# Jyh-Ming Lien

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## Research Interests

Algorithmic robotics, Computational geometry, Computational Fabrication and Design, Computer graphics and vision, GIS, and Visualization

## Education

**B.S. in Computer Science**, National Cheng-Chi University, Taiwan, 1999

**Ph.D. in Computer Science**, Texas A&M University, USA, 2006
Ph.D. Topic: *Approximation Convex Decomposition and its Applications*
Advisor: Nancy M. Amato

**Postdoctoral Researcher**, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, USA, 2006–2007
Advisor: Ruzena Bajcsy

## Professional Experience

**Senior Principal Robotics Scientist**
iRobot, 2021–present

**Associate Professor**
Department of Computer Sciences, George Mason University, Fairfax, 2013–present

**Research Professor**
Dept. of Computer Science&Engineering, Ewha Womans University, Seoul, S. Korea, 2015–2016

**Assistant Professor**
Department of Computer Sciences, George Mason University, Fairfax, 2007–2013

## Publications

Lien's advisees indicated by: graduate ($^\ddagger$), undergraduates ($^\dagger$) students and interns ($^\star$)

*All papers are available at: http://masc.cs.gmu.edu*

### Publications in Refereed Journals

[P1] Changyang Li, Haikun Huang, **Jyh-Ming Lien**, Lap-Fai Yu, "Synthesizing scene-aware virtual reality teleport graphs", *ACM Transactions on Graphics (TOG)*, vol. 40, no. 6, Dec. 2021.

[P2] Jixuan Zhi$^\ddagger$, Lap-Fai Yu, **Jyh-Ming Lien**, "Designing Human-Robot Coexistence Space", *IEEE Robotics and Automation Letters (RA-L)*, vol. 6, no. 4, pp. 7161–7168, Jul. 2021.

[P3] Jixuan Zhi[‡] and **Jyh-Ming Lien**, "Learning to Herd Agents Amongst Obstacles: Training Robust Shepherding Behaviors using Deep Reinforcement Learning", IEEE Robotics and Automation Letters (RA-L), 2021, to appear. Also in the *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, May, 2021.

[P4] **Jyh-Ming Lien**, Samuel Rodriguez and Marco Morales, "Persistent Covering with Latency and Energy Constraints", *IEEE Robotics and Automation Letters (RA-L)*, vol. 6, no. 2, pp. 998–1003, Apr. 2021. Also in the *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, May, 2021.

[P5] Y.-K. Lee, Z. Xi[‡], Y.J. Lee, Y.H. Kim, Y. Hao[‡], H. Choi, M.G. Lee, Y.C. Joo, C. Kim, **J.-M. Lien** and I.S Choi, *Computational wrapping: A universal method to wrap 3D-curved surfaces with nonstretchable materials for conformal devices*, vol. 6, no. 15, Science advances, Apr. 2020.

[P6] Yue Hao[‡] and **Jyh-Ming Lien**. "Volume Compaction via Thick Polyhedral Surface Stacking", *Computer Graphics Forum*, vol. 38, no. 7, pp. 323–333, Nov. 2019.

[P7] Jixuan Zhi[‡], Yue Hao[‡], Christopher Vo[‡], Marco Morales and **Jyh-Ming Lien**, *Computing 3D From-Region Visibility Using Visibility Integrity*, IEEE Robotics and Automation Letters (RA-L), vol. 4, no. 4, pp. 4286–4291, July 2019. Also in the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Macau, 2019.

[P8] Yun-hyeong Kim, Zhonghua Xi[‡], **Jyh-Ming Lien**. "Disjoint Convex Shell and its Applications in Mesh Unfolding", *Computer-Aided Design*, vol. 90, pp. 180–190, Sept. 2017.

[P9] Jianchao Tan, **Jyh-Ming Lien**, Yotam Gingold. "Decomposing Images into Layers via RGB-space Geometry", *ACM Transactions on Graphics (TOG)*, vol. 36, no. 1, article 7. Nov. 2016.

[P10] Zhonghua Xi[‡], Yun-hyeong Kim, Young J. Kim and **Jyh-Ming Lien**. "Learning to Segment and Unfold Polyhedral Mesh from Failures", *Journal of Computers & Graphics*, Vol. 58, August 2016, pp 139–149, Jun. 2016. (special issue of Shape Modeling International (SMI))

[P11] Youngeun Lee, Evan Behar[‡], **Jyh-Ming Lien**, and Young J. Kim. "Continuous Penetration Depth Computation for Rigid Models using Dynamic Minkowski Sums", *Computer-Aided Design*, vol. 78, pp. 14–25, Sept. 2016. ISSN: 0010-4485.

[P12] Guilin Liu[‡], Zhonghua Xi[‡], and **Jyh-Ming Lien**. "Nearly Convex Segmentation of Polyhedra Through Convex Ridge Separation", *Computer-Aided Design*, vol. 78, pp. 137–146, Sept. 2016. ISSN: 0010-4485.

[P13] Yanyan Lu[‡], Zhonghua Xi[‡], and **Jyh-Ming Lien**. "Online Collision Prediction Among 2D Polygonal and Articulated Obstacles", *International Journal of Robotics Research (IJRR)*, vol. 35, no. 5, pp. 476–500, April 2016. Special edition of [P97].

[P14] Evan Behar[‡] and **Jyh-Ming Lien**. "Dynamic Minkowski Sums Under Scaling", *Computer-Aided Design*, 45(2), pp. 331–341, 2013. Special edition of [P56].

[P15] Mukulika Ghosh, Nancy M. Amato, Yanyan Lu[‡] and **Jyh-Ming Lien**. "Fast Approximate Convex Decomposition Using Relative Concavity", *Computer-Aided Design*, 45(2), pp. 494–504 (2013). Special edition of [P57].

[P16] Yanyan Lu[‡], **Jyh-Ming Lien**, Mukulika Ghosh and Nancy Amato, "Alpha Decomposition of Polygons", *Computers & Graphics*, vol. 36, no. 5, pp. 466–476, 2012. Special edition of [P60].

[P17] Fernando Camelli, **Jyh-Ming Lien**, Dayong Shen, David W. Wong, Matthew Rice, Rainald Löhner and Chaowei Yang, "Generating Seamless Surfaces for Transport and Dispersion Modeling

in GIS", *Geoinformatica*, 16(2): pp. 307–327, April 2012.

[P18] **Jyh-Ming Lien**, Fernando Camelli, David Wong, Yanyan Lu[‡] and Benjamin McWhorter[†], "Creating Building Ground Plans via Robust *K*-way Union", *the Visual Computer*, 28(4): pp. 401–412, April 2012.

[P19] Yanyan Lu[‡], Evan Behar[‡], Stephen Donnelly[‡], **Jyh-Ming Lien**, Fernando Camelli, and David Wong, "Fast and Robust Generation of City-Scale Seamless 3D Urban Models", *Computer-Aided Design*, 43 (11), pp. 1380–1390, Nov. 2011. Special edition of [P62].

[P20] **Jyh-Ming Lien**, Gregorij Kurillo, and Ruzena Bajcsy, "Multi-Camera Tele-immersion System with Real-Time Model Driven Data Compression", *the Visual Computer*, Springer, 26(1), pp. 3–15, Jan. 2010.

[P21] **Jyh-Ming Lien**, "Covering Minkowski Sum Boundary Using Points with Applications", *Computer Aided Geometric Design (CAGD)*, 25(8), pp. 652–666, 2008. Special edition of [P76] featuring selected papers. **Listed by CAGD as one of the most cited paper since 2007**.

[P22] **Jyh-Ming Lien** and Nancy Amato, "Approximate Convex Decomposition of Polyhedra And Its Applications", *Computer Aided Geometric Design (CAGD)*, 25(7), pp. 503–522, 2008. Special edition of [P80] featuring selected papers.

[P23] **Jyh-Ming Lien** and Nancy M. Amato. "Approximate Convex Decomposition for Polygons", *Computational Geometry: Theory & Applications*, Vol. 35, pp. 100–123, 2006. Special edition of [P88] featuring selected papers.

[P24] **Jyh-Ming Lien**, Marco Morales, and Nancy M. Amato. "Neuron PRM: A Framework for Constructing Cortical Networks", *Neurocomputing*, Vol. 52-54, No. 28, pp. 191–197, June 2003.

## Publications in Refereed Magazines

[P25] Yunjoo Park and **Jyh-Ming Lien**. "Fabricate 2.5D Shadow Art Sculpture", HYPERSEEING, the Publication of the international Society of Arts, Mathematics and Architecture, summer 2016. (**Featured as the front cover image)** Also in Proceedings of SMI'2016 Fabrication and Sculpting Event (FASE).

## Publications in Refereed Conferences

[P26] Yue Hao[‡], Weilin Guan, Edwin A. Peraza Hernandez, **Jyh-Ming Lien**. "Planning Folding Motion with Simulation in the Loop Using Laser Forming Origami and Thermal Behaviors as an Example", in the *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, May 2021.

[P27] Peiwen J. Ma, Yue Hao[‡], **Jyh-Ming Lien**, Edwin A. Peraza Hernandez. "Metal Forming With Laser Origami: Parameter Analysis and Optimization", in the *Proceedings of the ASME International Mechanical Engineering Congress and Exposition (IMECE)*, Nov. 2020.

[P28] Wanwan Li, Javier Talavera, Amilcar Gomez Samayoa, **Jyh-Ming Lien** and Lap-Fai Yu. "Automatic Synthesis of Virtual Wheelchair Training Scenarios", in the *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, Atlanta, GA, USA, Mar. 2020.

[P29] Yue Hao[‡] and **Jyh-Ming Lien**. "Computational Laser Forming Origami of Convex Surfaces", in the *Proceedings of the ACM Symposium on Computational Fabrication (SCF)*, Pittsburgh, PA, USA, June. 2019.

[P30] Yue Hao[‡] and Yun-hyeong Kim and Zhonghua Xi[‡] and **Jyh-Ming Lien**. "Creating Foldable Polyhedral Nets Using Evolution Control", in the *Proceedings of the Robotics: Science and Systems (RSS)*, Pittsburgh, PA, USA, June. 2018.

[P31] Yue Hao[‡] and Yun-hyeong Kim and Zhonghua Xi[‡] and **Jyh-Ming Lien**. "Creating Foldable Polyhedral Nets Using Evolution Control", in the *Proceedings of the Robotics: Science and Systems (RSS)*, Pittsburgh, PA, USA, June. 2018.

[P32] Yue Hao[‡] and Yun-hyeong Kim and **Jyh-Ming Lien**. "Synthesis of Fast and Collision-free Folding of Polyhedral Nets", in the *Proceedings of the ACM Symposium on Computational Fabrication*, Cambridge, MA, USA, June. 2018.

[P33] Guilin Liu[‡] and Duygu Ceylan and Ersin Yumer and Jimei Yang and **Jyh-Ming Lien**. "Material Editing using a Physically Based Rendering Network", in the *Proceedings of the International Conference on Computer Vision (ICCV)*, Venice, Italy, Oct. 2017. **Spotlight Paper**.

[P34] Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Polyhedra Fabrication Through Mesh Convexification: A Study Of Foldability Of Nearly Convex Shapes", in the *Proc. of International Design and Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, ASME, Cleveland, Ohio, Aug. 2017.

[P35] **Jyh-Ming Lien** and Young J. Kim, "Follow Moving Things in Virtual World", in the *Proceedings of the Human Computer Interaction Korea (HCIK)*, South Korea, Jan. 2016. **Best Paper Award**.

[P36] Guilin Liu[‡]and **Jyh-Ming Lien**, "Fast Medial-Axis Approximation via Max-Margin Pushing", in the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Hamburg, Germany, Sept. 2015.

[P37] Zhonghua Xi[‡]and **Jyh-Ming Lien**, "Continuous Unfolding of Polyhedra – a Motion Planning Approach", in the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Hamburg, Germany, Sept. 2015.

[P38] Guilin Liu[‡], Yotam Gingold, **Jyh-Ming Lien**, "Continuous Visibility Feature", in the *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Boston, MA, USA, June 2015

[P39] Arsalan Mousavian[‡], Jana Kosecka and **Jyh-Ming Lien**, "Semantically Guided Location Recognition for Outdoors Scenes", in the *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, USA, May 2015.

[P40] Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Folding and Unfolding Origami Tessellation by Reusing Folding Path", in the *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, USA, May 2015.

[P41] Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Plan Folding Motion for Rigid Origami via Discrete Domain Sampling", in the *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, USA, May 2015.

[P42] Yanyan Lu[‡] and Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Collision Prediction Among Polygons with Arbitrary Shape and Unknown Motion", in the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Sept. 2014, Chicago, USA

[P43] Amirreza M. Kaleghi, Dong Xu, Sara Minaeian, Mingyang Li, Yifei Yuan, Jian Liu, Young-Jun Son, Christopher Vo[‡] and **Jyh-Ming Lien**, "A DDDAMS-Based UAV and UGV Team Formation Approach for Surveillance and Crowd Control", in the *Proceedings of the Winter Simulation Conference (WSC)*, Savannah, GA, 2014

[P44] **Jyh-Ming Lien** and Vikram Sharma and Gert Vegter and Chee Yap, "Isotopic Arrangement of Simple Curves: An Exact Numerical Approach Based on Subdivision", in the *Proceedings of the 4th International Congress on Mathematical Software (ICMS)*, Aug 2014, Seoul, Korea

[P45] Yanyan Lu[‡] and Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Collision Prediction: Conservative Advancement Among Obstacles With Unknown Motion", in the *Proc. of International Design and Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, ASME, Aug. 2014, Buffalo, NY, USA.

[P46] Carlye Lauff and Timothy W. Simpson and Mary Frecker and Zoubeida Ounaies and Saad Ahmed and Paris von Lockette and Rebecca Strzelec and Robert Sheridan and **Jyh-Ming Lien**, "Differentiating Bending From Folding in Origami Engineering Using Active Materials", in the *Proc. of International Design and Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, ASME, Aug. 2014, Buffalo, NY, USA.

[P47] Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Folding Rigid Origami with Closure Constraints", in the *Proc. of International Design and Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, ASME, Aug. 2014, Buffalo, NY, USA.

[P48] Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Determine Distinct Shapes of Rigid Origami", in the *Proc. of the 6th International Meeting on Origami in Science, Mathematics and Education (6OSME)*, Aug. 2014, Tokyo, JP.

[P49] Guilin Liu[‡], Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Dual-Space Decomposition of 2D Complex Shapes", in the *Proc. of 27th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2014, Columbus, Ohio.

[P50] Amirreza M. Khaleghi, Dong Xu, Sara Minaeian, Mingyang Li, Yifei Yuan, Christopher Vo[‡], Arsalan Mousavian[‡], and **Jyh-Ming Lien** and Jian Liu and Young-Jun Son, "A Comparative Study of Control Architectures in UAV/UGV-based Surveillance System", in the *Proc. of the Industrial and Systems Engineering Research Conference*, 2014

[P51] Evan Behar[‡] and **Jyh-Ming Lien**, "Mapping the Configuration Space of Polygons Using Reduced Convolution", in the *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, Nov., 2013, Tokyo, JP.

[P52] Zhonghua Xi[‡], **Jyh-Ming Lien**, Yi-Chang Chiu and C. Y. David Yang, "Identify and Visualize Differences in Vehicle Trajectory Data", in the *Proc. of the 7th International Visualization in Transportation Symposium*, Oct., 2013, Irvine, CA.

[P53] Saad Ahmed, Carlye Lauff, Adrienne Crivaro, Kevin McGough, Robert Sheridan, Mary Frecker, Paris von Lockette,b Zoubeida Ounaies, Timothy Simpson, **Jyh-Ming Lien**, Rebecca Strzelec, "Multi-Field Responsive Origami Structures: Preliminary Modeling And Experiments", in the *Proc. of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, August, 2013, Portland, Oregon, USA.

[P54] Zhenrui Wang, Mingyang Li, Amirreza M. Khaleghi, Dong Xu, Alfonso Lobos, Christopher Vo [‡], **Jyh-Ming Lien**, Jian Liu, and Young-Jun Son, "DDDAMS-based Crowd Control via UAVs and UGVs", in the *Proc. of the 2013 International Conference on Computational Science*, 2013.

[P55] Christopher Vo[‡], Sam McKay[*], Nikhil Garg[*], and **Jyh-Ming Lien** . "Follow a Group of Targets in Large Environments", in the Proc. of the International Conference on Motion in Games (MIG), Oct. 2012. (invited paper)

[P56] Evan Behar[‡] and **Jyh-Ming Lien**. "Dynamic Minkowski Sums Under Scaling", in the Proc. of the ACM/SIAM *Symposium on Solid and Physical Modeling (SPM)*, Dijon, France, Oct. 2012.

[P57] Mukulika Ghosh, Nancy M. Amato, Yanyan Lu‡ and **Jyh-Ming Lien**. "Fast Approximate Convex Decomposition Using Relative Concavity", in the Proc. of the ACM/SIAM *Symposium on Solid and Physical Modeling (SPM)*, Dijon, France, Oct. 2012.

[P58] **Jyh-Ming Lien**, Fernando Camelli, Yanyan Lu‡ and David Wong, "City-Scale Urban CFD using GIS Data", in the Proc. of the Computing for Geospatial Research, July, 2012.

[P59] Chee K. Yap, Vikram Sharma, and **Jyh-Ming Lien**, "Towards Exact Numerical Voronoi Diagrams", in the Proc. of the 9th International Symposium on Voronoi Diagrams in Science and Engineering (ISVD), June, 2012. (Invited paper)

[P60] Yanyan Lu‡, **Jyh-Ming Lien**, Mukulika Ghosh and Nancy Amato, "Alpha Decomposition of Polygons", in the Proc. of the Shape Modeling International (SMI), May, 2012.

[P61] Fernando Camelli, Rainald Löhner, **Jyh-Ming Lien** and David Wong, "Comparing Four Different CFD Approaches to Simulate Transport and Dispersion in Oklahoma City", *17th Conference on Air Pollution Meteorology with the A&WMA*, Part of the 92nd AMS Annual Meeting, Louisiana, New Orleans, Jan. 2012.

[P62] Yanyan Lu‡, Evan Behar‡, Stephen Donnelly‡, **Jyh-Ming Lien**, Fernando Camelli, and David Wong, "Fast and Robust Generation of City-Scale Seamless 3D Urban Models", in *Proc. SIAM Conference on Geometric and Physical Modeling (GD/SPM)*, Orlando, Florida, Oct. 2011. **Nominated for best paper award (6/72 papers)**

[P63] Yanyan Lu‡ and **Jyh-Ming Lien**, "Finding Critical Changes in Dynamic Configuration Spaces", *in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2011)*, San Francisco, CA, Sep. 2011.

[P64] Evan Behar‡ and **Jyh-Ming Lien**, "Fast and Robust 2D Minkowski Sum Using Reduced Convolution", *in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2011)*, San Francisco, CA, Sep. 2011.

[P65] **Jyh-Ming Lien**, Fernando Camelli, and David Wong, "Fast and Robust Generation of City Scale Urban Ground Plan", *In Proc. Computer Graphics International (CGI)*, Ottawa, Ontario, Canada, June 2011. Also invited to republish in *the Visual Computer*.

[P66] Evan Behar‡ and **Jyh-Ming Lien**, "Dynamic Minkowski Sum of Convex Shapes", *In Proc. IEEE Int. Conf. Robot. Autom. (ICRA)*, Shanghai, China, May 2011.

[P67] Christopher Vo‡ and **Jyh-Ming Lien**, "Following a Large Unpredictable Group of Targets Among Obstacles", *The Third International Conference on Motion in Games 2010*, Zeist, Netherlands, November, 2010.

[P68] Joseph F. Harrison‡, Christopher Vo‡ and **Jyh-Ming Lien**, "Scalable and Robust Shepherding via Deformable Shapes", *The Third International Conference on Motion in Games 2010*, Zeist, Netherlands, November, 2010.

[P69] **Jyh-Ming Lien** and Yanyan Lu‡, "Planning Motion in Point-Represented Contact Spaces Using Approximate Star-Shaped Decomposition", *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, St. Louis, Missouri, Oct. 2009.

[P70] Christopher Vo‡, Joseph F. Harrison‡ and **Jyh-Ming Lien**, "Behavior-Based Motion Planning for Group Control", *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, St. Louis, Missouri, Oct. 2009.

[P71] **Jyh-Ming Lien** and Yanyan Lu‡, "Planning Motion in Similar Environments", *Proceedings of the Robotics: Science and Systems Conference (RSS)*, Seattle, Washington, Jun. 2009.

[P72] **Jyh-Ming Lien** and Emlyn Pratt[†], "Interactive Planning for Shepherd Motion", *Proceedings of the AAAI Spring Symposium*, Stanford University, CA, March 2009.

[P73] **Jyh-Ming Lien**, "A Simple Method for Computing Minkowski Sum Boundary in 3D Using Collision Detection", *Proceedings of the Eighth International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, Guanajuato, Mexico, Dec. 2008.

[P74] **Jyh-Ming Lien**. "Hybrid Motion Planning Using Minkowski Sums", *Proceedings of the Robotics: Science and Systems Conference (RSS)*, Zurich, Switzerland. Jun. 2008.

[P75] **Jyh-Ming Lien**, Gregorij Kurillo, Ruzena Bajcsy. "Skeleton-Based Data Compression for Multi-Camera Tele-immersion System", *Proceedings of the Advances in Visual Computing: Proceedings of the 3rd Intl. Symp. on Visual Computing (ISVC 2007)*, Lecture Notes in Computer Science, Vol. 4841, Berlin, Germany: Springer-Verlag, 2007, pp. 714–723.

[P76] **Jyh-Ming Lien**. "Point-Based Minkowski Sum Boundary", *Proceedings of the Pacific Conference on Computer Graphics and Applications (Pacific Graphics)*, Maui, Hawaii, Nov. 2007, pp. 261–270. (Cover image) **Invited for journal re-publication in a special issue of COMPUTER AIDED GEOMETRIC DESIGN (CAGD) featuring selected papers**.

[P77] **Jyh-Ming Lien** and Ruzena Bajcsy. "Skeleton-Based Compression of 3-D Tele-Immersion Data", *Proceedings of the ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC)*, Vienna, Austria, Sep. 2007, pp. 347–354.

[P78] **Jyh-Ming Lien**. "Approximate Star-Shaped Decomposition of Point Set Data", *Proceedings of the IEEE/Eurographics Symposium on Point Based Graphics (PBG)*, Prague, Czech Republic, Sep. 2007.

[P79] Samuel Rodríguez, **Jyh-Ming Lien**, and Nancy Amato. "A Framework for Planning Motion in Environments with Moving Obstacles", *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Diego, Oct 2007, pp. 3309–3314.

[P80] **Jyh-Ming Lien** and Nancy M. Amato. "Approximate Convex Decomposition of Polyhedra", *Proceedings of the ACM Symposium on Solid and Physical Modeling (SPM)*, Beijing, China, June 2007, pp. 121 131. (Back cover image) **Invited for journal re-publication in a special issue of COMPUTER AIDED GEOMETRIC DESIGN (CAGD) featuring selected papers**.

[P81] Dawen Xie, Marco A. Morales A., Roger Pearce, Shawna Thomas, **Jyh-Ming Lien** and Nancy M. Amato. "Incremental Map Generation (IMG)", *Proceedings of the Workshop on Algorithmic Foundations of Robotics (WAFR)*, New York City, July, 2006.

[P82] **Jyh-Ming Lien**, John Keyser, and Nancy M. Amato. "Simultaneous Shape Decomposition and Skeletonization", *Proceedings of the ACM Symposium on Solid and Physical Modeling (SPM)*, Cardiff, UK, June 2006, pp. 219–228.

[P83] Aimée Vargas, **Jyh-Ming Lien** and Nancy M. Amato. "VIZMO++: a Visualization, Authoring, and Educational Tool for Motion Planning", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Orlando, May 2006, pp. 727–732.

[P84] Samuel Rodríguez, **Jyh-Ming Lien**, Nancy M. Amato. "Planning Motion in Completely Deformable Environments", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Orlando, May 2006, pp. 2466–2471.

[P85] Samuel Rodríguez, Xinyu Tang, **Jyh-Ming Lien**, Nancy M. Amato. "An Obstacle-based Rapidly-exploring random tree (OBRRT)", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Orlando, May 2006, pp. 895–900.

[P86] **Jyh-Ming Lien**, Samuel Rodríguez, Jean-Phillipe Malric and Nancy M. Amato. "Shepherding Behaviors with Multiple Shepherds", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Barcelona, Spain, April 2005, pp. 3413–3418.

[P87] O. Burchan Bayazit, **Jyh-Ming Lien** and Nancy M. Amato. "Swarming Behavior Using Probabilistic Roadmap Techniques", *Proceedings of the International Workshop Swarm Robotics (SAB'04)*, Santa Monica, July 2004, pp. 112–125. *Lecture Notes in Computer Science*, Jan 2005, 3342/2005:112-125.

[P88] **Jyh-Ming Lien** and Nancy M. Amato. "Approximate Convex Decomposition for Polygons", *Proceedings of the 20th Annual ACM Symposium on Computational Geometry (SoCG'04)*, New York, June 2004, pp. 17–26. **Invited for journal re-publication in a special issue of Computational Geometry: Theory & Applications featuring selected papers**.

[P89] **Jyh-Ming Lien**, O. Burchan Bayazit, Ross T. Sowell, Samuel Rodríguez, and Nancy M. Amato. "Shepherding Behaviors", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, New Orleans, April 2004, pp. 4159–4164.

[P90] **Jyh-Ming Lien**, Shawna L. Thomas, and Nancy M. Amato. "A general framework for sampling on the medial axis of the free space", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Taipei, Taiwan, September 2003, pp. 4439–444.

[P91] O. Burchan Bayazit, **Jyh-Ming Lien**, Nancy M. Amato, "Better Group Behaviors in Complex Environments with Global Roadmaps", *Proceedings of the 2002 Artificial Life (ALIFE): The 8th International Conference on the Simulation and Synthesis of Living System.s*, Sydney, Australia, December 2002, pp. 362–370.

[P92] O. Burchan Bayazit, **Jyh-Ming Lien**, Nancy M. Amato, "Better Group Behaviors using Rule-Based Roadmaps", *Proceedings of the Workshop on Algorithmic Foundations of Robotics (WAFR)*, Nice, France, December 2002, pp. 95–111.

[P93] O. Burchan Bayazit, **Jyh-Ming Lien**, Nancy M. Amato, "Roadmap-Based Flocking for Complex Environments", *Proceedings of the 2002 Pacific Graphics (PG)*, Beijing, China, October 2002, pp. 104–113.

[P94] O. Burchan Bayazit, **Jyh-Ming Lien**, Nancy M. Amato, "Probabilistic Roadmap Motion Planning for Deformable Objects", *Proceedings of the 2002 IEEE International Conference on Robotics and Automation (ICRA)*, Washington DC, May 2002, pp. 2126–2133.

[P95] Tsai-Yen Li, **Jyh-Ming Lien**, Shih-Yen Chiu, and Tzong-Hann Yu, "Automatically Generating Virtual Guided Tours", *Proceedings of the Computer Animation '99 Conference (CA'99)*, Geneva, Switzerland, May 1999, pp. 99–106.

## Publications in Refereed Book Chapters

[P96] Zhongdi Luo, Yi-Jen Chiang, **Jyh-Ming Lien** and Chee Yap, "Resolution-Exact Algorithms for Link Robots", in the *Algorithmic Foundation of Robotics XI*, pp. 353–370, Springer, 2015. Selected Contribution of *Proc. of the Eleventh International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, August 2014, Bogazici University, Istanbul, Turkey.

[P97] Yanyan Lu[‡] and Zhonghua Xi[‡] and **Jyh-Ming Lien**, "Predict Collision Among Rigid and Articulated Obstacles with Unknown Motion", in the *Algorithmic Foundation of Robotics XI*, pp. 161–177, Springer, 2015. Selected Contribution of *Proc. of the Eleventh International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, August 2014, Bogazici University,

Istanbul, Turkey. **Invited for journal re-publication in a special issue of International Journal of Robotics Research (IJRR) featuring selected papers.**

[P98]  **Jyh-Ming Lien**, "A Simple Method for Computing Minkowski Sum Boundary in 3D Using Collision Detection", Algorithmic Foundations of Robotics VIII, pp. 400–416, Springer, 2010. Selected Contribution of [P73].

[P99]  Dawen Xie, Marco A. Morales A., Roger Pearce, Shawna Thomas, **Jyh-Ming Lien** and Nancy M. Amato. "Incremental Map Generation (IMG)", *Algorithmic Foundation of Robotics VII*, pp. 53–68, Springer, 2008. Selected Contribution of [P81].

[P100]  O. Burchan Bayazit, **Jyh-Ming Lien**, Nancy M. Amato, "Better Group Behaviors using Rule-Based Roadmaps", *Algorithmic Foundation of Robotics V*, pp. 95–112, Springer, 2004. Selected Contribution of [P92].


## Lightly Refereed Publications and Posters

($\leq$ two reviews)

[P101]  Zhonghua Xi, **Jyh-Ming Lien**, Yi-Chang Chiu and C. Y. David Yang, "Visualize Route Choice in Vehicle Trajectory Data", *Proceedings of the 15th TRB Transportation Planning Applications Conference*, Jan., 2015, Ocean City, NJ.

[P102]  Christian D. Langevin, Sorab Panday, and **Jyh-Ming Lien**, "Domain Discretization Considerations for MODFLOW-USG", in *MODFLOW and More 2013 conference*, June 2013.

[P103]  Christian Langevin, Sorab Panday, Joseph Hughes, and **Jyh-Ming Lien**, "Modeling Saltwater Intrusion using Adaptive Mesh Refinement", American Geophysical Union (AGU), 45th annual Fall Meeting, San Francisco, CA, Dec. 2012.

[P104]  Christopher Vo and **Jyh-Ming Lien**, "Group Following in Monotonic Tracking Regions', '*22th Annual Fall Workshop on Computational Geometry*, College Park, MD, Oct 2012.

[P105]  Fernando Camelli, **Jyh-Ming Lien**, and David Wong, "Transport and Dispersion Simulation in Downtown Oklahoma City and New York City", Tech Talks, Poster and Video Demo, in the Proc. of the Computing for Geospatial Research, July, 2012.

[P106]  Stephen Donnelly[‡], Yanyan Lu[‡], Evan Behar[‡] and **Jyh-Ming Lien**, "Estimating Penetration Depth of Convex Polyghedra Using Dynamic Minkowski Sum", Contributed Presentation Abstract, *SIAM Conference on Geometric and Physical Modeling (GD/SPM11)*, Orlando, Florida, Oct. 2011.

[P107]  Christopher Vo[‡] and **Jyh-Ming Lien**, "Reusable Sampling-Based Techniques for Manipulation via Pushing", *the Workshop on Progress and Open Problems in Motion Planning, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2011)*, San Francisco, CA, Sep. 2011.

[P108]  Evan Behar[‡] and **Jyh-Ming Lien**, "Extracting the Minkowski Sum Boundary from the Reduced Convolution", *20th Annual Fall Workshop on Computational Geometry*, Stony Brook, NY, Oct 2010.

[P109]  Christopher Vo[‡] and **Jyh-Ming Lien**, "Visibility-Based Strategies for Searching and Tracking Unpredictable Coherent Targets Among Known Obstacles", *IEEE International Conference on Robotics and Automation (ICRA 2010) Workshop: Search and Pursuit/Evasion in the Physical World: Efficiency, Scalability, and Guarantees*, Anchorage, AK, May 2010.

[P110] Christopher Vo‡ and **Jyh-Ming Lien**, "Following Multiple Unpredictable Coherent Targets Among Obstacles", *Proceedings of the ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (i3D)*, Poster, Washington DC February, 2010.

[P111] Keith Sullivan and Christopher Vo‡ and Sean Luke and **Jyh-Ming Lien**, "RoboPatriots: George Mason University 2010 RoboCup Team", *Proceedings of 2010 RoboCup Workshop*, 2010.

[P112] **Jyh-Ming Lien**. "Minkowski Sums of Rotating Convex Polyhedra", *Proceedings of the ACM Symposium on Computational Geometry (SoCG)*, College Park, Maryland. Video Abstract, Jun. 2008, pp. 228–229. Video Abstract.

[P113] S. Rodriguez, R. Salazar, N. M. Amato, O. B. Bayazit, and J.-M. Lien. "Roadmap-Based Group Behaviors", *Proceedings of the RSS Workshop on Algorithmic Equivalences Between Biological and Robotic Swarms*, Atlanta, June 2007.

[P114] **Jyh-Ming Lien** and Nancy M. Amato. "Approximate Convex Decomposition", *Proceedings of the 20th Annual ACM Symposium on Computational Geometry (SoCG'04)*, New York, June 2004, pp. 457–458. Video Abstract.

[P115] Jyh-Charn Liu, M. Freckleton, **Jyh-Ming Lien**, and Di Wu. "On the Portable Remote Diagnostic Information and Telemedicine System (PoRDITS)", *Proceedings of the 13th IEEE Symposium on Computer-Based Medical Systems (CBMS'00)*, Houston, June 2000, pp. 33-35.

## Tech. Reports and Non-Refereed Publications

(Selected, excluding published or submitted manuscripts)

[P116] Yue Hao ‡, Peiwen J Ma, Huaishu Peng, Edwin A Peraza Hernandez, **Jyh-Ming Lien**, "Metal Blossom: Laser Forming Complex and Freeform Metal Structures Imitating Flower Blooming", *arXiv:2111.15083*, Nov. 2021.

[P117] Zhonghua Xi ‡, Yu-Ki Lee, Young-Joo Lee, Yun-hyeong Kim, Huangxin Wang, Yue Hao ‡, Young-Chang Joo, In-Suk Choi, **Jyh-Ming Lien**, "Super Compaction and Pluripotent Shape Transformation via Algorithmic Stacking for 3D Deployable Structures", *arXiv:1803.03302*, March 2018.

[P118] Yanyan Lu‡, Zhonghua Xi‡and **Jyh-Ming Lien**, "Conservative Advancement Among Obstacles with Unknown Motion", *Technical Report GMU-CS-TR-2013-4*, 2013, George Mason University

[P119] **Jyh-Ming Lien** and Nancy M. Amato. "Polyhedron Realization using Convex Hull Projection", *Technical Report TR05-016*, Parasol Lab., Dept. of Computer Science, December 2005.

[P120] **Jyh-Ming Lien**, Samuel Rodríguez, Xinyu Tang, John Maffei, Daniel Corlette, Arnaud Masciotra, and Nancy M. Amato. "Composable Group Behaviors", *Technical Report TR05-006*, Parasol Lab., Dept. of Computer Science, September 2005.

[P121] Aimée Vargas, **Jyh-Ming Lien**, Marco A. Morales A., Samuel Rodríguez, and Nancy M. Amato. "User-Guided Path Planning", *Technical Report TR05-011*, Parasol Lab., Dept. of Computer Science, September 2005.

[P122] **Jyh-Ming Lien** and Nancy M. Amato. "Approximate Convex Decomposition", *Technical Report TR03-001*, Parasol Lab., Dept. of Computer Science, January 2003.

# Research Grants

## External Research Grants

[G1] ARL: *Modeling of Laser Structures*

- GMU Award Amount: $120,000
- Total Award Amount: $120,000
- Project Period: 2 years (05/01/2019 – 04/30/2021)
- Funding Agency: US Department of the Army
- Project Members: **Jyh-Ming Lien (PI)**

[G2] AFOSR: *DDDAMS-Based Urban Surveillance and Crowd Control via UAV's and UGV's*

- GMU Award Amount: $199,782
- Total Award Amount: $600,000 (Collaborative project with University of Arizona)
- Project Period: 3 years (03/01/2017 – 02/29/2020)
- Funding Agency: Air Force Office of Scientific Research (AFOSR)
- Project Members: Young-Jun Son (PI, Dept. of Systems and Industrial Engineering, University of Arizona), **Jyh-Ming Lien (co-PI, sole GMU PI)**, and Jian Liu (Dept. of Systems and Industrial Engineering, University of Arizona)

[G3] USGS: *Development of Dynamic Gridding Tools for the USGS MODFLOW-USG Computer Program for Simulating Groundwater Flow*

- GMU Award Amount: $39,750
- Project Period: 1 year (09/25/2014 – 09/24/2015)
- Funding Agency: U.S. Geological Survey (USGS)
- Project Members: **Jyh-Ming Lien (Sole PI)**

[G4] USGS: *Development of Advanced Gridding and Visualization Tools for the USGS MODFLOW-USG Computer Program for Simulating Groundwater Flow*

- GMU Award Amount: $72,349
- Project Period: 1 year (06/25/2013 – 06/24/2014)
- Funding Agency: U.S. Geological Survey (USGS)
- Project Members: **Jyh-Ming Lien (Sole PI)**

[G5] CIT CRCF: *3D Modeling and Simulation Software for Defense and Security Operational Planning*

- GMU Award Amount: $119,109
- Total Award Amount: $145,717 (Collaborative project with ClearEdge3D)
- Project Period: 1 year (09/01/2012 – 08/30/2013)
- Funding Agency: Virginia Commonwealth Research Commercialization Fund (CRCF), Center for Innovative Technology
- Project Members: **Jyh-Ming Lien (PI)** and Fernando Camelli (co-PI, College of Science)

[G6] NSF: *EFRI-ODISSEI: Multi-field Responsive Origami Structures - Advancing the Emerging Frontier of Active Compliant Mechanisms* (EFRI-1240459)

- GMU Award Amount: $255,000

- Total Award Amount: $2 million (Collaborative project with Penn. State University)

- Project Period: 4 years (08/01/2012 – 07/31/2016)

- Funding Agency: National Science Foundation (NSF)

- Project Members: Mary Frecker (PI, Dept. of ME, PSU), **Jyh-Ming Lien (co-PI, sole GMU PI)**, Paris von Lockette (Dept. of ME, Rowan Univ.), Zoubeida Ounaies (Dept. of ME, PSU), Timothy Simpson (Dept. of ME, PSU), Rebecca Strzelec (Dept. of Visual Arts, PSU)

[G7] USGS: *Unstructured Grid Design for Control Volume Finite Difference Groundwater Models*

- GMU Award Amount: $49,993

- Total Award Amount: Same as GMU Award Amount.

- Project Period: 1 year (07/10/2012 – 07/9/2013)

- Funding Agency: U.S. Geological Survey (USGS)

- Project Members: **Jyh-Ming Lien (Sole PI)**

[G8] AFOSR: *DDDAMS-based Urban Surveillance and Crowd Control via UAVs and UGVs*

- GMU Award Amount: $171,738

- Total Award Amount: $473,614 (Collaborative project with University of Arizona)

- Project Period: 3 years (05/01/2012 – 04/30/2015)

- Funding Agency: Air Force Office of Scientific Research (AFOSR)

- Project Members: Young-Jun Son (PI, Dept. of Systems and Industrial Engineering, University of Arizona), **Jyh-Ming Lien (co-PI, sole GMU PI)**, and Jian Liu (Dept. of Systems and Industrial Engineering, University of Arizona)

[G9] NSF: *Acquisition of a Light Detection and Ranging (LiDAR) Scanner System* (CNS-1205260)

- GMU Award Amount: $200,775

- Total Award Amount: Same as GMU Award Amount.

- Project Period: 3 years (06/01/2012 – 05/31/2015)

- Funding Agency: National Science Foundation (NSF)

- Project Members: **Jyh-Ming Lien (PI)**, Jana Košecká, Jim Chen, Fernando Camelli, and David Wong.

[G10] FHWA: *VASTO - Evolutionary Agent System for Transportation Outlook*

- GMU Award Amount: $384,666

- Total Award Amount: $1,224,169 (Collaborative project with University of Arizona)

- Project Period: 2.5 years (06/01/2011 – 01/01/2014)

- Funding Agency: U.S. Department of Transportation, Federal Highway Administration (FHWA).

- Project Members: Yi-Chang Chiu (PI, Dept. of Civil Engineering, University of Arizona), **Jyh-Ming Lien (co-PI, sole GMU PI)**

[G11] NSF: *Shape Representation of Large Geometries via Convex Approximation* (IIS-096053)

- GMU Award Amount: $300,000 + $16,000 REU supplement
- Total Award Amount: $500,000 (Collaborative project with Texas A&M University)
- Project Period: 3 years (09/01/09 – 08/31/12) + 1 year of no cost extension
- Funding Agency: National Science Foundation (NSF)
- Project Members: **Jyh-Ming Lien (PI, sole GMU PI)** and Nancy Amato (Texas A&M University)

## Internal Research Grants

I am the PI on both internal grants. Both grants had initiated collaboration and led to external fundings.

[G12] Provost Seed Grant Research Award

- Title: *Beyond Pretty Pictures: Creating Virtual Cities for Simulation*
- Total Award Amount: $16,000
- Project Period: 1 year (09/01/2010 – 08/31/2011)
- Project Members: **Jyh-Ming Lien (sole PI)**
- Remark: This grant initiates the on-going collaboration with David Wong (Dept. of Geography) and Fernando Camelli (School of Physics, Astronomy and Computational Sciences) and leads to an NSF funded project (CNS-1205260) [G6] and the CTI CRCF grant with a local company ClearEdge3D [G5].

[G13] Provost Seed Grant Research Award

- Title: *Shepherd Computing Project*
- Total Award Amount: $20,000
- Project Period: 1 year (02/01/2008 – 1/31/2009)
- Project Members: **Jyh-Ming Lien (sole PI)**
- Remark: This grant initiates the on-going collaboration with the Dept. of Systems and Industrial Engineering, Univ. of Arizona and leads to the 2012 AFOSR funded project [G8] on crowd control via UAVs and UGVs.

# Honors and Awards

[H1] Apr. 2019. Awarded Fellowship of ARL Research Associateship Program (May Aug 2019);

[H2] Nov. 2016. Best Presentation Award at the *Korean Computer Scientists and Engineers Association of America (KOCSEA) Technical Symposium 2016.*

[H3] May 2016. Visiting Scholar Travel Award by the *Ministry of Science and Technology (MOST)*, Taiwan. NT. $56,363

[H4] Jan. 2016. Best Paper Award. "Follow Moving Things in Virtual World", *HCI Korea.*

[H5] Sep. 2015. Mason Emerging Researcher/Scholar/Creator Award. George Mason University, Fairfax, VA.

[H6] Feb. 2015. Brain Pool Program Award, the Korean Federation of Science and Technology, South Korea, providing ≈ $65,000 research and travel support.

[H7] Jan. 2014. Invited to German Academic Exchange Service (DAAD) on Artificial Intelligence and Visual/Multimodal Computing

[H8] May 2013. Young Researcher Award, department of Computer Science, George Mason University

[H9] Paper *Covering Minkowski sum boundary using points with applications* (J-M Lien, 08) is listed as one of the most cited computer aided geometric design articles by CAGD.

[H10] Oct. 2011. Finalist in Best Paper Awards. Paper [P62], *Proc. SIAM Conference on Geometric and Physical Modeling (GD/SPM)*, Orlando, Florida.

[H11] May 2010. Undergraduate-Faculty Apprenticeship Award with $1,000 student stipend. Jyh-Ming Lien and Maryam Jeiran (student).

[H12] Sep. 2007. Undergraduate-Faculty Apprenticeship Award with $1,000 student stipend. Jyh-Ming Lien and Emlyn Pratt (student).

[H13] Feb. 2006. Computing Research Association (CRA) Travel Grant, CRA Academic Careers Workshop, Washington, DC,

[H14] Dec. 2005. Graduate Teaching Academy (GTA) fellow, GTA certificate of completion, Texas A&M University,

[H15] May 2004. Student Research Week, Second Place in Engineering (University-wide annual award recognizing research excellence), Texas A&M University.

[H16] Sep. 2003. NSF Travel Grant, IEEE International Conference on Robotics and Automation (ICRA), Taipei, Taiwan

## Open Source Software

My open source software has been wildly used in academia and industry. (Selected only and very outdated; a complete list is available at http://masc.cs.gmu.edu/wiki/Software and https://github.com/jmlien)

Two Dimensional Minkowski Sum and Benchmarks (first release date: May 2011)

Notable academic and industrial users include: Java Topology Suite (JTS), Datagraph (an Italian textile company), CNC machining (ported to Cython by a 3rd private party), Tsinghua Univ. (China), National Univ. of Sci. & Tech (Pakistan).

Three Dimensional Minkowski Sum and Benchmarks (first release date: Dec. 2008)

Provide the benchmarks for various academic projects, notably, conducted at Université, Lyon 1 (France), UC Berkeley, Ewha Womans Univ. (Korea), International Institute of Molecular and Cell Biology (Poland), Universiti Teknikal Malaysia Melaka (Malaysia), etc.

Two Dimensional Approximate Convex Decomposition (first release date: April 2006)

Provide the benchmarks for various academic and industrial projects. Notable users include people from: AMD, ALTAIS (Spain), Univ. of Washington, Chinese Academic of Science (China), University of Cagliari (Italy), Nanyang Technological Univ. (Singapore), Univ. of Michigan, Univ. of Muenster (Germany), Soongsil Univ. (Korea), TELECOM Sud-Paris (France), etc.

## Courses Taught

**Undergraduate Courses**

Introduction to Low-level Programming (Fall 2011)

Computer Science III (Fall 2009)

Game Programming I (Fall 2020, Fall 2019, Fall 2013)

Game Programming II (Spring 2018, Spring 2017, Spring 2011 – 2015)

Analysis of Algorithms (Spring 2009, Spring 2008, Spring 2007)

Computer Graphics (Fall 2014)

Geometric Computing (Fall 2014, Fall 2010)

Guest lectures on Computer Graphics for CS101 (every semester Fall 2007– Spring 2012)

**Graduate Courses**

Analysis of Algorithms I (Spring 2009)

Computational Geometry (Fall 2015 at Ewha, Fall 2012, Fall 2009, Fall 2008, Fall 2007)

Computational Fabrication (Spring 2016 at Ewha)

Geometric Processing (Fall 2013, Spring 2011)

Deep Geometric Processing (Fall 2020)

# Student Research Mentoring

### Ph.D Students

Yanyan Lu, CS Ph.D, Fall 2007–Fall 2013

First position: Amazon

Thesis topic: Motion Planning in Similar Environments (area: Robotics Motion Planning)

Christopher Vo, CS Ph.D, Spring 2009–Fall 2014

First position: Chief Scientist, Sentien Robotics, Inc.

Thesis topic: Simultaneous Tracking and Manipulation Planning (area: Robotics)

Ph.D. Presidential Fellowship, George Mason University, 2007-2010

Suneeth Nayak Graduated Scholarship Endowment, 2009

Scholarship from Dr. Long Nguyen (Pragmatics Corp), 2011

Scholarship from Office of the Senior Associate Dean / Sunneth Nayak Endowment, 2011

Evan Behar, CS Ph.D Candidate, Spring 2010–Fall 2016

First position: Google

Thesis topic: Dynamic Minkowski Sums (area: Computational Geometry)

Zonghua Xi, CS Ph.D, Fall 2012–Spring 2017

First position: Google

Thesis topic: Making shape foldable (area: Computational Origami)

Guilin Liu, CS Ph.D, Fall 2012–Summer 2018

First position: Nvidia Research Scientist

Thesis topic: Learn to synthesize appearance shape and motion from synthetic data (area: Shape Analysis, Deep Learning)

Yue Hao, CS Ph.D, Fall 2016–Summer 2021

Thesis topic: Computational Design of Laser Foldable Structures

Awarded the Dissertation Completion Grant, Nov 2020

First position: Robotics Infrastructure Software Engineer, ISEE AI

Jixuan Zhi, CS Ph.D, Fall 2018–present

Thesis topic: Deep Reinforcement Learning in Human-Robot Collaboration

Awarded GMU Doctoral Research Scholarship, May 2021

**Masters Students**

Katherine Mercado, Computer and Electornic Engineering, M.S., Spring 2021–

Thesis topic: Shepherding a large group using reinforcement learning

Tonia Lado , Computational Sciences M.S., Fall 2013–Fall 2014

Co-advised with Prof. Fernando Camelli

Thesis topic: LiDAR Point Cloud Registration

Stephen Donnelly, CS M.S., Fall 2011–Spring 2012

Has 2 publications in refereed journals and conferences

Thesis topic: Large Scale Traffic Analysis and Visualization

CS Award for Distinguished Academic Achievement, 2012

Michael Shal, CS M.S., Graduated Spring 2008

Project topic: Scalable Build System

**Undergraduate Students**

Sahra Yusuf, CS major, Fall 2020–, , supported by GMU OSCAR Undergraduate Research Scholars Program

Project topic: Laser-forming Origami Human-Computer Co-design

Saru Kalva, CS major, Fall 2017–Fall 2019

Michael Berghold, CS major, Spring 2017, supported by GMU OSCAR Undergraduate Research Scholars Program

Project topic: Finding Hamiltonian Path on Quad Mesh

Sam McKay, CS major, Fall 2013–Spring 2014

Eugene Paik, CS major, Fall 2011 (NSF REU)

Project topic: Minkowski Sum with Reduced Convolution

Tim Ludwinski, CS major, Spring 2011, Fall 2011

Project topic: Integrate Building Models and DEM Terrain Data.

Mark Henrickson-Mattson, CS major, Summer REU, 2011

Project topic: Camera Tracking in 3D Environments using Game Engines

Ben McWhorter, CS major, Spring 2011–Summer REU, 2011

Project topic: Merging Building Footprints using CGAL

One journal publication

Enter GMU MS CS program 2012

Maryam Jeiran, CS major, Summer 2010 (GMU UAP)

Project topic: GPGPU Programming

Stephen Donnelly, CS major., Fall 2010–Spring 2011

Project topic: Planning Motion for Oil Spill Cleaning

Enter GMU MS CS program 2011

Emlyn Pratt, CS major, Fall 2007–Spring 2009 (GMU UAP)

Project topic: Interactive Shepherding using Laser Pointers

AFCEA scholarship (2008)

IT&E Outstanding undergraduate award (09)

**High School Students**

Eugene Cho, , Intern, the GW Community School, Spring 2018

Kelley Carlisle, Intern, the GW Community School, Spring 2017

Nikhil Garg, Intern, the Thomas Jefferson High School, Summer 2012

Sam McKay, Intern, the GW Community School, Summer 2012

Josh Barton, Intern, the GW Community School, Spring 2012

**Students Whose Ph.D. Committee I am on**

Amirreza Khaleghi, Dept. of Systems and Industrial Engineering, Univ. of Arizona, Advisor: Young-Jun Son (graduated)

Kevin Molloy, Computer Science, Advisor: Amarda Shehu (graduated)

Brian Olson, Computer Science, Advisor: Amarda Shehu (graduated)

Nada Basit, Computer Science, Advisor: Harry Wechsler (graduated)

Nalini Vishnoi, Computer Science, Advisor: Zoran Duric (graduated)

Raheem Rufai, Computer Science, Advisor: Dana Richards

Dan Fleck, Computer Science, Advisor: Zoran Duric (graduated)

Jing Li, Geoinformation Science, Advisor: David Wong (graduated)

Deepak Ropireddy, Molecular Neuroscience, Advisor: Giorgio Ascoli (graduated)

**Students Whose Masters Thesis Committee I am on**

Lisa Mai Huynh, Computer Science, Advisor: Yotam Gingold (graduated)

Michael Paton, Computer Science, Advisor: Jana (graduated) Košecká (graduated)

Brian Olson, Computer Science, Advisor: Amarda Shehu (graduated)

Kevin Molloy, Computer Science, Advisor: Amarda Shehu (graduated)

# Professional Activities and Service

## Editorial Board

IEEE Robotics and Automation Letters, Associate Editor, 2015 – present

IEEE Robotics and Automation Society, Member Activity Board, Associate Vice President, 2018 – present

IEEE International Conference on Robotics and Automation (ICRA), Associate Editor, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Associate Editor, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2007

Robotics: Science and Systems Conference (RSS), Area Chair, 2016

**Program Committee member**

Robotics: Science and Systems Conference (RSS) 2021, 2020, 2018, 2015, 2011, 2010, 2008, 2007

SIAM/ACM Joint Conference on Geometric and Physical Modeling 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010, 2009

IEEE Shape Modeling International (SMI) 2017, 2016, 2015, 2014, 2013, 2012

Shape Modeling International, Fabrication and Sculpting Event (FASE) 2018

International Conference on Geographical Information Systems Theory, Applications and Management (GISTAM), 2019

International Workshop on the Algorithmic Foundations of Robotics (WAFR) 2020, 2014

International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAR) 2014

International Conference on Motion in Game (MIG) 2014, 2013, 2012

Geometric Modeling and Processing (GMP) 2012

ACM SIGSPATIAL GIS 2012

International Conference on Computer Graphics, Visualization and Computer Vision 2012

ACM Computing Frontiers (CF) 2011

Conference on Technologies and Applications of Artificial Intelligence (TAAI) 2012, 2011, 2010

ACM Symposium on Computational Geometry (SoCG) Video and Multimedia 2011

International Workshop on Security in Cloud Computing (SCC) 2009

**Board member**, IEEE Robotics and Automation Society, Electronic Products and Services Board

**Publicity co-chair**, ACM International Conference on Computing Frontiers 2010

**Conference session chair**, IDETC 2014, IEEE/RSJ IROS 2009, 2011, 2013, SMI 2012, SPM 2011, IEEE ICRA 2011, CGI 2011

**Steering Committee member**, IEEE RAS Technical Committee on Algorithms for Planning and Control of Robot Motion 2008–2010

**Committee member**, of Grace Hopper Celebration of Women in Computing Scholarship 2013, 2014

**Frequent reviewer** (selected recent reviews)
**for journals**: IEEE Transactions on Robotics, International Journal of Robotics Research, ACM Transactions on Graphics, Algorithmica, Computer-Aided Design, Computer-Aided Geometric Design, Information Processing Letters, IEEE Transaction on Visualization and Graphics, Autonomous Robots, International Journal of Computer Vision, International Journal of Computational Geometry and Application
**for conferences**: International Workshop on the Algorithmic Foundations of Robotics (WAFR), SIGGRAPH, Eurographics, IEEE Visualization, IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), IEEE International Conference on Robotics and Biomimetics (ROBIO), IEEE Conference on Automation Science and Engineering (CASE), etc.

**Proposal reviewer**

AFOSR reviewer, 2014

NSF panel, CISE 2010, 2013, 2014, 2015, 2016, 2017 (x2), 2018 (x2)

Netherlands Organisation for Scientific Research (NWO), 2010, 2011, 2014

Israel Science Foundation (ISF), 2013, 2015

**Panelist**, UB Border Security and Intelligence Summit, 2018

**Thesis Examination**, National University of Singapore, 2011

**Coach**, ACM International Collegiate Programming Contest (ICPC) for the Department of Computer Science, George Mason University, 2008–present

**Advisor**, ACM Student Chapter, George Mason University, 2010–present

**Judge**, Engineering Senior Design Day, the Catholic University of America, May 2009

**Seminar Organizer**, the GRAND Seminar, the Department of Computer Science, George Mason University, 2007–present

**Member**, MSCS Admission Committee, Computer Science Department, George Mason University, Fall 2007 – Fall 2008

**Member**, Faculty Search Committee, Computer Science Department, George Mason University, Spring 2012

**Member**, Institute of Electrical and Electronics Engineers (IEEE) Robotics and Automation Society, 2002–present

**Member**, Association for Computing Machinery (ACM)

**Member**, Society for Industrial and Applied Mathematics (SIAM)

**Member**, Association for the Advancement of Artificial Intelligence (AAAI)

# Invited Professional Presentations
(These exclude regular conference/workshop paper talks)

[T1] "Folding, Unfolding, and Computational Origami"

**October 2019** Department of CS, Virginia Tech (NOVA center), VA

**August 2018** Seoul National University, Seoul, South Korea

**03/26/2018** University of Richmond, VA

**04/25/2017** Missile Defense Agency, TYCTWD

**11/04/2016** Korean Computer Scientists and Engineers Association of America (KOCSEA) Technical Symposium (Best Presentation Award)

**06/01/2016** National Cheng Chi University, Taipei, Taiwan

**05/31/2016** National Cheng Kung University, Tainan, Taiwan

**05/30/2016** National Taiwan University, Taipei, Taiwan

**03/24/2016** Ewha Womans University, Seoul, South Korea

**03/14/2016** ETRI, Daejeon, South Korea

**11/19/2015** KIST, Seoul, South Korea

[T2] "Approximate Convex Decomposition"

**10/30/2015** Seoul National University, Seoul, South Korea

**Fall 2006** Department of EECS, University of California, Berkeley

**Fall 2006** Department of EECS, University of California, Berkeley

**Mar 2006** Institute of Information Science, Academia Sinica, Taiwan

**Mar. 2005** Department of Computer Science, National Cheng-Chi University, Taiwan

**Feb. 2005** Parasol Seminar, Texas A&M University

**Dec. 2004** Physical and Biological Computing Group seminar, Rice University, TX

**Aug. 2004** SIGGRAPH Poster Session, Los Angeles

**Mar. 2004** Poster presented at Student Research Week, Texas A&M University

[T3] "Shepherding: Control the Motion of a Group via Agent-Agent Interaction"

**06/03/2016** , National Chengchi University, Taipei, Taiwan

**11/09/2015** , Korea/New Zealand HDI4D Workshop

**10/13/2015** KAIST, Daejeon, South Korea

**Nov. 2010** 10th KOCSEA Technical Symposium, Vienna, VA

[T4] "Mesh Repair and Reconstruction of City-Scale Urban Model"

**May 2012** Theory Seminar, Department of CS, University of Maryland, College Park

[T5] "GIS-based Traffic Data Visualization"

**Aug. 2011** Exploratory Advanced Research Workshop

[T6] "Minkowski sums and Its Applications"

**Oct. 2011** Contributed presentation, SIAM CGPM, Orlando, Florida

**Apr. 2010** Department of EECS, Catholic University of America (CUA), Washington DC

**Feb. 2009** Department of CS and IT, University of the District of Columbia, Washington DC

**Dec. 2008** Department of CS, Virginia Tech (NOVA center), VA

**Nov. 2008** Department of CS, University of Maryland, College Park, MD

[T7] "Gross Motion Planning"

**Feb. 2009** Department of Comp. and Data Sciences, George Mason University, VA

[T8] "Simultaneous Shape Decomposition and Skeletonization"

**Sep 2005** Parasol Seminar, Texas A&M University

**May 2005** Texgraph conference, College Station, Texas

[T9] "Neuron PRM: A Framework for Constructing Cortical Networks"

**Feb. 2004** Brain Networks Laboratory, Texas A&M University

**Jul. 2002** Poster presented at the Annual CNS Meeting, Chicago