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CURRICULUM VITAE

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EDUCATION

- 2004 Ph.D.** in Meteorology, University of Oklahoma, Norman, Oklahoma, USA.
Dissertation: “*The Effects of Wind Shear on Convective Boundary Layer Entrainment.*” Advisor: Evgeni Fedorovich.
- 1990 M.S.** in Meteorology, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA. *Thesis:* “Stratospheric behavior during tropospheric persistent anomaly events.” Advisors: Alan Plumb and Randall Dole.
- 1988 B.A.** in Chemistry, *Magna Cum Laude*, St. John’s University, Collegeville, Minnesota, USA.

EMPLOYMENT HISTORY

- 2005-present:** Senior Atmospheric Scientist, Windlogics, Inc., Grand Rapids, MN, USA.
- 2004-2005:** Post-Doctoral Fellow, Department of Atmospheric Science, Colorado State University, Fort Collins, Colorado, USA.
- 2000-2004:** Graduate Research Assistant, School of Meteorology, University of Oklahoma, Norman, Oklahoma, USA.
- 1999-2000:** Instructor in Meteorology, Department of Earth and Atmospheric Sciences, St. Cloud State University, St. Cloud, Minnesota, USA.
- 1998-1999:** Air Quality and Environmental Specialist, Labno Environmental, Inc., St. Paul, Minnesota, USA.
- 1996-1998:** Broadcast Meteorologist, KEYC television, Mankato, MN, USA.
- 1993-1996:** Air Quality Scientist, Barr Engineering, Inc., Minneapolis, MN, USA.
- 1990-1993:** Air Quality Meteorologist, ENSR Consulting and Engineering, Fort Collins, Colorado, USA.

WRITTEN PUBLICATIONS

Refereed Journal Articles:

Conzemius, R. J., and E. Fedorovich, 2006a: Dynamics of sheared convective boundary layer entrainment. Part I: Methodological background and large eddy simulations. *J. Atmos. Sci.*, **63**, 1151-1178.

Conzemius, R. J., and E. Fedorovich, 2006b: Dynamics of sheared convective boundary layer entrainment. Part II: Evaluation of bulk model predictions of entrainment flux. *J. Atmos. Sci.*, **63**, 1179-1199.

Conzemius, R. J., and E. Fedorovich, 2007: Bulk models of the sheared convective boundary layer: evaluation through large eddy simulations. *J. Atmos. Sci.*, **64**, 786-807.

Conzemius, R. J., and E. Fedorovich, 2008: A case study of convective boundary layer development during IHOP_2002: numerical simulations compared to observations. *Mon. Wea. Rev.*, **136**, 2305-2320.

Conzemius, R. J., and M. T. Montgomery, 2009: Clarification on the generation of absolute and potential vorticity in mesoscale convective vortices *Atmos. Chem. Phys.*, **9**, 7591-7605.

Conzemius, R. J., and M. T. Montgomery, 2010: Mesoscale convective vortices in multi-scale, idealized simulations: dependence on background state, interdependency with moist baroclinic cyclones, and comparison with BAMEX observations. *Mon. Wea. Rev.*, **138**, 1119-1139.

Conzemius, R. J., R. W. Moore, M. T. Montgomery, and C. A. Davis, 2007: Mesoscale convective vortex formation in a weakly sheared moist neutral environment. *J. Atmos. Sci.*, **64**, 1443-1466.

Fedorovich, E., Conzemius, R., and D. Mironov, 2004: Convective entrainment into a shear-free, linearly stratified atmosphere: bulk models reevaluated through large eddy simulations. *J. Atmos. Sci.*, **61**, 281-295.

Fedorovich, E., and R. Conzemius, 2008: Effects of wind shear on the atmospheric convective boundary layer structure and evolution. *Acta Geophysica*, **56**, 114-141.

Porté-Agel, F., Y.-T. Wu, H. Lu and R. J. Conzemius, 2011: Large-eddy simulation of atmospheric boundary layer flow through wind turbines and wind farms. *Journal of Wind Engineering and Industrial Aerodynamics*, **99(4)**, 154-168.

Weiss, C. C., H. B. Bluestein, R. Conzemius, and E. Fedorovich, 2007: Variational pseudo-multiple-Doppler wind retrieval in the vertical plane for ground-based mobile radar data. *J. Atmos. Oceanic Technol.*, **24**, 1165-1185.

Yang, X., Sotiropoulos, F., Conzemius, R. J., Wachtler, J. N., and M. B. Strong, 2014: Large-eddy simulation of turbulent flow past wind turbines/farms: The Virtual Wind Simulator (VWiS). *Wind Energy*, accepted for publication.

Conference Proceedings:

Conzemius, R., and E. Fedorovich, 2001: Entrainment dynamics of shear-free convective boundary layers growing in linearly and discretely stratified fluids. *Proc. Third Intern. Symp. on Environmental Hydraulics*, 5-8 December 2001, Tempe, Arizona, USA, 6pp. (*ISEH2001 Abstracts*, 129).

Conzemius, R., and E. Fedorovich, 2002: Dynamics of convective entrainment in a heterogeneously stratified atmosphere with wind shear. *Proc. 15th AMS Symp. on Boundary Layers and Turbulence*, 15-19 July 2002, Wageningen, the Netherlands, 31-34.

Conzemius, R., and E. Fedorovich, 2003: Evolution of mean wind and turbulence fields in a quasi-baroclinic convective boundary layer with strong wind shears. *Proc. 11th Intern. Conf. on Wind Eng.*, 2-5 June 2003, Lubbock, Texas, USA, 2055-2062.

Conzemius, R., and E. Fedorovich, 2003: Wind Shear Enhancement of Convective Boundary Layer Growth, *Proc. 23rd General Assembly of the International Union of Geodesy and Geophysics*, A.389.

Conzemius R., and E. Fedorovich, 2004: Predictions of entrainment into a sheared atmospheric convective boundary layer by large eddy simulation versus two-parameter turbulence closure model. *Geophysical Research Abstracts*, **6**, 05343, 2004.

Conzemius, R., and E. Fedorovich, 2004: Numerical models of entrainment into sheared convective boundary layers evaluated through large eddy simulations. Preprints, *16th Symp. on Boundary Layers and Turbulence*, Amer. Meteor. Soc., 9-13 August, Portland, Maine, USA, CD-ROM, 5.6.

Conzemius, R., and E. Fedorovich, 2005: Essential features of entrainment in the sheared atmospheric convective boundary layer as represented by zero- and first-order bulk models. *Geophysical Research Abstracts*, **7**, 10265, 2005.

Conzemius, R. J., 2006: Tests of transilient versus flux-gradient turbulence parameterizations for the prediction of surface layer wind profiles. Preprints, *17th Symp. on Boundary Layers and Turbulence*, Amer. Meteor. Soc., 22-26 May, San Diego, California, USA, CD-ROM, 9.3.

- Conzemius, R., and E. Fedorovich, 2008a: Simulations versus observations of a sheared convective boundary layer. *Abstr. Inaugural International Conference of the Engineering Mechanics Institute (EM08)*, May 18-21, 2008, University of Minnesota, Minneapolis, USA, p. 216.
- Conzemius, R., and E. Fedorovich, 2008b: Simulations versus observations of a sheared convective boundary layer. *Abstr. 18th AMS Symposium on Boundary Layers and Turbulence*, June 9-13, 2008, Stockholm, Sweden, P6.4.
- Fedorovich, E., and R. Conzemius, 2001: Large-eddy simulation of convective entrainment in linearly and discretely stratified fluids. *Direct and Large-Eddy Simulation IV*, B. J. Geurts et al., Eds., Kluwer, 435-442.
- Fedorovich, E., and R. Conzemius, 2002: Evolution of turbulent convective entrainment in heterogeneously versus linearly stratified fluids. *Advances in Turbulence IX*, I. Castro et al., Eds., CIMNE Publication, Barcelona, Spain, 457-460.
- Fedorovich, E., and R. Conzemius, 2002: Effects of initial temperature and velocity perturbations on the development of convection in the atmospheric boundary layer. *Proc. 15th AMS Symp. on Boundary Layers and Turbulence*, 15-19 July 2002, Wageningen, the Netherlands, 39-42.
- Fedorovich, E., and R. Conzemius, 2004: Numerical evaluation of wind-shear effects on turbulence regime and entrainment dynamics in the atmospheric convective boundary layer. *Geophysical Research Abstracts*, **6**, 05370, 2004.
- Fedorovich, E., R. Conzemius, I. Esau, F. Katopodes Chow, D. Lewellen, C.-H. Moeng, D. Pino, P. Sullivan, and J. Vilà-Guerau de Arellano, 2004: Entrainment into sheared convective boundary layers as predicted by different large eddy simulation codes. Preprints, *16th Symp. on Boundary Layers and Turbulence*, Amer. Meteor. Soc., 9-13 August, Portland, Maine, USA, CD-ROM, P4.7.
- Fedorovich, E., R. Conzemius, and A. Shapiro, 2004: Nonstationarity of convective boundary layer growth in a heterogeneously stratified, shear-free atmosphere. Preprints, *16th Symp. On Boundary Layers and Turbulence*, Amer. Meteor. Soc., 9-13 August, Portland, Maine, USA, CD-ROM, 7.9.
- Fedorovich, E., and R. Conzemius, 2005: Velocity scales associated with different entrainment-contributing mechanisms in the sheared atmospheric convective boundary layer. *Geophysical Research Abstracts*, **7**, 09821, 2005.
- Fedorovich, E., and R. Conzemius, 2008: Numerical simulation and parameterization of entrainment into sheared convective boundary layers. *Abstr. Inaugural International Conference of the Engineering Mechanics Institute (EM08)*, May 18-21, 2008, University of Minnesota, Minneapolis, USA, p. 242.

PRESENTATIONS GIVEN

Conference presentations:

- December 5-8, 2001:** Third International Symposium on Environmental Hydraulics (ISEH2001), Tempe, Arizona, USA. Title: “Entrainment dynamics of shear-free convective boundary layers growing in linearly and discretely stratified fluids” (w. E. Fedorovich).
- July 2-5, 2002** Ninth European Turbulence Conference (ETC9), Southampton, U.K. Title: “Evolution of turbulent convective entrainment in heterogeneously versus linearly stratified fluids” (w. E. Fedorovich).
- July 15-19, 2002:** 15th AMS Symposium on Boundary Layers and Turbulence (BLT15), Wageningen, the Netherlands. Title: “Dynamics of convective entrainment in a heterogeneously stratified atmosphere with wind shear” (w. E. Fedorovich).
- June 2-5, 2003:** 11th International Conference on Wind Engineering (ICWE11), Lubbock, Texas, USA. Title: “Evolution of mean wind and turbulence fields in a quasi-baroclinic convective boundary layer with strong wind shears” (w. E. Fedorovich).
- June 30-July 11, 2003:** 23rd General Assembly of the International Union of Geodesy and Geophysics (IUGG2003), Sapporo, Japan. Title: “Wind Shear Enhancement of Convective Boundary Layer Growth” (w. E. Fedorovich).
- August 9-13, 2004:** 16th AMS Symposium on Boundary Layers and Turbulence (BLT16), Portland, Maine, USA. Title: “Numerical models of entrainment into sheared convective boundary layers evaluated through large eddy simulations” (w. E. Fedorovich).
- April 24-29, 2005:** European Geosciences Union (EGU), Vienna, Austria. Title: “Velocity scales associated with different entrainment-contributing mechanisms in the sheared atmospheric convective boundary layer.” (w. E. Fedorovich).
- May 22-26, 2006:** 17th AMS Symposium on Boundary Layers and Turbulence (BLT17), San Diego, California, USA. Title: “Tests of transilient versus flux-gradient turbulence parameterizations for the prediction of surface layer wind profiles”.

- May 7-10, 2007:** 2007 European Wind Energy Conference, Milan, Italy (EWEC 2007). Title: "Recent Improvements to the Boundary Layer Parameterization in the MM5 Mesoscale Model".
- May 3-6, 2007:** 2007 American Wind Energy Association Conference, Los Angeles, California, USA (Windpower 2007). Title: "Tuning Numerical Weather Prediction Models to Predict Hub Height Wind Speeds".
- May 18-21, 2008:** *Inaugural International Conference of the Engineering Mechanics Institute (EM08)*. Title: "Simulations versus observations of a sheared convective boundary layer". (w. E. Fedorovich).
- June 9-13, 2008:** 18th AMS Symposium on Boundary Layers and Turbulence (BLT18), Stockholm, Sweden. Title: "Tests of RANS-based PBL Schemes Against LES, RUC, and Tall Tower Data". (w. D. Moon); and "Simulations versus observations of a sheared convective boundary layer." (w. E. Fedorovich).
- May 2010:
August 3-7, 2010: Windpower 2010 Expo, Dallas, Texas, USA. Title: ""
19th AMS Symposium on Boundary Layers and Turbulence (BLT19), Keystone, Colorado, USA. Title: ""
- May 22-25, 2011:
July 9-13, 2012: Windpower 2011 Expos, Anaheim, California, USA. Title: ""
20th AMS Symposium on Boundary Layers and Turbulence (BLT20), Boston, Massachusetts, USA. Title: ""

Seminars:

- October 2001:** School of Meteorology, University of Oklahoma, Norman, Oklahoma, USA. Title: "Large Eddy Simulation of Convective Entrainment in Linearly and Discretely Stratified Fluids" (with E. Fedorovich).
- March 2003:** National Center for Atmospheric Research, Boulder, Colorado, USA. Title: "Wind Shear Enhancement of Convective Boundary Layer Entrainment" (with E. Fedorovich).
- April 2003:** School of Meteorology, University of Oklahoma, Norman, Oklahoma, USA. Title: "Wind Shear Enhancement of Convective Boundary Layer Entrainment" (with E. Fedorovich).
- March 2004:** School of Meteorology, University of Oklahoma, Norman, Oklahoma, USA. Title: "Dynamics of Sheared Convective Boundary Layer Entrainment as Reproduced with Various Numerical Models".
- January 2005:** Department of Atmospheric Science, Colorado State University, Fort Collins, Colorado, USA. Title: "The Dynamics of Sheared Convective

Boundary Layer Entrainment as Reproduced by Large Eddy Simulations”.

August 2005: Department of Atmospheric Science, University of Northern Colorado, Greeley, Colorado, USA. Title: “Formation of mesoscale convective vortices in shear”.

November 2007: Department of Civil Engineering, University of Minnesota, Minneapolis, Minnesota, USA. Title: “Using Large Eddy Simulations to Improve Wind Energy Resource Assessments and Forecasts “.

SCIENTIFIC PROJECTS

Project "Dynamics of convective entrainment in heterogeneously stratified atmosphere with wind shears". Funding agency: National Science Foundation, USA. Grant ATM-0124068. Location: University of Oklahoma, USA. Function: assistant investigator. Duration: from January 2002 to December 2004. Budget: US\$ 270K.

Project "A Theoretical and Observational Study of Midlatitude Mesoscale Convective Vortices (MCVs) in Vertical Shear". Funding agency: National Science Foundation, USA. Grant ATM-0305412. Location: Colorado State University, USA. Function: assistant investigator. Duration: from December 2004 to present. Budget: US\$ 429K.

FIELD EXPERIMENTS

2002, May-June. International H₂O Project (IHOP). Extensive field experiment to study boundary layer heterogeneity, convection initiation, and quantitative precipitation estimation in the central and southern plains of the U.S. Responsibilities: ground systems coordinator, nowcasting.

2001,2003 May-June. Radar Observations of Tornadoes and Thunderstorms Experiment (ROTATE). Responsibilities: scout vehicle navigator, driver, forecasting, nowcasting.

2004 September. Hurricanes at Landfall (HAL) 2004. Experiment designed to study the boundary layer wind structures in land-falling hurricanes. Responsibilities: forecaster, driver.

CONSULTING/CONTRACTING WORK

2005-present: Tempest Tours SCE—tour guide and driver. Every year, lead one or two tours of paid guests to view and photograph severe weather in the central U.S.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

1993-1996: Air and Waste Management Association (AWMA)

1989-present: American Meteorological Society (AMS). President of Twin Cities (Minnesota) Chapter from 1995-1997.

2006-present: American Wind Energy Association (AWEA)

LANGUAGES

English: native language; **German:** basic skills.

SERVICE

Geosciences Technical Advisory Committee: Graduate Student Representative in Meteorology (2002-2004)

Bel-Aire Addition Association (homeowner's association): Secretary/Treasurer (2001-2004)

Volunteer, KAXE 91.7 FM, Grand Rapids, Minnesota (2008-present): cross-country ski blog and Monday morning weather discussion.

American Meteorological Society Boundary Layers and Turbulence Committee (2010-2013).

Greater Pokegama Lake Association: Secretary (2010-present)

Minnesota Youth Ski League: President of the Board and instructor for cross-country skiing (2012-present) at Mount Itasca on Sundays.

Bridges Kinship Mentoring: youth mentor (2009-present)

TEACHING

1999-2000: St. Cloud State University, St. Cloud, Minnesota, USA

Undergraduate courses taught:

Introduction to Meteorology (for majors), Fall 1999, Spring and Summer 2000;

Introduction to Forecasting, Fall 1999;

Introduction to Earth Sciences (for non-majors), Fall 1999;

Broadcast Meteorology, Spring 2000;

Micrometeorology, Spring 2000.

SCHOLARSHIPS AND AWARDS

Presidential International Travel Award Fellowship, Summer 2003

Douglas Lilly Award for best Ph.D. dissertation publication, April 2005