

# Berk Kasimcan

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## RESEARCH PROFILE

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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

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**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

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**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

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**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

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**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

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- 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

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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

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- 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

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- 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

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- **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

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**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

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**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.