

Bruce E. Wilson

Oak Ridge National Laboratory
Environmental Sciences Division
Box 2008, MS 6290
Oak Ridge, TN 37831-6290

e-mail: bruce@bewilson.net
work phone: 865-574-6651
ORCID: 0000-0002-1421-1728
<https://web.ornl.gov/~wb5>

EDUCATIONAL HISTORY

Ph.D. (Analytical Chemistry) University of Washington, Seattle (1988; Bruce Kowalski)
B.S. with High Honors (Chemistry and Mathematics) Michigan State University (1985)

PROFESSIONAL EXPERIENCE

Oak Ridge National Laboratory: 2006-present (Oak Ridge, TN):

Group Leader and ORNL DAAC Manager (2018-present): Line manager for Remote Sensing and Environmental Informatics Group (17 people). Manager and Principal Investigator for the ORNL Distributed Active Archive Center for Biogeochemical Dynamics, part of the NASA Earth Observing System.

- Built on a tradition of high customer satisfaction, as evidenced by continued ORNL DAAC leadership in customer satisfaction score for 2019 and 2020
- Achieved 20% growth in group funding for FY21 over FY20, including successful proposals for migration to NASA's Earthdata Cloud and three special missions
- Led renewal of the 5-year interagency agreement for ORNL DAAC operation

Enterprise Architect (2012-2018): Lead technologist for enterprise information technology, particularly identity and credential management, authentication, authorization, cloud, analytics, mobile device management, and remote access.

- Led redesign of ORNL's internal Certificate Authority, including architecture and policy
- Designed access management for high performance computing enclave for PHI data
- Led ORNL's implementation of mandated smart card multifactor authentication
- Designed, implemented, and operated ORNL's first SAML and federated ID platform
- Improved IT effectiveness by defining and leading the implementation for BYOD strategy
- Led external review panel for NASA Earth Observing System data center program

Group Leader, Client and Collaboration Technologies (2010-2012): Manager for 45-person group responsible for 20,000 unclassified endpoints (Windows, Mac, Linux, iOS), all aspects of mobile and cellular devices, three Active Directories, LDAP, and systems engineering supporting \$500M/year of R&D projects.

- Led the redesign and implementation of remote access tools after a cybersecurity event
- Architected award-winning high-performance analytics infrastructure for IARPA project
- Led the deployment for iPads and the infrastructure for broader mobile device management

Group Leader and ORNL DAAC Manager (2008–2010): Line manager for Environmental Data Science and Systems Group (35 people). Manager and principal investigator for the ORNL DAAC.

- Increased group funding by 10% (2009) and 15% (2010) through successful proposals
- Increased data ingest rate (key data center metric) through business process improvements
- Coordinated development of NASA award-winning tools for subsetting MODIS data

Environmental Informatics Leader (2006-2008): Systems architect and computing technical leader for the ORNL DAAC.

- Developed and operated initial USA National Phenology Network cyberinfrastructure
- Co-led implementation of metadata management and GIS data analytics tools
- Co-developed a novel data model for phenology data (published in Nature Proceedings)
- Implemented early use of Digital Object Identifiers for ecological and biogeochemical data

University of Tennessee, Knoxville: 2007-present (Knoxville, TN):

Joint Faculty, Bredesen Center for Interdisciplinary Studies (2019-present): Serve as thesis advisor and mentor for students in the Data Science and Engineering program.

Adjunct Professor, School of Information Sciences (2007-present): Serve on selected graduate thesis committees, contribute to school and college development and recruiting.

DataONE Project (2007-2016): Leadership Team member for \$4M/year NSF-funded project for long-term preservation and community development for ecological data (DataONE). Co-leader for cyberinfrastructure development (12 distributed developers).

- Served as UTK institutional lead for DataONE (2008-2013)
- Co-led the design and implementation of DataONE cyberinfrastructure
- Led community engagement team to recruit and support participants across 16 countries

The Dow Chemical Company: 2/01-6/06 (Midland MI):

Technical Leader, High Throughput Research Informatics Program: Technical lead for a \$10M/year, 45-person team designing, implementing, and supporting informatics for high throughput research (HTR) at multiple sites.

- Recognized for informatics role in >\$700M/yr new polypropylene line of business
- Led the development of informatics tools and growth of the HTR team from 2 people to 43
- Saved >\$2M/year by implementing a bar-code tracking and inventory management system
- Improved software development processes by co-leading waterfall to Scrum transition
- Completed training and project leadership for Six Sigma Black Belt (DMAIC and DFSS)

Dow Corning Company: 2/00-2/01 (Midland MI):

Senior Specialist, Chemometrics & Data Fusion Group: Designed and led the development of an informatics system (4-person team) to handle multivariate analyzer data for a silicone sealant pilot plant operation.

- Reduced product variance by 2σ by designing new control strategies based on analytics
- Co-developed an improved sealant by identifying previously unknown catalyst interactions
- Coordinated international development team across Europe, US, and Australia

Eastman Chemical Company: 10/88-12/99 (Kingsport TN):

11/97-12/99: Principal Research Chemist, Chemicals Research Division: Technical lead for 3-person Computational Chemistry team.

- Generated a new process for a fine chemical intermediate and a US Patent via modeling
- Contributed to 20x increase in catalyst lifetime by identification of a fouling mechanism
- Developed tools to support data analysis from high performance compute clusters

11/95-11/97: Principal Research Chemist, Research Information Technology Division: Responsible for Chemical Information Management for the entire company.

- Saved \$1M/yr by improving the process for Harmonized Tariff Code management in SAP
- Led the implementation of SciFinder and Crossfire across 4 US and 2 international sites
- Designed architecture and process for digitization of corporate technical report system

4/92-11/95: Senior Research Chemist, Polymers Research Division: Led two product concept development teams (first stage in commercialization process). Performed research in glass fiber reinforced composites.

- Developed a \$50M/yr improved composite by identifying flame retardant interactions
- Co-invented liquid crystalline polymer modifications to fiber-reinforced composites

10/88-4/92: Advanced Research Chemist, Physical & Analytical Chemistry Research Division: Research into exploratory data analysis for chemical process modeling, models for polyester reheat rate in soft drink bottle manufacture, and photophysics of a new polyester.

- Used analytics to identify seasonality causes, leading to a \$75M/year process improvement
- Killed a long-running project by using theory to prove irresolvable flaws

AWARDS AND HONORS

Senior Member, Association for Computing Machinery (2020)
Oak Ridge National Laboratory Significant Event Awards (2008, 2011, 2012, 2016)
NASA Software Reuse Team Award (2010)
Department of Energy Outstanding Mentor Award (2008)
National Science Foundation Graduate Fellow (1985-88)
American Chemical Society Analytical Division Summer Fellow (1988)
Tomas Hirschfeld Fellowship (UW Center for Process Analytical Chemistry; 1985-88)
Kedzie Award (top graduating Chemistry major at MSU)
Merck Award (top Chemistry GPA during Junior year)
Phi Beta Kappa (national liberal arts honor society)
Mortar Board (national service/honor society; treasurer of MSU chapter 1983-4)
National Merit Scholar

PROFESSIONAL ACTIVITIES

Co-Chair and Lead for Mining and Automation Sub-Committee NASA Institutional Review Board for the Planetary Data Ecosystem (10/2020-4/2021)
Co-Chair, NASA Distributed Active Archive Center Managers Council (2020-present)
Chair, Efficiency and Effectiveness Review Panel for the NASA Distributed Active Archive Centers (2016)
Chair, Cyberinfrastructure Review Panel for the US National Science Foundation Long Term Ecological Research Network (2010)
Informatics Advisor, European Union Biodiversity Observation Network (2016-18)
Board of Advisors, USA National Phenology Network (2007-16)
DOE Multifactor Authentication Technical Advisory Working Group (2015-17)
Summer Fellowship Mentor, CODE2040 (2020)
Mentor, Collaborative Analysis Liaison Librarians Program (CALL; <https://call.infosci.utk.edu>; 2019-present)
DOE Summer Undergraduate Laboratory Internship (SULI) Mentor (2008-10,2015,2019)
Topic Editor, Journal of Open Source Software (2019-present)
Program Committee, Ecological Informatics Conference (2009-10)
Session Convener, American Geophysical Union Fall Conference (2019)
Session Convener, DOE Information Technology Conference (2012, 2016-17)
Member, US Research Software Engineer Association (2020-present)
Member, American Association for the Advancement of Science (2008-present)
Member, American Geophysical Union (2006-present)
Member, Association for Computing Machinery (2005-present)
Proposal reviewer for multiple funding calls for NASA, National Science Foundation, and the Department of Energy
Past Member, American Chemical Society (including Computers in Chemistry Division and Chemical Information Division). Served as a Public Relations chairperson for the Northeast Tennessee Section and helped the section win a national award for PR activities and an Outstanding Section Award.

PATENTS

- BE Wilson and C. Cherry "Fiber reinforced resins with improved physical properties and process for producing same" *US Patent* #6,277,909 (2001)
- JR Zoeller, CA Crooks and BE Wilson "Process for the conversion of carboxylic acids to ketones" *US Patent* #6,265,618 (2001)
- BE Wilson and C. Cherry "Fiber reinforced resins with improved physical properties and process for producing same" *US Patent* #6,051,644 (1999)
- HS Carman, DC Alsmeyer, CH Juarez-Garcia, AW Garrett, BE Wilson & VA Nicely, "Method for standardizing Raman spectrometers to obtain stable and transferable calibrations" *US Patent* #5,850,623 (1994)

REFEREED LITERATURE PUBLICATIONS

- Peter E. Thornton, Rupesh Shrestha, Michele Thornton, Shih-Chieh Kao, Yaxing Wei, **Bruce E. Wilson** "Gridded Daily Weather Data for North America with Comprehensive Uncertainty Quantification" *Scientific Data* (2021) [doi:10.1038/s41597-021-00973-0](https://doi.org/10.1038/s41597-021-00973-0)
- Suresh Vannan, Robert R. Downs, Walt Meier, **Bruce E. Wilson**, and Irina V. Gerasimov "Data sets are foundational to research. Why don't we cite them?" *Eos* 101 (2020) [doi:10.1029/2020EO151665](https://doi.org/10.1029/2020EO151665)
- Elisha Wood-Charlson, A Anubhav, D Auberry, H Blanco, MI Borkum, YE Corilo, KW Davenport, S Deshpande, R Devarakonda, M Drake, WD Duncan, MC Flynn, D Hays, B Hu, M Huntemann, PE Li, M Lipton, CC Lo, D Millard, K Miller, PD Piehowski, S Purvine, TBK Reddy, M Shakya, JC Sundaramurthi, P Vangay, Y Wei, **BE Wilson**, S Canon, PSG Chain, K Fagnan, S Martin, LA McCue, CJ Mungall, NJ Mouncey, ME Maxon and EA Eloje-Fadros "The National Microbiome Data Collaborative: Enabling Microbiome Science" *Nature Reviews Microbiology* (2020) [doi:10.1038/s41579-020-0377-0](https://doi.org/10.1038/s41579-020-0377-0)
- Alyssa Rosemartin, Ellen Denny, Jake Weltzin, Lee Marsh, **Bruce E. Wilson**, Hamed Mehdipoor, Raul Zurita-Milla Mark Schwartz "Lilac and Honeysuckle Phenology Data 1956–2014" *Scientific Data* vol 2 (2015) [doi:10.1038/sdata.2015.38](https://doi.org/10.1038/sdata.2015.38)
- Suresh K. Santhana Vannan, Robert B. Cook, Jerry Y. Pan, **Bruce E. Wilson** "A SOAP Web Service for accessing MODIS land product subsets" *Earth Science Informatics* vol 4#2 97-106 (2011) [doi:10.1007/s12145-011-0079-2](https://doi.org/10.1007/s12145-011-0079-2)
- Dali Wang, Wilfred M. Post, **Bruce E. Wilson** "Climate Change Modeling: Computational Opportunities and Challenges" *Computing in Science and Engineering* vol 13, 36-42 (2011) [doi:10.1109/MCSE.2010.147](https://doi.org/10.1109/MCSE.2010.147)
- Jerry Pan, Christopher Lenhardt, **Bruce E. Wilson**, Giri Palanisamy, Robert Cook, Biva Shrestha "Geoscience data curation using a digital object model and open-source frameworks: Provenance applications" 2011 *IEEE International Geoscience and Remote Sensing Symposium* (2011) <https://doi.org/10.1109/IGARSS.2011.6050062>
- Ranjeet Devarakonda, Giri Palanisamy, James M. Green, **Bruce E. Wilson** "Data sharing and retrieval using OAI-PMH" *Earth Science Informatics* vol 4#1 1-5 (2010) [doi:10.1007/s12145-010-0073-0](https://doi.org/10.1007/s12145-010-0073-0)
- Ranjeet Devarakonda, Giriprakash Palansiamy, James M. Green, **Bruce E. Wilson** "Mercury: Reusable Metadata Management, Data Discovery and Access System" *Earth Science Informatics* vol 3#1-2 87-94 (2010) [doi:10.1007/s12145-010-0050-7](https://doi.org/10.1007/s12145-010-0050-7)
- Suresh Kumar Santhana Vannan, Robert B. Cook, **Bruce E. Wilson**, Susan K. Holladay, Lisa M. Olsen, and Upendra Dadi "A Web-Based Subsetting service for Regional Scale MODIS Land Products" *IEEE Journal of Selected Topics in Earth Observations and Remote Sensing*, vol 2#4 319-328 (2009) [doi:10.1109/JSTARS.2009.2036585](https://doi.org/10.1109/JSTARS.2009.2036585)

- Ellen G. Denny, Abraham J. Miller-Rushing, Brian P. Haggarty, Lisa Benton, Theresa M. Crimmins, Mark Losleben, Andrew D. Richardson, Alyssa Rosemartin, Mark D. Schwartz, Kathryn A. Thomas, Jake F. Weltzin and **Bruce E. Wilson** "A new approach to generating research-quality data through citizen science: The USA National Phenology Monitoring System" *Nature Proceedings* (2009) [doi:10.1038/npre.2009.3695.1](https://doi.org/10.1038/npre.2009.3695.1)
- Jeffrey T. Morisette, Andrew D. Richardson, Alan K. Knapp, Jeremy I. Fisher, Eric A. Graham, John Abatzoglou, **Bruce E. Wilson**, David D. Breshears, Geoffrey M. Henebry, Jonathan M. Hanes, and Liang Liang "Tracking the rhythm of the seasons in the face of global change: phenological research in the 21st century" *Frontiers in Ecology and the Environment* 7#5 (2009) 253-260 [doi:10.1890/070217](https://doi.org/10.1890/070217)
- Julio L. Betancourt, Mark D. Schwartz, David D. Brashears, Carol A. Brewer, Gary Frazier, John E. Gross, Suzan J. Mazer, Bradley C. Reed, and **Bruce E. Wilson** "Evolving Plans for the USA National Phenology Network" *Eos Transactions of the AGU* 88(19) 211 (2007) <https://doi.org/10.1029/2007EO190007>
- Mark A. Parsons & **Bruce E. Wilson** "User-Driven Design of a Data System for the International Polar Year" *Eos Transactions of the AGU* 88(8) 98 (2007) <https://doi.org/10.1029/2007EO080010>
- Thomas H. Kalantar, Christopher J. Tucker, Andrew S. Zalusky, Thomas A. Boomgaard, **Bruce E. Wilson**, Mladen Ladika, Susan L. Jordan, Wen K. Li, Xin Zhang, Chin G. Goh, "High Throughput Workflow for Coacervate Formation Characterization in Shampoo" *Journal of Cosmetics Science* 2007 Jul-Aug; 58(4) 375-83 [link to article](#)
- Kevin P. Peil, David R. Neithamer, Donald W. Patrick, **Bruce E. Wilson**, Christopher J. Tucker "Applications of High Throughput Research at The Dow Chemical Company" *Macromolecular Rapid Communications* (2004) 25(1), 119–126 [doi:10.1002/marc.200300160](https://doi.org/10.1002/marc.200300160)
- Alan S. Jones, Todd J. Dickson, **Bruce E. Wilson** & Jean Duhamel "Fluorescence properties of poly(ethylene terephthalate-co-2,6-naphthalene dicarboxylate) with naphthalene dicarboxylate contents ranging from 0.01 to 100 mole%" *Macromolecules* (1999) 32(9) 2956-2961 [doi:10.1021/ma9811573](https://doi.org/10.1021/ma9811573)
- Alan S. Jones, Todd J. Dickson, **Bruce E. Wilson**, Jean Duhamel & Mitchell A. Winnik "Fluorescence properties of PEN and PET/PEN copolymers" *Polymer. Preprints (American Chemical Society, Division of Polymer Chemistry)* (1996) 37(1) 229-30 *no link to article known*
- Bruce E. Wilson** & Bruce R. Kowalski "Quantitative analysis in the presence of spectral interferences using second-order nonbilinear data" *Analytical Chemistry* (1989), 61(20) 2277-84 [doi:10.1021/ac00195a013](https://doi.org/10.1021/ac00195a013)
- Bruce E. Wilson**, Walter Linberg & Bruce R. Kowalski "Multicomponent quantitative analysis using second-order nonbilinear data: theory and simulations" *Journal of the American Chemical Society* (1989) 111(11) 3797-804 [doi:10.1021/ja00193a006](https://doi.org/10.1021/ja00193a006)
- Bruce E. Wilson**, Eugenio Sanchez & Bruce R. Kowalski "An improved algorithm for the generalized rank annihilation method" *Journal of Chemometrics* (1989) 3(3) 493-8 [doi:10.1002/cem.1180030306](https://doi.org/10.1002/cem.1180030306)
- L. Scott Ramos, Kenneth R. Beebe, W. Patrick Carey, Eugenio Sanchez, Bryce C. Erickson, **Bruce E. Wilson**, Lawrence E. Wangen, and Bruce R. Kowalski "Chemometrics" *Analytical Chemistry* (1986) 58(5) 294R-315R [doi:10.1021/ac00296a020](https://doi.org/10.1021/ac00296a020)
- Bruce E. Wilson**, Jin Wu Chai & Christie G. Enke "Ion trajectory modeling in time-dependent potential fields: application to RF-only quadrupoles" *Computers in Chemistry* (1986) 10(1) 15-19 [doi:10.1016/0097-8485\(86\)85004-5](https://doi.org/10.1016/0097-8485(86)85004-5)

Also lead author on over 75 internal corporate technical reports and contributor to approximately 50 additional internal corporate technical reports.

INVITED AND REFEREED PRESENTATIONS

Bruce E. Wilson “Who am I; Who are You; and What Data are We Talking About?” (invited presenter and panelist) DOE Conference on Data Analysis (CoDA), Sante Fe, NM (March 15, 2018)

Bruce E. Wilson “Multifactor Authentication Implementation at Oak Ridge National Laboratory” (presenter and plenary panelist), US Department of Energy National Laboratories Information Technology Conference, Albuquerque, NM (May 3, 2016)

Bruce E. Wilson “ICAM Next Steps” (invited presentation and panelist) US Department of Energy Information Management Conference, workshop on Identity, Credential, and Access Management, Nashville, TN (June 15, 2015)

Bruce E. Wilson, Rebecca Koskela, Amber Budden “DataONE Member Node Implementation Workshop” (invited workshop) Open Repositories Conference, Helsinki, Finland (June 9-13, 2014)

Bruce E. Wilson “Data Quality and Integrity to Enable Science” (invited presentation and panelist) CENDI-NFAIS Workshop on Data Quality and Integrity, Alexandria, VA, (November 20, 2014)

Bruce E. Wilson “DataONE Overview” (invited presentation) European Union Biodiversity Observation Network Annual Meeting, Heraklion (Crete), Greece (April 2-4, 2013)

Bruce E. Wilson “Data Citation and Data Attribution: A View from the Data Center Perspective” Board of Research Data and Information of the National Research Council, Workshop on Data Attribution and Citation Practices, Berkeley, CA, (August 22-23, 2011). Published in Paul E Uhler (ed) Developing Data Attribution and Citation Practices and Standards: Summary of an International Workshop *National Academies Press* (2012), ISBN 978-0-309-26728-1

Bruce E. Wilson “Issues and Challenges in the Management of Data and Knowledge from High Throughput Research in Catalysis and Material Science” International Chemical Information Conference, Nimes, France (October 16-19, 2005)

Bruce E. Wilson “A Lifeguard for Researchers Working in the Sea of High Throughput Data” (invited keynote presentation) Central Regional Meeting, American Chemical Society, Indianapolis, IN (June 3, 2004)

Bruce E. Wilson & L. David Rothman “Informatics Needs and Solutions for Supporting High Throughput Research in Catalysis and Material Science” (invited presentation) Materials Research Society Fall Meeting, Boston MA (December 1-5, 2003)

Bruce E. Wilson “R&D Data Management Issues” (invited plenary presenter) Thermo Informatics World, Ft. Lauderdale FL (October 6-9, 2003)

Bruce E. Wilson & L. David Rothman “Computing Infrastructure to Support High Throughput Research in Catalysis and Material Science” (invited presentation) Laboratory Informatics/Pittsburgh Conference, Orlando FL (March 9-14, 2003)

Bruce E. Wilson "Role of chemical databases in the chemical industry: present and future possibilities" (invited presentation) MSI Catalyst Consortium Meeting, San Diego CA (November 2-6, 1998)

Bruce E. Wilson “Representation, registration, and retrieval of polymeric substance data at Eastman Chemical Company” (invited presentation) MDL Polymer Industry Advisory Council Meeting, Whippany NJ (February 16-18, 1994)

David L. Weininger (presenter) & Bruce E. Wilson (discussant) “Genetic algorithms” Gordon Research Conference on Statistics in Chemistry and Chemical Engineering, New Hampton NH, (July 26-30, 1993)

Bruce E. Wilson “The promise and pitfalls of multivariate regression” (invited presentation) 40th Conference of the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Cleveland OH, (October 6-10, 1990)

DATASETS AND OTHER PUBLICATIONS

Michele M. Thornton, Rupesh Shrestha, Yaxing Wei, Peter E. Thornton, Shih-Cheih Kao, and **Bruce E. Wilson** (2021) *Daymet Version 4 Monthly Latency: Daily Surface Weather Data* ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1904>

Michele M. Thornton, Rupesh Shrestha, Yaxing Wei, Peter E. Thornton, Shih-Cheih Kao, and **Bruce E. Wilson** (2020) *Daymet: Daily Surface Weather Data on a 1-km Grid for North America, Version 4* ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1840>

Michele M. Thornton, Rupesh Shrestha, Yaxing Wei, Peter E. Thornton, Shih-Cheih Kao, and **Bruce E. Wilson** (2020) *Daymet: Monthly Climate Summaries on a 1-km Grid for North America, Version 4* ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1855>

Michele M. Thornton, Rupesh Shrestha, Yaxing Wei, Peter E. Thornton, Shih-Cheih Kao, and **Bruce E. Wilson** (2020) *Daymet: Annual Climate Summaries on a 1-km Grid for North America, Version 4* ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1852>

Michele M. Thornton, Rupesh Shrestha, Yaxing Wei, Peter E. Thornton, Shih-Cheih Kao, and **Bruce E. Wilson** (2020) *Daymet: Station-Level Inputs and Cross-Validation Result for North America, Version 4* ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1850>

Alain Monteil, Alejandra Gonzalez-Beltran, Alexandros Ioannidis, Alice Allen, Allen Lee , Anita Bandrowski, **Bruce E. Wilson**, Bryce Mecum, Cai Fan Du, Carly Robinson, Daniel Garijo, Daniel S. Katz, David Long, Genevieve Milliken, Hervé Ménager, Jessica Hausman, Jurriaan H. Spaaks, Katrina Fenlon, Kristin Vanderbilt, Lorraine Hwang, Lynn Davis, Martin Fenner, Michael R. Crusoe, Michael Hucka, Mingfang Wu, Neil Chue Hong, Peter Teuben, Shelley Stall, Stephan Druskat, Ted Carnevale, Thomas Morrell “Nine Best Practices for Research Software Registries and Repositories: A Concise Guide” Report of the FORCE11 Task force on best practices for software repositories. <https://arxiv.org/abs/2012.13117>

Helen M. Amos, Travis Andersen, Anthony Arendt, Jarrett Byrnes, Matthew Clark, Lisa Dallas, Narendra Das, Prakash Doraiswamy, Robert Levy, Tamlin Pavelsky, David Overoye, Hampapuram Ramapriyan, Leonardo Salas, William Teng, John Volkens, Yaxing Wei, & **Bruce E. Wilson** "NASA ESDS Citizen Science Data Working Group White Paper" (2020) <https://cdn.earthdata.nasa.gov/conduit/upload/14273/CSDWG-White-Paper.pdf>

Bruce E. Wilson “Oak Ridge National Laboratory” in Department Energy National Laboratories and Plants: Leadership in Cloud Computing (2012). Assembled by the National Laboratories Chief Information Officer (NLCIO) organization. <http://www.nrel.gov/docs/fy13osti/56143.pdf>

Patrick J. Clemins et al “Cyberinfrastructure for Environmental Observation Networks (CEON) Workshop Report” February 25-26, 2008 (USA National Science Foundation, Arlington, VA). https://lternet.edu/wp-content/uploads/2010/12/CEON_Workshop_Final_Report.pdf