

CHONGXING FAN

https://cxfan1997.github.io/cxfan_starfan/

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EDUCATION

University of Michigan, Ann Arbor (UM)

August 2019 – May 2024

Ph.D. in Climate and Space Sciences and Engineering

Certificate of Graduate Studies in Computational Discovery and Engineering (2022)

GPA: 4.00/4.00

Ph.D. Dissertation: The Importance of Accurate Physical Parameterization for Radiative Transfer in Global Climate Simulations and Remote Sensing: Examples of Cloud Longwave Scattering and Solar Farm Modeling.

Advisor: Prof. Xianglei Huang

Nanjing University (NJU)

September 2015 – July 2019

Bachelor of Science in Atmospheric Sciences

GPA: 3.95/4.00

EMPLOYMENT

Princeton University

June 2024 – Present

Postdoctoral Research Associate

Program in Atmospheric and Oceanic Sciences

RESEARCH INTERESTS

- Atmospheric Radiative Transfer and Energy Budget
- Climate Modeling
- Application of Machine Learning in Climate Sciences

HONORS AND AWARDS

AGU Outstanding Student Presentation Award 2024

Richard and Eleanor Towner Prize for Distinguished Academic Achievement Award (UM) 2023

Future Investigators in NASA Earth and Space Science and Technology Fellowship (\$150,000, NASA) 2022

Project Title: Impacts of Solar Farming on Surface Energy Budget and Climate

from Long-Term NASA Satellite Observations

Rackham International Students Fellowship (UM)	2020
MICDE Fellowship (UM)	2019
Honorable Mention in the Mathematical Contest in Modeling (MCM, COMAP)	2018
Chow Tai Fook Scholarship (Top 1%, NJU)	2018
China's National Scholarship (Top 1%, NJU)	2017
Scholarship of Mr. Liao (Top 1%, NJU)	2016

PROFESSIONAL SERVICES

- **Peer reviewer** for journals:
 - *Advances in Atmospheric Sciences* (2022; 2023)
 - *Journal of Climate* (2023)
 - *Journal of Geophysical Research – Atmospheres* (2023~2024)
 - *Atmospheric Chemistry and Physics* (2023)
 - *Environmental Research: Climate* (2024)
 - *Journal of the Atmospheric Sciences* (2024)
 - *Geoscientific Model Development* (2024)
 - *Environmental Research Communications* (2024)
 - *Atmospheric Science Letters* (2024)
 - *Journal of Quantitative Spectroscopy and Radiative Transfer* (2024)
 - *Environmental Research Letters* (2024~2025)
- Selected as **IOP Trusted Reviewer** in 2024
- **Outstanding Reviewer** for *Environmental Research: Climate* in **IOP Outstanding Reviewer Awards 2024**

PEER-REVIEWED PUBLICATIONS

Published manuscripts:

1. **Fan, C., & Huang, X.** (2025). Monte-Carlo-Based Simulations of radiative transfer in photovoltaic solar farms: towards fast and accurate parameterizations in weather and climate models. *Journal of Quantitative Spectroscopy and Radiative Transfer*, 109417. <https://doi.org/10.1016/j.jqsrt.2025.109417>.
2. **Fan, C., & Huang, X.** (2023). Infrared scattering of cloud in an isothermal atmosphere. *Journal of the Atmospheric Sciences*, 80(11), 2701-2710. <https://doi.org/10.1175/JAS-D-23-0050.1>.
3. **Fan, C., Chen, Y.-H., Chen, X., Lin, W., Yang, P., & Huang, X.** (2023). A refined understanding of the ice cloud longwave scattering effects in climate model. *Journal of*

Advances in Modeling Earth Systems, 15, e2023MS003810.

<https://doi.org/10.1029/2023MS003810>.

4. Huang, X., Chen, X., **Fan, C.**, Kato, S., Loeb, N., Bosilovich, M., et al. (2022). A synopsis of AIRS global-mean clear-sky radiance trends from 2003 to 2020. *Journal of Geophysical Research: Atmospheres*, 127, e2022JD037598. <https://doi.org/10.1029/2022JD037598>.
5. **Fan, C.**, & Huang, X. (2021). Direct impact of solar farm deployment on surface longwave radiation. *Environmental Research Communications*, 3(12), 125006. <https://doi.org/10.1088/2515-7620/ac40f1>.
6. **Fan, C.**, & Huang, X. (2020). Satellite-observed changes of surface spectral reflectances due to solar farming and the implication for radiation budget. *Environmental Research Letters*, 15(11), 114047. <https://doi.org/10.1088/1748-9326/abbdea>.
7. **Fan, C.**, Wang, M., Rosenfeld, D., Zhu, Y., Liu, J., & Chen, B. (2020). Strong precipitation suppression by aerosols in marine low clouds. *Geophysical Research Letters*, 47(7), e2019GL086207. <https://doi.org/10.1029/2019GL086207>.

Submitted manuscripts:

8. **Fan, C.**, Paynter, D., Kramer, R., & Lin, P. Sensitivity of Earth's Radiation Budget in Historical Climate Simulations to Lower Boundary Condition Datasets [submitted].

CONFERENCES, PROCEEDINGS, AND ABSTRACTS

[O] Oral Talks; [P] Posters

1. [P] **Fan, C.**, Paynter, D., & Kramer, R. Long-Term Comparison of 20-Year Spectral OLR Trends between the GFDL AM4 Model and Satellite Observations with Insights on Climate Model Biases. AGU Annual Meeting 2024. Washington D.C., USA. December 9-13, 2024.
2. [P] **Fan, C.**, & Huang, X. A Fast and Physically Accurate Radiation Parameterization for Large-Scale Solar Farms. AGU Annual Meeting 2024. Washington D.C., USA. December 9-13, 2024.
3. [P] **Fan, C.**, Chen, Y.-H., Chen, X., Lin, W., Yang, P., & Huang, X. Improving the Surface and Cloud Longwave Radiative Couplings in the Earth System Model: A Tribute to Prof. Liou's Works on Ice Cloud Scattering and Radiation-Topography Interaction. Kuo-Nan Liou Symposium, 104th AMS Annual Meeting. Baltimore, MD, USA. January 28-February 1, 2024.
4. [O] **Fan, C.**, Chen, Y.-H., Chen, X., Lin, W., Huang, X., & Yang, P. Address Climate Model Bias by Refining Radiation Scheme: Examples and Future Perspectives. AGU Fall Meeting 2023. San Francisco, CA, USA. December 11-15, 2023.
5. [O] Huang, X., Chen, X., Strow, L., **Fan, C.**, Loeb, N., Kato, S., Yue, Q. The Insights from Twenty Years of AIRS Radiances and an Outlook for the Incoming Decade: A Climate

- Perspective. 20th Annual Meeting of the Asia Oceania Geosciences Society. Singapore. July 30 - August 4, 2023.
6. **[P]** Fan, C., & Huang, X. Understanding How Solar Farms Modify Radiation Budget and Regional Climate Based on Satellite-observation Constrained Climate Modeling. 20th Annual Meeting of the Asia Oceania Geosciences Society. Singapore. July 30 - August 4, 2023.
 7. **[O]** Fan, C., Chen, Y.-H., Chen, X., Lin, W., Huang, X., & Yang, P. Including Ice-cloud Longwave Scattering and Surface Spectral Emissivities in Climate Models Leads to More Impacts on Mean-state Climate Than Climate Feedbacks. 20th Annual Meeting of the Asia Oceania Geosciences Society. Singapore. July 30 - August 4, 2023.
 8. **[P]** Fan, C., Chen, Y.-H., Chen, X., Lin, W., Huang, X., & Yang, P. Ice-Cloud Longwave Scattering in Climate Models Leads to More Impacts on Mean-State Climate than Climate Feedbacks. GRC Radiation and Climate. Lewiston, Maine, USA. July 23-28, 2023.
 9. **[O]** Fan, C., Chen, Y.-H., Chen, X., Lin, W., Huang, X., Yang, P., Including two missing physics for a more realistic representation of cloud-surface longwave radiative coupling in the earth system model. XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG). Berlin, Germany. July 11-20, 2023.
 10. **[O]** Fan, C., Chen, Y.-H., Chen, X., Lin, W., Huang, X., & Yang, P., Including Ice-Cloud Longwave Scattering and Surface Spectral Emissivities in Climate Models Leads to More Impacts on Mean-State Climate than Climate Feedbacks. EGU General Assembly 2023. Vienna, Austria. April 23-28, 2023.
 11. **[O]** Fan, C., Chen, Y.-H., Jing, X., Chen, X., Lin, W., Huang, X., & Yang, P., An Overall Assessment of the Ice-Cloud Longwave Scattering Effects on the Simulated Global Climate. 36th Conference on Climate Variability and Change, 103rd AMS Annual Meeting. Denver, CO, USA. January 8-12, 2023.
 12. **[O]** Fan, C., & Huang, X., Satellite-observed changes of surface reflectance, emissivity, and temperature due to solar farming and the implication for radiation budget. 14th Conference on Weather, Climate, and the New Energy Economy, 103rd AMS Annual Meeting. Denver, CO, USA. January 8-12, 2023.
 13. **[O]** Fan, C., Chen, Y.-H., Jing, X., Chen, X., Lin, W., Huang, X., & Yang, P., An Overall Assessment of the Ice-Cloud Longwave Scattering Effects on the Simulated Global Climate. AGU Fall Meeting 2022. Chicago, IL, USA. December 12-16, 2022.
 14. **[P]** Fan, C., & Huang, X., Satellite-Observed Changes of Surface Radiative Properties due to Solar Farming and the Implication for Radiation Budget. Midwest Student Conference on Atmospheric Research 2022. Urbana, IL, USA. October 1-2, 2022.
 15. **[P]** Fan, C., Chen, Y.-H., Jing, X., Chen, X., Lin, W., Huang, X., & Yang, P., Cloud

- scattering and surface spectral emissivities in climate model: Performance evaluation and feedback analysis. 2022 CFMIP Meeting on Clouds, Precipitation, Circulation and Climate Sensitivity. Seattle, WA, USA. July 19-22, 2022
16. [O] Huang, X., Yang, P., Chen, Y.-H., Chen, X., Lin, W., **Fan, C.**, High-latitude surface-atmosphere radiative coupling in the far-IR: missing physics in climate models and opportunities in future observations. 2022 International Radiation Symposium. Thessaloniki, Greece. July 4-8, 2022.
 17. [O] **Fan, C.**, & Huang, X., Satellite-Observed Changes of Surface Radiative Properties due to Solar Farming and the Implication for Radiation Budget. 2022 International Radiation Symposium. Thessaloniki, Greece. July 4-8, 2022.
 18. [P] **Fan, C.**, & Huang, X., Solar Farm as an ideal test bed for satellite surface emissivity and temperature retrieval algorithms. AGU Fall Meeting 2021. New Orleans, LA, USA. December 13-17, 2021.
 19. [O] **Fan, C.**, & Huang, X., Use different machine-learning algorithms for clear-sky detections in infrared hyperspectral observations: assessment and physical interpretability. 3rd NOAA Workshop on Leveraging AI in Environmental Sciences. Online. September 13-17, 2021.
 20. [P] **Fan, C.**, & Huang, X., Satellite-observed changes of surface spectral reflectances due to solar farming and the implication for radiation budget. AGU Fall Meeting 2020. Online. December 1-17, 2020.

INTERNSHIP EXPERIENCE

Globalink Research Internship

July 2018 – October 2018

- Project Title: Evaluation of quantitative precipitation estimation from model, satellite and radar
- Advisor: Prof. Yongsheng Chen (York University, Canada)

Meteorological Bureau of Hunan Province, China

February 2018

- Weather forecast intern

TEACHING EXPERIENCE

Grader for CLIMATE 586 (Advanced Data Analysis)

September - December 2023

- Responsibility: grading assignments; hosting office hours to answer students' questions

Grader for CLIMATE 586 (Advanced Data Analysis)

September - December 2022

- Responsibility: grading assignments

COMMUNITY SERVICES

CLaSP-Fate High School Outreach

October 2023

- Volunteered to host ~30 10th graders from the Jalen Rose Leadership Academy in the department for exciting hands-on activities and lab tours.
- Planned the event and proposed physics demonstrations.
- Conducted physical demonstrations and explained the physics to students.

Daily Email Group for International Students

October 2019 – October 2020

- Created and organized the group where members write emails to other group members at any frequency they like to share their life, experiences, and stories.
- Named to be the English Language Institute (ELI) Student of the Month in December 2019. <https://lsa.umich.edu/eli/news-events/all-news/dec19studentofthemonth.html>

SKILLS

Computer Skills

- Programming languages: Python (with common scientific computing and web development packages), Fortran, C/C++, Visual Basic, NCL, JavaScript, Node.JS
- Modern software technology: Git, Docker, home server stack
- Media production: Adobe Premiere, Adobe Audition

Certifications

- Jiangsu Computer Rank Examination Certificate of Level Two: C Language (Excellent Grade, 2017)
- National Computer Rank Examination Certificate of Level Two: C Language (Excellent Grade, 2017)
- Jiangsu Computer Rank Examination Certificate of Level Two: Visual Basic (Excellent Grade, 2016)