Lydia Tapia

Contact Information

1 University of New Mexico
Department of Computer Science
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Research Interests

Motion Planning, Robotics, Computational Biology, Machine Learning, Artificial Intelligence, Virtual Reality

Education

Texas A&M University, College Station, Texas

Ph.D., Computer Science, December 2009

- Thesis "Intelligent Motion Planning and Analysis with Roadmap Methods for the Study of Complex and High-Dimensional Motions"
- Advisor: Nancy M. Amato

Tulane University, New Orleans, Louisiana

B.S., Computer Science, May, 1998

- Thesis "The Role of Tulane University in Expanding The Shrinking Pipeline of Women in Engineering and Computer Science"
- Advisor: Johnette Hassell

Honors and Awards

✦ ***Women in Technology Award***, New Mexico Tech Council, 2023

✦ ***Women in STEM Award***, University of New Mexico, 2021

✦ ***Distinguished Alumni***, Texas A&M University, Computer Science and Computer Engineering Department, 2019

✦ ***Faculty in Residence***, Google, Mountain View, California, 2018

✦ ***Best Paper in Service Robotics*** out of 2,500 papers, IEEE International Conference on Robotics and Automation (ICRA), 2018

✦ **International *Computing Research Association Borg Early Career Award***, 2017

✦ ***National Science Foundation CAREER Award***, 2016

✦ **International *Denice Denton Emerging Leader Award***, Anita Borg Institute for Women and Technology, 2015

Administrative Leadership and Experience

Member-at-Large, Association for Computing Machinery (ACM) 2026–2030

- Elected as one of six **international Members-at-Large** to ACM Council, providing governance for the world's largest educational and scientific computing society.
- Provide **strategic leadership and policy oversight** for ACM activities, priorities, and organizational direction.
- Exercise **fiduciary responsibility** through review and approval of annual budgets, financial reports, audit reports, and other governance actions.

- Support **international representation and external engagement** by appointing ACM representatives to other organizations.
- Contribute to **organizational governance** through review and amendment of ACM bylaws and policies.

Elected Board Member, Computing Research Association (CRA) 2023–2029

- Elected to CRA's **North American Board of Directors** through a member election process, recognizing leadership and sustained service to the computing research community.
- Provide **national governance and strategic leadership** for CRA, advancing initiatives that strengthen computing research, graduate education, faculty development, and academic leadership.
- Exercise **fiduciary and budgetary oversight** through service on the Budget and Finance Committee, contributing to financial planning, budget review, and stewardship of organizational resources.
- Support **national computing data infrastructure** through service on the Taulbee Survey Committee, which oversees CRA's annual survey of PhD-granting computing departments on enrollments, degree production, employment outcomes, faculty salaries, and demographic trends.
- Advance **professional-development programming** through organizing committees for national CRA initiatives supporting graduate students and department chairs in computing.

Chair, Department of Computer Science, University of New Mexico 2022–2025

- Secured full **6-year ABET accreditation** and established comprehensive assessment and reporting processes for the department.
- Achieved **15% faculty growth**—the first in over twenty years—completing 100% of approved hires in AI, cybersecurity, systems, and graphics, and successfully recruiting the Cleve Moler & MathWorks Endowed Chair.
- Advanced national visibility in diversity: nearly **50% of faculty are women** and **30% from ethnic minorities**, far exceeding national norms.
- Implemented significant **student success reforms**, including expanded advising capacity, ticketing and drop-in systems, and analytics dashboards for monitoring course outcomes by demographic categories.
- Strengthened **faculty support and retention**, securing all key retentions, implementing a major salary-equity correction for roughly half the faculty, and redesigning department space for collaborative faculty and student use.
- Facilitated **School of Engineering leadership efforts**, including chairing a department-chair search and coordinating cross-department budget alignment with other chairs.
- Expanded **fundraising and external engagement**, launching the School's first crowdfunding campaign and finalizing the $2M Cleve Moler & MathWorks Chair endowment.
- Modernized **financial and staffing infrastructure**, including structured teaching-resource planning, Teaching Assistant/Course Assistant budget realignment, computational infrastructure savings plans, tiered student worker raises, and strategic staff hiring.

Selected National and Institutional Leadership Service

Computing Research Association, Graduate Cohort Southwest Region, Lead Organizer, 2025–2026.
Led a semester-long professional-development series preparing graduate-bound students across three Southwest institutions for success in graduate school, research, mentoring, and academic career pathways.

National Academies of Sciences, Engineering, and Medicine consensus study: *Using Machine Learning in Safety-Critical Applications: Setting a Research Agenda*, Member, 2025.
Contributed to a National Academies consensus study establishing a research agenda for trustworthy and safety-aware machine learning in safety-critical systems.

National Science Foundation Committee of Visitors, Member, CISE-IIS Division, 2023–2024.
Evaluated program portfolio activities, funding decision processes, and the contribution of funded research to NSF's mission and goals.

Cleve Moler & MathWorks Chair in Mathematical and Engineering Software Search Committee, Hiring Officer, 2021–2025.
Completed the hire for the Cleve Moler & MathWorks Chair in Mathematical and Engineering Software through a multi-year process requiring stakeholder alignment and a targeted recruitment campaign.

Gerald May Department of Civil, Construction, and Environmental Engineering Chair Search Committee, Chair, 2023–2024.
Chaired a national department-chair search, synthesizing feedback across faculty, staff, and college leadership to support the final hiring decision.

University of New Mexico Faculty Senate, Faculty Senator, 2016–2017.
Represented the School of Engineering in university-level shared governance, contributing to institutional policy discussions on academic priorities, faculty affairs, student success, and university operations.

Experience

University of New Mexico, Computer Science Department, Albuquerque, New Mexico
Professor **2022–present**
Associate Professor **2017–2022**
Assistant Professor **2011–2017**
Director of the Tapia Lab Research Group.

Google, Mountain View, California
Faculty in Residence **2018**
Worked with Engineering Education and fostered collaboration with Google Brain Robotics.

University of Texas, Institute for Computational Engineering and Sciences, Austin, Texas
Computing Innovation Postdoctoral Fellow **2009–2011**
Studied protein folding using both coarse-grained and all-atom techniques. Research supervised by Professor Ron Elber.

Book

Marco Morales, Lydia Tapia, Gildardo Sánchez-Ante, Seth Hutchinson (Editors),
Algorithmic Foundations of Robotics XIII, Zeist, Springer, June 29, 2020.

Publications in Refereed Journals (*indicates advisee of Tapia)

[1] Birgit Linhart, Rachel M. Grattan, Jon Christian David*, Elton D. Jhamba, Christian Lupinek, Margarete Focke-Tejkl, Michael L. Paffett, Shayna R. Lucero, Rudolf Valenta, Lydia Tapia, Bruna Jacobson, Bridget S. Wilson, Diane S. Lidke, "IgE Occupancy and Antigen Valency Cooperate to Control FcεRI Aggregation Geometry and Signaling Efficiency," *International Journal of Molecular Sciences*, vol. 27, no. 15, Art. 6762, July 2026.

[2] Yazied Hasan*, Adrian B. Faust*, Evan C. Carter, Lydia Tapia, "Exploiting LiDAR Symmetries to Enhance Value Estimation Policies," *IEEE Robotics and Automation Letters*, pp.

4897–4904, April 2026.

[3] Hao-Tien Chiang*, John Baxter*, Satomi Sugaya*, Mohammad R. Yousefi*, Aleksandra Faust, Lydia Tapia, "Fast Deep Swept Volume Estimator," *International Journal of Robotics Research*, 40(10-11), pp. 1068–1086, 2021.

[4] Yazied Hasan*, Arpit Garg*, Satomi Sugaya*, Lydia Tapia, "Defensive Escort Teams for Navigation in Crowds via Multi-Agent Deep Reinforcement Learning," *IEEE Robotics and Automation Letters*, 5(4), pp. 5645–5652, 2020.

[5] Hao-Tien Chiang*, Jasmine Hsu, Marek Fiser, Lydia Tapia, Aleksandra Faust, "RL-RRT: Kinodynamic Motion Planning via Learning Reachability Estimators from RL Policies," *IEEE Robotics and Automation Letters*, 3(3), pp. 4298–4305, 2019.

[6] Hao-Tien Chiang* and Lydia Tapia, "COLREG-RRT: A RRT-based COLREGS-Compliant Motion Planner for Surface Vehicle Navigation," *IEEE Robotics and Automation Letters*, 3(3), 2024–2031, 2018.

[7] Nicholas Malone*, Hao-Tien Chiang*, Kendra Lesser, Meeko Oishi, Lydia Tapia, "Hybrid Dynamic Moving Obstacle Avoidance Using a Stochastic Reachable Set-Based Potential Field," *IEEE Transactions on Robotics*, 33(5), 1124–1138, 2017.

[8] Avanika Mahajan, Lama A. Youssef, Cedric Cleyrat, Rachel Grattan, Shayna R. Lucero, Christopher P. Mattison, M. Frank Erasmus, Bruna Jacobson*, Lydia Tapia, William S. Hlavacek, Mark Schuyler, Bridget S. Wilson, "Allergen Valency, Dose, and FcϵRI Occupancy Set Thresholds for Secretory Responses to Pen a 1 and Motivate Design of Hypoallergens," *The Journal of Immunology*, 198(3), 1034–1046, 2017.

[9] Aleksandra Faust*, Ivana Palunko, Patricio Cruz, Rafael Fierro, Lydia Tapia, "Aerial Suspended Cargo Delivery through Reinforcement Learning," *Artificial Intelligence Journal* Special Issue on Learning and Robotics, 247, 381–398, 2017.

[10] Brittany Hoard*, Bruna Jacobson*, Kasra Manavi*, Lydia Tapia, "Extending Rule-Based Methods to Model Molecular Geometry," *BMC Systems Biology Journal*, 10(2), 121–138, Aug 2016.

[11] Kasra Manavi*, Bruna Jacobson*, Brittany Hoard*, Lydia Tapia, "Influence of Model Resolution on Geometric Simulations of Antibody Aggregation," *Robotica Journal* Special Issue on Robotics Methods for Structural and Dynamics Modeling of Molecular Systems, 34(8), 1754–1776, May 2016.

[12] Aleksandra Faust*, Peter Ruymgaart*, Molly Salman*, Rafael Fierro, Lydia Tapia, "Continuous Action Reinforcement Learning for Control-Affine Systems with Unknown Dynamics," *IEEE/CAA Journal of Automatica Sinica* Special Issue on Extensions of Reinforcement Learning and Adaptive Control, 1(3), 323–336, July 2014.

[13] Nicholas Malone*, Aleksandra Faust*, Brandon Rohrer, John Wood, Lydia Tapia, "Efficient Motion-based Task Learning for a Serial Link Manipulator," *Transactions on Control and Mechanical Systems Journal*, 3(1), 25–35, Jan 2014.

[14] Lydia Tapia, Shawna Thomas, Nancy M. Amato, "A Motion Planning Approach to Studying Molecular Motions," *Journal of Communications in Information and Systems*, 10(1), 53–68, 2010.

[15] Xinyu Tang, Shawna Thomas, Lydia Tapia, David Giedroc, Nancy M. Amato, "Simulating RNA Folding Kinetics on Approximated Energy Landscapes," *Journal of Molecular Biology (JMB)*, 381(4): 1055–1067, Sep 2008.

[16] Shawna Thomas, Xinyu Tang, Lydia Tapia, Nancy M. Amato, "Simulating Protein Motions with Rigidity Analysis," *Journal of Computational Biology (JCB)*, 14(6): 839–855, July 2007.

[17] Lydia Tapia, Xinyu Tang, Shawna Thomas, Nancy M. Amato, "Kinetics Analysis Methods for Approximate Folding Landscapes," *Bioinformatics*, 23(13): i539–i548, July 2007.

[18] Sharon Stansfield, Dan Shawver, Annette Sobel, Monica Prasad, Lydia Tapia, "Design and Implementation of a Virtual Reality System and Its Application to Training Medical First Responders," *Presence Teleoperators and Virtual Environments*, 9(6):524–556, Dec 2000.

Publications in Refereed Conferences (*indicates advisee of Tapia)

[19] Liz DiGioia*, Torin Adamson*, Yazied Hasan*, Lidia S. Obregon, Evan C. Carter, Lydia Tapia. "Navigating With a Defensive Agent: Role Switching for Human Automation Collaboration", in *2023 ACM SIGGRAPH Motion, Interaction and Games (MIG)*, pp. 1–7, Rennes, France, Nov 2023.

[20] Lin Liu, Torin Adamson*, Lydia Tapia, Bruna Jacobson. "Player Exploration Patterns in Interactive Molecular Docking with Electrostatic Visual Cues", in *2023 ACM SIGGRAPH Motion, Interaction and Games (MIG)*, pp. 1–9, Rennes, France, Nov 2023.

[21] John E. G. Baxter*, Torin Adamson*, Yazied Hasan*, Mohammad R. Yousefi*, Lidia S. Obregon, Evan C. Carter, Lydia Tapia. "Virtual Joystick Control Sensitivity and Usage Patterns in a Large-Scale Touchscreen-Based Mobile Game Study", in *2023 ACM SIGGRAPH Motion, Interaction and Games (MIG)*, pp. 1–6, Rennes, France, Nov 2023.

[22] Yazied Hasan*, Ariana M. Villegas-Suarez*, Evan C. Carter, Aleksandra Faust, Lydia Tapia. "Enhancing Value Estimation Policies by Post-Hoc Symmetry Exploitation in Motion Planning Tasks", in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 4812–4819, Detroit, MI, Oct 2023.

[23] John Baxter*, Torin Adamson*, Satomi Sugaya*, and Lydia Tapia, "Exploring Learning for Intercepting Projectiles with a Robot-Held Stick," in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 369–376, Prague, Czech Republic, Sept 2021.

[24] Satomi Sugaya*, Mohammad R. Yousefi*, Andrew R. Ferdinand, Marco Morales, and Lydia Tapia, "Multitask and Transfer Learning of Geometric Robot Motion," in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 9071–9078, Prague, Czech Republic, Sept 2021.

[25] John Baxter*, Mohammad R. Yousefi*, Satomi Sugaya*, Marco Morales, and Lydia Tapia, "Deep Prediction of Swept Volume Geometries: Robots and Resolutions," in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 6665–6672, Las Vegas, NV, USA, Oct 2020.

[26] Arpit Garg*, Hao-Tien Chiang*, Satomi Sugaya*, Aleksandra Faust, Lydia Tapia, "Comparison of Deep Reinforcement Learning Policies to Formal Methods for Moving Obstacle Avoidance," in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 3534–3541, Macau, China, Nov 2019.

[27] Anna Chavez*, Torin Adamson*, Lydia Tapia, Bruna Jacobson, "A Mobile Game for Crowdsourced Molecular Docking Pathways," in *Proceedings of the ACM SIGGRAPH Motion in Games (MIG)*, pp. 1–6, Newcastle on Tyne, United Kingdom, Oct 2019.

[28] Torin Adamson*, Julian Antolin Camarena*, Lydia Tapia and Bruna Jacobson, "Optimizing Low Energy Pathways in Receptor-Ligand Binding with Motion Planning," in *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, San Diego, CA, USA, pp. 2041–2048, Nov 2019.

[29] Hao-Tien Chiang*, Aleksandra Faust, Satomi Sugaya*, Lydia Tapia, "Deep Neural Networks for Swept Volume Prediction," in *International Workshop on Algorithmic Foundations of Robotics (WAFR)*, Merida, Mexico, Dec 2018. Published in
Algorithmic Foundations of Robotics XIII, Zeist, Springer, 2020.

[30] Aleksandra Faust, James Bradley Aimone, Conrad James, Lydia Tapia, "Resilient Computing with Reinforcement Learning on a Dynamical System: Case Study in Sorting," in *IEEE Conference on Decision and Control*, pp. 5999–6006, Miami, FL, USA, Dec 2018.

[31] Aleksandra Faust, Oscar Ramirez, Marek Fiser, Kenneth Oslund, Anthony Francis, James Davidson, Lydia Tapia, "PRM-RL: Long-range Robotic Navigation Tasks by Combining Reinforcement Learning and Sampling-based Planning," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 5113–5120, Brisbane, Australia, May

2018. **Selected as *Best Paper in Service Robotics* out of 2500 accepted papers**

[32] Hao-Tien Chiang*, Baisravan HomChaudhuri*, Lee Smith*, Lydia Tapia, "Safety, Challenges, and Performance of Motion Planners in Dynamic Environments," in *Proceedings of International Symposium on Robotics Research (ISRR)*, pp. 1–16, Puerto Varas, Chile, Dec 2017.

[33] Torin Adamson*, Meeko Oishi, Hao-Tien Chiang*, Lydia Tapia, "Busy Beeway: A Game for Testing Human-Automation Collaboration for Navigation," in *Proceedings of the ACM SIGGRAPH Motion in Games (MIG)*, pp. 9:1–9:6, Barcelona, Spain, Nov 2017.

[34] Hao-Tien Chiang*, Baisravan HomChaudhri*, Abraham P. Vinod, Meeko Oishi, Lydia Tapia, "Dynamic Risk Tolerance: Motion Planning by Balancing Short-Term and Long-Term Stochastic Dynamic Predictions," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3762–3769, Marina Bay Sands, Singapore, May 2017.

[35] Hao-Tien Chiang*, Nathanael Rackley*, Lydia Tapia, "Runtime SES Planning: Online Motion Planning in Environments with Stochastic Dynamics and Uncertainty," in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 4802–4809, Daejeon, South Korea, Oct 2016.

[36] Aleksandra Faust*, Hao-Tien Chiang*, Nathanael Rackley*, Lydia Tapia, "Avoiding Moving Obstacles with Stochastic Hybrid Dynamics using PEARL: PrEference Appraisal Reinforcement Learning," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 484–490, Stockholm, Sweden, May 2016.

[37] Brittany Hoard*, Bruna Jacobson*, Kasra Manavi*, Lydia Tapia, "Extending Rule-Based Methods to Model Molecular Geometry," in *Proceedings of IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pp. 587–594, Washington D.C., USA, Nov 2015.

[38] Hao-Tien Chiang*, Nathanael Rackley*, Lydia Tapia, "Stochastic Ensemble Simulation Motion Planning in Stochastic Dynamic Environments," in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 3836–3843, Hamburg, Germany, Sept 2015.

[39] Aleksandra Faust*, Nicholas Malone*, Lydia Tapia, "Preference-balancing Motion Planning under Stochastic Disturbances," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3555–3562, Seattle, Washington, USA, May 2015.

[40] Hao-Tien Chiang*, Nicholas Malone*, Kendra Lesser, Meeko Oishi, Lydia Tapia, "Path-Guided Artificial Potential Fields with Stochastic Reachable Sets for Motion Planning in Highly Dynamic Environments," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2347–2354, Seattle, Washington, USA, May 2015.

[41] Hao-Tien Chiang*, Nicholas Malone*, Kendra Lesser, Meeko Oishi, Lydia Tapia, "Aggressive Moving Obstacle Avoidance Using a Stochastic Reachable Set Based Potential Field," in *International Workshop on Algorithmic Foundations of Robotics (WAFR)*, Istanbul, Turkey, Aug 2014. Published in H. Akin et al., editors, Algorithmic Foundations of Robotics XI, pp. 73–90, Zeist, Springer, 2015.

[42] Torin Adamson*, John Baxter*, Kasra Manavi*, April Suknot, Bruna Jacobson*, Patrick Kelley, Lydia Tapia, "Molecular Tetris: Crowdsourcing Molecular Docking Using Path Planning and Haptic Devices," in *Proceedings of the ACM SIGGRAPH Motion in Games (MIG)*, pp. 133–138, Los Angeles, CA, USA, Nov 2014.

[43] Rafael Figueroa, Aleksandra Faust*, Patricio Cruz, Lydia Tapia, and Rafael Fierro, "Reinforcement Learning for Balancing a Flying Inverted Pendulum," in *Proceedings of the 11th World Congress on Intelligent Control and Automation (WCICA)*, pp. 1787–1793, Shenyang, China, June 2014.

[44] Nicholas Malone*, Kendra Lesser, Meeko Oishi, Lydia Tapia, "Stochastic Reachability Based Motion Planning for Multiple Moving Obstacle Avoidance," in *Proceedings of the ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, pp. 51–60,

Berlin, Germany, Apr, 2014.

[45] Nicholas Malone*, Kasra Manavi*, John Wood, Lydia Tapia, "Construction and Use of Roadmaps That Incorporate Workspace Modeling Errors," in *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 1264–1271, Tokyo, Japan, Nov 2013.

[46] Aleksandra Faust*, Ivana Palunko, Patricio Cruz, Rafael Fierro, Lydia Tapia, "Learning Swing-free Trajectories for UAVs with a Suspended Load," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4881–4886, Karlsruhe, Germany, May 2013.

[47] Ivana Palunko, Aleksandra Faust*, Patricio Cruz, Lydia Tapia, Rafael Fierro, "A Reinforcement Learning Approach to Suspended Load Manipulation with Aerial Robots," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4887–4894, Karlsruhe, Germany, May 2013.

[48] Kasra Manavi*, Bridget Wilson, Lydia Tapia, "Simulation and Analysis of Antibody Aggregation on Cell Surfaces Using Motion Planning and Graph Analysis," in *Proceedings of ACM Conference on Bioinformatics, Computational Biology and Biomedicine (ACM BCB Short Presentation)*, pp. 458–465, Orlando, FL, USA, Oct 2012.

[49] Troy McMahon, Sam Ade Jacobs, Bryan Boyd, Lydia Tapia, Nancy M. Amato, "Local Randomization in Neighbor Selection Improves PRM Roadmap Quality," in *Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS)*, pp. 4441–4448, Vilamoura, Portugal, Oct 2012.

[50] Nick Malone*, Brandon Rohrer, Lydia Tapia, Ron Lumia, John Wood, "Implementation of an Embodied General Reinforcement Learner on a Serial Link Manipulator," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 862–869, St. Paul, MN, USA, May 2012.

[51] Lydia Tapia, Shawna Thomas, Bryan Boyd, Nancy M. Amato, "An Unsupervised Adaptive Strategy for Constructing Probabilistic Roadmaps," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4037–4044, Kobe, Japan, May 2009.

[52] Lydia Tapia, Xinyu Tang, Shawna Thomas, Nancy M. Amato, "Kinetics Analysis Methods For Approximate Folding Landscapes," in *Proceedings of International Conference on Intelligent Systems for Molecular Biology (ISMB)/European Conference on Computational Biology (ECCB)*, Vienna, Austria, July 2007.

[53] Xinyu Tang, Shawna Thomas, Lydia Tapia, Nancy M. Amato, "Tools for Simulating and Analyzing RNA Folding Kinetics," in *Proceedings of International Conference on Research in Computational Molecular Biology (RECOMB)*, pp. 268–282, San Francisco, CA, USA, Apr 2007.

[54] Shawna Thomas, Xinyu Tang, Lydia Tapia, Nancy M. Amato, "Simulating Protein Motions with Rigidity Analysis," in *Proceedings of International Conference on Research in Computational Molecular Biology (RECOMB)*, pp. 294–409, Venice, Italy, Apr 2006.

[55] Marco Morales, Lydia Tapia, Roger Pearce, Samuel Rodriguez, Nancy M. Amato, "C-space Subdivision and Integration in Feature Sensitive Motion Planning," in *Proceedings of IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3125–3130, Barcelona, Spain, Apr 2005.

[56] Marco Morales, Lydia Tapia, Roger Pearce, Samuel Rodriguez, Nancy M. Amato, "A Machine Learning Approach for Feature-Sensitive Motion Planning," in *International Workshop on Algorithmic Foundations of Robotics (WAFR)*, Utrecht/Zeist, The Netherlands, July 2004. Published in M. Erdmann et al., editors, Algorithmic Foundations of Robotics VI, pp. 361–376, Zeist, Springer, 2005.

Publications in Refereed Workshops (*indicates advisee of Tapia)

[56] Hao-Tien Chiang*, Aleksandra Faust, Lydia Tapia, "Deep Neural Networks for Swept Volume Prediction Between Configurations," in *Proceedings of the Third Workshop on Machine Learning in Planning and Control of Robot Motion Workshop (MLPC 18), IEEE International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, May 2018.

[57] Kasra Manavi*, Sahba Tashakkori*, Lydia Tapia, "Gaussian Mixture Models with Constrained Flexibility for Fitting Tomographic Tilt Series," Computational Structural Bioinformatics Workshop in *Proceedings of the 8th ACM International Conference on Bioinformatics, Computational Biology (ACM-BCB)*, Boston, MA, USA, pp. 710–715, Aug 2017.

[58] Bruna Jacobson, Jon Christian L. David*, Mitchell C. Malone*, Kasra Manavi*, Susan R. Atlas, Lydia Tapia, "Geometric Sampling Framework for Exploring Molecular Walker Energetics and Dynamics," Computational Structural Bioinformatics Workshop in *Proceedings of the 8th ACM International Conference on Bioinformatics, Computational Biology (ACM-BCB)*, Boston, MA, USA, pp. 704–709, Aug 2017.

[59] Aleksandra Faust*, Hao-Tien Chiang*, Nathanael Rackley*, Lydia Tapia, "Dynamic Obstacle Avoidance with PEARL: PrEference Appraisal Reinforcement Learning," in *Proceedings of the Workshop on Machine Learning in Planning and Control of Robot Motion Workshop (MLPC), IEEE International Conference on Intelligent Robots and Systems (IROS)*, Hamburg, Germany, Sept 2015.

[60] Aleksandra Faust*, Nick Malone*, Lydia Tapia, "Planning Preference-balancing Motions with Stochastic Disturbances," in *Proceedings of the Workshop on Machine Learning in Planning and Control of Robot Motion Workshop (MLPC), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Chicago, IL, USA, Sept 2014.

[61] Torin Adamson*, John Baxter*, Kasra Manavi*, Bruna Jacobson*, Lydia Tapia, "Crowdsourced Molecular Docking Using Path-Planning and Haptic Devices," in *Proceedings of the Workshop on Robotics Methods for Structural and Dynamic Modeling of Molecular Systems (RMMS), Robotics Science and Systems (RSS)*, Berkeley, CA, USA, July 2014.

[62] Kasra Manavi*, Lydia Tapia, "Influence of Model Resolution on Antibody Aggregation Simulations," in *Proceedings of the Workshop on Robotics Methods for Structural and Dynamic Modeling of Molecular Systems (RMMS), Robotics Science and Systems (RSS)*, Berkeley, CA, USA, July 2014.

[63] Kasra Manavi*, Alan Kuntz*, Lydia Tapia, "Geometrical Insights into the Process of Antibody Aggregation," in *Proceedings of the AAAI Workshop on Artificial Intelligence and Robotics Methods in Computational Biology (AIRMCB)*, pp. 26–31, Bellevue, WA, USA, July 2013.

[64] Shawna Thomas, Lydia Tapia, Chinwe Ekenna, Hsin-Yi (Cindy) Yeh, Nancy M. Amato, "Rigidity Analysis for Protein Motion and Folding Core Identification," in *Proceedings of the AAAI Workshop on Artificial Intelligence and Robotics Methods in Computational Biology (AIRMCB)*, pp. 38–43, Bellevue, WA, USA, July 2013.

[65] Nick Malone*, Aleksandra Faust*, Brandon Rohrer, John Wood, Lydia Tapia, "Efficient Motion-based Task Learning," in *Proceedings of the Robot Motion Planning Online, Reactive, and in Real-time Workshop, IEEE International Conference on Intelligent Robots and Systems (IROS)*, Vilamoura, Portugal, Oct 2012.

Magazine Articles

Elena Delgado and Lydia Tapia, "Retrospective on a Watershed Moment for IEEE Robotics and Automation Society Gender Diversity [Women in Engineering]", in *IEEE Robotics & Automation Magazine*, 28(3), pp. 163–167, Sept. 2021.

Laura Graesser, Aleksandra Faust, Hadas Kress-Gazit, Lydia Tapia and Risa Ulinski, "Gender Diversity of Conference Leadership [Women in Engineering]," in *IEEE Robotics & Automation Magazine*, 28(2), pp. 126-130, June 2021.

Lydia Tapia and Elena Delgado, "Best Practices: Becoming a Leader Through Conference Organization [Women in Engineering]," in *IEEE Robotics & Automation Magazine*, 27(4), pp. 78-80, Dec 2020.

Elena Delgado and Lydia Tapia, "Robotics Research During a Pandemic [Women in Engineering]," in *IEEE Robotics & Automation Magazine*, 27(3), pp. 17-18, Sept 2020.

Chinwe Ekenna and Lydia Tapia, "Best Practices of Successful Academic Research Labs [Women in Engineering]," in *IEEE Robotics & Automation Magazine*, 26(4), pp. 138-141, Dec 2019.

Chinwe Ekenna and Lydia Tapia, "The Integration of Diversity with Robotics Start-Ups [Women in Engineering]," in *IEEE Robotics & Automation Magazine*, 25(4), pp. 100-104, Dec 2018.

Lydia Tapia, "Workshops to Diversify the Next Generation of Roboticists [Women in Engineering]," in the *IEEE Robotics & Automation Magazine*, 25(3), pp. 103-105, Sept 2018.

Patents (*indicates advisee of Tapia)

"Autonomous Defensive Escort Teams" U.S. Provisional Patent filed, Inventors: Lydia Tapia, Arpit Garg*, 7/2017.

"Redundant Component and Intelligent Computerized Control System for Multi-rotor VTOL Aircraft," U.S. Patent issued: 9,828,107 Inventors: Peter Ruymgaart*, Lydia Tapia, Aleksandra Faust*, Rafael Fierro, 11/2017.

Selected Research Grants Total $13,691,488 ($4,507,208 to Tapia)

Gifts ($176,000 total to Tapia):

- General Atomics: $100,000 (2020, 2021)
- Google: $35,000 (2018)
- Computing Research Association: $21,000 (2015), $20,000 (2016)

DOD Awards ($1,247,881 total to Tapia):

- Army Research Lab, ARL W911NF2120182, *Enhancing human-autonomy teaming through personalized models of decision making*, **PI: Tapia**, $498,703, 2021–2026.
- Army Research Lab, ARL W911NF1920215, *Studying Human Agent Teaming Through Games*, **PI: Tapia**, $440,000, 2019–2021.
- Air Force Research Lab, AFRL FA9453-18-2-0022, *Agile Manufacturing for High Value, Low Volume Production*, PI Fierro, **Lead CoPIs: Tapia**, Taha, Wood, and Yang, CoPIs: Christodoulou, Lumia, Naseri, Oishi, Tehrani $6,677,080 ($309,178 to Tapia), 2018–2023.

NSF Awards ($1,668,161 total to Tapia):

- NSF III Core Program Award, NSF III-1716195, *III: Small: Facilitating Search in the High-Dimensional Space of Molecular Interactions*, PI Jacobson, **CoPI: Tapia**, $507,965 ($250,000 to Tapia), 2017–2022.
- NSF CAREER Award, NSF IIS-1553266, *CAREER: Modeling and Analyzing High-Dimensional Molecular Assembly: Quantifying the Impact of Allergen Structure*, **PI: Tapia**, $551,499, 2016–2022.
- NSF Large Collaborative Algorithmic Foundations Core Program Award, NSF CCF-1518861, *AF: Large: Collaborative Research: Molecular computing for the real world*, PI Stefanovic, **CoPIs: Tapia (UNM)**, Lakin (UNM), Graves (UNM), Teuscher (Portland State University), Stojanovic (Columbia University), and Rudchenko (Hospital For Special Surgery), $2,000,000 ($934,358 to UNM, $200,000 to Tapia), 2015–2022.
- NSF National Robotics Initiative Award, NSF IIS-1528047, **PI: Tapia**, CoPI: Oishi, $999,998 ($666,662 to Tapia), 2015–2020.

- NSF Major Research Instrumentation Award, NSF ACI-1040530, *MRI: Acquisition of a GPU-Accelerated Parallel Supercomputer for Computational Science and Engineering Research at the University of New Mexico*, PI Atlas, **CoPIs: Tapia**, Guo, and Thomas, $435,077 (shared UNM resource), 2011–2015.

NIH Awards ($1,052,529 total to Tapia):

- NIH National Centers for Systems Biology Trainee Award, NIH 5P50GM085273-07, PI Wilson, **Subawardee: Tapia**, $198,470 to Tapia, 2014–2019.
- NIH COBRE Center Trainee Award, NIH P20RR018754, PI Locker, **Subawardee: Tapia**, $854,059 to Tapia, 2011–2015.

Other Awards ($362,637 total to Tapia):

- Lawrence Livermore National Lab, B644908, *Large-Scale Neural Architecture Search using Reinforcement Learning and Neuroevolution Techniques*, **PI: Tapia**, $58,257, 2020–2021.
- Department of Education GAANN Award, *University of New Mexico Artificial Intelligence GAANN Fellowships*, **PI Tapia**, $304,380, 2021–2025.

Courses Taught

Graduate:

- CS 527 "Principles of Artificially Intelligent Machines," Fall 2012, Fall 2013, Fall 2014, Fall 2015, Fall 2016, Spring 2019, Fall 2019, Fall 2020, Fall 2021, Fall 2022, Fall 2023
- CS 591 "Planning Methods for Games, Robots, and Biomolecules," Fall 2011
- CS 591 "Advanced Artificial Intelligence," Spring 2015
- CS 591 "Deep Reinforcement Learning," Fall 2025
- CS 592 "Colloquium," Fall 2015, Spring 2016, Fall 2016
- CS 529 "Machine Learning," Spring 2021
- CS 564 "Introduction to Database Management," Spring 2011, Spring 2012, Spring 2013

Undergraduate:

- CS 259 "Data Structures with Java," Fall 2018
- CS 293 "Social and Ethical Issues in Computing," Fall 2011, Spring 2021, Fall 2023
- CS 362 "Data Structures and Algorithms II," Spring 2020
- CS 427 "Introduction to Artificial Intelligence," Fall 2012, Fall 2013, Fall 2014, Fall 2015, Fall 2016, Spring 2019, Fall 2019, Fall 2020, Fall 2021
- CS 429 "Machine Learning," Spring 2021
- CS 464 "Introduction to Database Management," Spring 2011, Spring 2012, Spring 2013
- CS 491 "Deep Reinforcement Learning," Fall 2025

Research Advisees

Research Advisees

- **Alumni:**

  Postdoctoral researchers (5):

  - Dr. Torin Adamson, Ph.D., UNM; postdoc, 2023–2025. First: Army Research Laboratory Postdoctoral Fellow placed at UNM.
  - Dr. Satomi Sugaya, Ph.D., UNM; postdoc, 2018–2022. First: Research Analyst, Global Energy Monitor.
  - Dr. Baisravan HomChaudhri, Ph.D., U. Cincinnati; postdoc, 2015–2017. First: Assistant Professor, Illinois Institute of Technology. Primary advisor: Meeko Oishi.
  - Dr. Bruna Jacobson, Ph.D., USC; postdoc, 2014–2017. First: Research Assistant Professor, UNM. Current: Assistant Professor, UNM.
  - Dr. A. Peter Ruymgaart, Ph.D., UT Austin; postdoc, 2013–2014. First: Manager of Technology Development, Thermon Manufacturing Company.

Ph.D. alumni (6):

- Dr. Yazied Hasan, Ph.D., Computer Science, UNM, 2025. First: Faculty, King Saud University. Graduation Distinction.
- Dr. Torin Adamson, Ph.D., Computer Science, UNM, 2023. First: Postdoctoral Fellow, Army Research Laboratory. Graduation Distinction.
- Dr. Hao-Tien "Lewis" Chiang, Ph.D., Computer Science, UNM, 2019. First: Research Scientist, Google X.
- Dr. Kasra Manavi, Ph.D., Computer Science, UNM, 2018. UNM Program in Interdisciplinary Biological & Biomedical Sciences Fellow, 2013–2015. First: Postdoctoral Fellow, Simtable.
- Dr. Aleksandra Faust, Ph.D., Computer Science, UNM, 2014. Sandia National Laboratories Doctoral Studies Program Fellow, 2012–2014; New Mexico Space Grant Fellow, 2013–2014; Graduation Distinction; UNM Popejoy Award, 2015. First: Senior Research Technical Staff, Sandia National Laboratories. Current: Google Brain.
- Dr. Nicholas Malone, Ph.D., Computer Science, UNM, 2015. Graduation Distinction. Current: Research Staff, Tau Technologies.

Other additional advisees (summary: 25 mentees: 4 M.S. students, including 2 M.S. theses; 17 undergraduate researchers; and 4 high-school students):

- Mr. Torin Adamson, M.S. thesis, Computer Science, UNM, 2016. Distinction.
- Ms. Ella Algermissen, high school student, Bosque School, Summer 2012.
- Mr. John Baxter, M.S., Computer Science, UNM, 2015.
- Ms. Anna Carey Chavez, B.S., Computer Science, UNM, 2019. Departmental Honors in Research. First: Sandia National Laboratories.
- Mr. Logan Crowley, undergraduate, Computer Science, University of Maryland University College, Summer 2012.
- Ms. Elena Delgado, B.S., Biochemistry, UNM, 2018. First: M.S. student, Computer Science, UNM.
- Adrian Faust, B.S., Computer Science, UNM, 2026. CRA Outstanding Undergraduate Researcher Honorable Mention, 2025. First: Ph.D. student, University of Illinois Urbana-Champaign.
- Mr. Anthony Hickerson, B.S., Computer Science, UNM, 2012.
- Ms. Brittany Hoard, M.S. thesis, Nanoscience and Microsystems Program, UNM, 2015. Distinction.
- Ms. Andrea Howells, undergraduate, Computer Science, SUNY Plattsburgh, 2011. CRA DREU participant.
- Mr. Arpit Garg, M.S., Computer Science, UNM, 2019. Current: Google.
- Mr. Danny Gomez, B.S., Computer Science, UNM, 2015.
- Mr. Elijah Jaffe, high school student, East Mountain High School, 2014.
- Mr. Alan Kuntz, B.S., Computer Science, UNM, 2014. CRA Outstanding Undergraduate Researcher Finalist, 2014, and Honorable Mention, 2013. First: Ph.D. student, UNC Chapel Hill.
- Mr. Frederick Lee, undergraduate, Computer Science, UNM, 2016.
- Mr. Marcos Lemus, undergraduate, Computer Science, UNM, 2015.
- Ms. Erica Lopez, undergraduate, Computer Science, UNM, 2013. CRA DREU participant.
- Ms. Amanda Miner, high school student, Sandia Preparatory School, 2014. NCWIT Aspirations in Computing Runner-Up, 2014–2015.
- Ms. Molly Salman, undergraduate, Mathematics, Austin College, 2013. CRA DREU participant.
- Ms. Valarie Sheffey, B.S., Computer Science, UNM, 2017. First: Software Engineer, Facebook.
- Mr. Lee Smith, undergraduate, Computer Engineering, UNM, 2016–2018.
- Mr. Jonah Spear, high school student, Highland High School, 2014.
- Mr. Sahba Tashakori, B.S., Computer Science, UNM, 2018. First: Ph.D. student, Duke University.

- Ms. Rachel Webster, undergraduate, Computer Science, Lewis & Clark College, 2011. CRA DREU participant.
- Mr. Micaiah "Kage" Weiss, undergraduate, Computer Science, UNM, 2019. First: Sandia National Laboratories.

- **Current:**

  Doctoral:
  - Ali Aslan; John Baxter; Jon David; Elizabeth DiGioia; John O'Fallon; Vadim Polyakov.

  Undergraduate:
  - Robert McDaniels, Computer Science, senior.

Additional Selected Academic Service

IEEE International Conference on Robotics and Automation (ICRA), Editor, 2019–2022.
Served as editor for the flagship conference in robotics, with focus on autonomy and automation for mobility and manipulation.

Robotics and Automation Letters (RA-L), Associate Editor, 2015–2021.
Served as associate editor for a leading peer-reviewed robotics journal.

IEEE Robotics and Automation Society Women in Engineering, Chair, 2018–2021.
Led society-level efforts supporting gender diversity, professional development, and inclusion in robotics and automation.

Workshop on the Algorithmic Foundations of Robotics (WAFR), Conference Co-Chair, 2018.
Co-chaired the thirteenth WAFR conference in Mérida, Mexico, overseeing program organization for 149 attendees, 55 accepted papers, and 5 keynote speakers.

IEEE Robotics and Automation Society Technical Committee on Algorithms for Planning and Control of Robot Motion, Co-Chair, 2015–2018.
Contributed to technical leadership and community-building for researchers working on robot motion planning, algorithms, and control.

***Becoming a Robot Guru: Integrating Science, Engineering and Creativity* Workshop**, Founder and Lead Organizer, 2015, 2016, 2018.
Founded and led broadening-participation workshops at ICRA, RSS, and WAFR to support student development and broaden participation in robotics.

Machine Learning in Planning and Control of Robot Motion Workshop, Founder and Organizer, 2014, 2015, 2018.
Organized a recurring international workshop series at top robotics conferences connecting machine learning, planning, and robot motion.

Robotics: Science and Systems (RSS), Organizing Committee Member and Workshops Co-Chair, 2016.
Coordinated workshop programming for a major international robotics conference.

References

Prof. Christos Christodoulou
Former Dean, School of Engineering
Distinguished Professor
Department of Electrical and Computer Engineering
University of New Mexico
Albuquerque, NM 87131
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Prof. Ann Gates
Former Senior Vice Provost for Faculty Affairs
Senior Advisor to the Provost for Strategic STEM Initiatives
Professor
Department of Computer Science
The University of Texas at El Paso
El Paso, TX 79968
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Prof. Ayanna Howard
Dean
College of Engineering
Ohio State University
Columbus, OH 43210-1226
email: howard.1727@osu.edu
Has been named President of Spelman College, effective August 1, 2026.

Prof. Diane Lidke
Vice Chair for Research
Professor
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