Jie Tan

Curriculum Vitae

Contact Information

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Google Scholar Link
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Areas of Expertise

Machine Learning, Robotics, Computer Graphics, Computer Vision and Computational Photography.

Programming Experience

C/C++, Python, TensorFlow, OpenGL, OpenCV, Eigen, Boost, MKL, TBB and Matlab.

Education

2009 - 2015	PhD of Computer Science at **Georgia Tech**. Advisors: Greg Turk and Karen Liu
2006 - 2009	Master of Computer Science at **Shanghai Jiao Tong University**. Advisor: Xubo Yang
2002 - 2006	Bachelor of Computer Science at **Shanghai Jiao Tong University**.

Work Experience

2024 - present	**Senior Staff Research Scientist** at Google DeepMind Leading the Robot Mobility and Embodied Reasoning Teams. Applying Foundation Models and Deep Reinforcement Learning to robotics applications.
2020 - 2023	**Staff Research Scientist** at Google Led the Robot Locomotion and Safety Teams. Applying Deep Reinforcement Learning to real-world systems, such as robotics and power grids.
2017 - 2020	**Software Engineer** at Google Worked on Deep Learning, Reinforcement Learning and Robotics at the Brain team.
2015 - 2016	**Core Member of Computational Photography** at Lytro Inc. Built the first light field cinematographic camera. Implemented the pipeline for light field video processing. Conducted research on depth sensing, SLAM, 3D reconstruction and image segmentation.
2014 summer	**Research Intern** at Adobe Creative Technology Lab. Conducted research on automatic shape completion of indoor scans using Kinect.
2010 summer	**Software Engineer Intern** at Pixar Animation Studio. Participated in the development of a new animation tool: Menv 3.0. Worked on the animation pipeline for hair/cloth simulations.
2005 - 2006	**Graphics Engineer Intern** at Ubisoft Entertainment. Developed new rendering features and special effects for the game “Brother in Arms: D Day” on PSP. Developed and optimized the sound engine for the game “Ghost Recon 3” on Xbox and PS2.

Publications

2023

Mnemosyne: Learning to Train Transformers with Transformers, Deepali Jain, Krzysztof Marcin Choromanski, Avinava Dubey, Sumeet Singh, Vikas Sindhwani, Tingnan Zhang, Jie Tan, Conference on Neural Information Processing Systems (NeurIPS)

User Preference Optimization for Control of Ankle Exoskeletons using Sample Efficient Active Learning, Ung Hee Lee, Varun S. Shetty, Patrick W. Franks, Jie Tan, Georgios Evangelopoulos, Sehoon Ha, Elliott J. Rouse, Science Robotics

Language to Rewards for Robotic Skill Synthesis, Wenhao Yu, Nimrod Gileadi, Chuyuan Fu, Sean Kirmani, Kuang-Huei Lee, Montse Gonzalez Arenas, Hao-Tien Lewis Chiang, Tom Erez, Leonard Hasenclever, Jan Humplik, Brian Ichter, Ted Xiao, Peng Xu, Andy Zeng, Tingnan Zhang, Nicolas Heess, Dorsa Sadigh, Jie Tan, Yuval Tassa, Fei Xia, Conference of Robot Learning (CoRL)

SayTap: Language to Quadrupedal Locomotion, Yujin Tang, Wenhao Yu, Jie Tan, Heiga Zen, Aleksandra Faust, Tatsuya Harada, Conference of Robot Learning (CoRL)

CAJun: Continuous Adaptive Jumping using a Learned Centroidal Controller, Yuxiang Yang, Guanya Shi, Xiangyun Meng, Wenhao Yu, Tingnan Zhang, Jie Tan, Byron Boots, Conference of Robot Learning (CoRL)

Transforming a Quadruped into a Guide Robot for the Visually Impaired: Formalizing Wayfinding, Interaction Modeling, and Safety Mechanism, J. Taery Kim, Wenhao Yu, Yash Kothari, Jie Tan, Greg Turk, Sehoon Ha, Conference of Robot Learning (CoRL)

On Designing a Learning Robot: Improving Morphology for Enhanced Task Performance and Learning, Maks Sorokin, Chuyuan Fu, Jie Tan, C. Karen Liu, Yunfei Bai, Wenlong Lu, Sehoon Ha, Mohi Khansari, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Discovering Adaptable Symbolic Algorithms from Scratch, Stephen Kelly, Daniel S. Park, Xingyou Song, Mitchell McIntire, Pranav Nashikkar, Ritam Guha, Wolfgang Banzhaf, Kalyanmoy Deb, Vishnu Naresh Boddeti, Jie Tan, Esteban Real, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Best Paper Award Finalist

Learning and Adapting Agile Locomotion Skills by Transferring Experience, Laura Smith, J. Chase Kew, Tianyu Li, Linda Luu, Xue Bin Peng, Sehoon Ha, Jie Tan, Sergey Levine, IEEE Robotics Science and System (RSS)

Robotic Table Wiping via Reinforcement Learning and Whole-body Trajectory Optimization, Thomas Lew, Sumeet Singh, Mario Prats, Jeffrey Bingham, Jonathan Weisz, Benjie Holson, Xiaohan Zhang, Vikas Sindhwani, Yao Lu, Fei Xia, Peng Xu, Tingnan Zhang, Jie Tan, Montserrat Gonzalez, IEEE International Conference on Robotics and Automation (ICRA)

Continuous Versatile Jumping Using Learned Action Residuals, Yuxiang Yang, Xiangyun Meng, Wenhao Yu, Tingnan Zhang, Jie Tan, Byron Boots, Annual Learning for Dynamics & Control Conference (L4DC)

How to Train Your Guide Dog: Wayfinding and Safe Navigation with Human-Robot Modeling, J. Taery Kim, Wenhao Yu, Jie Tan, Greg Turk, Sehoon Ha, ACM/IEEE International Conference on Human-Robot Interaction (HRI)

On the Robustness of Safe Reinforcement Learning under Observational Perturbations, Zuxin Liu, Zijian Guo, Zhepeng Cen, Huan Zhang, Jie Tan, Bo Li, Ding Zhao, International Conference on Learning Representations (ICLR)

2022 **Learning Model Predictive Controllers with Real-Time Attention for Real-World Navigation,** Xuesu Xiao, Tingnan Zhang, Krzysztof Choromanski, Edward Lee, Anthony Francis, Jake Varley, Stephen Tu, Sumeet Singh, Peng Xu, Fei Xia, Sven Mikael Persson, Dmitry Kalashnikov, Leila Takayama, Roy Frostig, Jie Tan, Carolina Parada, Vikas Sindhwani, Conference on Robot Learning (CoRL)

Learning Semantics-Aware Locomotion Skills from Human Demonstrations, Yuxiang Yang, Xiangyun Meng, Wenhao Yu, Tingnan Zhang, Jie Tan, Byron Boots, Conference on Robot Learning (CoRL)

Safe Reinforcement Learning for Legged Locomotion, Tsung-Yen Yang, Tingnan Zhang, Linda Luu, Sehoon Ha, Jie Tan, Wenhao Yu, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

PI-ARS: Accelerating Evolution-Learned Visual-Locomotion with Predictive Information Representations, Kuang-Huei Lee, Ofir Nachum, Tingnan Zhang, Sergio Guadarrama, Jie Tan, Wenhao Yu, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Best Paper Award Finalist

Legged Robots that Keep on Learning: Fine-Tuning Locomotion Policies in the Real World, Laura Smith, J. Chase Kew, Xue Bin Peng, Sehoon Ha, Jie Tan, Sergey Levine, IEEE International Conference on Robotics and Automation (ICRA)

Learning to Navigate Sidewalks in Outdoor Environments, Maks Sorokin, Jie Tan, C. Karen Liu, Sehoon Ha, IEEE Robotics and Automation Letters (RA-L)

Learning and Fast Adaptation for Grid Emergency Control via Deep Meta Reinforcement Learning, Renke Huang, Yujiao Chen, Tianzhixi Yin, Qiuhua Huang, Jie Tan, Wenhao Yu, Xinya Li, Ang Li, Yan Du, IEEE Transactions on Power Systems

2021 **Physics-informed Evolutionary Strategy based Control for Mitigating Delayed Voltage Recovery,** Yan Du, Qiuhua Huang, Renke Huang, Tianzhixi Yin, Jie Tan, Wenhao Yu, Xinya Li, IEEE Transactions on Power Systems

Visual-Locomotion: Learning to Walk on Complex Terrains with Vision, Wenhao Yu, Deepali Jain, Alejandro Escontrela, Atil Iscen, Peng Xu, Erwin Coumans, Sehoon Ha, Jie Tan, Tingnan Zhang, Conference on Robot Learning (CoRL)

Fast and Efficient Locomotion via Learned Gait Transitions, Yuxiang Yang, Tingnan Zhang, Erwin Coumans, Jie Tan, Byron Boots, Conference on Robot Learning (CoRL), Best System Paper Finalist

Learning Agile Locomotion Skills with a Mentor, Atil Iscen, George Yu, Alejandro Escontrela, Deepali Jain, Jie Tan, Ken Caluwaerts, IEEE International Conference on Robotics and Automation (ICRA)

SimGAN: Hybrid Simulator Identification for Domain Adaptation via Adversarial Reinforcement Learning, Yifeng Jiang, Tingnan Zhang, Daniel Ho, Yunfei Bai, C. Karen Liu, Sergey Levine, Jie Tan, IEEE International Conference on Robotics and Automation (ICRA)

Accelerated Derivative-free Deep Reinforcement Learning for Large-scale Grid Emergency Voltage Control, Renke Huang, Yujiao Chen, Tianzhixi Yin, Xinya Li, Ang Li, Jie Tan, Wenhao Yu, Yuan Liu, Qiuhua Huang, IEEE Transactions on Power Systems

How to Train Your Robot with Deep Reinforcement Learning -- Lessons We've Learned, Julian Ibarz, Jie Tan, Chelsea Finn, Mrinal Kalakrishnan, Peter Pastor and Sergey Levine, The International

Journal of Robotics Research (IJRR)

On the use of simulation in robotics: opportunities, challenges, and suggestions for moving forward, HeeSun Choi, Cindy Crump, Christian Duriez, Asher Elmquist, Gregory Hager, David Han, Frank Hearl, Jessica Hodgins, Abhinandan Jain, Frederick Leve, Chen Li, Franziska Meier, Dan Negrut, Ludovic Righetti, Alberto Rodriguez, Jie Tan, Jeff Trinkle, Proceedings of the National Academy of Sciences

2020 **Learning Agile Robotic Locomotion Skills by Imitating Animals**, Xuebing Peng, Erwin Coumans, Tingnan Zhang, Tsang-Wei Lee, Jie Tan and Sergey Levine, IEEE Robotics Science and System (RSS), Best Paper Award.

How to Train Your Robot with Deep Reinforcement Learning -- Lessons We've Learned, Julian Ibarz, Jie Tan, Chelsea Finn, Mrinal Kalakrishnan, Peter Pastor and Sergey Levine, The International Journal of Robotics Research (IJRR).

Learning to Walk in the Real World with Minimal Human Effort, Sehoon Ha, Peng Xu, Zhenyu Tan, Sergey Levine and Jie Tan, Submitted to Conference on Robot Learning (CoRL).

Learning agile locomotion via adversarial training, Yujin Tang, Jie Tan and Tatsuya Harada, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Rapidly Adaptable Legged Robots via Evolutionary Meta-Learning, Xingyou Song, Yuxiang Yang, Krzysztof Choromanski, Ken Caluwaerts, Wenbo Gao, Chelsea Finn and Jie Tan, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Learning Fast Adaptation with Meta Strategy Optimization, Wenhao Yu, Jie Tan, Yunfei Bai, Erwin Coumans, Sehoon Ha, IEEE International Conference on Robotics and Automation (ICRA).

Zero-shot Imitation Learning from Demonstrations for Legged Robot Visual Navigation, Xinlei Pan, Tingnan Zhang, Brian Ichter, Aleksandra Faust, Jie Tan and Sehoon Ha, IEEE International Conference on Robotics and Automation (ICRA).

Autonomous Control of a Tendon-driven Robotic Limb with Elastic Elements Reveals that Added Elasticity can Enhance Learning, Ali Marjaninejad, Jie Tan, and Francisco Valero-Cuevas, International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC).

2019 **Data Efficient Reinforcement Learning for Legged Robots**, Yuxiang Yang, Ken Caluwaerts, Atil Iscen, Tingnan Zhang, Jie Tan, Vikas Sindhwani, Conference on Robot Learning (CoRL).

Learning to Walk via Deep Reinforcement Learning, Tuomas Haarnoja, Sehoon Ha, Aurick Zhou, Jie Tan, George Tucker, Sergey Levine, IEEE Robotics Science and System (RSS).

Adaptive Power System Emergency Control using Deep Reinforcement Learning, Qiuhua Huang, Renke Huang, Weituo Hao, Jie Tan, Rui Fan, Zhenyu Huang, IEEE Transactions on Smart Grid.

NoRML: No-Reward Meta Learning, Yuxiang Yang, Ken Caluwaerts, Atil Iscen, Jie Tan, Chelsea Finn, International Conference on Autonomous Agents and Multiagent Systems (AAMAS).

2018 **Sim-to-Real: Learning Agile Locomotion For Quadruped Robots**, Jie Tan, Tingnan Zhang, Erwin Coumans, Atil Iscen, Yunfei Bai, Danijar Hafner, Steven Bohez and Vincent Vanhoucke. Robotics: Science and Systems (RSS).

Policies Modulating Trajectory Generators, Atil Iscen, Ken Caluwaerts, Jie Tan, Tingnan Zhang, Erwin Coumans, Vikas Sindhwani, Vincent Vanhoucke, Conference on Robot Learning (CoRL).

Optimizing Simulations with Noise-Tolerant Structured Exploration, Krzysztof Choromanski, Atil Iscen, Vikas Sindhwani, Jie Tan and Erwin Coumans. IEEE International Conference on Robotics and

Automation (ICRA).

Learning to Dress: Synthesizing Human Dressing Motion via Deep Reinforcement Learning, Alex Clegg, Wenhao Yu, Jie Tan, Karen Liu, Greg Turk, ACM Transactions on Graphics 34(4), SIGGRAPH Asia.

2017 **Learning to Navigate Cloth using Haptics**, Alexander Clegg, Wenhao Yu, Zackory Erickson, Jie Tan, Karen Liu and Greg Turk. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Preparing for the Unknown: Learning a Universal Policy with Online System Identification, Wenhao Yu, Jie Tan, Karen Liu and Greg Turk. Robotics: Science and Systems (RSS).

Large-Scale Evolution of Image Classifiers, Esteban Real, Sherry Moore, Andrew Selle, Saurabh Saxena, Yutaka Leon Suematsu, Jie Tan, Quoc V. Le and Alexey Kurakin. International Conference on Machine Learning (ICML).

Haptic Simulation for Robot-Assisted Dressing, Wenhao Yu, Ariel Kapusta, Jie Tan, Charles C. Kemp, Greg Turk and Karen Liu. IEEE International Conference on Robotics and Automation (ICRA).

2016 **Simulation-Based Design of Dynamic Controllers for Humanoid Balancing**, Jie Tan, Zhaoming Xie, Byron Boots and Karen Liu. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

2015 **Animating Human Dressing**, Alexander Clegg, Jie Tan, Greg Turk and Karen Liu. ACM Transactions on Graphics 34(4), SIGGRAPH.

Computer Simulations Imply Forelimb-Dominated Underwater Flight in Plesiosaurs, Shiqiu Liu, Adam Smith, Yuting Gu, Jie Tan, Karen Liu and Greg Turk, PLoS Computational Biology 11(12).

2014 **Learning Bicycle Stunts**, Jie Tan, Yuting Gu, Karen Liu and Greg Turk. ACM Transactions on Graphics 33(4), SIGGRAPH.

2012 **Soft Body Locomotion**, Jie Tan, Greg Turk and Karen Liu. ACM Transactions on Graphics 31(4), SIGGRAPH.

2011 **Articulated Swimming Creatures**, Jie Tan, Yuting Gu, Greg Turk and Karen Liu. ACM Transactions on Graphics 30(4), SIGGRAPH.

Stable Proportional-Derivative Controllers, Jie Tan, Karen Liu and Greg Turk. IEEE Computer Graphics and Application (CG&A), 31(4).

A Multi-layer Grid Approach for Fluid Animation, Jie Tan, Xubo Yang, Xin Zhao and Zhanxin Yang. Science in China Series F: Information Sciences, 54(11).

2009 **Physically-based Fluid Animations: A Survey**, Jie Tan and Xubo Yang. Science in China Series F: Information Sciences, 52(5).

2008 **Fluid Animations with Multi-layer Grids**, Jie Tan, Xubo Yang, Xin Zhao and Zhanxin Yang. ACM SIGGRAPH/Eurographics Symposium of Computer Animation (Poster).

Honors and Awards

2020 Best Paper Award at Robotics: Science and Systems.

2013 Foley Scholar.

2008 Tung OOCL Scholarship.

2006 Project Award in “Brother in Arms: D Day” at Ubisoft.

2004 and 2003 University Scholarship at Shanghai Jiao Tong University.

2002 Honored Class during undergraduate study.

Selected Talks

2023 **Towards Training Robots with Internet-Scale of Data,** Invited talk at Maryland Robotics Center Seminar.

Foundation Models for Robotics, Invited talk at Texas Robotics Symposium.

Robot Dog Companion – A Path Towards Embodied AGI, Invited talk experiment-oriented locomotion and orientation research workshop at RSS.

Towards Training Robots with Internet-Scale of Data, Invited talk at Learning from Diverse, Offline Data workshop at ICRA.

Learning Visual-Locomotion for Legged Robots, Invited talk at Stanford Vision and Learning Lab.

2022 **Building Robots that Learn by Themselves,** University of Tokyo.

Emergency Control in Large-Scale Power System using Deep Reinforcement Learning, IEEE PES General Meeting.

Autonomous, Safe and Efficient Learning of Locomotion Skills in the Real World, Invited talk at Texas Robotics, University of Texas, Austin.

Autonomous, Safe and Efficient Learning of Locomotion Skills in the Real World, ACC workshop on Towards Safe Legged Locomotion in Complex Environments: Learning, Estimation, Planning, and Autonomy.

2021 **Learning Locomotion: From Simulation to Real World,** Machine Learning Seminar @ Gatech

Emergency Control in Large-Scale Power System using Deep Reinforcement Learning, Keynote at Workshop on Applied Machine Learning for Intelligent Energy Systems at ACM e-energy

Learning Robot Locomotion: From Simulation to Real World, Dartmouth College.

Deep Reinforcement Learning -- From Simulation to Real World, Eindhoven Reinforcement Learning Seminar, Eindhoven University of Technology.

2020 **From Simulation to Real World,** Guest Lecture of CS348I: Computer Graphics in the Era of AI, Stanford University, USA.

Learning from Animals: From Virtual Characters to Real Robots, Synthetic Characters Conference, Google, USA.

Learning Legged Locomotion, BAIR Commons Workshop, University of California, Berkeley, USA.

2019 **Controlling Robots and Power Grids via Deep Reinforcement Learning,** Solar Colloquium at Department of Energy, Washington D.C., USA.

Can Robots Learn By Themselves, Invited talk at Robotics@Berkeley, University of California, Berkeley, USA.

Learning Legged Locomotion, SIGGRAPH workshop on "Sim-to-Real: From Skilled Virtual Agents to Real-World Robots", Los Angeles, USA.

2018 **Sim-to-Real: Learning Agile Locomotion for Quadruped Robots**, RSS, Pittsburgh, USA.

Learning Locomotion: From Character Animation to Robotics, PhD Intern Research Conference, Google, USA.

Learning Locomotion: From Character Animation to Robotics, Invited Talk, Shanghai Jiao Tong University, China.

2017 **TensorFlow on Robots**, TensorFlow Fall Symposium at Google, USA

	Play with Minitaur, Brain Robotics Team at Google NYC, USA.
2016	**Autonomous Virtual Characters**, Invited Talk, Brain Team at Google, USA.
2015	**Autonomous Virtual Characters**, Cornell CS Colloquium, Cornell, USA.
2014	**Learning Bicycle Stunts**, ACM SIGGRAPH, Vancouver, Canada.
	Learning Bicycle Stunts, Foley Scholar Award Talk, Georgia Tech, USA.
2012	**Soft Body Locomotion**, ACM SIGGRAPH, Los Angeles, USA.
	Modeling Soft Body Animals, Invited Talk, Shanghai Jiao Tong University, China.
2011	**Articulated Swimming Creatures**, ACM SIGGRAPH, Vancouver, Canada.
	Articulated Swimming Creatures, Invited Talk, Shanghai Jiao Tong University, China.
	Articulated Swimming Creatures, GVU Brown Bag, Georgia Tech, USA.

Professional Activities

Program Chair. CoRL 2023.

Conference Area Chair. NeurIPS, ICML, ICLR.

Conference Paper Reviewer. NeurIPS, ICML, ICLR, AAAI, CoRL, ICRA, IROS, SIGGRAPH, SIGGRAPH Asia, SCA, Eurographics, Pacific Graphics, Virtual Reality, Humanoid.

Journal Paper Reviewer. Transactions on Graphics, Transactions on Visualization and Computer Graphics, Computer Graphics Forum, Computer & Graphics, Journal of Computer Science and Technology.

Grant Proposal Reviewer. European Research Council, Google Research Awards, Discovery Grants Program (Natural Sciences and Engineering Research Council of Canada).