

CURRICULUM VITAE

Updated Dec. 27 2021

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EDUCATION

- Ph.D. 2004: The Pennsylvania State University, USA (Meteorology). Dissertation: *Ensemble Forecasting with the Ensemble Transform Kalman Filter*
- B.S. 1998: Beijing (Peking) University, Beijing, P.R. China (Atmospheric Science)

PROFESSIONAL EXPERIENCE

- 2019-Present: Robert Lowry Chair Professor, University of Oklahoma, OK
- 2018-Present: Full Professor (tenured), University of Oklahoma, Norman, OK
- 2014-2018: Associate Professor (tenured), University of Oklahoma, Norman, OK, USA
- 2014-Present: Presidential Research Professor, University of Oklahoma, Norman, OK, USA
- 2013-2016: Faculty Associate, Cooperative Institute for Mesoscale Meteorological Studies (CIMMS), University of Oklahoma
- 2012-Present: Fellow, Cooperative Institute for Mesoscale Meteorological Studies (CIMMS), University of Oklahoma
- 2009-2014: Affiliated faculty, Center for Analysis and Prediction of Storms (CAPS), University of Oklahoma
- 2009- 2014: Assistant Professor (tenure track), University of Oklahoma, Norman, OK, USA
- 2004-2008: Research Scientist I & II, NOAA/Earth System Research Laboratory/Physical Science Division and University of Colorado/CIRES, Boulder, CO
- 1999 - 2004: Graduate research assistant, Department of Meteorology, The Pennsylvania State University, State College, PA

RESEARCH INTERESTS AND EXPERTISE

- i) developing new techniques and novel methodologies for data assimilation and ensemble prediction;
- ii) applying these techniques for global scale to convective scale modeling systems assimilating a variety of observations (radar, satellite, ground based remote sensing platforms, aircraft borne observations, UAV, in-situ, etc.) to improve predictive skill;

- iii) improving the understanding of atmospheric predictability and dynamics through data assimilation and ensemble approaches from global to storm scales;
- iv) transitioning research and development into operations (R2O);
- v) Interdisciplinary research: interface between machine learning and data assimilation; interface between machine learning and forecast verification and post-processing; economic values of numerical predictions

SELECTED RECENT MAJOR HONORS, AWARDS AND RECOGNITION

- 2021 125th Anniversary Alumni Fellow Award, College of Earth and Mineral Sciences, The Pennsylvania State University
- 2021 Invited to co-lead the observation and data assimilation task team to perform a year-long Congress mandated Priorities for Weather Research (PWR) study to advise Congress on how to invest the US weather research, forecasting and enterprise for the next decade
- 2020 Most influential researchers in the world, published by PLOS Biology (<https://ou.edu/research-norman/news-events/2020/new-study-finds-ou-research-well-cited-impactful>)
- 2020 Elected World Meteorological Organization (WMO) World Weather Research Program (WWRP) Predictability, Dynamics and Ensemble Forecasting working group member
- 2019 Robert Lowry Chair Professor, University of Oklahoma
- Top 10 most impactful atmospheric scientists in the world based on the ISI Web of Science productivity and impact analysis by Chinese Academy of Science for papers published during 2011-2015.
- Wang et al. 2013 noted as “most read in the last 12 months” by Monthly Weather Review
- 2014 Presidential Research Professorship, University of Oklahoma
- 2014 Invited speaker of National Academy of Sciences Kavli Frontiers of Science (declined due to family commitment)
- 2013 Appointed as Faculty Associate, Cooperative Institute for Mesoscale Meteorological Studies (CIMMS)
- 2012 Dean's Award for Excellence in Research and Scholarship, University of Oklahoma, USA
- 2010 NASA New Investigator Award, USA
- 2007 Innovative Research Program Award, University of Colorado/CIRES, USA

MAJOR SCIENTIFIC ACHIEVEMENTS

- Lead and direct an **18**-member research team, “**Multiscale data Assimilation and Predictability (MAP) Lab**”, at University of Oklahoma, conducting active research and development on data assimilation, numerical simulation/prediction, predictability and dynamics across **a wide-range of scales and atmospheric phenomena**
- Make **direct impact** on **multiple** US National Weather Service (NWS) **operational Numerical Weather Prediction (NWP) systems** through **directly implementing** advanced data assimilation approaches in these systems (see details in next section “Major Research to Operation Efforts (R2O) and Community Public Code Release”)

- **Further develop and advance** the ensemble transform Kalman filter (ETKF) **theory and algorithm**. The algorithm has been adopted by operational numerical weather prediction centers and by the research community **worldwide**
- **Further develop and advance** the hybrid ensemble-variational data assimilation **theory and algorithm**. The algorithm has been adopted by **multiple US operational numerical weather prediction systems (GFS, HWRF, HRRR, NAM)** to improve global, hurricane and CONUS convective scale prediction
- **Develop a new multiscale data assimilation algorithm**, the multiscale local gain from ensemble transform Kalman filter (MLGETKF)
- **Advance radar and satellite cloudy radiance data assimilation** for convective scale numerical prediction. **Radar** data assimilation capability is adopted by US NWS **operational** convective scale prediction system, HRRR
- **Advance hurricane inner core observation assimilation**. **Radar** data assimilation capability is adopted by US NWS **operational** HWRF system.
- **Advance** convective scale **ensemble system design**
- **develop novel** numerical model forecast verification and calibration **methods**
- Scientific peer reviewed publication
 - Published **100** peer reviewed journal articles.
 - **10** additional peer reviewed papers accepted with revision and/or submitted.
 - **15** additional peer reviewed papers to be submitted and in preparation
 - Wang et al. 2013 noted as “**most read** in the last 12 months” by AMS journal Monthly Weather Review, and ranked top **2%** out of ~1300 papers published in Monthly Weather Review in the last 5 years (2012-2017) in terms of number of access
 - Google scholar citation **4663**, H-index **32**
 - Web of science core collection citation **3176**, H-index **28**
- Awarded research grants
 - **50** awarded grants from NOAA, NSF, NASA, DOD with a total amount of **\$17.6 million** as sole PI, PI, co-PI.
- Awarded competitive computing resource proposals: **16**
- Scientific presentation
 - Invited keynote speeches, colloquia, seminars, talks: **65**.
 - Other conference and workshop presentations: **308**.

MAJOR RESEARCH TO OPERATION (R2O) EFFORTS AND COMMUNITY PUBLIC CODE RELEASE

- Formally release data assimilation codes/systems developed to the public to **directly benefit national/international research and operational communities**
- **Directly** improve data assimilation for US NWS operational numerical weather prediction (NWP) systems, which advance skill and lead-time in **operational** forecasts of hazardous and high impact weather for a variety of scales.
- Co-develop the hybrid ETKF-variational data assimilation system for the community Weather Research and Forecasting (WRF) model in collaboration with NCAR and NOAA colleagues. This system is **released** and used by various users from both the research and operation communities **since 2008**.

- Lead OU portion of the effort during the multi-institution (including NOAA NCEP, NOAA ESRL, NASA) collaboration on the development and testing of the Hybrid data assimilation system for US NWS' operational Global Modeling System (GFS) under the support of THORPEX. The system became operational at NCEP beginning 2012. **“This data assimilation upgrade represents the biggest improvement in U.S. weather and climate forecasting in a decade”**, said by Louis Uccellini, Director of the National Weather Service (NWS) in a press release.
- Co-lead the data assimilation team in US National Oceanic and Atmospheric Administration (NOAA) Hurricane Forecast Improvement Program (HFIP) in developing and implementing the Hybrid data assimilation system in the US National Weather Service (NWS) convection-allowing hurricane prediction system HWRF. **The system is implemented operationally at NWS for operational convection allowing hurricane prediction beginning the 2017 hurricane season.**
- Develop the ground based radar data assimilation in operational HWRF and **the radar data assimilation capability is implemented operationally in HWRF beginning the 2020 hurricane season in collaboration with NCEP and AOML**
- Develop ensemble/hybrid data assimilation system for convective scale radar data assimilation for US National Weather Service (NWS) regional convection allowing prediction systems including NAM CONUS (North American Mesoscale Model Continental US), HRRR (High Resolution Rapid Refresh) and experimental WoF (Warn On Forecast) systems in collaboration with NOAA/NCEP, NOAA/ESRL and NOAA/NSSL colleagues. **The radar DA development is implemented in operational HRRR beginning 2020 in collaboration with ESRL.**
- **Real time demonstration** of the new convection allowing radar DA and ensemble forecast system during the NOAA Hazardous Weather Testbed (HWT) Spring Forecast Experiment (SFE), 2017-2019, 2021

ADVISING, MENTORING, TEACHING, AND OUTREACH

- University of Oklahoma (OU) postdocs advised: **19**
- OU M.S. students advised: **16**
- OU Ph.D. students advised: **13**
- Undergraduate student research advised: **4**
- International visiting graduate students advised: **5**
- Other OU graduate student committees (not chair) served on: **48**
- Students directly advised have won **27** various AMS **awards**, national fellowship, OU dissertation and publication awards, academic performance awards etc.
- Advise students and postdocs to **write lead-author papers** (**66** published peer reviewed papers are student/postdoc lead authors)
- **Supervise postdocs** and early career scientists **to develop awarded lead PI and Co-PI proposals**
- Develop a **new OU graduate class** on data assimilation and teach undergraduate atmospheric dynamics since 2009
- **High student evaluation** on both undergraduate and graduate classes taught
- **Mentor** of OU **female** tenure track **faculty**

- **Provide** professional career development **advices to Penn State female graduate students**
- OU undergraduate academic advising: 2009-present
- Teach middle school and high school students numerical weather prediction and data assimilation through the National Weather Center (NWC) **outreach** program

MAJOR COMMUNITY SERVICE, LEADERSHIP AND PROFESSIONAL ACTIVITIES

Community scientific leadership

- Serves as **lead or member** of **17 international and national** scientific committee, team, advisory board. **Recent highlights** include:
 - Invited to co-lead the observation and data assimilation task team to perform **year-long Congress mandated Priorities for Weather Research (PWR) study** to advise Congress on how to invest the US weather research, forecasting and enterprise for the next decade. The study resulted in a published 119-page report https://sab.noaa.gov/wp-content/uploads/2021/12/PWR-Report_Final_12-9-21.pdf, 2021
 - **AMS** (American Meteorological Society) **STAC** (Scientific and Technological Activities Commission) committee on Probability and Statistics, 2021-present
 - Invited advisory board, “German Programme of Fusion of Radar Polarimetry and Numerical Atmospheric Modelling Towards an Improved Understanding of Cloud and Precipitation Processes”, 2021-present
 - Co-lead the data assimilation team in US National Oceanic and Atmospheric Administration (NOAA) Hurricane Forecast Improvement Program (HFIP) (2012-present)
 - World Meteorological Organization (WMO) World Weather Research Program (WWRP) Predictability, Dynamics, and Ensemble Forecasting working group (2020-present)
 - US Unified Forecast System (UFS) Strategic Implementation Planning (SIP) working groups for data assimilation, convection allowing modeling, verification, and ensemble (2017-present)
 - UCAR Developmental Testbed Center (DTC) Science Advisory Board (2017-Present)

Leadership and professional activities for international and national conferences, symposia, workshops

Symposium to advise US Congress on 10-year US weather enterprise priority

- Co-organizer and co-lead, Symposium of 10-year priorities for weather research: Observation and data assimilation, 2021

AMS (American Meteorological Society)

- **AMS conference organizing and leadership** roles:

- Session chair for the AMS Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface (IOAS-AOLS) **continuously for 9 years since 2013.**
- Convener, Special joint session between the 26th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS) and 31st Conference on Weather Analysis and Forecasting (WAF)/27th Conference on Numerical Weather Prediction (NWP): Data assimilation methodology advancement for numerical weather prediction, 102nd AMS annual meeting, 2021-2022
- American Meteorological Society (AMS) numerical weather prediction (NWP) and Weather and Forecasting (WAF) conferences planning committee, 2020-present
- Promoting co-ordination among 4 AMS conferences (AMS WAF/NWP, AMS IOAS-AOLS (data assimilation), AMS AI, AMS Probability and Statistics conferences) 2020-present
- American Meteorological Society (AMS) Weather and Forecasting (WAF) statement committee, 2020-present
- Judges of AMS annual meeting student presentation 2014, 2015, 2020

Other international and national conferences/meetings

- Steering or session chairing other **14** international and national symposia and workshops

Editorial and Reviewer

- Associated Editor for AMS journal Monthly Weather Review 2011, 2013, 2014, 2022-present
- Associate Editor for AGU journal of Geophysical Research -atmosphere 2020-present
- Reviewer for **9** other high impact journals
- Reviewer for NOAA, NASA, NSF and German DFG (equivalent to US NSF) research funding agencies

Service to School of Meteorology, College and University

- School of Meteorology committee A (2020-present)
- Co-chair or member of **6** search committees responsible for hiring **8** faculty or director
- Graduate Study Committee, Graduate Admission Committee, Undergraduate Study Committee, and judges for various student activities
- Mentor of two early career tenure track female faculty
- CIMMS faculty associate and fellow
- CAPS affiliated faculty and executive committee
- Other committee and panelist: 5