Nicholas A. Danes

Computational Scientist

⛰️ **Denver, CO** • 🔨 ndanes@mines.edu • 🏠 hello@ndanes.com • 🌐 ndanes.com

SUMMARY

Computational scientist with over 5 years combined experience in industry and academia:

- Extensive background in the implementation of computational algorithms within existing finite element method codes for mathematical modeling coupled to CFD; modifying computational physics methods with innovative extensions using object oriented and distributed-memory parallel programming
- Experience with developing, building, benchmarking and running codes on high performance computing (HPC) clusters
- On and off-site technical customer support for HPC applications, modeling & simulation projects
- Excellent teamwork through interpersonal communication and interdisciplinary collaboration with experimentalists, mathematicians and engineers
- Flexibility in completing self-conducted review to learn new tools for a project, whether it be a programming language, numerical method or modeling program

EDUCATION

Colorado School of Mines, PhD in Computational & Applied Mathematics **December 2019**

PhD Advisor: Dr. Karin Leiderman

- Dissertation: *Computational modeling of extravascular platelet aggregation under flow*
- MATH440 - Parallel Scientific Computing

California State University, Bakersfield, BS in Mathematics - Applied **June 2013**

- 3.82 GPA, Magna Cum Laude
- Minor in Computer Science

WORK EXPERIENCE

Computational Scientist
Colorado School of Mines, Information & Technology Solutions (ITS) **August 2020 – Present**

- Member of the Cyber Infrastructure & Advanced Research Computing (CIARC) group under ITS where main duties include:
  - Supporting HPC users on technical and non-technical issues with research computing
  - Building, porting and scaling applications & software libraries on Mines' HPC cluster systems
  - Lead on developing and providing new technical information & user guides for Mines HPC users via CIARC Mines website
  - Participating in internal and external outreach for research computing awareness for campus-wide support

Computational Engineer I
Ball Aerospace & Technologies **September 2019 – August 2020**

- Utilized massively parallel coupled multi-physics codes for modeling and simulation
- Aided in code development of a Python written model using object-oriented principles with user documentation in a version control environment (git)
- Conducted parallel scaling studies on massively parallel coupled multiphysics codes to benchmark runtimes and identify solver bottlenecks for specific modeling problems
- Built scientific computing (MPI-enabled) libraries from source on workstation and high-performance

computing clusters; provided user documentation on successful builds
- Collaborated with a team of Ball engineers and sub-contractors to develop and verify/validate coupled multiphysics codes

RESEARCH EXPERIENCE

Graduate Student Researcher
Colorado School of Mines, Department of Applied Mathematics & Statistics **August 2016 – 2019**
University of California, Merced, Department of Applied Mathematics **August 2014 – 2016**

Advisor: Dr. Karin Leiderman | Funding: NIH R01HL120728

- Developed and validated a 2D computational model of extravascular platelet aggregation within the FEniCS software suite; model involves solving a large system of partial differential equations to account for fluid dynamics & platelet aggregation
- Code development includes novel changes to existing numerical algorithms; solved using multiple processing cores on Colorado School of Mines' "Mio" high performance computing cluster
- Compared and cross-validated model outputs with microfluidic experiments and reduced-order mathematical models
- Wrote technical reports, papers and presented research at major conferences

Research Intern
National Renewable Energy Lab (NREL), Computational Science Center **June – August 2017**

Mentors: Drs. H. Sitarman, J. Stickel & M. A. Sprague | Funding: NSF DMS-155122

- Implemented, and validated a 3D model of lignocellulosic biomass conversion into an existing CFD code
  - Simulations of model were run using the NREL high performance computing cluster "Peregine"
- Presented work at the 2017 APS-DFD conference
- Edited and reviewed manuscript submitted for publication

Undergraduate Researcher
California State University, Chico **June – August 2012**

Mentor: Dr. Sergei Fomin | Funding: NSF DMS-1156612 Chico, CA

- Used a combination of perturbation methods, asymptotic analysis and numerical simulation to study rimming flow inside a cylinder
- Collaborated with a teacher and other undergraduate math students with research, writing and presentations

SKILLS

Computer Skills

Novice	HTML, CSS, Markdown, Git, C/C++, Bash
Intermediate	Matlab, LaTeX, Fortran 77/90, Nek5000, Paraview, MPI, Slurm, Linux
Advanced	Python (NumPy, SciPy, PETSc4Py, Matplotlib), FEniCS

Math

- Numerical Solution of Ordinary & Partial Differential Equations, Numerical Anaylsis, Computational Fluid Dynamics, Linear Algebra

Other

- Formal presentations to groups and/or conferences, technical writing
- Interdisciplinary communication for research projects, papers, and presentations