

## Education

- present **Ph.D. in Meteorology and Atmospheric Science**, Department of Meteorology and Atmospheric Science, The Pennsylvania State University, University Park, Pennsylvania.  
Thesis: Data assimilation for estimating CO<sub>2</sub> fluxes at the regional scale: The role of atmospheric transport error.  
Advisors: Fuqing Zhang and Richard Alley.
- 2012 **M.S. in Atmospheric Sciences, Oceanography and Climate**, Department of Meteorology, Stockholm University, Stockholm, Sweden.  
Thesis: The Barents Oscillation and its impact on the Arctic climate.  
Advisors: Heiner Körnich and Qiong Zhang.
- 2010 **B.S. in Meteorology**, Department of Meteorology, Stockholm University, Stockholm, Sweden.  
Thesis: Local impact of soot on surface temperature in India and Sweden.  
Advisors: Annica Ekman and Henning Rodhe.

## Peer-reviewed publications

- 2016 **Chen, H. W.**, R. B. Alley, and F. Zhang (2016): Interannual Arctic sea ice variability and associated winter weather patterns: A regional perspective for 1979–2014. *Journal of Geophysical Research–Atmospheres*, **121**, 14,433–14,455, doi:10.1002/2016JD024769.
- 2016 **Chen, H. W.**, F. Zhang, and R. B. Alley (2016): The robustness of midlatitude weather pattern changes due to Arctic sea ice loss. *Journal of Climate*, **29**, 7831–7849, doi:10.1175/JCLI-D-16-0167.1.
- 2013 **Chen, H. W.**, Q. Zhang, H. Körnich, and D. Chen (2013): A robust mode of climate variability in the Arctic: The Barents Oscillation. *Geophysical Research Letters*, **40**, 2856–2861, doi:10.1002/grl.50551.
- 2013 Chen, D. and **H. W. Chen** (2013): Using the Köppen classification to quantify climate variation and change: An example for 1901–2010. *Environmental Development*, **6**, 69–79, doi:10.1016/j.envdev.2013.03.007.

## Manuscripts in preparation

- 2017 **Chen, H. W.** and Coauthors (2017): Sensitivity of atmospheric CO<sub>2</sub> to flow-dependent transport errors.
- 2017 Zhang, F, **H. W. Chen**, and Coauthors (2017): Validation of regional CO<sub>2</sub> concentrations in the ECMWF real-time analysis and CarbonTracker reanalysis with airborne observations from ACT-A field campaign.

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## Honors and awards

- 2016 **Öfverdirektör Elis Sidenbladhs fond**, Royal Swedish Academy of Sciences.
- 2014 **Hans Neuberger Award**, The Pennsylvania State University.
- 2014 **Chi Epsilon Pi**, National Meteorology Honor Society.

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## Research experience

- 2013–present **Research Assistant**, Department of Meteorology and Atmospheric Science, The Pennsylvania State University, University Park, Pennsylvania.
  - Currently developing a data assimilation system for estimating CO<sub>2</sub> surface fluxes at the regional scale over North America as part of the NASA Atmospheric Carbon and Transport – America (ACT-America) project.
  - Used the Weather Research and Forecasting Model coupled with chemistry to simulate the atmospheric transport of CO<sub>2</sub> and examine the sensitivity of atmospheric CO<sub>2</sub> concentration to transport errors.
  - Participated in ACT-America field campaigns and contributed to flight planning, weather forecasting, and data analysis.
  - Investigated the role of Arctic sea ice decline on atmospheric circulation changes in the mid-latitudes using the Community Atmosphere Model.
  - Analyzed regional Arctic sea ice cover variability from satellite data using neural networks and statistical methods.

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## Teaching experience

- Jul–Aug 2017 **Co-Mentor for Summer Research Project**, The Pennsylvania State University.  
Co-mentored a high school student to compare flight observations from the first ACT-America flight campaign with different CO<sub>2</sub> analysis products, and to quantify the spatial and temporal variations in atmospheric CO<sub>2</sub> concentration over North America.
- Spring 2015 **Lead Instructor**, The Pennsylvania State University.
  - Introduction to Programming Techniques for Meteorology  
Designed the course and developed all course material. The course focused on fundamental programming concepts and applied numerical analysis using MATLAB.
- Fall 2013 **Co-Instructor**, The Pennsylvania State University.
  - Applications of Computers to Meteorology  
Gave lectures on Fortran and Python, held labs, and created one third of the course material.
- 2013–2015 **Teaching Assistant**, The Pennsylvania State University.
  - Synoptic Meteorology Laboratory (Fall 2015)
  - Applications of Computers to Meteorology (Fall 2014, Spring 2014)
  - Introduction to Programming Techniques for Meteorology (Spring 2013)

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## Work experience

- Jun–Jul 2008 **Computer Programmer**, IVL Swedish Environmental Research Institute, Gothenburg, Sweden.  
Developed programs in Fortran to process data from atmospheric and air chemistry models. Continued to provide support and updates to programs as an independent contractor until February 2011.

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## Languages

native	<b>Swedish</b>
fluent	<b>English</b>
conversational	<b>Standard Chinese</b> (fluent speaking, basic reading and writing)
basic	<b>German</b>

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## Computer skills

OS	Linux, Unix, Windows, macOS	graphics	Adobe Photoshop, Inkscape
programming	Python, Fortran, C++, C	typography	L <sup>A</sup> T <sub>E</sub> X
numerical	MATLAB, Mathematica	office suites	Microsoft Office, LibreOffice
shell script	Bash, Z shell	miscellaneous	Vim, Git, Regular Expressions, HTML, CSS
analysis tools	Climate Data Operators (CDO), Grid Analysis and Display System (GrADS)		
numerical models	Weather Research and Forecasting Model (WRF) coupled with chemistry (WRF-Chem), Community Atmosphere Model (CAM), Single Column CAM (SCAM), Planet Simulator (PlaSim)		

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## Workshops

- 2016 **Advanced Study Program Summer Colloquium**, Advances in Air Quality Analysis and Prediction: The Interaction of Science and Policy, National Center for Atmospheric Research, Colorado (travel fund from NCAR).  
Participated in a two-week workshop to learn about state-of-the-art chemical data assimilation techniques and “top-down” inverse methods to estimate emissions; how in situ measurements, remote sensing observations, and numerical models are used to study atmospheric composition; and the interaction between science, policy, and the public.

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## Presentations

- Mar 2017 “Towards improved estimates of regional CO<sub>2</sub> fluxes: A unified carbon and meteorological data assimilation system” (poster), 2017 Joint NACP and AmeriFlux Principal Investigators Meeting.
- Feb 2017 “The robustness of mid-latitude weather pattern changes due to Arctic sea ice loss” (poster), US CLIVAR Arctic Mid-Latitude Workshop (travel fund from UCAR).
- May 2016 “Nonlinear atmospheric response to Arctic sea-ice loss under different sea ice scenarios” (oral presentation), Symposium on Advanced Assimilation and Uncertainty Quantification in BigData Research for Weather, Climate and Earth System Monitoring and Prediction.
- Jan 2016 “Predictability of mid-latitude extreme weather changes in response to Arctic sea ice loss” (poster), 96th American Meteorological Society Annual Meeting.
- Aug 2014 “Dynamics and predictability of atmospheric response to reduced Arctic sea ice through ensemble sensitivity analysis” (oral presentation), The World Weather Open Science Conference.