

Jin Hyung To

University of Illinois at Urbana-Champaign,
Department of Mathematics
NetMath House, 912 South Fifth Street Champaign, IL 61820
Work Phone: 217-300-4954
Email: jinto@illinois.edu, jinhyungto@gmail.com
Webpage: <http://www.math.illinois.edu/~jinto/>

EDUCATION

- **Ph.D. in Mathematics**, University of Illinois at Urbana-Champaign, May 2012
Thesis: Holomorphic chains on the projective line, **Advisor:** Steven Bradlow
- Ph.D. coursework completion, Kyungpook National University, South Korea, Mar. 2001 – Feb. 2003
- Military Service, Korean Army, Aug. 1998 – Oct. 2000
- **M.S. in Mathematics**, Kyungpook National University in South Korea, Aug. 1998
Thesis: Cancellation modules and gr-cancellation ideals, **Advisor:** Eun-sup Kim
- B.S. in Mathematics, Kyungpook National University in South Korea, Mar. 1992 – Feb. 1996

POSITION

- Lecturer, Department of mathematics, University of Illinois at Urbana-Champaign, Dec. 2018 ~ Present
- Initiator of upper-level courses and instructor, University of Illinois at Urbana-Champaign Aug. 2012 ~ Nov. 2018
I have created/developed/taught:
Differential Geometry, Math 423, Applied Complex Variables, Math 446, Complex Variables, Math 448, Complex Variables for engineering master (Math 448 XGR), Abstract Linear Algebra, Math 416, Real variables, Math 444, Abstract Algebra, Math 417, Differential Equations, Math 441, Probability Theory, Math 461 Applied Linear Algebra, Math415, Differential Equations +, Math 286, Differential Equations, Math285, Calculus I, II, III, Business Calculus, Math 220, 231, 241, 234, Aug. 2012 ~ Present, Instructional Specialist (October 31, 2014 ~ Nov. 2018), Lecturer (Dec. 2018 ~ Present), Department of mathematics, University of Illinois at Urbana-Champaign, Aug. 2012 ~ Present
- Adjunct Professor, Governors State University, Spring 2013
- Teaching Assistant and Research Assistant, University of Illinois at Urbana-Champaign, August 2003 ~ May 2012
- Grading and Seminar Assistant, Kyungpook National University, S. Korea, 1997, 2001 – 2002

RESIDENCE: US permanent resident

TEACHING EXPERIENCES

I have been teaching college-level math courses for more than 20 years.

Recently, I created contents and taught upper-level online courses after I finished randomized question bank for all undergraduate courses from Calculus II to Probability Theory. I have created the contents and first taught the following courses: Elementary Real Analysis (Math 444), Introduction to Abstract Algebra (Math 417), Abstract Linear Algebra (Math 416), Complex Variables (Math 448), Applied Complex Variables (Math 446), Differential Geometry (Math 423). I created the lecture note presentations of all the lectures of each of the above courses (edited Math 446), HW assignments/solutions, Exams (1 or 10 versions and two versions of summer exams), supplementary notes, etc. I went through the whole one semester lectures of each of the above courses when I created the lecture note presentations. I solved all the HW problems.

Currently, I am teaching four courses Abstract Linear Algebra (Math 416), Differential Geometry (Math 423), Applied Complex Variables (Math 446), Complex Variables (Math 448). I keep updating course contents to improve the courses.

I am connected to the students 365 days via technology (email and learning management system), and I hold virtual office hours (Blackboard, Zoom) and send them whiteboards I wrote right after each of the office hours. I also gave in-class office hours for the summer courses. I also answered students' questions through email and Forum post on the course webpage (Moodle). I grade their HW papers/exams and give feedbacks and related reading on the topics. I also discuss their interest beyond the courses.

Teaching the courses was a chance to meet a variety of students including middle school teachers and professionals who has to develop deeper mathematical backgrounds. I provided them with required math knowledge/skills and advice for further courses and topics.

I give talks at the Graduate Algebraic Geometry Seminar. Each semester we learn different topics in the area of algebraic geometry. My thesis was a study of the moduli space of holomorphic chains on a compact Riemann surface. The motivation of this comes from the Higgs bundles and the moduli space of representations of the fundamental group.

I. RECENT TEACHING

- Spring 2021
 - Abstract Linear Algebra, Math 416
 - Differential Geometry, Math 423
 - Applied Complex Variables, Math 446
 - Complex Variables, Math 448

- Fall and winter 2020
 - Abstract Linear Algebra, Math 416
 - Differential Geometry, Math 423
 - Applied Complex Variables, Math 446
 - Complex Variables, Math 448

- Summer 2020:
 - Abstract Linear Algebra, Math 416
 - Applied Complex Variables, Math 446
 - Complex Variables, Math 448
 - Complex Variables, Math 448 XGR

- Spring 2020:
 - Abstract Linear Algebras, Math 416: 117 students as of June 5, 2020, since May 2018.
 - Applied Complex Variables, Math 446: 11 students as of April 20, 2020, since June 2019.
 - Complex Variables, Math 448: 40 students as of April 20, 2020, since May 2018.
 - Complex Variables, Math 448 XGR
 - I created 10 sets (total 70 exams) of each of exams and final for Applied Complex Variables, Math 446 and Complex Variables Math 448 to give online proctoring exams.

- April 2020:
 - Abstract Linear Algebras, Math 416: 108 students as of April 20, 2020, since May 2018.
 - Applied Complex Variables, Math 446: 9 students as of April 20, 2020, since June 2019.
 - Complex Variables, Math 448: 38 students as of April 20, 2020, since May 2018.

- Fall 2019 ~ Spring 2020: I created new online Differential Geometry, Math 423
 - Lecture note presentations of 42 lectures of 50 minute class
 - Supplementary Notes and proofs
 - Homework assignments (13 homework assignments)
 - Course schedule, Syllabus, Course objectives, Topics of every sections, Exams, Practice exams

- Summer 2019:
 - Abstract Linear Algebra, Math 416
 - Applied Complex Variables, Math 446
 - Complex Variables, Math 448
 - Complex Variables, Math 446 XGR

- March 2019:
 - Abstract Linear Algebra, Math 416: 45 students as of March 27, 2019, since May 2018.
 - Complex Variables, Math 448: 13 students as of March 27, 2019, since May 2018.

- Fall 2018 ~ Spring 2019 (Developing new courses and others):
 - I edited and partially created Applied Complex Variables, Math 446 lecture note presentations (40 lectures).
 - I created three versions of each of three midterms and final for Applied Complex Variables, Math 446, for Summer 2019 and All Year course.
 - I created three versions of each of 2 midterms and final for Abstract Linear Algebra, Math416, Summer 2019 and All Year course.
 - I created exams and final for Complex Variables, Math 448, All Year course.
 - I created practice exams and solutions for Abstract Linear Algebra, Math416, Applied Complex Variables, Math 446, Complex Variables, Math 448.
 - I created all the necessary resources (Course schedule, topics of each of sections, course syllabi, course objectives, homework assignments)

- Fall and winter 2018:
 - Abstract Linear Algebra, Math 416
 - Complex Variables, Math 448

- Summer 2018:
 - Abstract Linear Algebra, Math 416
 - Complex Variables, Math 448
 - Complex Variables (Summer Course), Math 448

II. Teaching upper-level courses at NetMath

- Winter 2016 ~ Present, Advanced Course content development and teaching, Abstract Algebra, Elementary Real Analysis, Abstract Linear Algebra, Complex Variables, Applied Complex Variables, Differential Geometry (Math 417, 444, 416, 446, 448, 423)
- Spring 2019, Math 448 (Complex Variables), Math 416 (Abstract Linear Algebra)
- Fall and winter 2018: Math 446 (Applied complex variables) lecture presentation editing, Math 448 XGR(Complex variables for engineering master degree) exam creating, homework scheduling, and so on. This course will be offered for engineering master degree students in Spring 2019
- Fall 2018: I have been teaching abstract linear algebra and complex variables since May 2018 I have had 29 students (Abstract linear algebra) and 8 students (Complex variables) in the period May 2018 ~ November 2018
- Summer 2018: I taught 3.4 classes. Differential equation, Math 441, Exam grading, Complex variables, Math 416 8 weeks summer course, Abstract Linear Algebra, Math 416 and Complex Variables, 448 16 weeks courses. I developed Math 416 and Math 448. I developed and created all contents including lecture slides, homework assignments/solutions, exams/solutions, practice exams/solutions, course summary, course syllabi. I created the lecture presentations of each of the classes (total 80 classes of presentations), and exams (27 exams). I offer office hours for both on-campus and off-campus students using technology. I gave office hours every day in Summer 2018.

- Success of teaching in Summer 2017 Math 417, Math 444: My success of teaching in 2017, the following year 2018, 23 students registered for Math 417, and the class of Math 444 is full. 30 students registered for it.
- Summer 2017: Abstract Algebra , Math 417 & Elementary Real Analysis, Math 444 as an instructor for both courses I taught total 27+ students without hiring a TA.
 - Overall quality in End course survey:
Math 444: 92% gave Good/Excellent, Math 417: 67% gave Good/Excellent
 - *Preparation*: I created the latex beamer lecture presentations and 3 hour exams and final (2 versions of each for summer, 1 version of each for all year course) of each of the courses; I made the test problems and also used old exam problems, I designed the course schedule, I made course syllabi, I created all the exam solutions and homework solutions, I videotaped introduction to the students.
 - *Teaching*: I used both on- and off-campus office hours. I ran on-campus office hours all the way through the end of summer every week, and I gave additional office hours on student request. Off-campus office hours are electronic office hours via Black Board embedded in Moodle. I had online office hours 4 times a week. I graded all homework assignments (13 and 14 sets respectively) and all the exams and then scanned back to the students. As for homework assignments, the students uploaded in Moodle and I used electronic grading which is an embedded Adobe Acrobat pdf editor in Moodle.
 - My teaching quality: I am an excellent experienced math. professor. As for class running, I am an experienced teacher. I run classes effectively and efficiently.

III. Teaching lower-level courses at NetMath

- Fall and winter 2016: Advising and supervising teaching assistants, Grading exams (Math 461, 415, 241, 286, 285, 231, 220)
- Summer 2016: Applied Linear Algebra, Math 415, Teaching other courses (Math 461, 415, 241, 286, 285, 231), Advising and supervising teaching assistants, Grading exams (Math 461, 415, 241, 286, 285, 231, 220)
- Spring 2016: Probability Theory, Math 461, Applied Linear Algebra, Math 415, Vector Calculus, Math 241, Capstone Course (Mathematical paper writing experience), Math 241(Vector Calculus, Partner high school, Exam review and grading), Teaching other courses (Math 461, 415, 241, 286, 285, 231), Advising and supervising teaching assistants, Test bank (Randomized test/solution generating system operated by Mathematica software). I created 1000 pages of randomized exam questions for Math 415 and I reviewed and added exam questions for other seven courses. Finally, I used the Test bank to create 46 different exams/solutions of 8 different online courses for Summer 2016. I reviewed all the created exams and answers. This is used to create exams/solutions until now.
- Fall and winter 2015: Applied Linear Algebra, Math 415, Vector Calculus , Math 241, Capstone Course (Mathematical paper writing experience), Vector Calculus, Math 241 (Partner high school, exam review and grading), Grading other courses (Math 461, 415, 241, 286, 285, 231), Advising and supervising teaching assistants, Test bank for Math 415 (Creating randomized exam problems using Mathematica software)

- Summer 2015: Applied Linear Algebra, Math 415, Calculus I, Math 220 (Online summer course for university students). Capstone Course (Mathematical paper writing experience), Advising and supervising teaching assistants, Test bank for Math 415 (Creating randomized exam problems using Mathematica software)
- Spring 2015: Applied Linear Algebra, Math 415, Capstone Course (Mathematical paper writing experience), Partner high school Math 241 (Grading exams and creating homework solutions manual), Teaching via grading and giving feedback other courses (Math 461, 415, 241, 286, 285, 231, 220), Grading exams and giving feedback for 9 different NetMath courses, Test bank for Math 415 (Creating randomized exam problems using Mathematica software)
- Fall and winter 2014: Applied Linear Algebra, Math 415, Vector Calculus, Math 241, Calculus & Mathematica (Vector Calculus), Teaching via grading and giving feedback other courses (Math 461, 415, 241, 286, 285, 231,220), Grading exams and giving feedback for 9 different NetMath courses, Test bank for Math 415 (Creating randomized exam problems using Mathematica software), Proofreading course materials including Mathematica codes for Math 415.
- Summer 2014: Applied Linear Algebra, Math 415, Grading and giving feedback for 9 different regular NetMath courses, Test bank for Math 415 (Creating randomized exam problems using Mathematica software), Proofreading course materials including Mathematica codes for Math 415.
- Spring 2014: Applied Linear Algebra, Math 415, Grading and giving feedback for 9 different regular NetMath courses, Test bank for Math 415(Creating randomized exam problems using Mathematica software), Proofreading course materials including Mathematica codes for Math 415.
- Fall and winter 2013: Applied Linear Algebra, Math 415, Grading exams and giving feedback for 9 different regular NetMath courses, Test bank for Math 415 (Creating exam problems using Mathematica software). Creating actual exams, practice exams, study guide, quizzes, homework solutions manual for Math 415, Proofreading course materials including Mathematica codes for Math 415.
- Summer 2013: Applied Linear Algebra, Math 415, Grading exams and generating feedback for all regular NetMath courses, Test bank for Math 415 (Creating exam problems using Mathematica software), Creating actual exams, practice exams, study guide, quizzes, homework solutions manual for Math 415, Proofreading course materials including Mathematica codes for Math 415.
- Spring 2013: Applied Linear Algebra, Math 415, Grading exams and giving feedback for 9 different regular NetMath courses, Grading partner high school exam(Math 241, Vector Calculus), Test bank for Math 415(Creating exam problems using Mathematica software), Creating actual exams, practice exams, study guide, quizzes, homework solutions manual for Math 415, Proofreading course materials including Mathematica codes for Math 415.
- Fall 2012, Math 415(Applied Linear Algebra), Grading exams and giving feedback for 9 different regular NetMath courses, Proofreading course materials including Mathematica codes for Math 415

IV. Adjunct professor (Spring 2013)

- Spring 2013, Applied calculus, Math 2281, Analysis II: Complex variables, MATH 4243, an instructor as a adjunct professor, Governors State University

V. Teaching Assistance at University of Illinois at Urbana-Champaign (Fall 2003 ~ Spring 2012)

- Spring 2012, Abstract algebra II (a graduate course), Abstract linear algebra, Real variables, grading, University of Illinois at Urbana-Champaign
- Fall 2011, Calculus & *Mathematica* (Vector calculus), Math 241 D8 and Symbolic computation lab Math 290 R2, a sole instructor, University of Illinois at Urbana-Champaign
- Summer 2011, Calculus III (Vector calculus), Math 241 D1, a sole instructor, University of Illinois at Urbana-Champaign
- Fall 2010, Finite Mathematics, Math 124 M2 and Q2, running group discussion (blended course), University of Illinois at Urbana-Champaign
- Summer 2010, Calculus III (Vector calculus), Math 241 D1 a sole instructor, University of Illinois at Urbana-Champaign
- Spring 2010, Finite Mathematics, Math 124 M2 and Q2, running group discussion(blended course), University of Illinois at Urbana-Champaign
- Fall 2009, Calculus III(Vector calculus), Math 241 DD6 and DD7, Discussion and recitation, University of Illinois at Urbana-Champaign
- Spring 2009, Calculus II(2nd course of calculus of single variable), Math 231 AD6, Discussion and recitation, University of Illinois at Urbana-Champaign
- Spring 2008, Elementary linear algebra, Math 125, Tutoring and grading, University of Illinois at Urbana-Champaign
- Fall 2007, Calculus II(2nd course of calculus of single variable), Math 231 AD1 and AD2, Discussion and recitation, University of Illinois at Urbana-Champaign
- Spring 2007, Calculus I(1st course of calculus of single variable), Math220 AD4, Discussion and recitation / Elementary number theory, Tutoring and grading, University of Illinois at Urbana-Champaign
- Fall 2006, Analytic number theory(graduate course), Abstract algebra I(graduate course), Elementary linear algebra, Tutoring and grading , University of Illinois at Urbana-Champaign
- Summer 2006, Linear transformations and matrices, Discussion and grading, University of Illinois at Urbana-Champaign
- Spring 2006, Calculus of several variables, Math 242 CD3 and CD5, Discussion and recitation, University of Illinois at Urbana-Champaign
- Fall 2005, Calculus I(1st course of calculus of single variable), Math 220 CD1, CD6 and CD7, Discussion and recitation, University of Illinois at Urbana-Champaign
- Summer 2005, Introduction to abstract algebra, Linear transformations and matrices, Discussion and grading, University of Illinois at Urbana-Champaign
- Spring 2005, Calculus II(2nd course of calculus of single variable), Math 230 BD5 and BD6, Discussion and recitation, University of Illinois at Urbana-Champaign
- Fall 2004, Calculus II(2nd course of calculus of single variable), Math 230 CD1, Discussion and recitation/Introduction to differential equations, Tutoring and grading, University of Illinois at Urbana-Champaign

- Spring 2004, Calculus of severable variables, Grading, University of Illinois at Urbana-Champaign
- Fall 2003, Calculus of severable variables, Grading, University of Illinois at Urbana-Champaign
- 2002, Graduate student algebra seminar, organizer, Kyungpook National University, South Korea
- 2001, Abstract algebra, grading, Kyungpook National University, South Korea

VI. Nontraditional Teaching experience using technology

- Netmath Online teaching (Aug. 2012 – present)
 - Developing online 400 level courses towards mastery degree program
 - Teaching through grading and giving feedback (by typing/producing a paper in pdf format) the exams of 10 different courses (Finite mathematics, Calculus I, II, III, Business calculus, Half course of vector calculus, Differential equation, Differential equation plus, Applied linear algebra, Probability theory: feedback is a replacement of lecture in traditional classes – I have 20 years of college level math teaching experience
 - Teaching through following-up students' questions on grading exams
 - Teaching through grading and giving feedback homework assignments: feedback is a replacement of lecture in traditional classes
 - Teaching through grading and giving feedback belated homework assignments submitted by other mentors' students when some mentors (graders) are not able to finish in time
 - Teaching through answering students' questions via email, online chat, skype and Piazza forum
 - Teaching through advising students by sending emails individually weekly: discuss the students' progress and activities
 - Advising teaching assistances
 - Recording students' grades in the database (FileMaker)
 - Others

* See above for more details about courses I have taught.
- Calculus & Mathematica (Fall 2011, Calculus III, Vector Calculus)
 - Fall 2011, Calculus & Mathematica, Calculus III (Vector calculus), Math 241 D8 and Symbolic computation lab Math 290 R2, a sole instructor, University of Illinois at Urbana-Champaign
- Blended course (Spring and Fall 2010, Math 124, Finite mathematics)
 - Fall 2010, Blended course, Finite Mathematics, Math 124, University of Illinois at Urbana-Champaign
 - Spring 2010, Blended course, Finite Mathematics, Math 124, University of Illinois at Urbana-Champaign

PROJECT 2: 400 level courses towards online master degree program (Fall 2016 ~ Present)

- Math 423, Differential Geometry, Fall 2019 ~ Spring 2020.

- : I created Lecture note presentations (42 lectures), Supplementary Notes and proofs, Homework assignments, Course Schedule, Syllabus, Course objectives, Topics of each sections, exams.
- Applied Complex Variables, Math 446 -- Fall 2018 ~ Spring 2019.
: I edited Lecture note presentations (40 lectures), and I created Homework assignments, Course Schedule, Syllabus, Course objectives, Topics of each sections, exams.
- I developed Abstract Linear Algebra, Math 416 and Complex Variables, Math 448. I developed all contents except for the lecture videos. I created the lecture presentations of each of the classes (total 80 classes of presentations), and exams (27 exams). I am teaching them summer 2018. I offer office hours for both on-campus and off-campus students using technology. I have office hours every day. I have total 26+ students on 7/5/2018.
- I pioneered the new online courses. I developed and successfully taught in 2017 summer. I taught total 27+ students in 2017 summer as an instructor for both courses (Finally, Abstract Algebra, Math 417: 11 students & Elementary Real Analysis, Math 444: 16 students)
Overall quality in the End course survey: Math 444: 92% gave Good/Excellent, Math 417: 67% gave Good/Excellent
- Implement online classes in Moodle: each online course has components which include video lectures (40 50-minutes or 27 75-minutes), chalkboard presentations, caption, practice exams, homework assignments, actual exams, question forum, Blackboard collaborate embedded in Moodle, and etc (Blackboard collaborate makes possible to teach online.). I reviewed each of the video lectures and created latex beamer lecture presentations.
- I developed all contents except the video lectures. These include course timeline, course syllabi, lecture presentations, exams (2 or 3 versions of each course every summer) and solutions, homework and solutions, study guide, practice exams and solutions.
- I created efficient course timeline of each of the courses so that the students go through each material one at a time.
- Abstract Linear Algebra, Math 416 & Complex Variables, Math 448. These were offered in 2018 Summer -- Fall 2017 ~ Spring 2018.
- Abstract Algebra, Math 417 & Elementary Real Analysis, Math 444. I first launched and taught these new online courses in 2017 Summer -- Fall 2016 ~ Spring 2017.

PROJECT 1: Test bank contents operated by Mathematica (2016)

- I pioneered the new randomized test/solutions generating system operated by Mathematica.
- Exam problems for 8 undergraduate math. courses have been developed. I edited the problems/solutions and Mathematica codes, and I input new problems and randomized them.
- I tested the Test bank: I created two different versions of each of the exams (2 midterms and 1 final) of each of the courses from Calculus II to Probability Theory for courses offered in Summer 2016. I reviewed and edited all the generated exams and I adjusted the difficulty of each of the exams.
- Finite Mathematics by Andrew Hunte
- Calculus I by Shan Jiang

- Calculus II by Yi Xie
- Calculus III vector calculus by Roger Burt, Sunyechu Wang, Barry Walker
- Business calculus, combination of Calculus 1 and 2, (I added a section of business calculus problems)
- Half course of Calculus III which is provided for the returning students.
- Introduction to differential equation by Eujin Hong
- Differential equation Plus for engineering students by Eujin Hong, Eujin Hong added a section of engineering problems.
- Applied linear algebra by Michael Oyengo and Jinhyung To. (I input about 1,000 pages including Mathematica codes)
- Probability Theory by Goran Tomic
- The Mathematica based test composer by Faisal Whelpley

PROFESSIONAL OUTREACH SERVICES

- A committee member of the KSEA-NMC 2019 (2019 - 2020): I created 25 11th grade math competition problems. I reviewed 9th grade problems. I created sample problems – The event is cancelled due to COVID19 – Online competition on Dec 5
- State Finals of the ICTM high school math contest at University of Illinois at Urbana-Champaign: Judges for the Orals competition (May, 2020) – The event is cancelled due to COVID19
- State Finals of the ICTM high school math contest at University of Illinois at Urbana-Champaign: Judges for the Orals competition (May, 2019)
- A committee member of the KSEA-NMC 2019 (2018 - 2019): I created 30 11th grade math competition problems. I reviewed 9th grade problems. I also did external review for 7 & 8th grade problems.
- State Finals of the ICTM high school math contest at University of Illinois at Urbana-Champaign: Judges for the Orals competition (May 5, 2018)
- Organize and teaching Mathcounts preparation group
- A committee member of the KSEA-NMC 2018 (2017 - 2018): I created 30 11th grade math competition problems and I created sample questions. I reviewed 9th grade problems.
- A committee member of the KSEA-NMC 2017 (2016 - 2017): I created 30 11th grade math competition problems and I created sample questions. I reviewed 9th grade problems.
- In Recognition of Outstanding Contribution to KSEA-NMSC (2016)
- A committee member of the KSEA-NMSC 2016 (2015 - 2016): I created 30 11th grade math competition problems and I created sample questions. I reviewed 9th grade problems.
- NMSC (National Math and Science Competition) is organized by KSEA(Korean-American Scientists and Engineers Association) and KAMSA (Korean-American Mathematical Scientists Association)
- Thesis advising a PhD student: We discussed the thesis.

TECH CONFERENCE ATTENDED

- Wolfram Technology Conference 2016, Champaign IL (2016)

TECHNOLOGY SKILLS : COMPUTER AND LEARNING MANAGEMENT SKILLS

- Zoom (Virtual classes and office hours)
- Blackboard collaborate (Virtual classes and office hours)
- Moodle (Learning management system)
- Box (Online folders)
- Gradescope (Grading management system)
- Test generator (Mathematica based)
- Piazza (Online class management system)
- *Mathematica* (Computer algebra system)
- Mathable (Online *Mathematica* and textbooks)
- Makingmath (Online *Mathematica* and textbooks)
- File Maker Pro (Course management data base)
- RT system (E-mail management system)

RESEARCH INTEREST

- Tate conjecture and Riemann hypothesis
- My research is in the fields of complex algebraic geometry, algebraic geometry, and number theory
- Families of Galois representations and deformation to a representation
- Certain flat families of coherent sheaves over Artinian rings (Deformations)
- Co-Higgs bundles and holomorphic chains (on the projective line)
- Moduli spaces of holomorphic chains on (semi)stable vector bundles.
- Connections on a complex vector bundle
- Gröbner basis
- Commutative algebra towards algebraic geometry
- Derived category towards the moduli space of holomorphic chains on the projective line
- Derived category
- Morse theory
- From Moduli problem to linear algebra problem
- Topological invariants of moduli spaces
- Finding well-known varieties isomorphic to moduli spaces
- Symplectic geometry
- Symplectic geometry and Geometric Invariant Theory
- Non-reductive algebraic group actions and Geometric Invariant Theory
- Category equivalence towards moduli spaces of holomorphic chains
- Survey of the moduli spaces of vector bundles

- Higher rank Brill-Noether Theory
- Algebraic geometry
- Quiver bundles as a generalization of holomorphic chains
- Moduli spaces: categorical sense
- Moduli spaces and Geometric Invariant Theory
- Principle bundles in relation with vector bundles
- Complex algebraic geometry
- The existence of α -stable holomorphic chains
- Riemannian geometry: curvature form and metric
- Abelian varieties
- Algebraic groups
- Local description of the moduli space of holomorphic chains
- Stability of vector bundles under operations(ex. tensor product, wedge product, symmetric product and etc)
- Maps between moduli spaces of vector bundles
- Moduli spaces of holomorphic chains on the projective line and non-reductive Geometric Invariant Theory
- Non-reductive Geometric Invariant Theory and symplectic reduction
- Geometric Invariant Theory and symplectic reduction
- Moduli spaces of holomorphic chains on the projective line and the derived categories of quiver sheaves on the projective line
- Moduli spaces is a way of finding algebraic varieties not by polynomial equations but by Geometric Invariant Theory

PUBLICATIONS

- Holomorphic chains of type $(n, 1; d, 0)$ on the projective line, in preparation
- Holomorphic chains of type $(2, 1; L, 0)$ of a fixed determinant L , in preparation
- Holomorphic chains of type $(2, 1; d, 0)$ on the projective line: from a grassmannian to projective space, in preparation
- Holomorphic chains composed of semistable vector bundles, in preparation
- Holomorphic chains composed of line bundles, preprint
- Holomorphic chains on the projective line, Ph.D. Thesis, 2012
- Cancellation modules and gr-cancellation ideals, Master Thesis, 1998, Kyungpook National Univ. S. Korea

Book Project

- Geometric Invariant Theory and Moduli space

Survey Project

- p-adic Modular forms
- Deformation Theory of coherent sheaves on a scheme
- Moduli of Elliptic curves
- Flatness in algebraic geometry
- Set-theoretical complete intersection curves in the projective space \mathbf{P}^3

AWARDS AND SCHOLARSHIPS

- In Recognition of Outstanding Contribution to KSEA-NMSC (Spring 2016)
- NetMath Consistent Excellent Award, Univ. of Illinois at Urbana-Champaign (Fall 2013)
- Research Assistantship, Univ. of Illinois at Urbana-Champaign (Spring 2011)
- Fellowship, Univ. of Illinois at Urbana-Champaign (Spring 2009)
- Research Assistantship, Univ. of Illinois at Urbana-Champaign (Fall 2008)
- Research Assistantship, Univ. of Illinois at Urbana-Champaign (Summer 2007)
- KOSEF Scholarship, Korean Government (2003 ~ 2004)

CONFERENCES AND SEMINARS ATTENDED

- AMS Conference via Zoom, Fall 2020
- Diversity in Graduate Mathematical Sciences, IMSI, November 2020
- Preparing Math Majors for Careers webinar, TPSE, October 2020
- Lie theory without groups (Andrei Okounkov), AMS Erdos Memorial Lecture, October 2020
- Special Session on Automorphic Forms and Galois Representations, 2020 AMS Fall Eastern Virtual Sectional Meeting, October 2020
- Keynote Session: Practical Strategies for Teaching Online During COVID-19 / Bonus Session: Helping Graduate Students Write During COVID-19, ProQuest's 2nd Annual Fall Faculty Webinar, September 2020
- p-adic modular forms, algebraic number theory seminar, Spring 2020, University of Illinois at Urbana-Champaign
- Prismatic cohomology, algebraic number theory seminar, Fall 2019, University of Illinois at Urbana-Champaign
- Langlands correspondence, algebraic number theory seminar, Fall 2018, University of Illinois at Urbana-Champaign
- Graduate student algebraic geometry seminar (Weekly, University of Illinois at Urbana-Champaign)
- Algebraic geometry seminar (Weekly, University of Illinois at Urbana-Champaign)
- Algebraic geometry lunch seminar (Weekly, University of Illinois at Urbana-Champaign)
- Automorphic Forms and the Langland's Program at MSRI, July 24 ~ Aug 4 (University of Illinois at Urbana-Champaign, July 31 - Aug 11, 2017)
- Enumerative Geometry, Mirror Symmetry, and Physics, at University of Illinois at Urbana-Champaign, July 17-21, 2017

- D-module week at University of Illinois at Urbana-Champaign, July 2017
- Higher codimension cycles on algebraic varieties, Univ. of Illinois at Chicago (2016)
- TPSE Math (Regional meeting), University of Chicago (2015)
- Poisson 2014, University of Illinois at Urbana-Champaign (2014)
- Motivic Invariants and Singularities Thematic Program, Univ. of Notre Dame (2013)
- Ohio State-Michigan-UIC Algebraic Geometry, Univ. of Illinois at Chicago (2010)
- VBAC09, Derived Categories and the Langlands Program, Free Univ. Berlin, Germany (2009)
- Modern Moduli Theory, MSRI, Berkeley (2009)
- Classical Algebraic Geometry Today, MSRI, Berkeley (2009)
- VBAC06, Moduli Spaces and Vector Bundles, CIMAT, Guanajuato, Mexico (2006)

CONFERENCE & SEMINAR TALKS

- Hilbert schemes – Connectedness of Hilbert schemes of the projective space – Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, October 2020
- Cones and Segre classes (Chapter 4) – Intersection Theory learning seminar (Intersection Theory, Second Edition, Fulton) Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, April 17, 2019
- Derived categories of abelian categories and applications II - Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, October 23, 2018
- Derived categories of abelian categories and applications I - Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, October 16, 2018
- Moduli spaces of compact Riemann surfaces - Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, January 23, 2018
- Zariski Tangent Space to the moduli of vector bundles on an algebraic curve II - Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, November 1, 2017
- Zariski Tangent Space to the moduli of vector bundles on an algebraic curve I - Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, October 25, 2017
- Complete intersection in projective spaces - Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, May 5, 2017
- Holomorphic chains - Midwest Algebraic Geometry Graduate Conference, University of Wisconsin at Madison (2010)
- Parameter Spaces & Moduli Spaces - Graduate Student Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign (2008)

PROFESSIONAL MEMBERSHIPS

- American Mathematical Society (AMS)
- Association of Christian in the Mathematical Sciences (ACMS)

PERSONAL SERVICES

- Korean Math Graduate Student Representative, University of Illinois at Urbana-Champaign (Fall 2006 – Spring 2007)

REFERENCES: