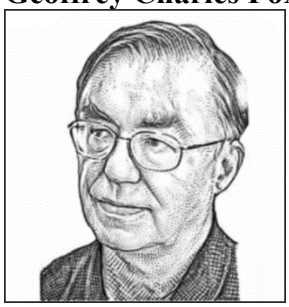
Geoffrey Charles Fox



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Papers from 1990-2004 at Syracuse, FSU and Indiana University 87
Unpublished Concurrent Computation Papers from Caltech 1981-1989 120
Internal Reports from Syracuse University, Florida State and Indiana (through 2004) 121

Addresses

Home: 690 Ivy Lane
Charlottesville, VA 22901

Office: Biocomplexity Institute and Initiative
994 Research Boulevard, 3rd Floor
Charlottesville, VA 22911

Date of Birth

June 7, 1944, Dunfermline, Scotland

Education

Institution and Location	Degree	Year(s)	Field of Study
Cambridge University, Cambridge, England	B.A.	1961-1964	Mathematics
	Ph.D.	1964-1967	Theoretical Physics
	M.A.	1968	Mathematics

Professional Experience

2021-	Professor of Computer Science, School of Engineering and Applied Science, University of Virginia
2021-	Professor, Biocomplexity Institute and Initiative, Network Systems Science and Advanced Computing Division, University of Virginia
2020-	MLCommons/MLPerf Science Data co-chair
2017-2018	Interim Associate Dean for Engineering, School of Informatics and Computing, Bloomington
2016-	Technical Advisor, C2RO
2015-2018	Chair, Department of Intelligent Systems Engineering, Indiana University Bloomington
2015-	Professor of Computing, Engineering, and Physics. Indiana University
2014-2015	Director of Data Science Program, School of Informatics and Computing, Indiana University Bloomington
2013-2015	Associate Dean for Research, School of Informatics and Computing, Indiana University Bloomington
2011-	Distinguished Professor, Indiana University
2011-2015	IV-endowed Chair Professor Tsinghua University
2010-2015	Member of Board Open Grid Forum
2009-2013	Associate Dean for Graduate Studies and Research, School of Informatics and Computing, Indiana University Bloomington
2009-2015	Professor of Informatics and Computing, Physics. Indiana University
2009-	Director Digital Science Center of Pervasive Technology Institute
2008-2009	Chair Department of Informatics, Indiana University Bloomington
2006-2012	Senior Research Associate in the Center for Computational Science and Advanced Distributed Simulation at University of Houston Downtown
2005-2009	Vice President of Community/eScience function for Open Grid Forum
2005-2009	Visiting Scholar for Cyberinfrastructure Development at the Alliance for Equity in Higher Education
2004-2012	Visiting Professor of Computer Science at Southampton University UK

2001-2009	Professor of Computer Science, Informatics, Physics. Indiana University
2001-	Director of Community Grid Laboratory Indiana University
2000-2001	Professor of Computer Science, Florida State University
2000-2001	Associate Director of School of Computational Science and Information Technology FSU
2000-2001	Director of the Computational and Information Science Laboratory FSU
2000-2001	Chief Technologist of Office of Distributed and Distance Learning, FSU
2000-2010	Chief Technology Officer, Anabas Inc
2000-2007	Distinguished Visiting Scientist, JPL Pasadena CA
1990-2002	Professor of Computer Science, Syracuse University
1990-2002	Professor of Physics, Syracuse University
1990-2004	Adjunct Professor, Computer Science, Rice University
1990-2000	Director of Northeast Parallel Architectures Center, Syracuse University
1979-1990	Professor of Physics, California Inst. of Tech.
1986-1988	Associate Provost for Computing, California Inst. of Tech.
1983-1985	Dean for Educational Computing, California Inst. of Tech.
1981-1983	Executive Officer of Physics, California Inst. of Tech.
1974-1979	Associate Professor of Physics, California Inst. of Tech.
1971-1974	Assistant Professor of Physics, California Inst. of Tech.
1970-1971	Millikan Research Fellow in Theoretical Physics, Caltech
1970	Visiting Scientist, Brookhaven National Laboratory, Long Island
1969-1970	Research Fellow at Peterhouse College, Cavendish Lab., Cambridge
1968-1969	Research Scientist, Lawrence Berkeley Lab., Berkeley, Calif.
1967-1968	Member of School of Natural Science, Inst. for Advanced Study, Princeton, New Jersey

Awards and Honors

- Senior Wrangler, Part III Mathematics, Cambridge (1964)
- Mayhew Prize, Applied Mathematics, Cambridge (1964)
- Alfred P. Sloan Foundation Fellowship (1973-75)
- Fellow of the American Physical Society (1990-)
- ACM Fellow (2011-)
- **HPDC Achievement Award** for Foundational contributions to parallel computing, high-performance software, the interface between applications and systems, contributions to education, and outreach to underrepresented communities (2019)
- **ACM - IEEE CS Ken Kennedy Award** for Foundational contributions to parallel computing methodology, algorithms and software, data analysis, and their interface with broad classes of applications (2019)

Board Membership

Anabas Corporation 2001-2015
Undergroundfilm.org 2003-2007

Industry Experience
Co-founder of WebWisdom.com and Anabas corporations. Advisor to C2RO, Active member of Industry-led MLCommons.

Patents
1) TangoInteractive Collaboration System, March 2000 with several members of WebWisdom.com
2) Cloud based robotic control systems and methods, July 23, 2020, with Supun Kamburugamuve (pending)

Current Journal Editor
1) Field Chief Editor for Frontiers in High Performance Computing (2022-)
2) Specialty Chief Editor in High Performance Big Data Systems for Frontiers in High Performance Computing (2022-)
3) Member of Editorial Board: *The Journal of Supercomputing* (1987-)
4) Member of Advisory Board *Theoretical and Computational Fluid Dynamics (2000-)*
5) Member of Editorial Board: *Future Generation Computer Systems* (2003-)
6) Member of Editorial Board: *Geospatial Information Science (2011-)*
7) Member of Editorial Board: *Big Data* (2012-)
8) Member of Editorial Board: *IEEE Transactions on Cloud Computing (2014-)*

Previous Journal Responsibility
1) Member of Editorial board: *Computing in Science and Engineering* (2001-2020)
2) Editor, Concurrency and Computation: Practice and Experience, John Wiley, Inc. (1989-2020)
3) Supervisory Editor: *Nuclear Physics B* (1975-1986).
4) Member of the Editorial Board: *Computer Physics Communications* (1987-1994)
5) Member of the Editorial Board: *International C3IS Journal: Command, Control, Communications, and Information Systems* (1987-1990)
6) Principal Editor: *Physics and Computers: International Journal of Modern Physics C* (1990-1998)
7) Member of Editorial board: *Theoretical and Computational Fluid Dynamics* (2002-2004)
8) Contributing Editor, *Grid Today* (2002-2003)
9) Member of Editorial Board: *International Transactions on Systems Science and Applications (2006-2011)*

77 Ph.D. Theses supervised
1) Niranda Perera, "TOWARDS SCALABLE HIGH PERFORMANCE DATA ENGINEERING SYSTEMS", Indiana University Ph.D. Thesis Dissertation Defense, December 6, 2022 Presentation

2) Bo Feng, "DEEP LEARNING FOR TACKLING SPATIOTEMPORAL FORECASTING PROBLEMS," Indiana University Ph.D. Thesis Dissertation Defense, October 7, 2022 Presentation
3) Pulasthi Supun Wickramasinghe "ROLE OF HIGH-PERFORMANCE COMPUTING IN DEEP LEARNING" Indiana University Ph.D. Thesis Dissertation Defense, June 3, 2021
4) Vibhatha Lakmal Abeykoon, "TOWARDS DATA ANALYTICS-AWARE HIGH PERFORMANCE DATA ENGINEERING AND BENCHMARKING", Indiana University Ph.D. Thesis Dissertation Defense, June 2, 2021
5) Hyungro Lee, BUILDING SOFTWARE-DEFINED SYSTEMS WITH REPRODUCIBLE ENVIRONMENTS, Indiana University Ph.D Dissertation Defense, May 31 2019
6) Jerome E. Mitchell, "A PROGRESSIVE STUDY FOR THE AUTOMATIC ANALYSIS OF INTERNAL LAYERS FROM POLAR RADAR IMAGERY" Indiana University Ph.D. Dissertation Defense, July 26, 2018
7) Supun Kamburugamuve, "TOWARDS HPC AND BIG DATA CONVERGENCE IN A COMPONENT BASED APPROACH," Indiana University Ph.D. Dissertation Defense, May 14th, 2018.
8) Andrew J. Younge, "Architectural Principles and Experimentation of Distributed High Performance Virtual Clusters," Indiana University Ph.D. Dissertation Defense, October 10th, 2016
9) Saliya Ekanayake, "Towards a Systematic Study of Big Data Performance and Benchmarking," Indiana University Ph.D. Dissertation Defense, September 28th, 2016
10) Yang Ruan, SCALABLE AND ROBUST CLUSTERING AND VISUALIZATION FOR LARGE-SCALE BIOINFORMATICS DATA Indiana University Ph.D. August 18, 2014
11) Thilina Gunarathne SCALABLE PARALLEL COMPUTING ON CLOUDS: EFFICIENT AND SCALABLE ARCHITECTURES TO PERFORM PLEASINGLY PARALLEL, MAPREDUCE AND ITERATIVE DATA INTENSIVE COMPUTATIONS ON CLOUD ENVIRONMENTS Indiana University Ph.D. defense April 21, 2014
12) Tao Huang BUILDING A SCALABLE FRAMEWORK FOR THE COLLABORATIVE ANNOTATION OF REAL TIME DATA STREAMS Indiana University Ph.D. January 11, 2013
13) Zhenhua Guo HIGH PERFORMANCE INTEGRATION OF DATA PARALLEL FILE SYSTEMS AND COMPUTING: OPTIMIZING MAPREDUCE Indiana University Ph.D. August 31, 2012
14) Seung-Hee Bae Scalable High Performance Dimension Reduction, Indiana University Ph.D. January 17, 2012
15) Jong Youl Choi *Unsupervised Learning Of Finite Mixture Models With Deterministic Annealing For Large-scale Data Analysis*, Indiana University Ph.D. January 12, 2012
16) Jaliya Ekanayake *ARCHITECTURE AND PERFORMANCE OF RUNTIME ENVIRONMENTS FOR DATA INTENSIVE SCALABLE COMPUTING* Indiana University Ph.D. December 20, 2010

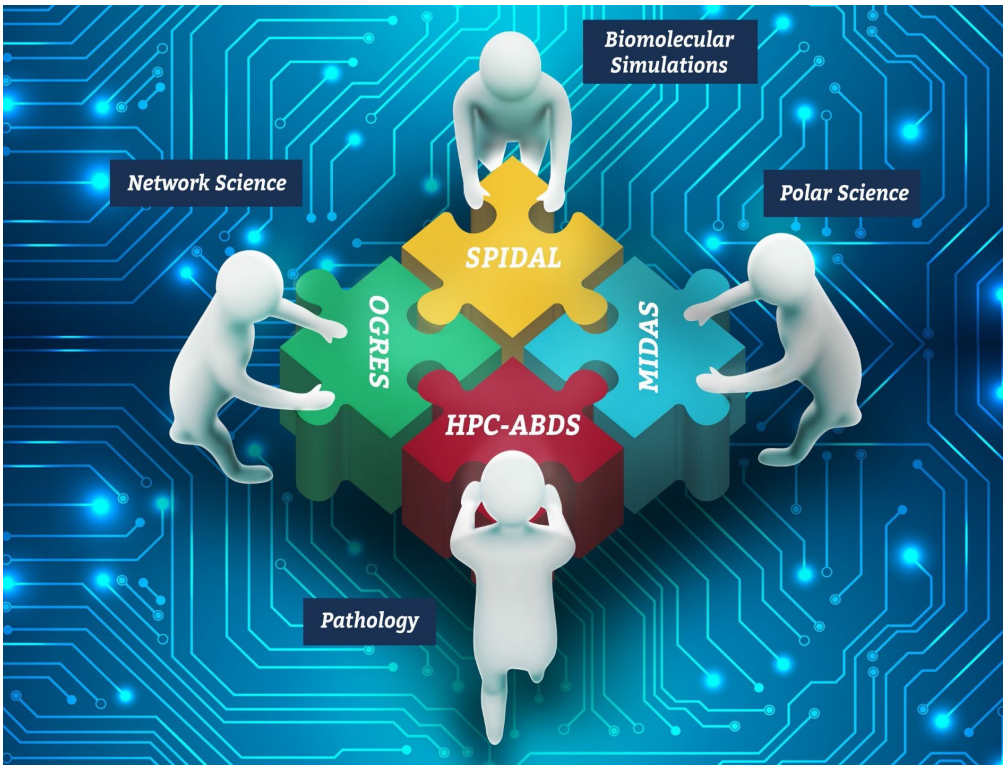
17) Ali Kaplan *Collaborative Framework for High-Performance P2P-based Data Transfer in Scientific Computing* Indiana University Ph.D. April 28, 2009
18) Ahmet Topcu *INTEGRATED COLLABORATIVE INFORMATION SYSTEMS* Indiana University Ph.D. March 23, 2009
19) Ahmet Sayar *High Performance, Federated, Service-Oriented Geographic Information Systems* Indiana University Ph.D. January 28, 2009
20) Ahmet Fatih Mustacoglu *Event-based Infrastructure for Reconciling Distributed Annotation Records* Indiana University Ph.D. July 31, 2008
21) Mehmet Nacar *A COMPONENT FRAMEWORK FOR BUILDING WEB SCIENCE GATEWAYS AND PORTALS* Indiana University Ph.D. November 27, 2007
22) Kangseok Kim *A FRAMEWORK FOR SYNCHRONOUS AND UBIQUITOUS COLLABORATION* Indiana University Ph.D. September 26, 2007
23) Beytullah Yildiz *Distributed Handler Architecture (DHArch)* Indiana University Ph.D. May 28, 2007
24) Mehmet Aktas *Information Federation in Grid Information Services* Indiana University Ph.D. May 3, 2007
25) Hasan Bulut *HIGH PERFORMANCE RECORDING AND MANIPULATION OF DISTRIBUTED STREAMS* Indiana University Ph.D. April 24, 2007
26) Harshawardhan Gadgil *SCALABLE, FAULT-TOLERANT MANAGEMENT OF GRID SERVICES: APPLICATION TO MESSAGING MIDDLEWARE* Indiana University Ph.D. April 5, 2007
27) Galip Aydin *Service Oriented Architecture for Geographic Information Systems Supporting Real-Time Data Grids* Indiana University Ph.D. January 15, 2007
28) Gurhan Gunduz *A Framework for Network Monitoring and Performance Based Routing in Distributed Middleware Systems* Syracuse University Ph.D. October 25, 2006
29) Minjun Wang *GRID-BASED COLLABORATION* Syracuse University Computer Engineering August 2, 2006
30) Sangyoon Oh *Optimizing Web Service Performance in Mobile Computing* Indiana University Ph.D. Computer Science August 1, 2006
31) Jungkee Kim *Hybrid Search across peer-to-peer Federated Data* Florida State University April 6, 2005
32) Ahmet Uyar *Scalable Service Oriented Architecture for Audio/Video Conferencing* Syracuse University March 23, 2005
33) Xiaohong Qiu *Message-based MVC Architecture for Distributed and Desktop Applications* Syracuse University March 2, 2005 (Honored as best Computer and Information Science Thesis at Syracuse University May 2005)
34) Sang Lim *PLATFORMS FOR HPJAVA: RUNTIME SUPPORT FOR SCALABLE PROGRAMMING IN JAVA* Florida State University June 11, 2003

35) Han-Ku Lee *TOWARDS EFFICIENT COMPILATION OF THE HPJAVA LANGUAGE FOR HIGH PERFORMANCE COMPUTING* Florida State University June 12, 2003
36) Sangmi Lee *A Modular Data Pipelining Architecture (MDPA) for enabling Universal Accessibility in P2P Grids* Florida State University July 3, 2003
37) Choonhan Youn *Web Services Based Architecture in Computational Web Portals* Syracuse University November 7, 2003
38) Shrideep Pallickara, *A Grid Event Service*, Syracuse University 2001
39) Yuh-Jye Chang, *Architecture of fine-grained data flow network programming environment*, Syracuse University 2000
40) M. A. Saleh Elmohammed, *Algorithms and heuristics for combinatorial optimization problems: Case study of academic course scheduling*, Syracuse University 2000
41) Sung-Hoon Ko, *Object-based message passing in high performance computing using Java*, Syracuse University 2000
42) Myeongjin Lee, *Information architecture of interactive and customizable learning environments*, Syracuse University 2000
43) Tseng-Hui Lin, *Parallelizing legacy applications using message passing programming model and the example of MOPAC*, Syracuse University 2000
44) Bokyun Na**,** *System model, and taxonomy for host-network interfaces***,** Syracuse University 2000
45) Mehmet Sen, *Distributed open asynchronous information access environment*, Syracuse University 2000
46) Erol Akarsu, *Integrated Three-Tier Architecture for High-Performance Commodity Metacomputing*, Syracuse University 1999.
47) Alvin Leung, *Real-time interactive client-server terrain rendering,* Syracuse University 1997
48) Kivanc Dincer, *World-wide virtual machine: A metacomputing environment integrating World Wide Web and high performance computing and communications technologies*, Syracuse University 1997
49) David Edelsohn *Random interactions with disk galaxies* Syracuse University 1996
50) Gang Cheng, *A dataflow-based software integration model in parallel and distributed computing and applications*, Syracuse University 1996
51) Gregor von Laszewski, *A parallel data assimilation system, and its implications on a metacomputing environment*, Syracuse University 1996
52) Nawal Copty, *Language and runtime support for the execution of hierarchical clustering applications on distributed-memory machines*, Syracuse University 1995
53) David Koester, *Parallel block-diagonal-bordered sparse linear solvers for power systems applications*, Syracuse University 1995
54) Leiping Han, *Monte Carlo Simulations of Random Surfaces with Extrinsic Curvature*, Syracuse University Physics 1995

55) Zeki Bozkus, *Compiling Fortran 90D/HPF for Distributed Memory MIMD computers*, Syracuse University 1995
56) Zheng-Yao Su, *The Hierarchical Algorithms: Theory and Applications*, Caltech 1994.
57) John Apostolakis, *Asymptotic scaling in the two-dimensional O(3) nonlinear sigma model: A Monte Carlo study on parallel computers*, Caltech 1994
58) Nashat Mansour. *Physical Optimization Algorithms for Mapping Data to Distributed-Memory Multiprocessors*, Syracuse University 1992
59) Ken Rose, *Deterministic Annealing, Clustering, and Optimization*, Electrical Engineering, Caltech 1990
60) John K. Salmon, *Parallel Hierarchical N-Body Methods*, Caltech, 1990.
61) Roberto Battiti, *Multiscale Methods, Parallel Computation, and Neural Networks for Computer Vision,* Computation and Neural Systems, Caltech 1990
62) Paul Stolorz, *NUMERICAL SIMULATIONS OF LATTICE QCD (MONTE CARLO, LATTICE GAUGE THEOR**Y,*** Caltech 1987
63) Jon Flower, *Lattice gauge theory on a parallel computer*, Caltech 1987
64) Adam Kolawa. *Semi-analytical Calculation of the 0++ Glueball Mass in SU(2) Gauge Theory,* Caltech 1986
65) Eric Mjolsness, *NEURAL NETWORKS, PATTERN RECOGNITION, AND FINGERPRINT HALLUCINATION (COLLECTIVE COMPUTATION)*, Caltech 1986
66) Mark Johnson, *Concurrent Computation and its Application to the Study of Melting in Two Dimensions*. Caltech 1986
67) Apoorva Patel, *Monte Carlo Renormalization Group for Lattice QCD*, Caltech 1984
68) Steve Otto, *Monte Carlo Methods in Lattice Gauge Theories*, Caltech 1983.
69) Michael Shatz, *A QCD Based Model of Hadron Hadron Scattering*, Caltech 1983
70) Sarbmeet Kanwal, *A Leading Order QCD Computation of ππ Elastic Scattering*, Caltech 1983
71) Rajan Gupta, *Mass Gap and Scaling in the O(3) Sigma Model in 1+1 Dimension*, Caltech 1982
72) Kar Woo Yung, *Study of hadronic jets produced by charged pion and proton beams incident on hydrogen and aluminum target**s***, Caltech 1980
73) James Rohlf, *JET PRODUCTION IN HIGH-ENERGY HADRON-PROTON COLLISIONS*, Caltech 1980
74) Stuart Stampke, *PION-PION DECAY DISTRIBUTIONS FOR PION(-) PROTON --> PION(+) PION(-) NEUTRON AT 100 AND 175 GEV/C*, Caltech 1982
75) Stephen Wolfram, *Some topics in theoretical high-energy physics,* Caltech 1980
76) Daniel Novoseller, *PION-EXCHANGE IN A PARTIAL WAVE ANALYSIS OF PION-NUCLEON ---> NUCLEON,PION,PION*, Caltech 1977
77) Robert Worden, *Regge models of forward pion and eta photoproduction*, Caltech 1972

Research Activities

From 1967 (my Ph.D.) until 1980, I had a modest size research program, but from 1983 to 2016, I have led research activities that ranged from 20-50 people in size with annual budgets of $2M-$5M dollars. I had a major role in but did not lead several large projects in the 1976-2000 time period, including the CRPC Science and Technology Center and significant particle physics experiments at Fermilab. My research has ranged over many areas but dominantly focused on practical uses of computing, an interest spurred by undergraduate research experiences. Below I list research thrusts as overlapping focus periods. Details can be found in books and papers and at the website for current projects. In the 2005-2015 time period, two large projects were FutureGrid (where I was PI) and the CReSIS Science and Technology Center (co-PI).



NSF	Indiana University	Rutgers University	Virginia Tech	Kansas University	Arizona State University	Stony Brook	University Of Utah
Crandall, Qiu, Von Laszewski	Fox	Jha	Marathe Vullikanti	Paden	Beckstein	Wang	Cheatham

For the last 5 years, my research areas are described in items 15-24 below with a major focus on work at the interface of HPC and Big Data with, especially the $1M a year SPIDAL project that I led. This is illustrated in the figure below. A lot of the contributions to SPIDAL came from the six other participating organizations as Indiana only received about 30% of the funds, and so one

needs to look at the total project to gauge the value of this research. We summarized the project for algorithms, communities (applications), and middleware in http://dsc.soic.indiana.edu/publications/SPIDALPaperSept2018.pdf, which is published as a book chapter by IOS Press and an unpublished summary update http://dsc.soic.indiana.edu/publications/SPIDAL%20Perspectives%202020-Final.pdf in Fall 2020.
Major progress in my research through SPIDAL is illustrated by the release of Twister2, a Big Data programming environment that integrates ideas of HPC, our older system Twister, Spark, Apache Storm (Heron), and Hadoop. Unlike other approaches, we built the software as a toolkit with each component carefully designed to satisfy big data requirements and make the best use of HPC. The focus of Twister2 on data management and engineering has led to Cylon, which supports today's Python machine learning environment and addresses the growing importance of GPUs. My interest in algorithms has focused on deep learning to build deep learning simulation surrogates and time series. I have helped MLCommons/MLPerf start a new activity in science data. Since moving to Virginia University, I am beginning new research on the cyberinfrastructure needed to support the work of the Biocomplexity Institute, of which I am a member.

1) **1964-1985 Particle Physics Phenomenology** with modeling of strong interactions and application to both "soft" and "hard" (high transverse momentum) processes
2) **1975-1985 Particle Physics Experiments** at Fermilab E110 (low transverse momentum peripheral production), E260 (production of jets and single particles at high transverse momentum), E350 (testing Triple Regge Theory)
3) **1980-1995** Study of **Parallel Computing** for MIMD machines based until 1990 on **hypercube** topology machines at Caltech/JPL. Develop core (simple) software and performance models and collaborate on some 50 applications reported in the "Parallel Computing Works" book.
4) **1988-2000** Work on **Parallel Computing** in the **CRPC** (Center for Research in Parallel Computation) and in particular on High-Performance Fortran and its PCRC runtime developing the first compiler and working on applications including the Black Hole Grand Challenge
5) **1990-2005** Identification of **Industry** interest in Data-intensive problems with the **Infomall** project at Syracuse
6) **1995-2005** Use of **Java** in scientific computing and HPJava
7) **1995-2010 Web-based** and Object Web **Computing**, Publish-Subscribe middleware, WebFlow, Service-Oriented Architectures, Web Services, and Grids.
8) **1997-2008 Portals** and Gateways using at first Web and then Grid technologies
9) **1995-2012 Web-based collaboration** with application to Education and Command & Control
10) **2005-2011 Cheminformatics** Application at Indiana University with Grid and Services
11) **1988-now** Development of **Interdisciplinary Education:** Computational Science, Plectics, Internetics, Informatics, Intelligent Systems Engineering
12) **1990-now** Continuing work on **optimization** and complex systems in the tradition of neural networks, particularly deterministic annealing with recent work greatly expanding the

applicability of this.

13) **1997-now** enhancing involvement of **Minority Serving Institutions** in STEM with Minority Serving Institutions (MSI) - Cyberinfrastructure Empowerment Coalition (MSI-CIEC). Development of e-Humanity portal and distance education.
14) **1998-2017 QuakeSim** software support for Earthquake forecasting; an area which I have returned to
15) **2000-now Sensors**, Robots, and Smart phone Grids and **Clouds.** This is now licensed to Canadian company C2RO http://c2ro.com/
16) **2007-now Multicore** use in (my) return to detailed parallel computing but mainly applied to data analytics
17) **2007-2017 PolarGrid** support Remote Sensing of ice-sheets with CReSIS center
18) **2008-2021 Bioinformatics** data analytics exploiting clustering and multidimensional scaling with groups at Indiana University and elsewhere
19) **2012-2019** Small effort in (return to) **Particle Physics Phenomenology** applied to Jefferson Laboratory experiments
20) **2012-now** Small effort in (return to) **Education Technology** including MOOCs. This education technology has recently focused on using Github as a learning management system, https://cybertraining-dsc.github.io/modules/bigdataapplications/2020/, and recent NSF Cybertraining award.
21) **2008-now distributed Big Data systems** including high performance computing leading to extensions of MapReduce with Twister and Twister2 and Cylon systems leading to **2014-now Building blocks for Data Analytics** Major National Collaboration http://www.spidal.org/, http://dsc.soic.indiana.edu/publications/SPIDAL%20Perspectives%202020-Final.pdf shown in the figure above.
22) **2010-now Cloud Computing** and associated infrastructure as a Service**.** First with **FutureGrid** as a National Facility, later with SDSC, and now NIST
23) **2017-2021** work with Nanohub on deploying **Nano-Bio** computational resources
24) **2018-now Interface of Deep Learning, HPC and Applications** Software, and Algorithms. MLCommons/MLPerf benchmarks; Deep Learning Surrogates for simulations. and data analytics, new directions for SPIDAL Software, Deep Learning for Time Series.
25) **2020-now Algorithms for Earthquake Forecasting** in collaboration with UC Davis and JPL
26) **2021-now** Work on **cyberinfrastructure for the Biocomplexity Institute** at the University of Virginia.

Summary of Current and Recent Funding

1) OAC Core: Smart Surrogates for High Performance Scientific Simulations, PI $200K, NSF2212550, 07/01/2022-06/30/2024 (in collaborations with other grants to Rochester Institute of Technology, and Rutgers).
2) Expeditions: Global Pervasive Computational Epidemiology, co-PI, $375K, 04/01/2020-03/31/2025. NSF CISE and led by the University of Virginia.

3) Fair Surrogate Benchmarks Supporting AI and Simulation Research, PI, $839K, 09/23/2020-09/22/2021 and 10/01/2022-09/30-2024 (gap due to transfer of grant to Virginia) to 09/22/2023 DoE (in collaborations with other grants to Chicago, Tennessee, and Rutgers).
4) EAGER: SciDatBench: Principles and Prototypes of Science Data Benchmarks, PI, $297K, 08/15/2020-10/31/2023 OAC NSF 2204115
5) Network for Computational Nanotechnology - Engineered nanoBIO Node, PI, $4M, 09/01/17 - 08/31/22, NSF Engineering (I resigned as PI August 2021 when I left Indiana University)
6) CyberTraining: CIC: CyberTraining for Students and Technologies from Generation Z, PI, $492K, 07/01/2018 - 10/31/2023, OAC NSF2200409
7) Collaborative Research: Framework: Software: CINES: A Scalable Cyberinfrastructure for Sustained Innovation in Network Engineering and Science, co-PI, $500K, 11/01/2018 - 10/31/2023, OAC NSF2210266
8) Generalized Data Analytics Services, PI, $60K, 09/01/2020 - 08/31/2021, NIST
9) Deep Learning-Based Time Evolution, PI, $86.5K, 09/01/2020-08/31/2021. Community Foundation of Silicon Valley (Cisco)
10) CIF21 DIBBs: Middleware and High Performance Analytics Libraries for Scalable Data Science, PI, $5,283K total, 10/01/14 - 09/30/21, NSF OAC with subcontracts to Arizona State, Kansas, Rutgers, Stony Brook, Utah, Virginia.
11) Big Data and Extreme-scale Computing, 2nd Series (BDEC2), co-PI, $205K, 10/1/2018-9/30/2020, NSF OAC
12) Automated Big Data REST Service Creation in Support of Big Data Applications, PI, $50K, 09/01/2018 - 08/31/2019, NIST
13) Supplemental Support for NSF Project PHY-1415459 to organize 2017 International Summer Workshop on Data Science for Scattering Reactions, PI, $42.5K, 05/01/17 – 07/31/18, NSF Nuclear Physics
14) Extensible Computational Services for Discovery of New Particles, PI, $475K, 08/01/14 - 07/31/18, NSF Nuclear Physics
15) Gateways to Discovery: Cyberinfrastructure for the Long Tail of Science with SDSC, co-PI, $1.2M, 01/01/15 – 03/31/20, NSF OAC

Conferences Organized

1) Caltech 1971 (with C. B. Chiu) on ``High Energy Physics Phenomenology."
2) Caltech 1979 on ``Gauge Theories and Related High Energy Physics (Experimental and Theoretical) Topics."
3) JPL 1988 ``Third Conference on Hypercube Concurrent Computers and Applications;" Chairperson of the program committee.
4) Syracuse 1992 ``First International Symposium on High-Performance Distributed Computing," Conference Chair.

5) Spokane 1993 ``Second International Symposium on High-Performance Distributed Computing," Conference Chair.
6) San Francisco 1994 ``Third International Symposium on High-Performance Distributed Computing," Conference Chair.
7) Washington, D.C. 1995 ``Fourth International Symposium on High-Performance Distributed Computing," Conference Chair.
8) Syracuse 1996 ``Fifth International Symposium on High Performance Distributed Computing," Conference Chair.
9) Syracuse 1996 "Java for Science and Engineering," Convener and Organizer
10) Seattle 2002 "Java Grande-ISCOPE 2002", Program Chair (plus continued involvement in previous Java Grande activities 1996-2002)
11) Chicago June 26-30, 2005 "GGF14 - The fourteenth Global Grid Forum", Program Chair
12) GCC 2005, The 4th International Conference on Grid and Cooperative Computing, November 30-December 3, 2005, Beijing, China, Program co-chair
13) Athens, Greece February 13-16, 2006 "GGF16 - The sixteenth Global Grid Forum", Program Chair
14) Seattle, Washington, October 15-19, 2007, "The 21st Open Grid Forum - OGF21", Program Chair
15) Bangalore, India, December 10-13 2007, "The 3rd International Conference on e-Science and Grid Computing", Program Chair
16) Indianapolis, Indiana, December 7-12 2008, "The 4th International Conference on e-Science ", General Chair
17) The Virtual Summer School of Computational Science and Engineering in "Big Data for Science," July 26-30, 2010, Indiana University and nine other sites.
18) Indianapolis, Indiana, November 30 - December 3, 2010, "The 2nd International Conference on Cloud Computing Technology and Science CloudCom2010", General Chair
19) The Virtual Summer School of Computational Science and Engineering in "Science Clouds" July 30-August 3, 2012, Indiana University and nine other sites
20) 2015 International Summer Workshop on Reaction Theory, June 8-19, 2015 Bloomington, Indiana, US
21) STREAM 2015 October 27-28, 2015 Indianapolis, an interdisciplinary workshop to identify application and technology communities working in streaming, steering and their intersection,
22) STREAM2016 March 22-23, 2016 Washington DC, follow-up workshop to identify application and technology communities working in streaming, steering, and their intersection
23) Program chair of Conference IEEE International Conference on Cloud Computing, Cloud 2017 Conference June 25-30, 2017, Honolulu, Hawaii
24) Co-general chair Cloud 2018 Conference July 2-7 2018, San Francisco

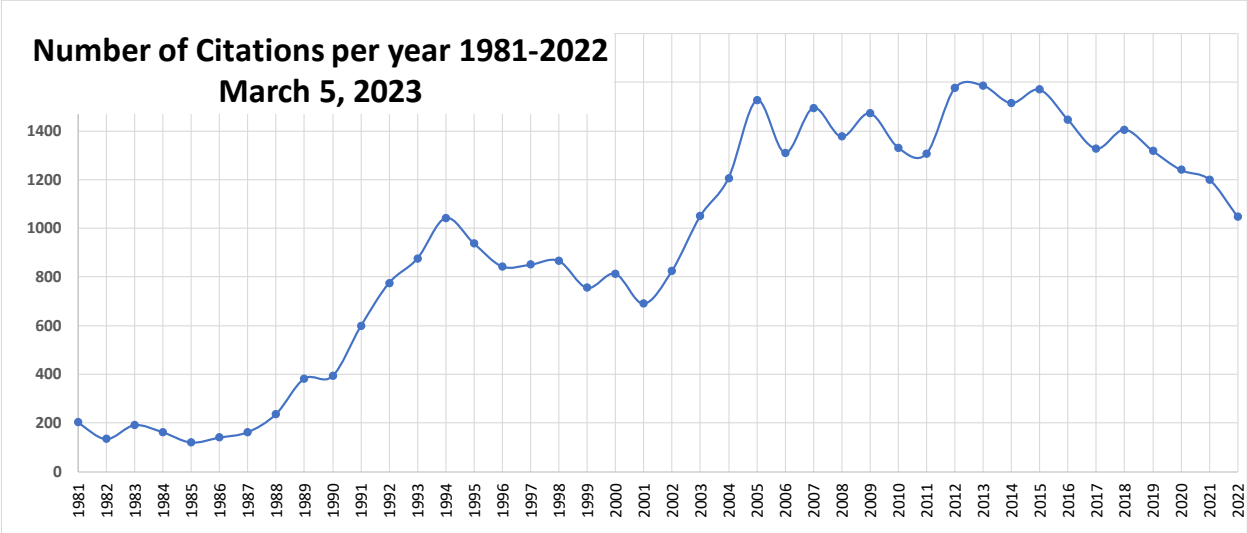
25) Co-organizer of Big data and extreme-scale computing BDEC2 workshop in Bloomington, Indiana November 28-30, 2018.
26) Co-general chair IEEE Cloud 2019 Conference July 8-13, 2019 in Milan, Italy
27) Lead General chair of IEEE Services Congress, July 2-8, 2023 in Chicago, Illinois

I am General Chair or Program chair of many more conferences, but those above, I had a particularly strong involvement.

Publications: Introduction
According to Google Scholar https://scholar.google.com/citations?user=dJ-fD-sAAAAJ, I have 42185 citations, 1851 papers of which 585 have at least 10 citations, and I have an h-index of 86. (as of March 5, 2023). The chart below gives citations per year from Google Scholar from 1981 to 2022.

Google Scholar tends to be liberal in its definition of a "paper" (conference committee pages are included for example), but there are very few "papers" not written by me in this sample. The listings in the CV identify 1337 "papers". ResearchGate lists 1454 "research items" for me at https://www.researchgate.net/profile/Geoffrey_Fox on March 5, 2023.

The publications in this CV start with full Books, Lecture and Course notes, and open-source Software systems. Then the "real" papers are organized in groups starting with those from January 2005 to March 2023. These are divided into conventional categories separating journal, book, and conference contributions. This is followed by a set from 1967-1990 and then the set from 1990-2004 with only unpublished technical reports separated. The website http://www.infomall.org contains recent online material and http://salsahpc.indiana.edu/dlib/home/, http://www.old-npac.org, http://www.new-npac.org/users/fox/, and http://www.new-npac.org/projects/ material from before 2001. I do not list presentations in this CV; the websites above list most of my presentations and are approximately complete since 1990, although only presentations while I am at Indiana University (July 2001 onwards) are easy to find at http://www.dsc.soic.indiana.edu/presentations.



Books Authored and Edited

1) *Phenomenology in Particle Physics*, 1971, (with C. B. Chiu and A. J. G. Hey), Proceedings of a conference at Caltech (organized by C. B. Chiu and G. C. Fox) in 1971.
2) *Hypercube Concurrent Computers and Applications*, Proceedings of the Third Conference on Hypercube Concurrent Computers and Applications, published by ACM, 1988.
3) *Solving Problems in Concurrent Processors-Volume 1*, with M. Johnson, G. Lyzenga, S. Otto, J. Salmon, D. Walker, Prentice Hall, March 1988.
4) *Solving Problems in Concurrent Processors-Volume 2*, with I. Angus, J. Kim, D. Walker, Prentice Hall, 1990.
5) *Supercomputer Applications of the Hypercube*, published in *Supercomputing Systems*, Chapter 11, pp. 480-577 by Van Nostrand Reinhold Publishing House, New York, N.Y. editors Steve and Lana Kartashev (1989).
6) *Parallel Computing Works!*, with P. Messina, R. Williams, Morgan Kaufman (1994).
7) *The Sourcebook of Parallel Computing* book edited by Jack Dongarra, Ian Foster, Geoffrey Fox, William Gropp, Ken Kennedy, Linda Torczon, and Andy White, Morgan Kaufmann, November 2002 (3 chapters co-authored by Fox)
8) *Grid Computing: Making the Global Infrastructure a Reality* edited by Fran Berman, Geoffrey Fox, and Tony Hey, John Wiley & Sons, Chichester, England, ISBN 0-470-85319-0, March 2003
9) *Distributed and Cloud Computing: Clusters, Grids, Clouds and The Internet of Things* by Kai Hwang, Geoffrey Fox, and Jack Dongarra, Morgan Kaufmann (Elsevier), ISBN 0-123-85880-1, October 2011
10) Artificial Intelligence for Science: A Deep Learning Revolution, https://doi.org/10.1142/13123 | 2023, Edited By: Alok Choudhary (Northwestern University, USA), Geoffrey Fox (University of Virginia, USA) and Tony Hey (Rutherford Appleton Laboratory, UK). World Scientific Publishing. https://www.worldscientific.com/worldscibooks/10.1142/13123#t=aboutBook

Lecture and Course Notes

1) ``Phenomenology of Particle Physics," course notes with answered problems for Physics 231, CALT-68-837, unpublished, 1980. These have been digitized at http://salsahpc.org/dlib/articles/00000629/, http://salsahpc.org/dlib/articles/00001078/, http://salsahpc.org/dlib/articles/00001669/
2) Numerous Courses have been put on the web including series Fox taught to Jackson State University 1997-2005 while http://www.old-npac.org has all courses offered at Syracuse http://www.old-npac.org/users/gcf/byarea0.html which lists two CD-Roms we made of educational material
3) "Grid Technologies" August 17, 2001, at ERDC Vicksburg Ms
4) "Web Services and Grids" at Global Grid Forum Toronto February 17, 2002
5) "XML for Science" HPMCO Users Meeting Austin Texas June 8, 2002 (similar at NCSA Alliance Meeting May 8, 2002)
6) "Lectures on Grid Technology" April 1-3 2003 CERN http://grids.ucs.indiana.edu/ptliupages/presentations/cerngridtechAapril03.ppt and

http://grids.ucs.indiana.edu/ptliupages/presentations/cerngridtechBapril03.ppt

7) "Web Services for Grids" at 2004 Grid Summer School Vico Equense near Naples Italy July 2004 "GlobalMMCS" at CTS2005 Saint Louis, Missouri, USA May 17, 2005
8) "Grids" at DSRT2005 Distributed Simulation and Real-Time Applications' Montreal October 10-12 2005
9) "Implications of Parallel Computing for Multicore" at Microsoft Research February 26-March 1 2007
10) "Web 2.0 and Grids" with Marlon Pierce CTS2007 May 21, 2007, http://grids.ucs.indiana.edu/ptliupages/presentations/Web20Tutorial_CTS.ppt (repeated OGF19, SC07 Education Program, and CTS2008)
11) "Parallel Computing and Multicore 2008" HPCS 2008 at Nicosia Cyprus June 5 2008
12) FutureGrid Tutorial at CTS2011 Philadelphia May 23, 2011
13) FutureGrid Tutorial at PPAM September 11, 2011, Poznan
14) See Summer Schools in 2010 and 2012 listed under conferences
15) https://bigdatacoursespring2014.appspot.com/preview Big data Applications and Analytics Course I590, I400 Spring 2014
16) https://bigdatacourse.appspot.com/preview Big data Applications and Analytics MOOC Fall 2013
17) http://iucloudsummerschool.appspot.com/preview Science Cloud Talk Repository Summer 2014
18) Geoffrey Fox Big Data Tutorial on Mapping Big Data Applications to Clouds and HPC: Cloudmesh: Software Defined Distributed Systems as a Service SDDSaaS January 27 2015 BigDat 2015: International Winter School on Big Data Tarragona, Spain, January 26-30, 2015
19) Geoffrey Fox Big Data Tutorial on Mapping Big Data Applications to Clouds and HPC: Sports Analytics January 27 2015 BigDat 2015: International Winter School on Big Data Tarragona, Spain, January 26-30, 2015
20) Geoffrey Fox Big Data Tutorial on Mapping Big Data Applications to Clouds and HPC: Looking At Individual HPCABDS Software Layers January 27 2015 BigDat 2015: International Winter School on Big Data Tarragona, Spain, January 26-30, 2015
21) Geoffrey Fox Big Data Tutorial on Mapping Big Data Applications to Clouds and HPC: Data Mining Runtime Software and Algorithms January 27 2015 BigDat 2015: International Winter School on Big Data Tarragona, Spain, January 26-30, 2015
22) Geoffrey Fox Big Data Tutorial on Mapping Big Data Applications to Clouds and HPC: Keynote January 27 2015 BigDat 2015: International Winter School on Big Data Tarragona, Spain, January 26-30, 2015
23) http://bigdataopensourceprojects.soic.indiana.edu/ March-June 2015 Big Data Open Source Software Projects Course
24) Geoffrey Fox (presenter), David Crandall, Judy Qiu, Gregor Von Laszewski, Shantenu Jha, John Paden, Oliver Beckstein, Tom Cheatham, Madhav Marathe, Fusheng Wang, "Tutorial Program", International Winter School BigDat 2017 MIDAS and SPIDAL Tutorial Bari Italy February 13-14 2017
25) Geoffrey Fox (presenter), David Crandall, Judy Qiu, Gregor Von Laszewski, Shantenu Jha, John Paden, Oliver Beckstein, Tom Cheatham, Madhav Marathe, Fusheng Wang,

"Integration of HPC, Big Data Analytics and the Software Ecosystem Tutorial" at BigDat 2018: 4th International Winter School on Big Data, Timisoara, Romania, January 22-26, 2018

26) Courses from 2015-9 are not online as they used OpenEdX which is no longer available from Indiana University. Recently we have rehosted this material on Github and the Big data Applications and Analytics Course now known as E534 isb described for 2018 and 2019. Other courses are being updated to this approach and are temporarily here.
27) Geoffrey Fox for the Twister2 Team, "Twister2 Tutorial", January 10-11 2019, 5th International Winter School on Big Data BigDat2019, Cambridge, United Kingdom - January 7-11, 2019
28) Cybertraining rehosting and update of previous and current classes. https://cybertraining-dsc.github.io/

Open Source Software and Resources: Current

1) FFFFWNPF Deep Learning model for time series https://www.researchgate.net/deref/https%3A%2F%2Fcolab.research.google.com%2Fdrive%2F1dUwrxlUq8G8HHTzImJXmJ9qiUFabdIKf%3Fusp%3Dsharing
2) Cylon "Data Engineering Everywhere" https://github.com/cylondata/cylon/releases/ with tutorial
3) Twister2 high performance data analytics hosting environment that can work in both cloud and HPC environments https://github.com/DSC-SPIDAL/twister2/releases released May 10 2019 with extensive tutorial.
4) SPIDAL Github https://github.com/DSC-SPIDAL data analytics library. This is being federated with all software from SPIDAL NSF Dibbs project
5) WebPlotViz 3D point viewer including time series https://spidal-gw.dsc.soic.indiana.edu/. This replaces Plotviz 3D software below
6) Cloudmesh DevOps Software originally developed for FutureGrid. Now for NIST and SDSC.
7) MSI-CIEC Portal for outreach to Minority Serving Institutions
8) eHumanity cultural portal developed for AIHEC the American Indian Higher Education Consortium with NEH (National Endowment for Humanities) funding

Open Source Software and Resources: Obsolescent SALSA Laboratory Projects

9) **Twister** Iterative MapReduce for Java applications replaced by Twister2
10) **Twister for Azure** Iterative MapReduce customized for Azure will be replaced by Twister2
11) **MapReduce for Azure** was the initial version of Twister for Azure using Azure PaaS capabilities
12) **Plotviz** 3D viewer for the study of clustering replaced by WebPlotviz 3D above in our operation but still used by others.
13) Early SALSA **Performance Measurements** and Kernel Software on multicore chips

Open Source Software and Resources: Older Projects

14) **HPJava** Parallel Java Compiler and mpiJava Java binding to MPI

15) **Machine Learning** C# code for Clustering with deterministic annealing and Multi Dimensional Scaling (replaced by Java version in SPIDAL library)
16) **QuakeSim** website (now retired but independent work built on this) providing interactivity and support for earthquake fault spatial deformation applications and GPS time series analysis tools using Web services for accessing backend high-performance computing resources. Used by NASA JPL researchers and geophysics classes at California State University-Northridge. This was awarded a NASA Software of the Year award in 2012.
17) **Futuregrid** virtual machine-based simulation test bed with much in house software. See Cloudmesh above
18) **Chembiogrid** CICC open-source software from the Chemical Informatics and Cyberinfrastructure Collaboratory at Indiana University. Currently Archived
19) Multi-institution Grid Portal (**Open Grid Computing Environment**) resource has been retired and integrated into the Science Gateway Institute SGCI
20) **CrisisGrid** Open Geospatial Consortium standards-compliant Web Services for Geographical Information Systems. Core Software for SERVOGrid Complexity Computational Environment. Currently archived
21) **GlobalMMCS** Service oriented audio-video conferencing and collaboration environment. This software is no longer supported and is archived.
22) **Underground Film** archive of multimedia digital objects was taken off the air and rehosted commercially May 2007 due to support funding issues.
23) **Core Grid and Web Service** software including Extended UDDI, WS-Context, Calendaring Service and older GXOS and XML Nuggets. Currently archived
24) NaradaBrokering Grid and Web Service publish-subscribe messaging infrastructure. This has important support for multi-protocol transport used in collaboration. It is now out of date and replaced by RabbitMQ Kafka or Pallickara's recent research work.
25) **e-Science 2008 Conference** Live Audio-Video broadcasting site Live site integrating live and archived video and audio feeds, chats, and blogs for E-Science 2008. Currently lost.

Publications

Published or Submitted Journal Articles 2005 – March 2023

1) Arup Kumar Sarker, Md. Khairul Islam, Yuan Tian, Geoffrey Fox, "MVAM: Multi-variant Attacks on Memory for IoT Trust Computing", SafeThings 2023, IEEE/ACM Workshop on the Internet of Safe Things San Antonio, Texas USA, May 9, 2023
2) J Quetzalcoatl Toledo-Marin, James A Glazier, Geoffrey Fox, "Analyzing the Performance of Deep Encoder-Decoder Networks as Surrogates for a Diffusion Equation", https://arxiv.org/abs/2302.03786 submitted to Machine Learning: Science and Technology, March 3, 2023.
3) Niranda Perera, Arup Kumar Sarker, Mills Staylor, Gregor von Laszewski, Kaiying Shan, Supun Kamburugamuve, Chathura Widanage, Vibhatha Abeykoon, Thejaka Amila Kanewela, Geoffrey Fox "In-depth Analysis On Parallel Processing Patterns for High-Performance Dataframes " Submitted to PPAM Conference 2022 Special Issue in FGCS, Elsevier, February 27, 2023
4) David Grzan, John B Rundle, Geoffrey C Fox, Andrea Donnellan, "Forecasting tsunami inundation with convolutional neural networks for a potential Cascadia Subduction Zone

rupture". Authorea. February 09, 2023. DOI: 10.22541/essoar.167591125.50103833/v1
5) EA Huerta, Ben Blaiszik, L Catherine Brinson, Kristofer E Bouchard, Daniel Diaz, Caterina Doglioni, Javier M Duarte, Murali Emani, Ian Foster, Geoffrey Fox, Philip Harris, Lukas Heinrich, Shantenu Jha, Daniel S Katz, Volodymyr Kindratenko, Christine R Kirkpatrick, Kati Lassila-Perini, Ravi K Madduri, Mark S Neubauer, Fotis E Psomopoulos, Avik Roy, Oliver Rübel, Zhizhen Zhao, Ruike Zhu, "FAIR for AI: An interdisciplinary, international, inclusive, and diverse community building perspective", Scientific Data, October 13, 2022, https://arxiv.org/abs/2210.08973, Proceedings of FAIR for AI Workshop held at Argonne National Laboratory on June 7, 2022.
6) J. B. Rundle, A. Donnellan, G. Fox, L. Grant Ludwig, and J. P. Crutchfield, "Does the Catalog of California Earthquakes, with Aftershocks Included, Contain Information about Future Large Earthquakes?," Earth and Space Science Open Archive, p. 18, 2022, https://doi.org/10.1002/essoar.10512008.4, arXiv:2208.03839
7) J. B. Rundle, J. Yazbeck, A. Donnellan, and L. Grant Ludwig, "Optimizing Earthquake Nowcasting with Machine Learning: The Role of Strain Hardening in the Earthquake Cycle," Earth and Space Science Open Archive. 2022 https://www.essoar.org/doi/abs/10.1002/essoar.10510940.4, Volume10, Issue2, February 2023, e2022EA002521 https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2022EA002521
8) G. Fox, J. Rundle, A. Donnellan, and B. Feng, "Earthquake Nowcasting with Deep Learning," arXiv [physics.geo-ph], 18-Dec-2021 [Online]. Available: http://arxiv.org/abs/2201.01869, GeoHazards 3 (2), 199-226 (2022)
9) V. Abeykoon, S. Kamburugamuve, C. Widanage, N. Perera, A. Uyar, T. A. Kanewala, G. von Laszewski, and G. Fox, "HPTMT Parallel Operators for High Performance Data Science and Data Engineering," Frontiers in Big Data, vol. 4, 2022 [Online]. Available: https://www.frontiersin.org/article/10.3389/fdata.2021.756041
10) J. Thiyagalingam, M. Shankar, G. Fox, and T. Hey, "Scientific Machine Learning Benchmarks," arXiv [cs.LG], 25-Oct-2021 [Online]. Available: http://arxiv.org/abs/2110.12773, Nature Reviews Physics 4 (6), 413-420
11) E. Garyfallidis, S. Koudoro, J. Guaje, M.-A. Côté, S. Biswas, D. Reagan, N. Anousheh, F. Silva, G. Fox, and Fury Contributors, "FURY: advanced scientific visualization," J. Open Source Softw., vol. 6, no. 64, p. 3384, Aug. 2021 [Online]. Available: https://joss.theoj.org/papers/10.21105/joss.03384
12) J. B. Rundle, A. Donnellan, G. Fox, J. P. Crutchfield, and R. Granat, "Nowcasting Earthquakes: Imaging the Earthquake Cycle in California with Machine Learning," Earth and Space Science, 8(12), 2021. https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2021EA001757
13) J. B. Rundle, A. Donnellan, G. Fox, and J. P. Crutchfield, "Nowcasting Earthquakes by Visualizing the Earthquake Cycle with Machine Learning: A Comparison of Two Methods," Surveys in Geophysics 43 (2), 483-501. https://doi.org/10.1007/s10712-021-09655-3
14) A. Uyar, G. Gunduz, S. Kamburugamuve, P. Wickramasinghe, C. Widanage, K. Govindarajan, N. Perera, V. Abeykoon, S. Akkas, and G. Fox, "Twister2 Cross-platform resource scheduler for big data," Concurr. Comput., Jul. 2021 [Online]. Available: https://onlinelibrary.wiley.com/doi/10.1002/cpe.6502 and 34 (9), e6502

15) John B. Rundle, Andrea Donnellan, Geoffrey Fox, James P Crutchfield, Robert A Granat, "Nowcasting Earthquakes: Imaging the Earthquake Cycle in California with Machine Learning", Earth and Space Science Open Archive, 28 Mar 2021, DOI 10.1002/essoar.10506614.1, https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2021EA001757
16) Vibhatha Abeykoon Geoffrey Fox Minje Kim Saliya Ekanayake Supun Kamburugamuve Kannan Govindarajan Pulasthi Wickramasinghe Niranda Perera Chathura Widanage Ahmet Uyar Gurhan Gunduz Selahatin Akkas, "Stochastic gradient descent-based support vector machines training optimization on Big Data and HPC frameworks", published in Concurrency and Computation: Practice and Experience: 30 March 2021and 34 (8), e6292 (2022). https://doi.org/10.1002/cpe.6292
17) Quetzalcóatl Toledo-Marín, J; Fox, Geoffrey; Sluka, James P; Glazier, James A, "Deep learning approaches to surrogates for solving the diffusion equation for mechanistic real-world simulations" February 10, 2021 Front. Physiol., vol. 12, p. 667828, Jun. 2021 [Online]. Available: http://dx.doi.org/10.3389/fphys.2021.667828, Arxiv Researchgate
18) Thanh Nguyen, Tongbin Zhang, Geoffrey Fox, Sisi Zeng, Ni Cao, Chuandi Pan, Jake Y. Chen, "Linking Clinotypes to Phenotypes and Genotypes from Laboratory Test Results in Comprehensive Physical Exams" BMC Medical Informatics and Decision Making volume 21, Article number: 51 (2021). DOI Researchgate February 24, 2021
19) H. He, W. Zhao, S. Huang, G. C. Fox, and Q. Wang, "Research on the Architecture and its Implementation for Instrumentation and Measurement Cloud," IEEE Trans. Serv. Comput., vol. 13, no. 5, pp. 944–957, 2020 [Online]. Available: http://dx.doi.org/10.1109/TSC.2017.2723006
20) Bokyoon Na and Geoffrey Fox, "Object Detection by a Super-Resolution Method and a Convolutional Neural Networks" in International Journal of Data Mining Science. Vol 1, Issue 1, pages 16-23, May 17 2019
21) W. Gao, J. Zhan, G. Fox, X. Lu, and D. Stanzione, "Benchmarking, Measuring, and Optimizing: Second BenchCouncil International Symposium", Bench 2019, Denver, CO, USA, November 14–16, 2019, Revised Selected Papers. Springer Nature, July 29, 2020
22) Geoffrey C. Fox, Gregor von Laszewski, Fugang Wang, and Saumyadipta Pyne "AICov: An Integrative Deep Learning Framework for COVID-19 Forecasting with Population Covariates" Technical Report July 3 2020 Arxiv with update published in J. data sci.(2021), 1-21, DOI 10.6339/21-JDS1007
23) Ahmet F. Mustacoglu, Ferhat O. Catak, Geoffrey C. Fox, "Password-based encryption approach for securing sensitive data" Security and Privacy, July 1 2020 DOI and ResearchGate
24) JCS Kadupitiya, Geoffrey C. Fox and Vikram Jadhao, "Simulating Molecular Dynamics with Large Timesteps using Recurrent Neural Networks" arXiv:2004.06493v2 and ResearchGate 12 April 2020. Revised and GitHub site. Oublished as J. C. S. Kadupitiya, G. C. Fox, and V. Jadhao, "Solving Newton's equations of motion with large timesteps using recurrent neural networks based operators," Machine Learning: Science, 2022. https://iopscience.iop.org/article/10.1088/2632-2153/ac5f60/meta
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Engineering Systems Journal (ASTESJ) Volume 5, Issue 2, Page No 476-483, 2020 DOI: 10.25046/aj050261 March 12 2020
26) Vibhatha Abeykoon, Geoffrey Fox, Minje Kim, Saliya Ekanayake, Supun Kamburugamuve, Kannan Govindarajan, Pulasthi Wickramasinghe, Niranda Perera, Chathura Widanage, Ahmet Uyar, Gurhan Gunduz, Selahattin Akkas, "Stochastic Gradient Descent Based Support Vector Machines Training Optimization on Big Data and HPC Frameworks", Technical Report August 7, 2019. Submitted to Special Issue of Concurrency and Computation: Practice and Experience
27) Mahzad Khoshlessan, Ioannis Paraskevakos, Geoffrey C. Fox, Shantenu Jha, Oliver Beckstein, "Parallel Performance of Molecular Dynamics Trajectory Analysis", Technical Report June 21 2019. Submitted to Concurrency and Computation: Practice and Experience
28) Pulasthi Wickramasinghe, Niranda Perera, Supun Kamburugamuve, Kannan Govindarajan, Vibhatha Abeykoon, Chathura Widanage, Ahmet Uyar, Gurhan Gunduz, Selahattin Akkas, Geoffrey Fox, "High-Performance Iterative Dataflow Abstractions in Twister2:TSet",Technical Report, September 2, 2019. Special Issue of Concurrency and Computation: Practice and Experience 34 (12), e5998 (2022)
29) Victor Berger, Mingze Xu, Mohanad Al-Ibadi, Shane Chu, David Crandall, John Paden, Geoffrey Fox, Automated Ice-Bottom Tracking of 2D and 3D Ice Radar Imagery Using Viterbi and TRW-S, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Sept 2019, vol 12, no 9, pp. 3272-3285, DOI: 10.1109/JSTARS.2019.2930920
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33) 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 Lavignon, Y Lu, S Matsuoka, B Mohr, D Reed, S Requena, J Saltz, T Schulthess, R Stevens, M Swany, A Szalay, W Tang, G Varoquaux, J-P Vilotte, R Wisniewski, Z Xu, 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 Volume: 32 issue: 4, page(s): 435-479 July 16, 2018. DOI
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202) Apu Kapadia, Steven Myers, XiaoFeng Wang and Geoffrey Fox "Secure Cloud Computing with Brokered Trusted Sensor Networks" Proceedings of The 2010 International Symposium on Collaborative Technologies and Systems (CTS 2010) May 17-21, 2010 The Westin Lombard Yorktown Center Chicago, Illinois, USA

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204) Tyler Pace, Shaowen Bardzell, Geoffrey Fox "Human-Centered e-Science: A Group-Theoretic Perspective on Cyberinfrastructure Design" Proceedings of The 2010 International Symposium on Collaborative Technologies and Systems (CTS 2010) May 17-21, 2010 The Westin Lombard Yorktown Center Chicago, Illinois, USA

205) Judy Qiu, Scott Beason, Seung-Hee Bae, Saliya Ekanayake, Geoffrey Fox "Performance of Windows Multicore Systems on Threading and MPI" Proceeding Frontiers of GPU, Multi- and Many-Core Systems Workshop of 10th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing Conference (CCGrid 2010). May 17-20, 2010. Melbourne, Victoria, Australia.

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207) Andrea Donnellan, Marlon Pierce, Dennis McLeod, Jay Parker, John Rundle, Lisa Grant, Rami Al-Ghanmi, Gepffrey Fox, Robert Granat "Integrating GPS, InSAR, and UAVSAR data into the QuakeSim Computational Environment" 2011 IEEE Aerospace Conference March 5-12, 2011, Big Sky, Montana

208) Jay W Parker, Margaret T Glasscoe, Andrea Donnellan, Robert A Granat, John Belting Rundle, Dennis McLeod, Rami Al-Ganmi, Lisa Grant Ludwig, Geoffrey Fox, Marlon Pierce, Walt Brooks QuakeSim: Increasing Utility of Spacebourne and Ground-based Earthquake Fault Data Earth and Space Science Informatics 2009 AGU Fall Meeting 14–18 December 2009 San Francisco, California, USA

209) Jaliya Ekanayake, (Advisor Geoffrey Fox) Architecture and Performance of Runtime Environments for Data Intensive Scalable Computing Doctoral Showcase SC09 Portland Oregon November 14-20 2009

210) Xiaohong Qiu, Jaliya Ekanayake, Thilina Gunarathne, Seung-Hee Bae, Jong Youl Choi, Scott Beason, Geoffrey Fox Using MapReduce Technologies in Bioinformatics and Medical Informatics in Using Clouds for Parallel Computations in Systems Biology workshop at SC09 Portland Oregon November 16 2009

211) Xiaohong Qiu, Jaliya Ekanayake, Scott Beason, Thilina Gunarathne, Geoffrey Fox, Roger Barga, Dennis Gannon Cloud Technologies for Bioinformatics Applications 2nd ACM Workshop on Many-Task Computing on Grids and Supercomputers (SC09), Portland, Oregon, November 16th, 2009

212) Geoffrey Fox, Xiaohong Qiu, Scott Beason, Jong Youl Choi, Mina Rho, Haixu Tang, Neil Devadasan, Gilbert Liu Biomedical Case Studies in Data Intensive Computing Keynote talk at The 1st International Conference on Cloud Computing (CloudCom 2009) at Beijing Jiaotong University, China December 1-4, 2009

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216) Marlon Pierce and Geoffrey Fox QuakeSim Web Computing Infrastructure Abstract for Asia Oceania Geosciences Society Meeting in Singapore AOGS2009 August 11-15 2009

217) Geoffrey Fox and Marlon Pierce Web 2.0, Cloud Computing, and Earthquake Forecasting Abstract for Asia Oceania Geosciences Society Meeting in Singapore AOGS2009 August 11-15 2009

218) Jaliya Ekanayake, Geoffrey Fox High Performance Parallel Computing with Clouds and Cloud Technologies First International Conference *CloudComp* on Cloud Computing October 19 - 21, 2009, Munich, Germany

219) Richard Alo, Karl Barnes , Diane Baxter, Julie Foertsch , Geoffrey Fox, Al Kuslikis, Alex Ramirez CyberInfrastructure (CI) Days at Minority-Serving Intuitions (MSIs): A MSI-CIEC Update in a Changing Climate Poster at TeraGrid 09 meeting Hyatt Regency Crystal City. June 22-25 2009

220) Siddharth Maini, Joshua Rosen, Marlon E. Pierce, Geoffrey C. Fox AVATS: Audio-Video and Textual Synchronization Proceeedings of The 2009 International Symposium on Collaborative Technologies and Systems CTS 2009 May 18-22, 2009 The Westin Baltimore Washington International Airport Hotel Baltimore, Maryland, USA

221) Geoffrey Fox, Alex Ho, Eddy Chan, William Wang Measured Characteristics of Distributed Cloud Computing Infrastructure for Message-based Collaboration Applications Proceeedings of The 2009 International Symposium on Collaborative Technologies and Systems CTS 2009 May 18-22, 2009 The Westin Baltimore Washington International Airport Hotel Baltimore, Maryland, USA

222) Tao Huang, Shrideep Pallickara, Geoffrey Fox A Distributed Framework for Collaborative Annotation of Streams Proceeedings of The 2009 International Symposium on Collaborative Technologies and Systems CTS 2009 May 18-22, 2009 The Westin Baltimore Washington International Airport Hotel Baltimore, Maryland, USA

223) Geoffrey Fox Summary of Cloud Systems Birds of a Feather session at OGF22 Hyatt Regency Cambridge MA February 27 2008

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225) Carl Lagoze describing work by University of Cambridge (Peter Murray Rust, Jim Downing), Cornell University (Carl Lagoze, Theresa Velden), Indiana University (Geoffrey Fox, Marlon Pierce), Penn State University (C. Lee Giles, Prasenjit Mitra, Karl Mueller), PuBChem (Steve Bryant), and University of Southampton (Jeremy Frey, Simon Coles).The OreChem Project paper at WebSci'09: Society On-Line Athens, Greece 18th–20th March, 2009

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229) Geoffrey Fox Distributed and Parallel Programming Environments and their performance Abstract of keynote talk at Microsoft Research eScience Workshop December 9 2008 IEEE International Conference on e-Science. Indianapolis. 2008. December 7-12 2008

230) Mehmet S. Aktas, Geoffrey Fox and Marlon Pierce Information Federation in Grids 4th International Conference on Semantics, Knowledge and Grid (SKG 2008) Beijing China December 3-5 2008

231) Linda B. Hayden, Geoffrey Fox, Anthony Adade Implementing Cyberinfrastructure in Support of Greenland and Antarctic SAR Data Sets Abstract for AARSE Conference. 7th International Conference of the African Association of Remote Sensing of the Environment (AARSE)-2008 Accra Ghana October 27-31 2008

232) Geoffrey Fox Integrating Parallel and Distributed Computing across Scientific and Web 2.0 Applications Abstract of keynote talk at 7th International Conference on Grid and Cooperative Computing GCC2008 Shenzhen China October 24-26 2008

233) Xiaohong Qiu (presenter), Geoffrey C. Fox, Huapeng Yuan, Seung-Hee Bae, George Chrysanthakopoulos, Henrik Frystyk Nielsen Parallel Data Mining on Multicore Clusters (Old version Parallel Data Mining on Multicore Systems) 7th International Conference on Grid and Cooperative Computing GCC2008 Shenzhen China October 24-26 2008

234) Shantenu Jha, Andre Merzky and Geoffrey Fox Programming Abstractions for Clouds CCA-08 Cloud Computing and its Applications Chicago ILL October 22-23 2008

235) Geoffrey Fox and Marlon Pierce Web 2.0 and Cloud Computing Abstract of talk at APRU Association of Pacific Rim Universities 4th Earthquake and Tsunami Symposium August 21 - 22, 2008 University of California, Davis (USA)

236) Marlon Pierce and Geoffrey Fox QuakeSim Web Computing Infrastructure Abstract of talk at APRU Association of Pacific Rim Universities 4th Earthquake and Tsunami Symposium August 21 - 22, 2008 University of California, Davis (USA)

237) Geoffrey Fox Parallel Data Mining from Multicore to Cloudy Grids INTERNATIONAL ADVANCED RESEARCH WORKSHOP ON HIGH PERFORMANCE COMPUTING AND GRIDS HPC2008 Cetraro Italy June 30 - July 4, 2008

238) Beytullah Yildiz, Geoffrey Fox, Shrideep Pallickara An Orchestration for Distributed Web Service Handlers The Third International Conference on Internet and Web Applications and Services ICIW 2008 June 8-13, 2008 - Athens, Greece

239) Mehmet S. Aktas, Geoffrey C. Fox, Marlon Pierce, Principles and Experiences: Building a Hybrid Metadata Service for Service Oriented Architecture based Grid Applications, accepted for The Third International IEEE International Conference on Internet and Web Applications and Services ICIW'08 June 8-13, 2008 - Athens, Greece

240) Alex Ramirez, Geoffrey Fox, Al Kuslikis, Richard Alo, Karl Barnes, Diane Baxter, and Julie Foertsch Engaging Minority-Serving Institutions (MSIs) in Cyberinfrastructure (CI) through CI Days The 3rd annual TeraGrid Conference, TeraGrid '08 All Hands Meeting Riviera Hotel and Casino in Las Vegas Nevada, June 9-13 2008

241) Xiaohong Qiu, Geoffrey C. Fox, Huapeng Yuan, Seung-Hee Bae, George Chrysanthakopoulos, Henrik Frystyk Nielsen PARALLEL CLUSTERING AND DIMENSIONAL SCALING ON MULTICORE SYSTEMS Invited talk at the 2008 High Performance Computing & Simulation Conference (HPCS 2008) In Conjunction With The 22nd EUROPEAN CONFERENCE ON MODELLING AND SIMULATION (ECMS 2008) Nicosia, Cyprus June 3 - 6, 2008.

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243) Jaliya Ekanayake, Shrideep Pallickara and Geoffrey Fox Collaborative Framework for Scientific Data Analysis 2008 International Symposium on Collaborative Technologies and Systems (CTS 2008) at The Hyatt Regency Irvine Irvine, California, USA May 19-23, 2008

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245) Geoffrey Fox, Alex Ho, Rui Wang, Edward Chu and Isaac Kwan A Collaborative Sensor Grids Framework 2008 International Symposium on Collaborative Technologies and Systems (CTS 2008) at The Hyatt Regency Irvine Irvine, California, USA May 19-23, 2008

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247) Marlon Pierce and Geoffrey Fox Web 2.0 and Geo-sciences Abstract for 6th ACES International Workshop Cairns, Australia from 11 to 16 May 2008.

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250) Andrea Donnellan, Jay Parker, Robert Granat, Geoffrey Fox, Marlon Pierce, John Rundle, Dennis McLeod, Rami Al-Ghanmi, Lisa Grant, Walter Brooks QuakeSim: Efficient Modeling of Sensor Web Data in a Web Services Environment November 30 2007 to be published in 2008 IEEE Aerospace Conference March 1-8 2008, Big Sky MT

251) Xiaohong Qiu, Geoffrey Fox, H. Yuan, Seung-Hee Bae, George Chrysanthakopoulos, Henrik Frystyk Nielsen High Performance Multi-Paradigm Messaging Runtime Integrating Grids and Multicore Systems (updated from original) September 23 2007 to be published in proceedings of eScience 2007 Conference Bangalore India December 10-13 2007

252) Geoffrey Fox, Seung-Hee Bae, Rajarshi Guha, Marlon E. Pierce, Xiaohong Qiu, David J. Wild , H. Yuan High Performance Robust Datamining for Cheminformatics PAPER ID: 1168842 at Division of Chemical Information session on *Cheminformatics: From Teaching to Research* Tuesday, April 8, 2008 from 11:35 AM to 12:00 PM at Spring 2008 American Chemical Society National Meeting & Exposition Sunday, April 6 — Thursday, April 10, 2008 New Orleans, LA USA

253) Rajarshi Guha, Geoffrey Fox, Kevin E. Gilbert, Marlon Pierce and David Wild I don't care where my data and methods are: A web-service approach for distributed access to methods, data and models. PAPER ID: 1170920 at Division of Chemical Information session on *Cheminformatics: From Teaching to Research* Tuesday, April 8, 2008 at Spring 2008 American Chemical Society National Meeting & Exposition Sunday, April 6 — Thursday, April 10, 2008 New Orleans, LA USA

254) Mehmet A. Nacar, Marlon E. Pierce, Andrea Donnellan, Geoffrey C. Fox Building QuakeSim Portlets with GTLAB Paper at GCE07 Workshop November 11-12 2007 at SC07 Reno Nevada

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257) Geoffrey C. Fox, Marlon E. Pierce, Ahmet Fatih Mustacoglu, and Ahmet E. Topcu Web 2.0 for E-Science Environments Keynote Presentation at 3rd International Conference on Semantics, Knowledge and Grid SKG2007 Xian China October 28-30 2007

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261) Donnellan, Andrea (JPL), John Rundle (UC Davis), Lisa Grant (UC Irvine), Dennis McLeod (USC), Geoffrey Fox (Indiana U), Marlon Pierce (Indiana U), Terry Tullis (Brown U), Walt Brooks (NASA Ames), Jay Parker (JPL), and Robert Granat (JPL) Abstract for 2007 SCEC Annual Meeting, September 9-12 at the Palm Springs Hilton Hotel in Palm Springs, California.

262) Shrideep Pallickara, Hasan Bulut, and Geoffrey Fox. Fault-Tolerant Reliable Delivery of Messages in Distributed Publish/Subscribe Systems . Proceedings of the 4th IEEE International Conference on Autonomic Computing. Jacksonville, Florida. June 12-15 2007

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264) Harshawardhan Gadgil, Geoffrey Fox, Shrideep Pallickara, Marlon Pierce Scalable, Fault-tolerant Management of Grid Services to appear in Proceedings of IEEE Cluster 2007

265) Andrea Donnellan, Jay Parker, Charles Norton, Gregory Lyzenga, Margaret Glasscoe, Geoffrey Fox, Marlon Pierce, John Rundle, Dennis McLeod, Lisa Grant, Walter Brooks and Terry Tullis QuakeSim: Enabling Model Interactions in Solid Earth Science Sensor Webs NASA Science Technology Conference NSTC 2007 University of Maryland June 19-21 2007
266) Xiaohong Qiu Multi-Paradigm Run Time MPR for Multicore Systems Position Paper for Microsoft Multicore Computing Workshop Seattle June 20-21 2007
267) Zao Liu, Marlon E. Pierce, and Geoffrey C. Fox Implementing a Caching and Tiling Map Server: a Web 2.0 Case Study Proceedings of The 2007 International Symposium on Collaborative Technologies and Systems (CTS 2007)
268) Ahmet Fatih Mustacoglu, Ahmet E. Topcu Aurel Cami, Geoffrey Fox A Novel Event-Based Consistency Model for Supporting Collaborative Cyberinfrastructure Based Scientific Research Proceedings of The 2007 International Symposium on Collaborative Technologies and Systems (CTS 2007)
269) Galip Aydin, Zhigang Qi, Marlon E. Pierce, Yehuda Bock, and Geoffrey C. Fox Building a Sensor Grid for Real Time Global Positioning System Data Proceedings of Workshop on Principles of Pervasive Information Systems Design Sunday, May 13, 2007 In conjunction with Pervasive 2007 Toronto, Ontario, Canada
270) Ahmet Fatih Mustacoglu, and Geoffrey Fox AJAX Integration Approach for Collaborative Calendar-Server Web Services Proceedings of The 2007 World Congress in Computer Science, Computer Engineering, & Applied Computing Las Vegas, Nevada, USA (June 25-28, 2007)
271) Harshawardhan Gadgil, Geoffrey Fox, Shrideep Pallickara Scalable, Fault-tolerant Management in a Service Oriented Architecture Poster in pages 235-236 of proceedings for IEEE International Symposium in High-Performance Distributed Computing (HPDC) Monterey California June 27-29 2007
272) Mehmet A. Nacar, Jong Y. Choi, Marlon E. Pierce, and Geoffrey C. Fox Building a Grid Portal for Teragrid's Big Red Proceedings of TeraGrid 2007 Conference Madison Wisconsin June 4-8 2007
273) Richard A. Aló, Karl Barnes, Diane Baxter, Geoffrey Fox, Al Kuslikis, and Alex Ramirez Advances in the MSI Community and the MSI CyberIn-frastructure Empowerment Coalition (MSI-CIEC) Proceedings of TeraGrid 2007 Conference Madison Wisconsin June 4-8 2007
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276) Shrideep Pallickara, Jaliya Ekanayake, Geoffrey Fox, A Scalable Approach for the Secure and Authorized Tracking of the Availability of Entities in Distributed Systems. (To appear) Proceedings of the 21st IEEE International Parallel & Distributed Processing Symposium (IPDPS 2007). Long Beach, California.
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278) Hao Yin, Sofia Brenes-Barahona, Donald F. McMullen, Marlon Pierce, Kianosh Huffman, Geoffrey Fox, A PERMIS-based Authorization Solution between Portlets and Back-end Web Services . Second International Workshop on Grid Computing Environments GCE06 at SC06, Tampa, FL. Nov. 12-13 2006
279) Mehmet S. Aktas, Sangyoon Oh, Geoffrey C. Fox, and Marlon E. Pierce XML Metadata Services Proceedings of SKG2006 Guilin China October 31 - November 3 2006.
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284) Richard Alo, Karl Barnes, Diane Baxter, Geoffrey Fox, Al Kuslikis, Calvin Lowe, Alex Ramirez, Selena Singleton MSI-CIEC: MSI Cyberinfrastructure Empowerment Coalition and the TeraGrid (Abstract) TeraGrid '06 Indianapolis IN June 12-15 2006
285) Harshawardhan Gadgil, Geoffrey Fox, Shrideep Pallickara and Marlon Pierce Managing Grid Messaging Middleware Proceedings of IEEE Conference on the Challenges of Large Applications in Distributed Environments (CLADE) Paris France June 19 2006, pp. 83 - 91 DOI
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WSEAS Int.Conf. on TELECOMMUNICATIONS and INFORMATICS (TELE-INFO '06), Istanbul, Turkey, May 27-29, 2006

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on Education and Information Systems, Technologies and Applications (EISTA 2006) Orlando, USA, July 20-23, 2006.

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300) Ahmet Sayar, Marlon Pierce and Geoffrey Fox Integrating AJAX Approach into GIS Visualization Web Services Proceedings of IEEE International Conference on Internet and Web Applications and Services ICIW'06 February 23-25, 2006 Guadeloupe, French Caribbean

301) Sayar, M. Pierce, G. C. Fox DEVELOPING GIS VISUALIZATION WEB SERVICES FOR GEOPHYSICAL APPLICATIONS ISPRS International Society for Photogrammetry and Remote Sensing Workshop Commission II WG/2 METU, Ankara, Turkey, November, 24-25, 2005

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Applications Invited talk at TIWDC 2005 CNIT Tyrrhenian International Workshop on Digital Communications July 4-6 2005

306) Geoffrey Fox, Galip Aydin, Harshawardhan Gadgil, Shrideep Pallickara, Marlon Pierce, and Wenjun Wu Management of Real-Time Streaming Data Grid Services Invited talk at Fourth International Conference on Grid and Cooperative Computing (GCC2005), held in Beijing, China, during Nov 30-Dec 3, 2005 and Longer Version

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