DOHYUN KIM

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Nationality: **Korean**

RESEARCH INTEREST

Finite Element Methods, High-performance Computing, PDE Constrained Optimization, Topology Optimization, Computational Fluid Dynamics

PROFESSIONAL EXPERIENCE

Postdoctoral Research Associate | Brown University
Supervisor: Brendan Keith, Brown University
2023 JAN -

Postdoctoral Research Associate | Hong Kong Centre for Cerebro-Cardiovascular Health Engineering
Supervisor: Raymond Chan, City University of Hong Kong
Co-supervisor: Lina Zhao, City University of Hong Kong
2021 DEC – 2022 OCT

Postdoctoral Researcher - Computational Science and Engineering | Yonsei University, South Korea
Supervisor: Eun-Jae Park, Yonsei University
2021 MAR – 2021 DEC

EDUCATION

Ph.D. Computational Science and Engineering – Mathematics | Yonsei University, South Korea
Advisor: Eun-Jae Park, Yonsei University
2015 MAR – 2021 FEB

B.S. Mathematics | Hanyang University, South Korea
2011 MAR – 2015 FEB

COMPUTER SKILLS

- MATLAB
- Python
- C++

PUBLICATIONS

Analysis of the SiMPL method for density-based topology optimization
ArXiv Preprint, B. Keith, **Dohyun Kim**, B. S. Lazarov, T. M. Surowiec

High-performance finite elements with MFEM, The International Journal of High Performance Computing Applications, 38 (5), pp. 447-467 (2024), J. Andrej, N. Atallah, J.-P. Bäcker, J.-S. Camier, D. Copeland, V. Dobrev, Y. Dudouit, T. Duswald, B. Keith, **Dohyun Kim**, T. Kolev, B. Lazarov, K. Mittal, W. Pazner, S. Petrides, S. Shiraiwa, M. Stowell, and V. Tomov.

DynAMO: Multi-agent reinforcement learning for dynamic anticipatory mesh optimization with applications to hyperbolic conservation laws, Journal of Computational Physics, 506, Article No. 112924 (2024), T. Dzanic, K. Mittal, **Dohyun Kim**, J. Yang, S. Petrides, B. Keith, R. Anderson

Staggered DG method with small edges for Darcy flows in fractured porous media, Journal of Scientific Computing, 90, Article No. 83 (2022), Lina Zhao, **Dohyun Kim**, Eun-Jae Park, Eric Chung

Review and implementation of staggered DG methods on polygonal meshes, Journal of the Korean Society and Applied Mathematics, 25, pp. 66-81 (2021), **Dohyun Kim**, L. Zhao, E.-J. Park

Polygonal staggered discontinuous Galerkin methods, Oberwolfach Reports, 3/2021, 25-27 (2021), E.-J. Park, L. Zhao, **Dohyun Kim**

Morley finite element methods for the stationary quasi-geostrophic equation, Computer Methods in Applied Mechanics and Engineering, 375, 113639 (2021), **D. Kim**, A. K. Pani, E.-J. Park

Staggered DG methods for the pseudostress-velocity formulation of the Stokes equations on general meshes, SIAM Journal on Scientific Computing, 42, pp. A2537-A2560 (2020), **Dohyun Kim**, L. Zhao, E.-J. Park

Error estimates of B-spline based finite-element methods for the stationary quasi-geostrophic equations of the ocean, Computer Methods in Applied Mechanics and Engineering, 335, pp. 255-272 (2018), **Dohyun Kim**, T.-Y. Kim, E.-J. Park, D.-w. Shin

ORGANIZED CONFERENCE

Minisymposium: Constrained Optimization and Optimal Control | 2025 SIAM Spring Central Sectional
March 29-30, 2025 , Lawrence, Kansas, USA

Minisymposium: Recent developments in mathematical analysis and numerics for incompressible flow and related problems | 2022 SIAM Annual Meeting
June 11-15, 2022, Pittsburgh, Pennsylvania, USA (Online-Offline Hybrid)

AWARDS AND GRANTS

Excellent Dissertation Award | Korean Mathematical Society 2021
Excellent Thesis Award | Yonsei University 2021
Excellent Paper Encouragement Award | Yonsei University 2019
Poster Excellence Award| KSIAM 2017
KSIAM-MathWorks Problem Challenge-Award of Excellence | KSIAM 2018
BK21Plus Scholarship | Brain Korea 21 Plus (2015-2020)
Research Competency Scholarship | Yonsei University 2019

NATIONALITY & LANGUAGE

- Advanced level in **English**
- Native proficiency in **Korean**