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| Dohyun KIM | Phone: (+1) (253) 402-7698 Phone icon  Email: dohyun\_kim@brown.edu  Nationality: **Korean** |

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|  | **Research interest** |

Finite Element Methods, Numerical Optimization, Nonconforming Methods, Fluid Dynamics, Scientific Computing, Reinforcement Learning

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|  | Professional Experience |

## Postdoctoral Research Associate | Brown University, USA

Supervisor: Brendan Keith, Brown University

## 2023 JAN –

## Postdoctoral Researcher | Hong Kong Centre for Cerebro-Cardiovascular Health Engineering, Hong Kong

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

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|  | 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

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|  | 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

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## KSIAM-MathWorks Problem Challenge-Award of Excellence | KSIAM 2018

## BK21Plus Scholarship | Brain Korea 21 Plus (2015-2020)

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## Research Competency Scholarship | Yonsei University 2019

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|  | Publications |

**HIGH-PERFORMANCE FINITE ELEMENTS WITH MFEM**

### **The International Journal of High Performance Computing Applications,** 2024

### Julian Andrej, Nabil Atallah, Jan-Phillip Bäcker, John Camier, Dylan Copeland, Veselin Dobrev, Yohann Dudouit, Tobias Duswald, Brendan Keith, **Dohyun Kim**, Tzanio Kolev, Boyan Lazarov, Ketan Mittal, Will Pazner, Socratis Petrides, Syun'ichi Shiraiwa, Mark Stowell, Vladimir Tomov

**DynAMO:** **Multi-agent reinforcement learning for dynamic anticipatory mesh optimization with applications to hyperbolic conservation laws**

**Journal of Computational Physics**, 112924, 2024

Tarik Dzanic, Ketan Mittal, **Dohyun Kim**, Jiachen Yang, Socratis Petrides, Brendan Keith, Robert Anderson

**Staggered DG method with small edges for Darcy flows in fractured porous media**

**Journal of Scientific Computing**, 90, Article number 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**, Lina Zhao, Eun-Jae Park

## Polygonal staggered discontinuous Galerkin methods

## Oberwolfach Reports, 3/2021, 25-27 (2021)

Eun-Jae Park, Lina Zhao, **Dohyun Kim**

## Morley finite element methods for the stationary quasi-geostrophic equation

## Computer Methods in Applied Mechanics and Engineering, 375, 113639 (2021)

**Dohyun Kim,** Amiya K. Pani, Eun-Jae 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**, Lina Zhao, Eun-Jae 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**, Tae-Yeon Kim, Eun-Jae Park, Dong-wook Shin

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|  | Organized Conference |

## Mini-symposium: 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)

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|  | Invited Talks |

## DynAMO: Dynamic Anticipatory Mesh Optimization with Reinforcement Learning | 17th U. S. National Congress on Computational Mechanics

July 23-27, 2023, Albuquerque, NM, U.S.

## DynAMO: Dynamic Anticipatory Mesh Optimization with Reinforcement Learning | 9th International Conference on High Order Finite Element and Isogeometric Methods

May 29-June 1, 2023, Larnaca, Cyprus

## A pressure-robust staggered DG methods for the stationary Stokes and Navier-Stokes problems | AMS Sectional Meeting: 2023 Spring Southeastern Sectional Meeting

March 18-19, 2023, Atlanta, GA, U.S.

## Pressure-Robust Staggered DG Method for Navier-Stokes Equations | SIAM Conference on Analysis of Partial Differential Equations (PD22)

March 14-18, 2022, Berlin, Germany (Online)

## Staggered DG Methods on General Meshes | SIAM Conference on Mathematical & Computational Issues in the Geosciences

June 21-24, 2021, Italy (Online)

## Staggered DG method for Darcy flows in fractured porous media on general meshes | International Conference on Computational Science 2021

June 16-18, 2021, Krakow, Poland (Online)

## Staggered discontinuous Galerkin methods for the Stokes equations on general polygonal meshes | The 26th International Domain Decomposition Conference

December 7-12, 2020, Hong Kong, China (Online)

## Error estimates of B-spline based finite-element methods for the stationary quasi-geostrophic equations of the ocean | The Week of Applied Mathematics and Mathematical Modelling

October 7-11, 2019, Vladivostok, Russia

## A C0-discontinuous Galerkin method for quasi-geostrophic equations | International Conference on Computational Mathematics – Advances in Computational PDEs

September 29-October 2, 2018, Seoul, South Korea

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|  | Presentations |

## (POSTER) DynAMO: Dynamic Anticipatory Mesh Optimization with Reinforcement Learning | Mathematical and Scientific Machine Learning

Jun 5-9, 2023, Providence, RI, U.S.

## Pressure robust staggered DG methods | KSIAM 2021 Annual Meeting

## Dec 2-5, 2021, Busan, Korea (Online-Offline Hybrid)

## A staggered DG method for the Darcy flow in fractured porous media on polygonal meshes | International Conference on Spectral and High Order Methods

July 12-16, 2021, Vienna, Austria (Online)

## Staggered DG method with small edges for Darcy flows in fractured porous media| KSIAM 2021 Spring Meeting

June 25-27, 2021, Gangneung, South Korea

## C0-interior penalty methods for stationary quasi-geostrophic equations | KSIAM 2018 Annual Meeting

November 2-4, 2018, Jeju, South Korea

## Finite element methods for wind-driven large scale ocean circulation with spline basis | 2017 KSIAM Annual Meeting

November 3-5, 2017, Busan, South Korea

## (POSTER) B-spline based finite element method for a large scale ocean circulation | KSIAM 2017 Spring Conference Joint with EASIAM

June 23-24, 2017, Seoul, South Korea

## Discontinuous Galerkin methods for Hodgkin-Huxley model | 2017 KMS Spring Meeting

April 28-30, 2017, Gwangju, South Korea

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|  | Computer Skills |

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| * MATLAB * Python | * C++ |

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|  | Nationality & Language |

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