# XINGJIAN (KEN) YAN

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## EDUCATION

**Massachusetts Institute of Technology** 2024 - Present
*Ph.D. Student* at the Department of Earth, Atmospheric, and Planetary Science
Doctoral Advisor: Prof. Talia Tamarin-Brodsky

**Courant Institute, New York University** 2020 - 2024
*B.A., Hons* in Mathematics
Minor: French Studies

Dean's List 2021, 2022, 2023, Member of Pi Delta Phi (ΠΔΦ)
Overall GPA: 3.87 (Magna Cum Laude)

## GRANTS AND SCHOLARSHIP

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| Dean's Undergraduate Research Fund, NYU | 2023 |
| Dean's Undergraduate Research Conference Grant, NYU | 2023 |
| Overseas Alumni Scholarship, High School Affiliated to Fudan University Overseas Foundation | 2023 |
| Julius Silver Scholarship, NYU | 2023 - 2024 |
| Irving H. Jurow Scholarship, NYU | 2021 - 2023 |
| CAS Scholarship, NYU | 2020 - 2023 |

## RESEARCH INTERESTS

Mid-latitude Atmospheric Dynamics, Machine Learning and Computations in (Geophysical) Fluid Dynamics

## PUBLICATIONS

1. Yan, X., Wang, L., Gerber, E.P., Amaya, V.C., Ho, K.Y., 2024: *Traffic Bottlenecks: Predicting Atmospheric Blocking with a Diminishing Flow Capacity*. *Geophysical Research Letters*.
2. Yan, X., Xu, Y., Liu, H., 2024: *Numerical Analysis on Run-up of Multi-Solitary Waves on a Planar Slope*. *Conference proceeding to ISOPE.*

## CONFERENCES

1. *A Data-Driven Examination on the Traffic Model Analogy for Blocking Statistics*
   at American Geophysical Union, December 2023. eLightning Presentation.
2. *Predicting Atmospheric Blocking with the Traffic Jam Mechanism: The Role of Merging*
   at US CLIVAR Workshop, March 2024. Poster Presentation.
3. *Numerical Analysis on Run-Up of Multi-Solitary Waves on A Planar Slope*
   at the 2024 International Society of Offshore and Polar Engineers. June 2024. Oral presentation.

## RESEARCH EXPERIENCES

**Weather and Climate Dynamics Lab** 2023 - 2024
*Research Assistant* *EAPS Department, Purdue University, IN*
*Advisor: Prof. Lei Wang*
*Co-Advisor: Prof. Edwin Gerber (NYU Courant)*

- Trained a Gradient Boosting Regression Model to detect key parameters from reanalysis Local Wave Activity (LWA) based on the 1D numerical model by Paradise et al. (2019).
- Calculated both approximated and data-driven flux capacities in Nakamura and Huang (2018) with composite analyses on reanalysis blocking statistics.
- Proposed a bottleneck capacity analogy to address regional features of blocking and distinguish false predictions.
- Partial results contributed to NSF project *Collaborative Research: Framework: Improving the Understanding and Representation of Atmospheric Gravity Waves using High-Resolution Observations and Machine Learning*, Award Number: 2004572.

**Predictive Analytics and AI Lab** 2022 - 2024
*Dean's Undergraduate Research Fundee* *Courant, New York University, NY*
*Advisor: Prof. Anasse Bari*

- Applied the YOLOv8 Algorithm to obtain automobile density and velocity from camera clips over the Woodrow Wilson Bridge. Regressed for a precise non-quadratic vehicular flux-density relationship.
- A manuscript titled *A Refined One-Dimensional Vehicular Traffic Model Based on Object Detection Algorithms* will be presented at NYU Undergraduate Research Conference in 2024 spring.

**Laboratory of Hydrodynamics** 2023 - 2024
*Student Researcher* *Shanghai Jiao Tong University, China*
*Advisor: Prof. Hua Liu*

- Numerically simulated solitary waves with a fully nonlinear Boussinesq wave - total variation diminishing model.
- Compared simulations to experiment data for single solitary wave, and multi-solitary wave evolution and overtaking collisions over a slope for the cases of unequal initial wave amplitudes.

## WORK EXPERIENCES

**Grader for Math-UA 121 Calc I** 2022 Spring
*Grader* *Courant, New York University*
*Supervisor: Prof. Joseph Foster*

**Power Monitoring & Diagnostic Technology Ltd.** 2019 & 2021 Summer, 2022 Winter
*Off-cycle Intern* *San Jose, CA*
*Supervisor: Emily Ma, CEO*

- Coded batch-processing programs to automate inspection reports from raw data; improved efficiency by 84.6%.
- Stock-took HQ inventory and investigated mismatching data; improved the record accuracy by 9.2%.
- Cooperatively front-end programmed a customizable online interview feedback system in CSS and HTML5.

## TECHNICAL STRENGTHS

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| **Grad Math Courses** | GFD, Methods of Applied Math, Fluid Dynamics, Stochastic Calculus |
| **Honors UG Math Courses** | Analysis I, Theory of Probability, Algebra I, Fourier Analysis |
| **Computer Science Proficiency** | Python, Java, C, LaTeX, High Performance Computing |
| **Machine Learning Skills** | Supervised Learning, Unsupervised Learning, Reinforcement Learning |
| **Volunteering Services** | Mastery Learning Hour (2021 - 2022) |
| **Language** | Mandarin (Native), English (Bilingual), French (DELF B2) |