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MSDL Website
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NOVA Website
https://no-va.kr

MSDL GitHub
https://github.com/hmjeon

Research Interests

- **DNA Nanotechnology** DNA Origami, Hybrid RNA-DNA Nanoparticle, Superstructure self-assembly, Gene Therapeutics
- **Computational Mechanics** Nonlinear Finite Element Method (FEM), Shell Elements, Partition of Unity-based FEM, Composite Structure, Phase-field Modeling, Virtual Heart Modeling
- **Medical AI** Data-driven Digital Biomarkers, AI-powered Healthcare Diagnostics, Deep Learning in Medical Imaging, AI Smart Farming System

Skills

- **Programming Language***:* C++, C, C#, Python, Ruby, Swift4, MATLAB, Java, Visual Basic, PGI, Fortran 77/90, Kubernetes, Docker, Git, Subversion, MySQL, PHP
- **Parallel Computing**: CUDA, OpenACC, OpenMP, PGI CUDA Fortran
- **GUI & 3D Graphics**: PyQt, MFC, OpenGL, Streamlit
- **Finite Element Software**: ADINA, ABAQUS, ANSYS, COMSOL
- **Molecular Dynamics**: oxDNA, NAMD
- **Machine Learning**: TensorFlow, pyTorch, mmLab, scikit-learn, OpenCV, Open3D
- **OS & Cloud Computing**: Ubuntu, Red Hat, Raspbian, AWS, GCP, Azure
- **Imaging & Molecular Analysis:** EMAN2, Image J, UCSF Chimera, VMD, PyMol
- **Scientific Visualization**: Adobe Illustrator, Adobe Premiere Pro, Corel Draw, TecPlot, Paraview, Origin, Pandas

Education

2015.02 **Korea Advanced Institute of Science and Technology (KAIST)** **Korea**
Ph.D., School of Mechanical, Aerospace and Systems Engineering, Thesis: Partition of unity-based shell finite elements
(Supervisor: Prof. Phill-Seung Lee)

2008.08 **Kangwon National University** **Korea**
M.Sc., Department of Mechanical & Mechatronics Engineering, Thesis: Development of a cell-system coupled model of cardiovascular hemodynamics
(Supervisor: Prof. EunBo Shim)

2006.08 **Kangwon National University** **Korea**
(***Summa cum laude, Graduated with first-class honors in the college of engineering / Early graduation with honor***)
B.Sc., Department of Mechanical and Mechatronics Engineering, Mechanical Engineering Program

Experience

2024.03 – Present **Jeonbuk National University** **Korea**
Vice Director, Intellectual Property Education Center

2023.07 – Present **Jeonbuk National University** **Korea**
Associate Vice President, Innovative Graduate Affairs, Office of Research

2023.06 – Present **LINC 3.0 Center, Jeonbuk National University** **Korea**
Director, Strategic Planning Center

2022.12 – Present **NOVA, Inc.** **Korea**
Chief Executive Officer

2022.04 – Present **Jeonbuk National University** **Korea**
Associate Professor, Department of Mechanical System Engineering

2019.12 – 2022.03 **Jeonbuk National University** **Korea**
Assistant Professor, Department of Mechanical System Engineering

2015.02 – 2019.12 **Massachusetts Institute of Technology (MIT)** **US**
Postdoctoral Associate, Department of Biological Engineering
Advisor: Prof. Mark Bathe
Development of sequence design procedure to render arbitrary 2D and 3D nanostructures using synthetic DNA

2010.07 **Oxford University** **UK**
Visiting Researcher, Centre for Mathematical Biology, Mathematical Institute. Prof. Philip Maini Laboratory
Research on a general-purpose simulation package, CASTE (Cancer, Heart, and Soft Tissue Environment)

2008.08 – Sep 2008.09 **Massachusetts Institute of Technology (MIT)** **US**
Visiting Researcher, Department of Health Sciences and Technology. Prof. Roger Mark Laboratory

2008.09 – 2009.11 **Kangwon National University** **Korea**
Researcher, Biosystems Laboratory
Development of an integrated cardiovascular system coupling a cell-system and arterial network models; Study on the effect of the age-related increase of arterial wall stiffness on the cross-bridge dynamics of the cardiac myocyte

2003.09 – 2006.08 **Kangwon National University** **Korea**
Undergraduate Research Program, Biosystems Laboratory
Development of a cardiovascular hemodynamic system model based on cardiac cells; Study on the arterial tree generation based on blood volume optimization

2000.09 – 2002.11 **Republic of Korea Marine Corps – 2nd Reconnaissance Battalion**
Military Service; Discharged upon completing military service as a sergeant

Affiliations

- Electrical Safety-Intelligence Information Graduate School
- Smart Grid Research Center
- Advanced Biomedical Imaging Center

Honors and Awards

- 논문 우수발표상, 한국생산제조학회 추계학술대회 (13 July 2023)
- 우수 연구자상, 한국전산구조공학회 (13 Apr 2023)
- 우수발표상, 한국풍력에너지학회 (22 June 2002)
- President's Award for the Best Member with Excellent Performance and Service from the President of Korea Institute of Energy Technology Evaluation and Planning (Nov 2014)
- National Government Scholarship (2010 - 2014)

- President's Award for the top-ranked Graduation in the College of Engineering from Kangwon National University (Aug 2006)
- Kangwon National University Scholarship (2000, 2003 - 2006)
- Cheonggang Foundation Scholarship (2004)

Teaching

2020.03 – Present **Jeonbuk National University** **Korea**

- An Introduction to Deep Learning (Graduate)
- Deep Learning for Computer Vision (Graduate)
- Finite Element Analysis (Undergraduate)
- Mechanical (System) Design 1 & 2 (Undergraduate)
- Python Programming & Applications (Undergraduate)

Korea Advanced Institute of Science and Technology (KAIST) **Korea**

- *Finite Element Analysis of Structures*. Teaching Assistant.
  Prepared problem sets and exams. Assisted students individually with homework problems and helped in their understanding of class lectures (Fall 2013, Division of Ocean Systems Engineering)

Publications

[25] Nafo, W., Guldeniz, O., **Jun, H.**, Kim, E. Ligamentous Tethering and Intradiscal Pressure Affecting the Mechanical Environment of Scoliotic Spines. *Medical Engineering & Physics*, 104035, August 2023 (IF=2.356) [Article]

[24] Trinh, M.C. and **Jun, H.**† Stochastic Bending and Buckling Analysis of Laminated Composite Plates using Latin Hypercube Sampling. *Engineering with Computers* 39: 1459-97, April 2023 (IF=8.7, IF%=2.6) [Article]

[23] Trinh, M.C. and **Jun, H.**† Geometrically nonlinear analysis of functionally graded composite shells using MITC4 and MITC9 elements. *Thin-Walled Structures*, 185: 110632, April 2023 (IF=6.4, IF%=6.2) [Article]

[22] Wang, X., W., Li, S., **Jun, H.***(Contributed Equally), John, T., Zhang, K., Fowler, H., Doye, J., Chiu, W., Bathe, M. Planar 2D wireframe DNA origami. *Science Advances*, 8: eabn0039, 20 May 2022 (IF=14.980, IF%=8.784) [Article] [SI]

[21] Wang, X., **Jun, H.**, Bathe, M. Programming 2D supermolecular assemblies with wireframe DNA origami. *Journal of the American Chemical Society*, 144: 4403-9, 1 Mar 2022 (IF=16.383, IF%=8.659) [Article] [SI]

[20] Jung, J., **Jun, H.**, Lee, P.S. Self-updated four-node finite element using deep learning. *Computational Mechanics*, 63: 23-44, Jan 2022 (IF=4.391, IF%=9.722) [Article]

[19] **Jun, H.***, Wang, X., Parsons, M., Bricker, W., Torsten, J., Li, S., Jackson, S., Chiu, W., Bathe, M. Rapid prototyping of arbitrary 2D and 3D wireframe DNA origami. *Nucleic Acids Research*, 49(18): 10265-74, 11 Sep 2021 (IF=19.160, IF%=2.525) [Article] [SI] [ATHENA Code]

[18] **Jun, H.***, Kim, J.J., Jang, H., Park, Y., Shim, E.B. Continuum-based modeling of collective cell migration. *Journal of Mechanical Science and Technology*, 35: 4271-7, 28 Aug 2021 (IF=1.810) [Article]

[17] Trinh, M.C. and **Jun, H.**† Stochastic free vibration analysis of functionally graded beams using artificial neural networks. *Structural Engineering and Mechanics*, 78(5): 529-43, 10 Jun 2021 (IF=2.998) [Article]

[16] Trinh, M.C. and **Jun, H.†** A higher-order quadrilateral shell finite element for geometrically nonlinear analysis. *European Journal of Mechanics / A Solids*, 89: 104283, 16 Apr 2021 (IF=4.873, IF%=14.130) [Article]

[15] Kasani, P.H., Oh, S.M., Choi, Y.H., Ha, S.H., **Jun, H.**, Park, K.H., Ko, H.S., Kim, J.E., Choi, J.W., Cho, E.S., Kim, J.S. A computer vision-based approach for behavior recognition of gestating sows fed different fiber levels during high ambient temperature. *Journal of Animal Science and Technology*, 63(2): 367-79, 31 Mar 2021 (IF=2.3) [Article]

[14] Trinh, M.C., **Jun, H.**, Nguyen-Thoi, T., Nguyen, S.N. Stochastic buckling quantification of laminated composite plates using cell-based smoothed finite elements. *Thin-Walled Structures*, 163: 107674, 26 Mar 2021 (IF=6.4, IF%=6.2) [Article]

[13] **Jun, H.***, Wang, X., Parsons, M., Bricker, W., Jackson, S., Bathe, M., Rapid prototyping of wireframe scaffolded DNA origami using ATHENA. *bioRxiv* 2020.02.09.940320, 10 Feb 2020

[12] **Jun, H.*,†** New higher-order triangular shell finite elements based on the partition of unity. *Structural Engineering and Mechanics*, 73: 1-16, 10 Jan 2020 (IF=2.998) [Article]

[11] **Jun, H.***, Wang, X., Bricker, W., Bathe, M. Automated sequence design of 2D wireframe DNA origami with honeycomb edges. *Nature Communications*, 10: 5419, 28 Nov 2019 (IF=17.694, IF%=7.432) [Article] [SI] [METIS Code]

Before JBNU

[10] Wamhoff1, E., Banal, J., Bricker, W., Shepherd, T., Parsons, M., Veneziano, R., Stone, M., **Jun, H.**, Wang X., Bathe, M. Programming structured DNA assemblies to probe biophysical processes. *Annual Review Biophysics*, 48: 395-419, 6 May 2019 (IF=19.763, IF%=0.694) [Article]

[09] **Jun, H.***, Shepherd, T., Zhang, K., Bricker, W., Li, S., Chiu W., Bathe, M. Automated sequence design of 3D polyhedral wireframe DNA origami with honeycomb edges. *ACS Nano*, 13: 2083-93, 3 Jan 2019 (IF=18.027, IF%=5.652) [Article] [SI] [TALOS Doc] [TALOS Code]

[08] **Jun, H.***, Zhang, F., Ratanalert, S., Shepherd, T., Qi, X., Yan, H., Bathe, M. Autonomously designed free-form 2D DNA origami. *Science Advances*, 5: eaav0655, 2 Jan 2019 (IF=14.980, IF%=8.784) [Article] [SI] [PERDIX Doc] [PERDIX Code] [MIT News] [EurekAlert] [Donga Science]

[07] **Jun, H.*,†**, Mukai, P., San, K. Benchmark tests of MITC triangular shell elements. *Structural Engineering and Mechanics*, 68: 17-38, 10 Oct 2018 (IF=2.998) [Article]

[06] **Jun, H.***, Yoon, K., Bathe, K.J., Lee, P.S. The MITC3+ shell element enriched in membrane displacements by interpolation covers. *Computer Methods in Applied Mechanics and Engineering*, 337: 458-80, 1 Aug 2018 (IF=7.2, IF%=3.3%) [Article]

[05] Lee, Y., **Jeon, H.M.**, Lee, P.S., Bathe, K.J. The modal behavior of the MITC3+ triangular shell element. *Computers & Structures*, 153: 148-64, Jun 2015 (IF=5.372) [Article]

[04] **Jeon, H.M.***, Lee, Y., Lee, P.S., Bathe, K.J. The MITC3+ shell element in geometric nonlinear analysis. *Computers & Structures*, 146: 91-104, Jan 2015 (IF=5.372) [Article]

[03] **Jeon, H.M.***, Lee, P.S., Bathe, K.J. The MITC3 shell finite element enriched by interpolation covers. *Computers & Structures*, 134: 128-42, 1 Apr 2014 (IF=5.372) [Article]

[02] Shim, E.B., **Jun, H.M.**, Leem, C.H., Matusuoka, S., Noma, A. A new integrated method using a cell-hemodynamics-autonomic nerve control coupled model of the cardiovascular system. *Progress in Biophysics and Molecular Biology*, 96: 44-59, Jan-Apr 2008 (IF=6.388 in JCR 2008) [Article]

[01] **Jun, H.M.*** and Shim, E.B. Theoretical analysis of the cross-bridge sliding rate in modulating heart mechanics. *International Journal of Vascular Biomedical Engineering*, 5: 34-45, Oct 2007

Presentations

[59] 임태중, **전형민** 초탄성재료 해석을 위한 PU 기반 유한요소 개발, *한국전산구조공학회 학술심포지엄*, 춘천 베어스호텔, 17 Nov, 2023

[58] 웬반호이, **전형민** Phase-field 모델을 사용한 PSZ/IN100 기능 등급 코팅의 열파괴, *한국전산구조공학회 학술심포지엄*, 춘천 베어스호텔, 17 Nov, 2023

[57] 임태중, **전형민** 한반도 풍속 변화에 따른 20MW 급 풍력터빈 구동계 최적설계, *한국풍력에너지학회 추계학술대회*, 제주 메종글래드, 14 Nov, 2023

[56] 임태중, **전형민** 한반도 풍속데이터 변화에 따른 대형풍력 메인 베어링의 피로수명 예측에 관한 연구, *한국풍력에너지학회 춘계학술대회*, 제주 라마다프라자호텔, 13 Jun, 2023

[55] **전형민** 메디컬 트윈 가상심장 모델링, *한국전산구조공학회 정기학술대회 초청강연*, 여수 디오션리조트, 13 Apr, 2023

[54] 웬반호이, 트린민첸, **전형민** 페이즈-필드 모델링을 통한 열충격 하중에 의한 알루미나 세라믹의 크랙 전파, *한국전산구조공학회 정기학술대회*, 여수 디오션리조트, 13 Apr, 2023

[53] 송필무, 정성진, 박대범, 심은보, **전형민** 환자맞춤형 가상심장모델의 심근비대에 따른 비선형 모드분석, *한국전산구조공학회 정기학술대회*, 여수 디오션리조트, 13 Apr, 2023

[52] 송필무, 박준혁, 정성진, 트린민첸, 류아진, 심은보, **전형민** 이방성 초탄성 재료모델을 적용한 가상심장 모델의 모드분석, *한국전산구조공학회 학술심포지엄*, 속초 델피노리조트, Nov 25, 2022

[51] Nguyen, V.H., Trinh, M.C., **Jun, H.** Fracture Analysis of Zirconia-Alumina Functionally Graded Material Using Phase-field Modeling, *한국전산구조공학회 학술심포지엄*, 속초 델피노리조트, Nov 25, 2022

[50] 송필무, 이병효, 임태중, **전형민** 대형 메인베어링의 기계적성질예측에 관한 연구, *한국풍력에너지학회 춘계학술대회*, 제주 라마다프라자호텔, Jun 21, 2022

[49] 송필무, 박준혁, 정성진, 트린민첸, 심은보, **전형민** 멀티스케일 심장수축모델을 활용한 좌심실 비대에 따른 심장역학 분석, *한국전산구조공학회 정기학술대회*, 제주 소노캄, Apr 14, 2022

[48] 트린민첸, 웬반호이, **전형민** 2 차원 재료에 대한 확률적 탄성 속성에 관한 연구, *한국전산구조공학회 정기학술대회*, 제주 소노캄, Apr 14, 2022

[47] 윤도현, 김희진, 강환구, **전형민** 영상분할 기법을 활용한 육계 군집의 평균 체중 예측 알고리즘 개발, *한국가금학회 추계학술대회*, 대전 컨벤션센터, Dec 5, 2021

[46] 송필무, 트린민첸, 심은보, **전형민** 좌심실비대 모드분석을 위한 가상심장 수치모델의 개발, *한국전산구조공학회 학술심포지엄*, 해운대 신라스테이, Nov 25-26, 2021

[45] Trinh, M.C., **Jun, H.** Probabilistic static behaviors of laminated composite plates, *한국전산구조공학회 학술심포지엄*, 해운대 신라스테이, Nov 25-26, 2021

[44] Dewangan, A., Trinh, M.C., **Jun, H.** ATHENA: A software suite for Wireframe Scaffold DNA Origami (invited), *The 2021 World Congress on Advances in Structural Engineering and Mechanics (ASEM21)*, Aug 25-26, 2021

[43] Trinh, M.C., **Jun, H.** Elastic properties of lattice-like 2D materials using continuum mechanics, *The 2021 World Congress on Advances in Structural Engineering and Mechanics (ASEM21)*, Aug 23-26, 2021

[42] Dewangan, A., **Jun, H.** Optimization of annular cavity dimensions in the circular jet burner to the enhancement of flame stability, *The 2021 World Congress on Advances in Structural Engineering and Mechanics (ASEM21)*, Aug 23-26, 2021

[41] 한종우, 트린민첸, **전형민** 복합재 해석을 위한 Partition of Unity 기반 유한요소 개발에 관한 연구, *한국생산제조학회*, 강릉 세인트존스호텔, Jul 7-9, 2021

[40] **전형민**, 한종우 Partition of Unity 기반 유한요소를 활용한 초대형 메인 베어링의 동적응력해석, *한국풍력에너지학회 춘계학술대회*, 제주 메종글래드호텔, Jul 5-7, 2021

[39] 홍수연, **전형민** PyFE: 4 절점 유한요소 프로그래밍, *대한기계학회 호남지회 춘계학술대회*, Jun 6, 2021

[38] 한종우, **전형민** 풍력 대형 베어링 해석을 위한 PU 기반 유한요소 개발, *대한기계학회 호남지회 춘계학술대회*, Jun 6, 2021

[37] 윤도현, **전형민** 딥러닝 영상분할 기법을 활용한 육계의 체중 예측에 관한 연구, *대한기계학회 호남지회 춘계학술대회*, Jun 6, 2021

[36] 송필무, **전형민** 단백질 농도구배에 따른 군집세포의 이동을 모사하는 수학 모델 개발, *대한기계학회 호남지회 춘계학술대회*, Jun 6, 2021

[35] 송필무, **전형민**, 박용두, 심은보 세포 군집 이동을 모사하기 위한 연속체역학 기반 유한요소 모델링, *한국산업응용수학회 춘계학술대회*, 강릉 경포탑스텐호텔, Jun 25-27, 2021

[34] 정재호, **전형민**, 이필승 딥러닝을 이용한 변위 적응형 유한요소 개발, *전산구조공학회 춘계학술대회*, 경주 The-K 본관, Apr 7-9, 2021

[33] **Jun, H.**, Trinh, M.C. Top-down Computational Design of Scaffolded DNA Origami. *대한기계학회(초청강연)*, Dec 16-19, 2020

[32] Trinh, M.C. **Jun, H.**, Kim, S.E. Dynamic Behaviors of Porous Functionally Graded Sandwich Shells in Thermal Environments. *한국전산구조공학회*, Dec 14-15, 2020

[32] **Jun, H.** Mathematical Modeling of Collective Precursor Cell Migration. *대한기계학회 호남지회 춘계학술대회*, 전북대학교, Aug 16, 2020

[31] **Jun, H.** Geometrically Nonlinear Analysis of the GPU-based Higher-order Shell Finite Element. *대한기계학회 호남지회 춘계학술대회*, 전북대학교, Aug 26, 2020

[30] **Jun, H.** Study on Automated and Optimum Sequence Design of DNA Nanoparticles. *대한기계학회 호남지회 춘계학술대회*, 전북대학교, Aug 26, 2020

[29] **Jun, H.** Study on the Design and Simulation of Scaffolded DNA Origami with Irregular Shape. *대한기계학회 CAE 및 응용역학부문*, 경주화백컨벤션센터, Aug 19-21, 2020

Before JBNU

[28] **Jun, H.**, Zhang, F., Ratanalert, S., Shepherd, T., Yan, H., Bathe, M. Programming 2D DX-based DNA nanostructures using top-down geometric specification. *FNANO18*, Utah USA, Apr 16-19, 2018

[27] **Jun, H.**, Shepherd, T., Zhang, K., Ratanalert, S., Chiu W., Bathe, M. Inverse geometric design of honeycomb DNA nanoparticles, *FNANO18*, Utah USA, Apr 16-19, 2018

[26] **Jun, H.**, Shepherd, T., Ratanalert, S., Bathe, M. Rigid MegaDaltion DNA nanoparticles programmed autonomously from the top down. *FNANO17*, Utah USA, Apr 10-13, 2017

[25] Shepherd, T., **Jun, H.**, Tucci, K., Ratanalert, S., Veneziano, R., Bathe, M. Design, assembly, and characterization of structured DNA and RNA Nanoparticles. *RNA Nanotechnology Gordon Research Conference in Ventura*, California USA, Jan 23-26, 2017

[24] Pan, K., **Jun, H.**, Bathe, M. Structure-Based Design of Scaffolded DNA Origami, *DNA21(21st International Conference on DNA Computing and Molecular Programming)*, Wyss Institute for Biologically Inspired Engineering, Harvard University, Aug 17-21, 2015

[23] **Jeon, H.M.**, Yoon, K., Lee, P.S. Development of the enriched MITC3 shell element. *Proceedings of the KSME Annual Spring Conference*, 192-193, Apr 30 - May 3, 2014

[22] Yoon, K., **Jeon, H.M.**, Lee, P.S. Introduction to continuum mechanics-based beam elements. *Proceedings of the KSME Annual Spring Conference*, 198-199, Apr 30 - May 3, 2014

[21] Shim, E.B., **Jun, H.M.** A hypothesis of changes in ventricular contraction mechanics caused by increased afterload. *Proceedings of the KSME Annual Fall Conference*, 2786-2790, Nov 4-6, 2009

[20] **Jun, H.M.**, Lee, S.C., Shim, E.B. Development of an integrated cardiovascular system coupling a cell-system and arterial network models. *36th International Congress of Physiological Sciences (IUPS 2009)*, Kyoto, Japan, Jul 27 - Aug 1, 2009

[19] Lim, K.M., **Jun, H.M.**, Choi, S.U., Kim, I.S., Shim, E.B. Numerical study of the effect of counter-pulsation by a ventricular assist device on the coronary and systemic circulations, *36th International Congress of Physiological Sciences (IUPS 2009)*, Kyoto, Japan, Jul 27 - Aug 1, 2009

[18] **Jun, H.M.**, Shim, E.B. Numerical analysis of the changing in left ventricular mechanics after increasing after loads. *Proceedings of the KSME Annual Spring Conference*, 45, May 21-22, 2009

[17] Shim, E.B., **Jun, H.M.** Numerical analysis of the effect of the physiological parameter on pulse wave velocity. *Proceedings of the KSME Annual Spring Conference*, 229-232, May 21-22, 2009

[16] Shim, E.B., **Jun, H.M.**, Kwon, S.S. FSI simulation for the analysis of pulse wave velocity in artery. *Proceedings of the KSME Annual Spring Conference*, 193-195, May 21-22, 2009

[15] **Jun, H.M.**, Shim, E.B. Numerical analysis of the effect of the age-related increase of arterial wall stiffness on the Cross-bridge dynamics of the cardiac myocyte. *Proceedings of the KSME Annual Fall Conference*, 1674-1678, Nov 5-7, 2008

[14] Kim, Y.S., **Jun, H.M.**, Choi, S.U., Shim, E.B. The development of convenient RQ measuring device for patient's real time monitoring. *Proceedings of the KSME Annual Fall Conference*, 1609-1612, Nov 5-7, 2008

[13] Kim, I.S., Im, G.M., Choi, S.U., **Jun, H.M.**, Shim, E.B. Numerical study of effect of counter-pulsation on hemodynamic response in the ECLS. *Proceedings of the KSME Annual Fall Conference*, 1660-1664, Nov 5-7, 2008

[12] **Jun, H.M.**, Shim, E.B., Choi, S.W. Development of medical device for respiratory quotient. *Proceedings of the KSME Annual Spring Conference*, 283-284, May 22-23, 2008

[11] **Jun, H.M.**, Shim, E.B. A combined model of cardiovascular and energy systems for the human body using a scaling law. *Proceedings of the KSME Annual Spring Conference*, 201-202, May 22-23, 2008

[10] Shim, E.B., **Jun, H.M.** Development of an integrative cardiovascular system model including cell-system and arterial network. *5th National Congress on Fluids Engineering*, Mar 26-28, 2008

[09] **Jun, H.M.**, Kwon, S.S., Kim, Y.S., Shim, E.B. A new cell-system model of circulation combined with a detailed arterial network. *4th International Symposium of Cell/Biodynamics simulation Project*, Kyoto, Japan, Nov 12-13, 2007

[08] Kim, Y.S., Kwon, S.S., **Jun, H.M.**, Shim, E.B. Computational analysis of hemodynamics in a human ventricular model. *The Korea Society of Medical & Biological Engineering*, Nov 9, 2007

[07] Shim, E.B., Kwon, S.S., Kim, Y.S., **Jun, H.M.** Computational analysis of hemodynamics in a human ventricular model. *Proceedings of the KSME Annual Spring Conference*, 2486-2489, May 30 - Jun 1, 2007

[06] **Jun, H.M.**, Shim, E.B. Computational analysis of heart mechanics using a cell-autonomic nerve control-hemodynamic system coupled model. *Proceedings of the KSME Annual Spring Conference*, 2480-2485, May 30 - Jun 1, 2007

[05] **Jun, H.M.**, Kwon, S.S., Kim, Y.S., Shim, E.B. A Combined model of cardiovascular and energy systems for the human body using a scaling law. *3rd International Symposium of Cell/Biodynamics simulation Project*, Kyoto, Japan, Dec 4-5, 2006

[04] **Jun, H.M.**, Shim, E.B. Development of a cardiovascular hemodynamic system model based on cardiac cells. *Proceedings of the KSME Annual Fall Conference*, 13-17, Nov 2006

[03] **Jun, H.M.**, Shim, E.B. Steady-State hemodynamic analysis of arterial tree generation based on blood volume optimization. *World Congress on Medical Physics and Biomedical Engineering (WC 2006)*, Seoul, Korea, Aug 27 - Sep 1, 2006

[02] **Jun, H.M.**, Shim, E.B. Steady-State hemodynamic analysis of arterial tree generation based on blood volume optimization. *Proceedings of the KSME Annual Spring Conference*, 1570-1575, Jun 2006

[01] **Jun, H.M.**, Shim, E.B. Computational study on the arterial tree generation based on blood volume optimization. *The Korea Society of Medical & Biological Engineering*, Oct 2005

Patents

[09] 딥러닝 컴퓨터비전 기반 가축의 체중을 측정하기 위한 시스템 및 그 방법(System for measuring weight of livestock based on deep learning computer vision and method thereof), **전형민**, **트린민췐**, #PCT/KR2023/018181, 13 Nov 2023

[08] 3D 모양 색인을 활용한 달걀 성별 감지 방법 및 장치(Method and Apparatus for Gender Determination of Eggs by 3D Shape Index), **전형민**, **송철규**, #10-2023-0135178, 11 Oct 2023

[07] 딥러닝 기반 베어링 고장 진단 시스템 및 방법(System and method for diagnosing failure of bearing), **전형민**, **송필무**, **윤도현**, #10-2023-0023309, 22 Feb 2023

[06] 딥러닝 컴퓨터비전 기반 가축의 체중을 측정하기 위한 시스템 및 그 방법(System for measuring weight of livestock based on deep learning computer vision and method thereof), **전형민**, **트린민췐**, #10-2022-0151696, 14 Nov 2022

[05] 비접촉방식 가금 평균체중 측정 장치 및 방법(Apparatus and method for average weighting broiler based on artificial intelligence), **전형민**, **윤도현**, 강환구, 이우도, #10-2022-0147736, 11 Nov 2022

[04] 케이지별 산란 수 측정시스템(Measurement system of eggs laying for each cage), **전형민**, **송필무**, **윤도현**, 강환구, 이우도, #10-2022-0101509, 12 Aug 2022

[03] Stable nanoscale nucleic acid assemblies and methods thereof, Veneziano, R., Ratanalert, S., Shepherd, T., **Jun, H.**, Bathe, M. #US20190156911A1, 9 Aug 2022 [Patent]

[02] 심실 제세동기 개발을 위한 가상 임상 실험 방법(Method of clinical demonstration for development of defibrillator), 심은보, 이수랑, 권순성, **전형민**, 최승윤, 권오범, 이승철, #KR101021154B1, 14 Mar 2011 [Patent]

[01] 한열 측정 방법 및 그 장치(Method and apparatus for diagnosing cold or hot habitute of patient), 심은보, 권순성, 권오범, 김유석, **전형민**, 최승윤, # KR100877971B1, 12 Jan 2009 [Patent]

Books

[01] SI 단위로 배우는 기계설계학(Mechanical Engineering Design), 김남웅, 김창완, 변성광, 양성모, 이치우, **전형민**, 정선모, 황평, ㈜도서출판 북스힐, ISBN: 979-11-5971-481-8

Software Registrations

[04] Program for the analysis of the 3D virtual heart with excitation-coupling in cardiac muscle, #2009-01-121-004745, 2009

[03] Simulation and post-processing platform of the cardiac cell for the e-organ analysis, #2008-01-121-007300, 2008

[02] Program for the analysis of whole cardiovascular system including the arterial network model, #2008-01-121-007301, 2008

[01] Platform for the virtual atrium simulations, #2008-01-121-007599, 2008

Software & Open Source

ATHENA (A GUI toolkit for scaffolded DNA origami)
- GitHub: https://github.com/lcbb/athena/

DAEDALUS2 (**D**NA orig**a**mi S**e**quence **D**esign **A**lgorithm for **U**ser-defined **S**tructures)
- Open-source for generalized design algorithm for DX-based DNA origami
- GitHub: https://github.com/hmjeon/daedalus2-pub/

METIS (**M**echanically **E**nhanced and **T**ighten or**I**rigami **S**tructures)
- Open-source for fully autonomous design algorithm for 2D rigid arbitrary nanometer-scale wireframe
- Web Portal: https://metis-dna-origami.org/
- GitHub: https://github.com/hmjeon/metis-pub/

TALOS (**T**hree-dimensional, **A**lgorithmically generated **L**ibrary of DNA **O**rigami **S**hapes)
- Free and open-source, fully autonomous design algorithm for generating arbitrary nanometer-scale structures using DNA
- Web Portal: http://talos-dna-origami.org/

- GitHub: https://github.com/hmjeon/talos/

PERDIX (**P**rogrammed **E**ulerian **R**outing for DNA **D**es**I**gns using **X**-overs)
- Open-source resource for the fully autonomous design of arbitrary 2D scaffolded DNA origami nanostructures
- Web Portal: http://perdix-dna-origami.org/
- GitHub: https://github.com/hmjeon/perdix/

MERCURY (Nonlinear shell finite elements) This is a private repository and will be released soon

JUPITER (Nonlinear finite element based on high-performance GPU computing) This is the private repository and will be released soon

Additional 83 private repositories on GitHub

Projects

[19] 고온환경에 따른 가금산물(계란, 계육)의 신선도 및 품질 저하 방지기술 개발, 신농업기후변화대응체계구축사업, 농촌진흥청, 2024.04.01~2027.12.31, 170,000 천원(총사업비 300,000 천원), 공동연구원

[18] 돼지 경제형질 모니터링을 통한 지능형 급이시스템 상용화, 스마트팜 다부처 패키지 혁신기술개발사업, 농림축산식품부, 2024.04.01~2025.12.31, 190,000 천원(총사업비 793,400 천원), 공동연구원

[17] 전북대학교 지식재산 전문인력 양성사업단, 지식재산 전문인력양성 중점대학 운영지원 사업, 한국발명진흥회, 2024.01.01~2028.12.31, 총사업비 4,812,000 천원, 부단장

[16] 혁신형 미래의료기반 마이랩 구축 지원사업, 전북대학교병원, 2024.01.01~2026-12.31, 100,000 천원, 공동연구원

[15] 혁신형 의사과학자 양성을 통한 융합연구 개발, 혁신형 미래의료연구센터 육성사업, 과학기술정통부, 2023.04~2026.12, 참여연구원

[14] 3D 컴퓨터비전 기술을 활용한 가축의 체중 측정 시스템, 초기창업패키지, 창업진흥원, 2023.04.24~2023.12.31, 327,700 천원, 연구책임자

[13] 딥러닝 기반 비접촉식 가축체중측정 장치, JBNU-INNOVATION AWARDS, LINC3.0 사업단, 2023.04.03~2023.05.31, 30,000 천원, 연구책임자

[12] 딥러닝 컴퓨터비전 교재 개발, 정책연구과제, 대학혁신지원사업, 전북대학교, 2022.07.15~2023.01.31, 20,000 천원, 연구책임자

[11] 전북대학교 미래형자동차 클로컬융합인재 양성, 대학혁신지원(R&D), 한국산업기술진흥원, 2022.07.01~2025.02.28, 총사업비 768,741 천원, 참여교수

[10] 스마트축산 체중예측 시스템, 실험실 특화형 창업선도대학 창업유망기술, 한국연구재단, 2022.06.01~2022.12.31, 56,000 천원, 연구책임자

[09] 2021 JBNU 우수신임 연구기자재 지원사업, 전북대학교, 2022.01.01~2022.02.28, 30,000 천원, 연구책임자

[08] 모바일 기기 판독 플랫폼에 기반한 감염병 면역진단키트의 개발, JBNU 미래핵심기술 특성화, 2021.12.01~2022.12.31, 40,000 천원(총사업비 300,000 천원), 공동연구자

[07] 트레일러 구조해석을 위한 유한요소 소프트웨어 개발, 주식회사 멀티테크특장, 민간기업체 연구용역, 2021.08.10~2023.08.09, 38,500 천원, 연구책임자

[06] 가금 개체별 정밀 모니터링 및 지능형 사양관리 기술, 스마트팜 다부처 패키지 혁신사업, 농림축산식품부, 2021.04.07~2024.12.31, 1,140,000 천원(총사업비 2,180,000 천원), 세부책임자

[05] Serial CT 분석을 위한 3 차원 관상동맥 Mapping 기술 개발, 주식회사 AIMEDIC, 민간기업체 연구용역, 2021.03.02~2022.02.28, 44,000 천원, 연구책임자

[04] 한반도 해역에 적합한 20 MW 급 초대형 해상풍력 발전 시스템 개념설계, 사외공모 기초연구, 한국전력공사, 2021.02.01~2024.01.31, 120,000 천원(총사업비 600,000 천원), 공동연구자

[03] Intelligence 기반 정밀 부품 장비 시스템 엔지니어 양성사업팀, 4 단계 BK21 사업 미래인재 교육연구팀, 한국연구재단, 2020.09.01~2024.02.29, 참여교수

[02] DNA 나노구조물의 물리-화학적 성질 예측을 위한 가상시스템 개발, 지역대학우수과학자, 한국연구재단, 2020.06.01~2024.05.31, 400,000 천원, 연구책임자

[01] DNA 나노구조물의 기계적 거동예측을 위한 유한요소모델 개발, 신임교수연구비, 전북대학교, 2020.01.15~2022.01.15, 30,000 천원, 연구책임자

Professional Activities

Editor, Structural Engineering and Mechanics (SEM), *An International Journal* (2021.11 ~ Present)
Director, The Korean Society of Manufacturing Technology Engineers, 탄소융합 및 경량소재 부문 (2021. 05 ~ Present)
Managing Editor, Computational Structural Engineering Institute of Korea (2020. 05 ~ 2022.04)
General Affairs Director, The Korean Society of Mechanical Engineers, Honam Branch (2020. 01 ~ 2020. 12)
Member, International Society for Nanoscale Science, Computation and Engineering
Member, The Korean Society of Mechanical Engineers (KSME)
Member, The Korean Society of Medical & Biological Engineering (KOSOMBE)

Professional Services

Peer reviewer for journals:
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