# Colin James Grudzien

Postdoctoral Researcher – NERSC

https://cgrudz.github.io

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## Professional Experience

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| Aug. 2016 – Present | **Nansen Environmental & Remote Sensing Center (NERSC)**<br>Bergen, Norway – Postdoctoral Researcher<br><br>Extending dimensional reduction methodology for Bayesian data assimilation in physical systems under the project Reduced subspace in big data treatment: A new paradigm for efficient geophysical Data Assimilation. |
| Oct. 2012 – May. 2016 | **Mathematics & Climate Research Network (MCRN)**<br>https://mcrn.hubzero.org/ – Graduate Research Assistant<br><br>Organized the **Joint Data Assimilation Seminar** between MCRN, NERSC and ICTS-TIFR of Bangalore, India.<br>Developed and maintained educational and research oriented resources to promote scientific literacy and outreach for MCRN.<br>Employed novel technology platforms for collaboration in virtual research networks under the NSF **Science Across Virtual Institutes** program. |
| June 2015 – Aug. 2015 | **Los Alamos National Laboratory**<br>Los Alamos, New Mexico – Graduate Research Assistant<br><br>Utilized Matlab & Javascript libraries to design reduction algorithms and visualization techniques for electric grid multiscale-networks.<br>Published algorithms and visualizations in code repository:<br>https://github.com/cgrudz/electric_grid_model_reduction |

## Education

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| 2011 – 2016 | **Applied Mathematics PhD, University of North Carolina at Chapel Hill**<br>Advisor: Christopher KRT Jones |
| 2008 – 2011 | **BSc Magna Cum Laude, University of Oregon**<br>Majors: Mathematics & History |
| 2006 – 2008 | **Lane Community College** |

# Publications

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| 2018 | **Grudzien, C.**, A. Carrassi, and M. Bocquet. Extending assimilaiton in the unstable subspace to the presence of model error. *In Preparation*, 2018 |
| 2017 | **Grudzien, C.**, A. Carrassi, and M. Bocquet. Asymptotic forecast uncertainty and the unstable subspace in the presence of additive model error. *arXiv preprint arXiv:1707.08334*, 2017 |
| 2017 | **Grudzien, C.**, D. Deka, M. Chertkov, and S.N. Backhaus. Structure-& physics-preserving reductions of power grid models. *arXiv preprint arXiv:1707.03672*, 2017 |
| 2017 | M. Bocquet, K.S. Gurumoorthy, A. Apte, A. Carrassi, **Grudzien, C.**, and C.K.R.T. Jones. Degenerate kalman filter error covariances and their convergence onto the unstable subspace. *SIAM/ASA Journal on Uncertainty Quantification*, 5(1):304–333, 2017 |
| 2017 | K.S. Gurumoorthy, **Grudzien, C.**, A. Apte, A. Carrassi, and C.K.R.T. Jones. Rank deficiency of kalman error covariance matrices in linear time-varying system with deterministic evolution. *SIAM Journal on Control and Optimization*, 55(2):741–759, 2017 |
| 2016 | **Grudzien, C.**, T.J. Bridges, and C.K.R.T. Jones. Geometric phase in the hopf bundle and the stability of non-linear waves. *Physica D: Nonlinear Phenomena*, 334:4–18, 2016 |
| 2016 | **Grudzien, C.** The instability of the hocking–stewartson pulse and its geometric phase in the hopf bundle. *Journal of Computational and Applied Mathematics*, 307:162–169, 2016 |

# Awards

- University of North Carolina at Chapel Hill

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| 2015 – 2016 | Off Campus Dissertation Fellowship |
| 2013 | Future Faculty Fellowship Program |

- University of Oregon

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| 2010 – 2011 | Phi Beta Kappa Alpha of Oregon – Oregon Six Elect |
| 2010 – 2011 | Mathematics Department DeCou Prize |
| 2010 – 2011 | Donald DuShane IV, College of Arts and Science Scholarship |
| 2009 – 2010 | Mathematics Department Stevenson Prize |

- Lane Community College

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| 2007 – 2008 | Social Science Shining Star Scholarship |
| 2006 – 2007 | Liberty Bank Making a Difference Scholarship |

# Languages

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| English | Native |
| Spanish | Limited Working Proficiency |
| Python, Matlab & LaTeX | Proficient |
| Bash, Javascript, HTML & CSS | Passable |

# Codebase

`https://github.com/cgrudz`

# Teaching

- Masters Students

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| June - Aug. 2017 | Armand Vic, École Normale Supérieure de Rennes<br>Supervised **Erasmus Plus Research Training Internship** in mathematics at NERSC. |

- Lecturer, University of North Carolina at Chapel Hill

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| 2013 | **Math 190, Topics in Mathematics: A Climate of Uncertainty**<br>Designed original curriculum and led course under the HHMI First Year Seminar program. Lesson plans and resources archived at: `https://aclimateofuncertainty.web.unc.edu` |
| 2012 | Math 252, Calculus II |

- Teaching Assistant, University of North Carolina at Chapel Hill

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| 2015 | Math 657, Dynamical Systems with Applications in Climate |
| 2013 | Masc 783, Mathematical Modeling: Climate Modeling |
| 2013 | Math 67, Topics: The Mathematics of Climate Change |
| 2012 | Math 541, Advanced Calculus |
| 2011 | Math 383, Ordinary Differential Equations |
| 2011 | Mathematics Help Center – Tutor |

- Educator Training, University of North Carolina at Chapel Hill

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| 2013 | Future Faculty Fellowship Program |
| 2011 | Math 920, Graduate TA Teaching Seminar |

- Tutor & Grader, University of Oregon

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| 2010 – 2011 | Grader: Math 307, Introduction to Proof |
| 2010 – 2011 | Tutor: Math 213, Fundamentals of Elementary Mathematics |

# Extended Research Visits

- Statistical and Applied Mathematical Sciences Institute – Durham, North Carolina
  Principal Investigator: Amit Apte

  - Jan. – April 2018

- Center for Nonlinear Studies, Los Alamos National Laboratory – Los Alamos, New Mexico
  Principal Investigator: Michael Chertkov

  - Oct. – Nov. 2016

- International Centre for Theoretical Science, TIFR – Bangalore, India
  Principal Investigator: Amit Apte

  - Nov. 2015 – Dec. 2015
  - Dec. 2014 – Jan. 2015
  - Dec. 2013 – Jan. 2014

- Nansen Environmental and Remote Sensing Center – Bergen, Norway
  Principal Investigator: Alberto Carrassi

  - Oct. 2105 – Nov. 2015

## Selected Talks

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| April 2018 | SIAM Conference on Uncertainty Quantification |
| | Garden Grove, California |
| Oct. 2017 | Numerical Modeling, Predictability and Data Assimilation in Weather, Ocean and Climate |
| | Bologna, Italy |
| Sept. 2017 | SIAM Conference on Mathematical and Computational Issues in the Geosciences |
| | Erlangen, Germany |
| April 2017 | European Geophysical Union General Assembly, |
| | Vienna, Austria |
| Nov. 2016 | Department of Meteorology Data Assimilation Research Centre Seminar, |
| | University of Reading – Reading, England |
| May 2015 | SIAM Conference on Applications of Dynamical Systems |
| | Salt Lake City, Utah |
| April 2015 | SIAM Central States Section First Annual Meeting |
| | Rolla, Missouri |
| March 2014 | IIMAS Coloquio de Matemáticas Aplicadas, |
| | Universidad Nacional Autónomo de México – México City, México |

## Workshops & Trainings

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| March 2017 | Emerging Applications of Data Assimilation in the Geosciences, |
| | Lorentz Center – Leiden, Netherlands |
| Sept. 2016 | Distributed Control and Decision Making Over Networks |
| | Institute for Mathematics and its Applications – Minneapolis, Minnesota |
| March 2015 | Data4Decisions Conference and Exposition, |
| | Raleigh, North Carolina |
| Dec. 2014 | Climate Variability: From Models to Decisions, |
| | Lorentz Center – Leiden, Netherlands |
| April 2014 | Careers and Opportunities in Industry for Mathematical Scientists, |
| | Institute for Mathematics and its Applications – Minneapolis, Minnesota |
| Feb. 2014 | Algebraic Topology in Dynamics, Differential Equations and Experimental Data, |
| | Institute for Mathematics and its Applications – Minneapolis, Minnesota |
| May 2013 | Community Earth System Model (CESM) Tutorial |
| | National Center for Atmospheric Research – Boulder, Colorado |

## Service

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| 2015 – 2016 | Math & Climate Research Network – Hubministrator |
| | Led trainings, curated meta-data and created resources for using the MCRN Hub. Video tutorials are available at `https://mcrn.hubzero.org/resources/606` |
| 2012 – 2013 | UNC-CH Graduate Mathematics Association Seminar Coordinator |
| 2012 – 2013 | UNC-CH Graduate & Professional Student Federation Senator |
| 2003 – 2011 | City of Eugene Libraries, Parks & Recreation – Lifeguard |
| | Eugene, Oregon |