



## Matthew H Park

Ph.D. Student in Mechanical Engineering, admitted Winter 2020

### Publications

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#### PUBLICATIONS

- **Neochordal Goldilocks: Analyzing the Biomechanics of Neochord Length on Papillary Muscle Forces Suggests Higher Tolerance to Shorter Neochordae.** *The Journal of thoracic and cardiovascular surgery*  
Park, M. H., van Kampen, A., Zhu, Y., Melnitchouk, S., Levine, R. A., Borger, M. A., Woo, Y. J.  
2023
- **Native and Post-Repair Residual Mitral Valve Prolapse Increases Forces Exerted on the Papillary Muscles: A Possible Mechanism for Localized Fibrosis?** *Circulation. Cardiovascular interventions*  
Park, M. H., van Kampen, A., Melnitchouk, S., Wilkerson, R. J., Nagata, Y., Zhu, Y., Wang, H., Pandya, P. K., Morningstar, J. E., Borger, M. A., Levine, R. A., Woo, Y. J.  
2022; 15 (12): e011928
- **A novel accelerated fatigue testing system for pulsatile applications of cardiac devices using widely translatable cam and linkage-based mechanisms.** *Medical engineering & physics*  
Park, M. H., Imbrie-Moore, A. M., Zhu, Y., Sellke, M., Marin-Cuartas, M., Wilkerson, R. J., Woo, Y. J.  
2022; 109: 103896
- **The Critical Biomechanics of Aortomitral Angle and Systolic Anterior Motion: Engineering Native Ex Vivo Simulation.** *Annals of biomedical engineering*  
Park, M. H., Imbrie-Moore, A. M., Zhu, Y., Wilkerson, R. J., Wang, H., Park, G. H., Wu, C. A., Pandya, P. K., Mullis, D. M., Marin-Cuartas, M., Woo, Y. J.  
2022
- **A Novel Rheumatic Mitral Valve Disease Model with Ex Vivo Hemodynamic and Biomechanical Validation.** *Cardiovascular engineering and technology*  
Park, M. H., Pandya, P. K., Zhu, Y., Mullis, D. M., Wang, H., Imbrie-Moore, A. M., Wilkerson, R., Marin-Cuartas, M., Woo, Y. J.  
2022
- **Biomechanical analysis of neochordal repair error from diastolic phase inversion of static left ventricular pressurization.** *JTCVS techniques*  
Park, M. H., Marin-Cuartas, M., Imbrie-Moore, A. M., Wilkerson, R. J., Pandya, P. K., Zhu, Y., Wang, H., Borger, M. A., Woo, Y. J.  
2022; 12: 54-64
- **From hardware store to hospital: a COVID-19-inspired, cost-effective, open-source, in vivo-validated ventilator for use in resource-scarce regions.** *Bio-design and manufacturing*  
Park, M. H., Zhu, Y., Wang, H., Tran, N. A., Jung, J., Paulsen, M. J., Imbrie-Moore, A. M., Baker, S., Wilkerson, R., Marin-Cuartas, M., Mullis, D. M., Woo, Y. J.  
2021: 1-8
- **Heart Valve Biomechanics: The Frontiers of Modeling Modalities and the Expansive Capabilities of Ex Vivo Heart Simulation.** *Frontiers in cardiovascular medicine*  
Park, M. H., Zhu, Y., Imbrie-Moore, A. M., Wang, H., Marin-Cuartas, M., Paulsen, M. J., Woo, Y. J.  
2021; 8: 673689
- **Quadrupling the N95 Supply during the COVID-19 Crisis with an Innovative 3D-Printed Mask Adaptor.** *Healthcare (Basel, Switzerland)*  
Imbrie-Moore, A. M., Park, M. H., Zhu, Y. n., Paulsen, M. J., Wang, H. n., Woo, Y. J.  
2020; 8 (3)

- **Artificial papillary muscle device for off-pump transapical mitral valve repair.** *The Journal of thoracic and cardiovascular surgery*  
Imbrie-Moore, A. M., Zhu, Y. n., Park, M. H., Paulsen, M. J., Wang, H. n., Woo, Y. J.  
2020
- **Biomimetic six-axis robots replicate human cardiac papillary muscle motion: pioneering the next generation of biomechanical heart simulator technology.** *Journal of the Royal Society, Interface*  
Imbrie-Moore, A. M., Park, M. H., Paulsen, M. J., Sellke, M. n., Kulkarni, R. n., Wang, H. n., Zhu, Y. n., Farry, J. M., Bourdillon, A. T., Callinan, C. n., Lucian, H. J., Hironaka, C. E., Deschamps, et al  
2020; 17 (173): 20200614
- **Discussion to: Neochordal Goldilocks: Analyzing the biomechanics of neochord length on papillary muscle forces suggests higher tolerance to shorter neochordae.** *The Journal of thoracic and cardiovascular surgery*  
Park, M. H., Casselman, F., Joseph Woo, Y.  
2023
- **An analytical, mathematical annuloplasty ring curvature model for planning of valve-in-ring transcatheter mitral valve replacement.** *JTCVS techniques*  
Park, M. H., Marin-Cuartas, M., Sellke, M., Pandya, P. K., Zhu, Y., Wilkerson, R. J., Holzhey, D. M., Borger, M. A., Woo, Y. J.  
2023; 20: 45-54
- **Biomechanics and clinical outcomes of various conduit configurations in valve sparing aortic root replacement.** *Annals of cardiothoracic surgery*  
Zhu, Y., Park, M. H., Pandya, P. K., Stark, C. J., Mullis, D. M., Walsh, S. K., Kim, J. Y., Wu, C. A., Baccouche, B. M., Lee, S. H., Baraka, A. S., Joo, H., Yajima, et al  
2023; 12 (4): 326-337
- **Biomechanical analysis of novel leaflet geometries for bioprosthetic valves.** *JTCVS open*  
Pandya, P. K., Park, M. H., Zhu, Y., Woo, Y. J.  
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- **Biomechanical evaluation of aortic regurgitation from cusp prolapse using an ex vivo 3D-printed commissure geometric alignment device.** *Journal of cardiothoracic surgery*  
Zhu, Y., Park, M. H., Imbrie-Moore, A., Wilkerson, R., Madira, S., Woo, Y. J.  
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- **A novel accelerated fatigue testing system for pulsatile applications of cardiac devices using widely translatable cam and linkage-based mechanisms** *MEDICAL ENGINEERING & PHYSICS*  
Park, M. H., Imbrie-Moore, A. M., Zhu, Y., Sellke, M., Marin-Cuartas, M., Wilkerson, R. J., Woo, Y.  
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- **Quantitative biomechanical optimization of neochordal implantation location on mitral leaflets during valve repair.** *JTCVS techniques*  
Pandya, P. K., Wilkerson, R. J., Imbrie-Moore, A. M., Zhu, Y., Marin-Cuartas, M., Park, M. H., Woo, Y. J.  
2022; 14: 89-93
- **Biomechanical Engineering Analysis of Pulmonary Valve Leaflet Hemodynamics and Kinematics in the Ross Procedure.** *Journal of biomechanical engineering*  
Zhu, Y., Wilkerson, R., Pandya, P., Mullis, D., Wu, C., Madira, S., Marin-Cuartas, M., Park, M. H., Imbrie-Moore, A., Woo, Y. J.  
2022
- **FDA Emergency Use Authorization-Approved Novel Coronavirus Disease 2019, Pressure-Regulated, Mechanical Ventilator Splitter That Enables Differential Compliance Multiplexing.** *ASAIO journal (American Society for Artificial Internal Organs : 1992)*  
Paulsen, M. J., Zhu, Y., Park, M. H., Imbrie-Moore, A. M., Baker, S., Walter Edmonston, D., Dawson, T., Ly, E., Martin Bell, S., Tran, N. A., Jung, J., Cedarleaf-Pavy, J., Sridhar, et al  
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- **Ex vivo biomechanical analysis of flexible versus rigid annuloplasty rings in mitral valves using a novel annular dilation system.** *BMC cardiovascular disorders*  
Zhu, Y., Imbrie-Moore, A. M., Wilkerson, R. J., Paulsen, M. J., Park, M. H., Woo, Y. J.  
2022; 22 (1): 73
- **A Novel Device for Intraoperative Direct Visualization of a Pressurized Root in Aortic Valve Repair.** *The Annals of thoracic surgery*  
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- **Biomechanical engineering analysis of an acute papillary muscle rupture disease model using an innovative 3D-printed left heart simulator.** *Interactive cardiovascular and thoracic surgery*  
Marin-Cuartas, M., Zhu, Y., Imbrie-Moore, A. M., Park, M. H., Wilkerson, R. J., Leipzig, M., Pandya, P. K., Paulsen, M. J., Borger, M. A., Woo, Y. J.  
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- **Biomechanical engineering analysis of commonly utilized mitral neochordae.** *JTCVS open*  
Marin-Cuartas, M., Imbrie-Moore, A. M., Zhu, Y., Park, M. H., Wilkerson, R., Leipzig, M., Borger, M. A., Woo, Y. J.  
2021; 8: 263-275
- **Ex Vivo Model of Ischemic Mitral Regurgitation and Analysis of Adjunctive Papillary Muscle Repair.** *Annals of biomedical engineering*  
Imbrie-Moore, A. M., Zhu, Y., Bandy-Vizcaino, T., Park, M. H., Wilkerson, R. J., Woo, Y. J.  
2021
- **Exvivo biomechanical analysis of the Ross procedure using the modified inclusion technique in a 3-dimensionally printed left heart simulator.** *The Journal of thoracic and cardiovascular surgery*  
Zhu, Y., Marin-Cuartas, M., Park, M. H., Imbrie-Moore, A. M., Wilkerson, R. J., Madira, S., Mullis, D. M., Woo, Y. J.  
2021
- **Collagen-Supplemented Incubation Rapidly Augments Mechanical Property of Fibroblast Cell Sheets.** *Tissue engineering. Part A*  
Zhu, Y., Thakore, A. D., Farry, J. M., Jung, J., Anilkumar, S., Wang, H., Imbrie-Moore, A. M., Park, M. H., Tran, N. A., Woo, Y. J.  
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- **Ex Vivo Analysis of a Porcine Bicuspid Aortic Valve and Aneurysm Disease Model.** *The Annals of thoracic surgery*  
Zhu, Y., Imbrie-Moore, A. M., Park, M. H., Paulsen, M. J., Wang, H., MacArthur, J. W., Woo, Y. J.  
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Zhu, Y. n., Imbrie-Moore, A. M., Paulsen, M. J., Priromprintr, B. n., Park, M. H., Wang, H. n., Lucian, H. J., Farry, J. M., Woo, Y. J.  
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