Changho Han *Curriculum Vitae*

1 (xxx) xxx-xxxx · changho.han@uwaterloo.ca · https://hanchangho.github.io/

Personal

Pure Mathematics, MC 6457
University of Waterloo
200 University Avenue West
Waterloo, Ontario, Canada
N2L 3G1
Canadian Citizen, born in Seoul, South Korea, on January 3, 1992.
Phone: 1 (xxx) xxx-xxxx

Employment

· **University of Waterloo** Postdoctoral Fellow, 2022 – present

· **University of Georgia** Limited Term Assistant Professor, 2019 – 2022

Education

· **Harvard University**, Ph.D., 2014 – 2019, Advisor: Joseph Harris.
Stable log surfaces, trigonal covers, and canonical curves of genus 4.
Committee: Joseph Harris, Maksym Fedorchuk, Dori Bejleri.

· **University of Toronto**, H.B.Sc., 2010 – 2014.

Preprints

1. (with Ethan Cotterill, Ignacio Darago, Cristhian Garay López, and Tony Shaska) Arithmetic inflection of superelliptic curves, arXiv:2110.04813 (Submitted)
2. (with Valery Alexeev and Philip Engel) *Compact moduli of K3 surfaces with a nonsymplectic automorphism*, arXiv:2110.13834 (To Appear at Trans. Amer. Math. Soc.)

Publications

1. (with Ethan Cotterill and Ignacio Darago) *Arithmetic inflection formulae for linear series on hyperelliptic curves*, Math. Nachr. **00** (2023), pp. 1–29
2. (with Jun-Yong Park) *Enumerating algebraic curves and abelian varieties over global function fields with lower order terms*, Math. Z. **304** (2023), Article no. 5
3. (with Anand Deopurkar) *Stable log surfaces, admissible covers, and canonical curves of genus 4*, Trans. Amer. Math. Soc. **374** (2021), no. 1, pp. 589–641
4. (with Jun-Yong Park) *Arithmetic of the moduli of semistable elliptic surfaces*, Math. Ann. **375** (2019), pp. 1745–1760.

In Preparation

1. (with Ethan Cotterill and Naizhen Zhang) *Arithmetic secant formulae for linear series on hyperelliptic curves*
2. (with Santiago Arango-Piñeros, Oana Padurariu, and Sun Woo Park) *Counting points on $x^2+y^2=z^4$ and 5-isogenies of elliptic curves over $\mathbb{Q}$*
3. (with Anand Deopurkar) *Stable quadrics, admissible covers, and Kondō's sextic K3 surfaces*

Awards

· NSERC Postgraduate Scholarships-Doctoral Program, May 2016 - April 2019

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- The Norman Stuart Robertson Scholarship in Mathematics, 2013
- NSERC Undergraduate Student Research Awards, May 2012 - August 2012
- The Coxeter Scholarship in Mathematics, 2012
- Queen Elizabeth II Aiming for Top Scholarship, 2010 – 2014

Research

Algebraic geometry: KSBA compactifications of moduli of stable slc pairs, Hassett-Keel program on moduli of curves, birational geometry and Minimal Model Program, deformations and degenerations of curves and surfaces, moduli of K3 surfaces and period domains, Baily-Borel and (semi)toroidal compactifications, enriched enumerative geometry, inflection and secant points on curves, moduli of elliptic surfaces, Grothendieck ring of varieties/stacks, and rational points on modular curves.

Recent Talks

In Conferences

Fall 2022

- **Dec 2022** *CMS Winter Meeting*, Chelsea Hotel, Toronto, ON.
  Moduli of K3 surfaces with cyclic nonsymplectic automorphisms

Fall 2020

- **Sep** *Madison Moduli Weekend*, Online via Zoom.
  Compact moduli of lattice polarized K3 surfaces with $\mathbb{Z}/3\mathbb{Z}$ group actions

Spring 2020

- **Feb** *Hodge Theory, Arithmetic and Moduli II*, Texas A&M University, College Station, TX.
  Genus four curves, K3 surfaces, and del Pezzo surfaces.

Spring 2017

- **May** *AMS graduate student conference in algebra and number theory*, Brown University, Providence, RI.
  Compactifying moduli of genus four curves using moduli of log surfaces.

In Seminars

Spring 2023

- **May** *Algebra Seminar*, Seoul National University, Seoul, South Korea.
  Enriched inflection points and secant planes for linear series on algebraic curves.
- **May** *Algebraic Geometry Seminar*, IBS – Center for Complex Geometry, Daejeon, South Korea.
  Compact Moduli of K3 Surfaces with a Given Nonsymplectic Cyclic Action.

Summer 2022

- **Aug** *Algebraic Geometry Seminar*, Duke University, Durham, NC.
  Enriched inflection and secant planes for linear series on algebraic curves. [joint talk with Ethan Cotterill]

· **July** *Geometry and Topology Seminar*, University of Waterloo, Waterloo, ON.
Compact Moduli of K3 surfaces with a given nonsymplectic cyclic action.

Spring 2022

· **May** *Algebraic Geometry Seminar*, IBS–Center for Geometry and Physics, Pohang, South Korea.
Compact Moduli of K3 surfaces with a prescribed nonsymplectic cyclic action.

Fall 2021

· **Sep** *Algebraic Geometry Seminar*, IBS - Center for Complex Geometry, Daejeon, South Korea.
Compact Moduli of lattice polarized K3 surfaces with nonsymplectic cyclic action of order 3.

Spring 2021

· **Jan** *Algebraic Geometry Seminar*, UCR, Riverside, CA.
Compact Moduli of lattice polarized K3 surfaces with nonsymplectic cyclic action of order 3.

Fall 2020

· **Oct** *Algebra & Number Theory Seminar*, UCSC, Santa Cruz, CA.
Arithmetic inflection locus for plurihyperelliptic series on hyperelliptic curves.

Spring 2020

· **Feb** *Number Theory Seminar*, University of Georgia, Athens, GA.
Counting hyperelliptic curves via hyperelliptic fibrations.

· **Feb** *Geometry Seminar*, Texas A&M University, College Station, TX.
Counting hyperelliptic curves over global fields of bounded height via hyperelliptic fibrations.

· **Jan** *CGP Seminar*, IBS–Center for Geometry and Physics, Pohang, South Korea.
Birational geometry of moduli spaces of curves and K3 surfaces.

Fall 2019

· **Oct** *Algebraic Geometry Seminar*, UGA, Athens, GA.
Moduli of 'almost K3' stable log surfaces, curves of genus 4, and degree 6 K3 surfaces with nonsymplectic $\mathbb{Z}/3\mathbb{Z}$ group actions.

Summer 2019

· **July** *Algebraic Geometry Seminar*, KAIST, Daejeon, South Korea.
An arithmetic (or real) count of inflection points on hyperelliptic curves.

· **July** *Algebraic Geometry Seminar*, KAIST, Daejeon, South Korea.
Moduli of 'almost K3' stable log surfaces and curves of genus 4

Spring 2019

· **May** *Valley Geometry Seminar*, UMass Amherst, Amherst, MA.
Moduli of 'almost K3 stable log surfaces'

· **Mar** *Harvard/MIT Algebraic Geometry Seminar*, Harvard University, Cambridge, MA.
'Almost K3' stable log surfaces and curves of genus 4.

· **Feb** *BC NT & AG Seminar*, Boston College, Chestnut Hill, MA.
'Almost K3' stable log surfaces and curves of genus 4.

· **Jan** *Pick My Brain Seminar*, Northeastern University, Boston, MA.
Modular compactifications of moduli spaces in algebraic geometry.

Spring 2018

· **Feb** *Algebraic Geometry Seminar*, Brown University, Providence, RI.
A birational model of moduli of genus 4 curves using stable log surfaces.

Spring 2017

· **Jan** *Algebraic Geometry Seminar*, University of Georgia, Athens, GA.
KSBA compactifications of smooth quadrics and trigonal genus four curves.

As Job Talks

Spring 2022

· **April** POSTECH, Pohang, South Korea.
Birational Geometry of Moduli Spaces

Conferences

— **June 2023**, *MRC Workshop on Explicit Computations with Stacks*, Beaver Hollow Conference Center, Java Center, NY, USA

— **May 2023**, *Workshop on Moduli, K-stability, Fano varieties, and related topics*, IBS – Center for Complex Geometry, Daejeon, South Korea

— **February and March 2023**, *Explicit Moduli Problems in Higher Dimensions*, Online via Zoom and Banff Centre, Banff, AB, Canada

— **February and March 2023**, *Around Symmetries of K3 Surfaces*, Juniper Hotel, Banff, AB, Canada

— **January 2023**, *Combinatorial Algebra meets Algebraic Combinatorics*, University of Waterloo, Waterloo, ON, Canada

— **December 2022**, *2022 CMS Winter Meeting*, Chelsea Hotel, Toronto, ON, Canada

— **October 2022**, *Arithmetic and Topology over Global Fields*, University of Wisconsin-Madison, Madison, WI, USA

— **April 2022**, *Georgia Algebraic Geometry Symposium*, Emory University, Atlanta, GA, USA

— **September 2021**, *Moduli Across the Pandemic*, Online via Zoom

— **October 2020**, *Rethinking Number Theory*, Online via Zoom

— **September 2020**, *Madison Moduli Weekend*, Online via Zoom

— **June – July 2020**, *Algebraic and Tropical Online Meetings*, Online via Zoom

— **April 2020**, *Western Algebraic Geometry ONline*, Online via Zoom

— **March 2020**, *Arithmetic Geometry is ONline In Zoom, Everyone*, Online via Zoom

— **February 2020**, *Hodge Theory, Arithmetic and Moduli II*, Texas A&M University, College Station, TX, USA

— **September 2019**, *Algebraic Geometry Northeastern Series*, Boston College, Boston, MA, USA

— **May 2019**, *Recent Progress in Moduli Theory*, MSRI, Berkeley, CA, USA

— **March 2019**, *Arizona Winter School 2019: Topology and Arithmetic*, University of Arizona, Tucson, AZ, USA

— **December 2018**, *FRG Workshop on Moduli Spaces of sheaves and Bridgeland Stability*, UIC, Chicago, IL, USA

— **November 2018**, *D-Modules and Hodge Theory*, UIC, Chicago, IL, USA

— **October 2018**, *Moduli Spaces: Birational Geometry and Wall Crossings*, BIRS, Banff, AB, Canada

— **October 2018**, *Western Algebraic Geometry Symposium*, University of Oregon, Eugene, OR, USA

— **September 2018**, *Algebraic Geometry Northeastern Series*, Brown University, Providence, RI, USA

— **July 2018**, *Moduli Spaces in Algebraic Geometry and Applications*, satellite conference of ICM, Campinas, Brazil

— **June – July 2018**, *Summer Graduate School on Derived Categories*, MSRI, Berkeley, CA, USA

— **May 2018**, *Birational Geometry and Arithmetic*, ICERM, Providence, RI

— **January 2018**, *Korean-Italian Meeting on Algebraic Geometry*, KIAS, Seoul, South Korea

— **October 2017**, *Algebraic Geometry Northeastern Series*, Northeastern University, Boston, MA, USA

— **August 2017**, *Conference on Birational Geometry*, Simons Foundation, New York, NY, USA

— **June 2017**, *Géométrie Algébrique en Liberté XXV*, University of Bath, Bath, UK

— **June 2017**, *Linear Systems on Irregular Varieties*, Como, Italy

— **May 2017**, *Geometry of Moduli Spaces*, UCSD, La Jolla, CA, USA

— **May 2017**, *Mini-workshop in Birational Geometry and Hodge Theory*, Northwestern University, Evanston, IL

— **March 2017**, *Georgia Algebraic Geometry Symposium*, University of Georgia, Athens, GA

— **December 2016**, *Workshop on Combinatorial Moduli Spaces and Intersection Theory*, Fields Institute, Toronto, ON, Canada

— **August 2016**, *Introductory Workshop on Combinatorial Algebraic Geometry*, Fields Institute, Toronto, ON, Canada

— **July 2016**, *Higher Dimensional Algebraic Geometry*, University of Utah, Salt Lake City, UT

— **July 2015**, *AMS Summer Institute on Algebraic Geometry*, University of Utah, Salt

Lake City, UT

— **April 2015**, *New Techniques in Birational Geometry*, Stony Brook University, Stony Brook, NY

Service

· Currently co-organizing a learning seminar on "Intersection Theory" for graduate students and postdocs in University of Waterloo, Fall 2023

· Refereed a paper in "IMRN", July 2023

· Gave three talks for a specialized student algebraic geometry seminar (Chiral de Rham cohomology) at University of Waterloo, Summer 2023

· Gave four talks for a specialized student algebraic geometry seminar (Horospherical MMP) at University of Waterloo, Fall 2022 - Winter 2023

· Gave a series of two expository talks at Algebraic Geometry Working Seminar in University of Waterloo, Fall 2022:

- Periods I: Elliptic Curves and Hodge Theory
- Periods II: Hodge Theory and K3 Surfaces

· Quick reviewed a paper in "Experimental Mathematics", January 2021

· Gave a series of two expository talks at Mini-Seminar on Compactifications in Washington University in St. Louis, Fall 2020:

- Introduction to Stacks via Quotient Stacks
- Properties and Examples of Algebraic Stacks

· Advised participants as a panelist in Lunch in the time of Covid: Academic visas and Immigration, via Zoom, July 2020:

- Mainly discussed the process of applying/maintaining F-1 student/OPT/STEM OPT status, and how that has been changed as political parties in power has changed.

· Gave an expository talk at Classical Reading in Arithmetic/Algebraic Geometry (CRAAG) seminar in UGA, Spring 2020:

- Irreducibility of M_g (based on papers of Deligne-Mumford and Fulton)

· Gave talks for a student seminar on modular curves at UGA, Fall 2019:

- Introduction to algebraic stacks.
- Morphisms of algebraic stacks, $\mathcal{M}_{1,1}$, and moduli space of level structures.

· Gave numerous talks for two student algebraic geometry seminars (BAGS and AGLS) at Harvard, Spring 2015 – Fall 2018

· Organized two student algebraic geometry seminars (BAGS and AGLS) at Harvard, Spring 2015 – Fall 2017

· Co-organized undergraduate math seminars at University of Toronto, Fall 2012 – Spring 2013

Teaching

University of Waterloo

· *Instructor for AMATH/PMATH 331 (Applied Real Analysis)*, Fall 2023.

{Teaching approx. 75 students in-person. Currently teaching 1 section with the help of 3 TA.}

· *Instructor for AMATH/PMATH 332 (Applied Complex Analysis)*, Winter 2023.
{Teaching approx. 70 students in-person. Taught 1 section with the help of 2 TA's.}

· *Instructor for Math 127 (Calculus 1 for the Sciences)*, Fall 2022.
{Coordinated course. Teaching approx. 80 students in-person. Taught 1 section with the help of TA's.}

University of Georgia

· *Instructor for Math 2700 (Elementary Differential Equations)*, Spring 2022.
{Teaching 21 students in hybrid format (Zoom classes and In-person workshops). Taught 1 section without TA's.}

· *Instructor for Math 2250 (Calculus I)*, Fall 2021.
{Coordinated course. Small class initiative, teaching at most 19 students per section in hybrid format (In-person instruction). Teaching 2 sections without TA's.}

· *Instructor for Math 2700 (Elementary Differential Equations)*, Spring 2021.
{Teaching 21 students in hybrid format (Zoom classes and In-person workshops). Taught 1 section without TA's.}

· *Instructor for Math 2250 (Calculus I)*, Fall 2020.
{Coordinated course. Small class initiative, teaching at most 19 students per section in hybrid format (Zoom classes and In-person workshops). Taught 3 sections without TA's.}

· *Instructor for Math 2250 (Calculus I)*, Spring 2020.
{Coordinated course. Small class initiative, teaching at most 19 students per section without TA's. Taught 1 section.}

· *Instructor for Math 1113 (Precalculus)*, Fall 2019.
{Coordinated course. Small class initiative, teaching at most 19 students per section without TA's. Taught 2 sections.}

Harvard University

· *Coaching Fellow for Math 1b (Calculus, Series, and Differential Equations)*, Spring 2019.
{Coordinated course. Responsible for taking care of students who need extra help to succeed. This position transitioned into a Teaching Fellow as an instructor took a maternity leave.}

· *Teaching Fellow for Math 1b (Calculus, Series, and Differential Equations)*, Fall 2017.
{Coordinated course. Responsible for planning and giving lectures to 20 students, holding office hours, and grading exams with the help of 2 TA's.}

· *Teaching Fellow for Math 21b (Linear Algebra and Differential Equations)*, Spring 2017.
{Responsible for planning and giving lectures to 30 students, holding office hours, and grading exams with the help of 2 TA's.}

· *Graduate Course Assistant for Math 258Y (degenerations in algebraic geometry)*, Fall 2016.
{Responsible for planning and running sessions that complement the lectures, grading homeworks.}

· *Teaching Fellow for Math 1b (Calculus, Series, and Differential Equations)*, Fall 2015.
{Coordinated course. Responsible for planning and giving lectures to 30 students, holding office hours, and grading exams with the help of 2 TA's.}

University of Toronto

· *Teaching Assistant for MAT136H1 (Calculus 1(B))*, Spring 2014.
{Responsible for running tutorials and help centers.}

· *Teaching Assistant for MAT135H1 (Calculus 1(A))*, Fall 2013.
{Responsible for running tutorials and help centers.}

· *Teaching Assistant for MAT136H1 (Calculus 1(B))*, Spring 2013.
{Responsible for running tutorials and help centers.}

· *Teaching Assistant for MAT135H1 (Calculus 1(A))*, Fall 2012.
{Responsible for running tutorials and help centers.}