Byeol (Star) Kim, PhD

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https://scholar.google.com/citations?user=HgjrAyIAAAAJ&hl=en&oi=ao

EDUCATION

Ph.D. in Mechanical Engineering   May 2022
Johns Hopkins University, Baltimore
Thesis title: Advances in Diagnosis and Surgery of Congenital Heart Disease Through Novel Virtual Reality Systems for Design, Simulation, and Planning Methods (Degree Conferred in Dec 2021)
Thesis committee: Axel Krieger (primary advisor), Chien-Ming Huang, Peter Kazanzides, Yue-Hin Loke

M.S. in Mechanical Engineering   May 2020
University of Maryland, College Park

B.S. in Bioengineering (Minor in International Engineering)   May 2015
University of Maryland, College Park
Thesis title: Low-Cost Ankle Rehabilitation Robot for Children with Cerebral Palsy
Thesis advisors: Jae Kun Shim, Kevin Cleary

BUSINESS AND STRATEGY EXPERIENCES

Board of Director   2024/03 – Present
M&C World, Korea
- Advising on strategic development for a hotel business, ensuring alignment of business goals with market trends and identifying growth opportunities.
- Advised on co-founder structure, including delineating roles, responsibilities, ownership stakes, and legal/financial terms, successfully mediating disputes and formalizing a co-founders' agreement.
- Conducted industry benchmarking and competitive analysis, identifying best practices in Korea's hotel sector to inform partnership strategies, optimize design, and enhance service offerings.

Management Consultant (Associate)   2022/01 – 2023/11
McKinsey & Company, Miami, FL
- Advised business executives on organizational and operational performance management strategies, leveraging financial planning and analysis (FP&A), performance evaluation analytics, competitive market analysis, and profit improvement strategies to drive key business decisions and uncover growth opportunities across various industries.
- Led outreach and relationship-building initiatives, developing and executing strategic outreach plans to establish partnerships, and organizing workshops to represent the company's mission and culture, enhancing stakeholder engagement and collaboration.
- Conducted market intelligence and partnership strategies by performing market analysis and customer journey mapping to identify potential business partners aligned with client objectives, and designed strategies to improve customer experience and drive new user acquisition for emerging service lines.
- Performed due diligence through patent expiration analysis, assessing the impact on the competitive landscape and market potential of generic alternatives, guiding long-term investment decisions for sustainable growth and profitability.

- Led business transformation initiatives, driving organizational change management by developing communication strategies, facilitating executive engagement to align on strategic objectives, and implementing feedback channels for continuous two-way communication during transitions.
- Developed urban economic development strategies, formulating initiatives to create thriving tech, business, and healthcare ecosystems through talent acquisition, economic impact assessments, community engagement, and infrastructure planning to optimize public transportation and enhance accessibility.

Co-Founder and CEO   2020/01 – 2022/01
CorFix Medical Inc., Fulton, MD
- Founded a virtual reality cardiac surgical simulation company, demonstrating entrepreneurial acumen and business leadership.
- Secured $315,000 in funding from TEDCO's Maryland Innovation Initiative, effectively leveraging state support to drive growth and technological advancement.
- Conducted comprehensive market analysis to assess product-market fit, evaluate the competitive landscape, and identify opportunities in the healthcare sector, driving strategic product development and business initiatives.
- Mediated co-founder conflicts by aligning interests, clarifying roles, and delegating responsibilities, formalizing a co-founders' agreement to ensure operational alignment and collaboration.

RESEARCH AND DEVELOPMENT EXPERIENCES

Educational Consultant

Test-Nation, Korea   2024/06 – Present
- Managing client relationships by providing strategic insights on research and product development, aligning them with client objectives, interests, and capabilities.
- Directing agile product management efforts for multiple clients, ensuring timely delivery and adaptability while strategically identifying innovative technology integration opportunities across diverse initiatives:
    - **AI-Driven Depression Assessment**: Implementing machine learning algorithms in conversational interfaces to differentiate between authentic and feigned emotional expressions, thereby improving diagnostic accuracy and mental health outcomes.
    - **Gamified Home Therapy for ACL Rehabilitation**: Creating a customized platform utilizing computer vision technology to deliver personalized, engaging rehabilitation solutions for patients recovering from ACL injuries.
    - **Automated Vertical Farming Harvesting System**: Designing a system for vertical farming that analyzes and automates the harvesting of lettuce while preserving roots for regrowth, enhancing agricultural efficiency.
    - **Virtual Reality Mars Educational Simulation**: Developing an immersive simulation that fosters engagement in STEM by enabling users to explore complex technical concepts in a virtual Mars environment.
    - **EEG Analysis of Alzheimer's Patients**: Conducting a study to investigate demographic influences on brain activity, providing critical insights for improved diagnostic and treatment strategies in Alzheimer's care.
    - **Pedestrian Crossing Behaviors Model for Safety**: Enhancing pedestrian safety through advanced modeling techniques to enable data-driven adjustments for optimizing traffic light timings at crosswalks, particularly in high-traffic areas.

- o **Traditional Korean Jars on Food Preservation**: Analyzing the effects of Hang-Ah-Ri on natural food preservation to identify sustainable storage solutions that reduce waste and enhance food longevity.
- o **Online Instrument Learning Platform**: Creating a platform that enables users to play instruments and receive real-time grading on pitch and vibrato accuracy, thereby enhancing music education through technological integration.

Visiting Researcher, Biomechanics Lab   2023/07 - Present
Seoul National University, Korea
Supervisor: Dr. Jae Bum Park

- **Mixed Reality Exergame for Rehabilitation**: Developing an innovative computer vision-based mixed reality platform that enables users to control characters through body movements to enhance balance and flexibility, establishing a foundation for future applications in rehabilitation and senior healthcare.
- **Avatar-Based Motivation in Telehealth**: Creating a mixed reality platform that allows users to design personalized avatars and assess the effects of avatar similarity and display modes on motivation and physical performance, advancing telehealth applications for rehabilitation.
- **Adaptive Virtual Reality Exposure Therapy**: Designing a platform that simulates various heights in treetop trekking, incorporating real-time distress feedback and neurophysiological data collection to evaluate emotional states and optimize therapeutic exposure for a safe and effective patient experience.
- **Botox Treatment on Stroke Rehabilitation**: Conducting a longitudinal study to evaluate the effects of Botox treatment on hand strength, independence, and precise control among stroke patients, addressing critical gaps in understanding outcomes compared to less-affected hands and a healthy control group.
- **Developmental Coordination Disorder in Korean Adults**: Conducting the inaugural study on the anthropometric, physical activity, and psychological characteristics of Korean adults with and without developmental coordination disorder, highlighting cultural and ethnic influences on DCD patterns to support personalized diagnostic approaches.

Research Consultant, Neuromechanics Research Core   2024/01 – 2024/05
University of Maryland, College Park
Supervisor: Dr. Jae Kun Shim

- **Gait Mechanics in Transfemoral Amputees**: Conducted a comprehensive study analyzing gait mechanics and the metabolic costs of walking among high-functioning transfemoral amputees using osseointegrated versus traditional socket-based prostheses, contributing to the understanding of prosthetic performance and rehabilitation strategies.

Faculty Assistant, Neuromechanics Research Core   2023/04 – 2024/03
University of Maryland, College Park
Supervisor: Dr. Jae Kun Shim

- Provided comprehensive guidance to research teams, facilitating their professional development through instruction on literature review methodologies, assistance in crafting Institutional Review Board (IRB) request packages, and training in data collection and analysis techniques, thereby fostering a collaborative and productive research environment.
- **Biomechanical Risk Factors in Knee Osteoarthritis**: Advised a research team in investigating biomechanical risk factors associated with knee osteoarthritis under four distinct emotional

walking conditions, enhancing understanding of the complex interactions between emotional states and biomechanical outcomes.

- **Emotional States and Physical Performance**: Led research initiatives investigating the interplay between emotional states, personality traits, and physical performance, specifically focusing on power and strength metrics, to inform rehabilitation strategies and improve patient outcomes.

Graduate Researcher, Intelligent Medical Robotic Systems and Equipment Lab   2020/05 – 2022/01
Johns Hopkins University, Baltimore, MD
Advisor: Dr. Axel Krieger

- **Novel Cardiac Surgical Technique:** Conducted early-phase exploration of the Convergent Cavopulmonary Connection (CCPC), an innovative patient-specific surgical approach designed to accommodate a mechanical motor, addressing challenges in traditional cardiac surgeries and validated through 3D design and computational fluid dynamics simulations.
- **Virtual Reality Cardiac Surgical Planning System (CorFix)**:
    - o Engineered a virtual reality system that enables the creation of bifurcated Fontan conduit designs, evaluates their hemodynamic performance, and allows for modification of existing designs, fostering collaboration and pre-simulation of various surgical ideas to enhance surgical precision and patient outcomes.
    - o Validated the CorFix software through usability testing, confirming that physicians could create customized conduit designs within 10 minutes of training, achieving design times of 5.49 minutes for tube-shaped conduits and 13.40 minutes for bifurcated conduits to accommodate tight surgical planning schedules.

Graduate Researcher, Medical Robotics and Equipment Lab   2017/04 – 2020/05
University of Maryland, College Park, MD
Advisor: Dr. Axel Krieger

- **Virtual Reality Implant Design Software (CorFix):**
    - o Developed CorFix, a first virtual reality vascular graft modeling software that addresses key challenges in surgical planning and diagnostics, incorporating advanced visualization features for creating patient-specific, tube-shaped grafts in 3D.
    - o Conducted usability testing with engineers trained in 3D design, validating CorFix's efficiency and learnability against standard CAD software like SolidWorks. Results showed that participants completed design tasks in an average of 8.98 minutes with CorFix compared to 30.27 minutes with CAD (p=0.004), achieving a 0% design failure rate for CorFix compared to a 75% failure rate for CAD.
    - o Conducted user research demonstrating that physicians may not always align with computer-optimized surgical designs due to the complexities of suturing and individual surgical preferences, while also exhibiting substantial intuition regarding indexed power loss and hepatic flow distribution in surgical design, effectively mapping the dynamics of blood flow within various cardiac conduit configurations and attachment sites for each patient despite lacking engineering backgrounds.
    - o Established and led a cohesive team by recruiting, interviewing, and mentoring members, providing professional development opportunities that empowered them to excel in their roles and pursue their career aspirations, ultimately ensuring the successful completion of the project.

- **Computational Fluid Dynamics Simulation for Cardiac Surgery:**
  - Investigated various mesh configurations and numerical solvers in computational fluid dynamics (CFD) simulations to enhance the speed and accuracy of hemodynamic performance calculations for cardiac conduits; results revealed no significant impact of numerical solvers on either iPL (P = .50) or HFD (P = .55), with a transient solver requiring 100 times more computational time than a steady solver with a 2.5 mm mesh size to produce comparable results.
  - Developed an innovative in vitro validation setup that enhanced the reliability of computational fluid dynamics (CFD) simulations by simulating hepatic flow distribution using beads in a blood-like fluid, thereby improving surgical decision-making processes and accurately demonstrating hemodynamic performance in cardiac conduits across various patient anatomies.
- **3D Printing Techniques for Tissue-Engineered Vascular Grafts (TEVG):**
  - Introduced a novel metallic collector design for electrospinning, inspired by a LEGO concept, which enabled the production of tissue-engineered vascular grafts with uniform thickness and structural integrity while allowing for easy post-printing removal to prevent material stretching or ripping, thereby enhancing overall production efficiency.
  - Validated our TEVG through in vivo experiments involving five porcine models, monitored for one-month post-implantation, which revealed significant intimal growth and healthy collagen formation without side effects, underscoring the potential of biomaterial and customized vascular grafts in cardiac surgeries.
- **Collaborative Cardiac Diagnosis Software (Cardiac Review 3D)**
  - Conceived and developed Cardiac Review 3D, the first multiuser virtual reality software designed for remote collaboration in diagnosing congenital heart disease (CHD), enhancing 3D visualization of medical images and facilitating simultaneous discussions among distant medical professionals.
  - Demonstrated that full-immersive VR significantly improved diagnostic accuracy by 54.49% and 146.82% over conventional and non-immersive methods, respectively (P < .001), proving its benefits primarily in complex cardiology cases, as conventional approaches remain sufficient for easier and intermediate diagnoses.

ORISE Research Fellow, Functional Performance and Device Use Lab   2016/06 – 2017/01
U.S. Food and Drug Administration, Silver Spring, MD
Advisor: LT. James Coburn
- **3D Printed Customized Surgical Cutting Guides:**
  - Conducted rigorous usability studies with orthopedic surgical trainees to assess the impact of patient-specific surgical cutting guides on total knee arthroplasty, demonstrating significant improvements in cognitive workload, cutting accuracy, and preservation of bone integrity compared to conventional guides.
  - Led a multidisciplinary research team in the design and execution of usability studies, providing advanced training in research methodologies and publication strategies, thereby enhancing the team's technical capabilities and research output.

Research Assistant, Hybrid-Systems Integration and Simulation Lab   2013/09 – 2016/12
University of Maryland, College Park, MD
Advisor: Dr. Monifa Vaughn-Cooke

- **Tobacco Cessation Project:**
  - o Led the development of a pioneering virtual reality cognitive behavioral therapy (CBT) application, addressing the public health challenge of tobacco cessation for mental health patients and substance abusers, and engineered a dynamic personalization framework that tailors therapeutic scenarios to smoker personas based on behavioral responses, enhancing user engagement and therapeutic outcomes.
  - o Conducted comprehensive evaluations of emotional responses using subjective surveys and objective neurophysiological measures, enabling iterative improvements in VR content that prioritized the most impactful cessation strategies and improved overall treatment effectiveness.
- **Telemetry Project:**
  - o Directed the development of a virtual reality simulation of the patient monitoring room at MedStar Hospital in Washington, D.C., to study the effects of visual and auditory inputs on healthcare technicians' performance and optimize designs for improved efficiency and reduced mental workload.
  - o Created a mock hospital phone interface using VBA code that enabled technicians to contact medical professionals while automatically recording the exact time and button pressed, allowing for the assessment of accuracy and response speed in patient monitoring tasks.
- **Depression Study:** Explored strategies for assessing depression severity by collecting voice recordings and analyzing them through multivariate statistical methods and text mining, linking vocal patterns (e.g., pitch, jitter) with DSM-5 survey results, highlighting individual differences in information sharing that affected the quality of text mining and demonstrating the potential for using vocal patterns in depression diagnosis.
- **MindBody Study:** Explored the mathematical relationships between cognitive load (i.e., workload and working memory) and neurophysiological and behavioral responses (i.e., facial expression), revealing that increased eye blinks during complex mental tasks correlated with decreased accuracy.

Summer Research Intern, Memory Biology Lab   2013/07 – 2013/08
Korea Advanced Institute of Science and Technology (KAIST), Daejeon
Advisor: Dr. Jin Hee Han
- **Fearful Memory Research:** Contributed to the investigation of the neural circuit basis of fearful memory by caring for experimental mice and performing mouse perfusion for brain tissue analysis, demonstrating that synapses between sensory input areas and the lateral amygdala can function as a conditioned stimulus.

Research Assistant, Molecular Mechanics and Self-Assembly Lab   2012/09 – 2012/12
University of Maryland, College Park, MD
Advisor: Dr. Joon Il Seog
- **Viral RNA Genome Study:** Contributed to the investigation of viral RNA genome replication and translation by employing single-molecule techniques with optical tweezers to observe the structural folding of RNA elements, followed by an in-depth analysis of RNA patterns using software tools including Igor, MATLAB, and KaleidaGraph.

TEACHING EXPERIENCES

Co-Instructor, Active Learning Program for Excellence   2024/01 – 2024/01
College of Physical Education, Kyung Hee University
Course Description: Modern principles and advanced techniques of kinesiology underlying improvement of human health and enhancement of physical performance through a series of seminars and laboratory sessions based on neuroscience, biomechanics, electrophysiology, and engineering
Class Size: 20 undergraduate students

Co-Instructor, EN.601.491/691 Human-Robot Interaction   2021/01 – 2021/05
Department of Computer Science, Johns Hopkins University
Course Description: Research methods and topics in human-robot interaction, focusing on the design and evaluation of interactions between humans and robotic technologies
Class Size: 25 undergraduates to doctorate students

Instructor, INST314 Statistics for Information Science   2020/01 – 2020/05
College of Information Studies, University of Maryland, College Park
Course Description: (1) Basic concepts of statistics including measure construction, data exploration, hypothesis development, hypothesis testing, pattern identification, and statistical analysis and (2) an overview of commonly used data manipulation and analytic tools such as R programming
Class Size: 100 undergraduate students

Graduate Teaching Assistant, ENME464 Cost Analysis for Engineers   2017/01 – 2017/05
Department of Mechanical Engineering, University of Maryland, College Park
Course Description: (1) Key elements of traditional engineering economics including interest, present worth, depreciation, taxes, inflation, financial statement analysis, and return on investment and (2) topics of cost analysis including manufacturing cost analysis, life-cycle cost modeling (reliability and warranty), and cost of ownership
Class Size: 100 undergraduate students

Private Tutor and College Mentor   2013/07 – 2018/05
St. Croix Lutheran High School, MN & Maranatha Christian Academy, MN
- Developed and implemented engaging lesson plans in STEM disciplines, including Algebra, Geometry, Calculus, Physics, and Chemistry, fostering a deep understanding of mathematical and scientific concepts.
- Conducted SAT and ACT preparatory workshops, emphasizing effective test-taking strategies and simulated practice examinations to optimize student performance.
- Provided tailored guidance to international students in navigating the complexities of acquiring student visas and supported them throughout the college application process, including university selection and application preparation.

PUBLICATIONS

Peer-Reviewed Journal Articles

[J11] **Kim, B.,** Kim, M., Kwon, H., Park, J., & Shim, J., Effect of Botulinum Toxin A on Stroke Patient's Hand Functionality and Maximum Distal Flexion Force Production (In Preparation)

[J10] Kim, M., Nam, S., **Kim, B.,** Park, I., Park, J., & Shim, J., (2023) Anthropometric, Physical Activity, and Psychological Characteristics of Korean Adults With and Without Developmental Coordination Disorder. *Frontiers in Human Neuroscience.* https://doi.org/10.3389/fnhum.2023.1280356

[J9] Snyder, S., Bell, E., Oh, S., Ehsani, H., Kambhamettu, A., **Kim, B.,** Bera, A., Miller, R., & Shim J. Walking with Sad and Happy Emotions Influences Risk Factors of Knee Osteoarthritis. Frontiers in Human Neuroscience (In Review)

[J8] Sinha, P., Contento, J., **Kim, B.**, Wang, K., Wu. Q., Cleveland, V., Mass, P., Loke, Y.H., Krieger, A., & Olivieri, L. (2023). The convergent cavopulmonary connection: A novel and efficient configuration of Fontan to accommodate mechanical support. *Journal of Thoracic and Cardiovascular Surgery Open.* https://doi.org/10.1016/j.xjon.2022.12.009

[J7] **Kim, B**., Nguyen, P., Loke, Y. H., Cleveland, V., Liu, X., Mass, P., Hibino, N., Olivieri, L., & Krieger, A. (2022). Virtual Reality Cardiac Surgical Planning Software (CorFix) for Designing Patient-Specific Vascular Grafts: Development and Pilot Usability Study. *Journal of Medical Internet Research Cardio*, *6*(1), e35488. https://doi.org/10.2196/35488

[J6] Liu, X., Aslan, S., **Kim, B**., Warburton, L., Jackson, D., Muhuri, A., Subramanian, A., Mass, P., Cleveland, V., Loke, Y. H., Hibino, N., Olivieri, L., & Krieger, A. (2022). Computational Fontan Analysis: Preserving Accuracy While Expediting Workflow. *World Journal for Pediatric and Congenital Heart Surgery*, *13*(3), 293–301. https://doi.org/10.1177/21501351211073619

[J5] Liu, X., Hibino, N., Loke, Y. H., **Kim, B**., Mass, P., Fuge, M., Olivieri, L., & Krieger, A. (2022). Surgical Planning and Optimization of Patient-Specific Fontan Grafts with Uncertain Post-Operative Boundary Conditions and Anastomosis Displacement. *IEEE Transactions on Biomedical Engineering*, vol. 69, no. 11, pp. 3472-3483. https://doi.org/10.1109/TBME.2022.3170922

[J4] Liu, X., **Kim, B.**, Loke, Y. H., Mass, P., Olivieri, L., Hibino, N., Fuge, M., & Krieger, A. (2022). Semi-Automatic Planning and Three-Dimensional Electrospinning of Patient-Specific Grafts for Fontan Surgery. *IEEE Transactions on Biomedical Engineering*, *69*(1), 186–198. https://doi.org/10.1109/TBME.2021.3091113

[J3] **Kim, B.,** Loke, Y. H., Mass, P., Irwin, M. R., Capeland, C., Olivieri, L., & Krieger, A. (2020). A Novel Virtual Reality Medical Image Display System for Group Discussions of Congenital Heart Disease: Development and Usability Testing. *Journal of Medical Internet Research Cardio*, *4*(1), e20633. https://doi.org/10.2196/20633

[J2] Yeung, E., Inoue, T., Matsushita, H., Opfermann, J., Mass, P., Aslan, S., Johnson, J., Nelson, K., **Kim, B**., Olivieri, L., Krieger, A., & Hibino, N. (2020). In vivo implantation of 3-dimensional printed customized branched tissue engineered vascular graft in a porcine model. *Journal of Thoracic and Cardiovascular Surgery*, *159*(5), 1971–1981.e1. https://doi.org/10.1016/j.jtcvs.2019.09.138

[J1] Loke, Y. H., **Kim, B**., Mass, P., Opfermann, J. D., Hibino, N., Krieger, A., & Olivieri, L. (2020). Role of surgeon intuition and computer-aided design in Fontan optimization: A computational fluid dynamics simulation study. *Journal of Thoracic and Cardiovascular Surgery*, *160*(1), 203–212.e2. https://doi.org/10.1016/j.jtcvs.2019.12.068

Peer-Reviewed Conference Full Papers

[C5] Wu, Q., Cleveland, V., Aslan, S., Liu, X., Contento, J., Mass, P., **Kim, B.**, Pollard, C., Sinha, P., Loke, Y., Olivieri, L. & Krieger, A. (2023) Hemodynamics of Convergent Cavopulmonary Connection with Ventricular Assist Device for Fontan Surgery: A Computational and Experimental Study. Proceedings of the 16th International Joint Conference on Biomedical Engineering Systems and Technologies. https://doi.org/10.5220/0011633200003414

[C4] **Kim, B**., Nguyen, P. D., Nar, P., Liu, X., Loke, Y.-H., Mass, P., Hibino, N., Olivieri, L., & Krieger, A. (2020). CorFix: Virtual Reality Cardiac Surgical Planning System for Designing Patient Specific Vascular Grafts. *26th ACM Symposium on Virtual Reality Software and Technology*. https://doi.org/10.1145/3385956.3418951

[C3] **Kim, B.,** Loke, Y.-H., Stevenson, F., Siallagan, D., Mass, P., Opfermann, J. D., Hibino, N., Olivieri, L., & Krieger, A. (2019). Virtual Cardiac Surgical Planning Through Hemodynamics Simulation and Design Optimization of Fontan Grafts. *Medical Image Computing and Computer Assisted Intervention*. https://doi.org/10.1007/978-3-030-32254-0_23

[C2] **Kim, B.,** Schwartz, W., Catacora, D., & Vaughn-Cooke, M. (2016). Virtual Reality Behavioral Therapy. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 60(1), 356–360. https://doi.org/10.1177/1541931213601081

[C1] Kohani, M., Berman, J., Catacora, D., **Kim, B**., & Vaughn-Cooke, M. (2014). Evaluating Operator Performance for Patient Telemetry Monitoring Stations Using Virtual Reality. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 58(1), 2388–2392. https://doi.org/10.1177/1541931214581497

Refereed Symposium and Abstract

[S3] Olivieri L, **Kim B**, Wang K, Liu X, Aslan S, Cleveland V, Mouzakis N, Mass P, Loke YH, Krieger A, Sinha P. (2022) Convergent cavopulmonary connection (CCPC): A novel, efficient design to accommodate mechanical TCPC support. Society for Cardiovascular Magnetic Resonance (SCMR) Scientific Sessions.

[S2] Olivieri L, **Kim B**, Liu X, Aslan S, Cleveland V, Mouzakis N, Mass P, Loke YH, Krieger A, Sinha P. (2022) Patient-specific, convergent total cavopulmonary connection (CCPC): A novel, efficient inverted 'Y' design to accommodate mechanical TCPC support. American Association for Thoracic Surgery Annual Meeting.

[S1] Loke, Y., **Kim, B**., Mass, P., Opfermann, J. D., Krieger, A., Hibino, N., & Olivieri, L. (2019). Abstract 9911: Hemodynamic Contributions of Computer Aided Designs and Surgeon's Unconstrained Modelling to the Fontan Operation: A Computational Fluid Dynamic Simulation Study. Circulation. https://www.ahajournals.org/doi/10.1161/circ.140.suppl_1.9911

PATENT

[P1] **Kim, B.,** Liu, X., Krieger, A., Fuge, M., Nguyen, P., Hess, R., Nar, P., Olivieri, L., Hibino, N., Loke, Y.-H., Mass, P., Methods, Systems and Related Aspects for Optimization and Planning of Cardiac Surgery, World Intellectual Property Organization, International Patent Number WO 2021/195044 Sep, 30 2021.

GRANT

TEDCO's Maryland Innovation Initiative   Jan 2020

Project title: Developing CorFix: A Software for Medical Diagnosis and Pre-operative Planning for Fontan Surgery
Awarded amount: Phase I = $165,000 & Phase II = $150,000 (Total = $315,000)

HONORS AND AWARDS

- Johns Hopkins University #100 Alumni Voices   Dec 2022
  Podcast Link: https://www.buzzsprout.com/2125627/12446924-dr-star-kim-phd-in-mechanical-engineering-management-consultant-at-mckinsey-company?t=0

- University of Maryland Three Minute Thesis (3MT) Competition Winner   Apr 2020

- A. James Clark School 3MT Competition Winner   Mar 2020

- Department of Mechanical Engineering 3MT Competition Winner   Mar 2020

- Best Presenter Award at the Korean Graduate Student Symposium   Nov 2018

- Best Use of Capital One's API Hack at Technica (Hackathon)   Nov 2016

- Best Watch Dogs® Device Privacy Hack at Technica (Hackathon)   Nov 2016

- Oak Ridge Institute for Science and Education Fellowship   Aug 2016

- University of Maryland PhD Dean's Fellowship   May 2015

- Best Booz Allen Hamilton Hack at Bitcamp (Hackathon)   Apr 2015

- Best Environmental Protection Agency Hack at Bitcamp (Hackathon)   Apr 2015

- Seymour and Faye Wolf Scholarship in Bioengineering   Oct 2014

- Best Twilio's API Hack at Bitcamp (Hackathon)   Apr 2014

CERTIFICATION

- Product Management Certification from General Assembly   May 2023

INVITED TALKS AND PANEL DISCUSSIONS

- "Engineering Your Future: Consulting for Engineering PhDs", Integrative Learning and Life Design – Doctoral Life Design Studio at Johns Hopkins University, Sep 24, 2024

- "What is Management Consulting", Johns Hopkins Undergraduate Consulting Club at Johns Hopkins Carey Business School, Nov 13, 2023

- "Developing Patient-Specific Medical Devices and Software", Department of Mechanical Engineering at Kyung Hee University, July 20, 2023

- "Elevator Pitch for Engineers", Department of Mechanical Engineering at Kyung Hee University, July 20, 2023

- "Personalizing Cardiac Surgeries", Department of Mechanical Engineering at Kyung Hee University, July 19, 2023

- "Creating Resume and CV for Landing Jobs in the US", Department of Mechanical Engineering at Kyung Hee University, July 19, 2023

- "Preparing for College Application and Deciding University and Major", St. Croix Lutheran High School, March 17, 2023

- "Life as a Management Consultant", Principles of Management Course at Johns Hopkins University, March 13, 2023

- "How to Transition into Management Consulting", Department of Biology at Johns Hopkins University, December 9, 2022

- "How to Become a Management Consultant", Department of Chemical and Biomolecular Engineering at Georgia Institute of Technology, December 5, 2022

- "What is Management Consulting", Department of Civil and Environmental Engineering at the University of Maryland, College Park, December 5, 2022

- "Career after PhD in Robotics", Laboratory for Computational Sensing and Robotics in the Department of Mechanical Engineering at Johns Hopkins University, November 30, 2022

- "How to Transition into Management Consulting", Department of Aerospace Engineering at Georgia Institute of Technology, November 29, 2022

- "Virtual Reality for Surgical Planning", Advanced Visualization in Healthcare: AR/VR/MR, 3dheals, Apr 2021

- "Future of Heart Surgery", Moco Makers Group, Jul 2020

CONFERENCE PRESENTATIONS

- "Corfix: Virtual reality cardiac surgical planning system for designing patient specific vascular grafts", ACM Symposium on Virtual Reality Software and Technology, Nov 2020

- "Virtual Reality Behavioral Therapy", Proceedings of the Human Factors and Ergonomics Society Annual Meeting, Sep 2016

LEADERSHIP AND SERVICES

- **University of Maryland Summer Training and Research (STAR) Program Mentor**   Summer 2023
  University of Maryland, College Park

- **Miami Hub Growth, Marketing, and Sales (GM&S) Event Coordinator**   2023
  McKinsey & Company

- **High School Counselor**   2023
  St. Croix Lutheran High School

- **Miami Office Advanced Degree Candidate Recruiting Volunteer**   2022-2023
  McKinsey & Company

- **Case study (Interview) Preparation Guide**   2022-2023
  McKinsey & Company

- **MBA & Advanced Degree Candidate Mentor**   2022-2023
  McKinsey & Company

- **Director of Professional Development**   2020-2021
  Johns Hopkins University Women of Whiting

- **Communications Director**   2017-2018
  University of Maryland Mechanical and Reliability Engineering Graduate Student Association

- **Co-Founding Member & Vice President**   2014-2015
  University of Maryland Student Chapter of Human Factors and Ergonomics Society

- **Co-Founding Member & President & Vice President**   2014-2016
  University of Maryland Society of Asian Scientists and Engineers

- **Minority High School Students Research Mentor**   Summer 2014, 2015, 2016, 2017
  University of Maryland, College Park

- **Maryland Day Volunteer**   Spring 2015, 2016
  University of Maryland, College Park