# Kedar Krishnan

JHU Biomedical Engineering and Computer Science Senior     + 1 443 983 2467
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## Education

**Johns Hopkins University /** 2021 - 2025
B.S. Double major in Biomedical Engineering and Computer Science
Dean's List: Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 2023, Spring 2024
Cumulative GPA: 3.88

**International School of Basel** / 2017 – 2021
International Baccalaureate (44 points)

## Skills and Interests

**Programming:** Python, Java, C, C++, MATLAB, JavaScript (React Native, Vue.js)

**Languages:** English, Tamil, German (Intermediate Proficiency), Japanese (Intermediate Proficiency), Italian (Beginner Proficiency)

**Interests:** Tennis, Climbing, Soccer, Photography, Artificial Intelligence

## Research Experience

**Mao Lab, Institute of Nanobiotechnology – Johns Hopkins University /** Jan 2023 - Current

Research assistant at research group led by Prof. Hai-Quan Mao in the Translational Tissue Engineering Center

*Focused on enhancing therapeutic efficacy of biomaterials and developing new methods for scalable manufacturing and translation for regenerative medicine applications*

- Developed a tunable nanofiber-hydrogel composite (NHC) with adjustable stiffness for enhanced regenerative effects when injected subcutaneously. Built proficiency in hydrogel formulation and material characterization techniques including rheology and SEM.
- Investigated macrophage programming in NHC stimulated tissue response using rat models, conducting macrophage depletion procedures, subcutaneous injections, and immunostaining with confocal imaging.
- Designed and developed NHCs loaded with extracellular vesicles (EVs) from adipose-derived stem cells to promote tissue regeneration in radiation-damaged areas. Designed and executed assays to assess the EV release rate from NHC. Conducted in vivo studies in murine models demonstrating that NHC-EVs promoted cell infiltration, reduction of fibrotic tissue formation, and regeneration of fat and hair follicles.
- Currently leading a project investigating the combination of high and low stiffness hydrogels to enhance structural properties of the matrix as well as enhancing cellular infiltration to promote comprehensive soft-tissue restoration.
- Worked for spin-off company, LifeSprout, Inc., to develop and run a pre-clinical study for Lumina™, a hyaluronic acid-based regenerative dermal filler.

**Cellular Engineering Lab – Columbia University /** May 2024 – Aug 2024

Summer Research Intern at research group led by Prof. Clark T. Hung in the Department of Biomedical Engineering

*Focused on elucidating cellular and tissue-level responses in musculoskeletal systems, with an aim of developing regenerative strategies for load-bearing tissues such as articular cartilage.*

- Developed a novel blood-joint transwell system combining human umbilical vein endothelial cells fibroblast-like synoviocytes, and articular chondrocytes to model complex joint space interactions.
- Investigated the effects of euglycemic and hyperglycemic conditions on cell viability, inflammation, and extracellular matrix degradation relevant to osteoarthritis and type 2 diabetes mellitus to study interplay between metabolic conditions and joint degeneration.

- Conducted qPCR to analyze gene expression, media assays, immunostaining and microscopy to demonstrate that hyperglycemia promotes ECM breakdown, synovial inflammation, oxidative stress, and altered glucose transport across joint tissues.
- Presented research findings in a poster at the Biomedical Engineering Society Annual Meeting (October 2024).

### Friedrich Miescher Institute / Jun 2022 - Jul 2022

Summer Research Intern at research group led by Prof. Prisca Liberali

*Focused on investigating cellular heterogeneity during collective cell behavior with an emphasis on intestinal organoid growth*

- Assisted in high-resolution imaging studies to investigate the growth and differentiation of intestinal organoids from single cells.
- Designed and optimized multiplexed immunostaining protocols for intestinal organoids, enhancing visualization of cellular morphology and subtypes critical for understanding organogenesis.
- Performed cloning and Cas9-Nickase gene editing to for cell lineage tracking, contributing to understanding the role of stem cells in organoid formation.
- Responsible for seeding, maintaining, and fixing intestinal organoids for staining, followed by confocal microscopy imaging.
- Collaborated on training neural networks and writing supplementary Python scripts to automate image analysis, improving efficiency and reproducibility of data processing.

## Publications

Kong, J., Yao, Z., Stelzel, J. L., Yang, Y.-H., Chen, J. F., Feng, H., Schmidt, C., Zhang, C., **Krishnan, K.**, Chen, L., Pan, J., Ding, K., Zhu, Y., Li, X., Doloff, J., Mao, H.-Q., & Reddy, S. (**2024**). *Granular nanofiber-hydrogel composite-programmed regenerative inflammation and adipose tissue formation.* **Advanced Healthcare Materials.** e2403094. doi: 10.1002/adhm.202403094. PMID: 39580666.

Kong, J., **Krishnan, K.**, Feng, H., Ding, K., Pan, J., Yang, Y.-H., Hopkins, C., Greco, A., Stelzel, J. L., Velarde, E., Reddy, S. K., & Mao, H.-Q. (**2024**). *Anti-fibrotic extracellular vesicle-loaded nanofiber-hydrogel composite for radiation-induced skin dermatitis prevention.* **Science Advances.** (In submission)

Kong, J., Schmidt, C., Chen, J., Feng, H., **Krishnan, K.**, Ding, K., Yao, Z., Zhang, C., Yang, Y.-H., Stelzel, J. L., Reddy, S. K., & Mao, H.-Q. (**2024**). *Injectable macroporous pore-forming hydrogel matrix for enhanced cell migration and angiogenesis.* (In preparation).

## Teaching Experience

### Undergraduate Course Assistant / Dec 2023 - Current

Data Structures & Artificial Intelligence

- Worked approximately 10 hours per week grading homework, exams, and discussion essays, providing detailed feedback to enhance student understanding of complex topics in data structures and artificial intelligence.
- Led bi-weekly office hours to assist students with core concepts such as algorithms, tree structures, graphs, dynamic programming, search algorithms, and neural networks.
- Worked closely with other course assistants to design assignments and exams that reinforce key learning objectives and challenge students' problem-solving skills.

### Biomedical Engineering Mentor / Jan 2023 - Current

CTO and Founding member of student venture working with Johns Hopkins Medical Institute

- Guided freshman students in acclimating to the JHU environment, offering advice on academic, social, and personal aspects of university life.
- Provided comprehensive academic support, including assistance with course planning, navigating the BME curriculum, and addressing general academic inquiries.
- Hosted bi-monthly meetings to check in with mentees, offer guidance, and share strategies for success in the BME program, fostering a supportive peer network.
- Helped students balance academic challenges with campus life, contributing to a smooth transition into university and improved retention rates in the BME program.

**Spring Ahead Tutoring Center (Reinach, Switzerland)/** Mar 2020 – Aug 2023

Employed by Spring Ahead Tutoring Center as STEM Tutor

- Provided one-on-one tutoring in Mathematics, Physics, Chemistry, and Biology to students from Grades 7 to 11, adapting teaching methods to individual learning styles.
- Supported International Baccalaureate students with homework, exam preparation, and test-taking strategies, ensuring a thorough understanding of core concepts and contributing to their academic success.
- Seamlessly transitioned from in-person tutoring (2020-2021) to a virtual format for the remainder of the role, maintaining high-quality educational support and developing skills in online education delivery.

## Additional Experience

**Locaze /** Aug 2022 - Current

CTO and Founding member of student venture working with Johns Hopkins Medical Institute

- Led the development of a mobile application designed to detect concussions through advanced eye movement tracking algorithms.
- Headed the tech sub-team as CTO, overseeing both front-end development of the app and back-end development of neural networks and additional scripts for eye movement analysis.
- Successfully submitted an IRB proposal to begin training and testing of the app on a population of high-school athletes, scheduled to commence in January 2024.
- Secured $7500 in seed funding through successful participation in HopStart, Johns Hopkins Healthcare Design Competition, and Baylor New Venture Competition Finals.
- Submitted non-provisional design patent for the technology currently under review.

**JHU Design Team /** Mar 2023 – May 2024

Founding member of design team affiliated with the JHU Department of Biomedical Engineering

- Collaborated with innovative startup Mendaera and their team of clinicians to develop a cutting-edge device aimed at significantly reducing the duration of prostate biopsies.
- Contributed to the design process with the goal of alleviating patient discomfort by reducing the prostate targeting learning curve and time of biopsy retrieval process.
- Entered prototyping phase in December 2023 and began testing low-fidelity prototypes in March 2024.

## Activities

**Rockhoppers Climbing Club /** Aug 2023 - Current
Member of university climbing club with weekly practices for bouldering and rope climbing.

**Inter-Asian Council /** Jan 2024 - Current
Member of university club organizing showcases/campaigns that promote discussion of Asian Pacific Islander Desi American (APIDA) identity and challenges facing the APIDA community.

**Intermural Soccer Club /** Jan 2022 – Current
Captain of intermural soccer team participating in semester tournaments for futsal and soccer.

**JHU Tennis Club /** Sep 2021 – Dec 2022
Member of university tennis club with weekly practices and occasional tournaments.

## Honors and Achievements

**Upsilon Pi Epsilon Honor Society (President)/** Nov 2023 - Current
Current President of UPE chapter in JHU, the International Honor Society for the Computing and Information Disciplines, hosting information and networking events for computer science students.

**Alpha Eta Mu Beta Honor Society/** September 2024 - Current
Member of AEMB, the National Biomedical Engineering Honor Society, representing academic excellence and leadership in biomedical engineering.

**Scouts BSA (Eagle Scout)**