasticity and Competitiveness.** *Statistics and Public Policy*, 2020.

C. Frogner, S. Claici, E. Chien, & JS. **Incorporating Unlabeled Data into Distributionally Robust Learning.** *Journal of Machine Learning Research* 22.56, 2021.

P. Zhang, J. Vekhter, E. Chien, D. Bommes, E. Vouga, & JS. **Octahedral Frames for Feature-Aligned Cross-Fields.** *Transactions on Graphics* 39.3, 2020.

D. Palmer, D. Bommes, & JS. **Algebraic Representations for Volumetric Frame Fields.** *Transactions on Graphics* 39.2, 2020.

T. Abrishami, N. Guillen, P. Rule, Z. Schutzman, JS, T. Weighill, and S. Wu. **Geometry of Graph Partitions via Optimal Transport.** *SIAM Journal on Scientific Computing* 42.5, 2020.

S. Claici, A. Genevay, & JS. **Wasserstein Measure Coresets**. *ArXiv* 1805.07412, 2020.

Yu Wang & JS. **Intrinsic and Extrinsic Operators for Shape Analysis.** Chapter 2 of *Processing, Analyzing and Learning of Images, Shapes, and Forms: Part 2* (Ron Kimmel and Xue-Cheng Tai, editors), 2019.

Y. Wang & JS. **PRNet: Self-Supervised Learning for Partial-to-Partial Registration.** NeurIPS 2019, Vancouver.

P. Monteiller, S. Claici, E. Chien, F. Mirzazadeh, JS, & M. Yurochkin. **Alleviating Label Switching Using Optimal Transport.** NeurIPS 2019, Vancouver.

M. Yurochkin, S. Claici, E. Chien, F. Mirzazadeh, & JS. **Hierarchical Optimal Transport for Document Representation.** NeurIPS 2019, Vancouver.

D. Deford, H. Lavenant, Z. Schutzman, & JS. **Total Variation Isoperimetric Profiles**. *SIAM Journal on Applied Algebra and Geometry* 3.4, 2019.

E. Najt, D. DeFord, & JS. **Complexity and Geometry of Sampling Connected Graph Partitions.** *ArXiv* 1908.08881, 2019.

T. Henderson & JS. **Audio Transport: A Generalized Portamento via Optimal Transport.** International Conference on Digital Audio Effects 2019 (DAFx-19), Birmingham.

Yue Wang, Y. Sun, Z. Liu, S. Sarma, M. Bronstein, & JS. **Dynamic Graph CNN for Learning on Point Clouds**. *Transactions on Graphics* 38.5, 2019.

Yue Wang & JS. **Deep Closest Point: Learning Representations for Point Cloud Registration.** International Conference on Computer Vision (ICCV) 2019, Seoul.

JS & A. Vaxman. **Optimal Transport-Based Polar Interpolation of Directional Fields**. SIGGRAPH 2019, Los Angeles.

D. Smirnov, M. Fisher, V. Kim, R. Zhang, & JS. **Deep Parametric Shape Predictions using Distance Fields.** Computer Vision and Pattern Recognition (CVPR) 2019, online.

S.M. Abulnaga, E.A. Turk, M. Bessmeltsev, P.E. Grant, JS, & P. Golland. **Placental Flattening via Volumetric Parameterization**. International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2019, Shenzhen.

C. Frogner, F. Mirzazadeh, & JS. **Learning Embeddings into Entropic Wasserstein Spaces**, ICLR 2019, New Orleans.

Yu Wang, V. Kim, M. Bronstein, & JS. **Learning Geometric Operators on Meshes.** Representation Learning on Graphs and Manifolds (ICLR workshop), New Orleans.

D. DeFord, M. Duchin, & JS. **Comparison of Districting Plans for the Virginia House of Delegates**. *MGGG technical report*, 2019.

D. Ezuz, JS, & M. Ben-Chen. **Reversible Harmonic Maps between Discrete Surfaces**. *Transactions on Graphics* 38.2, 2019.

Yu Wang, M. Ben-Chen, I. Polterovich, & JS. **Steklov Spectral Geometry for Extrinsic Shape Analysis**. *Transactions on Graphics* 38.1, 2019.

M. Bessmeltsev & JS. **Vectorization of Line Drawings via PolyVector Fields**. *Transactions on Graphics* 38.1, 2019.

E. Rodolà, Z. Lähner, Z. Bronstein, M. Bronstein, & JS. **Functional Map Representation on Product Manifolds**. *Computer Graphics Forum* 38.1, 2019.

H. Lavenant, S. Claici, E. Chien, & JS. **Dynamical Optimal Transport on Discrete Surfaces**. SIGGRAPH Asia 2018, Tokyo.

M. Li, D. Kaufman, V. Kim, JS, & A. Sheffer. **OptCuts: Joint Optimization of Surface Cuts and Parameterization**. SIGGRAPH Asia 2018, Tokyo.

H. Liu, P. Zhang, E. Chien, JS, & D. Bommes. **Singularity-Constrained Octahedral Fields for Hexahedral Meshing**. SIGGRAPH 2018, Vancouver.

A. Schulz, H. Wang, E. Grinspun, JS, & W. Matusik. **Interactive Exploration of Design Trade-Offs**. SIGGRAPH 2018, Vancouver.

S. Claici, E. Chien, & JS. **Stochastic Wasserstein Barycenters**. ICML 2018, Stockholm.

A. Gehre, M. Bronstein, L. Kobbelt, & JS. **Interactive Curve Constrained Functional Maps**. Symposium on Geometry Processing 2018, London.

L. Wang, A. Gehre, M. Bronstein, & JS. **Kernel Functional Maps**. Symposium on Geometry Processing 2018, London.

JS. **Optimal Transport on Discrete Domains**. AMS Short Course on Discrete Differential Geometry 2018, San Diego.

M. Essid & JS. **Quadratically-Regularized Optimal Transport on Graphs**. *SIAM Journal on Scientific Computing*, 2018.

JS. **Computational Optimal Transport**. *Snapshots of Modern Mathematics from Oberwolfach*, 2017.

M. Staib, S. Claici, JS, & S. Jegelka. **Parallel Streaming Wasserstein Barycenters**. NIPS 2017, Long Beach.

G. Peyré, L. Chizat, F. Vialard, & JS. **Quantum entropic regularization of matrix-valued optimal transport**. *European Journal of Applied Mathematics* 2017.

S. Claici, M. Bessmeltsev, S. Schaefer, & JS. **Isometry-Aware Preconditioning for Mesh Parameterization**. Symposium on Geometry Processing 2017, London.

D. Ezuz, JS, V. Kim, & M. Ben-Chen. **GWCNN: A Metric Alignment Layer for Deep Shape Analysis.** Symposium on Geometry Processing 2017, London.

JS, A. Vaxman, & D. Bommes. **Boundary Element Octahedral Fields in Volumes**. *Transactions on Graphics* 36.3, 2017.

E. Corman, JS, M. Ben-Chen, L. Guibas, & M. Ovsjanikov. **Functional Characterization of Intrinsic and Extrinsic Geometry**. *Transactions on Graphics* 36.2, 2017.

S. Berkiten, M. Halber, JS, C. Ma, H. Li, & S. Rusinkiewicz. **Learning Detail Transfer based on Geometric Features**. Eurographics 2017, Lyon.

T. Glozman, JS, F. Pestilli, & L. Guibas. **Shape Attributes of Brain Structures as Biomarkers for Alzheimer's Disease**. *Journal of Alzheimer's Disease* 56.1, 2017.

JS, G. Peyré, V. Kim, & S. Sra. **Entropic Metric Alignment for Correspondence Problems**. SIGGRAPH 2016, Anaheim.

M. Tao, JS, & A. Butscher. **Near-Isometric Level Set Tracking**. Symposium on Geometry Processing 2016, Berlin.

G. Peyré, M. Cuturi, & JS. **Gromov–Wasserstein Averaging of Kernel and Distance Matrices**. ICML 2016, New York City.

JS, R. Rustamov, L. Guibas, & A. Butscher. **Continuous-Flow Graph Transportation Distances**. *ArXiv* 1603.06927, 2016.

JS, F. de Goes, G. Peyré, M. Cuturi, A. Butscher, A. Nguyen, T. Du, & L. Guibas. **Convolutional Wasserstein Distances: Efficient Optimal Transportation on Geometric Domains**. SIGGRAPH 2015, Los Angeles.

W. Chao, JS, D. Michels, & F. Sha. **Exponential Integration for Hamiltonian Monte Carlo**. ICML 2015, Lille.

JS, R. Rustamov, L. Guibas, & A. Butscher. **Earth Mover's Distances on Discrete Surfaces**. SIGGRAPH 2014, Vancouver.

B. Zhu, E. Quigley, M. Cong, JS, & R. Fedkiw. **Codimensional Surface Tension Flow on Simplicial Complexes**. SIGGRAPH 2014, Vancouver.

JS, R. Rustamov, L. Guibas, & A. Butscher. **Wasserstein Propagation for Semi-Supervised Learning**. ICML 2014, Beijing.

F. Pestilli, JS, A. Butscher, & B. Wandell. **Model-Based Neuroanatomy: Tractography Validation, White-Matter Connections and Geometrical Organization**. ISMRM 2014 accepted abstract, Milan.

JS, K. Crane, A. Butscher, & C. Wojtan. **A General Framework for Bilateral and Mean Shift Filtering**. *ArXiv* 1405.4734, 2014.

JS, L. Guibas, & A. Butscher. **Dirichlet Energy for Analysis and Synthesis of Soft Maps**. Symposium on Geometry Processing 2013, Genoa.

JS, A. Nguyen, A. Butscher, M. Ben-Chen, & L. Guibas. **Soft Maps Between Surfaces**. Symposium on Geometry Processing 2012, Tallinn.

JS, E. Vouga, M. Wardetzky, & E. Grinspun. **Flexible Developable Surfaces**. Symposium on Geometry Processing 2012, Tallinn.

M. Ovsjanikov, M. Ben-Chen, JS, A. Butscher and L. Guibas. **Functional Maps: A Flexible Representation of Maps Between Shapes**. SIGGRAPH 2012, Los Angeles.

A. Vacavant, A. Albouy-Kissi, P. Menguy, & JS. **Fast Smoothed Shock Filtering**. International Conference on Pattern Recognition 2012, Tsukuba.

JS, M. Ben-Chen, A. Butscher, & L. Guibas. **As-Killing-As-Possible Vector Fields for Planar Deformation**. Symposium on Geometry Processing 2011, Lausanne.

JS, M. Ben-Chen, A. Butscher, & L. Guibas. **Discovery of Intrinsic Primitives on Triangle Meshes**. Eurographics 2011, Llandudno.

M. Kass and JS. **Smoothed Local Histogram Filters**. SIGGRAPH 2010, Los Angeles.

M. Ben-Chen, A. Butscher, JS, & L. Guibas. **On Discrete Killing Vector Fields and Patterns on Surfaces**. Symposium on Geometry Processing 2010, Lyon.

JS. **Programmers, Professors, & Parasites: Credit and Co-Authorship in Computer Science**. *Science and Engineering Ethics* 15.4 (2009): 467-489.

—. **Deconstructing the Definitive Recording: Elgar's Cello Concerto and the Influence of Jacqueline du Pré**. *The Hoefer Prizes for Excellence in Undergraduate Writing* 2009.

—. **Fast and Accurate Estimation of Principal Curvatures and Directions for Morphable Models**. SIGGRAPH 2007 posters, San Diego.

—. **Putting the Science in Computer Science**. *ACM Inroads Magazine* 39.2 (2007), 46-49.

—. **Programming as a Second Language**. *Learning & Leading with Technology* 32.4 (2004-05), 34-39.

—. **Ready, Set, Code** (two-part series in *Learning & Leading with Technology*): **Starting a Computer Team in Your School** (34.7, 2007, pp. 35-6); **Computer Team Competitions** (34.8, 2007, pp. 32-3).

Articles in *ACM Crossroads*: **Introduction** for 16.1 (September 2009), 15.4 (June 2009), 15.3 (March 2009), 15.2 (December 2008), 15.1 (September 2008), 14.4 (June 2008), 14.3 (March 2008), 14.2 (December 2007); **The Science of Shape** 13.4 (June 2007); **SIGGRAPH 2006: Exploring the Art and Science of Computer Graphics** 13.3 (March 2007)

Patents

Painterly Filtering (US 12/493,208, filed June 28, 2009)
Michael Kass, Justin Solomon (original assignee: Pixar)

Smoothed Local Histogram Filters for Computer Graphics (US8406518 B2, filed June 28, 2009)
Michael Kass, Justin Solomon, Rick Sayre (original assignee: Pixar)

Methods and Systems of Comparing Face Models for Recognition (US 12/416,716, filed April 1, 2009)
Mark Alan Livingston, Justin M. Solomon (original assignee: The United States Of America; Secretary Of The Navy)

Invited Talks

2024	**Navigating, Restructuring and Reshaping Learned Latent Spaces**
	Colloquium, Program in Applied and Computational Mathematics, Princeton University
2024	**Function Representations for Geometry Processing**
	CSAIM GDC Symposium on Geometric Computing
2024	**Convex Relaxation Strategies for Geometry Processing**
	Invited talk, Geometric Modeling and Processing (GMP), Qingdao
2024	**Optimal Transport in Graphics**
	Institute for Scientific Studies of Cargese
2023	**Distance-Free Optimal Transport on Surfaces**
	Innsbruck International Geometry Workshop
2023	**Machine Learning Using the Geometry of Datasets and Loss Functions**
	NVIDIA Colloquium, Geometry and Topology Meet Data Analysis and Machine Learning (GTDAML)
2023	**Application-Driven Measure Interpolation**
	Workshop on Interpolation of Measures, Paris
2022 & 23	**Volumetric Methods for Modeling, Deformation, and Correspondence**
	Simon Fraser University Applied and Computational Mathematics Seminar; ECE Distinguished Lecture, UC Santa Barbara
2022	**Putting Geometry on Collections of Data Points**
	Duke Applied Mathematics and Analysis Seminar
2022	**Designing Symmetric Distortion Energies**
	Oberwolfach Workshop on Mathematical Imaging and Surface Processing
2022	**Sensible Learning Tools for Shape Analysis**
	Keynote, London Geometry and Machine Learning (LOGML) Summer School; keynote, International Symposium on Visual Computing
2022	**Making Machine Learning Work for Geometry**
	Invited speaker, Graphics Interface conference, Montreal
2022	**Geometry Processing with Volumes**
	NSF FRG Workshop on Discrete Shapes, Center of Mathematical Sciences and Applications, Harvard University

2022	**Application-Driven Geometric Machine Learning**
	Distinguished Lecture in Computer Science, UT Austin; CMSE Colloquium, Michigan State University;
	PrAIrie Colloquium, Paris Artificial Intelligence Research Institute; Technion CGGC Seminar; Tel Aviv University
2022	**Geometric Models for Datasets and Probability Measures**
	Statistics and Data Sciences (SDS) Seminar Series, UT Austin; Interdisciplinary Science Seminar, Harvard Center
	of Mathematical Sciences and Applications; Fields Institute for Research in Mathematical Sciences
2021	**Geometric Data Processing**
	CS-GSA Talk Series, Georgia State University
2021	**Geometry Processing-Inspired Deep Learning**
	Deep Learning for Geometric Computing, ICCV Workshop
2021	**Pairing Learning Architectures with Geometric Representations**
	Topology, Algebra, and Geometry in Computer Vision, ICCV Workshop
2021	**Near-Optimization, Sampling, and Multi-Objective Optimization**
	Topic-Contributed Papers, Joint Statistical Meetings
2021	**Optimal Transport for Geometric Data Processing**
	BNY Mellon Radio AI Learn
2021	**Learning from Irregularly-Structured Geometric Data**
	Keynote, IEEE CVPR International Workshop on Differential Geometry in Computer Vision and Machine Learning
2021	**Learning and Optimizing for Local Geometry**
	CSAIL PI Meeting
2021	**Sensible Algorithms for Learning from Geometric Data**
	TU Munich AI Lecture Series
2021	**Optimization and Learning of Localized Geometric Structures**
	MIT Aerospace Computational Design Laboratory Seminar Series; UCSD Graphics Seminar
2021	**Transport Methods for Aligning Uncertain Models and Data**
	Computational and Applied Mathematics Colloquium, University of Chicago; IBM Research Seminar;
	Two Sigma PhD Research Symposium
2020	**Geometry, Probability, and Computation**
	Christie Lecture, NES Fall Meeting, Mathematical Association of America
2020	**Summarizing and Analyzing Data using Optimal Transport**
	MIT–IBM Watson AI Lab Monthly Seminar Series; Institute for Mathematics and its Applications
2020	**Sampling-Based Algorithms for Optimal Transport Problems**
	Optimal Transport, Topological Data Analysis and Applications to Shape and Machine Learning, Ohio State University
2020	**Fusion with Optimal Transport**
	Optimal Transport And Applications To Machine Learning And Statistics, Mathematical Sciences Research Institute
2020	**Approximating and Manipulating Probability Distributions with Optimal Transport**
	Learning Under Complex Structure, MIT Institute for Foundations of Data Science; Duke Department of Mathematics
2020	**Probabilistic Representations for Geometric Computation**
	Stanford Computer Science
2019 & 20	**Expanding the Scope and Dimensionality of Field Design**
	Inria Sophia Antipolis–Méditerranée, MIT IAP Mathematics Lecture Series
2019 & 20	**Counterexamples in Political Redistricting**
	NYU Mathematics and Democracy Seminar; Voting Rights Data Institute, MIT & Tufts;
	Duke Conference on Quantitative Investigations of Gerrymandering and Redistricting
2019	**Establishing a Computational Toolbox for Geometric Data Processing**
	MIT EECS faculty meeting
2019	**Approximating and Manipulating Probability Distributions with Transport**
	First Workshop on Practical Bayesian Methods for Big Data
2019	**Linking the Theory and Practice of Optimal Transport**
	Workshop on Foundations of Computational Science, Harvard Center of Mathematical Sciences and Applications,
	Institut de Mathématiques de Toulouse
2019	**Tutorial on Optimal Transport**
	MIT Biomedical Imaging and Analysis Seminar
2019	**Optimal Transport for Geometric Data Processing**
	Peter Hall Conference on Statistics and Machine Learning, UC Davis
2019	**The Last Mile: Bringing Optimal Transport to Applications**
	Economics Meets the Mathematical Sciences Workshop, Fields Institute; Adobe Seattle
2019	**Volumetric Challenges in Shape Analysis**
	MIT Center for Computational Engineering Symposium
2019	**Sensible Deep Learning for 3D Data**
	TRI Joint University Workshop, University of Michigan;
	Workshop on Boosted Object Phenomenology, Reconstruction and Searches in HEP

2019	**Transport, Geometry, and Computation**
	MIT IAP Mathematics Lecture Series
2019	**Sparse Linear Algebra and Geometry Processing**
	Workshop on Compiler Techniques for Sparse Tensor Algebra
2018	**Sampling Districting Plans**
	MGGG/LCCR joint workshop (with M. Duchin, D. DeFord)
2018	**Correspondence and Optimal Transport for Geometric Data Processing**
	LIRIS Seminar, CNRS/INSA Lyon/Université C. Bernard Lyon 1/Université Lumière Lyon 2/École Centrale de Lyon
2018	**Beneath the Surface: Bringing Geometry Processing and Shape Analysis to Volumes**
	Visual Computing Group Seminar Series, Brown University
2018	**Simulation and Transfer Learning for Deep 3D Geometric Data Analysis**
	Skoltech–MIT Conference (with E. Burnaev)
2018	**Correspondence and Optimal Transport for Geometric Data Processing**
	Colloquium, Harvard Center of Mathematical Sciences & Applications; Ohio State University Topology, Geometry, and Data Analysis Seminar; Yandex School of Data Analysis
2018	**Boundary Element Frame Fields for Hexahedral Meshing**
	Interdisciplinary Advances in Boundary Element Methods, World Congress on Computational Mechanics
2018	**Optimal Transport on Surfaces, Graphs, and Point Clouds**
	UCLA Applied Math & Computer Science
2018	**Correspondence and Embedding for Geometric Data**
	Geometry in Machine Learning (GiMLi) workshop, International Conference on Machine Learning (ICML)
2018	**Computational Applications of Spectral Geometry**
	Spectral Geometry: Theory, Numerical Analysis and Applications (BIRS)
2018	**Geometric Algorithms for Redistricting** *and* **Optimal Transport for Redistricting**
	Voting Rights Data Institute, MIT & Tufts
2018	**Learning & Optimization on Geometric Data**
	Workshop on Human and Machine Learning, Indiana University
2018	**Scaling & Broadening the Scope of Computational Transport**
	Applied Math Colloquium, MIT Department of Mathematics
2018	**Tutorial on Optimal Transport**
	MIT–IBM Watson AI Lab
2018	**Geometric Optimization Algorithms for Variational Problems**
	Weizmann Institute of Science Vision & Robotics Seminar
2017 & 18	**Algorithms for Geometrically-Structured Optimization**
	Tufts ECE Seminar, KAUST Conference on Visual Computing, Technion CGGC Seminar
2017 & 18	**Beneath the Surface: Geometry Processing at the Intrinsic/Extrinsic Interface**
	Quebec Mathematical Sciences Colloquium; keynote, Geometry and Computational Design (GCD 2017, Vienna, Austria); & keynote, Geometric Modeling & Processing (GMP 2018, Aachen, Germany)
2017	**A Primer on Optimal Transport (with M. Cuturi)**
	NIPS 2017 tutorial
2017	**The Theory and Practice of Geometric Data Processing**
	Keynote, MIT IEEE Undergraduate Research Technology Conference
2017	**Volumetric Shape Analysis from Boundary Representations**
	Geometry Workshop, Obergurgl, Austria
2017	**What Mathematicians Reveal about Gerrymandering**
	Science for the Public Contemporary Science Issues and Innovations program
2017	**Metric Geometry and Gerrymandering**
	Free and Open Source Software for Geospatial (FOSS4G)
2017	**Geometry & Data: Algorithmic Approaches to Redistricting**
	Geometry of Redistricting Workshop
2017	**Geometric Data Processing**
	Schlumberger–Doll Research
2017	**Intelligent Processing & Navigation of Geometric Data**
	CSAIL Systems that Learn board meeting & Samsung Research America
2017	**Scalable Optimization Algorithms for Geometry**
	Laboratoire d'Informatique (LIX), École Polytechnique
2017	**Regularized Optimal Transport on Graphs: Rank-1 Hessian Updates for Quadratic Regularization**
	Dagstuhl Seminar: Functoriality in Geometric Data
2016	**Structured Assignment: Practical Linear & Quadratic Matching**
	Google Vision Group
2016	**Toward Quadratic Optimal Transport on Graphs**
	Workshop on Computational Optimal Transportation, Centre de Recherches Mathématiques

2016	**Computational Spectral Geometry: Tutorial and Modern Applications**
	Montréal Analysis Seminar
2016	**Entropic Metric Alignment for Correspondence Problems**
	Tristate Workshop on Imaging and Graphics
2016	**Practical Tools for Applied Linear and Quadratic Matching**
	Data Science Meets Optimization Workshop, RWTH Aachen
2016	**Optimal Transportation for Practical Geometric Problems**
	NYU Applied Math Seminar & Technion CGGC Seminar
2015	**Convolutional Wasserstein Distances for Geometry Processing**
	Geometry Workshop, Seggau, Austria
2014 & 15	**Transportation Techniques for Geometric Data Processing**
	Several institutions
2014	**Embracing Uncertainty in Geometric Data Analysis**
	Computer Science Colloquium, University of Southern California
2014	**Dual Spaces and Functional Maps**
	Networks of Shapes, Images, and Programs, workshop for Stanford Computer Forum
2013	**Representations of Maps Between Surfaces**
	Computer Science Faculty Lunch, Stanford University
2013	**Computing and Analyzing Soft Maps**
	Geometry Workshop, Strobl, Austria
2012	**Coping with Symmetry in Shape Analysis**
	Industrial Light and Magic, San Francisco
2011	**Killing Vector Fields: Infinitesimal Isometries from a Linear Solve**
	Geometry Workshop, Obergurgl, Austria & Institute of Science and Technology, Klosterneuburg, Austria
2006	**Algorithmic Gymnastics**
	National Educational Computing Conference, San Diego
2004 & 05	**Programming as a Second Language**
	National Educational Computing Conference, New Orleans (2004) and Philadelphia (2005)

Professional Activities
Organization and Service

- Local chair, Symposium on Geometry Processing (2024)
- MIT Institute Council on Belonging, Achievement, and Composition (2023-2026)
- Co-chair, CSAIL METEOR Postdoc Search Committee (2023-present)
- Associate editor, SIAM Journal on Imaging Sciences (SIIMS) (2022-present)
- Technical program co-chair, Symposium on Geometry Processing (SGP) 2023
- MIT EECS Task Force on Graduate Admissions (2021-present)
- Co-Chair, MIT Joint EECS–MTA Search Committee (2023-2024)
- Associate editor, ACM Transactions on Graphics (TOG) (2021-2024)
- Director and founder, Summer Geometry Initiative (2021-present)
- MIT Joint EECS–Music and Theater Arts Faculty Search Committee (2022-2023)
- Associate editor, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) (2020-2023)
- Research Career Development Chair, ACM SIGGRAPH (2020-2023)
- Research mentor, African Master's in Machine Intelligence (2020 class)
- Area chair, Computer Vision and Pattern Recognition (CVPR) 2021
- Area chair, International Conference on Learning Representations (ICLR) 2020, 2021, 2022
- Technical papers program committee, SIGGRAPH Asia 2018, 2019, 2021, 2022, 2023
- AI+D Curriculum Committee, MIT EECS 2020, 2021
- 6.0002 special offering steering committee, MIT Computational Science & Engineering 2020
- NeurIPS Workshop program committee, 2020
- Conflict of interest coordinator, SIGGRAPH Asia 2020
- Area chair, NeurIPS 2019, 2020, 2021, 2022, 2023
- Designated Editor, International Mathematics Research Notices, 2020-present
- Admissions committee, MIT Master of Science Program in Computation for Design and Optimization (CDO) 2018, 2020
- ACM SIGGRAPH Executive Committee strategy meeting 2019
- Technical papers program committee, SIGGRAPH 2016, 2017, 2020, 2024
- Area chair, ICML 2019, 2020, 2021
- Program chair, Geometric Modeling and Processing (GMP) 2020
- Area chair, AISTATS 2019, 2020, 2021
- Program committee, Shape Modeling International (SMI) 2016, 2017, 2020, 2021
- Instructor, Machine Learning Summer School 2019 (Moscow, Russia)
- Best paper awards committee, Symposium on Geometry Processing 2019

- Organizing committee, International Workshop on Data-Centric Engineering
- Co-organizer, Erwin Schrödinger International Institute (ESI) 2019 Thematic Programme on Optimal Transport
- Co-organizer, Shape Analysis workshop, UCLA Institute of Pure and Applied Math (IPAM) 2019
- Chair for vision and graphics, MIT EECS PhD admissions 2018-present
- Co-director, Voting Rights Data Institute 2018, 2019
- International Program Committee (IPC), Eurographics 2017, 2018, 2019
- Organizer and creator, New England Symposium on Graphics 2017, 2018, 2019
- NSF Review Panelist 2017, 2019
- Program committee, Symposium on Geometry Processing (SGP) 2016, 2017, 2018, 2019
- Organizer, Banff International Research Station (BIRS) 2018 workshop on Spectral Geometry: Theory, Numerical Analysis and Applications (with I. Polterovich and N. Nigam)
- NIPS 2017 Tutorial: A Primer on Optimal Transport (with M. Cuturi)
- Co-organizer, NIPS 2017 Workshop on Optimal Transport & Machine Learning
- Hackathon director & panel speaker, Geometry of Redistricting Wisconsin Workshop 2017
- Organizing committee & hackathon director, Geometry of Redistricting Summer School 2017
- Co-Chair, Symposium on Geometry Processing Graduate School 2017
- CSAIL Lab Branding Committee 2017
- Program committee, Geometric Modeling and Processing (GMP) 2017
- NDSEG PhD Fellowship Scholarship Evaluation Panel, 2017
- Organizer, NIPS 2014 Workshop on Optimal Transport & Machine Learning (with M. Cuturi and G. Peyré)

Reviewer

A list of recent journal/conference reviewing engagements can be provided on request.

Membership

- Sigma Xi, Scientific Research Honor Society (full member)
- Association for Computing Machinery
- ACM SIGGRAPH
- Computer Science Teachers Association
- Council on Undergraduate Research

Honors and Awards

2023	Best Paper Award, ICML 2023 Workshop on Neural Compression
2023	ACM SIGGRAPH Test-of-Time Award
2023	Harold E. Edgerton Faculty Achievement Award
2022	ACM SIGGRAPH Significant New Researcher Award
2022	Seth J. Teller Award for Excellence, Inclusion and Diversity
2022	Google Research Scholar Award
2022	Best Paper Honorable Mention, Symposium on Computer Animation
2021	MIT EECS Outstanding Educator Award
2021	MIT Teaching with Digital Technology Award (student-nominated)
2020	Junior Bose Award for Excellence in Teaching, MIT School of Engineering
2018	NSF BIGDATA Award (with P. Rigollet)
2018	NeurIPS Top Reviewer Award
2018	Amazon Research Award
2018	MIT–IBM Watson AI Lab Exploratory Grant
2017-20	Prof. Amar G. Bose Research Fellowship
2017	ACM Future of Computing Academy
2017	Army Young Investigator Award
2017	Forbes 30 Under 30: Science
2015-2016	NSF Mathematical Sciences Postdoctoral Research Fellowship
2011 & 16	U.S. Junior Oberwolfach Fellow, National Science Foundation
2014	George E. Forsythe Memorial Award for Excellence in Student Teaching
2010-2015	Hertz Foundation Fellowship (inaugural Hertz-Google Fellow) & NSF Graduate Research Fellowship
2011-14	Bio-X Travel Subsidy Awardee, Stanford Bio-X Interdisciplinary Program
2010-14	Stanford Applied Music Scholarship
2010-13	National Defense Science and Engineering Graduate (NDSEG) Fellowship
2010	Second Place, Symposium on Geometry Processing (SGP) Best Paper Awards
2010	Edison Visiting Fellowship, British Library
2010	Frederick E. Terman Award for Scholastic Achievement in Engineering, Stanford University
2010	J.E. Wallace Sterling Award for Scholastic Achievement, Stanford University
2010	Outstanding Summerfield Scholar & Undergraduate of the Year, Phi Kappa Psi Foundation
2010	Firestone Medal for Excellence in Undergraduate Research
2009	Pixar Animation Studios Inventor Recognition Award

2009	Hoefer Prize for Excellence in Undergraduate Writing, Stanford University
2008	Barry M. Goldwater Scholarship & Tau Beta Pi Engineering Honor Society
2007	Boothe Prize for Excellence in Writing, Stanford University
2007	Finalist, Stanford CS 248 Video Game Design Competition (Project: "Paper Airplane 3D")
2007	Student Research Competition Finalist and poster presenter, SIGGRAPH 2007
2007	President's Award for Academic Excellence in the Freshman Year, Stanford University
2007	Team Finalist, ACM Intercollegiate Programming Contest (ICPC), Tokyo, Japan
2006	Finalist, Intel Science Talent Search (Project: Three-Dimensional Face Recognition from Video)
2004-2006	Scholarships: National Merit, Naval Research, Micron Science & Tech., Intel Excellence in CS
2006	Awards: Mu Alpha Theta Award; USA Today All-USA High School First Academic Team (5/18/06)
2006	Third Place (National) and First Place (State), Math/CS, Junior Science and Humanities Symposium
2005 & 06	First (05) and Second (06) Grand Prize, Computer Science, International Science and Engineering Fair
2005	Research Science Institute, Massachusetts Institute of Technology (Top Project Presentation Award)
2005	Fellowships: Davidson Institute for Talent Development, Department of Homeland Security
2004	Outstanding Intern Award, Naval Science & Engineering Apprenticeship Program (SEAP)

Other Activities

2020-Present	Mentor, Científico Latino
2017-Present	Cellist, New Philharmonia Orchestra
2018-Present	Cellist, No-Name Orchestra of Boston (2019 soloist: Elgar cello concerto)
2016-Present	Faculty mentor, Research Science Institute (RSI)
2020-2021	Mentor (high school mathematics), Boston Partners in Education
2016-2021	Metric Geometry and Gerrymandering Group (MGGG)
2018-2019	Faculty host, MIT Vest Scholarships
2015-2016	Cellist, Bravura Philharmonic Orchestra & Westminster Community Orchestra
2015	Attendee, Fall NSF Grants Conference
2010-2015	Cellist, Stanford University chamber music program
2010-2014	Cellist (symphony and chamber music), Palo Alto Philharmonic (principal, 2013-2014)
2006-2014	Applied Music Lessons, Stanford Department of Music (cello 2006-2014; piano 2006-2010)
2013	Cellist, Stanford Symphony Summer Tour "In Beethoven's Footsteps"
2012, 13	Mentor, Stanford CS Undergraduate Research Internship (CURIS)
2010	Organizer, "A Taste of Palo Alto" (to benefit Ecumenical Hunger Program, East Palo Alto)
2009-2010	Treasurer and Financial Manager (09-10), Phi Kappa Psi Fraternity, Stanford University
2009-2010	Undergraduate Representative, Department of Computer Science Curriculum Committee
2006-2010	Cello Tutor, Tutti Program, Stanford Alliance for Service Through the Arts
2009	Student Presenter, Stanford Music Symposium 2009: Reactions to the Record II
2008-2009	Head Peer Academic Coordinator, Otero House, Stanford Residential Education
2006-2009	Managing Editor (07-09), Associate Editor (06-07), *ACM Crossroads Magazine*
2006-2009	Associate Editor (06-07), Section Editor (07-08), Editor in Chief (08-09), *Stanford Undergraduate Research Journal*
2008	Speaker and Panelist, Scout Entrepreneurship Seminar, Kauffman Foundation, Kansas City
2007	Stanford Freshman Peer Mentor Program
2006, 07, 08	Cellist, MIT Summer Philharmonic Orchestra (06), UC Berkeley Summer Symphony (07, 08)
2004-2006	Cellist, Washington Metropolitan Philharmonic Orchestra (piano finalist, 2005 Concerto Competition)
2002-2006	TJ Computer Team (Freshman Capt. 02-03; Senior Capt. 05-06; Invitational Computing Olympiad 05)
2005	Presenter, Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), Orlando
1999-2005	Boy Scout Troop 152 (Eagle, Philmont Venture Crew, Order of the Arrow), Vienna VA