

# Hung Ming CHEUNG (Steven)

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## EDUCATION

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<b>Ph.D., Atmospheric Sciences</b> , Seoul National University, Republic of Korea	<b>08/2022</b>
<i>Thesis: Medium-range forecast for tropical cyclone tracks over the western North Pacific: Track-pattern-based model and artificial neural network model</i>	
<b>M.Sc., Earth System Sciences</b> , The Chinese University of Hong Kong, Hong Kong	<b>08/2010</b>
<b>B.Sc., Physics/Computer Science</b> , The University of Hong Kong, Hong Kong	<b>08/2009</b>

## RESEARCH EXPERIENCE

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<b>Postdoctoral Researcher</b>	<b>06/2024–Present</b>
Department of Climate and Energy Systems Engineering, Ewha Womans University, Republic of Korea	
P. I.: Prof. Chang-Hoi HO	
<ul style="list-style-type: none"><li>Developing nowcasting model for typhoon activities</li></ul>	
<b>Postdoctoral Researcher</b>	<b>08/2022–04/2024</b>
School of Energy and Environment, City University of Hong Kong, Hong Kong	
P. I.: Prof. Jung-Eun CHU	
<ul style="list-style-type: none"><li>Examined tropical cyclone genesis using reanalysis datasets</li><li>Investigated future extratropical transition events in a high-resolution Earth system model (CESM)</li><li>Assisted P.I. in grant writing</li></ul>	
<b>Research Assistant</b>	<b>06–08/2022</b>
Department of Geography, The University of Hong Kong, Hong Kong	
P. I.: Dr. Nicky Y. F. LAM	
<ul style="list-style-type: none"><li>Installed WRF, CMAQ, and required libraries on high-performance computing systems</li><li>Performed WRF-CMAQ simulations that included nudging and tropical cyclone bogussing</li></ul>	
<b>Ph.D. Candidate</b>	<b>2018–2022</b>
School of Earth and Environmental Sciences, Seoul National University, Republic of Korea	
Advisor: Prof. Chang-Hoi HO	
<ul style="list-style-type: none"><li>Developed statistical-dynamical models for tropical cyclone track forecast in the medium range with machine learning methods</li><li>Analyzed the spatial distribution of typhoon- and monsoon-induced rainfall with reanalysis data</li></ul>	
<b>Research Assistant</b>	<b>2012–2014</b>
School of Energy and Environment, City University of Hong Kong, Hong Kong	

P. I.: Dr. Nicky Y. F. LAM

- Ran WRF-CMAQ model, analyzed model output or observation for air quality studies
- Collaborated with an external client to develop an air quality forecasting system in China
- Analyzed future sea level in East Asia using CMIP5 dataset for an external client
- Gave a shell script and WRF tutorial to the research team

## PUBLICATION

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Book chapter:

- J.-E. Chu\*, and **Cheung, H. M.**: Extratropical Transition of Tropical Cyclones in a Changing Climate. *Advances in Hurricane Risk in a Changing Climate*, Springer, Cham. (Accepted)

In review:

- **Cheung, H. M.**, and J.-E. Chu\*, 2024: Discernability of the Vertical Vortex Structure of Pre-existing Disturbances and Their Implication for Tropical Cyclone Formation. Submitted to *npj Clim. Atmos. Sci.*

Peer-reviewed journal articles:

- **Cheung, H. M.**, and J.-E. Chu\*, 2023: Global increase in destructive potential of extratropical transition events in response to greenhouse warming. *npj Clim. Atmos. Sci.*, 137.
- **Cheung, H. M.**, C.-H. Ho\*, and M. Chang, 2022: Hybrid neural network models for postprocessing medium-range forecasts of tropical cyclone track over the western North Pacific. *Artif. Intell. Earth Syst.*, 1, e210003.
- Lam, Y. F.\*, and **H. M. Cheung**, 2022: Investigation of Policy Relevant Background (PRB) Ozone in East Asia. *Atmosphere*, 13, 723.
- **Cheung, H. M.**, C.-H. Ho\*, M. Chang, D. Kim, J. Kim, and W. Choi, 2021: Development of a track-pattern-based medium-range tropical cyclone forecasting system for the western North Pacific. *Wea. Forecasting*, 36, 1505–1518.
- **Cheung, H.M.**, C.-H. Ho\*, J.-G. Jhun, D.-S. R. Park, and S. Yang, 2018: Tropical cyclone signals on rainfall distribution during strong vs. weak Changma/Baiu years. *Clim. Dyn.*, 51, 2311–2320.
- Lam, Y. F.\*, **H. M. Cheung**, and C. C. Ying, 2018. Impact of tropical cyclone track change on regional air quality. *Sci. Total Environ.*, 610,1347–55.
- Chan, K. L., A. Hartl., Y. F. Lam, P. H. Xie\*, W. Q. Liu, **H. M. Cheung**, J. Lampel, D. Pöhler, A. Li, J. Xu, H. J. Zhou, Z. Ning, and M. O. Wenig, 2015: Observations of tropospheric NO<sub>2</sub> using ground based MAX-DOAS and OMI measurements during the Shanghai World Expo 2010, *Atmos. Environ.*, 119, 45–58.
- Kuhlmann, G.\*, Y. F. Lam\*, **H. M. Cheung**, A. Hartl, J. C. H. Fung, P. W. Chan, and M. O. Wenig, 2015: Development of a custom OMI NO<sub>2</sub> data product for evaluating biases in a regional chemistry transport model, *Atmos. Chem. Phys.*, 15, 5627–5644.
- Kuhlmann, G., A. Hartl, **H. M. Cheung**, Y. F. Lam\*, and M. O. Wenig, 2013: A novel gridding algorithm to create regional trace gas maps from satellite observations. *Atmos. Meas. Tech.*, 7,

## CONFERENCE/WORKSHOP PRESENTATION

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| <b>European Geosciences Union General Assembly (Vienna, Austria)</b>  | <b>04/2023</b> |
| • <i>Increasing destructive potential of extratropical transition events in response to higher CO<sub>2</sub> concentration in global climate model</i> |                |
| <b>Korean Meteorological Society Fall Meeting (Virtual)</b>   | <b>10/2020</b> |
| • <i>Development of a track-pattern-based medium-range tropical cyclone forecasting system for the western North Pacific</i>                            |                |
| <b>The 4th Korea-Taiwan Typhoon Expert Workshop (Jeju, Republic of Korea)</b>   | <b>12/2019</b> |
| • <i>Development of a track-pattern-based medium-range tropical cyclone forecasting system for East Asia</i>  |                |
| <b>Korean Meteorological Society Spring Meeting (Daegu, Republic of Korea)</b>  | <b>04/2019</b> |
| • <i>Development of a track pattern-based medium-range tropical cyclone forecasting system in South Korea</i>   |                |
| <b>Korean Meteorological Society Spring Meeting (Seoul, Republic of Korea)</b>  | <b>04/2018</b> |
| • <i>Tropical cyclone signals on rainfall distribution during strong vs. weak Changma/Baiu years</i>  |                |
| <b>European Geosciences Union General Assembly (Vienna, Austria)</b>  | <b>04/2018</b> |
| • <i>Tropical cyclone signals on rainfall distribution during strong vs. weak Changma/Baiu years</i>  |                |
| <b>Asia Oceania Geosciences Society Annual Meeting (Beijing, China)</b>   | <b>08/2016</b> |
| • <i>Tropical cyclone-induced rainfall variability under the influence of East Asian Summer Monsoon</i>   |                |
| <b>Korean Meteorological Society Spring Meeting (Busan, Republic of Korea)</b>  | <b>04/2016</b> |
| • <i>The relationship between East Asian Summer Monsoon and tropical cyclone-induced precipitation in East Asia</i>                                     |                |

## INVITED TALK

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| <b>National Institute of Meteorological Sciences, Korea Meteorological Administration, Republic of Korea (Virtual)</b>                                 | <b>10/2022</b> |
| • <i>Medium-range forecast of tropical cyclone track over the western North Pacific: track-pattern-based model and artificial neural network model</i> |                |
| <b>Department of Geography, The University of Hong Kong, Hong Kong (Virtual)</b>   | <b>05/2021</b> |
| • <i>Development of a track-pattern-based medium-range tropical cyclone forecasting system for the western North Pacific</i>                           |                |

## AWARDS

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| SNU Global Scholarship (full tuition) | 2015–2018 |
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## REVIEWER ACTIVITIES

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- Journal of Climate, Artificial Intelligence for the Earth Systems (American Meteorological Society)

- Atmosphere, Climate, Journal of Marine Science and Engineering, Applied Sciences (MDPI)
- International Journal of Climatology (Wiley-Blackwell)

## **SKILLS**

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- Programming languages: Python, NCL, FORTRAN, MATLAB, GrADS, IDL, C++, LabVIEW
- Unix shell: Bash and C shell
- Deep learning API: Keras, Tensorflow
- Numerical model: WRF, CMAQ, CESM
- File manipulation tool: cdo, nco, wgrib2
- Language: Cantonese, Mandarin (fluent); English (fluent); Korean (basic)