Ting-Yu Cha

Ph.D. candidate in Atmospheric Science
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Research Interests

Tropical cyclones, heavy precipitation, mesoscale dynamics, radar meteorology, develop and improve radar software, numerical modeling, and statistical analysis.

Education

2018 - Present Ph.D. in Atmospheric Science - Colorado State University

Advisor - Michael M. Bell

2016 - 2018 M.S. in Atmospheric Science - Colorao State University

Advisor - Michael M. Bell

Thesis: *Eyewall Replacement Cycle of Hurricane Matthew (2016) Observed by Doppler Radars*

2012 - 2016 B.S. in Atmospheric Science - National Taiwan University

Advisors - Chun-Chieh Wu and Ben Jong-Dao Jou

Research Project: *Rainbands Characteristics and Polarimetric Analysis of Typhoon Soudelor (2015)*

Professional Experience

2018 - Present **Research Assistant** Colorado State University, Fort Collins, CO

- Analyzed hurricane's dynamics and rainfall impacts by time-series and regression analyses using the radar observations to present the first observational evidence of the evolving wind field of a rapidly intensifying hurricane with a polygonal eyewall.
- Examined the ensemble simulations to evaluate the heavy precipitation forecasts using statistical analysis.
- Improved radar software using C++ to implement the boundary condition of terrain features.

2018 **Teaching Assistant** Colorado State University, Fort Collins, CO

- Facilitated students' learning on a graduate-level course: Thermodynamics and Cloud dynamics.

2016 - 2018 **Research Assistant** Colorado State University, Fort Collins, CO

- Investigated how asymmetric dynamics impacting a sheared tropical cyclone undergoing an eyewall replacement cycle using the ground-based and airborne radar observations.
- Compared the single Doppler and airborne dual-Doppler radar wind retrieval techniques and improved a radar wind retrieval algorithm.

2015 - 2016 **Research Assistant** National Taiwan University, Taipei

- Examined the polarimetric radar data during Typhoon Soudelor (2015) to understand the rainbands microphysics evolution.

Field Campaign Experience

2015 **Plains Elevated Convection at Night (PECAN)** Central U.S.

- Worked with the NCAR radiosonde team to launch balloon soundings in Kansas and Nebraska.
- Worked with University of Wyoming King Air to analyze flight-level data.
- Worked with the NCAR S-POL radar team to differentiate characteristics of hydrometeors from the S-POL radar data.

Publications

1. **Cha, T.-Y.**, Bell, M. M., and DesRosiers, A. J. (2021).Doppler Radar Analysis of the Eyewall Replacement Cycle of Hurricane Matthew (2016) in Vertical Wind Shear. *Monthly Weather Review*, 149(9), 2927-2943.
2. **Cha, T.-Y.** and Bell, M. M. (2021). Comparison of Single Doppler and Multiple Doppler Wind Retrievals in Hurricane Matthew (2016), *Atmospheric Measurement Techniques*, 14, 3523–3539.
3. **Cha, T.-Y.**, Bell, M. M., Lee, W.-C., and DesRosiers, A. J. (2020). Polygonal eyewall asymmetries during the rapid intensification of Hurricane Michael (2018). *Geophysical Research Letters*, 47, e2020GL087919.

Honors and Awards

2021 Received third place in the Peter B. Wagner Memorial Award competition
The Peter B. Wagner Award is a competitive national honor that recognizes a woman pursuing a graduate education in the atmospheric sciences who has published an outstanding academic paper.

2020 First Ph.D. paper was chosen as AGU Editors' Highlight.
Fewer than 2 percent of journal articles are featured this way."Polygonal eyewall asymmetries during therapid intensification of Hurricane Michael (2018)"

2020 Awarded Taiwan Ministry of Education graduate fellowship
Proposed project: "Examination of Dynamic and Thermodynamic processes of Heavy Precipitation over Taiwan with the upcoming PRECIP field campaign observations."

2017 Student Poster Award at ICMCS-XII conference
Presentation "Eyewall Replacement Cycle of Hurricane Matthew Observed by Doppler Radar"

Leadership & Service

2019 - Present **Reviewer**
Monthly Weather Review, Weather and Forecasting, Atmospheric Research

2020 - Present **Graduate Representatives**
CSU Department of Atmospheric Science

2014 - 2015 **Vice President**
NTU Department of Atmospheric Science Student Association

Technical Skills

- **Programming Languages** Julia, Python, Matlab, C++
- **Web Development** Jekyll, HTML, Mediawiki
- **Models** Weather Research and Forecast Model (WRF)
- **Operating Systems** Mac OS, Windows, Linux
- **Software Development** LIDAR RADAR Open Software Environment (LROSE)
- **Miscellaneous** git, LaTeX, Microsoft Office

Conference Presentations

Oral

1. **Cha, T.-Y.**, Bell, M. M., Lee, W.-C., and DesRosiers, A. J., 2019: Polygonal eyewall asymmetries during the rapid intensification of Hurricane Michael (2018), *39th AMS Radar Conference*, Nara, Japan
2. **Cha, T.-Y.** and Bell, M. M., 2018: Eyewall Replacement Cycle of Hurricane Matthew (2016) Observed by Doppler Radar, *33rd AMS Conference on Hurricanes and Tropical Meteorology*, Ponte Vedra, Florida
3. **Cha, T.-Y.** and Bell, M. M., 2017: Eyewall Replacement Cycle of Hurricane Matthew (2016) Observed by Doppler Radar, *38th AMS Conference on Radar Meteorology*, Chicago, Illinois
4. **Cha, T.-Y.** and Bell, M. M., 2017: Eyewall Replacement Cycle of Hurricane Matthew (2016) Observed by Doppler Radar, *17th AMS Conference on Mesoscale Processes*, San Diego, California

Poster

1. **Cha, T.-Y.** and Bell, M. M., 2018: Comparison of Single Doppler and Multiple Doppler Wind Retrievals in Hurricane Matthew (2016), *Colorado State University Graduate Student Showcase*, Fort Collins, Colorado
2. **Cha, T.-Y.** and Bell, M. M., 2017: Eyewall Replacement Cycle of Hurricane Matthew (2016) Observed by Doppler Radar, *Colorado State University Graduate Student Showcase*, Fort Collins, Colorado
3. **Cha, T.-Y.** and Bell, M. M., 2017: Eyewall Replacement Cycle of Hurricane Matthew (2016) Observed by Doppler Radar, *12th International Conference on Mesoscale Convective System and High Impact Weather (ICMCS-XII)*, Taipei, Taiwan
4. **Cha, T.-Y.**, Chu, S.-R. and Jou, J.-D., 2016: Rainbands Characteristics and Polarimetric Analysis of Typhoon Soudelor (2015), *11th International Conference on Mesoscale Convective System and High Impact Weather (ICMCS-XI)*, Busan, Korea