Sisi Chen

(She/Her)

EDUCATION

- 2018 Ph.D., Atmospheric Sciences, McGill University, Montreal, Canada.
 Thesis Title: Impacts of Turbulence on Cloud Microphysics and Warm-Rain Initiation (Tertia M.C. Hughes Memorial Graduate Student Prize for the Excellent Thesis)
- 2011 B. Sc., Applied Meteorology, Sun Yat-sen University, Guangzhou, China.

RESEARCH EXPERIENCE

- 2021 Project Scientist, National Center for Atmospheric Research (NCAR).
- 2019 2021 Adcanced Study Program (ASP) Postdoctoral Fellow, NCAR.
 - 2018 **Postdoctoral Researcher**, Department of Atmospheric and Oceanic Sciences, McGill University.
 - 2017 NCAR Visiting Student, NCAR.

PUBLICATIONS

- [21] 2023 Zhixing Xie; Katja Friedrich; Sarah Tessendorf; Lulin Xue; Sisi Chen; Theodore Whittock; Bart Geerts; Kyoko Ikeda, Relationship between Synoptic Weather Patterns and Topography on Snowfall in the Idaho Mountainous Regions, submitted.
- [20] 2023 Sourav Taraphdar; Deepak Gopalakrishnan; Changhai Liu; Olivier M. Pauluis; Lulin Xue; R. S. Ajayamohan; L. Ruby Leung; Wojciech W. Grabowski; Sisi Chen; Roy M. Rasmussen; Sarah A. Tessendorf, Subtropical jet regulates Arabian winter precipitation: A viable mechanism, submitted to J. Climate.
- [19] 2023 Roy Rasmussen, Fei Chen, et al., CONUS404: The NCAR-USGS 4-km long-term regional hydroclimate reanalysis over the CONUS, *Bull. Amer. Meteor. Soc.*, <u>link</u>.
- [18] 2023 Sisi Chen, Lulin Xue, Sarah Tessendorf, Roy Rasmussen, et al., Simulating Wintertime Orographic Cloud Seeding over the Snowy Mountains of Australia, Journal of Applied Meteorology and Climatology, link.
- [17] 2023 Thuy Trang Vo, Leiqiu Hu, Lulin Xue, Qi Li, Sisi Chen, Urban Effects on Local Cloud Patterns, The Proceedings of the National Academy of Sciences (PNAS), link.
- [16] 2023 Deepak Gopalakrishnan; Sourav Taraphdar; Olivier M. Pauluis; Lulin Xue; Ravindran S. Ajayamohan; Noor Al Shamsi; Sisi Chen; Jared A. Lee; Wojciech Grabowski; Changhai Liu; Sarah Tessendorf; Roy Rasmussen, Anatomy of a summertime convective event over the Arabian region, Monthly Weather Review, link.
- [15] 2023 Sisi Chen; Xue, L., Tessendorf, S., Ikeda, K., Weeks, C., Rasmussen, R., Kunkel, M., Blestrud, D., Parkinson, S., Meadows, M., and Dawson, N., Mixed-phase Direct Numerical Simulation: Ice Growth in Cloud-Top Generating Cells, Atmos. Chem. Phys., 23, 5217–5231, <u>link</u>.
- [14] 2022 Yangang Liu; M.K. Yau; Shin-ichiro Shima; Chunsong Lu; Sisi Chen, Parameterization and Explicit Modeling of Cloud Microphysics: Approaches, Challenges and Future Directions, Advances in Atmospheric Sciences, <u>link</u>.
- [13] 2022 Jared A. Lee; Wojciech W. Grabowski; Sarah A. Tessendorf; Lulin Xue; Youssef Wehbe; Sisi Chen; Changhai Liu; Roy M. Rasmussen, Investigation of the Terrain Impacts on Convective Initiation over the Al Hajar Mountains, *Monthly Weather Review*, under review.

- [12] 2022 Lulin Xue, Sudarsan Bera, Sisi Chen, Harish Choudhary, Shivsai Dixit, Wojciech W.Grabowski, Sandeep Jayakumar, Steven Krueger, Gayatri Kulkarni, Sonia Lasher-Trapp,Holly Mallinson, Thara Prabhakaran, Shin-ichiro Shima, Progress and challenges in modeling dynamics-microphysics interactions: from the Pi chamber to Monsoon convection, Bull. Amer. Meteor. Soc., link.
- [11] 2022 Lulin Xue; Courtney Weeks; Sisi Chen; Sarah A. Tessendorf; Roy M. Rasmussen; Kyoko Ikeda; Branko Kosovic; Dalton Behringer; Jeffery R. French; Katja Friedrich; Troy J. Zaremba; Robert M. Rauber; Bart Geerts; Derek Blestrud; Melvin Kunkel; Nick Dawson; Shaun Parkinson, Comparison between observed and simulated AgI seeding impacts in a well-observed case from the SNOWIE field program, Journal of Applied Meteorology and Climatology, link.
- [10] 2021 Chen, Sisi, Lulin Xue, M.K. Yau, Hygroscopic seeding effects of giant aerosol particles simulated by the Lagrangian-particle-based direct numerical simulation, *Geophysical Research Letter*, 10.1029/2021GL094621, <u>link</u>.
- [9] 2021 Istvan, Geresdi, Lulin Xue, Sisi Chen, Youssef Wehbe, Roelof Bruintjes, Jared A. Lee, Roy Rasmussen, Wojciech Grabowski, Noemi Sarkadi, Sarah Tessendorf, Impact of hygroscopic seeding on the initiation of precipitation formation: results of a parcel model, Atmos. Chem. Phys., link.
- [8] 2021 S. Taraphdar, O. Pauluis, L. Xue, C. Liu, R. Rasmussen, R. S. Ajayamohan, S. Tessendorf, X. Jing, S. Chen, W. Grabowski, WRF gray zone simulations of precipitation over the Middle-East and UAE: Impacts of physical parameterizations and resolution, *Journal of Geophysical Research: Atmosphere*, 126, e2021JD034648, <u>link</u>.
- [7] 2021 Sarah Tessendorf, Sisi Chen, Courtney Weeks, Roelof Bruintjes, The Influence of Hygroscopic Flare Seeding on Droplet Spectra in Southeast Queensland, Journal of Geophysical Research, e2020JD033771, link.
- [6] 2020 Chen, Sisi, Lulin Xue, M.K. Yau, Impact of Aerosols and Turbulence on Cloud Droplet Growth: An In-Cloud Seeding Case Study Using A Parcel-DNS Approach, Atmos. Chem. Phys., 20, 10111–10124, link.
- [5] 2020 Shaw, R.A., W. Cantrell, S. Chen, P. Chuang, N. Donahue, G. Feingold, P. Kollias, A. Korolev, S. Kreidenweis, S. Krueger, J.P. Mellado, D. Niedermeier, and L. Xue, Cloud-aerosol-turbulence interactions: Science priorities and concepts for a large-scale laboratory facility, Bull. Amer. Meteor. Soc., 101(7), E1026–E1035, link.
- [4] 2018 Chen, Sisi, M.K. Yau, Peter Bartello, Lulin Xue, Bridging the Condensation-Collision Size Gap: A Direct Numerical Simulation of Droplet Continuous Growth in Turbulent Clouds, *Atmos. Chem. Phys*, 18, 7251-7262, <u>link</u>.
- [3] 2018 Chen, Sisi, M.K. Yau, Peter Bartello, Turbulent Effect on Cloud droplet Collision Efficiency and Broadening of Droplet Size Distribution, J. Atmos. Sci., 75, 203-217, <u>link</u>.
- [2] 2016 Chen, Sisi, Peter Bartello, M.K. Yau, P.A.Vaillancourt, Kevin Zwijsen, Cloud Droplet Collisions in Turbulent Environment: Collision Statistics and Parameterization, J. Atmos. Sci. 73(2), 621-636, <u>link</u>.
- [1] 2013 Ye, Q. and Sisi Chen, Ultimate Meteorological Question from Observational Astronomers: How Good is the Cloud Cover Forecast?, Monthly Notices of the Royal Astronomical Society, 428(4), 3288-3294, <u>link</u>.

IN PREPARATION

- [2] **Sisi Chen**, Steve Krueger, et al., A model intercomparison study of aerosol-cloud-turbulence Interactions in the Pi Cloud Chamber.
- [1] **Sisi Chen**, Lulin Xue, Erin Dougherty, Andreas Prein, Convective and Stratiform Precipitation in the Illinois River Basin: Intercomparison of Convection Permitting Modeling and Observed results.

INVITED TALKS AND SEMINARS

2023 Understanding the Cloud-Top Generating Cells in Winter Orographic Clouds, University of Wyoming, Laramie, WY

- 2023 Understanding the Cloud-Top Generating Cells in Winter Orographic Clouds, Environment and Climate Change Canada, Toronto, Canada
- 2023 Ice-Droplet Interactions in Turbulent Clouds, Particle Growth in Turbulence, NORDITA program, Stockholm, Sweden
- 2022 Studying Ice-Droplet-Turbulence Interactions at an Ultra-Fine Scale via Direct Numerical Simulation, Atmospheres, Oceans, Earths – Unifying perspectives on geophysical and environmental multiphase flows, Kavli Institute for Theoretical Physics (KITP), University of California Santa Barbara, CA
- 2022 Understanding cloud-aerosol-turbulence interactions in warm and mixed-phase clouds, 4th International Workshop on Cloud Turbulence (virtual), Nagoya Institute of Technology, Nagoya, Japan
- 2021 Model inter-comparison study of aerosol-cloud-turbulence Interactions in the Pi Chamber, Workshop on laboratory facilities for cloud research, Boulder, CO, virtual
- 2021 Hygroscopic Seeding Simulations Using Parcel Model and DNS, International Cloud Modeling Workshop 2021, Pune, India (virtual)
- 2020 Formation of Clouds and Rain: Aerosol-Cloud-Turbulence Interactions in Natural and Seeded clouds, University of Utah Atmospheric Sciences Departmental Seminar, Salt Lake City, Utah(virtual)
- 2020 Formation of Clouds and Rain: The Role of Turbulence and Aerosols, University of Utah Atmospheric Sciences Departmental Seminar, Salt Lake City, Utah(virtual)
- 2020 Formation of Clouds and Rain: The Role of Turbulence and Aerosols, Michigan Tech Physics Colloquium, Houghton, MI
- 2019 From Aerosol Activation to Droplet Growth: Resolving Turbulence & Microphysics in DNS, MTU Pi Chamber Modeling Workshop, Michigan Technological University, Houghton, MI
- 2019 Inter-comparison of Modeled Cloud-Aerosol Interaction Using Cloud Chamber Measurements, Workshop to Explore Science Opportunities and Concepts for a Large-Scale Aerosol-Cloud– Turbulence Research Facility, Boulder, CO
- 2019 From Aerosol Activation to Droplet Growth: Resolving Turbulence & Microphysics in DNS, MTU Pi Chamber Modeling Workshop, Michigan Technological University, Houghton, MI
- 2017 Understanding Warm Rain Initiation: Impact of Small-Scale Turbulence on the Droplet Size Spectrum Broadening Simulated by DNS, UCAR/NCAR MMM/RAL Seminar, Boulder, CO, USA
- 2016 Warm Rain Initiation from Cloud Microphysics Perspective: Effect of Turbulence, School of Atmospheric Sciences Seminar Series, Sun Yat-sen University

CONFERENCE PRESENTATION

- 2023 (Talk), Unveiling Cloud-Top Generating Cells Properties Through Cloud Radar Simulators, 40th Conference on Radar Meteorology, Brisbane, Australia
- 2023 (Talk), Simulating Wintertime Orographic Cloud Seeding over the Snowy Mountain, 21st International Conference on Nucleation and Atmospheric Aerosols (ICNAA), Brisbane, Australia
- 2023 (Poster), Ice Growth in Mixed-Phase Cloud-Top Generating Cells, ICNAA, Brisbane, Australia
- 2023 (Talk) Winter orographic seeding simulation over the Snowy Mountain of Australia, Weather Modification Association (WMA) Annual Meeting 2023, Denver, CO
- 2023 (Talk) Evaluation of the Impact of Winter Orographic Cloud Seeding over the Snowy Mountains of Australia, AMS Annual Meeting 2023, Denver, CO
- 2023 (Talk) A Novel Microphysical Model of Mixed-Phase Cloud Processes: Lagrangian Particle Based Direct Numerical Simulation Method, AMS Annual Meeting 2023, Denver, CO
- 2022 (Poster) Convective and Stratiform Precipitation in the Illinois River Basin: Intercomparison of Convection Permitting Modeling and Observed results, American Geophysical Union (AGU) Fall Meeting 2022, Chicago, IL

- 2022 (Poster) Convective and Stratiform Precipitation in the Illinois River Basin: Intercomparison of Convection Permitting Modeling and Observed results , Collective Madison Meeting, Madison, WI
- 2022 (Poster) Simulation of Winter Orographic Clouds and Cloud Seeding over the Snowy Mountains of Australia, Collective Madison Meeting, Madison, WI
- 2022 (Talk) Direct Numerical Simulation of Mixed-Phase Cloud Microphysics, Collective Madison Meeting, Madison, WI
- 2022 (Talk) Numerical Evaluation of Wintertime Cloud Seeding over the Snowy Mountains of Australia Using WRF-WxMod, Weather Modification Association Annual Meeting 2022, virtual
- 2022 (Talk) Cloud seeding impacts of two SNOWIE IOPs from observation-constrained ensemble seeding simulations, Weather Modification Association Annual Meeting 2022, virtual
- 2022 (Talk) Hygroscopic Seeding Effects of Giant Aerosol Particles Simulated By the Lagrangian-Particle-Based Direct Numerical Simulation, AMS Annual Meeting 2022, virtual
- 2022 (Talk) Direct Numerical Simulation of Ice Growth in Cloud-Top-Generating Cells, AMS Annual Meeting 2022, virtual
- 2022 (Talk) Numerical Evaluation of Wintertime Cloud Seeding over the Snowy Mountains of Australia Using WRF-WxMod, AMS Annual Meeting 2022, virtual
- 2021 (Talk) Cloud Chamber Simulation Case for the International Cloud Modeling Workshop: Modeling Aerosol-Cloud-turbulence Interactions in the Pi Chamber, International Conference on Clouds and Precipitation (ICCP) 2021, virtual
- 2021 (Poster) Idealized simulation of hygroscopic seeding using In-situ data from Queensland cloud seeding research program, ICCP 2021, virtual
- 2021 (Talk) Numerical investigation of the influence of hygroscopic flare seeding on the droplet size distribution in southeast Queensland, AMS Annual Meeting 2021, virtual
- 2020 (Talk) Simulating Aerosol–Cloud Interactions during Hygroscopic Seeding, AMS Annual Meeting 2020, Boston, MA
- 2020 (Poster) Using in situ microphysical observations in Direct Numerical Simulations to study the impact of hygroscopic seeding, AMS Annual Meeting 2020, Boston, MA
- 2019 (Talk) Microphysical Impact of Hygroscopic Seeding: a Comparison of Parcel Model & DNS Model, UAE-NATURE Project Workshop, New York University, New York City
- 2019 (Poster) Simulating the Aerosol-Cloud Interaction in Cumulus Clouds Using Direct Numerical Simulation (DNS), IUGG General Assembly 2019, Montreal, Canada
- 2019 (Talk) Aerosol Impact on Warm Rain Initiation in Turbulent Clouds Using Direct Numerical Simulation (DNS), Understanding Clouds and Precipitation 2019, Berlin, Germany
- 2018 (Talk) Aerosol Impact on Warm Rain Initiation in Turbulent Clouds, 15th Conference on Cloud Physics, Vancouver, BC, Canada
- 2017 (Talk) Turbulence Enhancement of Cloud Droplet Collisions: How does the Droplet Size Distribution Evolve in Cumulus Clouds?, Canadian Meteorological and Oceanographic Society Congress (CMOS2017), Toronto, Canada
- 2016 (Talk) Turbulence Enhancement of Cloud Droplet Collisions: How does the Droplet Size Distribution Evolve in Turbulent Clouds?, International Conference on Clouds & Precipitations (ICCP2016), Manchester, UK
- 2016 (Poster) The Evolution of Droplet Size Distribution in Turbulence Clouds, Understanding Clouds and Precipitation, Berlin, Germany
- 2015 (Talk) A New Warm Cloud Microphysics Parameterization on the Droplet Collision Statistics, AGU-GAC-MAC-CGU Joint Assembly 2015, Montreal, Canada
- 2015 (Poster) Cloud Droplet Collisions under Different Turbulent Intensities, European Geosciences Union General Assembly (EGU2015), Vienna, Austria

TEACHING AND MENTORING TEACHING

2014 - 2018 Graduate Teaching Assistant, Department of Atmospheric and Oceanic Sciences, McGill University.

ATOC-512: Atmospheric and Oceanic Dynamics, ATOC-215: Oceans, Weather and Climate, ATOC-214: An Introduction: Physics of the Atmosphere, ATOC-183: Climate and Climate Change, ATOC-185: Nature Disasters

- 2012 **Co-Instructor**, Department of Atmospheric Sciences, Sun Yat-sen University. Professional English in Meteorology **MENTORING**
- 2023 Yuanfeng Cui, Cornell University
- 2022 Zhixing Xie, University of Colorado Boulder
- 2022 Christopher Hohman and Francis Afrifa, University of Wyoming
- 2022 Trang Thuy Vo, The University of Alabama in Huntsville
- 2020 Nicolas J Gordillo, UCAR SOARS Program
- 2019 2020 Uday Kurien, Postdoctoral Researcher at McGill University
 - 2019 Lois Thomas, NCAR Visiting Ph.D. Student
 - 2019 Neethi Suresh, Project Scientist at IITM, Pune, India
 - 2019 Moumita Bhowmik, Postdoctoral Researcher at IITM, Pune, India
 - 2016 Christopher Gagnon, Undergraduate Student at McGill University

SKILLS AND INTEREST

Programming/Data MPI-Based Parallel Computing; Python; Bash; MATLAB; JupyterLab/JupyterHub; Python-Processing Based Machine Learning; Fortran; NCL; Gnuplot, bash

Models DNS; WRF; WRF-WxMod; Cloud Parcel Models, CR-SIM simulator

- OS/Software Unix/Linux, Amazon Web Service (Cloud Computing), Windows, MacOS; IATEX, Visual Studio Code
- Web Design HTML, WordPress, Weebly, Google Sites
 - Interest Clouds and Precipitation, Model Development, Scientific Visualization, Data Processing/Analysis, Model-Observation Comparison, High Performance Computing, Cloud Seeding
 - Languages English (fluent); Mandarin (native), Wu Chinese (native), French (intermediate), Swedish (beginner)

SERVICE

Associate Editor, Journal of the Atmospheric Sciences.

Journal reviewer, Journal of the Atmospheric Sciences, Journal of Climate, Geophysical Research Letters, Journal of Advances in Modeling Earth Systems, Journal of Geophysical Research, Atmospheric Chemistry and Physics, Physical Review Research, Asia-Pacific Journal of Atmospheric Sciences, Advances in Atmospheric Sciences, Journal of Meteorological Research, Journal of Applied Meteorology and Climatology.

- 2022 Case leader, International Cloud Modeling Workshop (ICMW2024), Yonsei University, Korea.
- 2022 **Board member**, Chinese-American Oceanic and Atmospheric Association Colorado Chapter (COAA-CC).
- 2022 Co-organizer, COAA-CC Mentoring Pilot Program.
- 2021 Member, NCAR RAL Communication Committee.
- 2021 Session co-chair, International Conference on Clouds & Precipitations (ICCP), Pune, India.
- 2019-2021 Case leader, International Cloud Modeling Workshop (ICMW2021), Pune, India.
 - 2020 Organizer, International Cloud Modeling Mini Workshop 2020.
 - 2020 **Co-organizer**, The APS DFD 2020 minisymposium: Fluid Dynamics of Atmospheric Clouds.

- 2020 Session convener, 22nd Conference on Planned and Inadvertent Weather Modification, Boston.
- 2020 2021 Member, NCAR Postdoc Discussion Group on Racism and Anti Racism.
- 2019 2021 NCAR ASP committee member, Research review committee, Social networking committee, Lecture Series committee, HPC team.

PROFESSIONAL TRAINING

- 2023 NCAR MPAS Tutorial, Boulder, CO
- 2023 Supporting Neurodiverse Student in Your Internship Program, GEO REU Workshop for Internship Managers, Boulder, CO
- 2022 NCAR Early Career Leadership Program, Boulder, CO
- 2020 $\,$ NCAR ASP Leadership Training, Boulder, CO $\,$
- 2020 NCAP ASP Diversity, Equity, and Inclusion (DEI) Training, Boulder, CO
- 2019 CGD-CISL Python Tutorial and Hackathon, Boulder, CO

AWARDS

2019-2021 NCAR Advanced Study Program (ASP) Postdoctoral Fellowship

- 2019 Tertia M.C. Hughes Memorial Graduate Student Prize for the Excellent Thesis
- 2018 Fessenden Innovation Prize

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