(303) 492-7563
ian.grooms@colorado.edu
`colorado.edu/amath/grooms`

CURRENT POSITION

Assistant Professor
Department of Applied Mathematics
University of Colorado, Boulder

EDUCATION

- **University of Colorado at Boulder**
  Ph.D. in Applied Mathematics, May 2011
- **College of William and Mary, Williamsburg, VA**
  B.S. in Mathematics, *summa cum laude*, May 2005

RESEARCH INTERESTS

- Multiscale Modeling, Analysis, and Simulation
- Data Assimilation & Uncertainty Quantification for Turbulent Dynamical Systems
- Geophysical Fluid Dynamics, esp. Physical Oceanography

PUBLICATIONS **Refereed Journal Articles**

[28] **I. Grooms** *"Simulations of eddy kinetic energy transport in barotropic turbulence"* Phys. Rev. Fluids **2** 2017.

[27] J. B. Weiss and **I. Grooms** *"Assimilation of ocean sea-surface height observations of mesoscale eddies"* Chaos **27** 2017.

[26] **I. Grooms** and L. Zanna *"A note on 'Towards a stochastic parameterization of ocean mesoscale eddies'"* Ocean Modelling **113** 2017.

[25] **I. Grooms** *"A Gaussian-product stochastic Gent-McWilliams parameterization"* Ocean Modelling **106** 2016.

[24] **I. Grooms** and L.-P. Nadeau *"The effects of mesoscale atmosphere-ocean coupling on the quasigeostrophic double gyre"* Fluids **1** 2016.

[23] D. Nieves, **I. Grooms**, K. Julien, and J. B. Weiss *"Investigations of non-hydrostatic, stably stratified and rapidly rotating flows"* J. Fluid Mech. **801** 2016.

[22] C. B. Rocha, W. R. Young, and **I. Grooms** *"On Galerkin approximations for the quasigeostrophic equations"* J. Phys. Oceanogr. **46** 2016.

[21] **I. Grooms** *"A computational study of turbulent kinetic energy transport in barotropic turbulence on the f-plane"* Phys. Fluids **27** 2015.

[20] **I. Grooms** and Y. Lee *"A framework for variational data assimilation with superparameterization"* Nonlin. Proc. Geophys. **22** 2015.

[19] **I. Grooms**, Y. Lee, and A. J. Majda *"Ensemble filtering and low resolution model error: Covariance inflation, stochastic parameterization, and model numerics,"* Mon. Weather Rev. **143**, 2015.

[18] **I. Grooms**, Y. Lee, and A. J. Majda *"Numerical Schemes for Stochastic Backscatter in the Inverse Cascade of Quasigeostrophic Turbulence,"* Multiscale Modeling & Simulation **13**, 2015.

[17] **I. Grooms** *"Submesoscale Baroclinic Instability in the Balance Equations,"* J. Fluid Mech. **762**, 2015.

[16] **I. Grooms**, A. J. Majda, and K. S. Smith "*Stochastic Superparameterization in a Quasigeostrophic Model of the Antarctic Circumpolar Current,*" Ocean Modelling **85**, 2015.

[15] **I. Grooms** and J. P. Whitehead "*Bounds on Heat Transport in Rapidly Rotating Rayleigh-Bénard Convection,*" Nonlinearity **28**, 2015.

[14] **I. Grooms** "*Asymptotic Behavior of Heat Transport for a Class of Exact Solutions in Rotating Rayleigh-Bénard Convection,*" Geophys. Astrophys. Fluid Dyn **109**, 2015.

[13] **I. Grooms**, Y. Lee, and A. J. Majda "*Ensemble Kalman Filters for Dynamical Systems with Unresolved Turbulence,*" J. Comp. Phys. **273**, 2014.

[12] **I. Grooms** and A. J. Majda "*Stochastic Superparameterization in Quasigeostrophic Turbulence,*" J. Comp. Phys. **271**, 2014.

[11] A. J. Majda and **I. Grooms** "*New Perspectives on Superparameterization for Geophysical Turbulence,*" J. Comp. Phys. **271**, 2014.

[10] **I. Grooms** and A. J. Majda "*Stochastic Superparameterization in a One-Dimensional Model for Wave-Turbulence,*" Commun. Math. Sci. **12**, 2014.

[9] **I. Grooms**, L.-P. Nadeau, and K. S. Smith "*Mesoscale Eddy Energy Locality in an Idealized Ocean Model,*" J. Phys. Oceanogr. **43**, 2013.

[8] **I. Grooms** and A. J. Majda "*Efficient Stochastic Superparameterization for Geophysical Turbulence,*" Proc. Nat. Acad. Sci. USA **110**, 2013.

[7] **I. Grooms**, K. S. Smith, and A. J. Majda "*Multiscale Models for Synoptic-Mesoscale Interactions in the Ocean,*" Dyn. Atmos. Oceans **58**, 2012.

[6] K. Julien, A. Rubio, **I. Grooms**, and E. Knobloch "*Statistical and Physical Balances in Low Rossby Number Rayleigh-Bénard Convection,*" Geophys. Astrophys. Fluid Dyn. **106**, 2012.

[5] **I. Grooms**, K. Julien, and B. Fox-Kemper "*On the Interactions Between Planetary Geostrophy and Mesoscale Eddies,*" Dyn. Atmos. Oceans **51**, 2011.

[4] **I. Grooms** and K. Julien, "*Linearly Implicit Methods for Nonlinear PDEs with Linear Dispersion and Dissipation,*" J. Comp. Phys. **230**, 2011.

[3] **I. Grooms**, K. Julien, J. B. Weiss, and E. Knobloch, "*Model of Convective Taylor Columns in Rotating Rayleigh-Bénard Convection,*" Phys. Rev. Lett. **104**, June 2010. **Cover Article**

[2] **I. Grooms**, R. M. Lewis, and M. W. Trosset, "*Molecular Embedding via a Second Order Dissimilarity Parameterized Approach,*" SIAM J. Sci. Comp. **31**, 2009.

[1] J. Azzam, B. Buchholz, **I. Grooms**, G. Hagge, K. Hays, and G. Norgard, "*A Nonstandard Fourier Inequality,*" The Rose-Hulman Journal of Undergraduate Mathematics, **6** 1 2005.

Conference Proceedings

[2] J. Christopher, C. Lapointe, N. Wimer, T. Hayden, **I. Grooms**, G.B. Rieker, and P.E. Hamlington "*Parameter Estimation for a Turbulent Buoyant Jet with Rotating Cylinder Using Approximate Bayesian Computation*" 23rd AIAA Computational Fluid Dynamics conference, 2017.

[1] J. Christopher, C. Lapointe, N. Wimer, T. Hayden, **I. Grooms**, G.B. Rieker, and P.E. Hamlington "*Parameter Estimation for a Turbulent Buoyant Jet Using Approximate Bayesian Computation*" 55th AIAA Aerospace Sciences Meeting, 2017.

TEACHING EXPERIENCE

- Numerical Analysis 1, APPM/MATH 5600, Fall 2017
- Data assimilation for high-dimensional dynamical systems, APPM 4/5720, Fall 2016
- Matrix Methods and Applications, APPM 3310, Spring 2016 & 2017
- Honors Calculus 2 for Engineers, APPM 1360, Fall 2015
- Calculus 2 for Engineers, APPM 1360, Summer 2007

AWARDS AND HONORS

- **Turcotte Award** "to recognize an outstanding dissertation by a recent graduate that contributes directly to nonlinear geophysics." Nonlinear Geophysics section of the American Geophysical Union, 2011
- **William and Mary Prize in Mathematics**, 2005

PROFESSIONAL MEMBERSHIPS I am a lifetime member of:

- The Society for Industrial and Applied Mathematics (SIAM)
- The American Geophysical Union (AGU)