

# Jonathan Gula

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Researcher

## Education

### 2006-09 - PhD in physical oceanography and meteorology

*Supervisors : Prof. Vladimir Zeitlin and Riwal Plougonven - LMD, ENS, Paris*

### 2005-06 - Master's degree in Ocean, Atmosphere and Climate

*Master's speciality : Dynamics of the ocean and atmosphere - Université Paris VI*

### 2004-05 - Agrégation de Sciences Physique

*Superior diploma for teaching Physics and Chemistry in high school. - ENS Cachan*

### 2003-04 - Maitrise in fundamental physics

*equivalent of first year of master in fundamental physics - ENS Cachan*

### 2002-03 - Licence in Physics

*equivalent of bachelor's degree in physics - ENS Cachan*

## Work Experience

### Research

#### 2011-... - UCLA - Dept. of Atm. and Ocean. Sciences

**Assistant Researcher** : Interactions of currents and topography using the UCLA Regional Oceanic Modeling System (ROMS). *Contact : James C. McWilliams.*

#### 2009-11 - University of Toronto - Department of Physics

**Postdoctoral fellow** : Regional climate modeling and downscaling of global warming experiments. *Contact : W.R. Peltier.*

#### 2006-09 - Laboratoire de Météorologie Dynamique, ENS, Paris

**PhD candidate** : Ageostrophic instabilities of baroclinic flows in the atmosphere and ocean : Nonlinear evolution, secondary cyclogenesis and inertia-gravity waves emissions.

*Supervisors : Prof. Vladimir Zeitlin et Riwal Plougonven.*

#### Apr.-Jul. 2006 - Laboratoire de Météorologie Dynamique, ENS, Paris

**Research assistant** : Study of the Rossby-Kelvin instability

*Supervisors : Prof. Vladimir Zeitlin et Riwal Plougonven.*

#### Apr.-Aug. 2004 - University of Western Australia - Geophysical Fluid Dynamics group

**Research assistant** : Periodic Forcing of Baroclinic Basin-Scale Waves in a Rotating Stratified Basin.

*Supervisor : Prof. Greg Ivey*

#### Jul.-Aug. 2003 - Institut de Physique du Globe de Paris - Mécanique des roches

**Research assistant** : Experimental study of the electrico-sismic response in a grès de Fontainebleau.

*Supervisor : Jean-Pierre Vilotte*

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## Publications :

### In journals :

2015

- McWilliams, J.C., J. **Gula**, J., M.J. Molemaker, L. Renault & A. Shchepetkin, **2015** : Filament frontogenesis by boundary layer turbulence, *J. Phys. Oceanogr.*, accepted.
- **Gula**, J., M.J. Molemaker & J.C. McWilliams, **2015** : Topographic vorticity generation, submesoscale instability and vortex street formation in the Gulf Stream, *Geophys. Res. Lett.*, in press.
- Callies, J., R. Ferrari, J. M. Klymak & J. **Gula**, **2015** : Seasonality in submesoscale turbulence, *Nat. Commun.*, 6, 6862.
- Mallard, M.S., C.G. Nolte, T.L. Spero, O.R. Bullock, K. Alapaty, J. Herwehe, J. **Gula** & J. Bowden, **2015** : Challenges and Solutions in Representing Lakes when Using WRF in a Downscaling Application, *Geosci. Model Dev.*, 8, 1085-1096.
- **Gula**, J., M.J. Molemaker & J.C. McWilliams, **2015** : Gulf Stream dynamics along the Southeastern U.S. Seaboard, *J. Phys. Oceanogr.*, 45, 690-715.

2014

- **Gula**, J., M.J. Molemaker & J.C. McWilliams, **2014** : Submesoscale cold filaments in the Gulf Stream, *J. Phys. Oceanogr.*, 44, 2617-2643.
- d'Orgeville, M., W.R. Peltier, A. Erler & J. **Gula**, **2014** : Global Warming Impacts on Great Lakes Basin Precipitation Extremes, *J. Geophys. Res. Atmos.*, 119, 10799-10812.
- Mallard, M.S., C.G. Nolte, O.R. Bullock, T.L. Spero & J. **Gula**, **2014** : Using a Coupled Lake Model with WRF for Dynamical Downscaling, *J. Geophys. Res. Atmos.*, 119, 7193-7208.

2012

- **Gula**, J. & W.R. Peltier **2012** : Dynamical Downscaling over the Great Lakes Basin of North America using the WRF Regional Climate Model :The impact of the Great Lakes system on regional greenhouse warming, *Journal of Climate*, 25, 7723-7742.

2011

- Flór, J.-B., H. Scolan & J. **Gula**, **2011** : Frontal instabilities and waves in a differentially rotating fluid, *J. Fluid Mech.*, 685, 532-542.

2010

- Ribstein, B., J. **Gula** & V. Zeitlin, **2010** : (A)geostrophic adjustment of dipolar perturbations, formation of coherent structures and their properties, as follows from high-resolution numerical simulations with rotating shallow water model, *Physics of Fluids*, 22, doi :10.1063/1.3514200.
- **Gula**, J., V. Zeitlin & F. Bouchut, **2010** : Instabilities of buoyancy driven coastal currents and their nonlinear evolution in the two-layer rotating shallow water model. Part II. Active lower layer, *J. Fluid Mech.*, 665, 209-237.
- **Gula**, J. & V. Zeitlin, **2010** : Instabilities of buoyancy driven coastal currents and their nonlinear evolution in the two-layer rotating shallow water model. Part I. Passive lower layer., *J. Fluid Mech.*, 659, 69-93.

2009

- **Gula**, J., V. Zeitlin & R. Plougonven, **2009** : Instabilities of two-layer shallow-water flows with vertical shear in the rotating annulus, *J. Fluid Mech.*, 638, 27-47.
- **Gula**, J., R. Plougonven & V. Zeitlin, **2009** : Ageostrophic instabilities of fronts in a channel in the stratified rotating fluid., *J. Fluid Mech.*, 627, 485-507.

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### Book chapter :

- **Gula**, J. & V. Zeitlin, **2014** : Instabilities of shallow-water flows with vertical shear in the rotating annulus,"Modelling Atmospheric and Oceanic flows : insights from laboratory experiments and numerical simulations", edited by T. von Larcher and P. Williams, AGU, Washington, D. C.
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 Proceedings :

- **Gula, J., & V. Zeitlin, 2011** : Instabilities of buoyancy driven coastal currents and their nonlinear evolution in the two layer rotating shallow water model, In *Mathematical Theory and Modelling in Atmosphere-Ocean-Science*. Eds. A. J. Majda, B. Stevens and R. Klein. Mathematisches Forschungsinstitut Oberwolfach, Report No. 34/2010.
- **Gula, J., R. Plougonven & V. Zeitlin, 2007** : Ageostrophic instabilities of a front in a stratified rotating fluid., 18ème Congrès Français de Mécanique, 27-31 août 2007, Grenoble, France, (CD-ROM proceedings).
- Wake, G. W., J. **Gula** & G.N. Ivey, **2004** : Periodic Forcing of Baroclinic Basin-Scale Waves in a Rotating Stratified Basin, 15th Australasian Fluid Mechanics Conference, The University of Sydney, 13-17 December 2004, CD Rom : AFMC00097

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 Reports and Thesis :

- **Gula, J. & W.R. Peltier, 2011** : The impact of the Great Lakes system on regional greenhouse warming, Report for the Ontario Ministry of Environment.
- **Gula, J., 2009** : Ageostrophic instabilities of baroclinic flows in the atmosphere and ocean and their non-linear evolution, Thèse de Doctorat de l'Université Pierre et Marie Curie, Paris, France.

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 Submitted :

- **Gula, J., M.J. Molemaker & J.C. McWilliams, *Dynamics of Gulf Stream Frontal Eddies propagating along the Shelf***, Soumis à *J. Phys. Oceanogr.* [<http://www.atmos.ucla.edu/~gula/GMMW14c.pdf>]

## Oral Communications

- Apr. 30, 2015** Submesoscale Phenomena and Consequences around the Gulf Stream.  
*Seminar, Laboratoire de Glaciologie et Géophysique de l'environnement (LGGE), Grenoble, France.*
  - Dec. 17, 2014** Gulf Stream frontal eddies and their submesoscale interior.  
*Poster, American Geosciences Union Fall Meeting, San Francisco, California, USA.*
  - Feb. 28, 2014** Submesoscale instabilities and mixing on the Gulf Stream North Wall.  
*Oral, Ocean Sciences Meeting, Honolulu, Hawaii, USA.*
  - Jan. 8, 2013** Gulf Stream North Wall submesoscale fronts and instabilities.  
*Workshop on "Scalable lateral mixing and coherent turbulence", Stanford University, CA, USA.*
  - Dec. 10, 2012** Dynamics of the Gulf Stream : From gyre-scale balance to submesoscale generation.  
*Seminar at the Laboratoire de Physique des Océans, Brest, France.*
  - Jun. 20, 2012** Submesoscale dynamics in the Gulf Stream region.  
*Workshop on "Scalable lateral mixing and coherent turbulence", Woods Hole Oceanographic Institution, MA, USA.*
  - Jan. 11, 2012** Small scale features in the Gulf Stream region.  
*Workshop on "Scalable lateral mixing and coherent turbulence", Portland, OR, USA.*
  - Dec. 5, 2011** Dynamical Downscaling over the Great Lakes Basin of North America : The impact of the Great Lakes system on regional greenhouse warming. *Poster at the American Geosciences Union Fall Meeting, San Francisco, California, USA.*
  - May 18, 2011** Dynamical Downscaling over the Great Lakes Basin of North America using the WRF Regional Climate Model : The impact of the Great Lakes system on regional greenhouse warming.  
*Seminar at the Department of Atmospheric and Oceanic Sciences, UCLA, Los Angeles, US.*
  - Apr. 03, 2011** Dynamical Downscaling over the Great Lakes Basin of North America using the WRF Regional Climate Model : The impact of the Great Lakes system on regional greenhouse warming. *Oral at the European Geosciences Union General Assembly, Vienna, Austria.*
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- Feb. 05, 2010** Regional Climate Modelling at the University of Toronto : Physics and SciNet.  
*Climate Science Workshop : Regional Climate Modelling Capacity in Ontario, Toronto, Canada.*
- Sep. 02, 2009** Instabilities of coastal currents, nonlinear evolution and vortex formation.  
*Oral at the International Conf. on High-Reynolds Number Vortex Interactions, Brest, France.*
- Aug. 31, 2009** Existence, propagation and collisions of localized dipolar vortices on the f-plane. *Poster at the International Conf. on High-Reynolds Number Vortex Interactions, Brest, France.*
- Apr. 24, 2009** Instabilities of two-layer shallow-water flows with vertical shear in the rotating annulus.  
*Oral at the European Geosciences Union General Assembly, Vienna, Austria.*
- Jan. 9, 2009** Instabilities of two-layer shallow-water flows with vertical shear in the rotating annulus.  
*Oral at The Dynamics of Rotating Fluids Meeting, University College London.*
- Dec. 9, 2008** Instabilities of two-layer shallow-water flows with vertical shear in the rotating annulus.  
*Seminar at the Laboratoire des Ecoulements Géophysiques et Industriels (LEGI), Grenoble, France.*
- Dec. 02, 2008** Instabilities of two-layer shallow-water flows with vertical shear in the rotating annulus.  
*Seminar at The Mathematical Institute, University of Oxford, UK.*
- Nov. 5, 2007** Ageostrophic instabilities of a front in a stratified rotating fluid.  
*Seminar at The School of Mathematics, University of Edinburgh, UK.*
- Aug. 31, 2007** Ageostrophic instabilities of a front in a stratified rotating fluid.  
*Oral at the Congrès Français de Mécanique, Grenoble, France.*
- Apr. 18, 2007** Ageostrophic instabilities of balanced flows and their nonlinear evolution.  
*Poster at the European Geosciences Union General Assembly, Vienna, Austria.*

## Others

**Referee for :** Journal of Physical Oceanography, Ocean Modeling, Journal of Fluid Mechanics, Geophysical & Astrophysical Fluid Dynamics, AGU books, Nonlinear Processes in Geophysics.