Kent K. Yamamoto

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EDUCATION

Ph.D., Mechanical Engineering, Duke University | Durham, North Carolina *Aug. 2022 - Present*
- **Advisors:** Dr. Patrick Codd, M.D., Dr. Yash Chitalia, Ph.D. (Co-advisor at University of Louisville)
- **Concentration:** Medical Robotics

B.S., Biomedical Engineering, Georgia Institute of Technology (Georgia Tech) | Atlanta, Georgia *May 2021*
- **Minor:** Robotics
- **Concentration:** Pre-Health

RESEARCH

Brain Tool Lab / HeART Lab, Advisors: Patrick J. Codd / Yash Chitalia *Aug. 2022 – Present*
NSF GRFP, TAST Fellow, GRA – Duke University
- Exploring surgical laser steering modalities for endoscopic surgical robots.
- Designing and fabricating end-effectors for minimally invasive steerable surgical tools
- Modeling tendon-actuated concentric tube robots for endoscopic surgical navigation

Medical Robotics and Automation (RoboMed) Lab, Advisor: Jaydev P. Desai *July 2021 – July 2022*
Staff Research Supporter - Georgia Institute of Technology
- Utilized femtosecond laser to machine meso-scale, tendon-driven, steerable surgical robots
- Machined, assembled, and evaluated 2-mm tendon-actuated steerable surgical graspers
- Created flexible, CT-derived, 3D printable phantom models of the human heart
- Conducted surgical simulation with neurosurgeons for preclinical evaluation of neuroendoscopic robot

Medical Robotics and Automation (RoboMed) Lab, Advisor: Jaydev P. Desai *May 2018 – May 2021*
PURA Scholar, Petit Scholar - Georgia Institute of Technology
- Implemented medical imaging software to create phantom models of the pediatric skull and brain for robotic device testing
- Designed meso-scale bipolar electrocautery tooltip for neuroendoscopic robot
- Wrote IRB protocol for neurosurgical device testing
- Collaborated with neurosurgeons and shadowed surgeries to integrate observations into my research project

Bio-Interfaced Translational Nanoengineering Group, Advisor: W. Hong Yeo *Dec. 2017 – July 2018*
Vertically Integrated Projects (VIP) Researcher - Georgia Institute of Technology
- Aerosol-jet printed flexible, skin-conforming electrode sensors
- Designed and programmed a robotic arm controlled by electrooculography and electroencephalography signals
- Implemented fundamental digital signal processing and machine learning in MATLAB

JOURNAL PUBLICATIONS

1. *(In Preparation)* K. Gao, S. Thornton, S. Barter, O. Oladokun, **K.K. Yamamoto**, L. Triplett, S. Peeler, K.L. Jackson, "Robotic March Madness: A Gamified Approach to Enhancing Resident Engagement in Robotic Surgical Simulation", for *Journal of Surgical Education*
2. *(Under Review)* P. Kheradmand, B. Mordkhani, R. Sankaranarayanan, **K. K. Yamamoto**, T.J. Zachem, P.J. Codd, Y. Chitalia, P. Dupont, "A Comprehensive General Model of Tendon-Actuated Concentric Tube with Multiple Tubes and Tendons", *arXiv preprint,* arXiv:2510.23954
3. *(Under Review)* **K.K. Yamamoto (Co-First Author),** S.M. McDonald, Y. Bu, T.J. Zachem, Y. Chitalia, P.J. Codd, M.L. Becker, "Stereochemically-controlled Barrier Encapsulations for Steerable Neuroendoscope Tools", for *Advanced Materials Technologies*
4. *(Under Review) J. Abdelgadir, T.J. Zachem, S. Adil, S. Chen, E. Ray, B. Wissel, H. Johsnon,* ***K.K. Yamamoto****, A. Husain, C. Cunningham III, P.J. Codd, A. Zomorodi, C.R. Goodwin,* "Interpretable Machine Learning Identification of Blink Reflex Response during Cerebellopontine Angle Surgery", for *Journal of Neurosurgery*
5. *(Under Review)* **K. K. Yamamoto**, O. Oladokun, D. Chen, L. Triplett, S. Barter, C. Reid, T.J. Zachem, B.P. Mann, K.L. Jackson, S. Zani Jr., *"Insufflatable Modular Abdominal Simulation Environment (MASE) for Surgical Training Simulation"*, for *Surgical Innovation*
6. **K.K. Yamamoto (Co-First Author),** P. Kheradmand, E. Webster, K. Sowards, G. Hatheway, K.L. Jackson, S. Zani Jr., J.A. Raffi, D.N. Ayala-Peacock, S.R. Silva, J.D. Bertram, Y. Chitalia, *"The OncoReach Stylet for Brachytherapy: Design Evaluation and Preclinical Trial"*, for *Journal of Medical Robotics Research* ***(Accepted)***

7. **K. K. Yamamoto,** B. Moradkhani (Co-First Author), T.J. Zachem, P.J. Codd, and Y. Chitalia, “Tendon-Actuated Galvanometer Robot (TAGR) Towards Minimally Invasive Hybrid Surgical Laser Steering”, for *IEEE Robotics and Automation Letters (RA-L)* ***(Accepted)***
8. T.J. Zachem, A. Bello, B. Lee, E. Luo, J. Woo, S. Yoo, E. Duerr, E. Massat, A. Hunter, **K.K. Yamamoto**, S.M. Adil, S. Kaplan, R.A. Hachem, A.M. Husain, P.J. Codd, A. Zomorodi, C.R. Goodwin, J. Abdelgadir, “Current state of intraoperative neuromonitoring of the facial nerve during skull base surgery: A systematic review”, *Journal of Clinical Neuroscience,* 2025 Oct, DOI: 10.1016/j.jocn.2025.111525 (Link)
9. **K. K. Yamamoto**, T. J. Zachem, P. Kheradmand, P. Zheng, J.L. Bailey, K. Pieter, P.J. Codd, Y. Chitalia, “Tendon-Actuated Concentric Tube Endonasal Robot (TACTER)”, *Journal of Medical Robotics Research,* 2025 Jun, DOI: 10.1142/S2424905X25500023 (Link)
10. J. Sperber, T.J. Zachem, R. Prakash, E. Owolo, **K. K. Yamamoto**, A.D. Nguyen, H. Hockenberry, W. Ross, J.E. Herndon, P.J. Codd, R. Goodwin, “A Blinded Study Using Laser Induced Endogenous Fluorescence Spectroscopy to Differentiate Spine Tumor, Healthy Muscle, and Healthy Bone”, in *Scientific Reports,* 2024 Jan, DOI: 10.1038/s41598-023-50995-4 (Link)
11. **K.K. Yamamoto**, T.A. Brumfiel, R. Qi, J. J. Chern, J.P. Desai, “Preclinical Evaluation of a Novel Steerable Robotic Neuroendoscope Tool”, in *Operative Neurosurgery,* 2023 Nov, DOI: 10.1227/ons.0000000000000976 (Link)
12. N.J. Deaton T. A. Brumfiel, M. Sheft, **K.K. Yamamoto**, D. Elliott, P. Patel, J.P. Desai, ”Towards Steering a High-Dose Rate Brachytherapy Needle with a Robotic Steerable Stylet," in *IEEE Transactions on Medical Robotics and Bionics,* 2023 Apr, DOI: 10.1109/TMRB.2023.3237861. (Link)
13. Y. Chitalia, S. Jeong (co-first author), **K.K. Yamamoto,** J.J. Chern, J.P. Desai, “Modeling and Control of a Meso-scale Multi-Joint Continuum Robot for Pediatric Neurosurgery,” in *IEEE Transactions on Robotics,* 2021 Apr, DOI: 10.1109/TRO.2020.3031270 (Link)

CONFERENCE PROCEEDINGS

1. C.R. Reid*, A. Haughey, S. Barter, **K.K. Yamamoto**, S. Thornton, K.L. Jackson, S. Zani, J.D. Bertram, B.P. Mann, “Dynamic Motion Metrics for Objective Evaluation of Laparoscopic Camera Navigation Skill”, for *International Symposium on Medical Robotics (ISMR)*, 2025 May, Atlanta, GA, USA
2. **K. K. Yamamoto***, T.J. Zachem, P. Kheradmand, P. Zheng, J.L. Bailey, K. Pieter, P.J. Codd, and Y. Chitalia “Tendon-Actuated Concentric Tube Endonasal Robot (TACTER)”, *International Symposium on Medical Robotics (ISMR),* 2025 May, Atlanta, GA, USA
3. **K.K. Yamamoto***, T. J. Zachem, B. Moradkhani, Y. Chitalia, P.J. Codd, “Towards the Development of a Tendon-Actuated Galvanometer for Endoscopic Surgical Laser Scanning”, *International Symposium on Medical Robotics*, 2024 Jun, Atlanta, GA, USA
4. B. Moradkhani*, P. Kheradmand, H. Jella, **K.K. Yamamoto**, A. Tofangchi, P.J. Codd, Y. Chitalia, “An FBG-based Stiffness Estimation Sensor for In-vivo”, *International Symposium on Medical Robotics*, 2024 Jun, Atlanta, GA, USA
5. **K.K. Yamamoto***, T. J. Zachem, W. Ross, P. Codd, “Incident Angle Study for Designing an Endoscopic Tool for Intraoperative Brain Tumor Detection”, *Hamlyn Symposium on Medical Robotics,* 2023 Jun, London, UK (Link)
6. A. Raman*, R. Odion, **K.K. Yamamoto**, W. Ross, P. Codd, T. Vo-Dinh, “Transfer Learning and Surface-Enhansed Raman Spectroscopy Toward the Rapid Reconstruction of the Surgical Zone”, *Hamlyn Symposium on Medical Robotics,* 2023 Jun, London, UK (Link)
7. R. Prakash*, **K.K. Yamamoto**, S. Oca, W. Ross, P. Codd, “Brain-Mimicking Phantom for Photoablation and Visualization”, *International Symposium on Medical Robotics,* 2023 April, Atlanta, GA, USA (Link)
8. T.A. Brumfiel, **K.K. Yamamoto**, A. Rashid, A. Shigematsu, C. Chapman, S.N. Melkote, J.J. Chern, J.P. Desai*, “Design of a Meso-Scale Grasper for Robotic Pediatric Neuroendoscope Tool”, *Hamlyn Symposium on Medical Robotics,* 2022 Jun, London, UK (Link).

**Denotes Presenter*

PEER-REVIEWED ABSTRACTS

1. **K.K. Yamamoto***, K. Gao, S. Barter, S. Thornton, C. Reid, B. Gilmore, S. Zani Jr., K.L. Jackson, “3D printable, customizable, and low-cost vasculature model for resident suture training”, Association for Surgical Education, 2026 Apr, Atlanta, GA
2. C. Reid*, S. Glomski, Z. Moore, J.D. Bertram, **K.K. Yamamoto**, S. Oca, S. Barter, S. Zani Jr., K.L. Jackson, “Automated Surgical Knot-Tying Skill Assessment Tool Using Computer Vision”, *American College of Surgeons (ACS) - Surgeons and Engineers*, 2026 Mar, Chicago IL, USA
3. **K.K. Yamamoto***, O. Oladokun, D. Chen, L. Triplett, K. Gao, K.L. Jackson, S. Zani Jr, “Low-cost, Patient-Derived, and Insufflatable Modular Abdominal Simulation Environment (MASE) for Surgical Testing”, *American College of Surgeons (ACS) - Surgeons and Engineers,* 2026 Mar, Chicago, IL, USA
4. **K.K. Yamamoto***, T.J. Zachem, J. Abdelgadir, Y. Chitalia, P.J. Codd, “Novel Steerable Robotic tool for Endoscopic Approaches: A Cadaveric Study”, *Congress of Neurological Surgeons (CNS),* 2025 Oct, Los Angeles, CA, USA
5. P. Zheng, **K. K. Yamamoto**, Y. Chitalia, P.J. Codd, “Towards the Development of a Compact Tension Sensing Unit for Tendon Actuation Systems”, *International Symposium on Medical Robotics (ISMR),* 2025 May, Atlanta GA, USA

6. D. Chari-Letts, **K. K. Yamamoto*,** O. Oladokun, W. Chen, L. Triplett, K. L. Jackson, S. Zani, "Dynamic patient-specific ED thoracotomy model for surgical training", *American College of Surgeons - Surgeons and Engineers,* 2025 Mar, Chicago IL, USA
7. O. Oladokun*, **K. K. Yamamoto**, E. Kusa, P. Codd, S. Zani, "Development of a Patient-Specific Hydrogel Liver Phantom with Intra-hepatic Vasculature Architecture, *American College of Surgeons (ACS) Surgical Simulation Summit*, 2024 Mar, Chicago, IL, USA
8. P. J. Codd*, G. Ma, R. Prakash, A. Raman, T. Zachem, **K.K. Yamamoto**, D. Sykes, W. Edward, B. Mann, W. Ross, "3D Multi-sensor-fusion Robotic Laser System for Neurosurgery", *Neurosurgical Society of America 2023 Annual Meeting,* 2023 Jun, MA, USA
9. **K.K. Yamamoto***, Y. Chitalia, S. Jeong, J.J. Chern, J.P. Desai, "Designing a Brain Phantom Model and Surgical Simulation System for Testing Surgical Robots," *Biomedical Engineering Society Annual Meeting*, 2019 Oct, Philadelphia, PA, USA (Link).

POSTER PRESENTATIONS

1. **K.K. Yamamoto***, T.J. Zachem, P. Kheradmand, P. Zheng, J. Abdelgadir, J.L. Bailey, K. Pieter, P.J. Codd, Y. Chitalia, "Tendon-Actuated Concentric Tube Endonasal Robot (TACTER) Cadaveric Study", *Duke Medical Robotics Symposium 2025,* 2025 Oct, Durham, NC, USA
2. **K. K. Yamamoto***, O. Oladokun, D. Chen, L. Triplett, S. Barter, P. Zheng, D. Chari-Letts, K.L. Jackson, S. Zani, "MASE: Modular Abdominal Simulation Environment with Insufflation Functionality for Surgical Training", *Duke Department of Surgery Research Day,* 2025 Apr, Durham, NC, USA
3. **K. K. Yamamoto***, B. Moradkhani (Co-First Author), T. J. Zachem, P. J. Codd, Y. Chitalia, "Hybrid Surgical Laser Steering Robot for Minimally Invasive Surgery", *Duke Medical Robotics Symposium 2024,* 2024 Oct, Durham, NC, USA
4. J. Piland*, **K. Yamamoto,** P.J. Codd, "FPGA Control of 8-DoF Concentric Tube Robot", *Duke University Undergraduate Research Symposium,* 2024 April, Durham, NC, USA
5. **K.K. Yamamoto***, J.P. Desai, "Pediatric Phantom Model and Cauterizing Tool Design for Novel Neuroendoscopic Surgical Robot Evaluation," *Georgia Tech Undergraduate Research Spring Symposium*, 2021 Apr, Atlanta, GA, USA

**Denotes Presenter*

PATENTS

1. *(Invention Disclosure Form Submitted)* K.K. Yamamoto, S. Barter, B. Gilmore, S. Zani Jr., K.L. Jackson, "3D printable, customizable, low-cost vasculature model for resident suture training"
2. *(Invention Disclosure Form Submitted)* K.K. Yamamoto, O. Oladokun, D. Chen, L. Triplett, K.L. Jackson, S. Zani Jr. "Modular Abdominal Simulation Environment (MASE)"
3. *(Patent Pending)* K.K. Yamamoto, P.J. Codd, Y. Chitalia, "Tendon-Actuated Concentric Tube Endonasal Robot (TACTER)"
4. *(Patent Pending)* K.K. Yamamoto, T.J. Zachem, P.J. Codd, Y. Chitalia, "Miniature Tendon-Actuated Galvanometer and Methods Thereof"

HONORS & AWARDS

Duke University Neurosurgery Shark Tank - 1st Place, Duke University School of Medicine Department of Neurosurgery	**2025**
DIY Surgical Model Competition - 1st Place, American College of Surgeons (ACS)	**2025**
Duke Bass Connections Health Policy and Innovation Award, Duke University Bass Connections	**2024**
DIY Surgical Model Competition Finalist, American College of Surgeons (ACS)	**2024**
CO-LAB Seed Grant, Duke University Co-Lab	**2024**
Best Student Paper Award - 2nd Place, International Symposium on Medical Robotics (ISMR)	**2024**
NSF Graduation Research Fellowship Program (GRFP), National Science Foundation	**2024**
Department of Mechanical Engineering Best Teaching Assistant (TA) Award - Fall 2023, Duke University	**2023**
NSF-NRT: Graduate Student Travel Award, National Science Foundation (NSF)	**2023**
Pre-Candidacy Ph.D. Student Conference Award, Duke University	**2023**
Mechanical Engineering and Materials Science (MEMS) First Year Award, Duke University	**2022**
NSF-NRT: Traineeship in the Advancement of Surgical Technologies (TAST) Program, Duke University	**2022**
***Winner* - Coronavirus Hackathon,** CommonVC *(virtual)*	**2021**
President's Undergraduate Research (PURA) Awards, Georgia Tech Undergraduate Research Opportunities Program	**2020**
Biomedical Engineering Department Travel Award, Georgia Tech Wallace H. Coulter Department of Biomedical Engineering	**2019**
Petit Undergraduate Research Scholar, Parker H. Petit Institute of Bioengineering & Bioscience	**2019**

ACADEMIC SERVICE

Peer Reviewer

- Surgical Innovation
- Journal of Medical Robotics Research (JMRR)

- IEEE Robotics and Automation Letters (RA-L), International Conference on Robotics and Automation (ICRA), International Symposium on Medical Robotics (ISMR), International Conference on Intelligent Robots and Systems (IROS), International Conference on Robotics and Biomimetics (ROBIO)

Invited Talks

- ME 555: Intro to Robotics - *DH Parameters and Forward Kinematics* *September 2025*
- BOOST Beyond (Middle-School STEM Mentorship Program) Science Saturdays - *Snake Robots in Surgery!* *February 2025*
- Future Leaders in Neuroscience Symposium for Underrepresented Students - *Brain Tool Lab* *October 2025*
- ME 555: Intro to Medical Robotics - *Designing Surgical Robots: Ideation to Testing* *September 2024*

TEACHING EXPERIENCE

Bass Connections Lead Instructor *Fall 2025 - Present*

Duke University - Surgical Education and Activities Lab Durham, North Carolina

- Lead engineering instructor for undergraduate course on developing surgical simulation models
- Prepare and present didactic lectures on technical skills for CT segmentation, 3D printing, and 3D modeling
- Manage and guide group projects across undergraduate students from multiple departments

Graduate Student Research Mentor *Jan. 2023 - Present*

Brain Tool Lab Durham, North Carolina

- Mentoring high-school, undergraduate, and masters students on research projects.
- Providing younger students hands-on biomedical research experiences and opportunities
- Teaching "Skills Workshop Sessions" every week on technical skills relevant to their projects

Academic Tutor (*virtual)* *Feb. 2023 - Present*

Top Tier Admissions Bedminster, New Jersey

- Tutoring high-school with various STEM topics
- Teaching standardized test strategies (SAT/ACT/AP/IB) high school students
- Assigning student-tailored homework to help them reinforce and practice content

ME555 - Intro to Robotics Teaching Assistant *Fall 2023, Fall 2024*

Duke University Durham, North Carolina

- Prepared and presented guest lectures on DH-parameters and Forward/Inverse Kinematics
- Lead office hours and extra-help students every week for students in need of additional help
- Immersed students in applications of course topics to robotics research

LEADERSHIP

Engineering Coordinator Volunteer *Jan. 2023. – Present*

Duke Surgical Education and Activities Lab (SEAL) Durham, North Carolina

- Lead technical development of surgical training models as Engineering Coordinator
- Developing new physical surgical simulation models for resident training
- Learning about different types of surgery through shadowing and collaborating with residents
- Set up and managing 3D-printing system for SEAL faculty and staff

Executive Officer *Jan. 2023 – Present*

Duke BOOST Beyond Mentorship Program Durham, North Carolina

- Help high school students in underserved communities gain the resources they need to succeed
- Mentoring one highly motivated, underserved, high-school senior with college applications
- Organize weekly office hours for students to stop by and ask any questions
- Lead Duke Robotics lab tours once a semester for local middle-school students

President *June 2023 – June 2025*

Duke Mechanical Engineering and Materials Science (MEMS) Graduate Student Committee (GSC) Durham, North Carolina

- Lead the committee to cultivate community for both Masters and Ph.D. students
- Serve as liaison between Director of Graduate Studies and MEMS students
- Spearhead recruitment for new graduate students accepted to Duke University

ACTIVITIES

Texting Volunteer *Feb. 2022. – Present*

Crisis Text Line Durham, North Carolina

- Help people nationwide in real-time crises via texting platform

- Risk-assess for suicidal thoughts and alleviate their immediate mental and emotional pain
- Brainstorm healthy coping methods to get through the criss at that moment

College Volunteer *Aug. 2018 – Apr. 2022*
Children's Healthcare of Atlanta Atlanta, Georgia
- Provided and engaged in craft activities with patients in the ICU wing
- Assisted sterilization staff with monitoring surgical tray inventory and cleaning
- Tutored patients who have missed school due to their hospital stay

Professional Beatboxer *Aug. 2017 – May 2021*
kento_bbx Atlanta, Georgia
- Featured and performed for Church's Texas Chicken events, commercials, and social media spots
- Won 3rd Place at 2023 North Carolina Beatbox Championships
- Opened for Georgia Tech 2018 and 2019 Homecoming Concerts
- Co-managed Georgia's premier beatboxing organization and community

SKILLS

Spoken Languages: English (Native), Japanese (Fluent), Mandarin (Elementary)

Instrumentation: ELEGOO DLP 3D Printer, Wire Electric Deposition Machine (EDM), Formlabs SLA 3D Printers, Laser Cutters, MakerBot 3D printers, NDI Aurora Electromagnetic Trackers, OPTEC Femtosecond Laser Micro-machining System, 3d Systems ProJet MJP 3D Printer

Software: Arduino, Autodesk Fusion 360, Blender, Eagle, MATLAB, Meshmixer, Simulink, Slicer3D, SolidWorks

Programming Languages: Arduino C, HTML, Java, MATLAB, Python

Certifications: SolidWorks Mechanical Design - Associate (CSWA)

PRESS COVERAGE

- Duke Mechanical Engineering Department: Day in the Life of a Duke ME PhD Student (link)
- Duke University School of Medicine: Duke Team Builds an Award-winning Surgical Simulator (link)
- Duke Pratt School of Engineering: MEMS Graduate Students Among Blue Devils Awarded NSF Fellowships (link)
- Duke Pratt School of Engineering: Research Traineeship Programs Prepare the Next Generation of Engineers (link)

STUDENTS MENTORED

- Zimiao Meng (Undergraduate, 2025 - Present) - Abdominal Organ Segmentation
- Cameron Reid (Masters, 2025 - Present) - Portable Insufflation Unit
- Isabella Chen (Undergraduate, 2025 - Present) - Open-source Continuum Controller
- Kaelyn Pieter (Masters, 2024 - Present) - Pediatric Nasogastric Tube Training Model
- Jared Laurance Bailey (Masters, 2024 - Present) - Portable Bioimpedance Indentation Device
- Patrick Zheng (Undergraduate, 2024 - Present) - Compact Actuation System for Concentric Tube Robots
- Will Chen (Masters, 2023 - 2024) - General Surgery Surgical Simulator *(now PhD student at Duke)*
- Dharma Chari-Letts (High School, 2023 - 2025) - ED Thoracotomy Simulator *(now MechEng student at MIT)*
- Joshua Bang (Undergraduate, Summer 2024) - Portable Bioimpedance Indentation Device *(now at BMW)*
- Michelle Ramirez-Martinez (High school, 2023-2024) - General Surgery Surgical Simulator *(now BME student at Harvard)*
- Jonathan Piland (Undergraduate, 2023-2024) - Compact Concentric Tube Robot Actuation System *(now at APL)*
- Caroline Chen (Masters, 2023-2024) - Portable Bioimpedance Indentation Device *(now at Meta)*
- Annika Rogers (Undergraduate, Summer 2023) - Portable Bioimpedance Indentation Device *(now at Revivicor)*
- Hope Hauck (High school, Summer 2023) - Portable Bioimpedance Indentation Device *(now MechEng student at Duke)*
- Abigail Swiger (Undergraduate, 2021-2022) - Phantom Model of Brain and Hippocampus *(now at W.L. Gore Medical)*
- Akiyuki Shigematsu (Undergraduate, 2021-2022) - Meso-scale Tendon-actuated Grasper *(now at Morgan Stanley Japan)*