

Anirban Mandal, Ph.D.

Director, Network Research & Infrastructure Group (NRIG), RENCI • Associate Director, CI Compass

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PROFILE

Computer systems researcher working at the intersection of distributed systems and scientific computing. I lead federally funded, multi-institutional research on AI-enabled scientific workflows, edge-to-cloud computing, network testbeds, performance and anomaly analysis, and cyberinfrastructure (CI) for NSF Major Facilities. My work has been supported by NSF and DOE awards with combined budgets of more than \$40M, and has produced more than 100 publications, including four best paper awards.

107 publications • **15** NSF and DOE research grants • **7** honors and awards

Research interests: Distributed systems, Cloud & edge computing, Networking & testbeds, Scientific workflows, Resource provisioning & scheduling, Performance analysis, ML for anomaly detection, Cyberinfrastructure, Quantum networking.

PROFESSIONAL EXPERIENCE

Director, Network Research and Infrastructure Group (NRIG)

2024–present

Renaissance Computing Institute (RENCI), UNC Chapel Hill *Interim Director from January 2024.*

- Lead a team of PhD researchers, software developers, and CI experts carrying out federally funded R&D in networking, distributed systems, scientific computing, cybertraining, and computer systems.
- PI or co-PI on multiple multi-institutional NSF and DOE projects; develop research agendas and coordinate work across partner universities and national laboratories.
- Build new research directions and partnerships with federal agencies, NSF Major and Mid-scale Facilities, national labs, and industry.

Associate Director, CI Compass

2021–present

NSF Cyberinfrastructure Center of Excellence

- Co-lead planning, community engagement, and operations of the Center, which supports CI practitioners across NSF Major and Mid-scale Facilities.
- Liaison to the NSF Large Facilities Office; organize the NSF CI for Major Facilities workshops and CI Compass virtual workshops.

Assistant Director, Network Research and Infrastructure Group

2019–2024

RENCI, UNC Chapel Hill

Senior Research Scientist, HPC and Network Research and Infrastructure

2006–2019

RENCI, UNC Chapel Hill

- Led and executed federally funded research on cloud computing, scientific workflows, performance analysis, anomaly detection, machine learning, networked testbeds (ExoGENI), and CI for scientific applications.

Graduate Research Assistant

2001–2006

Rice University (advisor: Ken Kennedy)

- Developed heuristic workflow scheduling using performance models, batch-queue-aware scheduling, and scalable application scheduling for Grid systems (GrADS and VGrADS projects).

Graduate Research Intern

Summer 2003

USC Information Sciences Institute (supervisors: Carl Kesselman and Ewa Deelman)

- Extended the Pegasus Workflow Management System with new scheduling algorithms and dynamic task-based scheduling.

EDUCATION

Ph.D., Computer Science , Rice University, Houston, TX	2006
Thesis: <i>Toward a Tool for Scheduling Application Workflows onto Distributed Grid Systems</i> · Advisor: Ken Kennedy	
M.S., Computer Science , Rice University, Houston, TX	2002
Thesis: <i>Mapping HPF onto the Grid</i> · Advisor: Ken Kennedy	
B.Tech., Computer Science and Engineering , Indian Institute of Technology Bombay, Mumbai, India	2000
Thesis: <i>Design and Implementation of a Java JIT Compiler</i> · Advisor: D. M. Dhamdhare	

HONORS AND AWARDS

Best Paper Award , IEEE/ACM Innovating the Network for Data-Intensive Science (INDIS) Workshop at SC'23	2023
“Elephants Sharing the Highway: Studying TCP Fairness in Large Transfers over High Throughput Links”	
Best Paper Runner-Up , CNERT Workshop at IEEE INFOCOM 2023	2023
“Experiments on Network Services for Video Transmission using FABRIC Instrument Resources”	
Best Paper Award , ACM/IEEE International Workshop on Cloud-to-Things Continuum (Cloud2Things 2022)	2022
“Automating Edge-to-cloud Workflows for Science: Traversing the Edge-to-cloud Continuum with Pegasus”	
Best Paper Award , Elsevier Future Generation Computer Systems (FGCS) Journal	2021
“End-to-end online performance data capture and analysis for scientific workflows”	
Editor's Choice Paper , Elsevier Future Generation Computer Systems (FGCS)	2021
“End-to-end online performance data capture and analysis for scientific workflows”	
SCinet Technology Challenge Awards: Most Original Technical Approach & Most Diverse Resource Set , SC'19 Conference	2019
“Dynamic Network-Centric Multi-Cloud Platform (DyNamo) for Real-Time Weather Forecasting Workflows”	
Phil Andrews Most Transformative Contribution Award & Best Paper Award , Practice and Experience in Advanced Research Computing (PEARC '19)	2019
“Integrity Protection for Scientific Workflow Data: Motivation and Initial Experiences”	

RESEARCH FUNDING

Amounts are total award budgets across all collaborating institutions.

CO-PI CSSI: Frameworks: Applying Artificial Intelligence Advances to the Next Generation of Workflow Management on Modern Cyberinfrastructure	Jun 2025 – May 2030
NSF Office of Advanced Cyberinfrastructure (OAC) · Award 2513101 · \$5,000,000 total Partners: USC/ISI (Lead), RENCi, University of Tennessee at Knoxville, University of Massachusetts at Amherst	
PI (UNC) Collaborative Research: Cross-Cutting Improvements: Open Science Roadmap for Research Infrastructures	Oct 2025 – Sep 2028
NSF Office of Advanced Cyberinfrastructure (OAC) · Award 2531701 · \$600,000 total Partners: University of Notre Dame (Lead), USC/ISI, RENCi, Indiana University	
PI REU Site: Exploring the FABRIC Research Instrument to Catalyze Multi-disciplinary Research in Networks, Distributed Systems, and Emerging CyberInfrastructure (CI) Applications	Aug 2025 – Jul 2028
NSF Division of Computer and Network Systems (CNS) · Award 2447441 · \$369,421 total Partners: RENCi	

PI CyberTraining: Implementation: Medium: Cyberinfrastructure Training and Education for Leveraging Advanced Electron Microscopy in Materials Science NSF Office of Advanced Cyberinfrastructure (OAC) · Award 2519465 · \$1,000,000 total Partners: RENCi (Lead), USC/ISI, University of Maryland at College Park	Jul 2025 – Jun 2028
PI CyberTraining: Implementation: Medium: Cyberinfrastructure Training and Education for Synchrotron X-Ray Science (X-CITE) NSF Office of Advanced Cyberinfrastructure (OAC) · Award 2320373 · \$1,000,000 total Partners: RENCi (Lead), USC/ISI, Cornell University	Sep 2023 – Aug 2026
CO-PI Exploring the Power of Distributed Intelligence for Resilient Scientific Workflows DOE Advanced Scientific Computing Research (ASCR) · \$8,750,000 total Partners: USC/ISI (Lead), RENCi, Lawrence Berkeley National Lab, Argonne National Lab, Oak Ridge National Lab	Jul 2023 – Jun 2028
CO-PI PosEiDon: Platform for Explainable Distributed Infrastructure DOE Advanced Scientific Computing Research (ASCR) · \$3,750,000 total Partners: USC/ISI (Lead), RENCi, Lawrence Berkeley National Lab, Argonne National Lab	Sep 2021 – Aug 2024
CO-PI CI CoE: CI Compass: An NSF Cyberinfrastructure (CI) Center of Excellence for Navigating the Major Facilities Data Lifecycle NSF Office of Advanced Cyberinfrastructure (OAC) · Award 2127548 · \$8,000,000 total Partners: USC/ISI (Lead), RENCi, University of Notre Dame, University of Utah, Indiana University, Texas Tech University	Jul 2021 – Jun 2026
CO-PI CC* Integration-Large: An 'On-the-fly' Deeply Programmable End-to-end Network-Centric Platform for Edge-to-Core Workflows NSF Office of Advanced Cyberinfrastructure (OAC) · Award 2018074 · \$750,000 total Partners: University of Massachusetts at Amherst (Lead), RENCi, USC/ISI, University of Missouri	Oct 2020 – Sep 2022
CO-PI Pilot Study for a Cyberinfrastructure Center of Excellence NSF Office of Advanced Cyberinfrastructure (OAC) and Biological Sciences (BIO) · Award 1842042 · \$3,884,346 total Partners: USC/ISI (Lead), RENCi, University of Notre Dame, University of Utah, Indiana University	Oct 2018 – Sep 2021
PI CICI: SSC: Integrity Introspection for Scientific Workflows (IRIS) NSF Office of Advanced Cyberinfrastructure (OAC) · Award 1839900 · \$999,575 total Partners: RENCi (Lead), USC/ISI, Indiana University	Sep 2018 – Aug 2022
PI CC* Integration: Delivering a Dynamic Network-centric Platform for Data-driven Science (DyNamo) NSF Office of Advanced Cyberinfrastructure (OAC) · Award 1826997 · \$1,000,000 total Partners: RENCi (Lead), USC/ISI, University of Massachusetts at Amherst, Rutgers University	Aug 2018 – Jul 2021
CO-PI Panorama 360: Performance data capture and analysis for end-to-end scientific workflows DOE Advanced Scientific Computing Research (ASCR) · Award DE-SC0012636M · \$3,000,000 total Partners: USC/ISI (Lead), RENCi, Lawrence Berkeley National Lab, Oak Ridge National Lab	Sep 2017 – Aug 2021
Predictive Modeling and Diagnostic Monitoring of Extreme Science Workflows DOE Advanced Scientific Computing Research (ASCR) · Award DE-SC0012636 · \$3,000,000 total Partners: USC/ISI (Lead), RENCi, Lawrence Berkeley National Lab, Oak Ridge National Lab, RPI	Sep 2014 – Aug 2017
Collaborative Research: SDCI Net New: The Missing Link: Connecting Eucalyptus Clouds with Multi-Layer Networks NSF Office of Advanced Cyberinfrastructure (OAC) · Award 1032873, 1032573, 1032765 · \$808,000 total Partners: Duke University, RENCi, University of Massachusetts at Amherst	Sep 2010 – Aug 2014

PUBLICATIONS

Reverse chronological within each category. Names in bold are mine.

Journal Articles (15)

- J15** R. Mayani, K. Vahi, M. Rynge, K. Thareja, X. Casas-Moreno, H. Jin, **A. Mandal**, F. Lordan, K. Raghavan, R. M. Badia, and E. Deelman. "Kiso: A Foundation for Complex, Agentic, and Reproducible Experiments." *Frontier Complex Systems*, 4:1800335. doi: 10.3389/fcpxs.2026.1800335, July 2026.
- J14** Suman Raj, Radhika Mittal, Rajiv Mayani, Pawel Zuk, **Anirban Mandal**, Michael Zink, Yogesh Simmhan, and Ewa Deelman. "AeroResQ: Edge-accelerated UAV framework for scalable, resilient and collaborative escape route planning in wildfire scenarios." *Future Generation Computer Systems*, Volume 183, 2026, 108579, ISSN 0167-739X, <https://doi.org/10.1016/j.future.2026.108579>, May 2026.
- J13** Casas-Moreno X, Thareja K, de Juan Vela P, Mayani R, Fanals-i-Batllori J, **Mandal A**, Deelman E, Badia RM, and Lordan F. "Decentralized Coordination of Autonomous Agents in the Compute Continuum Using Consensus." *Frontier Complex Systems*, 4:1800101. doi: 10.3389/fcpxs.2026.1800101, April 2026.
- J12** K. Thareja, **A. Mandal**, J. Race, P. Ruth, C. Romsos, and E. Deelman. "Ship-to-Shore Network Monitoring: The Research Vessel Sikuliaq Experience." *IEEE Internet Computing*, vol. 29, no. 4, pp. 77-84, doi: 10.1109/MIC.2025.3615849 Aug 2025.
- J11** P. Balaprakash, K. Raghavan, F. Cappello, E. Deelman, **A. Mandal**, H. Jin, I. Mahmud, K. Thareja, S. Wu, P. Zuk, M. Kiran, Z. Chen, S. Di, and K. Wu. "SWARM: Reimagining Scientific Workflow Management Systems in a Distributed World." *International Journal of High Performance Computing Applications (IJHPCA)*, 2025;39(5):692-712. doi:10.1177/10943420251339317, May 2025.
- J10** K. Raghavan, G. Papadimitriou, H. Jin, **A. Mandal**, M. Kiran, P. Balaprakash, and E. Deelman. "Advancing Anomaly Detection in Computational Workflows with Active Learning." *Future Generation Computer Systems Journal*, Volume 166, May 2025.
- J9** A. Morel, C. Qu, P. Calyam, C. Wang, K. Thareja, **A. Mandal**, E. Lyons, M. Zink, G. Papadimitriou, and E. Deelman. "FlyNet: Drones on the Horizon." *IEEE Internet Computing*, vol. 27, no. 3, pp. 35-43, doi: 10.1109/MIC.2023.3260440, May-June 2023.
- J8** H. Jin, K. Raghavan, G. Papadimitriou, C. Wang, **A. Mandal**, M. Kiran, E. Deelman, and P. Balaprakash. "Graph Neural Networks for Detecting Anomalies in Scientific Workflows." *The International Journal of High Performance Computing Applications*, 2023;0(0). doi:10.1177/10943420231172140, May 2023.
- J7** G. Papadimitriou, E. Lyons, C. Wang, K. Thareja, R. Tanaka, P. Ruth, I. Rodero, E. Deelman, M. Zink, and **A. Mandal**. "Fair Sharing of Network Resources Among Workflow Ensembles." *Cluster Computing (2021) Journal*, Springer. <https://doi.org/10.1007/s10586-021-03457-3>, November 2021.
- J6** G. Papadimitriou, C. Wang, K. Vahi, R. Silva, **A. Mandal**, Z. Liu, R. Mayani, M. Rynge, M. Kiran, V. Lynch, R. Kettimuthu, E. Deelman, J. Vetter, and I. Foster. "End-to-end online performance data capture and analysis for scientific workflows." *Future Generation Computer Systems (FGCS) journal*, Volume 117, Pages 387-400, April 2021.
- ★ Best Paper Award, Elsevier FGCS 2021
- J5** M. Kiran, C. Wang, G. Papadimitriou, **A. Mandal**, and E. Deelman. "Detecting Anomalous Packets in Network Transfers: Investigations using PCA, Autoencoder and Isolation Forest in TCP." *Machine Learning*, vol 109, pages 1127-1143, 2020, <https://doi.org/10.1007/s10994-020-05870-y>, 2020.
- J4** E. Deelman, **A. Mandal**, M. Jiang, and R. Sakellariou. "The Role of Machine Learning in Scientific Workflows." *The International Journal of High Performance Computing Applications*, Volume: 33 issue: 6, page(s): 1128-1139, 2019, doi: <https://doi.org/10.1177/1094342019852127>.
- J3** E. Deelman, C. Carothers, **A. Mandal**, B. Tierney, J. S. Vetter, I. Baldin, C. Castillo, G. Juve, D. Krol, V. Lynch, B. Mayer, J. Meredith, T. Proffen, P. Ruth, and R. Ferreira da Silva. "PANORAMA: An Approach to Performance Modeling and Diagnosis of Extreme Scale Workflows." *International Journal of High Performance Computing Applications*, vol. 31, iss. 1, p. 4-18, 2017.
- J2** **A. Mandal**, I. Baldin, Y. Xin, P. Ruth and C. Heermann. "Enabling Persistent Queries for Cross-aggregate Performance Monitoring." *IEEE Communications Magazine*, vol 52(5), pp. 157-164, IEEE, May 2014.

- J1** F. Berman, H. Casanova, A. Chien, K. Cooper, H. Dail, A. Dasgupta, W. Deng, J. Dongarra, L. Johnsson, K. Kennedy, C. Koelbel, B. Liu, X. Liu, **A. Mandal**, G. Marin, M. Mazina, J. Mellor-Crummey, C. Mendes, A. Olugbile, M. Patel, D. Reed, Z. Shi, O. Sievert, H. Xia and A. YarKhan. "New Grid Scheduling and Rescheduling Methods in the GrADS Project." *International Journal of Parallel Programming (IJPP)*, Volume 33(2-3):pp. 209-229, 2005.

Conference Papers (39)

- C39** K. Thareja, K. Raghavan, H. Safri, **A. Mandal**, and E. Deelman. "SWARM+: Scalable and Resilient Multi-Agent Consensus for Decentralized Data-Aware Workload Management." *22nd IEEE International Conference on eScience (eScience)*, Naples, Italy, September 2026. **to appear**
- C38** K. Thareja, P. Ruth, B. Aldikacti, **A. Mandal**, and M. Zink. "AI-Assisted Computational Reproducibility on the FABRIC Testbed." *22nd IEEE International Conference on eScience (eScience)*, Naples, Italy, September 2026. **to appear**
- C37** I. Mahmud, K. Wu, A. Sim, **A. Mandal**, and E. Deelman. "Validating TCP Behavior in DISTRI: A Comparison of Simulated and Real-World Network Performance for Distributed Computing." *2026 International Conference on Computing, Networking and Communications (ICNC)*, Feb 2026.
- C36** I. Mahmud, K. Wu, A. Sim, **A. Mandal**, and E. Deelman. "BBRv3 Startup Behavior: Analysis and Fairness Enhancements." *2026 International Conference on Computing, Networking and Communications (ICNC)*, 716-722. 10.1109/ICNC68183.2026.11416923. Feb 2026.
- C35** K. Thareja, K. Raghavan, **A. Mandal**, P. Zuk, I. Mahmud, M. Kiran, and E. Deelman. "A Greedy Consensus-based Approach to Distributed Job Selection: Toward Fully-decentralized Workload Management System." *2025 25th IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGrid'25)*, Tromso, Norway, May 2025.
- C34** H. Jin, G. Papadimitriou, K. Raghavan, P. Zuk, P. Balaprakash, C. Wang, **A. Mandal**, and E. Deelman. "Large Language Models for Anomaly Detection in Computational Workflows: from Supervised Fine-Tuning to In-Context Learning." *2024 IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis (SC'24)*, Atlanta, GA, November 2024.
- C33** A. Grote, E. Lyons, K. Thareja, G. Papadimitriou, E. Deelman, **A. Mandal**, P. Calyam, and M. Zink. "FlyPaw: Optimized Route Planning for Scientific UAV Missions." *19th IEEE International Conference on eScience (eScience)*, doi: 10.1109/eScience58273.2023.10254831, Limassol, Cyprus, Oct 2023.
- C32** A. E. Morel, P. Calyam, C. Qu, D. Gafurov, C. Wang, K. Thareja, **A. Mandal**, E. Lyons, M. Zink, G. Papadimitriou, and E. Deelman. "Network Services Management using Programmable Data Planes for Visual Cloud Computing." *Proceedings of the 2023 International Conference on Computing, Networking and Communications (ICNC): Next Generation Networks and Internet Applications (ICNC '23)*, Honolulu, HI, USA, doi:10.1109/ICNC57223.2023.10074183, February 2023.
- C31** Y. Xin, Shih-Wen Fu, **A. Mandal**, R. Tanaka, M. Rynge, K. Vahi, and E. Deelman. "Data Integrity Error Localization in Networked Systems with Missing Data." *2022 IEEE International Conference on Communications (ICC '22)*, Seoul, South Korea, May 2022.
- C30** E. Lyons, S. Wang, K. Thareja, C. Qu, G. Papadimitriou, R. Tanaka, H. Saplakoglu, P. Calyam, E. Deelman, **A. Mandal**, and M. Zink. "FlyNet: A Platform to Support Scientific Workflows from the Edge to the Core for UAV Applications." *2021 IEEE/ACM 14th International Conference on Utility and Cloud Computing (UCC 2021)*, Leicester, UK, December 2021.
- C29** Y. Xin, Shih-Wen Fu, **A. Mandal**, I. Baldin, R. Tanaka, M. Rynge, K. Vahi, E. Deelman, I. Abhinit and V. Welch. "Root Cause Analysis of Data Integrity Errors in Networked Systems with Incomplete Information." *12th International Conference on Information and Communication Technology Convergence (ICTC 2021)*, Jeju Island, South Korea, October 2021.
- C28** B. Xie, Q. Cao, M. Kunjir, L. Wan, J. Chase, **A. Mandal**, and M. Rynge. "WIRE: Resource-efficient Scaling with Online Prediction for DAG-based Workflows." *IEEE Cluster 2021 Conference (CLUSTER 2021)*, Virtual, pp. 35-46, doi: 10.1109/Cluster48925.2021.00025. September 2021.
- C27** P. Krawczuk, G. Papadimitriou, S. Nagarkar, M. Kiran, **A. Mandal**, and E. Deelman. "Anomaly Detection in Scientific Workflows using End-to-End Execution Gantt Charts and Convolutional Neural Networks." *ACM Practice and Experience in Advanced Research Computing (PEARC 2021) Conference*, doi: <https://doi.org/10.1145/3437359.3465597>, Virtual, July 2021.

- C26** H. Tu, G. Papadimitriou, M. Kiran, C. Wang, **A. Mandal**, E. Deelman, and T. Menzies. "Mining Workflows for Anomalous Data Transfers." *The 2021 Mining Software Repositories Conference*, May 2021.
- C25** E. Lyons, D. Westbrook, A. Grote, G. Papadimitriou, K. Thareja, C. Wang, M. Zink, E. Deelman, **A. Mandal**, and P. Ruth. "An On-Demand Weather Avoidance System for Small Aircraft Flight Path Routing." *Darema F., Blasch E., Ravela S., Aved A. (eds) Dynamic Data Driven Applications Systems. DDDAS 2020. Lecture Notes in Computer Science*, vol 12312. Springer, Cham. https://doi.org/10.1007/978-3-030-61725-7_36 Oct 2020.
- C24** C. Wang, G. Papadimitriou, M. Kiran, **A. Mandal**, and E. Deelman. "Identifying Execution Anomalies for Data Intensive Workflows Using Lightweight ML Techniques." *2020 IEEE High Performance Extreme Computing Conference (HPEC 2020)*, doi: 10.1109/HPEC43674.2020.9286139, Sep 2020.
- C23** L. Christopherson, **A. Mandal**, E. Scott and I. Baldin. "Toward a Data Lifecycle Model for NSF Large Facilities." *Practice and Experience in Advanced Research Computing (PEARC 2020) Conference, Portland, OR*, doi: <https://dl.acm.org/doi/abs/10.1145/3311790.3396636> July 2020.
- C22** E. Lyons, M. Zink, **A. Mandal**, C. Wang, P. Ruth, C. Radhakrishnan, G. Papadimitriou, E. Deelman, K. Thareja, and I. Rodero. "DyNamo: Scalable Weather Workflow Processing in the Academic MultiCloud." *100th American Meteorological Society (AMS) Annual Meeting*, Jan 2020.
- C21** E. Deelman, **A. Mandal**, V. Pascucci, S. Sons, J. Wyngaard, C. F. Vardeman II, S. Petruzza, I. Baldin, L. Christopherson, R. Mitchell, L. Pottier, M. Rynge, E. Scott, K. Vahi, M. Kogank, J. A. Mann, T. Gulbrandsen, D. Allen, D. Barlow, S. Bonarrigo, C. Clark, L. Goldman, T. Goulden, P. Harvey, D. Hulsander, S. Jacob, C. Laney, I. Lobo-Padilla, J. Sampson, J. Staarmann, and S. Stone. "Cyberinfrastructure Center of Excellence Pilot: Connecting Large Facilities Cyberinfrastructure." *15th International Conference on eScience (eScience)*, San Diego, CA, Sep 2019.
- C20** E. Lyons, G. Papadimitriou, C. Wang, K. Thareja, P. Ruth, J. J. Villalobos, I. Rodero, E. Deelman, M. Zink, and **A. Mandal**. "Toward a Dynamic Network-centric Distributed Cloud Platform for Scientific Workflows: A Case Study for Adaptive Weather Sensing." *15th International Conference on eScience (eScience)*, p. 67–76, San Diego, CA, Sep 2019.
- C19** K. Vahi, M. Rynge, G. Papadimitriou, D. Brown, R. Mayani, R. Ferreira da Silva, E. Deelman, **A. Mandal**, E. Lyons, and M. Zink. "Custom Execution Environments with Containers in Pegasus-enabled Scientific Workflows." *15th International Conference on eScience (eScience)*, 2019, p. 281–290, San Diego, CA, Sep 2019.
- C18** M. Rynge, K. Vahi, E. Deelman, **A. Mandal**, I. Baldin, O. Bhide, R. Heiland, V. Welch, R. Hill, W. L. Poehlman, and A. F. Feltus. "Integrity Protection for Scientific Workflow Data: Motivation and Initial Experiences." *Proceedings of the Practice and Experience in Advanced Research Computing (PEARC) on Rise of the Machines (Learning)*, New York, NY, USA, 2019, p. 17:1–17:8, Jul 2019. ★ Best Paper & Phil Andrews Most Transformative Contribution Award, PEARC '19
- C17** P. Gaikwad, **A. Mandal**, P. Ruth, G. Juve, D. Krol, and E. Deelman. "Anomaly Detection for Scientific Workflow Applications on Networked Clouds." *IEEE 2016 International Conference on High Performance Computing & Simulation (HPCS 2016)*, Jul 2016.
- C16** Y. Xin, I. Baldin, **A. Mandal**, P. Ruth, and J. Chase. "Towards and Experimental Legoland: Slice Modification and Recovery in ExoGENI Testbed." *Proceedings of 11th EAI International Conference on Testbeds and Research Infrastructures for the Development of Networks & Communities (TridentCom'16)*, Hangzhou, China, June 2016.
- C15** **A. Mandal**, P. Ruth, I. Baldin, Y. Xin, C. Castillo, F. Jiang, C. Schmitt, G. Juve, M. Rynge, E. Deelman, and J. Chase. "Adapting Scientific Workflows on Networked Clouds Using Proactive Introspection." *2015 IEEE/ACM 8th International Conference on Utility and Cloud Computing (UCC)*, Limassol, 2015, pp. 162-173, Dec 2015.
- C14** P. Ruth, **A. Mandal**. "Domain Science Applications on GENI: Presentation and Demo." *ICNP, 2014 IEEE 22nd International Conference on Network Protocols (ICNP)*, pp. 540-543, doi:10.1109/ICNP.2014.86, Oct 2014.
- C13** P. Ruth, **A. Mandal**, Y. Xin, I. Baldine, C. Heermann and J. Chase. "Dynamic Network Provisioning for Data Intensive Applications in the Cloud." *IEEE e-Science 2012, Chicago, IL*, Oct 2012.
- C12** I. Baldine, Y. Xin, **A. Mandal**, P. Ruth, A. Yumerefendi and J. Chase. "ExoGENI: A Multi-Domain Infrastructure-as-a-Service Testbed." *Proceedings of the 8th International ICST Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities (TRIDENTCOM 2012)*, Thessaloniki, Greece, June 2012.

- C11** **A. Mandal**, Y. Xin, I. Baldine, P. Ruth, C. Heermann, J. Chase, V. Orlikowski and A. Yumerefendi. "Provisioning and Evaluating Multi-domain Networked Clouds for Hadoop-based Applications." *Proceedings of the 3rd International Conference on Cloud Computing Technologies and Science (IEEE Cloudcom '11)*, Athens, Greece, December 2011.
- C10** Y. Xin, I. Baldine, **A. Mandal**, C. Heermann, J. Chase and A. Yumerefendi. "Embedding Virtual Topologies in Networked Clouds." *Proceedings of the 6th ACM International Conference on Future Internet Technologies 2011 (CFI 2011)*, Seoul, Korea, June 2011.
- C9** **A. Mandal**, R. Fowler and A. Porterfield. "Modeling Memory Concurrency for Multi-Socket Multi-Core Systems." *Proceedings of 2010 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS 2010)*, White Plains, NY, March 2010.
- C8** L. Ramakrishnan, D. Nurmi, **A. Mandal**, C. Koelbel, D. Gannon, T. M. Huang, Y. S. Kee, G. Obertelli, K. Thyagaraja, R. Wolski, A. Yarkhan, D. Zagorodnov. "VGrADS: Enabling e-Science Workflows on Grids and Clouds with Fault Tolerance." *Proceedings of the IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC) '09*, Portland, OR, Nov 2009.
- C7** R. Zhang, **A. Mandal**, C. Koelbel and K. Cooper. "Combined Fault Tolerance and Scheduling Techniques for Workflow Applications on Computational Grids." *Proceedings of the IEEE International Symposium on Cluster Computing and the Grid (CCGrid)*, May 2009.
- C6** G. Kandaswamy, **A. Mandal**, and D. A. Reed. "Fault Tolerance and Recovery of Scientific Workflows on Computational Grids." *Proceedings of the IEEE International Symposium on Cluster Computing and the Grid (CCGrid)*, pp. 777-782, Lyon, France, May 2008.
- C5** D. Nurmi, **A. Mandal**, J. Brevik, K. C. Koelbel, R. Wolski and K. Kennedy. "Evaluation of a Workflow Scheduler Using Integrated Performance Modeling and Batch Queue Wait Time Prediction." *Proceedings of the IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC)*, pp. 29-, Tampa, FL, November 2006.
- C4** R. Zhang, **A. Mandal**, H. Casanova, A. Chien, Y. Kee, K. Kennedy and C. Koelbel. "Scalable Grid Application Scheduling with Virtual Grids via Decoupled Resource Selection and Scheduling." *Proceedings of the IEEE International Symposium on Cluster Computing and the Grid (CCGrid)*, Vol 1, pp. 568-575, Singapore, May 2006.
- C3** **A. Mandal**, K. Kennedy, C. Koelbel, G. Marin, J. Mellor-Crummey, B. Liu and L. Johnsson. "Scheduling Strategies for Mapping Application Workflows onto the Grid." *Proceedings of the IEEE International Symposium on High Performance Distributed Computing (HPDC)*, pp. 125-134, Raleigh, NC, July 2005.
- C2** J. Blythe, S. Jain, E. Deelman, Y. Gil, K. Vahi, **A. Mandal** and K. Kennedy. "Task Scheduling Strategies for Workflow-based Applications in Grids." *Proceedings of the IEEE International Symposium on Cluster Computing and the Grid (CCGrid)*, Vol 2, pp. 759-767, Cardiff, UK, May 2005.
- C1** **A. Mandal**, A. Dasgupta, K. Kennedy, M. Mazina, C. Koelbel, G. Marin, K. Cooper, J. Mellor-Crummey, B. Liu and L. Johnsson. "Scheduling Workflow Applications in GrADS." *Proceedings of the IEEE International Symposium on Cluster Computing and the Grid (CCGrid)*, pp. 790-797, Chicago, IL, April 2004.

Workshop Papers (29)

- W29** K. Thareja, H. Safri, R. Mayani, **A. Mandal**, and E. Deelman. "Complexity and Scale in AI-Assisted Workflow Management: A Federated Learning Case Study." *SC'26-W Proceedings of the 21st Workshop on Workflows in Support of Large-Scale Science (WORKS '26)*, Chicago, IL, November 2026. to appear
- W28** X. Casas Moreno, K. Thareja, **A. Mandal**, E. Deelman, R. Badia, and F. Lordan. "Decentralized Scheduling of Scientific Workflows." *SC'26-W Proceedings of the 21st Workshop on Workflows in Support of Large-Scale Science (WORKS '26)*, Chicago, IL, November 2026. to appear
- W27** H. Jin, K. Raghavan, **A. Mandal**, and E. Deelman. "RLSA: Adaptive LLM Gating for Multi-Agent HPC Scheduling Agents." *SC'26-W Proceedings of the 21st Workshop on Workflows in Support of Large-Scale Science (WORKS '26)*, Chicago, IL, November 2026. to appear

- W26** I. Mahmud, P. Zuk, C. Wang, M. Kiran, K. Wu, K. Thareja, K. Raghavan, **A. Mandal**, and E. Deelman. “DISTR: Development and Integration of Simulation Tools for Resilient Infrastructure.” *2024 IEEE International Conference on Big Data workshop: 5th International Workshop on Big Data & AI Tools, Models, and Use Cases for Innovative Scientific Discovery (BTSD) 2024, Washington, DC, December 2024*.
- W25** I. Mahmud, G. Papadimitriou, C. Wang, M. Kiran, **A. Mandal**, and E. Deelman. “Elephants Sharing the Highway: Studying TCP Fairness in Large Transfers over High Throughput Links.” *2023 IEEE/ACM Innovating the Network for Data-Intensive Science (INDIS) Workshop at SC'23*, doi: <https://doi.org/10.1145/3624062.3624594>, Denver, CO, Nov 2023.
★ Best Paper Award, INDIS Workshop at SC'23
- W24** I. Mahmud, G. Papadimitriou, C. Wang, M. Kiran, **A. Mandal**, and E. Deelman. “Experimenting TCP Performance with Fabric.” *2023 IEEE/ACM Innovating the Network for Data-Intensive Science (INDIS) Workshop at SC'23, Denver, CO, Nov 2023*.
- W23** A. E. Morel, P. Calyam, D. Gafurov, C. Wang, K. Thareja, **A. Mandal**, E. Lyons, M. Zink, G. Papadimitriou, and E. Deelman. “Experiments on Network Services for Video Transmission using FABRIC Instrument Resources.” *Proceedings of the 10th International Workshop on Computer and Networking Experimental Research using Testbeds (CNERT) in conjunction with IEEE International Conference on Computer Communications (INFOCOM)*, doi:10.1109/INFOCOMWKSHPS57453.2023.10225817, New York, NY, May 2023. ★ Best Paper Runner-Up, CNERT 2023
- W22** H. Jin, K. Raghavan, G. Papadimitriou, C. Wang, **A. Mandal**, P. Krawczuk, L. Pottier, M. Kiran, E. Deelman, and P. Balaprakash. “Workflow Anomaly Detection with Graph Neural Networks.” *Proceedings of the 17th Workshop on Workflows in Support of Large-Scale Science (WORKS '22)*, Dallas, TX, November 2022.
- W21** I. Abhinit, E. K. Adams, B. Chase, **A. Mandal**, Y. Xin, K. Vahi, M. Rynge, and E. Deelman. “Modeling Data Integrity Threats for Scientific Workflows Using OSCR and MITRE ATT&CK.” *Lightning Talk Abstract at 17th Workshop on Workflows in Support of Large-Scale Science (WORKS '22)*, Dallas, TX, November 2022.
- W20** R. Tanaka, G. Papadimitriou, S. Charan, C. Wang, E. Lyons, K. Thareja, C. Qu, A. Esquivel, E. Deelman, **A. Mandal**, P. Calyam, and M. Zink. “Automating Edge-to-cloud Workflows for Science: Traversing the Edge-to-cloud Continuum with Pegasus.” *2nd ACM/IEEE International workshop on Cloud-to-Things continuum: towards the convergence of IoT, Edge and Cloud Computing (Cloud2Things 2022)*, Taormina, Messina Italy, May 2022. ★ Best Paper Award, Cloud2Things 2022
- W19** I. Abhinit, E. K. Adams, K. Alam, B. Chase, E. Deelman, L. Gorenstein, S. Hudson, T. Islam, J. Larson, G. Lentner, **A. Mandal**, J. -L. Navarro, B. Nicolae, L. Pouchard, R. Ross, B. Roy, M. Rynge, A. Serebrenik, K. Vahi, S. Wild, Y. Xin, R. F. da Silva, and R. Filgueira. “Novel Proposals for FAIR, Automated, Recommendable, and Robust Workflows.” *Proceedings of the 17th Workshop on Workflows in Support of Large-Scale Science (WORKS '22)*, Dallas, TX, November 2022.
- W18** P. Krawczuk, G. Papadimitriou, R. Tanaka, Tu Mai Anh Do, S. Subramanya, S. Nagarkar, A. Jain, K. Lam, **A. Mandal**, L. Pottier, and E. Deelman. “A Performance Characterization of Scientific Machine Learning Workflows.” *Proceedings of the 16th Workshop on Workflows in Support of Large-Scale Science (WORKS '21)*, St. Louis, MO, November 2021.
- W17** G. Papadimitriou, E. Lyons, C. Wang, K. Thareja, R. Tanaka, P. Ruth, J. J. Villalobos, I. Roder, E. Deelman, M. Zink, and **A. Mandal**. “Application Aware Software Defined Flows of Workflow Ensembles.” *2020 IEEE/ACM Innovating the Network for Data-Intensive Science (INDIS)*, doi: 10.1109/INDIS51933.2020.00007, Nov 2020.
- W16** G. Papadimitriou, M. Kiran, C. Wang, **A. Mandal**, and E. Deelman. “Training Classifiers to Identify TCP Signatures in Scientific Workflows.” *Innovating the Network for Data Intensive Science (INDIS)*, Nov 2019.
- W15** K. Thareja, C. Wang, P. Ruth, **A. Mandal**, I. Baldin, M. Stealey. “COMET: Distributed Metadata Service for Multi-cloud Experiments.” *Midscale Education and Research Infrastructure and Tools (MERIT) Workshop at 27th IEEE International Conference on Network Protocols (ICNP 2019)*, October 2019.
- W14** M. Kiran, C. Wang, N. S. V. Rao and **A. Mandal**. “Detecting Outliers in Network Transfers with Feature Extraction.” *DISE1: Joint Workshop on Deep (or Machine) Learning for Safety-Critical Applications in Engineering co-located with 35th International Conference on Machine Learning*, Jul 2018.
- W13** **A. Mandal**, P. Ruth, I. Baldin, R. Ferreira da Silva, and E. Deelman. “Toward Prioritization of Data Flows for Scientific Workflows Using Virtual Software Defined Exchanges.” *First International Workshop on Workflow Science (WoWS 2017)*, 2017, p. 566–575, Oct 2017.

- W12** Y. Yao, Q. Cao, J. Chase, P. Ruth, I. Baldin, Y. Xin, **A. Mandal**. "Slice-based Network Transit Service: Inter-Domain L2 Networking on ExoGENI." *Distributed Cloud Computing (DCC) Workshop at IEEE International Conference on Computer Communications (INFOCOM)*, May 2017.
- W11** **A. Mandal**, P. Ruth, I. Baldin, D. Krol, G. Juve, R. Mayani, R. Ferreira da Silva, E. Deelman, J. Meredith, J. Vetter, V. Lynch, B. Mayer, J. Wynne III, M. Blanco, C. Carothers, J. LaPre, and B. Tierney. "Toward an End-to-end Framework for Modeling, Monitoring, and Anomaly Detection for Scientific Workflows." *Workshop on Large-Scale Parallel Processing (LSPP 2016)*, 2016, p. 1370–1379, May 2016.
- W10** E. Deelman, C. Carothers, **A. Mandal**, B. Tierney, J. S. Vetter, I. Baldin, C. Castillo, G. Juve, D. Krol, V. Lynch, B. Mayer, J. Meredith, T. Proffen, P. Ruth, and R. Ferreira da Silva. "Panorama: Modeling The Performance of Scientific Workflows." *Workshop on Modeling and Simulation of Systems and Applications (ModSim 2015)*, August 2015.
- W9** F. Jiang, C. Castillo, C. Schmitt, **A. Mandal**, P. Ruth, and I. Baldin. "Enabling workflow repeatability with virtualization support." *Proceedings of the 10th Workshop on Workflows in Support of Large-Scale Science (WORKS '15)*. ACM, New York, NY, USA, Article 8, 10 pages. DOI=<http://dx.doi.org/10.1145/2822332.2822340>.
- W8** P. Ruth, **A. Mandal**, C. Castillo, R. Fowler, J. Tilson, I. Baldin, and Y. Xin. "Achieving Performance Isolation on Multi-Tenant Networked Clouds Using Advanced Block Storage Mechanisms." *Proceedings of the 2015 ACM HPDC International Workshop on Scientific Cloud Computing (ScienceCloud)*, Portland, OR, June 2015.
- W7** **A. Mandal**, P. Ruth, I. Baldin, Y. Xin, C. Castillo, F. Jiang, C. Schmitt, G. Juve, M. Rynge, E. Deelman, and J. Chase. "Managing Dynamic Networked Cloud Infrastructure for Data Driven Scientific Workflows Using Proactive Introspection." *SCinet Workshop on Innovating the Network for Data Intensive Science (INDIS) at SC 2014*, New Orleans, LA, Nov 2014.
- W6** Y. Xin, I. Baldin, C. Heerman, **A. Mandal**, and P. Ruth. "Capacity of Inter-Cloud Layer-2 Virtual Networking." *Proceedings of ACM SIGCOMM Workshop on Distributed Cloud Computing (DCC 2014)*, August 2014.
- W5** Y. Xin, I. Baldin, C. Heerman, **A. Mandal**, and P. Ruth. "Scaling up Applications Over Distributed Clouds with Dynamic Layer-2 Exchange and Broadcast Service." *Proceedings of Workshop on Federated Future Internet and Distributed Cloud Testbeds (FIDC)*, September 9th-11th, 2014.
- W4** **A. Mandal**, P. Ruth, I. Baldin, Y. Xin, C. Castillo, M. Rynge, and E. Deelman. "Leveraging and Adapting ExoGENI Infrastructure for Data-driven Domain Science Workflows." *Proceedings of the 3rd GENI Research and Educational Experiment Workshop (GREE 2014)*, GEC19, Atlanta, GA, USA, March 19-20, 2014.
- W3** **A. Mandal**, P. Ruth, I. Baldin, Y. Xin, C. Castillo, M. Rynge, and E. Deelman. "Evaluating I/O aware network management for scientific workflows on networked clouds." *Proceedings of the Third International Workshop on Network-Aware Data Management (NDM '13)*. ACM, New York, NY, Nov 2013.
- W2** **A. Mandal**, A. Porterfield and R. Fowler. "System-wide Introspection for Accurate Attribution of Performance Bottlenecks." *Proceedings of the 2nd International Workshop on High-performance Infrastructure for Scalable Tools (WHIST 2012)*, Venice, Italy, June 2012.
- W1** I. Baldine, Y. Xin, **A. Mandal**, C. Heermann, J. Chase, V. Marupadi, A. Yumerefendi and D. Irwin. "Network Cloud Orchestration: A GENI Perspective." *Proceedings of the 2nd IEEE International Workshop on Management of Emerging Networks and Services (IEEE MENS '10) in conjunction with GLOBECOM'10*, Miami, FL, December 2010.

Book Chapters (3)

- B3** G. Papadimitriou, C. Wang, E. Lyons, K. Thareja, P. Ruth, J. J. Villalobos, I. Rodero, E. Deelman, M. Zink, and **A. Mandal**. "Dynamic Network-Centric Multi-cloud Platform for Real-Time and Data-Intensive Science Workflows." in: *Darema, F., Blasch, E.P., Ravela, S., Aved, A.J. (eds) Handbook of Dynamic Data Driven Applications Systems: Volume 2*, Springer, pages 835-868, doi=10.1007/978-3-031-27986-7_32, March 2023.
- B2** I. Baldin, J. Chase, Y. Xin, **A. Mandal**, P. Ruth, C. Castillo, V. Orlikowski, C. Heermann, and J. Mills. "ExoGENI: A Multi-Domain Infrastructure-as-a-Service Testbed." *Rick McGeer, Mark Berman, Chip Elliott, Robert Ricci, Eds., The GENI Book, Chapter*, pp 279-315, Springer International Publishing, isbn 978-3-319-33769-2, doi: 10.1007/978-3-319-33769-2_13, 2016.

- B1** R. J. Fowler, T. Gamblin, G. Kandaswamy, **A. Mandal**, A. K. Porterfield, L. Ramakrishnan, and D. A. Reed. “Challenges of Scale: When All Computing Becomes Grid Computing.” *Lucio Grandinetti, Eds., High Performance Computing and Grids in Action, Chapter, IOS Press, Amsterdam, 2008.*

Reports, Preprints, Posters, and Theses ⁽²¹⁾

- R21** K. Thareja, **A. Mandal**, and E. Deelman. “From Sensors to Insight: Rapid, Edge-to-Core Application Development for Sensor-Driven Applications.” *POSTER Paper in 22nd IEEE International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT 2026), Reykjavik, Iceland, June 2026.* [Poster]
- R20** S. Raj, R. Mittal, R. Mayani, P. Zuk, **A. Mandal**, M. Zink, Y. Simmhan, and E. Deelman. “AeroResQ: Edge-Accelerated UAV Framework for Scalable, Resilient and Collaborative Escape Route Planning in Wildfire Scenarios.” *arXiv, <https://doi.org/10.48550/arXiv.2511.00038>, Oct 2025.* [Preprint]
- R19** **A. Mandal**, M. Miller, E. Deelman, E. Scott, K. Vahi, W. Sun, P. Ko, K. Nygren, K. Soloway, R. Verberg, V. Kuznetsov, and B. Sorge. “CyberInfrastructure Training and Education for Synchrotron X-Ray Science (X-CITE).” *Poster at 2025 NSF Cybertraining PI Meeting, Denver, CO, July 2025.* [Poster]
- R18** **Mandal, A.**, Bayer, F., Biffard, B., Bontempi, C., Butcher, D. S., Casey, R., Clark, C., Cox, D., Deelman, E., Glatstein, J., Habermann, T., Kee, K., Laney, C., Murillo, A., Nabrzyski, J., O’Mullane, W., Riedel, B., Rollins, J., Tawa, R., Virdone, N., & Zhang, Q. “2025 U.S. NSF CI Compass Virtual Workshop Report - Data Management: From Instrument to First Storage.” *doi:10.5281/zenodo.15858297, July 20, 2025.* [Report]
- R17** R. Ferreira da Silva, R. G. Moore, B. Mintz, R. Advincula, A. Al Najjar, L. Baldwin, C. Bridges, R. Coffee, E. Deelman, C. Engelmann, B. D. Etz, M. Firestone, I. T. Foster, P. Ganesh, L. Hamilton, D. Huber, I. Ivanov, S. Jha, Y. Li, Y. Liu, J. Lofstead, **A. Mandal**, H. G. Martin, T. Mayer, M. McDonnell, V. Murugesan, S. Nimer, N. Rao, M. Seifrid, M. Taheri, M. Taufer, and K. D. Vogiatzis. “Shaping the Future of Self-Driving Autonomous Laboratories Workshop.” *Technical Report, ORNL/TM-2024/3714, DOI: 10.5281/ZENODO.14588062, January 2025.* [Report]
- R16** E. Deelman, P. Balaprakash, M. Kiran, **A. Mandal**, K. Raghavan, S. Di, F. Cappello, J. Wu, Z. Chen, S. Wu, H. Jin, C. Wang, I. Mahmud, K. Thareja, E. Scott, P. Zuk, and A. Hamade. “SWARM: Scientific Workflow Applications on Resilient Metasystem.” *Poster in 2024 IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis (SC’24), Atlanta, GA, November 2024.* [Poster]
- R15** **A. Mandal**, M. Miller, E. Deelman, E. Scott, S. Sasidharan, K. Vahi, W. Sun, P. Ko, K. Nygren, K. Soloway, R. Verberg, and B. Sorge. “CyberInfrastructure Training and Education for Synchrotron X-Ray Science (X-CITE).” *Poster at 2024 NSF Cybertraining PI Meeting, Charlotte, NC, August 2024.* [Poster]
- R14** I. Baldin, D. Brower, D. Butcher, R. Casey, C. Clark, E. Deelman, B. Flynn, M. Hasan, K. Kee, M. Livny, **A. Mandal**, A. Murillo, J. Nabrzyski, V. Pascucci, S. Petruzza, C. Romsos, D. Stanzone, K. Vahi, and N. Virdone. “2024 Cyberinfrastructure for U.S. NSF Major Facilities Workshop Report (1.0).” *Zenodo, June 2024.* [Report]
- R13** **A. Mandal**, K. Thareja, and P. Ruth. “Network Testbed for Experimenting With Decentralized Federated Learning.” *POSTER Paper in 20th IEEE International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT 2024), Abu Dhabi, UAE, April 2024.* [Poster]
- R12** A. P. Murillo, D. Brower, S. Hossain, K. Kee, **A. Mandal**, J. Nabrzyski, E. Scott, N. Virdone, R. Ewing, and E. Deelman. “Broadening Student Engagement To Build the Next Generation of Cyberinfrastructure Professionals.” *Poster in Practice and Experience in Advanced Research Computing (PEARC 2023) Conference, Portland, OR, doi: 10.1145/3569951.3597567, July 2023.* [Poster]
- R11** G. Papadimitriou, H. Jin, C. Wang, K. Raghavan, **A. Mandal**, P. Balaprakash, E. Deelman. “Flow-Bench: A Dataset for Computational Workflow Anomaly Detection.” *arXiv preprint arXiv:2306.09930, June 2023.* [Preprint]
- R10** E. Deelman, I. Baldin, S. Barnet, G. B. Berriman, D. Brower, R. Casey, S. Chaudhry, L. Christopherson, C. Clark, B. Dobbins, M. Gohsman, K. Kee, M. Livny, **A. Mandal**, R. Mayani, A. Murillo, J. Nabrzyski, A. Olshansky, V. Pascucci, S. Petruzza, L. Pottier, C. Romsos, M. Rynge, E. Scott, A. Shepherd, J. Schopf, K. Vahi, C. Vardeman, N. Virdone, and J. West. “2022 Cyberinfrastructure for NSF Major Facilities Workshop Report.” *Zenodo. <https://doi.org/10.5281/zenodo.6643902>, June 2022.* [Report]

- R9** L. Pottier, P. Balaprakash, G. Papadimitriou, M. Kiran, K. Raghavan, C. Wang, P. Krawczuk, K. Thareja, **A. Mandal** and E. Deelman. "Graph Neural Network for Anomalies Detection in Scientific Workflows." *Poster and Short Paper in 2022 Workshop on Modeling & Simulation of Systems and Applications (MODSIM '22), Seattle, WA, August 2022*. [Poster]
- R8** E. Lyons, D. Seo, S. Kim, H. Habibi, G. Papadimitriou, R. Tanaka, E. Deelman, M. Zink, and **A. Mandal**. "Predicting Flash Floods in the Dallas-Fort Worth Metroplex Using Workflows and Cloud Computing." *IEEE eScience 2021 Poster, Virtual, pp. 259-261, doi: 10.1109/eScience51609.2021.00050. September 2021*. [Poster]
- R7** Deelman, E., **Mandal, A.**, Murillo, A. P., Nabrzyski, J., Pascucci, V., Ricci, R., Baldin, I., Sons, S., Christopherson, L., Vardeman, C., Ferreira da Silva, R., Wyngaard, J., Petruzza, S., Rynge, M., Vahi, K., Whitcup, W. R., Drake, J., & Scott, E. "Blueprint: Cyberinfrastructure Center of Excellence." *Zenodo. <https://doi.org/10.5281/zenodo.4587866>, 2021*. [Report]
- R6** **A. Mandal**, P. Ruth, I. Baldin, R. Silva and E. Deelman. "Data Flow Prioritization for Scientific Workflows Using A Virtual SDX on ExoGENI." *Poster at 25th GENI Engineering Conference (GEC 25), Miami, FL, March 2017*. [Poster]
- R5** A. Porterfield, R. Fowler, **A. Mandal**, D. Obrien, S. Olivier and M. Spiegel. "Adaptive Scheduling Using Performance Introspection." *RENCI Technical Report TR-12-02, May 2012*. [Report]
- R4** **A. Mandal**, M. Y. Lim, A. Porterfield and R. Fowler. "Implications for Applications and Compilers of Multi-core Memory Concurrency." *Poster at International Workshop on Languages and Compilers for Parallel Computing (LCPC'10), Houston, TX, October 2010*. [Poster]
- R3** A. Porterfield, R. Fowler, **A. Mandal** and M. Y. Lim. "Empirical Evaluation of Multi-Core Memory Concurrency." *Technical Report TR-09-01, RENCi, North Carolina, Jan 2009*. [Report]
- R2** A. Porterfield, R. Fowler, **A. Mandal**, and M. Lim. "Performance Consistency on Multi-socket AMD Opteron Systems." *Technical Report TR-08-07, RENCi, North Carolina, Dec 2008*. [Report]
- R1** **A. Mandal**. "Toward a Tool for Scheduling Application Workflows onto Distributed Grid Systems." *PhD Thesis, Available as Technical Report TR06-875, Computer Science, Rice University, May 2006*. [Thesis]

TALKS AND PRESENTATIONS

- Oct 2025 "PegasusAI: AI-Driven Scientific Workflow Management." UNC Research Week: AI-Powered Solutions for Scientific Discoveries, Chapel Hill, NC. *Invited talk*
- Nov 2024 "NSF CI Compass Cyberinfrastructure Center of Excellence: Recent Updates." RENCi booth, SC24, Atlanta, GA. *Presentation*
- Apr 2024 "Network Testbed for Experimenting With Decentralized Federated Learning." IEEE DCSS-IoT 2024, Abu Dhabi, UAE. *Poster*
- Mar 2024 "CI Compass: The NSF CI Center of Excellence for Navigating the Major Facilities Data Lifecycle." NSF Research Infrastructure Workshop, Tucson, AZ. *Poster*
- Feb 2024 "Overview of the PosEiDon and SWARM Projects." DOE ASCR Computer Science PI Meeting, Atlanta, GA. *Poster*
- Jan 2024 "If I Knew Then What I Know Now, I Would Have Never Designed It This Way: Approaches to CI Conceptualization and Design." NSF CI for Major Facilities Workshop, Long Beach, CA. *Panel*
- Jun 2023 "CI Compass Overview." NSF Research Infrastructure Workshop, Washington, DC. *Poster*
- Sep 2022 "Cyberinfrastructure Workshop at RIW 2022 (closing presentation)." NSF Research Infrastructure Workshop, Boulder, CO. *Presentation*
- Jun 2022 "Building a Community around Cyberinfrastructure for NSF Major Facilities." CI Compass Webinar. *Webinar*
- Mar 2022 "Cyberinfrastructure for Major Facilities: Challenges and a Path Forward." NSF CI for Major Facilities Workshop, Redondo Beach, CA. *Panel*
- Feb 2022 "Engaging with CI Compass." CI Compass Webinar. *Webinar*
- Mar 2020 "Leveraging Distributed Research Cloud Infrastructures for Domain Science Research and Experimentation." Open Cloud Workshop, Boston, MA. *Panel*

Feb 2020 “The Role of ML in Diagnosis of Integrity Errors in Distributed CI.” NSF Workshop on Smart Cyberinfrastructure, Crystal City, VA. *Invited talk*

Nov 2019 “Dynamic Network-centric Multi-cloud Platform (DyNamo) for Real-Time Weather Forecasting Workflows.” SCinet Technology Challenge, SC19, Denver, CO (two awards). *Presentation*

Nov 2019 “Leveraging Distributed Cloud Testbeds for Domain Science Research and Experimentation.” NSF Workshop on Next Generation Cloud Research Infrastructure, Princeton, NJ. *Invited talk*

Nov 2019 “Leveraging Distributed Networked Cloud Testbeds for Domain Science Research and Experimentation.” Global Experimentation for Future Internet (GEFI) Workshop, Coimbra, Portugal. *Invited talk*

Nov 2019 “Cyberinfrastructure Center of Excellence Pilot.” UNOLS Fall Council Meeting, Alexandria, VA. *Invited talk*

Sep 2019 “Data Life Cycle for Large Facilities.” NSF Large Facilities CI Workshop, Alexandria, VA. *Presentation*

Sep 2019 “Integrity Introspection for Scientific Workflows.” NSF CC*/CICI PI Meeting, Minneapolis, MN. *Panel*

Aug 2019 “CICoE Pilot: Data Life Cycle and Disaster Recovery for Large Facilities.” CI CoE Pilot Webinar. *Webinar*

Aug 2019 “Integrity Protection for Scientific Workflow Data: Motivation and Initial Experiences.” Trusted CI Webinar Series. *Webinar*

Oct 2018 “Investigating Use of Distributed Research Infrastructures and Testbeds for Domain Science Experimentation and Validation.” GEFI Workshop, Tokyo, Japan. *Invited talk*

Oct 2017 “Workflow Adaptation on Networked Cloud Infrastructures Using Intent and Performance Models.” Internet2 Technology Exchange, San Francisco, CA. *Presentation*

Jul 2016 “Anomaly Detection for Scientific Workflow Applications on Networked Clouds.” IEEE HPCS 2016, Innsbruck, Austria. *Presentation*

May 2016 “Toward an End-to-end Framework for Modeling, Monitoring and Anomaly Detection for Scientific Workflows.” LSPP Workshop at IPDPS 2016, Chicago, IL. *Presentation*

Dec 2015 “Adapting Scientific Workflows on Networked Clouds Using Proactive Introspection.” IEEE/ACM UCC 2015, Limassol, Cyprus. *Presentation*

Sep 2015 “Distributed Computing on GENI: Hadoop in a Slice (hands-on).” 36th IEEE Sarnoff Symposium, Newark, NJ. *Tutorial*

Nov 2014 “Managing Dynamic Networked Cloud Infrastructure for Data Driven Scientific Workflows Using Proactive Introspection.” INDIS Workshop at SC14, New Orleans, LA. *Presentation*

Mar 2014 “Leveraging and Adapting ExoGENI Infrastructure for Data-driven Domain Science Workflows.” 3rd GENI Research and Educational Experiment Workshop (GREE 2014), Atlanta, GA. *Presentation*

Mar 2014 “Distributed Computing on GENI: Hadoop in a Slice.” GENI Winter Camp, Boston, MA (Jan 2014) and GENI Engineering Conference 19, Atlanta, GA. *Tutorial*

Feb 2014 “Leveraging Persistent Queries for Monitoring Distributed, Data-intensive Scientific Applications.” 2nd NSF perfSONAR Workshop, Arlington, VA. *Invited talk*

Nov 2013 “Evaluating I/O Aware Network Management for Scientific Workflows on Networked Clouds.” NDM'13 Workshop at SC13, Denver, CO. *Presentation*

Mar 2013 “Distributed Resource Ensembles for Petascale Science.” DOE NGNS PI Meeting, LBNL, Emeryville, CA. *Presentation*

Jan 2013 “ExoGENI: A Distributed Networked Infrastructure-as-a-Service (NlaaS) Platform for Experimentation.” NIST Cloud Computing and Big Data Workshop, Gaithersburg, MD. *Poster*

Jul 2012 “Client Authentication and Authorization for GENI XMPP Messaging Service.” 14th GENI Engineering Conference. *Presentation*

Jun 2012 “System-wide Introspection for Accurate Attribution of Performance Bottlenecks.” WHIST'12 Workshop, Venice, Italy. *Presentation*

Feb 2012 “Provisioning and Scheduling Scientific Workflows.” Department of Computer Science, Duke University, Durham, NC. *Invited talk*

Dec 2011	“Provisioning and Evaluating Multi-domain Networked Clouds for Hadoop-based Applications.” IEEE CloudCom 2011, Athens, Greece. Presentation
Mar 2010	“Modeling Memory Concurrency for Multi-Socket Multi-Core Systems.” IEEE ISPASS 2010, White Plains, NY. Presentation
May 2008	“Fault Tolerance and Recovery of Scientific Workflows on Computational Grids.” IEEE CCGrid 2008, Lyon, France. Presentation
Jul 2005	“Scheduling Strategies for Mapping Application Workflows onto the Grid.” IEEE HPDC 2005, Raleigh, NC. Presentation

PROFESSIONAL SERVICE

Leadership and Advisory Roles

Associate Director , CI Compass, the NSF Cyberinfrastructure Center of Excellence	2021–present
Member, Advisory Council , MCNC (Microelectronics Center of North Carolina)	Current
Member, Advisory Committee , Midscale Experimental Research Infrastructure Forum (MERIF)	Current
Liaison to the NSF Large Facilities Office , Research Infrastructure Community Outreach (RICO) Working Group	Current

Conference and Workshop Organization

Workshop Co-Chair , Workshop on Workflows in Support of Large-Scale Science (WORKS), held with SC	2023–2026
Organizer , NSF CI Compass Virtual Workshop: AI Meets CI	2026
Organizer , NSF CI Compass Virtual Workshop: Data Management, From Instrument to First Storage	2025
Workshop Organizer , NSF Cyberinfrastructure for Major Facilities Workshop	2019, 2022, 2024
Area Chair, Architecture, Network/Communications, and Management , IEEE Cluster 2021	2021
Workshop Co-Chair , Innovating the Network for Data-Intensive Science (INDIS), held with SC	2021
Guest Editor , Elsevier Future Generation Computer Systems (FGCS), special issue on workflows	2019–2021

Program Committees

- **SC**: 2018 (Clouds & Distributed Computing track), 2024 (Reproducibility Challenge)
- **eScience**: 2019, 2024, 2025, 2026
- **CCGrid**: 2017–2021, 2025
- **Cluster** (Area Chair): 2021
- **IPDPS**: 2016
- **Euro-Par**: 2023–2026
- **UCC**: 2020–2023
- **ICCS**: 2024–2026
- **WORKS** (Co-Chair 2023–2026): 2016–2021
- **INDIS** (Co-Chair 2021): 2018, 2021–2025
- **WiDE**: 2024
- **SlotEC**: 2024
- **GCE**: 2009

Proposal Review Panels

- **National Science Foundation (NSF)**: Apr 2026, Dec 2025, Oct 2024, Jan 2024, Oct 2023, Oct 2022, Apr 2019, Mar 2017, May 2009, Mar 2009
- **Department of Energy (DOE)**: Jun 2025, Jun 2024, May 2023, Nov 2021, Apr 2021, Jan 2016
- **Vienna Science and Technology Fund (WWTF), Austria**: 2024

Journal Reviewing

IEEE Transactions on Parallel and Distributed Systems (TPDS) (2007–2009, 2014–2016, 2021); IEEE Transactions on Cloud Computing (TCC) (2014, 2017, 2019); Future Generation Computer Systems (FGCS) (2005–2007, 2017–2021); Journal of Parallel and Distributed Computing (JPDC) (2004–2006, 2022); International Journal of High Performance Computing Applications (IJHPCA) (2019); Concurrency and Computation: Practice and Experience (2001, 2004, 2021); Computing in Science & Engineering (2023); IEEE Access (2022–2023); Elsevier SoftwareX (2020–

2021); ACM Transactions on Modeling and Computer Simulation (2019); ACM Computing Surveys (2012); Journal of Systems and Software (2010); Parallel Computing (PARCO) (2006); Journal of Grid Computing (2003).
External reviewer for IPDPS (2003, 2005, 2010), SC (2004), Euro-Par (2004, 2006, 2008), Middleware for Grid Computing (2004), and the LACSI Symposium (2004).

MENTORING AND TEACHING

PI and program lead, NSF REU Site: Multi-disciplinary Research with the FABRIC Network RENCI, UNC Chapel Hill Nine-week summer research program for undergraduates; first cohort of eight students in 2026.	2025–present
Mentor to PhD researchers, research staff, and graduate students RENCI and partner institutions	2006–present
Teaching Assistant (five semesters) Rice University Operating Systems, Compiler Construction, Design and Analysis of Algorithms, and Principles of Computing and Programming. Led lab sessions and mentored visiting undergraduate summer students.	2000–2002