Xu Gao

Curriculum Vitae

Education

2016–present **Doctor of Philosophy**
Mathematics Department, University of California at Santa Cruz
Santa Cruz, California, USA

2012–2015 **Master of Mathematics**
Chern Institute of Mathematics, Nankai University
Tianjin, China

2008–2012 **Bachelor of Science**
School of Mathematical Sciences, Nankai University
Tianjin, China

Research Interests

My current research focuses on p-adic representations and Bruhat-Tits buildings. More precisely, I'm interested in the stable simplices in the Bruhat-Tits building obtained from a p-adic representation. Other interests include algebraic topology, chiral algebras, D-modules, higher category theory, homotopical algebras, mathematical physics, p-adic geometry, representation theory, transcendental number theory, etc.

Research Experience

2020–present With the advice of *Junecue Suh*, I consider generalizing his recent works on p-adic representations to general Bruhat-Tits buildings. At present, I obtain some asymptotic estimations of the simplicial volume of Bruhat-Tits buildings of split classical groups.

2018–2020 I considered the transcendentality of periods under the advice of *Junecue Suh*. It is a topic with a long history and slow progression. My goal is to prove some transcendental results about periods of a specific variety with plentiful properties. For this purpose, I learned how people attack such problems in history, the theory of G-functions, and some Arakelov geometry.

2016–2018 I learned vertex operator algebras under the advice of *Chongying Dong*. During that time, I tried to considered chiral algebras. To understand such objects, I learned the theory of D-modules and multicategories.

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2015 I studied the nonabelian cohomology of pre-Lie algebras from homotopy theory and deformation theory. The result contains interpretations of the second cohomology of pre-Lie algebra in terms of the Deligne groupoid and of the intrinsic cohomology.
- Xu Gao, "*Extensions and Non-abelian Cohomology of Pre-Lie Algebras*", Master degree thesis, 2015, Nankai University.

2014 I studied a classification problem of Rota-Baxter operators under the advice of *Chengming Bai*. Although this problem seems hard to do, I find a way to solve it using the idea of algebraic sets. The result is in the following join work.
- Xu Gao, Ming Liu, Chengming Bai and Naihuan Jing, "*Rota-Baxter Operators on Witt and Virasoro Algebras*", Journal of Geometry and Physics, vol.108, 2016, pp.1-20.

Honors

2014 First prize of Hu Guoding Scholarship at Nankai University

2007 First prize of China National Mathematics Olympiad (CNMO)

Attended Academic Activities

June 7–18, 2021 **Sparsity of Algebraic Points**, *MSRI Summer Graduate School*
Mathematical Sciences Research Institute

March 2–6, 2019 **Topology and Arithmetic**, *Arizona Winter School*
University of Arizona

August, 2019 **Vertex Operator Algebras and Related Topics**, Sichuan University

May, 2016 **Workshop on Lie Theory and Representation Theory**, Sichuan University

July, 2014 **The Lie Theory Workshop**, Sichuan University

June 2013 **Conference on arithmetic geometry**, Nankai University

Teaching Assistants

2016–present **University of California at Santa Cruz**
TA for *Calculus*, *Linear Algebra*, *Introduction to Proof*, *Algebra*, *Number theory* and *Advanced Linear algebra*.
Duties include organizing discussion sections, holding office hours, responding to questions, reviewing quizzes, writing solutions, grading homework and exams.

2014-2015 **Nankai University**
TA for *Calculus*.
Duties include responding questions, grading homeworks, and exams.

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