

# Xiangtao Chen

First name / last name: Xiangtao / Chen

Date of birth: 22 Aug, 2000

Place of birth: Guangdong China

Citizenship: China

## Education

Sep 2018 - Jul 2022: Bc.S. Peking University

Sep 2022 - :Ph.D. Northwestern University

## Research Interest

Algebraic Geometry and Algebraic Topology. Especially the interaction between algebraic geometry and algebraic topology. Application of algebraic geometry and algebraic topology to number theory and physics.

## Research Experience

REU of UChicago, 2021. For an  $E_\infty$ -ring spectrum  $E$ , I constructed a space level Dyer-Lashof operation  $E_1 \times E_1 \rightarrow E_n$ .

Thesis: The Generalized Dyer-Lashof Operations for  $E_\infty$  Ring Spectra.

Undergraduate Research in Peking University. I wrote a note about the minimal rational curves on wonderful compactifications of semisimple algebraic groups.

## Activity

2021 SCMS Algebraic Geometry Summer School, Shanghai Center for Mathematical Sciences.

## Graduate-level Courses Taken

Homology Theory. Singular, simplicial, and cellular homology and cohomology. Poincaré duality. More in a combinatorial taste.

Riemann Surfaces. The main part is about Riemann-Roch. Reference textbook: Algebraic Curves and Riemann Surfaces, Miranda.

Fiber Bundles and Characteristic Classes. Stiefel-Whitney classes, Chern classes, Pontrjagin classes. Reference textbook: Characteristic Classes, Milnor and Stasheff.

Algebraic Geometry I. Scheme theory. Mainly the 2nd chapter of Algebraic Geometry by Hartshorne.

Topics in Algebra. Introduction to character theory of representation of finite groups and the theory of Coxeter groups.

Number Theory I. Algebraic number field, local field, adèle & idele, L-functions.

Topics in Algebraic Geometry. Explaining the paper The Hodge Theory of Algebraic Maps by de Cataldo & Migliorini, about the perverse sheaf version of the Lefschetz decomposition.

Modular Form and Number Theory. Basic topics on modular forms.

Topics in number theory II. Étale cohomology.

Algebraic Geometry II. Cohomology in scheme theory. Mainly the 3rd chapter of Algebraic Geometry by Hartshorne. Some geometric applications of scheme theory, such as the construction of moduli spaces, the existence of 27 lines on a smooth cubic surface.

Introduction to Derived Geometry. Following Lurie's paper. We finally gave a proof on Artin's representability theorem.

## Seminar on Which I Gave a Talk

Reading seminar on Differential Forms in Algebraic Topology by Bott-Tu.

Reading seminar on Principles of Algebraic Geometry by Griffiths-Harris.

Seminar on the minimal model program. We aim to understand the famous paper Existence of Minimal Models for Varieties of Log General Type by Birkar, Cascini, Hacon, and McKernan.

Seminar on algebraic D-modules and Hodge modules.

Seminar on noncommutative Hodge theory. We aim to understand Kontsevich's paper Hodge theoretic aspects of mirror symmetry in 2008.

Reading seminar on the book 3264 & All That by Harris and Eisenbud.

Seminar on  $\mathbb{A}^1$ -homotopy theory. We aim to understand the paper by Morel and Voevodsky.

## Language

Chinese, native

English, normal

Japanese, beginner