

Hyeondong Yang, Ph.D.

585 Purdue Mall, West Lafayette, Indiana, 47907

Phone: +1 (765) 409 - 1826

E-mail: yang2777@purdue.edu

RESEARCH FOCUSES

- Hemodynamic Analysis
- Computational Fluid Dynamics
- Finite Element Analysis
- Fluid-Structure Interaction
- Simulator for Cerebral Aneurysms
- Particle Analysis for Inkjet Printing

DEGREE & EDUCATION

Ph.D. in Mechanical Design Engineering **Mar 2020 – Aug 2023**

Hanyang University, Seoul, Republic of Korea

[Dissertation title: A Rupture Risk Prediction Model for Cerebral Aneurysms

Combining Hemodynamic and Morphological Parameters]

M.S. in Mechanical Design Engineering

Mar 2018 – Feb 2020

Hanyang University, Seoul, Republic of Korea

(M.S. and Ph.D. Integrated Course, Supervisor: Prof. *Je Hoon Oh*)

B.S. in Mechanical Engineering

Mar 2012 – Feb 2018

Hanyang University ERICA, Ansan, Republic of Korea

(*Note: Military Service during February 2013 - February 2015*)

PUBLICATIONS

(Notes: † indicates equally contributing authors.)

1. K.C. Cho†, **H. Yang**†, J.J. Kim, J.H. Oh and Y.B. Kim, “Prediction of rupture risk in cerebral aneurysms by comparing clinical cases with fluid-structure interaction analyses,” **Scientific Reports**, 10, 18237 (2020) [[Link](#)]
2. Y. Kim, **H. Yang** and J.H. Oh, “Simple fabrication of highly sensitive capacitive pressure sensors using a porous dielectric layer with cone-shaped patterns,” **Materials & Design**, 197, 109203 (2021) [[Link](#)]

3. J. Hwang, Y. Kim, **H. Yang**, and J.H. Oh, "Fabrication of hierarchically porous structured PDMS composites and their application as a flexible capacitive pressure sensor." **Composites Part B: Engineering**, 211, 108607 (2021) [[Link](#)]
 4. J. J. Kim†, **H. Yang**†, Y.B. Kim, J.H. Oh, and K.C. Cho, "The quantitative comparison between high wall shear stress and high strain in the formation of paraclinoid aneurysms." **Scientific reports**, 11, 1-8 (2021) [[Link](#)]
 5. S. Kim†, **H. Yang**†, I. Hong, J.H. Oh, and Y.B. Kim, "Computational Study of Hemodynamic Changes Induced by Overlapping and Compacting of Stents and Flow Diverter in Cerebral Aneurysms." **Frontiers in Neurology**, 12, 705841 (2021) [[Link](#)]
 6. **H. Yang**†, K.C. Cho†, J.J. Kim, J.H. Kim, Y.B. Kim, and J.H. Oh, "Rupture risk prediction of cerebral aneurysms using a novel convolutional neural network-based deep learning model." **Journal of NeuroInterventional Surgery**, 15(2), 200-204 (2023) [[Link](#)]
 7. **H. Yang**, I. Hong, Y.B. Kim, K.C. Cho and J.H. Oh, "Influence of blood viscosity models and boundary conditions on the computation of hemodynamic parameters in cerebral aneurysms using computational fluid dynamics.", **Acta Neurochirurgica**, 165, 471–482 (2023) [[Link](#)]
 8. **H. Yang**†, K.C. Cho†, J.J. Kim, Y.B. Kim, and J.H. Oh, "New morphological parameter for intracranial aneurysms and rupture risk prediction based on artificial neural networks." **Journal of NeuroInterventional Surgery**, 15, e209-e215 (2023) [[Link](#)]
 9. Y. Kim, **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, "3D-Printed Patient-Specific Circles of Willis with an Intracranial Aneurysm and their Application to Neurointerventional Endovascular Simulation." **Advanced Materials Technologies**, 2201783 (2023) [[Link](#)]
 10. **H. Yang**, J.J. Kim, Y.B. Kim, K.C. Cho, and J.H. Oh, "Investigation of Paraclinoid Aneurysm Formation by Comparing the Combined Influence of Hemodynamic Parameters Between Aneurysmal and Non-Aneurysmal Arteries." **Journal of Cerebral Blood Flow & Metabolism**, 44(8), 1393-1403 (2024) [[Link](#)]
 11. **H. Yang**†, K.C. Cho†, I. Hong, Y. Kim, Y.B. Kim, J.J. Kim, and J.H. Oh, "Influence of circle of Willis modeling on hemodynamic parameters in anterior communicating artery aneurysms and recommendations for model selection." **Scientific Reports**, 14(1), 8476 (2024) [[Link](#)]
 12. S. Kim†, **H. Yang**†, J.H. Oh, and Y.B. Kim, "Quantitative analysis of hemodynamic changes induced by the discrepancy between the sizes of the flow diverter and parent artery." **Scientific Reports**, 14(1), 10653 (2024) [[Link](#)]
- **Ongoing papers** -----
13. **H. Yang**, J.J. Kim, Y.B. Kim, K.C. Cho, and J.H. Oh, "Beyond conventional morphological parameters: Novel morphological indexes for quantitative evaluation of cerebral aneurysm irregularity." Submitted

INTERNATIONAL CONFERENCE

1. K.C. Cho, **H. Yang**, J.J. Kim, J.H. Oh, and Y.B. Kim, “Prediction of Rupture Risk in Cerebral Aneurysms by Comparing Clinical Cases with Fluid-Structure Interaction.” Annual Conference and General Assembly of Korean Society of Interventional Neuroradiology 2020, Virtual, Republic of Korea (Dec. 12, 2020)
2. J.J. Kim, **H. Yang**, K.C. Cho, J.H. Oh, and Y.B. Kim, “Prediction of Rupture Risk in Cerebral Aneurysms by Comparing Clinical Cases with Fluid-Structure Interaction (FSI) Analyses.” The 61st Annual Meeting of the Korean Neurosurgical Society, Incheon, Republic of Korea (Oct. 14 – Oct. 16, 2021)
3. **H. Yang**, K.C. Cho, J.J. Kim, J.H. Kim, Y.B. Kim, and J.H. Oh “A Novel Deep Learning Model Based on Hemodynamic Analysis for Predicting the Rupture Risk of Cerebral Aneurysms.” America Stroke Association International Stroke Conference (ISC) 2022, Session: Risk Factors and Prevention WP190, Los Angeles and Virtual, USA (Feb. 9 – Feb. 11, 2022)
4. J.J. Kim, **H. Yang**, K.C. Cho, J.H. Oh, and Y.B. Kim, “The Quantitative Comparison Between High Wall Shear Stress and High Strain in the Formation of Paraclinoid Aneurysms.” The 6th Bi-Neurovascular Symposium, Busan, Republic of Korea (Sep. 23 – Sep. 25, 2022)
5. K.C. Cho, **H. Yang**, J.J. Kim, J.H. Kim, J.H. Oh, and Y.B. Kim, “Rupture Risk Prediction of Cerebral Aneurysms using a Novel CNN-based Deep Learning Model.” The 62nd Annual Meeting of the Korean Neurosurgical Society, Incheon, Republic of Korea (Oct. 5 – Oct. 8, 2022)
6. J.J. Kim, **H. Yang**, K.C. Cho, J.H. Oh, and Y.B. Kim, “Analysis of Hemodynamic Parameters and Flow Patterns in Anterior Communicating Artery Aneurysms with Respect to Blood Flow in the Circle of Willis.” The 62nd Annual Meeting of the Korean Neurosurgical Society, Incheon, Republic of Korea (Oct. 5 – Oct. 8, 2022)
7. Y. Kim, **H. Yang**, K.C. Cho, J.J. Kim and J.H. Oh “Manufacturing Realistic Cerebrovascular Replica with an Intracranial Aneurysm and Their Application to Neurointerventional Endovascular Simulation,” ASME 2022 International Mechanical Engineering Congress & Exposition (IMECE 2022), Session: 05-05-02 Biomedical Devices – II, Columbus, USA (Oct. 30 – Nov. 3, 2022)
8. **H. Yang**, J.J. Kim, Y.B. Kim, K.C. Cho and J.H. Oh, “Investigation of Combined Influence of Hemodynamic Parameters on Intracranial Aneurysm Formation by Performing Computer-Simulations on Aneurysmal and Non-Aneurysmal Paraclinoid Arteries,” ASME 2022 International Mechanical Engineering Congress & Exposition (IMECE 2022), Session 05-09-03: Computational Modeling in Biomedical Applications – III, Columbus, USA (Oct. 30 – Nov. 3, 2022)

DOMESTIC CONFERENCE

1. K.C. Cho, **H. Yang**, J.J. Kim, J.H. Oh, and Y.B. Kim, “Prediction of Rupture Risk in Cerebral Aneurysms by Comparing Clinical Cases with Fluid-Structure Interaction.” The 38th Annual Spring Meeting of the Korean Neurosurgical Society, Virtual, Republic of Korea (Jul. 30 – Aug. 1, 2020)
2. K.C. Cho, J.J. Kim, **H. Yang**, J.H. Oh, and Y.B. Kim, “The Quantitative Comparison between High WSS and High Strain in the Formation of Paraclinoid Aneurysms.” The 39th Annual Spring Meeting of the Korean Neurosurgical Society, Virtual, Republic of Korea (Apr. 29 – May. 1, 2021)
3. **H. Yang**, K.C. Cho, J.J. Kim, J.H. Kim, Y.B. Kim, and J.H. Oh, “Rupture Risk Prediction of Cerebral aneurysms using a Novel CNN-based Deep Learning Model.” Korea Society of Mechanical Engineers (KSME) Annual meeting, Gwangju, Republic of Korea (Nov. 3 – Nov. 5, 2021)
4. K.C. Cho, **H. Yang**, J.J. Kim, J.H. Oh, and Y.B. Kim, “New Morphological Parameter for Cerebral Aneurysms - Rupture Risk Prediction based on Artificial Neural Networks.” Korean Neuroendovascular Society, Busan, Republic of Korea (Nov. 25 – Nov. 26, 2022)
5. K.C. Cho, Y. Kim, **H. Yang**, J.J. Kim, J.H. Oh, and Y.B. Kim, “3D-Printed Patient-Specific Circle of Willis with Aneurysm - Application to Neurointerventional Endovascular Simulation.” The 41st Annual Spring Meeting of the Korean Neurosurgical Society, Jeju, Republic of Korea (Mar. 30 – Apr. 1, 2023)
6. J.J. Kim, **H. Yang**, K.C. Cho, J.H. Oh, and Y.B. Kim, “Measurement of Mechanical Properties of Microcatheters for Stability and Shapability with Simulation.” The 41st Annual Spring Meeting of the Korean Neurosurgical Society, Jeju, Republic of Korea (Mar. 30 – Apr. 1, 2023)

PATENTS

1. **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “Apparatus and Method for Predicting Rupture of Aneurysm.” KR10-2327662, Republic of Korea (2021)
2. **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “Aneurysm Learning Data Augmentation System and Method.” KR10-2466572, Republic of Korea (2022)
3. **H. Yang**, J. Nam, D. Kim, and J.H. Oh “System and Method for Predicting Blot Fatigue Life using Artificial Intelligence.” KR10-2462127, Republic of Korea (2022)
4. **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “Vascular simulator for Practice and Manufacturing Method of the Same.”, KR10-2359688, Republic of Korea (2022)

5. **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “Aneurysm Prediction Method using Deep Learning Algorithm and Thereof System.” Application No. KR10-2020-0077309, Republic of Korea (2020)
6. **H. Yang**, Y. Kim, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “Blood Simulator and Method for Controlling the Same.” Application No. KR10-2022-0103421, Republic of Korea (2022)
7. **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “Aneurysm Rupture Prediction Method and Device using Artificial Intelligence based on Morphological and Hemodynamic Factors of Aneurysm.” Application No. KR10-2022-0041961, Republic of Korea (2022)
8. **H. Yang**, I. Hong, Y. Kim, and J.H. Oh, “Method of Creating a Blood Vessel Model.” Application No. KR10-2022-0021973, Republic of Korea (2022)
9. **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “System and Method for Augmentation Aneurysm Learning Data.” Application No. US17/928,777, USA (2022)
10. **H. Yang**, K.C. Cho, J.J. Kim, Y.B. Kim, and J.H. Oh, “Method of Rupture Risk Prediction based Morphological and Hemodynamic Parameters in Aneurysms.” Application No. KR2023/004488, PCT (2023)

AWARDS

- 3rd Prize, “Measurement of Torque-Preload and Friction Coefficient in Bolted Joint.” G-Capstone Competition, Hanyang University ERICA (2021)
- Excellence Prize, 1st BK 21 ERICA-ACE Excellent Research Activity Award, Hanyang University ERICA (2021)
- Excellence Prize, “Endovascular Simulator for Patient-Specific Surgical Planning.” G-Capstone Competition, Hanyang University ERICA (2022)
- Excellence Prize, 2nd BK 21 ERICA-ACE Excellent Research Activity Award, Hanyang University ERICA (2022)
- Best Dissertation Prize, Graduate School Outstanding Dissertation Award, Hanyang University (2023)