

Lisa J. Neef

PERSONAL INFORMATION

Citizenship: German, Permanent Resident in the U.S.A.

Work Address

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RESEARCH INTERESTS

My primary research interest is in data assimilation for atmospheric and oceanic applications, focusing on balance dynamics and understanding dynamics in the language of estimation theory. I am especially interested in using low-order models to interpret complicated systems, and to clarify fundamental issues. I am also involved in a project studying the ocean's cascade of energy from the internal tide into turbulence, via a nonlinear interaction modeled as resonant triads.

EDUCATION

Ph.D. **University of Toronto, Department of Physics. May, 2007 (expected).** Thesis title: *Gravity Waves and Balance Dynamics in Four-Dimensional Data Assimilation*. Thesis committee: Drs. Theodore G. Shepherd and Saroja M. Polavarapu (advisors) and Drs. Stephen Morris and W.R. Peltier.

M.Sc. **University of Toronto, Department of Physics., October, 2002.** Graduate coursework in geophysical fluid dynamics, geophysics, asymptotic methods, data assimilation and retrieval.

B.S. **Valparaiso University. April, 2001.** Majors: Physics, Mathematics, Humanities. Included one year of study at the Eberhard-Karls Universität, Tübingen, Germany. Senior project studied the lifetimes of aircraft exhaust emissions in the stratosphere, supervised by Drs. Lynn Sparling, Mark Schoeberl, and Gary Morris. Member of Christ College (the honors college), graduating with the distinction of Christ College Scholar.

RESEARCH EXPERIENCE

Summer Fellow, Geophysical Fluid Dynamics Summer School, Woods Hole Oceanographic Institution. Attended lectures by Drs. Merl Hendershott and Chris Garrett. Performed independent research project investigated dissipation of the internal tide. **May-July 2004**.

Summer Research Student, NASA Goddard Space Flight Center, Greenbelt, Maryland. Studied stratosphere-troposphere exchange using GCM simulations, under the supervision of Drs. Mark Schoeberl, Gary Morris, and Lynn Sparling. Also worked on retrieval from handheld ozone measurement instruments, in collaboration with Dr. Gordon Labow. **Summers of 1999, 2001**.

PUBLICATIONS

Neef, L.J., 2004: Triad resonance as a mechanism for internal wave dissipation. Geophysical Fluid Dynamics Program Notes, Woods Hole Oceanographic Institution Technical Report, WHOI-2005-08.

Neef, L.J., S. M. Polavarapu, and T.G. Shepherd, 2006: Four-dimensional data assimilation and balance dynamics. *Journal of the Atmospheric Sciences*, (63) 1840-1858.

PRESENTATIONS

Neef, L.J., S. M. Polavarapu, and T.G. Shepherd, 2006: The effect of gravity waves in 4DDA. Presentation given at 7th International Workshop on Adjoint Applications in Dynamic Meteorology, Obergurgl, Tyrol, Austria.

Neef, L.J., S. M. Polavarapu, and T.G. Shepherd, 2005: Nonlinear balance issues in 4D data assimilation. Poster, XX EGU General Assembly, Vienna, Austria.

Neef, L.J., S. M. Polavarapu, and T.G. Shepherd, 2005: Nonlinear balance issues in 4D data assimilation. Poster, 4th WMO Symposium on the assimilation of observations in Meteorology and Oceanography, Prague, Czech Republic.

Neef, L.J., S. M. Polavarapu, and T.G. Shepherd, 2004: Balance in the nonlinear Kalman Filter: studies with a simple model. Presentation given at the 6th Workshop on Adjoint Applications in Dynamic Meteorology, Acquafredda di Maratea, Italy.

Neef, L., T. Shepherd, and S. Polavarapu, 2003: Four-dimensional data assimilation and balanced dynamics: illustrations with a simple model. Presentation given at the Roger Daley Memorial Symposium, Montréal, Quebec, Canada.

Neef, L., T.G. Shepherd, and S.M. Polavarapu, 2003: Balanced dynamics and four-dimensional data assimilation. Presentation given at the International Union of Geodesy and Geophysics confress, Sapporo, Japan.

Neef, L., T. Shepherd, and S. Polavarapu, 2003: Balance dynamics and four-dimensional

data assimilation. Presentation given at the American Meteorological Society 14th Conference on Atmospheric and Oceanic Fluid Dynamics, San Antonio, Texas, USA.

Neef, L.J., S. M. Polavarapu, and T.G. Shepherd, 2003: Balanced Dynamics and Kalman Filter Data Assimilation. Presentation given at the Canadian Meteorological and Oceanographic Society 37th Annual Congress, Ottawa, Canada.

SUMMER SCHOOLS

1st ENVISAT Data Assimilation Summer School

ESA / ESRIN, Frascati, Italy. **August 18-29, 2003**

Global Chemistry for Climate Summer School

Université du Québec à Montréal, Montréal, Quebec, Canada. **August 7-13, 2003**

Summer School on Applications of Advanced Mathematical and Computational Methods to Atmospheric and Oceanic Problems

National Center for Atmospheric Research, Boulder, Colorado, USA. **July 14-26, 2003**

Geophysical and Environmental Fluid Dynamics Summer School Department of Applied Mathematics and Theoretical Physics

University of Cambridge, Cambridge, United Kingdom. **September 9-20, 2002**

Fluid Dynamics Summer School

Pacific Institute for the Mathematical Sciences University of Alberta, Edmonton, Alberta, Canada. **July 29 - August 8, 2002**

Carbon Data / Model Assimilation Summer Institute

National Center for Atmospheric Research, Boulder, Colorado, USA. **May 20-31, 2002**

TEACHING EXPERIENCE

Teaching Assistant. PHY138: Physics for the Life Sciences, University of Toronto. **(Fall 2001-Present)**

Teaching Assistant. PHY1530F: Fluid Mechanics, University of Toronto (graduate course). **(January-May 2006)**

Teaching Assistant. PHY272S: Thermal Physics, University of Toronto. **(January-May 2004)**

Teaching Assistant. PHY2509F: Special Topics in Atmospheric Physics 1: Data Assimilation and Retrieval Theory, University of Toronto (graduate course). **(January-May 2003)**

Teaching Assistant. CC110: Texts and Contexts: Traditions of Human Thought. Christ College, Valparaiso University. **(September 2000-May 2001)**

Teaching Assistant. PHY111: Introduction to Physics, Dept. of Physics, Valparaiso University. (September 2000-May 2001)

Teaching Assistant. ASTR101: Introduction to Astronomy, Dept. of Physics, Valparaiso University. (Autumn 1998)

Private Tutor, various students (1998 - present)

OTHER ACADEMIC ACTIVITIES

Member, Faculty of Arts and Sciences Planning Committee, University of Toronto, 2004-present.

Organizer, Brewer Seminar Series (Graduate student weekly seminar), Dept. of Physics, University of Toronto, 2005-present.

Representative, Graduate Liason Committee, Dept. of Physics, University of Toronto, 2004-present.

OTHER SKILLS

- Fluent in German
- Basic French, ability to read Cyrillic and Hebrew scripts
- Computer Languages: MATLAB, IDL, HTML, \LaTeX
- Operating Systems: Linux, Mac OS X, Windows

VOLUNTEER WORK

Missionaries of Charity
Kolkata, India (May 13 - July 13, 2005)

Project 614. Toronto, Canada. Various volunteer projects within a cooperative project of the Salvation Army and Freedomize Toronto communities. (2005 - Present)

REFERENCES

Dr. Theodore G. Shepherd

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