Berk Kasimcan

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EDUCATION

Johns Hopkins University (JHU)   Baltimore, MD

Master of Science in Mechanical Engineering, <u>GPA: 4.00/4.00</u>   May 2025 - Expected May 2026

Thesis Advisor: Jeremy D. Brown, PhD (Haptics and Medical Robotics Lab)

Relevant Courses: Robot Device Kinematics & Dynamics, Haptic Interface Design, Rehabilitation Engineering, Biomechanics of Human Movement, Applied Machine Learning

George Mason University (GMU)   Fairfax, VA

Master of Science in Bioengineering, <u>GPA: 4.00/4.00</u>   August 2024 - Graduated May 2025

Thesis Advisor: Deepak Saluja (Clinibooth) & Shani Ross (Associate Chair of Department of Bioengineering)

Relevant Courses: Probabilistic Machine Learning, Translational Bioengineering, AI Ethics and Policy, Neural Engineering, Biomanufacturing, Biomedical Data Analytics

George Mason University (GMU)   Fairfax, VA

Bachelor of Science in Bioengineering, Accelerated Master's Candidate   August 2021 - Graduated May 2024

Honors College Student, Dean's List 2023 & 2024, Concentration: Biomedical Imaging and Devices & Pre-health, <u>GPA:3.51/4.00</u>

Relevant Courses: Medical Image Processing, Bioinstrumentation, Neural System Designs, Medical Image Processing

NOTABLE AWARDS AND HONORS

Chair Award, George Mason University Department of Bioengineering (highest departmental award)   May 2024

Best Poster Presentation, Yale Biomedical Engineering Conference (among top student projects from 25 schools)   November 2023

Stu Shea Peraton Scholarship, Peraton National Security Company (only 9 students out of 1000+ applicants)   September 2023

Best STEM Engagement, NASA Student Launch Initiative (awarded among 50 teams)   March 2021

RESEARCH EXPERIENCE

Johns Hopkins University, Haptics and Medical Robotics Laboratory   Baltimore, MD | June 2025 - Present

Graduate Student Researcher, Advisor: Jeremy D. Brown, PhD

Multimodal Haptic Feedback for Neurorehabilitation (HAND Device)

- Designing and programming experimental systems that integrate vibrotactile and visual feedback to study cross-modal sensory matching in upper-limb rehabilitation tasks.
- Engineering a finger-force quantification pipeline, custom fixtures, calibrated sensors, and signal-processing routines (Python, MATLAB, Arduino), achieving fine resolution at 10 kHz sampling for microforce assessment.
- Developing automated data-collection and analysis protocols, improving experiment repeatability and reducing post-processing time.
- Creating controlled test environments to evaluate participants' perception of combined vibration, pressure, and visual cues, supporting the development of adaptive haptic feedback strategies for post-stroke motor retraining.

Wearable Vibrotactile Belt for Spatial Guidance

- Co-leading development of a multi-directional haptic belt providing 8-point vibrotactile feedback for spatial navigation and motor learning applications.
- Implementing UWB + IMU-based localization and closed-loop vibration control for directional cueing in human-in-the-loop experiments.
- Building embedded firmware and real-time control interface enabling synchronized belt actuation with sub-10 ms latency.
- Conducting user studies to characterize perceptual accuracy and latency thresholds across directional haptic stimuli, informing next-generation assistive guidance systems.

Harvard University, Aizenberg Group Cambridge, MA | June 2024 – August 2024

Harvard Wyss REU Summer Intern, Advisor: Joanna Aizenberg, PhD

Liquid Windows for Programmable Daylighting and Heat Gain

- Fabricated microfluidic "liquid window" test articles in the cleanroom and benchtop rigs to control light intensity, direction, and spectrum via fluidic reconfiguration of refractive/absorptive layers; iterated 50+ functional variants across channel geometry, surface treatment, and fluid pair.
- Instrumented high-speed photometry and spectral measurements with scripted analysis to quantify transmittance/irradiance, switching speed, and stability; used results to down-select materials and optimize channel cross-sections for repeatable, bubble-free cycling (15+ rig configurations).
- Outcome: Established durability and repeatability procedures (duty-cycle stress + thermal dwell), informing design rules for low-hysteresis, rapid (<s-level) optical switching in building-scale concepts.

George Mason University, Senior Design CAPSTONE Project Fairfax, VA | August 2023 – May 2024

Fabrication Lead, Advisor: Remi Veneziano

Solar-Driven Hydrogel Desalination (Chitosan–PVA–PPy)

- Engineered a chitosan/PVA/polypyrrole hydrogel device that wicks saline via capillarity and drives photo-thermal evaporation under sunlight; validated water transport and salt rejection in bench-scale tests with conductivity and ion-content assays.
- Produced detailed CAD and machining drawings, jigs/fixtures, and SOPs to improve throughput and test repeatability; ran a mini patent + literature landscape to set polymer ratios, porosity, and thickness targets.
- Outcome: demonstrated stable flux under 1-sun illumination with measurable salinity reduction across cycles, providing parameters for scale-up (pad area, thickness, PPy loading).

George Mason University, ImPoWeR laboratory Fairfax, VA | August 21st, 2023 – June 5th, 2024

Research Assistant, Advisor: Quentin Sanders, PhD

Quantitative Assessment of Hand Tactile–Proprioceptive Function

- Built a clinician-informed assessment device combining voice-coil haptics (controlled vibration/force) and instrumented interaction to probe micro-force and position sense; integrated Raspberry Pi, custom PCBs, and 3D-printed/laser-cut enclosures into a robust lab prototype.
- Characterized actuator frequency/force response and closed-loop control behavior; developed Python pipelines for synchronized stimulus–response logging and feature extraction (thresholds, JNDs).
- Outcome: delivered a foundation of a prototype ready for pilot human testing and a calibrated stimulus space (amplitude/frequency/hold) to support clinician workflows.

Johns Hopkins University, McCann Lab Baltimore, MD | January 30, 2023 – May 10th, 2024

Research Assistant, Advisor: Una D. McCann, PhD

ML-Assisted Therapeutic Support & Oculomotor Biomarkers

- Co-engineered an AI-assisted therapeutic service prototype to structure session workflows and surface just-in-time insights for clinicians; contributed to data schemas, consent-aware logging, and front-end interaction flows.
- Assisted experiments on blink dynamics (rate/latency/variability) as candidate biomarkers; built preprocessing and feature-extraction scripts to support downstream ML analyses.
- Outcome: delivered a functional demo system plus a reproducible blink-feature pipeline, enabling subsequent model exploration in clinical studies.

University of Michigan, Shtein Lab Ann Arbor, MI | May 22, 2023 – August 5, 2023

NSF REU/REM Research Assistant, Advisor: Max Shtein, PhD

Printed Drug Formulations for Energy-Efficient Therapeutics

- Ran HPLC, XRD, SEM, and dissolution studies to map how printing parameters influence crystallinity, morphology, and release; executed 50+ printing trials to generate crystallinity–concentration curves over time.
- Outcome: identified process windows that improve formulation quality and reduce re-crystallization risk, informing low-energy manufacturing routes for medical products.

| University of Otago, Cakmak Lab | Dunedin, New Zealand | December 16, 2022 – January 20, 2023 |

Summer Research Assistant, Advisor: Yusuf Ozgur Cakmak, PhD

Outer Ear Morphology and Acoustic Filtering

- Modeled 128 anatomically distinct human ears to quantify how tragus and antitragus morphology affect acoustic filtering, frequency response, and directionality. Performed 3D segmentation, mesh refinement, and surface rendering to prepare models for acoustic simulation.
- Outcome: Produced a labeled, simulation-ready ear-shape dataset enabling comparative acoustic studies and morphometric correlation analyses across diverse populations.

Ear-Mounted Wearable Devices and Facial Muscle Dynamics

- Contributed to a neuroengineering study investigating how ear-mounted haptic and sensing devices influence facial muscle activation and mechanical coupling during expression and speech.
- Created 3D anatomical models and streamlined data-processing workflows for over 10,000 multi-format files, improving throughput and consistency in shape analysis.
- Outcome: Helped establish an early biomechanical characterization framework guiding future assistive and therapeutic wearables for neurodegenerative and communication disorders.

PRESENTATIONS † denotes presenter ✳ initiated as class project

C6 **Kasimcan B.** †, Tulun E., Bijan A. "Solar-Driven Desalination Using Chitosan–PVA–PPy Hydrogels," 17th Annual STAR-TIDES Capabilities Demonstration, Arlington, VA, May 2024. Poster ✳

C5 **Kasimcan B.**† , Tulun E., Bijan A. "Solar-Driven Desalination Using Chitosan–PVA–PPy Hydrogels," CEC Undergraduate Research Celebration – Senior Capstone, Fairfax, VA, Apr 2024. Poster ✳

C4 **Kasimcan B.**† "Senior Honors Research Talk (GMU Honors College Fellows)," GMU Honors College Fellows Annual Presentation, Fairfax, VA, May 2024. Oral Presentation

C3 **Kasimcan B.**†, Huang C., Bell A., Shtein M. "Impacting Griseofulvin Dissolution Rates through Crystal- Amorphous Modification via Organic Vapor Jet Printing (OVJP)," VCHC Spring Conference at Radford University, Radford, VA, Apr 2024. Presentation

C3 **Kasimcan B.**†, Huang C., Bell A., Shtein M. "Impacting Griseofulvin Dissolution Rates through Crystal- Amorphous Modification via Organic Vapor Jet Printing (OVJP)," ERN: Emerging Researchers National Conference in STEM, Washington D.C, March 2024. Presentation

C2 **Kasimcan B.**†, Huang C., Bell A., Shtein M. "Impacting Griseofulvin Dissolution Rates through Crystal- Amorphous Modification via Organic Vapor Jet Printing (OVJP)," Yale First Bioengineering Conference – Research Symposium, New Haven, CT, Nov 2023. Presentation

C1 **Kasimcan B.**†, Huang C., Bell A., Shtein M. "Printed Drug Formulations: Crystallinity–Concentration Mapping via HPLC/XRD/SEM," University of Michigan – NSF REU Summer Research Presentation, Ann Arbor, MI, Aug 2023. Oral Presentation

CONFERENCES & SCHOOLS EVENTS (Participation)

• Summer School on Neurorehabilitation (SSNR 2025)	Jun 2025
• RehabWeek 2025 – ICORR (Chicago, IL),	May 2025
• 17th Annual STAR-TIDES Capabilities Demonstration,	May 2024
• Post-Baccalaureate Training Program in Biomolecular Structure Prediction & Design Conference,	March 2024

NOTABLE ACADEMIC PROJECTS

Biophysics Simulation of Cancer Cell Transport and Cardiac Hemodynamics using MATLAB-based Fluidic Models.
     Advisor: Juan Cebral, PhD | May 2023

City-Scale Machine Learning for Predicting DC Capital Bikeshare Patterns from 10 TB of Mobility Data.
     Advisor: Anand Vidyashankar, PhD | May 2024

Infrastructure Development in Rural Regions using High-Performance Geospatial Machine Learning on Supercomputing Clusters.
     Advisor: Mohammad Rafiei, PhD | June 2025

TEACHING ENGAGEMENTS

Continuum Biomechanics & Transport (BENG 230, Undergraduate), Graduate Teaching Assistant   August 2024 – May 2025
Fall Semester: 26 Students & Spring Semester: 23 Students, 10-20 hrs / week

- Lead weekly recitations on continuum mechanics and biotransport (stress/strain tensors, conservation laws, constitutive models, diffusion–advection), bridging math to physiology with worked derivations and coding demos.
- Hold structured office hours and review sessions; design and grade problem sets/exams with clear rubrics to ensure consistency and timely feedback; coordinate with instructor on pacing and assessment alignment.

Health Services Research Program (High School Outreach), Teaching Faculty   January 2023 – June 2024
120 Students, 5 hrs / week

- Taught sections on health systems, health economics, and policy with case studies (coverage, cost, access) and short debates to build quantitative reasoning and civic literacy.
- Authored classroom materials (handouts, interactive quizzes, mini-problem sets) and a simple capstone template so teams could analyze a real policy question using data and present evidence-based recommendations.

WORK EXPERIENCE

INOVA, Department of Neurosurgery   Fairfax, VA | January 2025 – June 2025
Bioengineering Design and Development Intern

- Developed and automated Python/Jupyter pipelines to analyze a 12-month SI-joint surgical outcomes database, computing demographic summaries, VAS improvements with 95% CIs, and statistical comparisons across diagnostic and fusion subgroups.
- Identified key predictors of surgical success by evaluating diagnostic test positivity, imaging findings, and fusion history using χ^2, correlation, and regression analyses; visualized trends with publication-ready figures.
- Explored novel data-collection tools and clustering methods for patient stratification; presented results and workflow improvements at departmental research meetings.

Clinibooth   Washington D.C. | August 2024 – December 2024
Bioengineering Design and Development Intern

- Led the design and prototyping of Clinibooth's first-ever medical diagnostic booth, spending over 200 hours developing and 3D printing more than 100 design iterations using Onshape; contributed to device integration for EKG, spirometry, and strep testing to advance accessible telemedicine solutions.

Prostate IR Centers USA   Fairfax, VA | June 2022 – Jan 2024
Research and Development Intern

- Created digital and physical 3D training models that accelerated onboarding for new physicians and standardized training steps and assisted during clinic hours to align models with procedural realities

SKILLS

Robotics and Mechatronics:	Mechanism design, actuators voice coil DC stepper, vibrotactile and pressure haptics, exoskeleton assembly EduExo, sensor integration force pressure encoders IMU
Programming and Data:	Python numpy pandas scipy scikit learn, MATLAB Simulink, LabVIEW, Arduino, Raspberry Pi, data acquisition, basic statistics and ML workflows, version control Git
Modeling and Controls:	Kinematics and simple dynamics, controller tuning PID, experiment design
CAD and Prototyping:	SolidWorks Fusion 360 Inventor Onshape, 3D printing FDM resin, laser cutting, basic machining, fixture and test bench design, CAD documentation
Instrumentation and Materials:	HPLC XRD SEM optical testing, cleanroom microfabrication exposure, hydrogel fabrication
Human Factors and Clinical:	Survey design and analysis, clinician stakeholder interviews, usability testing
Communication and Leadership:	Technical writing, presentations, cross functional collaboration, mentoring and teaching
Professional:	Technical communication, interdisciplinary collaboration, research-driven problem solving, project leadership, adaptability, mentoring and instruction, scientific presentation, critical thinking, cross-functional teamwork
Languages:	English (Native), Turkish (Native), Spanish (Intermediate)

STUDENT ORGANIZATIONS – (SELECTED ORGANIZATIONS – PARTICPATED AND LEAD OVER 10 ORGANIZATIONS)

Science Policy and Diplomacy Group at Johns Hopkins – JHU   August 2025 - Present
- As Diplomacy Coordinator with the Science Policy and Diplomacy Group at Johns Hopkins, I engage with government organizations, public figures, and faculty to plan and coordinate university events.

Mechanical Engineering Graduate Association – JHU   August 2025 - Present
- As the sole master's student representative, I advocate for student concerns to the board and organize public events to strengthen the graduate community.

Honors College Contemporary Student Advisory Board – GMU   August 2021 – May 2024
- Collaborated with university president throughout the semester to discuss and address university issues. Contributed to developing actionable solutions that were implemented to improve academic success, and professional readiness
- Was one of the School Representative & Co- Executive Board Member of Honors College where participated in community outreach, events, and workshops to bolster the university's reputation and inclusivity.

The National Society of Leadership and Success   August 2022 - Present
- Member since 2022 while engaging in specialized programs and on-campus events to develop and exhibit leadership competencies.

Biomedical Engineering Society (BMES) – GMU   August 2021 – May 2024
- Spearheaded essential administrative duties and facilitated intra-chapter communication and event coordination.

HONORS AND AWARDS

GMU Bioengineering Department Chair Award   May 2024
- Given to only one student out of the graduating class who showcased the most involvement in the department.

Senior Design Capstone Project Awards   May 2024
- 2nd Place, Star-Tides Poster Competition; People's Choice Award by BENG Department and CEC Chair Award.

Yale Biomedical Engineering Conference 2023 Research Symposium   November 2023
- for outstanding achievement and promise in research.

The Thomas Sowell, PhD Endowed Scholarship $2500   September 2023
- Endowed by Cecil Van Alsburg, a business executive influenced by Dr. Sowell's principles.

Stu Shea Peraton Scholarship in National Security $5000   September 2023
- Recognized for the Honors College's 15th Annual Research Exhibition and Awards Ceremony by Peraton.

Silvana Maria Tajuddin Memorial Endowed Scholarship $1000   December 2022
- Acknowledging dedication to Islamic art studies, complemented by extensive coursework in Islamic studies.

Mason Idea Scholarship $5500   August 2021, 2022, 2023
- Awarded for maintaining a good standing academically, recognizing commitment and excellence in studies.

GMU Honors College Recruitment Team - Member of The Year   2021, 2022, 2023
- Recognized for exemplary contributions and dedication within the recruitment team.

NASA Student Launch Initiative Awards   2020-2021
- 1st Place STEM Engagement, 2nd Place Social Media, 3rd Place Best Looking Rocket.

TRAININGS & CERTIFICATIONS

JHU Trainings (2025):   Graduate & Advanced Lab Safety, Responsible Conduct of Research, Conflict of Interest, Fire/Hazard Safety, Title VI, Sexual Assault Prevention, Opioid Awareness, CITI Researchers & Human Subjects, Effort Reporting, Billing Orientation.

Harvard Trainings (2024): Clean Room & Nanofabrication Modules (Thin Film, Wet Bench, Etching, SEM, Litho, Sputter), Lab Safety, Responsible Conduct in Research (CITI).

LinkedIn Skill Assessment: MATLAB, AutoCAD, Autodesk Fusion 360, Adobe Photoshop, and Adobe Lightroom