Tsz-Kin (Eric) Lai

Ph.D. Candidate

Department of Atmospheric and Oceanic Sciences, McGill University

Room 945, Burnside Hall, 805 Sherbrooke Street West, Montreal, Quebec H3A 0B9, Canada

✉ eric.lai@mail.mcgill.ca • erictklai.github.io

Research Interests

Tropical Cyclones, Mesoscale Convective Systems, Tropical Meteorology, Severe Weather, Cloud Dynamics

Education

Ph.D. Candidate in Atmospheric and Oceanic Sciences 2015–Present

McGill University Montreal, Canada

- Eyewall Replacement Cycles of Tropical Cyclones
- Supervisor: Prof. M. K. (Peter) Yau

M.Sc. in Atmosphere, Ocean and Climate 2013

University of Reading Reading, UK

- Dissertation: *Emergence of Tropical Cyclones in Baroclinic Waves*
- Supervisors: Prof. John Methven and Prof. Rosalind J. Cornforth
- Graduated with Distinction

B.Sc. in Physics with minor in Earth System Science 2012

The Chinese University of Hong Kong Hong Kong

- Bachelor Final Year Project: *Advanced Bias Removal Approach Using a Kalman Filter for Probabilistic Wind Speed Forecasts During the Periods of Tropical Cyclone Influence*
- Supervisors: Mr. Ping Cheung (Hong Kong Observatory) and Dr. Kam-Moon Pang

Research and Work Experience

Research

Visiting Graduate Student Jul 2019–Oct 2019

Research Applications Laboratory (RAL), National Center for Atmospheric Research (NCAR) Boulder, USA

- Tropical Cyclone Inner Eyewall Decay in Numerical Experiments
- Host: Dr. Eric A. Hendricks

Graduate Research Assistant Sep 2015–Present

Department of Atmospheric and Oceanic Sciences, McGill University Montreal, Canada

Meteorology Researcher Dec 2013–Jul 2015

Fugro GEOS Ltd. (now Fugro GB Marine Ltd.) South Oxfordshire, UK

- Participated in a meteorological research project "IFADS: Improving Forecasts of African Dust Storms" in collaboration with University of Leeds
- Participated in a research project on "Holistic Vessel Performance and Routing System" in collaborations with University of Southampton etc.
- Performed internal projects such as Nigeria lightning statistics and validation of wind speed forecasts produced by WRF and GFS

Voluntary Research Assistant Aug 2013–Aug 2015

Department of Meteorology, University of Reading Reading, UK

- Performed a research project about tropical cyclogenesis based on my master's dissertation

Summer Intern Student Summer 2011
Hong Kong Observatory Hong Kong

- Worked on "Improving the very short range convective weather forecast for the Hong Kong Flight Information Region (HKFIR)"
- Developed an improved forecasting approach based on ECMWF model data

Student Research Assistant Summer 2010
Institute of Space and Earth Information Science, The Chinese University of Hong Kong Hong Kong

- Studied the influence of ENSO on the weather in Hong Kong

Teaching and Technical

Teaching Assistant Sep 2016–Apr 2020
Department of Atmospheric and Oceanic Sciences, McGill University Montreal, Canada

- ATOC214 Introduction: Physics of the Atmosphere (Fall 2016, Fall 2018)
- ATOC184 Science of Storms (Winter 2017, Winter 2018, Winter 2019, Winter 2020)
- ATOC181 Introduction to Atmospheric Science (Fall 2017)

Technical Helper for Community Weather Information Network (Co-WIN) Summer 2009
Department of Applied Physics, The Hong Kong Polytechnic University Hong Kong

- Monitored, maintained and upgraded the automatic weather stations of Co-WIN
- Performed data testing and apparatus calibration

Selected Honours and Awards

2019: **Graduate Mobility Award,** *McGill University,* Canada

2017–2019: **Graduate Research Enhancement and Travel (GREAT) Award,** *McGill University,* Canada

2015–2018: **Graduate Excellence Fellowship,** *McGill University,* Canada

2015–2016: **Atmospheric and Oceanic Sciences Graduate Award,** *McGill University,* Canada

2012: **International Masters Bursary,** *University of Reading,* UK

2011: **Hong Kong Observatory Scholarship,** *Hong Kong Observatory,* Hong Kong

2011: **Second Runner-up in Undergraduate Individual Entry,** *Professor Sir Charles K. Kao Student Creativity Awards 2011, The Chinese University of Hong Kong,* Hong Kong

Publications

In press

- **Lai, T.-K.,** E. A. Hendricks, M. K. Yau, and K. Menelaou, 2021: Roles of barotropic instability across the moat in inner eyewall decay and outer eyewall intensification: Essential dynamics. *J. Atmos. Sci.*, in press, doi:10.1175/JAS-D-20-0169.1.

Published

- **Lai, T.-K.,** E. A. Hendricks, K. Menelaou, and M. K. Yau, 2021: Roles of barotropic instability across the moat in inner eyewall decay and outer eyewall intensification: Three-dimensional numerical experiments. *J. Atmos. Sci.*, **78**, 473–496, doi:10.1175/JAS-D-20-0168.1.
- **Lai, T.-K.,** K. Menelaou, and M. K. Yau, 2019: Barotropic instability across the moat and inner eyewall dissipation: A numerical study of Hurricane Wilma (2005). *J. Atmos. Sci.*, **76**, 989–1013, doi:10.1175/JAS-D-18-0191.1.
- Menelaou, K., M. K. Yau, and **T.-K. Lai**, 2018: A possible three-dimensional mechanism for oscillating wobbles in tropical cyclone-like vortices with concentric eyewalls. *J. Atmos. Sci.*, **75**, 2157–2174, doi:10.1175/JAS-D-18-0005.1.

In review

- **Lai, T.-K.,** E. A. Hendricks, and M. K. Yau, 2021: Long-term effect of barotropic instability across the moat in double-eyewall tropical cyclone-like vortices in forced and unforced shallow-water models. *J. Atmos. Sci.*, in review.

Presentations

- **Lai, T.-K.**, E. A. Hendricks, K. Menelaou, and M. K. Yau, 2019: Barotropic Instability across the Moat and Inner Eyewall Decay: Numerical Experiments. *AGU Fall Meeting 2019,* San Francisco, CA, USA. (Oral)
- **Lai, T.-K.**, E. A. Hendricks, K. Menelaou, and M. K. Yau, 2019: Barotropic Instability across the Moat and Inner Eyewall Dissipation: A Real Case Simulation and Numerical Experiments. *NCAR MMM Dynamics Happy Hour Seminar Series,* Boulder, CO, USA. (Invited talk)
- **Lai, T.-K.**, K. Menelaou, and M. K. Yau, 2019: Barotropic Instability across the Moat and Inner Eyewall Dissipation: A Real Case Simulation and an Idealised Experiment. *9th Northeast Tropical Meteorology Workshop,* Dedham, MA, USA. (Oral)
- **Lai, T.-K.**, K. Menelaou, and M. K. Yau, 2018: Barotropic Instability across the Moat and Inner Eyewall Dissipation: A Numerical Study of Hurricane Wilma (2005). *AGU Fall Meeting 2018,* Washington, DC, USA. (Oral)
- **Lai, T.-K.**, K. Menelaou, and M. K. Yau, 2018: A Dynamical Perspective on Inner Eyewall Dissipation in Hurricane Wilma (2005). *AMS 33rd Conference on Hurricanes and Tropical Meteorology,* Ponte Vedra, FL, USA. (Poster)
- **Lai, T.-K.**, and M. K. Yau, 2017: Emergence of PV Skirts in TC-like Vortices. *8th Northeast Tropical Meteorology Conference,* Rensselaerville, NY, USA. (Poster)

Professional Affiliations

American Meteorological Society, USA

American Geophysical Union, USA

Other Training Received

2013: **University of Reading Forecasting Module held by Met Office,** *University of Reading,* UK

Other Professional Experience

Founder and President (2010–2011)
The Meteorological Society, The Student Union of the Chinese University of Hong Kong Hong Kong

Languages

English: Professional proficiency

French: Elementary proficiency

Cantonese: Native

Mandarin: Bilingual proficiency

Computer Skills

Operating Systems: Unix, Linux, Windows, macOS

Programming: Python, Fortran, Perl (basic), C++ (basic)

Computing: MATLAB, Mathematica, R (basic)

Visualisation: GrADS, IDL, NCL (basic)

Scripting: PHP, JavaScript, PowerShell (basic)

Typography: LaTeX

Miscellaneous: MySQL, HTML, CSS