

# Colin James Grudzien

Postdoctoral Researcher – NERSC

<https://cgrudz.github.io>

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## Professional Experience

Aug. 2016 – Present	<b>Nansen Environmental &amp; Remote Sensing Center (NERSC)</b> Bergen, Norway – Postdoctoral Researcher  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	<b>Mathematics &amp; Climate Research Network (MCRN)</b> <a href="https://mcrn.hubzero.org/">https://mcrn.hubzero.org/</a> – Graduate Research Assistant  Organized the <b>Joint Data Assimilation Seminar</b> between MCRN, NERSC and ICTS-TIFR of Bangalore, India. Developed and maintained educational and research oriented resources to promote scientific literacy and outreach for MCRN. Employed novel technology platforms for collaboration in virtual research networks under the NSF <b>Science Across Virtual Institutes</b> program.
June 2015 – Aug. 2015	<b>Los Alamos National Laboratory</b> Los Alamos, New Mexico – Graduate Research Assistant  Utilized Matlab & Javascript libraries to design reduction algorithms and visualization techniques for electric grid multiscale-networks. Published algorithms and visualizations in code repository: <a href="https://github.com/cgrudz/electric_grid_model_reduction">https://github.com/cgrudz/electric_grid_model_reduction</a>

## Education

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

## Publications

2018	<b>C. Grudzien</b> , A. Carrassi, and M. Bocquet. A dynamically consistent view of covariance inflation for reduced rank extended Kalman filters. <i>In Preparation</i> , 2018
2017	<b>C. Grudzien</b> , A. Carrassi, and M. Bocquet. Asymptotic forecast uncertainty and the unstable subspace in the presence of additive model error. <i>arXiv preprint arXiv:1707.08334</i> , 2017
2017	<b>C. Grudzien</b> , D. Deka, M. Chertkov, and S.N. Backhaus. Structure-& physics-preserving reductions of power grid models. <i>arXiv preprint arXiv:1707.03672</i> , 2017
2017	M. Bocquet, K.S. Gurumoorthy, A. Apte, A. Carrassi, <b>C. Grudzien</b> , and C.K.R.T. Jones. Degenerate Kalman filter error covariances and their convergence onto the unstable subspace. <i>SIAM/ASA Journal on Uncertainty Quantification</i> , 5(1):304–333, 2017
2017	K.S. Gurumoorthy, <b>C. Grudzien</b> , 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. <i>SIAM Journal on Control and Optimization</i> , 55(2):741–759, 2017
2016	<b>C. Grudzien</b> , T.J. Bridges, and C.K.R.T. Jones. Geometric phase in the Hopf bundle and the stability of non-linear waves. <i>Physica D: Nonlinear Phenomena</i> , 334:4–18, 2016
2016	<b>C. Grudzien</b> . The instability of the Hocking–Stewartson pulse and its geometric phase in the Hopf bundle. <i>Journal of Computational and Applied Mathematics</i> , 307:162–169, 2016

## Awards

- University of North Carolina at Chapel Hill
 

2015 – 2016	Off Campus Dissertation Fellowship
2013	Future Faculty Fellowship Program
- University of Oregon
 

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
 

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

## Languages

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

## Codebase

<https://github.com/cgrudz>

## Teaching

- Masters Students
 

June - Aug. 2017	Armand Vic, École Normale Supérieure de Rennes Supervised <b>Erasmus Plus Research Training Internship</b> in mathematics at NERSC.
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- Lecturer, University of North Carolina at Chapel Hill
 

2013	<b>Math 190, Topics in Mathematics: A Climate of Uncertainty</b>  Designed original curriculum and led course under the HHMI First Year Seminar program. Lesson plans and resources archived at: <a href="https://aclimateofuncertainty.web.unc.edu">https://aclimateofuncertainty.web.unc.edu</a>
2012	Math 252, Calculus II
  
- Teaching Assistant, University of North Carolina at Chapel Hill
 

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	Math 381, Discrete Mathematics
2011	Mathematics Help Center – Tutor
  
- Educator Training, University of North Carolina at Chapel Hill
 

2013	Future Faculty Fellowship Program
2011	Math 920, Graduate TA Teaching Seminar
  
- Tutor & Grader, University of Oregon
 

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

## Extended Research Visits

Jan. – April 2018	Statistical and Applied Mathematical Sciences Institute – Durham, North Carolina Principal Investigator: Amit Apte
Oct. – Nov. 2016	CNLS, Los Alamos National Laboratory – Los Alamos, New Mexico Principal Investigator: Michael Chertkov
Nov. 2015 – Dec. 2015	International Centre for Theoretical Science, TIFR – Bangalore, India Principal Investigator: Amit Apte
Oct. 2105 – Nov. 2015	Nansen Environmental and Remote Sensing Center – Bergen, Norway Principal Investigator: Alberto Carrassi
Dec. 2014 – Jan. 2015	International Centre for Theoretical Science, TIFR – Bangalore, India Principal Investigator: Amit Apte
Dec. 2013 – Jan. 2014	International Centre for Theoretical Science, TIFR – Bangalore, India Principal Investigator: Amit Apte

## Selected Talks

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
May 2017	Twelfth International Ensemble Kalman Filter Workshop, Bergen, Norway
April 2017	European Geophysical Union General Assembly, Vienna, Austria
Nov. 2015	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 Autónoma de México – México City, México

## Workshops & Trainings

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

2017	Quarterly Journal of the Royal Meteorological Society – Referee
2015 – 2016	Math & Climate Research Network – Hubadministrator  Led trainings, curated meta-data and created resources for using the MCRN Hub. Video tutorials are available at <a href="https://mcrn.hubzero.org/resources/606">https://mcrn.hubzero.org/resources/606</a>
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