

# NAN TIAN

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## EDUCATION

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- 08/2020 **Ph.D.**, Department of EECS, University of California, Berkeley, CA  
– **Major:** 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, Medical Electronics, and MRI Medical Imaging

## ACADEMIC RESEARCH (UC BERKELEY)

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

**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: as a grasping recommendation and collective learning system for automatic non-standard chess playing with a dual arm robot ([ICRA 2017](#), [video](#));
- Intraoperative real-time ECoG spectrogram system to monitor motion evoked potentials (PAC) in patients with Parkinson's disease (Society of Neuroscience Conference Talk: A2; [video](#))

### Other Researches at UC Berkeley

- Automatic Blood Vessel Map Extraction for Image-Guided Brain Surgery ([video](#) 2012 computer vision class project);
- Translational research and prototyping to use Z-Space display for virtual colonoscopy with reconstructed CT images (2013 translational medicine program capstone project)
- Platform agnostic auto-tuning to accelerate convolution operator in Berkeley Caffe for optimal GPU performance in deep learning (Aspire Lab).

## REFERENCES

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- **Prof. Somayeh Sojoudi** [sojoudi@berkeley.edu](mailto:sojoudi@berkeley.edu)
- **Prof. Kenneth Goldberg** [goldberg@berkeley.edu](mailto:goldberg@berkeley.edu)

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Please see pg 2-3 for industrial R&D experience in robotics and AI, pg 4-5 for publications, and pg 6 for brain-machine interface and biomedical imaging. I'm also happy to provide more references

## INDUSTRY EXPERIENCE

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### **Dyna Robotics, Redwood City, CA**

10/2022 - Present

*Member of the Technical Staff*

- Robotics imitation learning for robot manipulation (zero-shot).

### **Robert Bosch North America Research Center, Sunnyvale, CA**

12/2021 - 10/2024

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

- Successfully proposed and led 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
- **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](#));
  - \* RDS Cloud: human gesture control of [Rexroth Active Shuttle](#) (Bosch Rob. Focus Day demo)
  - \* Object-Centric interactive Gaussian splat for robotics active perception (in-progress);
- **Human Machine Interaction in Mixed Reality**
  - \* **Dynamic Robotics Control in the Cloud:** Intuitive Robot Arm Teleoperation in Mixed Reality via Cloud Robotics ([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, Prof. Wenzhen Yuan (now at UIUC)

### **Nikon Research Corporate of America, Belmont, CA**

01/2020 - 01/2021

*Associate Principle AI Engineer*

- Dynamic robotic arm control with high speed visual servo ([video](#), [press release in Japanese](#))
  - \* 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

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**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

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- 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, pending)
- P7. Systems and Methods for Dynamically Offloading Robotic Computation to the Cloud (Filed, pending)
- P8. Intelligent Mobile Robot Task Assignment using Augmented Reality and 3D Semantic Maps (Filed, pending)
- P9. Efficient View Selection and 3D Scene Reconstruction for Mobile Robots with Neural Radiance Fields (Filed, pending)

**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 (**IROS Best Student Paper Finalist**)
- 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 Kummur 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. **Nan Tian** 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

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- 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

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**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**)