

# Anshu Dubey

## *Curriculum Vitae*

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Chicago, IL 60615  
adubey@anl.gov

### Degrees Attained

*Ph.D., Computer Science, 1993*  
Old Dominion University, Norfolk, VA

*M.S., Electrical Engineering, 1990*  
Auburn University, Auburn, AL

*B.Tech, Electrical Engineering, 1985*  
Indian Institute of Technology, New Delhi, India

### Positions Held

2015–present        Computational Scientist V Leader 1  
Mathematic and Computer Science Division  
Argonne National Laboratory, Argonne, IL

2018–present        Senior Scientist, Department of Computer Science  
CASE, University of Chicago, Chicago, IL

2015–2018            Senior Fellow  
Computation Institute, University of Chicago, Chicago, IL

2013–2015            Work Lead and Computer Systems Engineer IV  
Applied Numerical Algorithms Group, Computational Research Division  
Lawrence Berkeley National Laboratory, Berkeley, CA

2009–2013            Associate Director and CS/Applications Group Leader  
Flash Center for Computational Science  
University of Chicago, Chicago, IL

2008–2013            Fellow  
Computation Institute, University of Chicago, Chicago, IL

2004–2011            Lecturer CSPP  
Computer Science, University of Chicago, Chicago, IL

2003–2009            Code Group Leader  
ASC/Flash Center, University of Chicago, Chicago, IL

2001–2003            Lead Applications Programmer  
ASC/Flash Center, University of Chicago, Chicago, IL

1998–2001            Research Scientist  
Astronomy & Astrophysics, University of Chicago, Chicago, IL

1993–1998            Research Associate  
Astronomy & Astrophysics, University of Chicago, Chicago, IL

1985–1987          Senior Research Assistant  
Comp Science & Engineering / Center for Applied Research in Electronics  
Indian Institute of Technology, New Delhi, India

## Honors

*National Talent Search Scholarship Award, India (1981-1985)*

## Professional Society Membership

*SIAM, ACM, sigHPC, AWM*

## Professional Activities

Associate Editor - Parallel Computing, Area Editor - International Journal of High Performance Computing Applications

Department Co-chair, Scientific computing, IEEE CiSE

Technical Papers Chair - ICPP2022

Workshops Chair - SC2021

Lead for Earth and Space Science Applications, Exascale Computing Project, US-DOE 2017-2019

Chair, Applications Area, SC17, Applications and Algorithms HPC-ASIA2020

Member of site-visit team for Nano-bio hub, NSF 2020

Co-chair, Applications Area, SC14

Member, Program Committee :SC20, SC19, IPDPS 2018, SC18, SC16, SC15, SC13, PACT 2015, ICS 2015, SBAC-PAD 2013, 2014 & 2015; WolfHPC 2014, 2015, 2016; WSSSPE 2013,2014, 2016; CCGrid2013, eSciecnce 2012,2013; IASDS 2010, 2011.

Organizer and Lecturer, Software Engineering and Community Codes Track, Argonne Training Program for Extreme Scale Computing 2013-Current.

Workshop Organizing Committee, PADAL 2015, 2016, 2017, 2019.

Workshop Chair, COLOC, colocated with Europar 2021.

Workshop Organizing Committee, SE-HER 2019, co-located with SC19.

Workshop Organizing Committee, Software Theory Translation Workshop, New Orleans, February 2019.

Workshop Chair, SIMAC Series, CC2012 .

Section Lead for Report on Extreme Scale Heterogeneity Workshop, March, 2018.

Senior Member, USSRI Conceptualization Team for NSF.

Reviewer, Parallel Computing, JPDC, MNRAS, ApJ, TPDS, IJHPCA.

Member, MCS Strategic Council, MCS CS Council

Co-organizer, Webinar Series on Best Practices in Scientific Software Engineering, 2016.

## Book Chapters

A. Dubey, K. Antypas, E. Coon, and K.M. Riley. Software process for multicomponent multiphysics codes. In J. Carver, N.C. Hong, and G. Thiruvathukal, editors, *Software Engineering for Science*, chapter 1. Taylor and Francis, 2016.

R. A. Bartlett, A. Dubey, X. Sherry Li, J.D. Moulton, J.M. Willenbring, and U.M. Yang. Testing of scientific software: Impacts on research credibility, development productivity, maturation, and sustainability. In J. Carver, N.C. Hong, and G. Thiruvathukal, editors, *Software Engineering for Science*, chapter 4. Taylor and Francis, 2016.

## Journal Publications

Anshu Dubey. Insights from the software design of a multiphysics multicomponent scientific code. *IEEE CiSE*, to appear, 2021.

J. A. Harris, Ran Chu, Sean M. Couch, Anshu Dubey, Eirik Endeve, Antigoni Georgiadou, Rajeev Jain, Daniel Kasen, M. Paul Laiu, O.E. Bronson Messer, Jared O’Neal, Michael A. Sandoval, and Klaus Weide. Exascale models of stellar explosions: quintessential multi-physics simulation. *in revision for International Journal of High Performance Computing Applications*, 2021.

A Grannan, K Sood, B Norris, and A Dubey. Understanding the landscape of scientific software used on high-performance computing platforms. *The International Journal of High Performance Computing Applications*, 34(4):465–477, 2020.

Caroline Jay, Robert Haines, Daniel S. Katz, Jeffrey Carver, Sandra Gesing, Steven R. Brandt, James Howison, Anshu Dubey, James C. Phillips, Hui Wan, and Matthew J. Turk. The challenges of theory-software translation. *submitted to F1000*, 2020.

Anshu Dubey, Jared O’Neal, Klaus Weide, and Saurabh Chawdhary. Distillation of best practices from refactoring flash for exascale. *SN Computer Science*, 1(4):223, Jul 2020.

Alex Grannan, Kanika Sood, Boyana Norris, and Anshu Dubey. Understanding the landscape of scientific software used on high-performance computing platforms. *accepted, International Journal of High Performance Computing Applications*, 2019.

M Asch, T Moore, R Badia, M Beck, P Beckman, T Bidot, F Bodin, F Cappello, A Choudhary, B de Supinski, E Deelman, J Dongarra, A Dubey, G Fox, H Fu, S Girona, W Gropp, M Heroux, Y Ishikawa, K Keahey, D Keyes, W Kramer, J-F Lavignion, Y Lu, S Matsuoka, B Mohr, D Reed, S Requena, J Saltz, T Schulthess, R Stevens, M Swamy, A Szalay, W Tang, G Varoquaux, J-P Vilotte, R Wisniewski, Z Xu, and I Zacharov. Big data and extreme-scale computing: Pathways to convergence-toward a shaping strategy for a future software and data ecosystem for scientific inquiry. *The International Journal of High Performance Computing Applications*, 32(4):435–479, 2018.

Daniel Katz, Kyle Niemeyer, Sandra Gesing, Lorraine Hwang, Wolfgang Bangeth, Simon Hettrick, Ray Izadak, Jean Salac, Neil Chue Hong, Santiago Nunez-Corrales, Alice Allen, R. Stuart Geiger, Jonah Miller, Emily Chen, Anshu Dubey, and Patricia Lago. Report on the fourth workshop on sustainable software for science: Practice and experiences (wssspe4). *Jors*, 2018.

Anshu Dubey, Petros Tzeferacos, and Donald Lamb. The dividends of investing in computational software design – a case study. *International Journal of High Performance Computing Applications*, 2018.

Didem Unat, Anshu Dubey, Torsten Hoefler, John Shalf, Mark Abraham, Mauro Bianco, Bradford L Chamberlain, Romain Cledat, H Carter Edwards, Hal Finkel, et al. Trends in data locality abstractions for hpc systems. *IEEE Transactions on Parallel and Distributed Systems*, 2017.

Anshu Dubey and Katherine Riley. Experience paper: Software engineering and community codes track in atpesc. *Journal of Open Research Software*, 2017.

A. Chien, P. Balaji, N. Dun, A. Fang, H. Fujita, K. Iskra, Z. Rubenstein, Z. Zheng, J. Hammond, I. Laguna, D. Richards, A. Dubey, B. van Straalen, M. Hoemmen, M. Heroux, K. Teranishi, and A. Siegel. Exploring versioned distributed arrays for resilience in scientific applications: Global view resilience. *International Journal of High Performance Computing Applications*, accepted, 2016.

- A. Dubey, K. Weide, D. Lee, J. Bachan, C. Daley, S. Olofin, N. Taylor, P.M. Rich, and L.B. Reid. Ongoing verification of a multiphysics community code: FLASH. *Software: Practice and Experience*, 45(2), 2015.
- Anshu Dubey, Ann Almgren, John Bell, Martin Berzins, Steve Brandt, Greg Bryan, Phillip Colella, Daniel Graves, Michael Lijewski, Frank Loffler, Brian O'Shea, Erik Schnetter, Brian Van Straalen, and Klaus Weide. A survey of high level frameworks in block-structured adaptive mesh refinement packages. *Journal of Parallel and Distributed Computing*, 74(12):3217–3227, 2014.
- Anshu Dubey, Steve Brandt, Richard Brower, Merle Giles, Paul Hovland, Donald Lamb, Frank Loffler, Boyana Norris, Brian O'Shea, Claudio Rebbi, Marc Snir, Rajeev Thakur, and Petros Tzeferacos. Software abstractions and methodologies for hpc simulation codes on future architectures. *Journal of Open Research Software*, 2(1), 2014.
- Anshu Dubey and Brian Van Straalen. Experiences from software engineering of large scale AMR multiphysics code frameworks. *Journal of Open Research Software*, 2(1), 2014.
- A. Dubey, K. Antypas, A.C. Calder, C. Daley, B. Fryxell, J.B. Gallagher, D.Q. Lamb, D. Lee, K. Olson, L.B. Reid, P. Rich, P.M. Ricker, K.M. Riley, R. Rosner, A. Siegel, N.T. Taylor, F.X. Timmes, N. Vladimirova, K. Weide, and J. ZuHone. Evolution of FLASH, a multiphysics scientific simulation code for high performance computing. *International Journal of High Performance Computing Applications*, 28(2):225–237, 2013.
- A. Dubey, A.C. Calder, C. Daley, R.T. Fisher, C. Graziani, G.C. Jordan, D.Q. Lamb, L.B. Reid, D. M. Townsley, and K. Weide. Pragmatic optimizations for better scientific utilization of large supercomputers. *International Journal of High Performance Computing Applications*, 27(3):360–373, 2013.
- A. Dubey, C. Daley, J. ZuHone, P. M. Ricker, K. Weide, and C. Graziani. Imposing a Lagrangian particle framework on an Eulerian hydrodynamics infrastructure in FLASH. *ApJ Supplement*, 201:27, aug 2012.
- Chalence Safranek-Shrader, Meghann Agarwal, Christoph Federrath, Anshu Dubey, Miloš Milosavljević, and Volker Bromm. Star formation in the first galaxies – i. collapse delayed by lyman–werner radiation. *Monthly Notices of the Royal Astronomical Society*, 426(2):1159–1177, 2012.
- Christopher Daley, Marcos Vanella, Anshu Dubey, Klaus Weide, and Elias Balaras. Optimization of multi-grid based elliptic solver for large scale simulations in the FLASH code. *Concurrency and Computation: Practice and Experience*, 24(18):2346–2361, 2012.
- R. Latham, C. Daley, W. Liao, K. Gao, R. Ross, A. Dubey, and A. Choudhary. A case study for scientific I/O: Improving the FLASH astrophysics code. *Computational Science and Discovery*, 5(1):015001, 2012.
- A. Dubey, K. Antypas, and C. Daley. Parallel algorithms for moving Lagrangian data on block structured Eulerian meshes. *Parallel Computing*, 37(2):101 – 113, 2011.
- D. Lee, G. Xia, C. Daley, A. Dubey, S. Gopal, C. Graziani, D.Q. Lamb, and K. Weide. Progress in development of HEDP capabilities in FLASH's unsplit staggered mesh MHD solver. *HEDLA 2010: Astrophysics and Space Science Special Issue*, 2010.
- A. Dubey, K. Antypas, M.K. Ganapathy, L.B. Reid, K. Riley, D. Sheeler, A. Siegel, and K. Weide. Extensible component based architecture for FLASH, a massively parallel, multiphysics simulation code. *Parallel Computing*, 35:512–522, 2009.
- Bronis R de Supinski, Sadaf Alam, David H Bailey, Laura Carrington, Chris Daley, Anshu Dubey, Todd Gamblin, Dan Gunter, Paul D Hovland, Heike Jagode, Karen Karavanic, Gabriel Marin, John Mellor-Crummey, Shirley Moore, Boyana Norris, Leonid Oliker, Catherine Olschanowsky, Philip C Roth, Martin Schulz, Sameer Shende, Allan Snavely, Wyatt Spear, Mustafa Tikir, Jeff Vetter, Pat Worley, and Nicholas Wright. Modeling the office of science ten year facilities plan: The PERI architecture tiger team. *Journal of Physics: Conference Series*, 180(1):012039, 2009.
- A. Dubey, R. Fisher, C. Graziani, G. C. Jordan, IV, D. Q. Lamb, L. B. Reid, P. Rich, D. Sheeler, D. Townsley, and K. Weide. Challenges of extreme computing using the FLASH code. In *Numerical Modeling of Space*

*Plasma Flows: ASTRONUM, ASP Conference Series, N.V. Pogorelov, E. Audit, and G.P. Zank, editors, volume 385 of Astronomical Society of the Pacific Conference Series, pages 145–+, April 2008.*

D. M. Townsley, R. A. Bair, A. Dubey, R. T. Fisher, N. C. Hearn, D. Q. Lamb, and K. M. Riley. Large-scale simulations of buoyancy-driven turbulent nuclear burning. *Journal of Physics Conference Series*, 125(1):012009–+, July 2008.

R. Fisher, S. Abarzhi, K. Antypas, S.M. Asida, A.C. Calder, F. Cattaneo, P. Constantin, A. Dubey, I. Foster, J.B. Gallagher, M.K. Ganapathy, C.C. Glendenin, L. Kadanoff, D.Q. Lamb, S. Needham, M. Papka, T. Plewa, L.B. Reid, P. Rich, K. Riley, and D. Sheeler. Terascale turbulence computation on BG/L using the FLASH3 code. *IBM Journal of Research and Development*, 52(1/2):127–137, January/March 2008. Special issue on “Applications of Massively Parallel Systems”.

E.-J. Rijkhorst, T. Plewa, A. Dubey, and G. Mellema. Hybrid characteristics: 3D radiative transfer for parallel adaptive mesh refinement hydrodynamics. *Astronomy and Astrophysics*, 452:907–920, June 2006.

M. Comparato, V. Antonuccio, U. Becciani, A. Dubey, T. Plewa, and D. Sheeler. FLY-FLASH: A software interface for adaptive mesh refinement - treecode simulations. *Memorie della Societa Astronomica Italiana Supplement*, 9:448–+, 2006.

A. Dubey and D. Tessaera. Redistribution strategies in portable parallel FFTs. *Concurrency, Practice and Experience*, 13(3):209–220, 2001.

Y.-N. Young, H. Tufo, A. Dubey, and R. Rosner. On the miscible Rayleigh-Taylor instability: two and three dimensions. *Journal of Fluid Mechanics*, 447:377–408, 1999.

A. Dubey, M. Zubair, and C.E. Grosch. A general purpose subroutine for fast Fourier transform on a distributed memory parallel machine. *Parallel Computing*, 20(12):1697–1710, 1994.

A. Dubey, M. Zubair, and C.E. Grosch. Real Fourier transforms on a massively parallel machine. *Computer Systems, Science and Engineering*, 7(4):243–248, 1992.

A. Dubey, M. Zubair, and C.E. Grosch. Computing the Fourier transform of real data on a hypercube. *Journal of Scientific Computing*, 5(4):293–309, 1990.

## Refereed Conference Publications

Anshu Dubey, Katherine M. Riley, and David E. Bernholdt. Teaching software sustainability for high performance computing at atpesc. In *2020 IEEE/ACM Workshop on Education for High-Performance Computing (EduHPC)*, pages 19–24, 2020.

Anshu Dubey, Saurabh Chawdhary, J.Austin Harris, and Bronson Messer. Simulation planning using component based cost model. In *The 20th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing (PDSEC 2019)*, 2019.

Jared O’Neal, Klaus Weide, and Anshu Dubey. Experience reort: Refactoring the mesh interface in flash, a multiphysics software. In *WSSSPE6.1, colocated with eScience 2018, Amsterdam, Netherlands, 2018*.

Anshu Dubey and Hui Wan. Methodology for building granular testing in multicomponent scientific software. In *SE4Science, held in conjunction with ICSE 2018, Gothenburg, Sweden, 2018*.

Anshu Dubey and Lois McInnes. Proposal for a scientific software lifecycle model. In *2017 International Workshop on Software Engineering for High Performance Computing in Computational and Data-Enabled Science and Engineering held in conjunction with SC17 (Denver, CO, USA, 11/12/2017 - 11/12/2017)*.

A. Dubey, H. Fujita, D.T. Graves, A. Chien, and D. Tiwari. Granularity and the cost of error recovery in resilient amr scientific applications. 2016. SC16.

- A. Dubey and L. McInnes. Idea paper: Software lifecycle for scientific simulation software. 2016. WSSSPE-4.
- A. Dubey and K.M. Riley. Experience paper: Software engineering and community codes track in atpesc. 2016. WSSSPE-4.
- A. Chien, P. Balaji, P. Beckman, N. Dun, A. Fang, H. Fujita, K. Iskra, Z. Rubenstein, Z. Zheng, R. Schreiber, J. Hammond, J. Dinan, I. Laguna, Richards D, A. Dubey, B. van Straalen, M. Hoemmen, M. Heroux, K. Teranishi, and A. Siegel. Versioned distributed arrays for resilience in scientific applications: Global view resilience. ICCS-2015.
- A. Dubey and D. Graves. A design proposal for a next generation scientific software framework. HeteroPar'2015, colocated with EuroPar-2015.
- A. Dubey, H. Fujita, Z.A. Rubenstein, B. Van Straalen, and A. Chien. Resilience through hierarchical state saving and differentiated recovery. 2015. 8th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids.
- H. Fujita, N. Dun, A. Fang, Z.A. Rubenstein, Z. Zheng, K. Iskra, J. Hammond, A. Dubey, P. Balaji, and A. Chien. Using global view resilience (GVR) to add resilience to exascale applications. 2014. Best Poster Finalist, SC14.
- P. Mohapatra, A. Dubey, C. Daley, M. Vanella, and E. Balaras. Parallel algorithms for using lagrangian markers in immersed boundary method with adaptive mesh refinement in FLASH. In *Proceedings of SBAC-PAD*, 2013.
- A. Dubey, K. Antypas, A. Calder, B. Fryxell, D.Q. Lamb, P. Ricker, L. Reid, K. Riley, R. Rosner, A. Siegel, F. Timmes, N. Vladimirova, and Klaus Weide. The software development process of FLASH, a multiphysics simulation code. In *SE-CSE San Francisco, USA*, 2013.
- A. Dubey, P. Mohapatra, and K. Weide. Fault tolerance using lower fidelity data in adaptive mesh applications. In *FTXS'13, New York, NY, USA.*, 2013.
- C. Daley, J. Bachan, S. Couch, A. Dubey, M. Fatenejad, B. Gallagher, D. Lee, and K. Weide. Adding shared memory parallelism to FLASH for many-core architectures. In *TACC-Intel Highly Parallel Computing Symposium*, April 2012. Poster.
- D. Lee, A. Dubey, K. Olson, K. Weide, and K. Antypas. Exploiting the extensibility of the FLASH code architecture for unsplit time integration. In *Numerical Modeling of Space Plasma Flows: ASTRONUM, ASP Conference Series, N.V. Pogorelov, E. Audit, and G.P. Zank, editors*, volume 429 (4), pages 247–252, 2010.
- A. Dubey, R. Fisher, C. Graziani, G. C. Jordan, IV, D. Q. Lamb, L. B. Reid, P. Rich, D. Sheeler, D. Townsley, and K. Weide. Challenges of extreme computing using the FLASH code. In *Numerical Modeling of Space Plasma Flows: ASTRONUM, ASP Conference Series, N.V. Pogorelov, E. Audit, and G.P. Zank, editors*, volume 385 of *Astronomical Society of the Pacific Conference Series*, pages 145–+, April 2008.
- K. Antypas, A.C. Calder, A. Dubey, R. Fisher, M.K. Ganapathy, J.B. Gallagher, L.B. Reid, K. Riley, K. Sheeler, and N. Taylor. Scientific applications on the massively parallel BG/L machine. In *PDPTA*, pages 292–298, 2006.
- K.B. Antypas, A.C. Calder, A. Dubey, J.B. Gallagher, J. Joshi, D.Q. Lamb, T. Linde, E.L. Lusk, O.E.B. Messer, A. Mignone, H. Pan, M. Papka, F. Peng, T. Plewa, K.M. Riley, P.M. Ricker, D. Sheeler, A. Siegel, N. Taylor, J.W. Truran, N. Vladimirova, G. Weirs, D. Yu, and J. Zhang. FLASH: Applications and future. In *Parallel Computational Fluid Dynamics – Theory and Applications*, pages 325+, 2006.
- A. Dubey, F. Cattaneo, and A. Malagoli. PFFT: A portable and efficient framework for parallel FFT's,. In *Proceedings of High Performance Computing*, 2000.
- A. Dubey and T. Clune. Optimization techniques for pseudospectral codes on MPPs. In *Proceedings of Frontiers 99*, 1999.

A. Malagoli, A. Dubey, F. Cattaneo, and D. Levine. A portable and efficient code for astrophysical fluid dynamics. In *Proceedings of Parallel CFD'95*, 1995.

M. Zubair and A. Dubey. A hybrid algorithm for inverting matrices on a massively parallel machine (AMT DAP-510). In *Proceedings of ParCo 93*, Advances in Parallel Computing, 1993.

## Presentations

### Invited Talks

A. Dubey, J. O'Neal, K. Weide, M. Wahib, J. Rudi, and T. Klosterman. Orchestrating data movement and computation for a multiphysics application at scale, 2021. SOS-24, Online, March.

Programming abstractions for orchestration of hpc scientific computing. <https://chapel-lang.org/CHIUIW2019.html>, 2019. Keynote, Chapel User's Group Meeting.

A. Dubey. Improving scientific discovery through better scientific software. <https://mcaim.math.lsa.umich.edu/events/siam-spring-meeting-2019/>, 2019. Invited talk, SIAM Great Lakes Annual Meeting.

A. Dubey. Dynamic resource management, an application perspective. <https://project.inria.fr/resourcearbitration/program/>, 2019. Invited talk, RADR, co-located with IPDPS.

A. Dubey. An application perspective on programming models for future. <https://sc18.supercomputing.org/presentation/?id=pec175&sess=sess144>, 2018. Keynote, PAW-ATM, co-located with SC18.

The FLASH code and two decades of science, 2018. Keynote at International Symposium on Computational Science at Scale, Erlangen, Germany.

Data centric programming abstractions suitable from a multiphysics application perspective. Focus Session Data Centric Computing (06/2018), ISC 2018, Frankfurt, Germany.

An application perspective on programming models. SOS22, Waikola, Hawaii, March 2018.

Adaptive mesh refinement, and its use in different domains. keynote at BASARIM (09/14/2017 - 09/15/2017).

Improving scientific software productivity and sustainability - the ideas approach. 10th anniversary workshop virtual institute high productivity supercomputing (06/23/2017 - 07/23/2017).

Application structure aware resiliency and cost model for differentiated recovery, 2015. (Salishan HPC Conference).

Stencils in scientific computations, 2014. (Second Workshop on Optimizing Stencil Computations, co-located with SPLASH-2014).

The FLASH code development plans and future directions, 2012. (FLASH Workshop Hamburg).

Challenges of computing with FLASH on largest HPC platforms, 2010. (ICNAAM 2010, Rhodes, Greece.).

Challenges of computing with FLASH, a highly capable multiphysics multiscale AMR code, on leadership class machines, 2010. (SciComp, San Francisco CA).

Blowing up stars and colliding galaxies: A showcase of FLASH simulations on largest open science supercomputers, December, 2009. (International Intradisciplinary Conference on the Frontiers of Astronomy, Kodagu, India).

Experiences with parallel IO in FLASH, 2008. (SciComp, Poughkeepsie NY).

## **Seminars**

A. Dubey. Using supercomputers to understand our world, 2021. Undergraduate Seminar, Morgan State University.

A. Dubey. Scientific discovery using supercomputers, 2021. ACMW University of Minnesota Chapter.

A. Dubey. Software design for longevity with performance portability, 2020. IDEAS Webinar, December.

A. Dubey. Adaptive mesh refinement, and its use in different scientific domains, 2019. University of Notre-Dame, SIAM Student Chapter.

A. Dubey. Software productivity in high performance scientific computing, 2019. Colloquium, Department of Computational Mathematics, Science and Engineering, Michigan State University.

A. Dubey. Software productivity in high performance scientific computing, 2018. Departmental Seminar, Department of Mechanical Engineering, UC Santa Barbara.

The FLASH code and two decades of science. LANS Seminar, April 2018.

A. Dubey. Software practices in computational science communities – an overview, October 2016. Webinar hosted by Computational Infrastructure for Geodynamics.

What all codes should do: Overview of best practices in HPC software development, 2016. Webinar Series on Best Practices in HPC Software Development.

FLASH code lifecycle in the context of evolving software engineering and platform architecture, 2015. NCSA Colloquium.

Code architecture and version transitions: Experience from FLASH, 2014. LANL.

Computing at scale: Past, present and future, 2013. NERSC Brown Bag.

Software engineering and process for scientific computing : The FLASH example, 2013. AFRD Seminar.

Architecting codes for future platforms, 2012. Argonne National Laboratory.

The FLASH code architectures and abstractions, 2011. (Stonybrook University).

Flash co-design methodology, 2011. Nvidia, San Jose.

Architecting FLASH, a complex multiphysics application code that scales from laptops to the largest supercomputers, April, 2009. Argonne National Laboratory.

FLASH, a modern, well tested, multiphysics application code that scales from laptops to the largest supercomputers, May, 2009. LLNL.

Challenges of extreme computing using the FLASH code, July, 2007. Computation Institute Lunch Presentation.

Software engineering of a scientific code, 2005. Light Group, Department of Chemistry, University of Chicago.

## **Conference Presentations**

A. Dubey, J. O'Neal, A. Harris, and B. Messer. Amr in core collapse supernova simulations, 2020. SIAM Conference on Parallel Processing for Supercomputing, Seattle, WA.

A. Dubey. Recorded interview, 2020. Collegetown Software Sustainability Workshop.

A. Dubey. What is sustainability from a large multiphysics software perspective, 2019. Collegetown Software Sustainability Workshop.

FLASH software design for longevity, 2019. MS:Basic Libraries for Advanced Simulations: BLAS Redux Extreme Scale Computationa, PASC-2019.



A. Dubey. The dividends of investing in computational software design, 2019. MS: Design and Usability of High-Performance PDE Software Engines and Frameworks, SIAM-CSE 2019.

A. Dubey. The impact of investing in extensible design of scientific software, 2019. Software Engineering Assembly Conference, Boulder, CO.

Software process for FLASH, a code serving multiple scientific communities. PASC 18, Basel, Switzerland, July 2018.

The art of applying refinement, cost-benefit trade-off. 13th Scheduling for Large Scale Systems Workshop, Berkeley, July 2018.

Role of framework development in multiphysics high performance computing software, 2018. SIAM-PP.

Anshu Dubey. Unique challenges of multiphysics high performance computing for DOE labs, 2017. AWM Symposium (Los Angeles, 04/08/2017 - 09/09/2017).

Anshu Dubey. Different flavors of adaptive mesh refinement use in flash by different domains. USNCCM (07/17/2017 - 07/20/2017).

Anshu Dubey. Experiences with amr co-design from the perspective of an application using amr. SIAM Annual Meeting (Pittsburgh, Pennsylvania, USA, 07/10/2017 - 07/14/2017).

A. Dubey. Resiliency in AMR using rollback and recovery, 2016. SIAM-PP, Paris.

A. Dubey and S. Habib. Data intensive and high performance computing; an HEP view, 2016. BDEC Workshop, Frankfurt.

A. Dubey, H. Fujita, Z.A. Rubenstein, B. Van Straalen, and A. Chien. Hierarchical resilience for structured AMR, 2015. SIAM-CSE, Salt Lake City.

A. Dubey and D. Graves. Exploration of finer computation granularity through micro-blocking in AMR, 2014. PADAL Workshop.

A. Dubey, E. Balaras, and M. Vanella. Incompressible navier-stokes and other new capabilities in FLASH-4, 2011. Turbulent Mixing and Beyond, Trieste, Italy.

What the paradigm shift means for large mature codes like FLASH, April, 2009. Path to Petascale: Adapting GEO/CHEM/ASTRO Applications for Accelerators and Accelerator Clusters, NCSA.