Brief Vita of Eugenia Kalnay

Address: 3431 Computer and Space Sciences, College Park, MD, 20742-2425.
Tel: 301-405-5391/5370
Email: ekalnay@atmos.umd.edu; home page: http://atmos.umd.edu/~ekalnay/

Education: License in Meteorology, University of Buenos Aires, 1965; Ph. D., 1971, MIT (Prof. Jule G. Charney, Advisor).

Work experience:

Chair, Department of Meteorology, U. of Maryland	July 1999 –
Robert E. Lowry Prof. of Meteorology, University of Oklahoma	1998-1999
Director, Environmental Modeling Center, NOAA/NWS/NCEP	1987-1997
Branch Chief, NASA Goddard Glob. Mod. and Sim. Branch	1983-1986
Senior Research Meteorologist, NASA/GSFC	1979-1983
Associate Prof. of Meteorology, MIT	1977-1978
Assistant Prof. of Meteorology, Univ. of Montevideo, Uruguay	1971-1973

Awards:

Distinguished University Professor, University of Maryland (2001)
Foreign Member of the Academia Europaea (2000)
Member of the National Academy of Engineering (1996)
Robert E. Lowry endowed chair in Meteorology, University of Oklahoma (1998)
Dept of Commerce Gold Medal for Reanalysis Project.(1997)
Senior Executive Service Presidential Rank Award (1996)
American Meteorological Society Jule G. Charney Award (1995)
Dept of Commerce Gold Medal awarded to the Development Division (EMC) (1993)
Department of Commerce Silver Medal for outstanding leadership (1990)
Fellow of American Meteorological Society (1982)
NASA Medal for Exceptional Scientific Achievement (1981)

From 1979 to 1986 Eugenia Kalnay worked at, and later directed, the Global Modeling and Simulation Branch, at NASA/GSFC. She developed the accurate and efficient “NASA Fourth Order Global Model” which for more than 15 years was the core of many data assimilation and forecasting experiments, as well as stratospheric and climate simulations, and is still being used for climate experiments. From 1987 to 1997, Dr. Kalnay was the Director of the Environmental Modeling Center (EMC, ex Development Division) of the National Centers for Environmental Prediction (NCEP, ex NMC), National Weather Service (NWS). During this decade there were major improvements in the NWS models' forecast skill. Many successful projects such as ensemble forecasting, 3-d and 4-d variational data assimilation, advanced quality control, coastal ocean forecasting, GCIP research with the Eta model, seasonal and interannual dynamical predictions, were started or carried out during those years. She directed the NCEP/NCAR 50-year Reanalysis project and with Zoltan Toth developed the ensemble forecasting method implemented in 1992 at NCEP.

Current research interests of Dr. Kalnay are in predictability and ensemble forecasting, numerical weather prediction and data assimilation. With Dr. Ming Cai she is studying the Lyapunov vectors of the coupled ocean-atmosphere system. With her collaborators Dr. Zhao-Xia Pu and Dr. Seon Ki Park, she introduced the method of backward integration of atmospheric models and several novel applications such as Inverse 3D-VAR, and targeted observations. Dr. Zoltan Toth and Dr. Kalnay introduced the breeding method for ensemble forecasting. She is also the author (with Ross Hoffman and Wesley Ebisuzaki) of other widely used ensemble methods known as Lagged Averaged Forecasting (LAF) and Scaled LAF. She has also published papers on atmospheric dynamics and convection, numerical methods, and the atmosphere of Venus. Her book

"Atmospheric modeling, Data Assimilation, and Predictability" will be published in 2002 by Cambridge University Press. She has published over 70 peer reviewed papers.

Selected recent refereed publications of Eugenia Kalnay:

Toth, Zoltan and E. Kalnay, 1993: Ensemble forecasting at NMC: the generation of perturbations. Bull. Am. Met. Soc., 74, 2317-2330.

Tracton, MS, and E. Kalnay, 1993: Ensemble forecasting at NMC: Practical aspects. Weather and Forecasting, 8, 379-398, 1993.

Reynolds, Carolyn A., Peter J. Webster and Eugenia Kalnay, 1994: Random error growth in NMC's global forecasts,. Mon. Wea. Rev, 122, 1281-1305.

Mo, KC, X. L. Wang, R. Kistler, M. Kanamitsu and E. Kalnay, 1995: Impact of satellite data on the CDAS-reanalysis system. Mon. Wea. Rev., 123, 124-139.

Wobus, R. and E. Kalnay, 1995: Three years of operational prediction of forecast skill,. Mon. Wea. Rev., 123, 2132-2148.

Kalnay, E. 1995: Numerical Weather Prediction,. Computers in Physics, 9, 488-495.

Toth, Zoltan and Eugenia Kalnay, 1997: Ensemble Forecasting at NCEP: the breeding method,. Mon. Wea. Rev.,125, 3297-3319.

E. Kalnay and M. Kanamitsu, R. Kistler, W. Collins, D. Deaven, L. Gandin, M. Iredell, S. Saha, G. White, J. Woollen, Y. Zhu, M. Chelliah, W. Ebisuzaki, W.Higgins, J. Janowiak, K. C. Mo, C. Ropelewski, J. Wang, A. Leetmaa, R. Reynolds, Roy Jenne, Dennis Joseph, 1996: The NCEP/NCAR 40-Year Reanalysis Project. Bull. Amer. Meteor. Soc., 1996, 77,437-431. (it contains the first CD ROM ever published by the AMS with 13 years of reanalysis).

Szunyogh, I., Z. Toth and E. Kalnay, 1997: A comparison of Lyapunov vectors and optimal vectors in a low resolution general circulation model. Tellus, 49A, 200-227.

Pu, Z-X, E. Kalnay, J. Sela, and I. Szunyogh, 1997: Sensitivity of forecast errors to initial conditions with a quasi-inverse linear model, Mon. Wea. Rev. ,125, 2479-2503.

Pu, Z-X., E. Kalnay, D Parrish, W. Wu and Z. Toth, 1997: The use of the bred vectors in the NCEP operational 3-dimensional variational system. Weather and Forecasting, 12, 689-695.

Toth, Zoltan, Eugenia Kalnay, Steve Tracton, Richard Wobus, and Joseph Irwin, 1997: A synoptic evaluation of the NCEP ensemble. Weather and Forecasting, 12, 140-153.

Pu, Z-X., SJ Lord and E Kalnay, 1998: Forecast Sensitivity with Dropwindsonde Data and Targeted Observations. Tellus, 50A, 391-410.

E. Kalnay, S, Lord and R. McPherson, 1998: Maturity of Numerical Weather Prediction: the medium range. Bull. Am. Met. Soc., 2753-2769.

E. Kalnay, Seon Ki Park, Zhao-xia Pu and Jidong Gao, 2000: Applications of the quasi-inverse method to data assimilation. Mon. Wea. Rev, 128, 864-875.

Pu, Zhao-Xia and Eugenia Kalnay, 2000: Targeting observations with the quasi-inverse linear and adjoint NCEP global models: performance during FASTEX. QJRMS, 125, 3329-3337.

Hou, D., E. Kalnay, and K.K. Droegemeier, 2000: Objective verification of the SAMEX '98 ensemble forecasts. *Mon. Wea. Rev*., in press.

Kistler, R., E. Kalnay, and co-authors, 2000: The NCEP/NCAR 50-year Reanalysis. Bull. Am. Met. Soc. 82, 247-267.

Hong, Song-you and E. Kalnay, 2000: Origin and maintenance of the Oklahoma-Texas drought of 1998. Nature, 842-845.

Falkovich, Alexander, E. Kalnay, S. Lord and Mukut Mathur, 2000: A new method of observed rainfall assimilation in forecast models.J. Applied Met. 39, 1282-1298.

Patil, DJ, B Hunt, E Kalnay, E Ott, J Yorke, 2001: Local Low Dimensionality of Atmospheric Dynamics. Phys. Rev. Letters, 86, 5878.

Cai, Ming, E. Kalnay and Z. Toth, 2002: Bred Vectors of the Zebiak-Cane Model and Their Application to ENSO Predictions. Accepted in J. of Climate.

Seon-ki Park and E. Kalnay, 2002: Inverse 3D-var with an advection-diffusion problem: Validity and Performance. Submitted to Monthly Weather Review.

Song-you Hong and Eugenia Kalnay, 2002: The 1998 Oklahoma-Texas Drought: Mechanistic Experiments with NCEP Global and Regional Models. J. of Climate, in press.

Corazza, M., E. Kalnay, D. J. Patil, R. Morss, I. Szunyogh, B. R. Hunt, E. Ott, and M. Cai, 2001: Use of the breeding technique to estimate the structure of the analysis “errors of the day”. Submitted to Nonlinear Processes in Geophysics.

Pena, M., E. Kalnay and M. Cai, 2002: Statistics of coupled ocean and atmosphere intraseasonal anomalies in Reanalysis and AMIP data. Submitted to the Nonlinear Processes in Geophysics, European Geophysical Society.

Kalnay, Eugenia, 2002: Atmospheric Modeling, Data Assimilation and Predictability. Cambridge University Press, in press.