

KAUSHIK G KULKARNI

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EDUCATION

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| Aug '17 – <i>Present</i> | Ph.D. student in Computer Science <i>University of Illinois at Urbana-Champaign, Urbana, IL</i> |
| Aug '13 – May '17 | Bachelor of Technology in Mechanical Engineering <i>Indian Institute of Technology, Bombay</i> |

EXPERIENCE

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| Aug '18 – <i>Present</i> | Teaching Assistant for Numerical Analysis <i>Computer Science Dept., UIUC</i> |
| Dec '17 – Aug '18 | Graduate Research Assistant <i>Computer Science Dept., UIUC</i> |
| Aug '17 – Dec '17 | Teaching Assistant for Numerical Methods <i>Computer Science Dept., UIUC</i> |
| Jan '17 – May '17 | Teaching Assistant for Introduction to Numerical Analysis <i>Mathematics Dept., IITB</i> |
| May '16 – July '16 | Software Engineering Intern <i>Morgan Stanley Strats and Modelling, Mumbai</i> |

PUBLICATIONS

- [1] A. Bhati, R. Sawanni, **K. Kulkarni**, and R. Bhardwaj, “Role of skin friction drag during flow-induced reconfiguration of a flexible thin plate,” *Journal of Fluids and Structures*, vol. 77, pp. 134–150, 2018

AWARDS AND ACHIEVEMENTS

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| 2016 | Undergraduate Research Award(URA01) by Indian Institute of Technology, Bombay |
| 2013 | All India Rank of 341 (top 0.01%) in the Joint Entrance Examination - Mains out of 1.5 million students |
| 2013 | All India Rank of 419 (top 0.3%) in the Joint Entrance Examination - Advanced out of 0.15 million students |
| 2013 | <i>Kishore Vaigyanik Protsahan Yojana</i> Fellowship Award |
| 2013 | Certificate of Merit for being among the State Top 1% in National Standard examination in Physics and Chemistry |

RESEARCH

Transformation based Code generation for Finite Element Methods

Advised by Prof. Andreas Klöckner, UIUC

We are extending the `loo.py` package by enabling transformations that would optimize the Finite Element kernels of the Firedrake Project(Imperial College), to boost their performance on GPUs.

Solving Eikonal Equations on Unstructured Grids

Advised by Prof. S Baskar, IIT Bombay

Characteristic Fast Marching Method is widely used in solving the Eikonal equations, however previous work had been only formulated for structured grids. We developed a solver that extended the algorithm for unstructured grids as well. Used the solver to solve known problems in literature with skew grids so that the activity of the solution could be efficiently observed in the region of activity.

Link: <https://github.com/kaushikcf/eikonal-unstructured>

Discontinuous Galerkin Framework for Hyperbolic PDEs

Advised by Prof. Shiva Gopalakrishnan, IIT Bombay

We developed a C++ library for solving Hyperbolic Equations through Discontinuous Galerkin (“DG”) methods on structured grids. Performed a series of convergence tests to verify that

the framework satisfied hp -convergence. Eventually, used the framework to simulate problems in Fluid Dynamics like the dam-break problem using high order DG elements.

Link: <https://github.com/kaushikcf/Discontinuous-Galerkin>

Flow Induced Reconfiguration of Aquatic Vegetation

Advised by Prof. Rajneesh Bharadwaj, IIT Bombay

Corrected the existing models for Fluid Structure Interaction for a Flexible plate by including the Skin friction coefficient in the computations. Implemented a "*Predictor-Corrector*" based Finite Difference scheme for the computation of coefficient of drag on the plate.

Link: <https://arxiv.org/abs/1712.00441>