

MU-CHIEH KO

Education

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Experience

Senior Research Associate

NOAA Hurricane Research Division - Miami, FL

Nov 2016 -

- Develop and investigate machine learning models for hurricane forecasting to advance hurricane forecasts
- Improve, maintain, and evaluate the experimental Hurricane Weather Research and Forecasting models to help achieve research-to-operations objectives
- Evaluate and verify the Hurricane Research Division’s experimental hurricane model’s forecasting capability and provide improvements
- Develop weather visualization products and improve existing plotting and analysis packages for consumption by both experts and the general public

Feb 2016 - July 2016

Research Assistant, Intern

NOAA Hurricane Research Division - Miami, FL

- Applied programming skills to collecting and analyzing forecast data
- Investigated the utility of the GFDL vortex tracker for locating weak tropical storms
- Applied statistical methods to study forecast bias in order to improve predictive accuracy of the model

Jun 2013 - Aug 2013

Summer Intern

WeatherRisk Explore Inc. - Taipei, Taiwan

- Conducted various environment-related events for spreading the knowledge of weather risks and strengthening relationships with stakeholders
- Participated in weather anchor and daily weather forecasting trainings
- Assisted with data collection and management

Master of Science

Electrical and Computer Engineering

University of Miami - Miami, FL, United States

GPA: 4.0 / 4.0

Concentrations Artificial Intelligence

Courses Pattern Recognition and Neural Networks, Digital Signal Processing, Digital Image Processing, Computer Vision

Dec 2021

Master of Professional Science

Meteorology

University of Miami - Miami, FL, United States

GPA: 3.7 / 4.0

Track Computational Meteorology

Concentrations Numerical Weather Prediction, Cyclogenesis

Courses Computer Models in Fluid Dynamics, Advanced Weather Forecasting, Spatial Analysis

Bachelor of Science

Atmospheric Sciences

National Central University - Taoyuan, Taiwan

GPA: 3.7 / 4.0

Concentrations Numerical Weather Prediction, Air

Pollution

Courses Air Pollution Control, Environment Hazard, Numerical Weather Prediction, Numerical Analysis, Programming and Application

Publications

Aug 2016 Jun 2014

- **Evaluation of hurricane Harvey (2017) rainfall in deterministic and probabilistic HWRP forecasts**
Ko, Mu-Chieh, F. Marks, G. Alaka Jr., and S. Gopalakrishnan
<https://www.mdpi.com/2073-4433/11/6/666>
- **An Investigation of the Cyclogenesis Forecast Ability of the Basin-Scale HWRP Model by Invoking the GFDL Vortex Tracker**
Ko, Mu-Chieh, D. Nolan, X. Zhang, and B. Soden
https://scholarlyrepository.miami.edu/rsmas_intern_reports/78

Public Presentations

- **“An Investigation of the Cyclogenesis Forecast Ability of the Basin-Scale HWRP Model by Invoking the GFDL Vortex Tracker”**
Jul 2016
NOAA Atlantic Oceanographic and Meteorological Laboratory – Seminar
- **“HIWPP Precipitation Evaluation – Selected cases of 2016 Atlantic Hurricane Season”**
Apr 2017
NOAA Atlantic Oceanographic and Meteorological Laboratory – Science Meeting
- **“Preliminary Review –Basin-Scale HWRP 2016 Retrospective Dataset”** Jul 2017
NOAA Atlantic Oceanographic and Meteorological Laboratory – Science Meeting
- **“Precipitation Evaluation of the Real-Time Basin-Scale HWRP in 2017”** Apr 2018

American Meteorological Society 33rd Hurricane and Tropical Meteorology Conference

- **“A Rainfall Evaluation of Deterministic and Ensemble Basin-Scale HWRF”**
Jan 2019
Tropical Cyclones: Coastal Impacts and Communication Session, *American Meteorological Society 99th Annual Meeting*
- **“A Review of Support Vector Machine Performance on Tropical Cyclone Intensity Prediction with Imbalanced Datasets”**
Jan 2020
American Meteorological Society 100th Annual Meeting
- **“Effects of Feature-Space Reduction and Resampling on Machine Learning Performance for Hurricane Intensity Predictions”**
Jan 2021
American Meteorological Society 101st Annual Meeting
<https://ams.confex.com/ams/101ANNUAL/meetingapp.cgi/Paper/383546>
- **“A Comparison of Utilizing Analysis Data and 6-h Forecast Data from the Hurricane Weather Research and Forecasting Model on Machine Learning Predictions for Hurricane Rapid Intensification”**
Jan 2021
American Meteorological Society 101st Annual Meeting
<https://ams.confex.com/ams/101ANNUAL/meetingapp.cgi/Paper/383621>
- **“Effects of Resampling on Machine Learning Performance for Hurricane Intensity Predictions”**
Jan 2021
The 2nd NOAA Workshop on Leveraging AI in Environmental Sciences
- **“Introduction to Machine Learning”** (invited lecturer)
Apr 2021
Short Course: Machine Learning in Python for Environmental Science Problems, American Meteorological Society 101st Annual Meeting
- **“The Development of a Consensus Machine Learning Model for Hurricane Rapid Intensification Probabilistic Forecast”**
Sep 2021
The 3rd NOAA Workshop on Leveraging AI in Environmental Sciences
- **“Introduction to Machine Learning”** (invited lecturer)
Jan 2022
Short Course: Machine Learning in Python for Environmental Science Problems, American Meteorological Society 102nd Annual Meeting

Awards

- **Honorable Mention** for the outstanding presentation in the AMS AI for Environmental

Science Conference Student Presentation Contest

Jan 2020

American Meteorological Society 100th Annual Meeting

- **Certificate of Appreciation** for exceptional performance in assisting 2018 HWRF upgrades

31 May 2018

NOAA Atlantic Oceanographic and Meteorological Laboratory

- **Certificate of Appreciation** for the excellent contribution during the tenure of AOML director

25 Oct 2018

NOAA Atlantic Oceanographic and Meteorological Laboratory

- **Certificate of Appreciation** for exceptional performance in helping transition significant updates to NOAA's Hurricane Forecast system

29 Nov 2018

NOAA Atlantic Oceanographic and Meteorological Laboratory

Membership

- Member of American Meteorological Society
- Member of American Geophysical Union

Skills

- **Programming Languages** Python, MATLAB, C++, Shell Scripting, Fortran ▪

Visualizing Languages NCL graphics, GrADS

- **Applications** ArcGIS, MetTC, GPLOT, Microsoft Office - Word, Excel, PowerPoint, Adobe - Photoshop, Lightroom, Illustrator

- **Operating Systems** Linux (including NOAA RDHPCS), Windows, MacOS

Languages

English (Fluent) / Mandarin (Native Speaker) / Taiwanese (Native Speaker)