

# XINCHEN HUA

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[Github](#)  $\diamond$  [Linkedin](#)

## EDUCATION

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### University of Chicago, Chicago, Illinois

Sep 2023 - Current

M.S. in Computational and Applied Mathematics (MCAM)

*PhD qualify courses:* [Functional Analysis](#), Variation Method, Partial Differential Equations, Real and Complex Analysis (Qualify Exam), Dynamic System, [Differential Manifold](#), Fourier Analysis, Topological Insulator, [Stochastic Process and Brown Motion](#), [Probability Measure](#).

### Rutgers University, New Brunswick, New Jersey

Sep 2021 - Aug 2023

B.A. in Mathematics (Honors)

Minor in Economics

Major GPA: 3.92/4.0

Cumulative GPA: 3.63/4.0

*Relevant coursework:* [Abstract Algebra](#), Linear Algebra, [Real and Complex Analysis](#), Probability Theory, Partial Differential Equations, Ordinary Differential Equation, Linear Optimization, Topology, Fourier Analysis, [Intro to Differential Geometry](#).

## RESEARCH INTERESTS

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I am interested in partial differential equations, especially those arising from physical and geometric backgrounds.

## RESEARCH EXPERIENCE



### Rutgers RISE Program

May 2023 - Jul 2023

*Research Assistant*

Piscataway, NJ, USA

- With the help of Prof. Yanyan Li at Rutgers math department, I worked on RISE Reading Program on the book, Lectures on Differential Equations and Differential Geometry, Luis Nirenberg, ISSN: 978-7-04-050302-9
- Conducted materials on Perron method for the Dirichlet problem and Schauder estimates with interior estimates on strong Barrier problems and general boundary value problems.
- Conducted materials on classic differential geometry topics including Hadamard's principle, Asymptotic coordinates in small balls, and Hilbert's theorem on hyperbolic surfaces (negative Gauss curvature), which resulted in presentation.

### Rutgers DRP (Direct Reading Program)

Jul 2023 - Oct 2023

*Research Assistant*

Piscataway, NJ, USA

- Worked with Weihao Zheng on the book "Fourier Analysis and its Applications" by Elias M. Stein and part of topics in GTM 249.
- Focused on the transition from Fourier analysis to Harmonic analysis, introducing the concept of analysis on the  $L^2$  function to the Abelian group, Fourier Transform on Measure (Projection Value Measure view), and Functional Calculus.
- Presented the topic "Fourier Analysis and its Applications to PDE (Liouville's function)."

### Hopssen Group (H.K.) Limited

May 2022 - Jul 2022

*Artificial Intelligence Algorithm Analysis Intern*

Hong Kong, China

- Utilized the Topological Data Analysis (TDA) tool and Persistent Ontology to extract valuable information from high-dimensional sparse data.
- Reconstructed and visualized three-dimensional point cloud data without causing information loss during representation learning.
- Participated in developing a topology optimization algorithm for a composite swing arm mechanical structure using a non-oscillatory interpolation algorithm.

### **BISU NEUEU Program**

*Research Assistant*

March 2020 – Nov 2020

Beijing, China

- Published in the International Journal of Education and Technology on "Will Bitcoin Become Currency."
- Investigated Bitcoin as a common currency through an analysis of monetary power using the IS-LM-BP and Mundell-Fleming models.

## **PUBLICATIONS AND PROJECTS**

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- Xinchun Hua. "Dirac and Schrödinger Equations with Cubic Nonlinearities (Master thesis Continuing)." 2024.
- Xinchun Hua. "Relax Functional with Mild Perturbations (Variation Method)." 2024.
- Xinchun Hua. "Some Geometric Inequalities. (Undergrad honor thesis)." 2023.
- Xinchun Hua. "Will Bitcoin Become Currency." *International Journal of Education and Technology*, 2020. ISSN: 2709-4278.
- Xinchun Hua. "Geometry and Topology Qualify Exam Guideline." 2024.
- Xinchun Hua, Bingheng Yang. "Remarks on Proof of Homoclinic Bifurcation Theorem. (Dynamic System)" 2023.
- Xinchun Hua. "Fourier Analysis and Its Applications (Summer REU)." 2024.

## **ACHIEVEMENTS**

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RISE Program Scholar	<i>Summer 2023</i>
DRP Program Scholar	<i>Summer 2023</i>
William Lowell Putnam Mathematical Competition Candidate	<i>Fall 2022</i>
BISU NEU Program Scholar	<i>Spring 2020</i>

## **SKILLS/HOBBIES**

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<b>Programming Languages</b>	Python, Mathematica, SQL, MATLAB, HTML
<b>Machine Learning Tools</b>	Pytorch, Tensorflow, Sklearn, Pandas, Numpy
<b>Databases</b>	MySQL, Oracle
<b>Topological Data Analysis</b>	TDA
<b>Hobbies</b>	Basketball (National Second Tier Athlete), Football (High School Team Member)
<b>Languages</b>	Chinese (Mandarin): Native English: Advanced French: Upper Intermediate