Ajay Mandyam RANGARAJAN

LinkedIn | Github | Google Scholar | ResearchGate | Publons | Personal webpage

Personal Data

Email: rangarajan@aices.rwth-aachen.de
Personal webpage: https://armandyam.github.io/

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Education

2021 | Doctorate in Computational Sciences (dr.-Ing.)
RWTH Aachen University, Aachen, Germany
Thesis: Metric Based hp–Adaptation Using a Continuous Mesh Model for Higher Order Schemes
Advised by: Prof. Georg May, Prof. Marek Behr

2015 | Masters in Simulation Sciences (m.sc.)
RWTH Aachen University, Aachen, Germany
German Research School for Simulation Science (GRS)
Thesis: Anisotropic Mesh Optimization for Higher Order Discontinuous Galerkin Methods Using a Continuous Mesh Model
Advised by: Prof. Georg May

2013 | Bachelors in Mechanical Engineering (Hons.) (b. tech.)
Indian Institute of Technology, Hyderabad
Department of Mechanical Engineering
Minor: Electrical Engineering
Thesis: Numerical Modeling of In-Cylinder Spray in GDI Engines
Advised by: Prof. Raja Banerjee

Professional Experience

12/2021 – Current | R&D Software Engineer
Dassault Systèmes
Electromagnetics team
Darmstadt, Germany
Workflows and Interoperability group

01/2020 – 11/2023 | Postdoctoral Researcher
RWTH Aachen University, Aachen, Germany
Aachen Institute for advanced study in Computational Engineering Science (AICES)
Aachen, Germany
Model Order Reduction for Stochastic PDEs

10/2016 – 04/2021 | Doctoral Researcher
RWTH Aachen University, Aachen, Germany

	Aachen Institute for advanced study in Computational Engineering Science (AICES) *Development of optimized solvers for solving partial differential equations*
11/2017 – 12/2017	Visiting Researcher Charles University, Prague, Czech Republic Department of Numerical Mathematics
02/2016 – 09/2016	Research Assistant RWTH Aachen University, Aachen, Germany Aachen Institute for advanced study in Computational Engineering Science (AICES)
12/2014 – 12/2015	Student Assistant RWTH Aachen University, Aachen, Germany Aachen Institute for advanced study in Computational Engineering Science (AICES)
01/2014 – 02/2015	Student Assistant Access Technology e.V, Aachen, Germany
07/2013 – 09/2013	Student Intern CD-Adapco (Now Siemens), Bengaluru, India
05/2012 – 07/2012	Student Intern CD-Adapco (Now Siemens), Bengaluru, India
05/2011 – 07/2011	Student Intern Indian Institute of Technology, Madras, India Department of Applied Mechanics

Technical Skills

Languages	C, C++, Python, MPI, OpenMP
Typography	LaTeX, Microsoft office, Open office
Environments	Windows, Mac, Linux
Applications	CST Studio Suite, ParaView, MATLAB, STAR-CCM+, Simulink, Tecplot

Publications

1. Stefan Wittschieber, **Ajay Rangarajan**, Georg May, Marek Behr, Metric-Based Anisotropic Mesh Adaptation for Viscoelastic Flows, *Computers & Mathematics with Applications, Volume 151, 2023, Pages 67-79*
2. Ankit Chakraborty, **Ajay Rangarajan**, Georg May, An anisotropic h-adaptive strategy for discontinuous Petrov-Galerkin schemes using a continuous mesh model, *Computers & Mathematics with Applications. 2022, Vol. 106, pp.1-17.*
3. Aravind Balan, Michael Park, Stephen Wood, W. Anderson, **Ajay Rangarajan**, Devina Sanjaya, Georg May, A review and comparison of error estimators for anisotropic mesh adaptation for flow simulations,*Computers & Fluids. 2022, Vol. 234, pp.105259.*
4. Georg May, Koen Devesse, **Ajay Rangarajan**, Thierry Magin, A Hybridized Discontinuous Galerkin Solver for High-Speed Compressible Flow, *Aerospace. 2021, Vol. 8(11), 322.*
5. **Ajay Rangarajan**, Georg May and Vit Dolejsi, Adjoint-based anisotropic mesh hp-adaptation

for Discontinuous Galerkin Methods Using a Continuous Mesh Model, *Journal of Computational Physics, Volume 409, 15 May 2020, 109321*

6. Ondrej Bartos, Vit Dolejsi, Georg May, **Ajay Rangarajan** and Filip Roskovec, A goal-oriented anisotropic hp-mesh adaptation method for linear convection-diffusion-reaction problems, *Volume 78, Issue 9, 1 November 2019, Pages 2973-2993*
7. Vit Dolejsi, Georg May, **Ajay Rangarajan** and Filip Roskovec, A Goal-Oriented High-Order Anisotropic Mesh Adaptation Using Discontinuous Galerkin Method for Linear Convection-Diffusion-Reaction Problems, *SIAM J. Sci. Comput., 41(3), A1899–A1922.*
8. **Ajay Rangarajan**, Aravind Balan and Georg May, Mesh Optimization for Discontinuous Galerkin Methods Using a Continuous Mesh Model, *AIAA Journal, Vol. 56, No. 10 (2018), pp: 4060-4073*
9. Vit Dolejsi, Georg May and **Ajay Rangarajan**, A Continuous hp-mesh model for adaptive discontinuous Galerkin schemes, *Applied Numerical Mathematics, Vol. 124, Feb 2018, pp: 1-21*

Conference proceedings

1. Dipendrasingh Kain, Gowri Venugopal, Aravind Balan, **Ajay Rangarajan** and Georg May, Optimally adapted quad-dominant meshes for high-order Discontinuous Galerkin methods, *AIAA Aviation 2024 Forum, under progress*
2. **Ajay Rangarajan** and Georg May, Metric Construction for Error Control of Finite Element Solutions, *AIAA Aviation 2019 Forum, (AIAA 2019-3058)*
3. **Ajay Rangarajan**, Ankit Chakraborty and Georg May, A goal oriented optimization technique for tetrahedral grids using a continuous-mesh model, *AIAA SciTech Forum, (AIAA 2019-0349)*
4. **Ajay Rangarajan**, Ankit Chakraborty, Georg May, and Vit Dolejsi, A continuous-mesh optimization technique for piecewise polynomial approximation on tetrahedral grids, *2018 Fluid Dynamics Conference, AIAA AVIATION Forum, (AIAA 2018-3246)*
5. **Ajay Rangarajan** and Raja Banerjee, Numerical investigation of in-cylinder fuel atomization and mixing for a GDI engine, *11th ISHMT - ASME Heat and Mass Transfer Conference, Kharagpur, India, Dec 28-31, 2013*
6. Aditya Karnik, **Ajay Rangarajan** and Mohit Tandon, Numerical Investigation of the Hydrodynamics of Cylindrical Fluidized Bed, *The 14th International Conference on Fluidization-From Fundamentals to Products, Eds, ECI Symposium Series, Volume (2013)*
7. Gautham Manoharan, Abram Kakkozha, **Ajay Rangarajan**, Karthik Vajapeyajula, Ashwin Kolappan, Mahesh Panchagnula and Srikanth Vedantam, Experimental study of dense bi-disperse granular flow through a pipe with a ninety degree bend, *3rd International Conference on Material Modelling, Warsaw, Poland, Sept 8-11, 2013*

Invited talks and conference presentations

1. Ajay Rangarajan, Metric-Based hp-Adaptation using a Continuous Mesh Model, IRTG Modern Inverse Problems (MIP) Annual Workshop, Austin, USA, July 24, 2019
2. Ajay Rangarajan, Metric-Based hp-Adaptation using a Continuous Mesh Model, IRTG Modern Inverse Problems (MIP) Kick-off, Aachen, Germany, November 28, 2018
3. Ajay Rangarajan, Georg May and Vit Dolejsi, Optimized hp Approximation Spaces for Goal-Oriented Adaptation, International Conference On Spectral and High Order Methods (ICOSAHOM) 2018, Co-organized minisymposia: Mesh Adaptation and Error Estimation for High-Order Methods, London, United Kingdom, July 9-13, 2018

4. Georg May and Ajay Rangarajan, A fully adaptive HDG computational framework for convection-diffusion systems, International Conference On Spectral and High Order Methods (ICOSAHOM) 2018, London, United Kingdom, July 9-13, 2018
5. Georg May, Ajay Rangarajan and Ankit Chakraborthy, A Continuous Mesh Model for Goal-Oriented hp-Adaptation, 7th European Conference on Computational Fluid Dynamics (ECOMASS), Glasgow, United Kingdom, June 11-15, 2018
6. Ajay Rangarajan, Georg May, Vit Dolejsi and Filip Roskovec, Anisotropic Goal-oriented Error Estimates for HDG Schemes, 6th European Seminar on Computing, Pilzen, Czech Republic, June 3-8, 2018
7. Ajay Rangarajan and Georg May, Hybridized DG schemes on near optimal meshes, Seminar of Numerical Mathematics, Department of Numerical Mathematics, Charles University, Prague, Czech Republic, December 14, 2017
8. Ajay Rangarajan, Georg May and Vit Dolejsi, A Continuous Mesh Model for Goal-Oriented hp-Adaptation, 14th U.S. National Congress on Computational Mechanics, Montreal, Canada, July 17-20, 2017
9. Ajay Rangarajan, Georg May and Vit Dolejsi, Analytic Metric-Based Adaptation Using a Continuous Mesh Model, Fenics 17, Luxembourg, June 12-14, 2017
10. Georg May, Ajay Rangarajan and Vit Dolejsi, Metric-Based hp-adaptation using a continuous mesh model, 2017 SIAM Conference on Computational Science and Engineering, Atlanta, USA, Feb 27-Mar 3, 2017
11. Georg May and Ajay Rangarajan, Adaptive HDG Schemes on Near-Optimal Meshes, 2016 SIAM Annual meeting, Boston, USA, July 11-15, 2016
12. Ajay Rangarajan and Georg May, Analytic Mesh Optimization for Discontinuous Galerkin Methods Using a Continuous Mesh Model, 5th European Seminar on Computing, Pilzen, Czech Republic, June 5-10, 2016
13. Aditya Karnik, Ajay Rangarajan and Mohit Tandon, Numerical investigation of the effect of bed height and coefficient of restitution on the minimum fluidization velocity of a cylindrical fluidized bed, 8th International conference on multiphase flow (ICMF 2013), 26-31 May 2013, Jeju, Korea

Supervision and Mentoring

1. Working student (current), Dassault Systèmes
2. M. Romanelli (2021), Master Thesis, Department of Mechanics, Mathematics and Management, Politecnico Di Bari
3. Y.-C. Tsai (2019), Student Assistant, Aachen Institute for advanced study in Computational Engineering Science (AICES), RWTH Aachen University
4. A. Chakraborty (2018), Master Thesis and Student Assistant, Aachen Institute for advanced study in Computational Engineering Science (AICES), RWTH Aachen University
5. Student Supervisor (2017, 2018), Computational and Mathematical Modeling Program (CAMMP), RWTH Aachen University

Service and Societies

1. Student Member
   American Institute for Aeronautics and Astronautics
   2016 - 2019

2. Board of Doctoral Candidates
   Aachen Institute of advanced study in Computational Engineering Science (AICES)
   Student Representative
   2018
3. Society for Industrial and Applied Mathematics, Aachen Chapter
   Student Member
   2016 - now
   RWTH Aachen University, Germany.

Certifications

1. Machine Learning Specialization
   Stanford University
   Coursera, 11/2022
2. Web Scraping with Python
   Linkedin Learning, 11/2022
3. Introduction to Philosophy
   The University of Edinburgh
   Coursera, 05/2021

Teaching

1. Numerical Methods for PDE
   Course offered as part of the Masters Program in Simulation Sciences, RWTH Aachen University.
   2016-2019
2. Fast Iterative Solvers
   Course offered as part of the Masters Program in Simulation Sciences, RWTH Aachen University.
   2016-2019

Languages

English	Fluent
German	Intermediate
Hindi	Intermediate
Tamil	Intermediate
Kannada	Fluent

Interests and Activities

Triathlete	Ran 8 marathons and 8 triathlons
Traveler	Traveled to $30+$ countries
Avid reader	Read $50+$ books in a year