

NAN TIAN

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PROFILE

I'm a passionate robotics and AI researcher with 10 years of industry experiences. My expertise includes robotics manipulation, 3D robotics vision, VR/AR tele-operation, parallel computing, and Cloud-Edge Robotics. During my PhD at UC Berkeley, I investigated how to build Cloud-Edge "Hybrid" Robotic systems for dynamic physical human robot interactions (pHRIs). I have also built VR/AR interfaces for (1) tele-operation of robot arms, (2) an efficient text entry for mixed reality goggles (patent P1).

In industry, I have successfully executed numerous robotics projects, as manager, lead scientist, principle engineer, and principle investigator (see list of industry projects on page 2 & 3). I have built and managed research and development team, while continuously advising C-level executives on go-to-market strategies of Cloud-Edge Robotics for embodied AI (Cloudmind Inc.). Lastly, I have proposed, lead, and executed successful large scale industrial and government collaborations as the responsible PI (Siemens), while building strong partnership between the academics and industry (Bosch).

**Fun fact: I worked for and with three co-founders of NeuroLink on brain-machine interface at UCSF, via my computational neural science and biomedical imaging career prior to robotics (page 6)*

EDUCATION

- 08/2020 **Ph.D**, Department of EECS, University of California, Berkeley, CA
– **Majors:** Robotics & Artificial Intelligence **Minor:** Parallel Computing
- 12/2013 **M.S.** in Transnational Medicine (MTM), Bioengineering, UC Berkeley & UCSF
- 08/2009 **B.S/M.S.** Biomedical Engineering (cum laude), CWRU, Cleveland, OH
– Brain Machine Interface and MRI Medical Imaging

ACADEMIC RESEARCH (UC BERKELEY)

Prof Sojoudi's Lab (in Collaboration with Prof. Goldberg) 09/2017 - 08/2020
Ph.D Candidate & Graduate Student Researcher

Ph.D. Thesis ([link](#)):

A Cloud-Edge "Hybrid" Robotic System for Physical Human Robot Interactions

1. Motion Segmentation and Synthesis for Network Latency Mitigation ([ISRR 2019](#), [video](#));
2. Dynamic Visual Servoing using a Self-Balancing Robot for Object Pickups ([ICRA 2019](#), [video](#));
3. Cloud Robotic Human Gesture (Semaphore) Imitation using Visual Feedbacks ([CASE 2019](#)).

Prof Goldberg's Autolab 05/2015 - 09/2017
Ph.D Candidate & Graduate Student Researcher

- Built a Cloud Robotic framework BRASS hosting Dexnet, a grasping recommendation system, to control a dual-arm robot for automatic non-standard chess playing ([ICRA 2017](#), [video](#));
- VR/AR assisted teleoperation for non-standard chess play [video](#)

Other Researches at UC Berkeley

- Platform Agnostic Convolutional Operator Acceleration for deep learning in Berkeley Caffe via auto-tuning (Aspire Lab).

Please see pg 2-3 for Industrial R&D Experiences in Robotics and AI, pg 4-5 for Publications, and pg 6 for Brain-Machine Interface Research, and References are upon request

INDUSTRY EXPERIENCE

Robert Bosch North America Research Center, Sunnyvale, CA

12/2021 - Present

Lead Research Scientist (Tech-Lead Manager), Human Machine Intelligence Group

- Successfully proposed and leading the large-scale collaboration with [Prof. Ken Goldberg](#) at UC Berkeley on Cloud Robotics (3-year collaboration with [Berkeley BAIR](#)),
 - * Widely recognized among Bosch Corporate Research executives
 - * Convinced and managing multiple stockholders for the large-scale collaboration
- **Cloud Robotics System:** reliability, redundancy, and latency aware distributed systems using FogROS for embodied AI ([ICRA 2024](#), [IROS 2024](#), [ICRA 2025 submitted](#), C1);
- **Interactive Visual Perception with Cloud Robotics:**
 - * Life-Long LERF/NERF for semantic inventory monitoring ([IROS 2023 Demo](#), [ICRA 2024](#));
 - * People following and pose estimation in the Cloud for mobile robots ([ICRA 2025 submitted](#)).
 - * Object-Centric interactive gaussian splatt for robotics active perception (in-progress);
- **Human Machine Interaction in Mixed Reality**
 - * **Dynamic Robotics Control in the Cloud:** Collision-free Cloud Robotics Tele-operation using GPU accelerated MPC for intuitive human robot interactions using Hololens ([Video](#), [IROS 2024 Cloud Robotics Workshop](#));
 - * **Smart Glasses:** EyeClick: A Robust Two-Step Eye-Hand Interaction for Text Entry in Augmented Reality Glasses ([UIST 2023 demo](#), [Integrated with ChatGPT](#), patent P1).

Siemens Corp. Technology, Future of Automation, Berkeley, CA

01/2021 - 12/2021

Staff Research Scientist, Technical Expert Track, Projects Owner

- Government project: Automated Bottom Hemming Through Robotic Garment Manipulation ([video](#))
 - * lead principle investigator with 4 industrial and university partners
 - * Innovated on technology and successfully executed the project under pressing timeline
- Successful Government Project Proposal: Visual Tactile Robotic Surface Inspections ([ARM Project](#)):
 - * Explored and negotiated partnerships with multiple industrial and university entities
 - * Led, proposed, and matriculated this government robotics project for aerospace industry
- Vision Guided Robotic Kitting:
 - * led a team to expand on my robotics pick-n-place implementation to complete a robust demo for Siemens executives in Germany;
 - * Successfully renewed and expanded the research project.
- Managed university collaboration with CMU: visual tactile sensing for robotic manipulation

Nikon Research Corporate of America, Belmont, CA

01/2020 - 01/2021

Associate Principle AI Engineer

- Dynamic precision robotic arm control with high speed visual servoings
 - * Presentation to Nikon CTO as one of the innovative development projects
- 3D intelligent robotic vision with deep learning and advanced optimization

INDUSTRY EXPERIENCE CONT'D

Cloudminds Technology Inc, Advanced Research, Santa Clara, CA 05/2016 - 04/2019
Director and Principle Engineer in AI and Robotics (Part-Time)

- Strategized company's robotic R&D vision and provided technical advises, including cloud robotic architectural improvements, to CEO, CTO, and Chief Scientist;
- Created, grew, and managed the AI and Robotics Advanced Research team (4 people) in the US Silicon Valley Robotics Lab
- Led R&D efforts on building robust prove-of-concept demos (POCs) for investor visits, customer engagements, and trade shows (CES, MWC, etc.) with the 4-people research team.
- Designed and implemented prototypes of Cloud-Edge Hybrid Robotics system for Embodied AI
- **Projects/Demos Include:**
 - * Vision based robotics control using Cloud Robotics ([grasping, 2016](#), [humanoid gesture, 2017](#));
 - * Cloud-based human-robot-interaction and immersive tele-operation in AR/VR ([video 2016](#))
 - * humanoid robot controls via imitation learning; ([XR1 Robot Grasping, MWC 2019](#))

Grafty Inc, Sunnyvale, CA 09/2015-04/2016
Senior Software Engineer, First Engineer Hire under CTO

- Lead developer (80% of the production code) of a real-time heart-rate detector on a smart phone using face landmark detection and tracking (iOS, C++, Dlib, Apha-Face) to gamify excises on gym/fitness equipments

PATENTS

- P1. System and method for coarse and fine selection keyboard user interfaces, Patent NO: US-12026366-B2
- P2. System and Method for Multi-Modal Input and Editing on Human Machine Interface, Patent NO: US-20240231580-A9
- P3. Automatic Bin Detection for Robotic Applications, Patent NO: US-20240066723-A1
- P4. Sensor control system for coanda-based end effectors Patent NO.: WO2024035432A1
- P5. Planar object segmentation (for Robotics kitting), Patent NO.: US20230228688A1
- P6. Training Mobile Robot Traversability Detection with Simulated Data (Filed, In-process)
- P7. Systems and Methods for Dynamically Offloading Robotic Computation to the Cloud (Filed, In-process)
- P8. Intelligent Mobile Robot Task Assignment using Augmented Reality and 3D Semantic Maps (Filed, In-process)
- P9. Efficient View Selection and 3D Scene Reconstruction for Mobile Robots with Neural Radiance Fields (Filed, In-process)

Conference Papers

- C1. Kaiyuan Chen, Nan Tian, Christian Juette, Tianshuang Qiu, Liu Ren, John Kubiawicz, and Ken Goldberg, “FogROS2-PLR: Probabilistic Latency-Reliability For Cloud Robotics”, *IEEE International Conference on Robotics and Automation (ICRA)* 2025, (Submitted)
- C2. Kaiyuan Chen, Kush Hari, Trinity Chung, Michael Wang, Tian Nan, Christian Juette, Jeffrey Ichnowski, Liu Ren, John Kubiawicz, Ion Stoica, Ken Goldberg “FogROS2-FT: Fault Tolerant Cloud Robotics”, *International Conference on Intelligent Robots and Systems (IROS)* 2024
- C3. Adam Rashid, Chung Min Kim, Justin Kerr, Letian Fu, Kush Hari, Ayah Ahmad, Kaiyuan Chen, Huang Huang, Marcus Gualtieri, Michael Wang, Christian Juette, Tian Nan, Liu Ren, Ken Goldberg. “Cloud-Enabled Lifelong LERF for Semantic Inventory Monitoring” , *IEEE International Conference on Robotics and Automation (ICRA)*, 2024
- C4. Kaiyuan Chen, Michael Wang, Marcus Gualtieri, Nan Tian, Christian Juette, Liu Ren, Jeffrey Ichnowski, John Kubiawicz, Ken Goldberg. “FogROS2-LS: A Location-Independent Fog Robotics Framework for Latency Sensitive ROS2 Applications” , *IEEE International Conference on Robotics and Automation (ICRA)*, 2024
- C5. Nan Tian, Ajay Kumar Tanwani, Ken Goldberg and Somayeh Sojoudi. “Mitigating Network Latency in Teleoperation with Motion Segmentation and Synthesis” , *The International Symposium on Robotics Research (ISRR)*, 2019
- C6. Nan Tian, Ajay Kummam Tanwani, Jinfa Chen, Mas Ma, Robert Zhang, Bill Huang, Ken Goldberg and Somayeh Sojoudi. “A Fog Robotic System for Dynamic Visual Servoing” , *IEEE International Conference on Robotics and Automation (ICRA)*, 2019.
- C7. Nan Tian*, Benjamin Kuo*, Xinhe Ren, Michael Yu, Robert Zhang, Bill Huang, Ken Goldberg and Somayeh Sojoudi. “A Cloud-Based Robust Semaphore Mirroring System for Social Robots” , *IEEE International Conference on Automation Science and Engineering (CASE)*, Munich, Germany 2018.
- C8. Nan Tian*, Matthew Matl*, Jeffrey Mahler, Yu Xiang Zhou, Samantha Staszak, Christopher Correa, Steven Zheng, Qiang Li, Robert Zhang and Ken Goldberg. “A Cloud Robot System using the Dexterity Network and Berkeley Robotics and Automation as a Service (BRASS)” , *IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, Singapore 2017.

Talks, Orals, and Posters

- A1. Invited Industrial Speaker and Panelist: Bosch Cloud Robotics @ ICRA, [Cloud and Fog Robotics Workshop](#) [Tutorial on ROS2 and FogROS2](#), *IEEE International Conference on Robotics and Automation (ICRA)*, 2024
- A2. Nan Tian, Ajay Kumar Tanwani, Somayeh Sojoudi. “Explainable One-Shot Meta-Learning to Imitate Motion Segments of Unseen Human-Robot Interactions” , *International Conference on Intelligent Robots and Systems (IROS)*, 2019
- A3. N. Tian, S. Miocinovic, C. Correa, A. Miller, C. De Hemptinne, P. A. Starr and K. Goldberg. “Intra-Operative Real-Time ECoG Spectrogram for Motion Induced Spectral Change in Patients with Parkinson’s” in *Society of Neural Science Annual Meeting*, San Diego, CA, USA, 2016. (Oral)
- A4. N. Tian, M. Moskewicz, F. Iandola, K. Kuetzer, “Improved GPU Implementation of Convolution Neural Network (CNN) via More Efficient cuBLAS-dgemm,” in *ASPIRE Lab Summer Retreat*, Santa Cruz, CA, USA, 2015.

- A5. N. Tian, A. Kells, A. Yazdan Shahmorad, J. He, J. Bringas, K. H. Rosenbluth, K. Bankiewicz, P. Sabes. “Widespread Cortical expression of ChR2 in Macaque via MR-guided, Convection Enhanced Delivery (CED) of AAV vector to the thalamus,” in *Society of Neural Science Annual Meeting*, San Diego, CA, USA, 2012.
- A6. Nan Tian, Seriana Murphy, Fraser Robb, James Barkovich, Duan Xu, “8 Channel 3T Neonatal MRI Volume Phased Array Receiver Built with Non-overlapping Capacitive Decoupling,” in *Proceedings of the International Astronomical Conference*, Biomedical Engineering Society Annual Meeting, Hartford, CT, USA 2011. (Oral)
- A7. J. Wang, N. Tian, Fraser J. Robb, Albert P. Chen, L. Friesen-Waldner, B. K. Rutt, C. A. McKenzie, “An 8-Channel Coil Array for Small Animal ¹³C MR Imaging,” in *International Society for Magnetic Resonance in Medicine Annual Meeting*, Honolulu, Hawaii, USA 2010.
- A8. N. Tian, Kingman P. Strohl, K. B. Kile, P. Feng, and D. M. Durand, “Chronic Electroencephalography/Electromyograph (EEG/EMG) Interface for Sleep Monitoring on Transgenic Epilepsy Mouse Model Q54C57BL/6-SJL/J,” in *Biomedical Engineering Society Annual Meeting*, St. Louis, MO, USA 2008. (Oral)

(* co-first authors)

JOURNAL PAPERS

- J1. A. Yazdan-Shahmorad*, N. Tian*, V. Kharazia*, L. Samaranch Gusi, A. Kells, J. Bringas, J. He, K. Bankiewicz, P. N. Sabes, “Widespread Optogenetic Expression in Macaque Cortex Obtained with MR-Guided, Convection Enhanced Delivery (CED) of AAV vector to the Thalamus” *Journal of Neuroscience Methods*, 2017. (* co-first authors)
- J2. O. Tymofiyeva, CP Hess, E Ziv, N. Tian, SL Bonifacio, PS McQuillen, DM Ferriero, AJ Barkovich, D. Xu, “Towards the ”baby connectome”: mapping the structural connectivity of the newborn brain.” *PLoS One*, 2012.
- J3. K.B. Kile, N. Tian, and D.M. Durand, “Low frequency stimulation decreases seizure activity in a mutation model of epilepsy.” *Epilepsia*, vol. 51, no. 9, pp. 1745–53, 2010.
- J4. K.B. Kile, N. Tian, and D.M. Durand, “Scn2a sodium channel mutation results in hyperexcitability in the hippocampus in vitro.” *Epilepsia*, vol. 49, no. 3, pp. 488–499, 2008.

(* co-first authors)

BIOMEDICAL ENGINEERING RESEARCH EXPERIENCE

University of California at San Francisco (UCSF), San Francisco, CA 10/2009 - 08/2012
Junior Development Engineer (Joint Appointment)

Department of Neural Physiology

Prof. Philip Sabes' (currently at Neurolink) motor-control and sensory integration lab

- Primate optogenetics: MR-imaging guided intra-cranial delivery to primate brain for optogenetic neural control (abstract: A4; [paper: J1](#));
- Led collaboration with Dr. Kris Bankiewicz's lab in neurosurgery and technology development of convection enhanced delivery to primate thalamus under interventional MRI.
- Implemented human-computer interactive system for primate visio-motor-behavior research;
- Recorded, quantified, encode, and decode primate's motor behavior from neural signals.

Department of Radiology and Biomedical Imaging

Prof. Duan Xu's Lab, support Dr. Jim Barkovich's neonatal MRI clinical trial

- Designed and built an MRI compatible neonatal incubator with 8-channel phased array imaging coil for MRI clinical study of brain asphyxia in neonate babies (talk: A5);
- Processed large scale MR images of clinical neonatal brain scans using high performance computer grid ([paper: J2](#)).

GE Healthcare MR Division, Aurora, Ohio

01/2009-10/2009

Co-op Internship in Advanced Technology Department (ATD)

Supervisor: Fraser Robb, Ph.D

- Designed and built the first phased array RF transmitter/receiver for Hyperpolarized Carbon-13
- Created the first Hyperpolarized Carbon-13 phased array parallel imaging *in vivo* (abstract: A6)
- Electromagnetic field simulation and optimization for MRI RF transceiver designs at 7 Tesla

Case Western Research University, Cleveland Ohio

Department of Biomedical Engineering

08/2003-05/2009

B.S./M.S. Student in Neural Engineering and Medical Imaging

Master's Advisor Prof. Dominique Durand, Ph.D

- **Master's Thesis:** Relationship of Sleep and Epilepsy via Chronic Video EEG/EMG Monitoring of Transgenic Mice (talk: A7; paper: J3, J4)
 - * Built end-to-end rodent chronic video EEG/EMG monitoring and stimulation system to deliver low-frequency electrical stimulation to epileptic Hippo-campus, enabling chronic electrical stimulation experiment and data collection (up to 6 months in duration);
 - * Conducted pre-clinical experiments (surgery) using this chronic *in vivo* setup to show the effectiveness of applying low-frequency electrical stimulations to suppress seizures
- Computer aided electro-magnetic simulation for optimal design of multi-electrode arrays for deep brain stimulation (DBS) treatments in patients with Parkinson Disease (PD)
(REU Undergraduate Summer Fellowship)
- MRI compatible pulse oxymeter with automatic gain control (**Undergraduate Research Award, Department of Biomedical Engineer, CWRU, 2008**)