Curriculum Vitae
Istvan Szunyogh

Education:

PhD, Earth Sciences 1994, Hungarian Academy of Sciences, Budapest, Hungary

Diploma, Meteorology 1991, Eötvös Loránd University, Budapest, Hungary

Employment History:

(Full) Professor; September 2012–Present; Department of Atmospheric Sciences, **Texas A&M University**

Associate Professor; February 2009–August 2012; Department of Atmospheric Sciences, **Texas A&M University**

Associate Research Scientist, July 2005–January 2009; Institute for Physical Science and Technology, Department of Atmospheric and Oceanic Science (formerly Department of Meteorology), Member of the Applied Mathematics and Scientific Computation Graduate Program and the Burgers Program for Fluid Dynamics, **University of Maryland, College Park**

Assistant Research Scientist, February 2001–June 2005; Institute for Physical Science and Technology and Department of Meteorology, **University of Maryland, College Park**

Visiting Scientist, September 1997–February 2001; **University Corporation for Atmospheric Research** (UCAR), based at the Environmental Modeling Center, **National Centers for Environmental Prediction** (formerly NMC), National Weather Service

Postdoctoral Associate, March 1997–September 1997; Department of Earth, Atmospheric, and Planetary Sciences, **Massachusetts Institute of Technology**, Cambridge, Massachusetts, based at **NCEP**

Postdoctoral Visiting Scientist, September 1996–February 1997; Mesoscale and Microscale Meteorology Division, **National Center for Atmospheric Research**, Boulder, Colorado, based at **NCEP**

Visiting Scientist at the Program "Mathematics of the Atmosphere and Ocean Dynamics" (July 1996-September 1996), **Isaac Newton Institute for Mathematical Sciences**, Cambridge, United Kingdom

Magyary Zoltan Postdoctoral Fellow, September 1995–August 1996; Department of Meteorology, **Eötvös Loránd University**, Budapest, Hungary

Research Scientist, September 1998–September 1999 (on leave); Department of Meteorology, **Eötvös Loránd University**, Budapest, Hungary

Research Associate, September 1991–September 1998 (on leave after September 1995), Department of Meteorology, **Eötvös Loránd University**, Budapest, Hungary

1 Research, Scholarly and Creative Activity

a. Books and Chapters in Books

1. Szunyogh, I., 2014: *Applicable Atmospheric Dynamics: Techniques for the Exploration of Atmospheric Dynamics.* World Scientific, 608 pp.

2. Kalnay, E., B. Hunt, E. Ott, and I. Szunyogh, 2006: Ensemble forecasting and data assimilation: two problems with the same solution? In *Predictability of Weather and Climate.* Eds. T. Palmer and R. Hagedorn. Cambridge University Press. Cambridge, pp. 157-180.

b. Articles in Refereed Journals

* indicates a student, and ** a postdoctoral co-author

1. Arcomano*, T., I. Szunyogh, A. Wikner*, J. Pathak*, B. Hunt, and E. Ott, 2021: A hybrid modeling approach to weather prediction that combines machine learning with numerical modeling (to be submitted).

2. Pathak*, J., A. Wikner*, B. Hunt, I. Szunyogh, M. Girvan, and E. Ott, 2021: Using data assimilation to train a hybrid forecast system that combines machine-learning and knowledge-based components (under review).

3. Szunyogh, I., E. Forinash*, G. Gyarmati, Y. Jia, P. Chang, and R. Saravanan, 2021: Evaluation of a coupled modeling approach for the investigation of the effects of SST mesoscale variability on the atmosphere (under review). Preprint: https://doi.org/10.1002/essoar.10504810.1.

4. Arcomano*, T., I. Szunyogh, J. Pathak*, A. Wikner*, B. Hunt, and E. Ott, 2020: A machine learning-based global atmospheric forecast model. *Geophys. Res. Lett.,* **47,** e2020GL087776.

5. Wikner*, A., J. Pathak*, B. Hunt, M. Girvan, T. Arcomano*, I. Szunyogh, A. Pomerance, and E. Ott, 2020: Combining machine learning with knowledge-based modeling for scalable forecasting and subgrid-scale closure of large, complex, spatiotemporal systems. *Chaos*, **30,** 053111.

6. Žagar, N., and I. Szunyogh, 2020: Comments on "What is the predictability limit of midlatitude weather?" by Zhang et al., J. Atmos, Sci., 76, 1077-1091. *J. Atmos. Sci.*, **77,** 781-785.

7. Jia, Y., P. Chang, I. Szunyogh, R. Saravanan, and J. T. Bacmeister, 2019: A modeling strategy for the investigation of the effect of mesoscale SST feedback to the atmosphere. *Geophys. Res. Lett.,* **46,** 3982-3989.

8. Herrera*, A. M., I. Szunyogh, A. Brainard*, D. D. Kuhl, K. Hoppel, C. H. Bishop, T. R. Holt, Q. Zhao, S. Rainwater 2018: Regionally Enhanced Global (REG) 4D-Var. *Mon. Wea. Rev.,* **146,** 4015–4038.

9. Battalio*, M., I. Szunyogh, and M. Lemmon, 2018: Wave energetics of the Southern Hemisphere on Mars. *Icarus,* **309,** 220-240.

10. Battalio*, J. A., I. Szunyogh, and M. Lemmon, 2018: Corrigendum to "energetics of the Martian atmosphere using the Mars Analysis Correction Data Assimilation (MACDA) dataset. *Icarus,* **302,** 565-567.

11. Han*, F. and I. Szunyogh, 2018: A technique for the verification of precipitation forecasts and its application to a problem of predictability *Mon. Wea. Rev.,* **146,** 1303-1318.

12. Han*, F. and I. Szunyogh, 2018: How well can an ensemble predict the uncertainty in the location of winter storm precipitation? *Tellus,* **70A**, 1440870.

13. Khade**, V., J. Kurian, P. Chang, I. Szunyogh, K. Thyng, and R. Montuoro, 2017: Oceanic ensemble forecasting in the Gulf of Mexico: An application to the case of the Deep Water Horizon oil spill. *Ocean Modeling,* **113,** 171-184.

14. Loeser*, C. F., M. A. Herrera*, and I. Szunyogh, 2017: An assessment of the performance of the operational global ensemble forecast systems in predicting the forecast uncertainty. *Weather Forecasting,* **32,** 149–164.

15. Parsons, D. and Co-authors, 2017 : THORPEX research and the science of prediction. *Bull. Am. Met. Soc.,* **98,** 807-830.

16. Herrera*, M. A., I. Szunyogh, and J. Tribbia, 2016: Forecast uncertainty dynamics in the THORPEX Interactive Grand Global Ensemble (TIGGE). *Mon. Wea. Rev.,* **144,** 2739–2766.

17. Battalio*, J. A., I. Szunyogh, and M. Lemmon, 2016: Energetics of the Martian atmosphere using the Mars Analysis Correction Data Assimilation (MACDA) dataset. *Icarus,* **276,** 1–20.

18. Han*, F. and I. Szunyogh, 2016: A morphing-based technique for the verification of precipitation forecasts. *Mon. Wea. Rev.,* **144,** 295–313.

19. Roh*, S., M. Jun, I. Szunyogh M. C. Genton, 2015: Multivariate localization methods for ensemble Kalman filtering. *Nonlin. Processes Geophys.,* **22,** 723–735.

20. Holt*, C. R., I. Szunyogh, G. Gyarmati, S. Mark Leidner and R. N. Hoffman, 2015: Assimilation of tropical cyclone observations: improving the impact of TCVitals, scatterometer winds, and dropsonde observations. *Mon. Wea. Rev.,* **143,** 3956–3980.

21. Kretschmer*, M., B. R. Hunt, E. Ott, C. H. Bishop, S. Rainwater, I. Szunyogh, 2015: A composite state method for ensemble data assimilation with multiple limited-area models. *Tellus,* **67A**, 26495 .

22. Roh*, S., M. C. Genton, M. Jun, I. Szunyogh, and I. Hoteit, 2013: Observation quality control with a robust ensemble Kalman filter. *Mon. Wea. Rev.,* **141,** 4414–4428.

23. Kavulich*, M. J., I. Szunyogh, G. Gyarmati, and R. J. Wilson, 2013: Local dynamics of baroclinic waves in the Martian atmosphere. *J. Atmos. Sci.,* **70,** 3415–3447.

24. Holt*, C. R., I. Szunyogh, G. Gyarmati, 2013: Can a moderate resolution limited-area data assimilation system add value to the global analysis of tropical cyclones? *Mon. Wea. Rev.,* **144,** 1866–1883.

25. Yoon*, Y.-N., B. R. Hunt, E. Ott and I. Szunyogh, 2012: Ensemble regional data assimilation using joint states. *Tellus,* **64A,** 18407.

26. Jun, M., I. Szunyogh, M. C. Genton, F. Zhang, C. H. Bishop, 2011: A statistical investigation of the sensitivity of ensemble based Kalman filters to covariance filtering. *Mon. Wea. Rev.,* **139,** 3036–3051.

27. Merkova*, D., I. Szunyogh, and E. Ott, 2011: Strategies for coupling global and limited-area ensemble Kalman filter assimilation. *Nonlin. Processes Geophys.,* **18,** 415-430.

28. Aravequia**, J. A., I. Szunyogh, E. J. Fertig*, E. Kalnay, D. Kuhl*, and E. J. Kostelich, 2011: Evaluation of a strategy for the assimilation of satellite radiance observations with the Local Ensemble Kalman Filter. *Mon. Wea. Rev.,* **139,** 1932-1951.

29. Satterfield*, E., and I. Szunyogh, 2011: Assessing the performance of an ensemble forecast system in predicting the magnitude and the spectrum of analysis and forecast uncertainties. *Mon. Wea. Rev.,* **139,** 1207-1223.

30. Li*, H., J. Liu*, E. Fertig*, E. Kalnay, E. J. Kostelich, and I. Szunyogh, 2011: Improved analyses and forecasts with AIRS temperature retrievals using the Local Ensemble Transform Kalman Filter. *Journal of Tropical Meteorology,* **17,** 43-49.

31. Yoon*, Y.-N., E. Ott, and I. Szunyogh, 2010: On the propagation of information and the use of localization is ensemble Kalman filtering. *J. Atmos. Sci.,* **67,** 3823-3834.

32. Hoffman*, M. J., S. J. Greybush*, R. J. Wilson, G. Gyarmati, R. N. Hoffman, E. Kalnay, K. Ide, E. Kostelich, T. Miyoshi, I. Szunyogh, 2010: An ensemble Kalman filter data assimilation system for the Martian atmosphere: Implementation and simulation experiments. *Icarus* **209**, 470-481.

33. Satterfield*, E. and I. Szunyogh, 2010: Predictability of the performance of an ensemble forecast system: Predictability of the space of uncertainties. *Mon. Wea. Rev.,* **138,** 962-981.

34. J. Liu*, H. Li, E. Kalnay, I. Szunyogh, and E. J. Kostelich, 2009: Univariate and multivariate assimilation of AIRS humidity retrievals with the Local Ensemble Transform Kalman Filter. *Mon. Wea. Rev.,* **137,** 3918-3932.

35. S.-J. Baek**, I. Szunyogh, B. R. Hunt, and E. Ott, 2009: Correcting for surface pressure background bias in ensemble-based analyses. *Mon. Wea. Rev.,* **137,** 2349-2364.

36. Fertig*, E. J., S.-J. Baek*, B. R. Hunt, E. Ott, I. Szunyogh, J. A. Aravequia, E. Kalnay, H. Li*, and J. Liu*, 2009: Observation bias correction with an Ensemble Kalman Filter. *Tellus,* **61A**, 210-226.

37. Sellwood*, K. J., S. J. Majumdar, B. E. Mapes, and I. Szunyogh, 2008: Predicting the influence of observations on medium-range winter weather forecasts. *Q. J. Roy. Met. Soc.,* **134,** 2011-2027.

38. Hoffman, R. N., R. M. Ponte, E. Kostelich, A. Blumberg, I. Szunyogh, S. Vinogradov, and J. M. Henderson, 2008: Data Assimilation in New York Harbor: A simulation study applying a Local Ensemble Kalman Filter to the Estuarine and Coastal Ocean Model. *Journal of Atmospheric and Oceanic Technology,* **25,** 1638-1656.

39. Szunyogh, I., E. J. Kostelich, G. Gyarmati, E. Kalnay, B. R. Hunt, E. Ott, E. Satterfield*, and J. A. Yorke, 2008: A Local Ensemble Transform Kalman Filter data assimilation system for the NCEP global model. *Tellus,* **60A**, 113-130.

40. Fertig*, E. J., B. R. Hunt, E. Ott, and I. Szunyogh, 2007: Assimilating nonlocal observations with a local Ensemble Kalman Filter. *Tellus,* **59A,** 719-730.

41. Hunt, B. R., E. J. Kostelich, and I. Szunyogh, 2007: Efficient data assimilation for spatiotemporal chaos: a Local Ensemble Transform Kalman Filter. *Physica D,* **230,** 112-126.

42. Kuhl*, D., I. Szunyogh, E. Kostelich, G. Gyarmati, E. Kalnay, B. R. Hunt, E. Ott, J. A. Yorke, 2007: Assessing predictability with a Local Ensemble Kalman Filter. *J. Atmos. Sci.,* **64,** 1116-1140.

43. Baek*, S.-J., B. R. Hunt, I. Szunyogh, and E. Ott, 2006: Local ensemble Kalman filtering in the presence of model bias. *Tellus,* **58A,** 293-306.

44. Zimin*, A. V., I. Szunyogh, B. R. Hunt, and E. Ott, 2006: Extracting envelopes of nonzonally propagating wave packets. *Mon. Wea. Rev.,* **134,** 1329-1333.

45. Szunyogh I., E. J. Kostelich, G. Gyarmati, D. J. Patil, B. R. Hunt, E. Kalnay, E. Ott, and J. A. Yorke, 2005: Assessing a local ensemble Kalman filter: Perfect model experiments with the NCEP global model. *Tellus,* **57A,** 528-545.

46. Oczkowski*, M., I. Szunyogh, and D. J. Patil, 2005: Mechanisms for the development of locally low dimensional atmospheric dynamics. *J. Atmos. Sci.,* **65,** 1135-1156.

47. Baek*, S.-J., B. Hunt, I. Szunyogh, A. V. Zimin*, and E. Ott, 2004: Localized error bursts in estimating the state of spatiotemporal chaos. *Chaos,* **14,** 1042-1049.

48. Ott, E., B. R. Hunt, I. Szunyogh, A. V. Zimin*, E. J. Kostelich, M. Corazza*, E. Kalnay, D. J. Patil, and J. A. Yorke, 2004: A local ensemble Kalman filter for atmospheric data assimilation. *Tellus,* **56A,** 415-428.

49. Ott, E., B. R. Hunt, I. Szunyogh, A. V. Zimin*, E. J. Kostelich, M. Corazza*, E. Kalnay, D. J. Patil, and J. A. Yorke, 2004: Estimating the state of large spatio-temporally chaotic systems.. *Phys. Lett. A,* **330,** 365-370.

50. Hunt, B. R., E. Kalnay, E. J. Kostelich, E. Ott, D. J. Patil, T. Sauer, I. Szunyogh, J. A. Yorke, A. V. Zimin*, 2004: Four-dimensional ensemble Kalman filtering. *Tellus,* **56A,** 273-277.

51. Corazza*, M., E. Kalnay, D. J. Patil, R. E. Morss, M. Cai, I. Szunyogh, B. R. Hunt, E. Ott, and J. A. Yorke, 2003: Use of the breeding technique to estimate the structure of the analysis "errors of the day". *Nonlin. Processes Geophys.,* **10,** 233-243.

52. Zimin*, A. V., I. Szunyogh, D. J. Patil, B. R. Hunt, and E. Ott, 2003: Extracting envelopes of Rossby wave packets. *Mon. Wea. Rev.,* **131,** 1011-1017.

53. Gyarmati G., I. Szunyogh, and D. J. Patil, 2003: Local predictability in a simple model of atmospheric balance. *Nonlin. Processes Geophys.,* **10,** 183-196.

54. Szunyogh, I., G. Gyarmati*, and D. Devenyi, 2002: Using observed data for testing the statistical consistency of initial ensemble perturbations. *Időjárás,* **106,** 293-303.

55. Szunyogh, I., Z. Toth, A. V. Zimin*, S. Majumdar, and. A Persson, 2002: Propagation of the effect of targeted weather observations: The 2000 Winter Storm Reconnaissance program. *Mon. Wea. Rev.,* **130,** 1144-1165.

56. Szunyogh, I, and Z. Toth, 2002: The effect of increased horizontal resolution on the NCEP global ensemble mean forecasts. *Mon. Wea. Rev.,* **130,** 1125-1143.

57. Majumdar, S. J., C. H. Bishop, I. Szunyogh, and Z. Toth, 2001: Can an Ensemble Transform Kalman Filter predict the reduction in forecast error variance produced by targeted observations? *Quart. J. Roy. Met. Soc.,* **127,** 2803-.

58. Szunyogh, I., Z. Toth, R. E. Morss, S. J. Majumdar, B. J. Etherton, and C. H. Bishop, 2000: The effect of targeted dropsonde observations during the 1999 Winter Storm Reconnaissance program. *Mon. Wea. Rev.,* **128,** 3520-3537.

59. Langland, R., Z. Toth, R. Gelaro, I. Szunyogh, M. Shapiro, S. Majumdar, R. Morss, G. Rohaly, C. Velden, N. Bond, and C. H. Bishop, 1999: The North Pacific Experiment (NORPEX-98). *Bull. Am. Met. Soc.,* **80,** 1363-1384.

60. Szunyogh, I., Z. Toth, K. A. Emanuel, C. H. Bishop, C. Snyder, J. Woolen, T. Marchok, and R. Morss, 1999: Ensemble-based targeting experiments during FASTEX: The impact of dropsonde data from the Lear jet. *Quart. J. Roy. Met. Soc.,* **125,** 3520-3537.

61. Toth, Z., I. Szunyogh, E. Kalnay, G. Iyengar, 1999: Comments on "Notes on the appropriateness of 'bred modes' for generating initial perturbations." *Tellus,* **51A,** 442-449.

62. Kádár*, B., I. Szunyogh, and D. Devenyi, 1998: On the origin of model errors. Part II. Effects of the spatial discretization. *Időjárás,* **101,** 71-107.

63. Kádár*, B., I. Szunyogh, and D. Devenyi, 1998: On the origin of model errors. Part I. Effects of the temporal discretization. *Időjárás,* **101,** 19-41.

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

65. McLachlan, R. I., I. Szunyogh, and V. Zeitlin, 1997: Hamiltonian finite-dimensional models of baroclinic instability. *Phys. Let. A,* **229,** 299-305.

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

67. Szunyogh I., 1993: Finite-dimensional quasi-Hamiltonian structure in simple model equations. *Meteorology and Atmospheric Physics,* **52,** 49-57.

68. Szunyogh I., 1993: The dynamics of a shallow-water flow over topography. Part II. Numerical experiments. *Időjárás,* **97,** 191-203.

69. Szunyogh I., 1993: The dynamics of a shallow-water flow over topography. Part I. Theory. *Időjárás,* **97,** 147-161.

70. Szunyogh I., 1992: Statistical mechanics of inviscid truncated models of two-dimensional incompressible flows. *Időjárás,* **96,** 22-31.

c. Talks, Abstracts, and Other Professional Papers Presented

i. Invited Talks

1. **University of Maryland,** College Park, MD. March 12, 2020. *Testing a hybrid modeling approach for global weather prediction by blending numerical modeling and machine learning.* Applied Dynamics Seminar Series, 45-minute talk.

2. **Michigan Tech Research Institute,** Ann Arbor, MI, October 2-4, 2019. *Machine learning with baked-in knowledge for forecasting large complex spatiotemporal systems with application to weather forecasting.* DARPA Physics of Artificial Intelligence Review Meeting. 45-minute talk, jointly with Brian Hunt and Edward Ott.

3. **Naval Research Laboratory,** Monterey, CA, March 28, 2017. *The robust model of sequential data assimilation* 1-hour seminar format talk.

4. **Texas A&M University,** College Station, TX, November 30, 2015. Oceanography Seminar. *A survey of the latest trends in data assimilation.* 1-hour seminar format talk.

5. **National Center for Atmospheric Research,** Boulder, CO, July 30, 2015. *The dynamics of forecast uncertainty in the THORPEX Interactive Grand Global Ensemble (TIGGE).* 1-hour seminar format talk.

6. **Naval Research Laboratory,** Monterey, CA, July 21, 2015. *The dynamics of forecast uncertainty in the THORPEX Interactive Grand Global Ensemble (TIGGE)* 1-hour seminar format talk.

7. **MIT Enterprise Forum,** Houston, TX, November 12, 2014. *How well can we know the future? How well can we know the present?* 12-minute talk and 40-minute panel discussion. Video recordings are available at
   http://video.mitef.org/a3b/advances-in-modeling-weather-and-climate-change-part-3
   -istvan-szunyogh/
   http://video.mitef.org/Haa/advances-in-modeling-weather-and-climate-part-7-question
   -and-answers/

8. **Nanjing University of Information Science and Technology, School of Atmospheric Physics,** Nanjing, China, June 19, 2014. *Lecture 1: Short-term Atmospheric Variability: Part I.Lecture 2: Short-term Atmospheric Variability: Part II. Lecture 3: Data Assimilation. Lecture 4: Ensemble-based Kalman Filters: An Overview.* 4 90-minute lectures.

9. **Institute for Mathematics and its Applications (IMA)**, Minneapolis, MN, November 18-21, 2013, Workshop on Predictability in Earth System Processes. *On the dynamics of forecast errors.* 40-minute talk.

10. **Institute for Mathematics and its Applications (IMA)**, Minneapolis, MN, March 11-15, 2013, Workshop on Stochastic Modeling of the Oceans and Atmosphere. *On the low-dimensionality of the atmospheric error dynamics in the extratropics.* 30-minute talk.

11. **NCAR**, Boulder, CO, August 10-12, 2012, DTC and NUOPC Ensemble Design Workshop. *A diagnostic technique to assess the skill of an ensemble in representing the model uncertainty.* 30-minute talk.

12. **Arizona State University,** Tempe, AZ, March 5, 2012. Math Climate Network Data Assimilation Fest.*Two selected problems of atmospheric data assimilation.* 30-minute talk.

13. **ONR Marine Meteorology Peer Review Meeting,** Monterey, CA, August 2-4, 2011. *Tropical Cyclone Data Assimilation.* 20-minute talk.

14. **NOAA, Earth System Research Laboratory,** Boulder, CO, July 26, 2011. *Limited Area Data Assimilation Experiments with the Local Ensemble Transform Kalman Filter.* 1-hour seminar format talk.

15. **European Centre for Medium Range Weather Forecasts,** Reading, UK, June 20-24, 2011. Workshop on Representing Model Uncertainty and Error in Numerical Weather and Climate Prediction Models. *Local diagnostics to measure the efficiency of the ensemble in representing the error space.* 30-minute talk.

16. **Texas A&M University,** College Station, TX, May 30-31, 2011. IAMCS Spring Symposium. *The Local Ensemble Transform Kalman Filter: Theory and Applications.* 40-minute talk.

17. **Max Planck Institute for the Physics of Complex Systems,** Dresden, Germany, January 25-29, 2010. Workshop on Exploring Complex Dynamics in High-Dimensional Chaotic Systems: From Weather Forecasting to Oceanic Flows. *A toolkit to predict the utility of ensemble based forecasts of high-dimensional chaotic systems.* 45-minute talk.

18. **Arizona State University,** Tempe, AZ, February 19, 2009: *Predictability of the performance of an ensemble forecast system.* Applied Mathematics Seminar Series. 1-hour seminar format talk.

19. **WMO-Workshop on 4D-Var and Ensemble Kalman Filter Inter-comparisons**, Buenos Aires, Argentina, November 10-13, 2008. *Mixing the elements of 4D-Var and ensemble Kalman filters: Building practical data assimilation algorithms.* 30-minute opening talk of the Session "Synergistic Approaches".

20. **Texas A&M University**, College Station, TX, July 15, 2008. *Ensemble-based diagnostics to investigate the spatio-temporal evolution of atmospheric predictability.* Special seminar at the Department of Atmospheric Science. 1-hour seminar format talk.

21. **SIAM Annual Meeting**, San Diego, CA, July 7-11, 2008. *Ensemble-based diagnostics to investigate the spatio-temporal evolution of predictability.* Minisymposium on Advanced methods for data assimilation and adaptive observation of multiscale systems. 30-minute talk.

22. **Workshop on Mathematical Advancement in Geophysical Data Assimilation**, Banff International Research Station for Mathematical Innovation and Discovery, Banff, Canada, February 3-8, 2008. *Flow-dependence of the performance of an ensemble-based analysis-forecast system.* 30-minute talk.

23. **University of California Los Angeles,** Los Angeles, CA, November 7, 2007. *Development of the Local Ensemble Transform Kalman Filter data assimilation system .* Seminar Series of the Department of Atmospheric and Oceanic Sciences. 1-hour seminar format talk.

24. **ECMWF Workshop on Flow-dependent Aspects of Data Assimilation,** European Centre for Medium-Range Weather Forecasts, Reading, UK, 11-13 June, 2007. *Implementation of the LETKF on the NCEP Global Forecast System.* 30-minute talk.

25. **SIAM Conference on Applications of Dynamical Systems,** Snowbird, UT, May 27-June 1, 2007. *Assessing predictability of the atmospheric global circulation.* Minisymposium on Data Assimilation: A key scientific issue that brings dynamical systems and statistics together. 30-minute talk.

26. **State University of New York at Stony Brook,** Stony Brook, NY, February 15, 2007. *Applications of an Ensemble-based Kalman Filter to the assimilation of observations and the assessment of predictability.* New York Center for Computational Sciences Seminar Series. 1-hour seminar format talk.

27. **Naval Research Laboratory,** Monterey, CA, September 12, 2006. *Overview of the International THORPEX program.* Office of Naval Research DRI Planning Meeting. 30-minute talk.

28. **The Institute for Integrative and Multidisciplinary Earth Studies, NCAR,** Boulder, CO, USA, July 10-14, 2006. *THORPEX Predictability Research: Some General Comments and One Example.* Summer Retreat on Tropical Convection and The Weather Climate Interface. 30-minute talk.

29. **Workshop on the Organization and Maintenance of Tropical Convection and the Madden Julian Oscillation,** The Abdus Salam International Centre for Theoretical Physics, Miramare, Trieste, Italy, March 16, 2006. *THORPEX predictability research: One example and some remarks.* 20-minute talk.

30. **Towards a Mathematical Advancement of Data Assimilation, Workshop,** Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, NC, October 5, 2005. *Assessing predictability with a Local Ensemble Kalman Filter.* 30-minute talk.

31. **George Mason University,** Fairfax, VA, September 29, 2005. *The Local Ensemble Transform Kalman Filter of the University of Maryland for Atmospheric Data Assimilation.* Colloquium of the School of Computational Sciences. 1-hour seminar format talk.

32. **Statistical and Applied Mathematical Science Institute,** Research Triangle Park, NC, March 18, 2005. *On the inherently local nature of atmospheric dynamics: Implications for Data Assimilation.* Seminar Series of the 2004-2005 program "Data Assimilation for Geophysical Systems: Interdisciplinary Perspectives. 1-hour seminar format talk.

33. **Institute for Pure and Applied Mathematical Sciences, UCLA,** Los Angeles, CA, February 25, 2005. *Assessing a Local Ensemble Kalman Filter.* Short Program "Mathematical Issues and Challenges in Data Assimilation for Geophysical Systems: Interdisciplinary Perspectives". 45-minute talk.

34. **Workshop on Mesoscale and CFD Modeling for Military Applications,** Jackson State University, Jackson, MS, May 25, 2004. *The Local Ensemble Kalman Filter of the University of Maryland.* A Workshop Sponsored by Army's High Performance Computing Research Center. 30-minutes talk.

35. **United Kingdom Meteorological Office,** Exeter, United Kingdom, May 12, 2004: *A Local Ensemble Kalman Filter for the NCEP GFS: Perfect model experiments.* 1-hour seminar format talk.

36. **European Centre for Medium-Range Weather Forecasts,** Reading, United Kingdom, May 10, 2004. *A Local Ensemble Kalman Filter for the NCEP GFS: Perfect model experiments.* 1-hour seminar format talk.

37. **Cooperative Institute for Meteorological Satellite Studies,** Madison, WI, March 18, 2004: *Implementation of the the LEKF on the NCEP GFS: "Perfect Model" experiments.* 1-hour seminar format talk.

38. **National Centers for Environmental Prediction,** Camp Springs, MD, February 27, 2004: *Implementation of the the LEKF on the NCEP GFS: "Perfect Model" experiments.* Environmental Modeling Center Seminar Series. 1-hour seminar format talk.

39. **IBM, Watson Research Center,** Yorktown Heights, NY, USA, January 29, 2004. *Estimating the State of the Atmosphere.* 45-minute seminar format talk.

40. **Forecast Systems Laboratory, NOAA,** Boulder, Colorado, September 8, 2003. *A Local Ensemble Kalman Filter for the NCEP Global Forecast System.* 1-hour seminar format talk in the Data Assimilation Seminar Series.

41. **National Institute of Aerospace,** Hampton, VA, August 18, 2003. *Data Assimilation Research at the University of Maryland.* Atmospheric Composition Workshop. 30-minute talk.

42. **Arizona State University,** Tempe, AZ, March 28, 2003. Spatio-temporal propagation of localized improvements in the initial conditions of numerical weather predictions. Environmental Fluid Dynamics Seminar Series. 1-hour seminar format talk.

43. **National Centers for Environmental Weather Prediction,** Camp Springs, MD, March 18, 2003. *Local Ensemble Kalman Filtering: Numerical Experiments.* 2-nd Workshop on Ensemble Data Assimilation. 30-minute talk.

44. **NASA Goddard Space Flight Center,** Greenbelt, MD, March 14, 2003 *Local Ensemble Kalman Filtering: Numerical Experiments.* 1-hour talk jointly with Edward Ott and Eugenia Kalnay.

45. **Lamont-Doherty Earth Observatory, Columbia University,** New York, March 7, 2003. *Local low dimensionality of atmospheric dynamics and Applications to Data Assimilation.* Physical Oceanography Seminar Series. 1-hour seminar format talk jointly with Dhanurjay Patil.

46. **National Centers for Environmental Prediction,** Camp Springs, MD, 2002. *Exploiting local low dimensionality of the atmospheric dynamics for efficient ensemble Kalman filtering.* Environmental Modeling Center Seminar Series. 1-hour seminar format talk jointly with Eugenia Kalnay and Edward Ott.

47. **Eötvös Loránd University,** Budaperst, Hungary, February 26, 2002. *Exploiting local low dimensionality of the atmospheric dynamics for efficient Kalman filtering.* Complex Systems Seminar Series. 1-hour seminar format talk.

48. **Hungarian Meteorological Service,** Budapest, Hungary, February 20, 2002: *On the dynamical basis of targeting weather observations.* 1-hour seminar format talk.

49. **University of Miami,** Miami, FL, January 19, 2002: *On the dynamical basis of targeting weather observations.* 1-hour seminar format talk.

50. **NASA Goddard Space Flight Center,** Greenbelt, MD, September 24, 1999. *Targeted observations at NCEP.* Data Assimilation Office Seminar Series. 1-hour seminar format talk jointly with Zoltan Toth

51. **Massachusetts Institute of Technology,** Cambridge, MA, September 25, 1997. *Ensemble-based targeting experiments during THORPEX.* 1-hour seminar format talk jointly with Zoltan Toth.

52. **Isaac Newton Institute for the Mathematical Sciences, Cambridge University,** Cambridge, United Kingdom, July 18, 1996. *Structure preserving truncation strategies: Practical Implications.* "Mathematics of Atmosphere and Ocean Dynamics" program. 1-hour seminar format talk.

53. **Royal Netherlands Meteorological Institute,** De Bilt, The Netherlands, December 1995. 1-hour seminar format talk.

54. **Forecast System Laboratory, NOAA,** Boulder, CO, 1995. 1-hour seminar format talk.

55. **National Centers for Environmental Prediction,** Camp Springs, MD, 1995. 1-hour seminar format talk.

56. **National Meteorological Center,** Camp Springs, MD, 1994. 1-hour seminar format talk.

57. **Meteorologisches Institute der Universität Munchen,** Munich, Germany, June, 1993. 1-hour seminar format talk.

58. **National Meteorological Center,** Camp Springs, MD, 1993. 1-hour seminar format talk.

59. **Meteorologie und Geophysik Institution, Universität Wien,** Vienna, Austria, 1992. 40-minute seminar format talk.

ii. Contributed Talks

1. *An investigation of the effect of ocean mesoscale variability on the dynamics of the North Pacific Jet Stream and Storm Track.* AMS Annual Meeting 2020, Boston, MA, January 13-16, 2020.

2. *Operational forecast based estimates of the practical predictability of weather.* AMS Annual Meeting 2020, Boston, MA, January 13-16, 2020.

3. *Verification of the location of winter storm precipitation events in ensemble forecasts.* 27th IUGG General Assembly, Montreal, Canada, July 8-18, 2019.

4. *The effects of ocean mesoscale variability on the energetics of the atmosphere in the midlatitudes.* S2S Prediction Task Force Monthly Meeting, June 19, 2019.

5. *On the Predictability of Winter Storm Precipitation.* S2S Prediction Task Force Monthly Meeting, March 21, 2018.

6. *How Well Can the NCEP Global Ensemble Forecast System Capture the Uncertainty in the Analysis and Forecast of Winter Storm Precipitation?* 8th EnKF Workshop, Mont Gabriel, Quebec, Canada, May 7-10, 2018.

7. *Regionally Enhanced Global (REG) Data Assimilation (DA).* 98th AMS Annual Meeting, Austin, TX, January 7-11, 2018.

8. *Coping with model errors in data assimilation.* The 7th EnKF Data Assimilation Workshop, State College, PA, May 23–27, 2016.

9. *An investigation of the dynamics of forecast uncertainty in global atmospheric model forecasts.* 26th IUGG General Assembly 2015, Prague, Czech Republic, June 22–July 2, 2015.

10. *An investigation of the evolution of forecast uncertainty in global model forecasts.* World Weather Open Science Conference, Montreal, Canada, August 16–21, 2014.

11. *Local dynamics of baroclinic waves in the Martian atmosphere.* Second Symposium on Planetary Atmospheres, AMS 93rd Annual Meeting, Austin, TX, January 6–10, 2013

12. *Improvements in numerical weather prediction.* Workshop for Texas Broadcast Meteorologists, Texas A&M university, College Station, TX, November 3, 2012.

13. *On the efficiency of an ensemble in representing the local error space.* 21th Symposium on Probability and Statistics in the Atmospheric Sciences, AMS 93rd Annual Meeting, New Orleans, LA, January 22–January 26, 2012.

14. *An overview of the state-of-the-art in data assimilation: Practical technics for geoscience applications.* (1-hour opening talk of the workshop). Institute for Applied Mathematics and Computational Science Workshop on Data Assimilation in the Geosciences. College Station, TX, October 26–27, 2009.

15. *Local predictability of the performance of an ensemble forecast system.* Symposium on Toward Seamless Ensemble Prediction Systems, IAMAS-IAPSO-IACS Assembly, Montreal, Canada, July 20–29, 2009.

16. *A toolkit to predict the utility of ensemble based forecasts.* Symposium on the Dynamics and Predictability of High-Impact Weather, IAMAS-IAPSO-IACS Assembly, Montreal, Canada, July 20–29, 2009.

17. *Assessing Predictability with a Local Ensemble Kalman Filter.* Symposium on the Dynamics and Predictability of Severe Weather Events, XXIV General Assembly of IUGG, Perugia, Italy, July 2–13, 2007.

18. *Assessing predictability with a Local Ensemble Kalman Filter.* Cyclone Workshop, Pacific Grove, October 22-27, 2006.

19. *An overview of the key THORPEX predictability and dynamical processes issues.* Cyclone Workshop, Pacific Grove, October 22-27, 2006.

20. *An implementation of the Local Ensemble Transform Kalman Filter on the NCEP GFS.* 18th Symposium on Probability and Statistics in the Atmospheric Sciences, Atlanta, GA, January 28–February 3, 2006.

21. *Mechanisms for the development of locally low dimensional atmospheric dynamics.* The 1st THORPEX International Science Symposium, Montreal, Canada, December, 2004.

22. *Identifying the origin of forecast errors in the 3 to 14 days range: A challenge.* Predictability Workshop, University of Wisconsin, Madison, WI, March 15-17, 2004.

23. *A Local Ensemble Kalman Filter for the NCEP GFS.* 20th Conference on Weather Analysis and Forecasting/16th Conference on Numerical Weather Prediction. Seattle, WA, January 11-15, 2004.

24. *Dispersion of the effects of targeted weather observations.* The Norm Phillips Symposium. January 15, 2004.

25. *Extracting envelopes of Rossby wave packets.* 12th Cyclone Workshop. Far Hills Inn, Canada, September 20-26, 2003.

26. *Implementation of the University of Maryland ensemble data assimilation scheme on the NCEP GFS.* 2nd Workshop on Ensemble Weather Forecasting. The Far Hills Inn, Canada, September 17-19, 2003.

27. *On the dynamical basis of targeting weather observations.* Symposium on Observations, Data Assimilation, and Probabilistic Prediction, Orlando, FL, January 13-17, 2002.

28. *The impact of model resolution on the performance of the NCEP global ensemble forecast system.* 13th AMS Conference on Numerical Weather Prediction. Denver, Colorado, September 13-17, 2002.

29. *Ensemble-based targeted observations during NORPEX.* Third Symposium on Integrated Observing System. Dallas, Texas, January 10-15, 1999.

30. *Ensemble-based sensitivity calculations.* Third Workshop on adjoint applications in dynamic meteorology. Lennoxville, Canada, June 16-20, 1997.

31. Record of contributed talks given before 1997 has not been kept.

iii. Unrefereed Papers (Conference Proceedings are not listed)

1. Arcomano*, T., I. Szunyogh, J. Pathak*, A. Wikner, B. Hunt, and E. Ott, 2020: A machine-learning-based global atmospheric forecast model. https://doi.org/10.1002/essoar.10502527.2.

2. Wikner*, A., J. Pathak*, B. Hunt, M. Girvan, T. Arcomano*, I. Szunyogh, A. Pomerance, and E. Ott, 2020: Combining machine learning with knowledge-based modeling for scalable forecasting and subgrid-scale closure of large, complex, spatiotemporal systems. http://arxiv.org/abs/2002.05514.

3. Szunyogh, I. and E. A. Satterfield*, 2011: Local diagnostics to measure the efficiency of the ensemble in representing the error space. Proceedings of the ECMWF Workshop on Representing Model Uncertainty and Error in Numerical Weather and Climate Prediction Models, 343–350.

4. Szunyogh, I., E. A. Satterfield*, J. A. Aravequia, E. J. Fertig*, G. Gyarmati, E. Kalnay, B. R. Hunt, E. J. Kostelich, D. D. Kuhl, E. Ott, and J. A. Yorke, 2007: The Local Ensemble Transform Kalman Filter and its implementation on the NCEP global model at the University of Maryland. Proceedings of the ECMWF Workshop on Flow-dependent Aspects of Data Assimilation, 47-64.

5. Liu*, J.-J., E. J. Fertig*, H. Li*, E. Kalnay, B. R. Hunt, E. J. Kostelich, I. Szunyogh, and R. Toddling, 2007: Comparison between Local Ensemble Kalman Filter and PSAS in the NASA finite volume GCM: perfect model experiments. arXiv.org

6. Ott, E., B. R. Hunt, I. Szunyogh, M. Corazza*, E. Kalnay, D. J. Patil, J. A. Yorke, A. V. Zimin*, E. J. Kostelich, 2002: Exploiting local low dimensionality of the atmospheric dynamics for efficient ensemble Kalman filtering. arXiv:physics/0203058 v3 11 Sep 2002.

7. Szunyogh, I., 1993: Application of Hamiltonian mechanics to the investigation of numerical weather prediction models. Ph.D. Thesis (in Hungarian). Library of Hungarian Academy of Sciences, Budapest.

Further publications appeared in Hungarian in popular science magazines Természet Világa, Élet és Tudomány, and Légkör. The English translation of the title of these magazines is "World of Nature", "Life and Science", and "Atmosphere", respectively.

d. Media Interviews

1. 20-minute interview about weather prediction models in the program Houston Matters of Houston Public Media, KUHF News 88.7. November 19, 2014.

e. Contracts and Grants

1. **Principal Investigator**. 2018. *Machine Learning with Baked-In Knowledge for Forecasting Large Complex Spatiotemporal Systems with Application to Weather Forecasting.* Sponsor: Defense Advanced Projects Research Agency through University of Maryland: $ 150,000 over 1.5 years.

2. **Principal Investigator**. 2018. *Regionally Enhanced Global (REG) Local Ensemble Transform Kalman Filter (LETKF).* Sponsor: Office of Naval Research. Support: $ 367,443 over 3 years.

3. **Principal Investigator**. 2016. *Regionally Enhanced Global (REG) 4D-VAR.* Sponsor: Office of Naval Research. Support: $ 80,000 over 1 year.

4. **Principal Investigator**. 2016. *Investigation of the effects of oceanic mesoscale eddies on the midlatitude storm tracks and their predictability.* Sponsor: National Oceanic and Atmospheric Administration, Climate Program Office, Modeling, Analysis, Prediction, and Projection (MAPP) Program: $ 402,327 over 3 years.

5. **Principal Investigator**. 2016. *Coupled global-regional data assimilation with NAVDAS-AR.* Sponsor: Office of Naval Research. Support: $ 80,000 over 2 years.

6. **Principal Investigator**. 2012. *Investigation of the effect of model uncertainty and error on the forecast uncertainty.* Sponsor: NSF. Support: $ 356,281 over 3 years.

7. **Principal Investigator**. 2012. *Coupled global-regional data assimilation using joint states.* Sponsor: Office of Naval Research. Support: $ 442,396 over 3 years.

8. **Co-Investigator,** 2011. Sponsor: Gulf of Mexico Research Initiative (BP GRI). Support: $ 371,855 over three years, which will cover the data assimilation efforts of the group led by I. S. and Ping Chang. This amount is part of the total of $14,403,000, which was awarded to the Gulf Integrated Spill Response Consortium (GISR) led by Texas A&M University.

9. **IAMCS Applications Researcher,** 2011. Sponsor: KAUST. Support: 1 month/year salary support for 1+1 year.

10. **Lead Organizer,** 2009. Summer School on *Advanced mathematical methods to study atmospheric dynamical processes and predictability* at the Banff International Research Station (BIRS), Canada, July 10–July 15, 2011. Support: BIRS provided lodging, meals and the conference facilities at no cost to 10 invited lecturers and 32 graduate students from all around the world.

11. **Principal Investigator** jointly with Marc Genton and Mikyoung Jun of the Department of Statistics, Texas A&M, 2009. *Statistical covariance estimation in data assimilation and its application to Earth Science problems.* Sponsor: KAUST, IAMCS Innovation Award to support 50% of the 1-year effort of a graduate student. Support: $19,953 over 1 year. [The grant has supported Texas A&M ATMO student Elizabeth Satterfield.]

12. **Principal Investigator,** 2009. *Development of an ensemble Kalman filter data assimilation for Martian weather analysis and forecasting.* Sponsor: NASA. Support: $149,510 over 1.5 years.

13. **Principal Investigator,** 2009. *Tropical cyclone ensemble data assimilation.* Sponsor: Office of Naval Research. Support: $379,146 over 3 years.

14. **Principal Investigator,** 2009.*Assessing atmospheric predictability with a global analysis-forecast system.* Sponsor: NSF. Support: $147,314 over 2.5 years.

15. **Project Director,** 2008. *Investigation of the impact of wildfire emissions: Renewal* Sponsor: NASA-Langley. Support: $30,000 over 1 year.

16. **Co-Principal Investigator** 2007. *Earth System Science Research using Data and Products from the Terra, Aqua, and ACRIMSAT Satellites.* Sponsor: NASA. Support: $490,812 over 3 years.

17. **Principal Investigator,** 2007.*Assessing atmospheric predictability with a global analysis-forecast system.* Sponsor: NSF. Support: $389,790 over 3 years.

18. **Principal Investigator,** 2007. *Development of an ensemble Kalman filter data assimilation for Martian weather analysis and forecasting.* Sponsor: NASA. Support: $249,789 over 2 years.

19. **Project Director,** 2007. *Investigation of the impact of wildfire emissions.* Sponsor: NASA-Langley. Support: $30,000 over 1 year.

20. **Co-Principal Investigator,** 2007 *Ensemble Kalman filter data assimilation for Martian weather analysis and forecasting.* Sponsor: NASA. Support: $560,046 over 3 years.

21. **Co-Principal Investigator,** 2007. *Carbon data assimilation with a coupled ensemble Kalman filter data assimilation system.* Sponsor: DOE. Support: $751,746 over 4 years.

22. **Co-Director,** 2005. *Improving geographically localized high-resolution weather forecasts.* Sponsor: Department of Defense. Support: $266,000 for computer equipment.

23. **Principal Investigator,** 2004. *Chemical data assimilation of AIRS CO sensor data.* Sponsor: National Institute of Aerospace. Support: $131,738 over three years.

24. **Recipient,** 2004, jointly with Dhanurjay Patil of an *IBM Shared University Research (SUR) Program Equipment and Installation Service Award.* Sponsor: IBM. Support: $249,428 value of computer equipment.

25. **Co-Investigator,** 2004: *State estimation and predictability of high-dimensional complex systems: Theory and experiment.* Sponsor: NSF. Support: $499,792 over 4 years.

26. **Principal Investigator,** 2004. *A strategically new forecast process based on a Local Ensemble Kalman Filter.* Sponsor: NOAA. Support: $240,000 over 3 years.

27. **Co-Investigator and Co-Writer of Proposal,** 2003. *Data assimilation using Advanced Infrared Sounder data.* Sponsor: NASA. Support: $450,000 over 3 years.

28. **Co-Investigator and Co-Writer of Proposal,** 2002. *Improving high resolution, geographically localized, Short-Term Weather Forecasts.* Sponsor: US Army Research Office. Support: $420,000 over 3 years.

29. **Recipient,** 2001, jointly with Brian Hunt of a 21st Century Science Research Award. *Weather forecasting, complexity, and chaos.* Sponsor: James S. McDonnell Foundation. Support: $450,000 over 3 years.

f. Fellowships, Prizes, and Awards

1. **2017 Dean's Distinguished Achievement Award for Research** from the College of Geosciences, Texas A&M University.

2. **2015 Author's Award,** May 24, 2016 from the Hungarian Meteorological Society for the book *Szunyogh, I., 2014, Applicable Atmospheric Dynamics: Techniques for the Exploration of Atmospheric Dynamics. World Scientific.*

3. **Certificate of Recognition,** January 5, 2015 from the U.S. THORPEX Executive Committee. For his international leadership and predictability and data assimilation research contributions to U.S. participation in the World Meteorological Organization's THORPEX Weather Research Program.

4. **Certificate of Appreciation,** November 17, 2014 from the World Weather Research Programme (WWRP) of the World Meteorological Organization (WMO). In recognition of an outstanding contribution to the WMO THORPEX program for the years 2005-2014.

5. **Magyary Zoltan Postdoctoral Fellowship,** 1995, from the Hungarian Ministry of Education and Culture. The only meteorologist ever awarded with the most prestigious postdoctoral award of the time in Hungary.

6. **Szádeczky-Kardoss Elemér Award,** 1994, from the Hungarian Academy of Sciences for the paper "Szunyogh, I., 1993: Finite-dimensional quasi-Hamiltonian structure in simple model equations. *Meteorology and Atmospheric Physics,* **52,** 49-57.

7. **Róna Zsigmond Award,** 1993, from the Hungarian Meteorological Society. For outstanding scientific achievement by a young Hungarian scientist in the atmospheric sciences.

8. **Hille Alfréd Award,** 1991, from the Hungarian Meteorological Society. Winner at the national graduate research competition in the Meteorology and Climatology category.

g. Reviewing Activities for Journals and Other Learned Publications

1. *Advances in Atmospheric Sciences,* Chinese Academy of Sciences.

2. *Atmosphere-Ocean*, Canadian Meteorological and Oceanographic Society.

3. *Dynamics of Atmospheres and Oceans*, Elsevier Publisher.

4. *Időjárás,* Hungarian Meteorological Service.

5. *IEEE Transactions on Signal Processing*, IEEE.

6. *International Journal of Climatology,* Royal Meteorological Society.

7. *Journal of Advances in Modeling Earth Systems,* American Geophysical Union.

8. *Journal of Applied Meteorology and Climatology,* American Meteorological Society Union.

9. *Journal of Atmospheric and Oceanic Technology*, American Meteorological Society.

10. *Journal of the Atmospheric Sciences,* American Meteorological Society.

11. *Journal of Climate,* American Meteorological Society

12. *Journal of Computational Physics,* Elsevier Publisher.

13. *Journal of Environmental Informatics,* International Society for Environmental Information Sciences

14. *Journal of Fluid Mechanics,* Cambridge University Press.

15. *Journal of Geophysical Research–Atmosphere,* American Geophysical Union.

16. *Journal of Nonlinear Science,* Springer Verlag.

17. *Monthly Weather Review,* American Meteorological Society.

18. *Nonlinear Processes in Geophysics,* European Geophysical Society

19. *Numerical Linear Algebra with Applications,* Wiley Interscience.

20. *Physica D,* Elsevier Publisher.

21. *Quarterly Journal of the Royal Meteorological Society,* Royal Meteorological Society.

22. *Tellus,* International Meteorological Institute in Stockholm.

23. *Weather and Forecasting,* American Meteorological Society.

2 Teaching and Advising

a. Courses taught in last ten years

1. **Texas A&M, ATMO-689:** Special Topics in Advanced Geophysical Data Assimilation (Spring 2011).

   Developed the syllabus and course material for this course, which was first offered in Spring 2011 semester. A total of 11 students from 5 different graduate programs registered for the class. The class was also regularly attended by additional graduate students, postdoctoral associates and professors.

2. **Texas A&M, ATMO-455:** Numerical Weather Prediction (Spring 2010, 2012, 2013, 2014, 2015, 2016, 2018, 2019, 2020).

3. **Texas A&M, ATMO-435:** Dynamic-Synoptic Meteorology (Fall 2013).

4. **Texas A&M, ATMO-335:** Atmospheric Thermodynamics (Fall 2015, 2016, 2017,2018, 2019).

5. **Texas A&M, ATMO-321:** Computer Applications in the Atmospheric Sciences (Fall 2009, 2010, 2011, 2014, 2020).

6. **Texas A&M, ATMO-201:** Atmospheric Science (Fall 2013).

7. **Texas A&M, ATMO-201:** Weather and Climate (Fall 2017).

8. **UMD AOSC-615:** Advanced Methods in Data Assimilation for the Earth Sciences (Spring 2007).

b. Mentoring

1. **Mentor,** *Csengele Barta*, Postdoctoral Research Associate at the Department of Atmospheric Sciences, Texas A&M University, for Graduate Teaching Academy Certificate, 2011

c. Advising Research Direction

iii. Doctoral

1. **Chair,** *Troy Arcomano,* Atmospheric Sciences, Texas A&M University, in progress.

2. **Co-Chair,** *Joseph Michael Battalio,* Atmospheric Sciences, Texas A&M University, 2017.

3. **Chair,** *Fan Han,* Atmospheric Sciences, Texas A&M University, 2017.

4. **Chair,** *Michael Herrera,* Atmospheric Sciences, Texas A&M University, 2016.

5. **Chair,** *KwangOh Jung,* Atmospheric Sciences, Texas A&M University, withdrawn.

6. **Chair,** *Chirstina Holt,* Atmospheric Sciences, Texas A&M University, 2014.

7. **Co-Chair,** *Dagmar Merkova,* Atmospheric and Oceanic Science, University of Maryland, 2011.

8. **Chair,** *Elizabeth Satterfield,* Atmospheric Sciences, Texas A&M University, 2010.

9. **Co-Chair,** *David Kuhl,* Atmospheric and Oceanic Science, University of Maryland, 2009.

10. **Member,** *Junjie Liu,* Atmospheric and Oceanic Science, University of Maryland, 2007.

11. **Member,** *Hong Li,* Atmospheric and Oceanic Science, University of Maryland, 2007.

12. **Member,** *Seung-Jong Baek,* Electrical Engineering, University of Maryland, 2007.

13. **Member,** *Elana Klein,* Applied Mathematics and Scientific Computation, 2007.

14. **Member,** *Michael Oczkowski,* Physics, University of Maryland, 2003.

15. **Member,** *Aleksey Zimin,* Physics, University of Maryland, 2003.

16. **Research Advisor,** *Barbara Kádár,* Eötvös Loránd University, Budapest, Hungary, 1998.

ii. Master's and Diploma

1. **Chair,** *Eric Forinash,* Atmospheric Sciences, Texas A&M, 2019.

2. **Chair,** *Maxwell Gawryla,* Atmospheric Sciences, Non-Thesis Option, Texas A&M, 2018.

3. **Chair,** *Adam Brainard,* Atmospheric Sciences, Texas A&M, 2017.

4. **Chair,** *Carlee Loeser,* Atmospheric Sciences, Texas A&M, 2016.

5. **Chair,** *Michael Herrera,* Atmospheric Sciences, Texas A&M, 2014.

6. **Chair,** *Fan Han,* Atmospheric Sciences, Texas A&M University, 2014.

7. **Chair,** *Michael Kavulich,* Atmospheric Sciences, Texas A&M, 2011.

8. **Chair,** *Christina Holt,* Atmospheric Sciences, Texas A&M, 2011.

9. **Co-Chair,** *Elizabeth Satterfield,* Atmospheric and Oceanic Science, 2008.

10. **Member**, *Kathryn Sellwood,* Atmospheric Science, University of Miami, 2007. The thesis won the Dean's Prize for best M.S. thesis at the Rosenstiel School of Marine and Atmospheric Sciences, University of Miami.

11. **Chair**, *Tamás Fehér,* Meteorology, Eötvös Loránd University, Budapest, Hungary,1996.

12. **Chair**, *Zoltán Barcza* Meteorology, Eötvös Loránd University, Budapest, Hungary, 1994.

i. Undergraduate Research

1. *Ethan Nelson,* Meteorology, Texas A&M University, 2010–2012; Undergraduate Research Scholar Thesis was submitted in April 2011.

2. *Michael Herrera,* Meteorology, Texas A&M University, 2011–2012

d. Extension Activities

1. Developed the syllabus for, and directed the activities of, the summer workshop *"Applications of remotely sensed observations in data assimilation"*, July 23-August 10, 2007, sponsored by the Joint Center for Satellite Data Assimilation.
For details see `http://www.weatherchaos.umd.edu/workshop/index.php`.

3   Services

a. Professional

i. Offices and committee memberships held in professional organizations

1. **Member** of the International Commission on Dynamical Meteorology. 2012–present.

2. **Member** of Joint Scientific Committee (JSC) of the World Weather Research Programme (WWRP) of the World Meteorological Organization (WMO), 2010–2014.

3. **Co-Chair** of the Predictability and Dynamical Processes Working Group (PDP WG) of THORPEX, 2005–2014. THORPEX is a WMO research program for the 21th Century to accelerate improvements in the accuracy of 1-day to 2-week forecasts of high-impact weather events; for details see `http://www.wmo.int/thorpex`.

4. **Associate Editor,** Weather and Forecasting, AMS, 2009–2015.

5. **Member of the Editorial Board,** Időjárás. The Quarterly Journal of the Hungarian Meteorological Service since 2009–present.

ii. Reviewing activities for agencies

1. The National Academies Report *"When Weather Matters: Science and Service to Meet Critical Societal Needs"* from the National Research Council's Board on Atmospheric Sciences and Climate, 2010.

2. Austrian Science Foundation

3. National Science Foundation (NSF)

4. Swiss National Science Foundation (SNF)

5. National Oceanic and Atmospheric Administration (NOAA)

iii. Memberships in professional associations

1. American Meteorological Society (AMS)

2. American Association for the Advancement of Science (AAAS)

3. Society for Industrial and Applied Mathematics (SIAM)

4. Hungarian Meteorological Society (MMT)

iv. Other non-university committees, commissions, panels

1. **Co-Convener** of the IAMAS session on *Frontier Challenges in Data Assimilation and Ensemble Forecasting* at the 27th IUGG General Assembly. Montreal, Canada, July 8-18, 2019.

2. **Member of the Scientific Organizing Committee** of the International Commission on Dynamical Meteorology (ICDM) Workshop on the *Dynamics and predictability of high-impact weather and climate events*, Kunming, China, August 6-9, 2012.

3. **Leader of the Organizing Committee** of the Summer School *Advanced Mathematical Methods to Study Atmospheric Dynamical Processes and Predictability.* Banff International Research Station for Mathematical Innovation and Discovery (BIRS), Banff, Alberta, Canada, July 10–15, 2011.

4. **Member of the Organizing Committee** of the ECMWF/WGNE/THORPEX/WCRP *Workshop on representing model uncertainty and error in numerical weather and climate prediction models*, ECMWF, Reading, June 20-24, 2011.

5. **Co-Convenor** of the symposium *High-impact weather and extreme climate events,* at the XXV General Assembly of IUGG, Melbourne, Australia, June 28-July 2011.

6. **Program Chair of the Organizing Committee** of the Third THORPEX International Science Symposium. Monterey, CA, USA, 2009.

7. **Convenor** of the session *Dynamics and Predictability of High-Impact Weather* at the IAMAS-IAPSO-IACS Assembly, Toronto, 2009.

8. **Co-Convenor** of the session *Quantifying predictability including high impact weather and hydrology* at the EGU General Assembly 2008, Vienna, Austria, 13-18 April 2008.

9. **Member** of the Planning Group for the global research initiative at the intersection of weather and climate *Year of Tropical Convection,* YOTC.

10. **Convenor** of the session *Dynamics and Predictability of Severe Weather Events* at the XXIV General Assembly of IUGG, Perugia, Italy, July 2-13, 2007.

11. **Convenor** of the session *Dynamics and Predictability of Severe Weather Events* at the 2nd International THORPEX Symposium. Landshut, Bavaria, Germany, December 4-8, 2006.

12. **Member** of the Committee charged with developing a White Paper on the proposed research collaboration between the WMO programs THORPEX and World Climate Research Program (WCRP)

13. **Co-Principal Investigator** of the NSF submission of the *Scientific Program Overview: THORPEX Pacific Asian Regional Campaign (T-PARC)*,
available at `http://www.ucar.edu/na-thorpex/tparc/SPO\_PARC\_revised.pdf`.
The proposal has been accepted for funding and T-PARC is one of the two major field campaigns funded by the Atmospheric Science Directorate of NSF in 2008.

14. **Member** of the Science Committee of the program *Data Assimilation in Geophysical Systems.* at the Statistical and Applied Mathematics Science Institute, NC, 2004-2005.

15. **Contributed** to the *THORPEX International Science Plan: THORPEX–A Global Atmospheric Research Program, 2004*

16. **Contributed** to the'THORPEX US Plan *A Call for Participation in THORPEX–A Global Atmospheric Research Program,* 2004

17. **Contributed** to the science plan of the *Petascale Earth System Collaboratory* by the request of the Ad Hoc Committee for a Petascale Earth System Collboratory working on the behalf of the atmospheric, oceanic and Earth Science communities, 2004.

b. Campus (search committees not included)

i. Texas A&M: College of Geosciences

- **Member** of the University English Language Proficiency Task Force, 2013.

- **Member** of the College of Geosciences Working Group for High-Performance Computing, 2011–present.

- **Member** of the College of Geosciences Graduate Curriculum Committee, September 2010–present.

- **Chair** of the Atmospheric Sciences Graduate Committee, September 2010–present.

- **Member** of the Atmospheric Sciences Graduate Committee, February 2009–present.

- **Member** of the Organizing Committee of the Institute for Applied Mathematics and Computational Science Workshop on Data Assimilation in the Geosciences, October 26-27, 2009.

ii. University of Maryland: College of Computer, Mathematical and Physical Sciences

1. **Member** of the Coordinating Committee for the CEAFM-Burgers Student Symposium, between 2005 and 2008.

2. **Member** of Ph. D. Final Exam Committees

   (a) Physics program
   (b) AMSC program
   (c) AOSC program
   (d) Electrical Engineering

3. **Member** of Ph. D. Comprehensive Exam Committees

   (a) UMD, AOSC program