

Ben O'Neill

Software Engineer

RNET Technologies Inc.

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EDUCATION

University of Colorado at Boulder, Boulder, CO

- Ph.D. in Applied Mathematics, August 2017.
- Masters in Applied Mathematics, May 2015.
- Cumulative GPA: 4.0

Honors/Accomplishments

- SIAM Student Travel Grant, March 2017
- Top Poster Award, Lawrence Livermore Poster Competition, July 2014
- Mile High Fellowship, Aug 2014

The University of Waikato, Waikato, NZ

- Bachelor of Science (Hons) in Mathematics and Physics, December 2011.
- First Class Honors
- Dean's honors list, 2009-2011
- Cumulative GPA: 4.0

RESEARCH EXPERIENCE

RNET Technologies Inc – Senior Research Scientist.

An Extensible Verification and Validation Library with NEAMS Workbench Integration.

DOE Phase I SBIR, Primary Investigator (DE-SC0017701)

July 2018 - Present

- Developing a modular toolkit for streamlining verification and validation of numerical simulations.
- The tool will utilize binary injection to insert V&V tests into existing simulations. Automatic Verification documentation will be created using the output of those tests.

Cloud-based Scientific Workbench for Nuclear Reactor Simulation Life Cycle Management.

DOE Phase II SBIR, Research Scientist (DE-SC0015748)

October 2017 – Present

- Developing CloudBench, a web-enabled infrastructure that increases adoption of advanced simulation tools.
- CloudBench enables identification of modeling codes (often developed by major government projects such as NEAMS and CASL), remote execution and cloud visualization, and workflow management/provenance.

Automatic solver selection for Nuclear Engineering Simulation.

DOE Phase II SBIR, Research Scientist (DE-SC0013869)

July 2017 - Present

- Developing a machine learning based solver selection tool for the NEAMS toolkit.
- The tool analyzes the sub problem characteristics at runtime and select the optimal solver with

- minimal overhead based on previously trained machine learning models
- High prediction accuracy has been demonstrated for optimal linear solver selection in terms of execution time.

VERA-Workbench: A unified Multi-physics toolkit for the VERA Suite of Tools.

DOE Phase I SBIR, Primary Investigator (DE-SC0017701)

October 2017 – Jul 2018

- Developed a unified IDE for the VERA suite of tools with python and Enthought Canopy.
- The tool provides a rich graphical interface allowing end-users design, execute and visualize pellet-to-plant nuclear physics simulations in a rich, graphical and integrated environment.

Dissertation Research, April 2014-August 2017

University of Colorado at Boulder

Mentor: Tom Manteuffel (CU Boulder), Jacob Schroder (Lawrence Livermore National Laboratory)

- Studied Parallel-in-time solvers for parabolic partial differential equations
- Implemented a fully adaptive parallel-in-time solver using the FENICS finite element package, C/C++, and MPI.
- Designed and implemented a temporal load balancing algorithm for the opensource XBraid project with $O(\log(P))$ communication.

Summer Internship, Summer, 2016

Lawrence Livermore National Laboratory

Mentor: Jacob Schroder and Rob Falgout

- Researched an embedded error estimate for the XBraid project.
- Designed and implemented a cost efficient parallel-in-time solver based on MGRIT and Richardson Extrapolation.
- Lead author for “Multigrid Reduction in Time with Richardson Extrapolation”, a paper that is currently in preparation.

PUBLICATIONS

- R. D. Falgout, T. A. Manteuffel, **B. O’Neill**, and J. B. Schroder, Multigrid reduction in time for nonlinear parabolic problems, Copper Mountain Special Section, SIAM J.Sci. Comput., (2016). LLNL-JRNL-692258 .
- R. D. Falgout, T. A. Manteuffel, **B. O’Neill**, and J. B. Schroder, Multigrid reduction in time with Richardson Extrapolation SIAM J.Sci. Comput., (submitted)
- R. D. Falgout, T. A. Manteuffel, **B. O’Neill**, and J. B. Schroder, Multigrid reduction in time for nonlinear parabolic problems, Copper Mountain Special Section, SIAM J.Sci. Comput., (2016). LLNL-JRNL-692258.
- M.T. Wilson, P.A. Robinson, **B. O’Neill**, D.A. Steyn-Ross, Complementarity of Spike- and and Rate-Based Dynamics of Neural Systems, PLOS Computational Biology, Vol 8 (2012).

PRESENTATIONS

- Multigrid Reduction in Time with Space-Time Adaptivity, SIAM conference on Computer Science and Engineering, Atlanta GA, February 2017
- Multigrid Reduction in time for nonlinear problems, Copper Mountain Conference, Copper Mountain, March 2016
- Multigrid Reduction in time for nonlinear problems, SIAM conference on Computer Science and Engineering, Salt Lake City, March 2015