KUNYI MA

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EDUCATION

Columbia University, Graduate School of Arts and Science, New York　　　　　　Sept. 2024 – Current
- Doctor of Philosophy in Mathematics
  - Analysis and Probability I, Modern Geometry I, Analytic Methods for PDEs, Numerical Analysis of PDEs

New York University Shanghai, College of Arts and Science, Shanghai　　　　　　Sept. 2020 – Jan. 2024
- Double Major in Honors Mathematics and Data Science　Overall GPA: 3.897/4　*Magna cum laude, Phi Beta Kappa*
- *Honors Math Major Curriculum*　Major GPA: **3.930**/4
  - Graduate Advanced Topics in Analysis: Analysis of Harmonic Maps, Graduate Advanced Topics in Analysis: Ergodic Theory, Graduate Partial Differential Equations, Graduate Real Variables II; Stochastic Processes, Differential Geometry, Topology, Complex Analysis, Honors Theory of Probability, Honors Analysis I&II, Honors Algebra I&II, Honors Ordinary Differential Equations, Honors Linear Algebra I&II, Honors Calculus

  Data Science Major Curriculum　Major GPA: 3.863/4
  - Senior Project, Graduate Algorithms, Machine Learning, Mathematical Statistics, Data Structures, Databases

Nanyang Model High School, Shanghai　　　　　　Sept. 2017 – July 2020
- Class monitor, President of Student Clubs Organization

RESEARCH

Undergraduate

On modifying Loss Function for PINO to approach Mathematics Nature in Fluid Mechanic, **NYU Shanghai**
　　Advisor: Zhuang Su　　　　　　Aug. 2023 – Dec. 2023
- Self-designed and coded 4 Modified Loss functions to Physics Informed Neural Operator (PINO): Sobolev Training, 2D NS Strong Solution norm, and Leary-Hopf Weak Solution norm, following paper *Physics-Informed Neural Operator for Learning Partial Differential Equations*, giving better convergence and model prediction than original result

Existence of Stationary Measure for Incompressible 2D Stochastic Navier-Stokes Equations, **NYU Shanghai**
　　Advisor: Vahagn Nersesyan　　　　　　Jan. 2023 – Dec. 2023
- Writing Senior Thesis on Bogolyubov-Krylov to prove existence of stationary measure for Incompressible 2D NS with white noises and random kick forces, following *Mathematics of Two-Dimensional Turbulence* by Kuksin-Shirikyan
- Guided Study on *The Mathematical Analysis of the Incompressible Euler and Navier-Stokes Equations: An Introduction* by Vicol-Bedrossian, *Introduction to Stochastic Calculus*, and *Partial Differential Equations* Part II, III by Evans

SEMINARS

Graduate

Reading Seminar: Functions of Bounded Variations and Minimal Surfaces, **Columbia University**
　　Advisor: Ovidiu Savin, Daniela De Silva　　　　　　Aug. 2024 – Dec. 2024
- Biweekly presentations on Functions of Bounded Variations, Caccioppoli Sets, Trace for BV Functions, Reduced Boundaries and its Regularity, De Giorgi's Lemma and Monotonicity Formula.

Informal Reading Group: Hyperbolic PDEs and General Relativity, **Columbia University**
　　Advisor: Elena Giorgi　　　　　　Sep. 2024 – Dec. 2024
- Biweekly presentations on Notes by Jonathan Luk on nonlinear waves, and related recent topics in GR.

Undergraduate

Reading Seminar: 2nd order Elliptic Partial Differential Equations and Hilbert's 19th Problem, **New York University**
　　Advisor: Fanghua Lin, Chao Li　　　　　　July. 2023 – Dec. 2023
- Biweekly presentations with prof. Li: Maximum Principles, Weak Solutions, De Giorgi-Nash-Moser, Hölder and Harnack's Inequality, Schauder Estimate, Viscosity Solution following *Elliptic Partial Differential Equations* by Lin-Han
- Special topics with prof. Lin: Moving Plane Method, Krylov-Safonov, Wiener Criterion, Perron's Method

Onsager's Theorem and Intermittent Convex Integration for Incompressible Euler and Navier-Stokes, **New York University**
> **Advisor:** Vlad Vicol   Aug. 2023 – Dec. 2023
- Studied convex integration schemes that build weak solutions to 3D Euler's equation which dissipate kinetic energy using Mikado flow, and compared to Intermittent jets that build mild weak solutions to 3D Navier-Stokes.
- Presentations and study on papers: *Onsager's Conjecture for Admissible Weak Solutions*, *Wild Solutions of the Navier-Stokes Equations whose Singular Sets in Time Have Hausdorff Dimension Strictly Less than 1*, *An Intermittent Onsager Theorem*

Reading Seminar: Evans' Partial Differential Equations Part I, **NYU Shanghai**
> **Advisor:** Pedro Antonio Santoro Salomão   Aug. 2022 – Dec. 2022
- Presentations and guided study on Existence, Uniqueness, Regularity for Laplace, Heat, Wave Equations from Evans

TALKS (STUDENT SEMINAR & INFORMAL)
1. *Hyperbolic PDEs and General Relativity(**Local Theory for Quasi-linear Wave Equations**)*, Nov 18th 2024
2. *Functions of Bounded Variations and Minimal Surfaces(**De Giorgi's Lemma for C^1 Caccioppoli Sets**)*, Nov 6th 2024
3. *Functions of Bounded Variations and Minimal Surfaces(**De Giorgi's Lemma for Harmonic and C^1 function**)*, Oct 16th 2024
4. *Hyperbolic PDEs and General Relativity(**Existence of Solutions to non-constant coefficient linear wave IVP**)*, Oct 7th 2024
5. *Functions of Bounded Variations and Minimal Surfaces(**Regularity of the reduced boundary**)*, Sep 25th 2024
6. *Hyperbolic PDEs and General Relativity(**Representation formula using Homogeneous Distribution**)*, Sep 16th 2024
7. *Functions of Bounded Variations and Minimal Surfaces(**Basic properties of functions of bounded variation**)*, Sep 11th 2024

ATTENDANCE
1. *Differential Geometry Summer School 2024,* Peking University BICMR, July 2024 - Aug. 2024
2. *Workshop on Minimal Surfaces and Mean Curvature Flow 2024,* Peking University BICMR, July 2024
3. *International Congress of Chinese Mathematicians 2022,* Tsinghua University YMSC, July 2022 - Aug. 2022

SERVICE
1. *Student Tutor for College Algebra and Calculus I - III,* Columbia University, Sep. 2024 - Dec. 2024
2. *Academic Resource Center Learning Assistant for Pre Calculus,* NYU Shanghai, Aug. 2021 – Dec. 2021

HONORS AND AWARDS

Graduate
- *Fellowship Package from Columbia Graduate School of Arts and Science*

Undergraduate
- *Latin Honors: Magna cum laude*
- *NYU Shanghai Excellence Award*
- *NYU Honors Scholar: Founders Day Award*
- *2023 NYU Shanghai Dean's Undergraduate Research Funding*
- *2023 Invitation from Phi Beta Kappa National Honor Society*
- *2022 NYU Shanghai Hack the Pearl, Champion of Data Modelling Track*
- *2022 Mathematical Contest in Modelling*
- *2020-2022 NYU Shanghai Recognition Award*
- *2020-2023 NYU Shanghai Dean's List*

EXTRACURRICULAR

Orientation Ambassador, **NYU Shanghai**   May 2021 – Sep. 2021
- Facilitating 2 diversity workshops, game session for Talent Show and meetings with OA group members
- Co-hosting 2 ARC Learning Sessions and GPS Course Introduction Session

President of Literature@NYUSH Student Club, **NYU Shanghai**   June 2021 – May 2022
- Running Official Wechat Account Lit at NYUSH and posting weekly creative writing pieces
- Organizing a Book Donation Event for Qingni and Baihu Elementary School in Jiangxi Province

Tenor, **NYU Shanghai Elite A Cappella Chamber Singers (Octave Fusion)**   Feb. 2021 – Dec. 2022
- Performed nearly 20 Songs at each End of Semester Concert and responsible for solos

Quantitative Researcher, **Ipsos China,** Shanghai   June 2021 – Aug. 2021