Lisa L. Lowe, Ph.D.

High Performance Computing / Scientific Applications Consultant

https://www.linkedin.com/in/lisalenorelowe ◆ *https://orcid.org/0000-0003-0408-9324*

Summary of Qualifications

Originally trained in Computational Astrophysics and Numerical Relativity, I now work with scientists from a variety of fields with scientific modeling and visualization on High Performance Computing (HPC) platforms. I am also skilled at teaching and presenting complex scientific topics to highly varied audiences.

Education

- **Ph.D. Physics (Numerical Relativity)**, North Carolina State University, Raleigh, NC (2008)

Dissertation: *Topics in Numerical Relativity: Solving the Initial Value Problem Using Adaptive Mesh Refinement, Examining Evolution Stability Using Spectral Methods, and Finding Apparent Horizons using a Mean Curvature—Level Set Method. http://www.lib.ncsu.edu/resolver/1840.16/4042*

- **Graduate Certificate in Environmental Assessment**, North Carolina State University, Raleigh, NC (2012)
- **B.S. Physics**, Drexel University, Philadelphia, PA (2001)

Specialty Training

2015 Argonne Training Program on Extreme-Scale Computing (ATPESC) – Intensive two-week training in state-of-the-art high performance computing technologies and programming techniques. This is a competitive-based acceptance program funded by the Department of Energy and administered by Argonne National Laboratory. Topics included MPI, OpenMP, GPU computing, architecture, algorithms, toolkits, visualization, and I/O.
http://extremecomputingtraining.anl.gov/archive/atpesc-2015

Professional Development

- **NASA Open Science** - by NASA Transform to Open Science, *2/2024*
- **AWS Certified Solutions Architect - Associate**, 2/2022-2/2025. ID: 34GKJ5C1JEF4QHWE
- **IBM AI Engineering** by IBM on Coursera, 10/2020. ID: *K3BLMN348SX*
- **Campus Champion** for XSEDE, Extreme Science and Engineering Development Environment

Professional Experience

Sole Proprietor / HPC Scientific Applications Consultant, L3 Scientific Applications Consulting LLC in Cary, North Carolina - (Present)

Independent Consultant, specializing in developing, debugging, optimizing, and parallelizing large complex scientific modeling codes written in Fortran and designed to run on High Performance Computing (HPC) platforms. *https://l3sac.com*

Assistant Research Professor, Department of Marine, Earth, and Atmospheric Science, North Carolina State University in Raleigh, North Carolina - (December 2022 – March 2024)

Co-PI for NOAA RESTORE *Science Program grant Building Resilience for Oysters, Blue Crabs, and Spotted Seatrout(**OyBcSt**) to Environmental Trends and Variability in the Gulf of Mexico. (2019-2024)*

- Algorithm development of biogeochemical model CGEM (Coastal Gulf Ecology Model)
- Incorporate CGEM as a bio module for the SCHISM (Semi-implicit Cross-scale Hydroscience Integrated System Model) hydrodynamics model. (*CGEM-SCHISM*).

- Train and assist other PI/Co-PIs, post-docs, and students to effectively use NSF high performance computing (HPC) resources, including compiling and installation, parallelization, optimization, and code refactoring.
- NSF computational resources awarded under XSEDE/ACCESS(*EES210015*) include large distributed systems for hydrodynamics modeling(Expanse, SDSC), GPUs for machine learning(Bridges2, PSC), Ceph storage for model outputs(Open Storage Network), and cloud instances for hosting web applications(Jetstream2).
  See
  - *OyBcSt GitHub Organization* – a collection of code and Jupyter Notebooks with sample data and analysis for transparency and reproducibility
  - *OyBcSt Hydrodynamics page* – a Jupyter Book website showcasing high resolution model visualizations, an R Shiny app, and GIS products(KMZ)

PI for EPA contract *Mathematical Modeling and High-Performance Computer Support. (2020-2023)*

- Assist ORD, Center for Computational Toxicology & Exposure (CCTE), Great Lakes Toxicology & Ecology Division with highly specialized mathematical modeling, high-performance computer coding and optimization skills to develop and improve mathematical models of the Great Lakes, Gulf of Mexico and other coastal systems.
- Incorporating biogeochemical models into the FVCOM(Finite Volume Coastal Ocean Model) hydrodynamics model.
- Port legacy R scripts and VisIt interactive workflows into Python scripts that may be run in batch mode on HPC resources to create images and animations for large outputs.
  See
  - *Lake Erie visualizations*
  - *VisIt GUI tutorials*
  - *VisIt python scripts*
  - *R Shiny App*

PI for NASA TOPST(Transform to Open Science Training) *grant: Building a framework for ScienceCore Carpentry from a Marine Sciences Lab(2023-2025).*

Create an open-source computational component to a marine sciences lab, delivered via Jupyter Notebooks, and a suite of tutorials on data collection, analysis methods, and visualization techniques used in physical oceanography and biogeochemistry by retracing the steps needed to reproduce results from two published articles on 1) combining field data with satellite data to understand the sea surface temperature conditions associated with a hurricane undergoing rapid intensification over the continental shelf and 2) using locally calibrated satellite products to improve the satellite estimation of the partial pressure of carbon dioxide in coastal waters.

- *Full proposal*
- *ScienceCore: Marine Sciences*

Advanced Computing Specialist at North Carolina State University in Raleigh, North Carolina (RTP, NC) - (July 2018 – November 2022)

NC State's Henry2 HPC cluster is an Intel Xeon based Linux cluster, and compute nodes include a mix of several generations of Intel Xeon processors primarily in dual-socket blade servers, some having attached GPUs.

Support for North Carolina State's high-performance computing (HPC) cluster:

- Provide guidance and instruction in optimal use of the heterogeneous environment, including hardware targeted compiling. Support for installing software in a shared environment (e.g., modules, containers, environments).
- Create modules for non-trivial software stacks including WRF, UFS, MET, and CMAQ.
- Offer hands-on training to HPC users from all backgrounds, including rank beginners and researchers from non-traditional fields. Training materials include video tutorials created in Camtasia and hosted on YouTube. For sample video tutorial, see *HPC Terminology and 'Core' Concepts*.

- Offer consultations in HPC best practices, workflow optimization, code development, debugging, and parallelization. Example projects include writing scripts or MPI wrappers to bundle serial jobs, porting code or script (e.g., C++, MATLAB) with Windows specific syntax/libraries to work on Linux, modifying existing Fortran analysis codes to subroutines then using f2py to allow the routines to be called from Python, and support for using profiling tools (e.g., ARM Forge, snakeviz).
- Offer consultations on using HPC in the classroom, including creating custom HPC training modules and demos that align with the course goals and objectives.
- Develop projects for and supervise HPC interns. Projects include writing scripts to assist HPC staff with monitoring utilization, to assist users in checking memory and utilization of running jobs, and to organize 'Software Affinity Groups' (e.g. Bioinformatics Users Group) to facilitate communication between researchers with similar workflows on the HPC.
- Connect researchers with external resources such as XSEDE or DOE Leadership Computing Facilities.
- Obtain external funding through grants and contracts (NOAA, EPA).

High Performance Computing Scientific Programmer at CSRA and Leidos Innovations Inc. (formerly Lockheed Martin) for the United States Environmental Protection Agency (EPA) in Research Triangle Park, North Carolina (RTP, NC) (July 2012 – February 2018)

Support a wide variety of scientific research projects that require computer modeling and programming, but was especially involved in these projects:

- ***Modeling Hypoxia in the Gulf of Mexico.*** Serve as the project technical lead, collaborating with EPA and Naval Research Laboratory (NRL) scientists to develop and improve codes that model the physics, chemistry, and biology of the waters of the Gulf of Mexico.
  - Converted 1D FORTRAN code into a 3D working model: Coastal Gulf Ecology Model (CGEM).
  - Parallelized the 3D code with MPI. Code runs on sol, EPA's IBM iDataPlex cluster, and achieves near maximal speedup according to Ahmdal's law.
  - Currently adding new subroutines, and testing, verifying, and modifying existing subroutines as needed and requested by the project's principal investigator (PI).
  - Maintaining a knowledge of current literature in order to keep the code science up to date.
  - Visualizing data using VisIt for 3D movies and R for 1D time series graphs.
  - Maintaining a Wiki for transparency and clarity of communication between Leidos contractors and EPA scientists.
  - Generalized CGEM for a generic grid to be used outside of the Gulf of Mexico, including a single cell version that will run on Windows called FishTank.
  - Co-authored papers, posters, and a book chapter on ocean modeling with the PI and other lead researchers, such as colleagues at NRL.
  - Delegated programming tasks to others on my Leidos team and supervised their work as needed.
  - Gave weekly oral reports to the PI, EPA management, and the rest of the research team.
  - Provided detailed written monthly technical reports to EPA documenting our progress.
- **Gulf of Mexico Dissolved Oxygen Model (GoMDOM).** Serve as the project technical lead, collaborating with EPA and NRL scientists to improve the performance and capabilities of GoMDOM, which models hypoxia and eutrophication in the Gulf of Mexico region. GoMDOM uses an irregular grid structure, which does not lend itself to ordinary parallelization.
  - Ported existing FORTRAN code to terra, EPA's current HPC platform.
  - Wrote a hybrid parallelization of GoMDOM in OpenMP and MPI for a 6x speedup.
  - Achieved a 21x speedup of the GoMDOM system by modifying the Eutrophication subroutines to be called from inside the CGEM (described above) grid structure.
  - Gave weekly oral reports to the PI, EPA management, and the rest of the research team.
  - Provided detailed written monthly technical reports to EPA documenting our progress.
- **Streamline Modeling of Subsurface Contaminants (SMSC)**
  - Ported desktop FORTRAN code to terra, EPA's current HPC platform.
  - Developed a method to visualize ModFlow files using VisIt and Python.

  - Developed a method to read in ModFlow's irregular grid and extract streamlines. Velocities must be interpolated from an irregular Cartesian mesh and a Runge-Kutta 4 integrator is used to integrate the streamline equations. Calculated streamlines are plotted using gnuplot.
  - Worked with EPA scientist to develop a Quality Assurance Project Plan for the SMSC project.
- **R Shiny App** – Porting static R plots to interactive HTML applications
  - Served as the project technical lead.
  - Added features to R Shiny App per customer specifications: mouse click capability, sliders, and table creation.
  - Added a capability for the manipulation of large data sets including output from EPA's Community Multi-scale Air Quality (CMAQ) model, and the capability for calculating averages of particulate matter (PM) over counties with R.
- **Risk Assessment Modeling** – Supporting EPA's National Center for Environmental Assessment (NCEA)
  - Wrote R functions to read in and perform statistical analysis on cancer data.
  - Wrote code in OpenBugs to do Bayesian modeling for the cancer models.
  - Wrote R functions and scripts to analyze the OpenBugs output, plot distributions, and test for Markov Chain Monte Carlo convergence.
  - Did quality assurance checks of existing model averaging code (in C) to be used in a workshop to determine suitability for addition to BMDS, an internationally used software package from NCEA and supported by EMVL.
- **CMAQ Optimization** - Project Lead
  - Used Allinea MAP and Intel VTune to profile and analyze the code to identify bottlenecks and suggest code modifications to decrease run time.
  - Consulted on methods of parallel debugging and error visualization.

Postdoctoral Fellow, Oak Ridge Institute for Science and Education (ORISE) at U.S. EPA, RTP, NC (June 2011 – July 2012)

As a post-doctoral Fellow at EPA, focused on these three projects:

- **Bayesian Markov Chain Monte Carlo Physiologically Based Pharmacokinetic (PBPK) modeling:** Used acslX to perform fitting of experimental data in the Methanol PBPK model. Digitized figures to extract data for use in the PBPK model. Developed a hierarchical Bayesian PK model in acslX and ported the model to both acslX for Linux on terra—EPA's HPC platform and wrote an MCSim version of the model. Did a comparison study between acslX and MCSim, characterized variability in the enzyme kinetics and background methanol levels of monkeys.
- **BMDS and CatReg Modeling – Statistical Modeling for Dose Response Analysis:** Used Benchmark Dose Software Modeling (BMDS) to model the dose-response in support of finding the RfC, or reference concentration, of Methanol. Assisted in leading a BMDS training course for Society of Risk Analysis meeting in December 2012. Assisted in code testing of BMDS and Categorical Regression (CatReg) software.
- **IRIS assessment of Methanol:** Support for the Methanol IRIS assessment including literature search and analysis of scientific studies, preparation of responses to peer review charges, using Benchmark Dose Software Modeling (BMDS) to model dose-response, and contributing to the final editing of the IRIS assessment.
- **Risk Assessment Training Experience (RATE):** Worked with EPA scientists and contractors to develop educational materials for risk assessors.

Research Assistant, North Carolina State University, Raleigh, NC (August 2001 – August 2008)

- ***AMRMG – a Parallel AMR Nonlinear Multigrid Solver:*** Developed a parallel nonlinear multigrid solver with adaptive mesh refinement. AMRMG is used to provide the initial data for the relativity group at NASA/GSFC and has made possible one of the first successful evolutions of a binary black hole merger.
  - The solver uses the NASA-developed PARAMESH package to support a parallel adaptive mesh refinement grid structure. High level PARAMESH subroutines were modified to accommodate the multigrid infrastructure. Code is written in FORTRAN with MPI.

  - Uses cell-centered MLAT multigrid with adaptive grid refinement based on relative truncation error. Includes option for direct solve on the coarsest grid using LAPACK routines. Uses Gauss-Seidel red-black ordering relaxation and is second order accurate. AMRMG maintains second order accuracy across mesh refinement boundaries.
  - Ran using SHMEM on the NASA/GSFC CRAY T3E until its decommissioning, and then was rewritten for MPI and run on the IBM Blade Center Linux cluster at NCSU.
  - 3D visualization performed using Tecplot.
- ***Distorted Black Holes using the Puncture Method:*** Used AMRMG to create a new class of initial data for Numerical Relativity. The sets may represent conditions immediately following a binary black hole merger.
  - The puncture method introduces a singular term in the calculation. Adaptive mesh refinement makes it possible to provide the resolution necessary to resolve a puncture, while maintaining a grid large enough to contain gravitational wave information.
- ***Investigating the Constraints with Spectral Methods:*** Developed a spectral methods code to investigate and remedy the inherent instability problems in the ADM 3+1 Einstein evolution equations. The stabilization technique is purely mathematical and can be applied to any system of equations.
  - Written in object-oriented C, using structures to define scalar, vector, and tensor quantities.
  - Uses a pseudo-spectral collocation method. Options to use either Chebyshev or Fourier bases.
  - Integration is performed using method of lines with an RK4 integrator. Preconditioning and GMRES used to solve the modified equations at every time step.
- ***Level Set Method Apparent Horizon Finder:*** Developed a robust and generic apparent horizon finder for analytic or numerically generated (from AMRMG) spacetimes.
  - The apparent horizon equation is rewritten as a surface evolving along its normal vector according to the speed of the apparent horizon equation. A level set defines a surface.
  - The level set method is used in a variety of physical and biological applications, in particular water and oil interface problems.
  - This code is in FORTRAN and uses the PARAMESH grid infrastructure.

Research Co-op, Princeton Plasma Physics Laboratory/US DOE, Plainsboro, NJ (March 2000 – September 2000)

- ***Field line tracing routine for ParM3D*:** Developed a field line tracing program for general toroidal geometry as a diagnostic tool for ParM3D, a parallel MHD code using finite elements on unstructured meshes. ParM3D is used to theoretically test stability properties of proposed Stellarator models, in search of the ideal configuration to support a confined fusion reaction. Code is in C with MPI and visualization by IRIS Explorer. *(Technical Report)*, (*Seminar*)
- ***ORBIT MPI*:** Implemented an MPI-based parallelization of ORBIT, a guiding center drift orbit integrator. Improves the performance of the code to scale linearly on parallel machines. (*Technical Report*)

Research Specialist, Drexel University, Philadelphia, PA (June 1997 – May 2001)

- ***Dynamical instability in polytrope stars*:** Exploration of a vast parameter space of initial equilibrium models of polytrope stars. Evolution of toroidal density distribution models show instability at a significantly lower than normal ratio of kinetic over potential energy (T/W).
  - Used Perl and shell scripts to automate the generation of large quantities of data (rerunning the equilibrium solver with different parameters, and labeling and storing the output in directories).
  - Developed Tecplot macros to automate graph generation of energy ratio and density contour plots.
  - Used IRIS Explorer to create MPEG movies of the polytrope evolution. 3D data visualization of nested, semi-transparent, density iso-surfaces.
- **Bar mode instability simulation support:** Updated legacy FORTRAN code, verified routines, ran code in batches on supercomputers and managed data output. Produced graphs for reviewed publications and talks.
- **Documentation of ADM code:** Produced a user's manual for an extensive FORTRAN ADM code (numerical relativity evolution code) in LaTeX. Verified and documented analytical formulas, documented and checked each subroutine for accuracy, and mapped out the logical structure of the code.

Awards, Fellowships, and Scholarships

- Lockheed Martin Spot Award, 2015 and 2016
- Lockheed Martin Special Recognition Award (SRA), 2013
- AAUW Dissertation Fellowship, 2007-2008
- GAANN Fellowship, 2002-2003
- Alumni Association Graduate Fellowship, 2001
- A.J. Drexel Scholarship, 1996-2001
- Henry S.C. Chen Memorial Scholarship, 1998 and 2001
- Walter R. Coley Award, 1997

Teaching Experience

iSchool Astronomy Lecturer, University of North Carolina, Greensboro, NC (January 2011 – May 2011)

- Using Mastering Astronomy and other online material: Used online material to assign and check student progress of homework assignments. Class was remote and included high school students from across the state of North Carolina.
- Use of Elluminate Live! and online discussion tools: Communicated online with students through video, audio, chat, and whiteboard conferencing via Elluminate Live! Established and maintained classroom discussion and participation through online forums and chat.

Astronomy Teaching Assistant, North Carolina State University, Raleigh, NC (August 2001 – May 2007)

- Presented topics in observational astronomy at a non-science major level. Set up telescope equipment and guided students through telescope observation activities and constellation recognition. Used various astronomical maps and charts. Designed and proctored quizzes and tests and submitted grades.
- As ***Head Teaching Assistant*** *(August 2002 – May 2007)* organized and trained new tutors. Maintained multi-section class web page(s) using HTML, administered course WolfWare site including email lists, grade submission, and class discussion forum. Maintained telescopes, lab equipment, and supplies, and secured van services. Performed troubleshooting, including severe weather events, transportation issues, and lab manual publishing errors.

Interim Manager of the Physics Tutorial Center (January 2004 – August 2004)

- ***Tutoring***: Tutored all physics courses given at NCSU, including conceptual physics, algebra-based physics, calculus-based physics for engineers and majors, and Matter and Interactions. Helped students with WebAssign and studying for exams using professor-submitted back exams.
- ***Managing:*** Hired, scheduled, trained, and assisted with payroll sheets for tutors. Maintained office supplies, ordered equipment, maintained computers, and worked with IT services. Maintained a patron database with FileMaker Pro. Scheduled, administered, and graded make up exams. Performed troubleshooting and maintained relations between professors, tutors, and students.

Educational Outreach

- ***Astronomy Open Houses***: Organized several Astronomy Open Houses, including recruitment and training volunteers, publicizing, and setting up indoor and outdoor exhibits for a general audience including small children. Open houses are held at the Reedy Creek Lab site.
- ***Expanding Your Horizons Presenter:*** Designed and presented a workshop in Astronomy for Expanding Your Horizons 2007, a program designed to encourage young girls to pursue a career in Science, Engineering or Mathematics. Secured funding for presentation and workshop supplies from The Science House at NCSU.
- ***Elementary Education Astronomy Outreach:*** Assisted in NCSU Astrophysics outreach by setting up telescopes and giving astronomy demonstrations at secondary schools. Designed and guided students in hands on learning experiences to supplement their current curriculum.

- ***Project Pleiades Girl Scout Badge Program:*** Secured funding from The Science House at NCSU to continue "Project Pleiades", a program where female NCSU physics graduate students give Girl Scout troops hands on astronomy experience. Met with Wake County Girl Scouts to advertise the program, scheduled dates with troop leaders, and recruited volunteers. Created activities and materials based on the original Project Pleiades program. At the end of the workshop, scouts qualify for their "Sky Search" badges.

Publications

Pauer, James J., Mark D. Rowe, Wilson Melendez, Thomas P. Hollenhorst, **Lisa L. Lowe**, Peter J. Alsip, Dale M. Robertson, Steven A. Pothoven. *Modeling nearshore total phosphorus in Lake Michigan using linked hydrodynamic and water quality models*. Ecological Modelling. In press.

Jarvis, Brandon, John C. Lehrter, **Lisa L. Lowe**, Bradley Penta, Yongshan Wan, Melissa Duvall, Cody W. Simmons, Wilson Melendez, Dong S. Ko. *Coastal Generalized Ecosystem Model (Cgem) 1.0: A Complex Biogeochemical Model for Simulating Lower Trophic Levels and Ecosystem Dynamics*. In review.

Liu Zhilong, John C. Lehrter, Brian Dzwonkowski, **Lisa L. Lowe**, and Jeff Coogan. *Using dissolved oxygen variance to investigate the influence of nonextreme wind events on hypoxia in Mobile Bay, a shallow stratified estuary*. Front. Mar. Sci. 9:989017, 2002-11-01.

Jarvis, Brandon M., James J. Pauer, Wilson Melendez, Yongshan Wan, John C. Lehrter, **Lisa L. Lowe**, and Cody W. Simmons. *Inter-model comparison of simulated Gulf of Mexico hypoxia in response to reduced nutrient loads: Effects of phytoplankton and organic matter parameterization.* Environmental Modelling & Software, 2022-03.

Wang, Fang, Di Tian, **Lisa L. Lowe**, Latif Kalin, & John C. Lehrter. *Deep learning for daily precipitation and temperature downscaling*. Water Resources Research, 57, e2020WR029308: 2021.

Jarvis, Brandon M., Richard M. Greene, Yongshan Wan, John C. Lehrter, **Lisa L. Lowe**, and Dong S. Ko. *Contiguous Low Oxygen Waters between the Continental Shelf Hypoxia Zone and Nearshore Coastal Waters of Louisiana, USA: Interpreting 30 Years of Profiling Data and Three-Dimensional Ecosystem Modeling*. Environmental Science and Technology, 2021-03-08.

James J. Pauer, Wilson Melendez, Timothy J. Feist, John C. Lehrter, Brenda Rashleigh, **Lisa L. Lowe**, Richard M. Green. *The impact of alternative nutrient kinetics and computational grid size on model predicted primary production and hypoxic area in the northern Gulf of Mexico*. Environmental Modelling & Software, Volume 126, 2020, 104661.

Jarvis, Brandon M., John C. Lehrter, **Lisa L. Lowe**, James D. Hagy, Yongshan Wan, Michael C. Murrell, Dong S. Ko, Bradley Penta, and Richard W. Gould Jr. *Modeling Spatiotemporal Patterns of Ecosystem Metabolism and Organic Carbon Dynamics Affecting Hypoxia on the Louisiana Continental Shelf*. JGR Oceans, Volume 125, Issue 4: 2020.

M. Beck, John C., **Lisa L. Lowe**, and B. Jarvis. *Parameter sensitivity and identifiability for a biogeochemical model of hypoxia in the northern Gulf of Mexico*. Ecological Modelling. Elsevier Science BV, Amsterdam, Netherlands, 363:17-30, 2017.

Lehrter, John C., Dong S. Ko, **Lisa L. Lowe**, and Bradley Penta. Predicted effects of climate change on northern Gulf of Mexico hypoxia. Modeling Coastal Hypoxia: Numerical Simulations of Patterns, Controls and Effects of Dissolved Oxygen Dynamics. Springer, 2016. Accepted.

J. David Brown and **Lisa L. Lowe**, *Modifying the Einstein Equations off the Constraint Hypersurface*. Physical Review, D74:104023, 2006.

J. David Brown and **Lisa L. Lowe**, *Multigrid Elliptic Equation Solver with Adaptive Mesh Refinement*. Journal of Computational Physics, 209:582-598, 2005.

J. David Brown and **Lisa L. Lowe**. *Distorted Black Hole Initial Data Using the Puncture Method*. Physical Review, D70:124014, 2004.

Joan M. Centrella, Kimberly C. B. New, **Lisa L. Lowe**, and J. David Brown. *Dynamical Rotational Instability at Low T/W*. Astrophysical Journal Letters:550:L193-L196, 2001.

Technical Reports

Tang, X. Z., G. Y. Fu, S.C. Jardin, **Lisa L. Lowe**, W. Park, & H. R. Strauss. *Resistive Magnetohydrodynamics Simulation of Fusion Plasmas*. United States. 2001.

Lowe, Lisa L. *Orbitmpi Documentation*. United States. 2000.

Essays

- The RCD Unicorn. Wanted: RCD Unicorn. Preferred qualifications: Everything and the kitchen sink. *LinkedIn: December 18, 2021*.
- Got Performance Metrics? Using the annual review process to assess corporate culture. *LinkedIn: January 22, 2022*.
- How to be a recruiter for RCD, Recruiting for Research Computing and Data. *LinkedIn: June 27, 2022*.
- How to be a recruiter, Part II for RCD, Recruiting for advanced roles in Research Computing and Data. *LinkedIn: January 27, 2022*.
- Misinformation, Bias, and CentOS Stream: How we let Linux become a hot button issue. *LinkedIn: July 30, 2023*.
- Four Selfish Reasons to do Open Science Now! *LinkedIn: February 16, 2024*.