Yikai Teng

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Primary Study Fields	*Differential Geometry and Riemann Surfaces* *PDEs and Dynamical Systems* *Numerical Analysis*
Education	**University of Illinois at Urbana-Champaign** *Major in Mathematics, Minor in Computer Science* Deans List for Fall 2018 - Fall 2019 GPA: 3.93/4.00 Expected May, 2021
Computer Skills	**Expert:** Python, Java, Mathematica, Matlab **Proficient :** C, C++ **General:** Optimization, Data Structures, Algorithm, Object Oriented Programming

Experience

Course Aide: Numerical Methods (Math/CS 357)   **Aug 2019 - Present**

- Teaching theory behind numerical methods and help around 200 students in this Python-based course
- Assist the professor with in-class activities and help develop and revise homework assignments
- Host weekly office hours, aid around 20 students with their academic problems

Researches and Projects

Complex Analysis in a Geometric Approach   **Aug 2019 - Dec 2019**

Independent study, Under Professor Richard Laugesen

- Apply classical Complex analysis in differential geometry to study particular metrics like Poincare, Caratheódory, and Kobayashi metric.
- Compare the geometry in complex analysis with classical differential geometry to study the cross sections of the two fields.
- Study harmonic mappings in the complex domain and its application to minimal surface theory.

Complex Algebraic Curves   **Jan 2020 - Present**

Independent study, Under Professor Steven Bradlow

- Study the foundation and properties of complex algebraic curves, both algebraically and topologically, including Bézout's Theorem, the degree-genus formula, etc.
- Study complex algebraic curves as Riemannian surfaces and related theorems like Abel's Theorem and the Riemann-Roch Theorem.

Geometry in Advanced Physics   **Jan 2020 - Present**

Independent study, Under Professor Daniel Berwick Evans

- Apply knowledge in geometry and functional analysis in one dimensional Quantum field theory to study Supersymmetric Quantum Mechanics.
- Focus on Professor Edward Witten's paper to study Supersymmetry and Morse Theory.

Modern Theory of Dynamical Systems   **Aug 2019 - Dec 2019**

Independent study, Under Professor Eduard-Wilhelm Kirr

- Study advanced modern theory of dynamical systems, particularly the behavior around a hyperbolic fixed point, like the Hadamard-Perron Theorem and the Hartman-Grobman Theorem.
- Finish the proof of the existence of the Lake of Wada as a group of four.

Illinois Geometry lab   **Jan 2019 - Sept 2019**

- Study the coupon collector problem and coupon collector randomness test and visualize such problems by Mathematica
- Simulation accepted by Wolfram Mathematica demonstration

Relevant courses
- Algebraic Topology (Graduate) • Vector and Tensor Analysis • Numerical Analysis
- Partial Differential Equations • Dynamical Systems and Chaos • Honor Real Analysis
- Complex Analysis • Abstract Algebra • Abstract linear algebra

Additional Activities

HackIllinois   **Feb 2019**
Compose tests for LinearMappings package for Julia and add add support for quaternions
Compose various tests and make multiple contributions to the DoubleFloat package for Julia

Mechmania   **Sept 2019**
Develop a strategy of a board game to compete with other contestants.

Mathematical Contest of Modelling   **Feb 2020**
Construct a math model to predict where Scottish herring will migrate for the next few decades and provide suggestions for fishing companies in Scotland.