

James A. Hansen

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Professional Experience

July 2001 – present: Assistant Professor, Department of Earth Atmospheric and Planetary Sciences, Massachusetts Institute of Technology.

April 2000 – June 2001: Post-Doctoral Associate, Department of Earth Atmospheric and Planetary Sciences, Massachusetts Institute of Technology.

November 1998 – April 2000: Research Scientist, Climate Dynamics Group, Space Science Department, Rutherford Appleton Laboratory.

October 1998 – April 2000: Post-Doctoral Research Assistant, Mathematical Institute, Oxford Centre for Industrial and Applied Mathematics, University of Oxford.

October 1998 – April 2000: General Physics Instructor, Exeter College, University of Oxford.

September 1996 – 2000: Managing Director, GNet Services Ltd.

May 1996 – July 1996: Teaching Assistant, Physics Computing Practicals, University of Oxford.

May 1994 – July 1994: Research Assistant, Geophysical Flow Modeler: Dr. A. Bedard, University of Colorado, Boulder.

June 1992 – September 1993: Teaching Assistant, Senior Design Lab: Dr. A. Bedard, University of Colorado, Boulder.

Education

D.Phil., Atmospheric, Oceanic and Planetary Physics, August 1998, Oxford University
Thesis title: Adaptive Observations in Spatially-extended, Nonlinear Dynamical Systems
Advisors: Dr. Leonard Smith and Prof. David L.T. Anderson

M.S., Aerospace Engineering, December 1993, University of Colorado, Boulder
Thesis title: The Laboratory Modeling of Atmospheric Vortices
Advisor: Dr. Alfred Bedard

B.S. (High Distinction), Aerospace Engineering, May 1992, University of Colorado, Boulder

Awards and Honors

- 2000: Visiting Research Fellow, Mathematical Institute, Oxford Centre for Industrial and Applied Mathematics, University of Oxford.
- 1994: University of Colorado, College of Engineering Centennial Medal (awarded to the top 100 alumni of the college's first century)
- 1993: GTE College Sports Academic All-American of the Year (awarded to the nation's top scholar-athlete in any sport)
- 1992: Rhodes Scholarship
- 1992: Captain, University of Colorado Football Team
- 1992: National Football Foundation and College Hall of Fame Scholar-Athlete of the Year Award Winner
- 1992: GTE Football Academic All-American of the Year
- 1992: Anson Mount National Scholar-Athlete of the Year
- 1992: All-American Honorable Mention, Football
- 1992: First Team All-Big Eight, Football
- 1992: NCAA Post-Graduate Scholarship Award
- 1990: Sophomore Engineering Student of the Year (University of Colorado)
- 1989: Freshman Engineering Student of the Year (University of Colorado)
- 1988: College of Engineering Merit Scholarship (University of Colorado)

Five Year Career Objectives

Tenure-track position at a top research and teaching university; NSF CAREER Award winner; Teaching excellence award winner; Establish respected research program; Several successful Ph.D. students.

Professional Membership and Activities

American Geophysical Union

- 2001: Session organizer AGU Fall 2001
- 2000: Session organizer AGU Fall 2000
- 2000: Session convener AGU Fall 2000
- 2000: Session convener AGU Fall 2000

European Geophysical Society

- 1999: Session Chair XXIV General Assembly
- 2000: Session Co-chair XXV General Assembly

Royal Meteorological Society

European Geophysical Society

American Geophysical Union

Organizer, United Kingdom Ocean Data Assimilation Meeting, December 1999.

Co-organizer, Y2K Benchmarks of Predictability. An international project to assess the current state of the art in reconstructing the dynamics of nonlinear systems. <http://y2k.maths.ox.ac.uk/>

Co-organizer, Casino-21: Climate Simulation of the 21st Century. A scientific experiment in large-scale Monte Carlo simulation of the climate of the 20th and 21st centuries using the untapped processing power of home PCs. <http://www.climate-dynamics.rl.ac.uk/>

Presentations

“A Probabilistic Approach to State Estimation and Forecasting”. National Center for Atmospheric Research, Boulder, Colorado. April 2001.

“A Probabilistic Approach to State Estimation and Forecasting”. Department of Atmospheric Sciences Seminar Series, University of Arizona, Tucson. January 2001.

“Probabilistic State Estimation”. Invited, AGU 2000 Fall Meeting, San Francisco. December 2000.

“Probabilistic State Estimation”. Program in Atmospheres, Oceans and Climate Oceanography Seminar, MIT, Boston. December 2000.

“Casino-21: Climate Simulation of the 21st Century”. The XIth Global Warming International Conference and Expo, Boston. April 2000.

“30% Chance of Rain? Practical Probabilistic Prediction”. K.D. Wood Colloquium, Department of Aerospace Engineering Sciences, University of Colorado at Boulder, February 2000.

“Ensemble Data Assimilation”. United Kingdom Ocean Data Assimilation Meeting, Rutherford Appleton Laboratory, Didcot, UK. December 1999.

“Ensemble Construction through Data Assimilation: Sequential vs. Variational”. Ensemble Forecasting Workshop, National Center for Atmospheric Research, Boulder, Colorado. September 1999.

“Structural Model Error, the Linear Range, and Variational Assimilation”. International Union of Geodesy and Geophysics, 22nd General Assembly. University of Birmingham, UK, July 1999.

“Impact of structural model error on 4D-Var assimilation”. XXIV European Geophysical Society General Assembly: The Hague. April 1999.

“New methods of ensemble construction and assessment”. XXIV European Geophysical Society General Assembly: The Hague. April 1999.

“Operational constraints on selection schemes for supplementary weather observations”. Fifth SIAM Conference on Mathematical and Computational Issues in the Geosciences, San Antonio, Texas. March 1999.

“Operational constraints on selection schemes for supplementary weather observations”. Earth, Atmospheric and Planetary Sciences Department Seminar Series, Massachusetts Institute of Technology, March 1999.

“QUARCC: Quantifying Uncertainty in the Attribution of Recent Climate Change”. Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology, March, 1999.

“Probabilistic prediction: ensemble construction and assessment”. Physical Earth Science Seminar Series, Oxford University. February, 1999.

“A data assimilation primer”. Atmospheric, Oceanic and Planetary Physics Internal Seminar Series, Oxford University. January 1999.

“Analysis of uncertainty in climate change prediction: The QUARCC Project”. Space Sciences Department Research Day, Rutherford Appleton Laboratory. December 1998.

“Operational constraints on selection schemes for supplementary weather observations”. Atmospheric, Oceanic and Planetary Physics Seminar Series, Oxford University. November 1998.

“Adaptive Observations”. Isaac Newton Institute for Mathematical Sciences, Cambridge University. September 1998.

“Towards a Better Ensemble”. Oxford Centre for Industrial Applied Mathematics Junior Applied Mathematics Seminar Series, Oxford University. February 1998.

“Adaptive Observations”. Atmospheric, Oceanic and Planetary Physics Annual Retreat, Oxford University. October 1997.

“A FASTEX Analogue in the Lorenz '95 Model”. XXII European Geophysical Society General Assembly, Vienna, Austria. May 1997.

“Spatial vs. Temporal Information in Nonlinear Systems”. XXI European Geophysical Society General Assembly, The Hague, Netherlands. May 1996.

“The Laboratory Modeling of Atmospheric Vortices”. Atmospheric, Oceanic and Planetary Physics Internal Seminar Series, Oxford University. March 1995.

“Neural Networks and Statistical Atmospheres”. Atmospheric, Oceanic and Planetary Physics Annual Retreat, Oxford University. October 1994.

Publications

Refereed Journals

J.A. Hansen and L.A. Smith (2000) The Role of Operational Constraints to Selection Schemes for Supplementary Weather Observations, *Journal of Atmospheric Sciences*, Vol. 57, No. 17, pp. 2859-2871.

J.A. Hansen, M.R. Allen, D.A. Stainforth, A. Heaps and P. Stott (2001) Casino-21: Climate Simulation of the 21st Century, accepted, *World Resource Review*.

J.A. Hansen and L.A. Smith (2001) Probabilistic Noise Reduction, accepted, *Tellus*.

L.A. Smith and J.A. Hansen (2000) Extending the Limits of Forecast Verification with the MST, submitted, *Physical Research Letters*.

J.A. Hansen and K.A. Emanuel (2001) Forecast 4d-Var: Exploiting Model Output Statistics, submitted, *Quarterly Journal of the Royal Meteorological Society*.

J.A. Hansen (2001) A Probabilistic Approach to State Estimation and Forecasting, submitted, *Monthly Weather Review*.

L.A. Smith and J.A. Hansen (2000) Prediction of Spatial-Temporal Chaos with Fully Adaptive Observations, in preparation for *Journal of Forecasting*.

D.J. Lea, J.A. Hansen, M.R. Allen and T.W.N Haine (2000) Sensitivity analysis of the climate of a chaotic ocean circulation model, in preparation for *Tellus*

J.A. Hansen and M.R. Allen (2000) Applicability of adjoint parameter sensitivity estimates to climate-like scenarios, in preparation for *Tellus*.

Proceedings

J.A. Hansen, L.A. Smith and I. Gilmour (1998) Towards Better Initial Conditions: Variational Assimilation, Nonlinear Noise Reduction, and ι -shadowing, in *Annales Geophysicae*, Supplement II to Volume 16, page C794.

J.A. Hansen and L.A. Smith (1997) A FASTEX Analogue in the Lorenz '95 Model, in *Annales Geophysicae*, Supplement II to Volume 15, page C556.

J.A. Hansen and L.A. Smith (1996) Spatial vs. Temporal Information in Nonlinear Systems, in *Annales Geophysicae*, Supplement II to Volume 14, page C651.

A. Bedard, S.A. Storms and J.A. Hansen (1993) Laboratory Modules in the Context of an Integrated Teaching Laboratory, Proceedings of the 5th Annual Conference of the Technology-Based Engineering Educations Consortium, pages 143–155.

Reports

J.A. Hansen and M.R. Allen (1999), *Applicability of adjoint parameter sensitivity estimates to climate-like scenarios*, Year 1 Technical Report for Contract No. ENV4-CT97-0501, Quantifying uncertainty in the attribution of recent climate change (QUARCC).

J.A. Hansen and M.R. Allen (2000), *Variational fitting of a basic coupled climate model to output from a complex A-OGCM*, Year 2 Technical Report for Contract No. ENV4-CT97-0501, Quantifying uncertainty in the attribution of recent climate change (QUARCC).

Theses

J.A. Hansen (1998) *Adaptive Observations in Spatially-extended Nonlinear Dynamical Systems*, D.Phil. Thesis, Oxford University.

J.A. Hansen (1993) *The Laboratory Modeling of Atmospheric Vortices*, M.S. Thesis, University of Colorado, Boulder.

Graduate Students

Current – E. Perez, D.Phil. Candidate, Oxford Centre for Industrial Applied Mathematics, Mathematical Institute, Oxford University.

2000 – B. Casati, M.Sc. Thesis *Sampling the Sensitivity of Climate Models*, Oxford Centre for Industrial Applied Mathematics, Mathematical Institute, Oxford University.

1999 – T. Hirose, M.Sc. Thesis *Non-linear Analysis Applied to Roll Resonance*, Oxford Centre for Industrial Applied Mathematics, Mathematical Institute, Oxford University.

Personal

Born November 14, 1969 in Seattle, Washington

U.S. Citizen

Married