

Berk Kasimcan

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RESEARCH PROFILE

Mechanical and bioengineering researcher with training across **Johns Hopkins, Harvard, and George Mason**, focused on haptics, neurorehabilitation systems, MedTech prototyping, and translational experimental design. Experienced in full-stack research execution: mechanism design, embedded sensing/control, instrumentation, statistical analysis, and publication-quality technical communication.

EDUCATION

Johns Hopkins University (JHU), Whiting School of Engineering

Baltimore, MD

M.S., Mechanical Engineering | GPA: 4.00/4.00

May 2025 – Expected May 2026

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

Relevant Coursework: Robot Device Kinematics and Dynamics, Haptic Interface Design, Rehabilitation Engineering, Biomechanics of Human Movement, Applied Machine Learning.

George Mason University (GMU)

Fairfax, VA

M.S., Bioengineering | GPA: 4.00/4.00

Aug 2024 – May 2025

Thesis Advisors: Deepak Saluja (Clinibooth) and Shani Ross (Associate Chair, Bioengineering)

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

George Mason University (GMU)

Fairfax, VA

B.S., Bioengineering (Accelerated M.S. Path) | GPA: 3.51/4.00

Aug 2021 – May 2024

Honors College Student; Dean's List (2023, 2024); Concentration: Biomedical Imaging and Devices / Pre-Health

Relevant Coursework: Medical Image Processing, Bioinstrumentation, Neural Systems Design.

RESEARCH EXPERIENCE

Johns Hopkins University, Haptics and Medical Robotics Laboratory

Baltimore, MD

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

Jun 2025 – Present

Multimodal Haptic Feedback for Neurorehabilitation (HAND Device)

- Design and implement experimental systems combining vibrotactile and visual cues to study cross-modal sensory matching in upper-limb rehabilitation tasks.
- Engineered a finger-force quantification pipeline with custom fixtures, calibrated sensors, and signal-processing scripts (Python, MATLAB, Arduino), enabling high-fidelity microforce assessment at 10 kHz sampling.
- Built automated data collection and analysis workflows that improved protocol repeatability and reduced post-processing effort.

Wearable Vibrotactile Belt for Spatial Guidance

- Co-lead development of an 8-point directional haptic belt for navigation and motor-learning experiments.
- Implement UWB+IMU localization and closed-loop control for directional cueing in human-in-the-loop trials.
- Developed embedded firmware and real-time control interfaces enabling synchronized actuation with sub-10 ms latency.

Harvard University, Aizenberg Group (Wyss REU)

Cambridge, MA

Summer Research Intern (Advisor: Joanna Aizenberg, PhD)

Jun 2024 – Aug 2024

Liquid Windows for Programmable Daylighting and Heat Gain

- Fabricated microfluidic liquid-window test articles and benchtop validation rigs; iterated 50+ functional variants spanning channel geometry, surface treatment, and fluid pairs.
- Instrumented photometric and spectral testing workflows to quantify transmittance, irradiance, switching speed, and stability across configurations.

- Established durability and repeatability procedures (duty-cycle stress and thermal dwell), informing low-hysteresis switching design rules for scale-up concepts.

George Mason University, ImPoWeR Laboratory
Research Assistant (Advisor: Quentin Sanders, PhD)

Fairfax, VA
Aug 2023 – Jun 2024

Quantitative Assessment of Hand Tactile-Proprioceptive Function

- Built a clinician-informed assessment prototype combining voice-coil haptics and instrumented interaction for micro-force and position-sense characterization.
- Integrated Raspberry Pi control, custom electronics, and rapid-fabrication enclosures; characterized actuator frequency-force response and closed-loop behavior.
- Developed synchronized stimulus-response logging pipelines in Python and extracted psychophysical features (thresholds and JND-style metrics) for pilot testing readiness.

George Mason University, Senior Design Capstone
Fabrication Lead (Advisor: Remi Veneziano)

Fairfax, VA
Aug 2023 – May 2024

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

- Engineered and tested a photothermal hydrogel desalination device with capillary-driven transport and bench-scale salinity reduction characterization.
- Produced CAD/machining drawings, fixtures, and SOPs to improve build throughput and test repeatability.
- Conducted a focused patent and literature landscape review to guide polymer ratio, porosity, and thickness targets.

Johns Hopkins University, McCann Lab
Research Assistant (Advisor: Una D. McCann, PhD)

Baltimore, MD
Jan 2023 – May 2024

ML-Assisted Therapeutic Support and Oculomotor Biomarkers

- Co-developed an AI-assisted therapeutic workflow prototype with consent-aware logging and clinician-facing interaction flows.
- Built preprocessing and feature-extraction scripts for blink dynamics (rate, latency, variability) to support downstream modeling and clinical analysis.

University of Michigan, Shtein Lab (NSF REU/REM)
Research Assistant (Advisor: Max Shtein, PhD)

Ann Arbor, MI
May 2023 – Aug 2023

Printed Drug Formulations for Energy-Efficient Therapeutics

- Executed 50+ printing trials and characterization protocols (HPLC, XRD, SEM, dissolution) to map process effects on crystallinity, morphology, and release behavior.
- Identified process windows that improved formulation quality and reduced re-crystallization risk for low-energy manufacturing pathways.

University of Otago, Cakmak Lab
Summer Research Assistant (Advisor: Yusuf Ozgur Cakmak, PhD)

Dunedin, New Zealand
Dec 2022 – Jan 2023

Outer Ear Morphology, Acoustic Filtering, and Wearable Biomechanics

- Modeled 128 anatomically distinct ears for acoustic simulation workflows (segmentation, mesh refinement, rendering) and morphometric comparison.
- Contributed to ear-mounted wearable studies; created anatomical models and streamlined processing across 10,000+ files to improve analysis consistency and throughput.

INDUSTRY AND APPLIED EXPERIENCE

INOVA, Department of Neurosurgery
Bioengineering Design and Development Intern

Fairfax, VA
Jan 2025 – Jun 2025

- Developed automated Python/Jupyter analytics pipelines for a 12-month SI-joint outcomes database, including demographic summaries, VAS-change analysis with confidence intervals, and subgroup comparisons.
- Evaluated predictors of procedural outcomes using diagnostic variables, imaging features, fusion history, and statistical modeling; delivered publication-ready visualizations for research meetings.

Clinibooth
Bioengineering Design and Development Intern

Washington, D.C.
Aug 2024 – Dec 2024

- Led design and prototyping of the company's first medical diagnostic booth; completed 100+ CAD/3D-print design iterations across 200+ project hours.
- Supported modular integration for EKG, spirometry, and strep diagnostics in an accessible telemedicine hardware platform.

Prostate IR Centers USA
Research and Development Intern

Fairfax, VA
Jun 2022 – Jan 2024

- Built digital and physical 3D procedural training models that accelerated onboarding and improved standardization of physician training workflows.

TEACHING AND MENTORSHIP

George Mason University, BENG 230: Continuum Biomechanics and Transport
Graduate Teaching Assistant

Fairfax, VA
Aug 2024 – May 2025

- Led weekly recitations (stress/strain, conservation laws, constitutive models, diffusion-advection) and translated mathematical frameworks into physiological applications.
- Held office hours and review sessions; designed and graded assignments/exams with transparent rubrics and coordinated assessment alignment with course faculty.

Health Services Research Program (High School Outreach)
Teaching Faculty

Fairfax, VA
Jan 2023 – Jun 2024

- Taught health systems, health economics, and policy through case-based modules and data-informed classroom debates.
- Authored instructional handouts, interactive quizzes, and capstone scaffolds to support evidence-based policy analysis projects.

SELECTED PRESENTATIONS

- Kasimcan B. (Presenter), Tulun E., Bijan A. *Solar-Driven Desalination Using Chitosan-PVA-PPy Hydrogels*. STAR-TIDES Capabilities Demonstration, Arlington, VA (May 2024), Poster.
- Kasimcan B. (Presenter), Tulun E., Bijan A. *Solar-Driven Desalination Using Chitosan-PVA-PPy Hydrogels*. CEC Undergraduate Research Celebration, Fairfax, VA (Apr 2024), Poster.
- Kasimcan B. (Presenter). *Senior Honors Research Talk*. GMU Honors College Fellows Annual Presentation, Fairfax, VA (May 2024), Oral.
- Kasimcan B. (Presenter), Huang C., Bell A., Shtein M. *Impacting Griseofulvin Dissolution Rates via Crystal-Amorphous Modification by OVJP*. VCHC Spring Conference, Radford, VA (Apr 2024), Presentation.
- Kasimcan B. (Presenter), Huang C., Bell A., Shtein M. *Impacting Griseofulvin Dissolution Rates via Crystal-Amorphous Modification by OVJP*. ERN in STEM, Washington, D.C. (Mar 2024), Presentation.
- Kasimcan B. (Presenter), Huang C., Bell A., Shtein M. *Impacting Griseofulvin Dissolution Rates via Crystal-Amorphous Modification by OVJP*. Yale First Bioengineering Conference, New Haven, CT (Nov 2023), Presentation.
- Kasimcan B. (Presenter), Huang C., Bell A., Shtein M. *Printed Drug Formulations: Crystallinity-Concentration Mapping via HPLC/XRD/SEM*. University of Michigan NSF REU Symposium, Ann Arbor, MI (Aug 2023), Oral.

CONFERENCES AND ACADEMIC EVENTS

Summer School on Neurorehabilitation (SSNR 2025); RehabWeek 2025 (ICORR, Chicago); STAR-TIDES Capabilities Demonstration (2024); Post-Baccalaureate Training Program in Biomolecular Structure Prediction and Design Conference (2024).

SELECTED ACADEMIC PROJECTS

- Biophysics simulation of cancer-cell transport and cardiac hemodynamics using MATLAB-based fluidic models (Advisor: Juan Cebral, PhD; 2023).
- City-scale machine learning for forecasting Washington, D.C. Capital Bikeshare demand from 10 TB mobility data (Advisor: Anand Vidyashankar, PhD; 2024).
- Geospatial machine-learning pipeline for infrastructure planning in rural regions on high-performance computing systems (Advisor: Mohammad Rafiei, PhD; 2025).

HONORS AND AWARDS

- Chair Award, GMU Department of Bioengineering (highest departmental award; one recipient), 2024.
- Best Poster Presentation, Yale Biomedical Engineering Conference (top student projects from 25 schools), 2023.
- Stu Shea Peraton Scholarship (9 selected from 1000+ applicants), 2023.
- Senior Design Capstone Awards: STAR-TIDES 2nd Place Poster; People's Choice and CEC Chair recognition, 2024.
- Thomas Sowell, PhD Endowed Scholarship (\$2,500), 2023.
- Silvana Maria Tajuddin Memorial Endowed Scholarship (\$1,000), 2022.
- Mason Idea Scholarship (\$5,500; 2021-2023).
- GMU Honors College Recruitment Team Member of the Year (2021, 2022, 2023).
- NASA Student Launch Initiative Awards: 1st STEM Engagement, 2nd Social Media, 3rd Best-Looking Rocket (2020-2021).

LEADERSHIP AND SERVICE

- **Science Policy and Diplomacy Group, JHU** (Diplomacy Coordinator, Aug 2025 – Present): coordinate events with faculty, policymakers, and external stakeholders.
- **Mechanical Engineering Graduate Association, JHU** (Master's Representative, Aug 2025 – Present): represent student priorities and support graduate community programming.
- **Honors College Contemporary Student Advisory Board, GMU** (Aug 2021 – May 2024): collaborated with university leadership on initiatives tied to academic success and professional readiness.
- **Biomedical Engineering Society (BMES), GMU** (Aug 2021 – May 2024): supported chapter operations, communication, and event execution.

TECHNICAL SKILLS

Robotics and Mechatronics: mechanism design, voice-coil/DC/stepper actuation, vibrotactile and pressure haptics, sensor integration (force, pressure, encoder, IMU), closed-loop control.

Programming and Data: Python (NumPy, Pandas, SciPy, scikit-learn), MATLAB/Simulink, LabVIEW, Arduino, Raspberry Pi, Git, statistical analysis, ML workflows.

CAD and Prototyping: SolidWorks, Fusion 360, Autodesk Inventor, Onshape, FDM/resin 3D printing, laser cutting, machining fundamentals, fixture/test-bench design.

Instrumentation and Materials: HPLC, XRD, SEM, optical testing, cleanroom nanofabrication exposure, hydrogel fabrication.

Human Factors and Clinical: usability testing, survey design, clinician stakeholder interviews, translational MedTech development.

Languages: English (Native), Turkish (Native), Spanish (Intermediate).

TRAINING AND CERTIFICATIONS

JHU (2025): Graduate and advanced lab safety, responsible conduct of research, conflict of interest, fire/hazard safety, Title VI, human subjects/CITI, effort reporting, billing orientation.

Harvard (2024): Cleanroom and nanofabrication modules (thin film, wet bench, etching, SEM, lithography, sputter), lab safety, responsible conduct in research (CITI).

Additional: LinkedIn skill assessments in MATLAB, AutoCAD, Autodesk Fusion 360, Adobe Photoshop, and Adobe Lightroom.