

# Lim, Dong Gyu

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## Curriculum Vitae

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EDUCATION	<b>University of California at Berkeley</b> , Berkeley, CA Ph.D in Mathematics <i>On leave for 3 years (Military Service in South Korea)</i> Master of Arts in Mathematics <b>Rutgers, the State University of New Jersey</b> , New Brunswick, NJ Exchange Student Program <b>Seoul National University</b> , Seoul, South Korea Bachelor of Science in Mathematics, <i>Summa Cum Laude</i> Bachelor of Arts in Economics	Aug 2018 ~ May 2023 Aug 2013 ~ Aug 2015 Jan 2013 ~ May 2013 Mar 2009 ~ Aug 2013
RESEARCH INTERESTS	$p$ -adic geometry, moduli of shtukas, affine Deligne-Lusztig varieties, Shimura varieties, Langlands Program	
RESEARCH PAPERS	<i>Nonemptiness of single affine Deligne-Lusztig varieties</i> , preprint (2022) <i>The connected components of affine Deligne-Lusztig varieties</i> , with I.Gleason and Y.Xu, preprint (2022)	available upon request available at <a href="https://arxiv.org/abs/2208.07195">arxiv.org/abs/2208.07195</a> .
OTHER PUBLICATIONS	<b>Moments in Life When You Need Your Math Brain</b> , Tornado Press, Korea, 344 pages Written for the general public, about approachable ways to discover math in our everyday lives	July 2019
INVITED TALKS	The 10th NCTS-POSTECH-PMI Joint Workshop on Number Theory, Online Conference Title: <i>Nonemptiness of single affine Deligne-Lusztig varieties</i> <b>Johns Hopkins Junior Number Theory Days 2022</b> , Johns Hopkins University, Baltimore, MD Title: <i>p-adic geometry and affine Deligne-Lusztig varieties Lie Groups and Representation Theory Seminar, University of Maryland, College Park, MD Title: <i>Nonemptiness of single affine Deligne-Lusztig varieties</i> <i>Connected components of affine Deligne-Lusztig varieties</i> CAS AMSS Seminar, Chinese Academy of Sciences, Beijing, China (online) Title: <i>Some geometry of affine Deligne-Lusztig varieties</i> Berkeley-Tokyo Workshop, University of California, Berkeley, CA (online) Title: <i>Nonemptiness of (single) affine Deligne-Lusztig varieties</i> CUHK RANT Seminar, Chinese University of Hong Kong, Hong Kong (online) Title: <i>Nonemptiness of affine Deligne-Lusztig varieties</i> SNU Number Theory Group Seminar, Seoul National University, Seoul, South Korea Title: <i>Nonemptiness of affine Deligne-Lusztig varieties</i></i>	Dec 2022 Dec 2022 Nov 2022 Nov 2022 Mar 2022 Feb 2022 Jan 2022

TEACHING  
EXPERIENCE

Graduate Student Instructor (GSI), Department of Mathematics, UC Berkeley  
with **Outstanding GSI Award** (2014-15)

• Math 1B <i>Calculus</i>	Spring 2015	• Math 110 <i>Linear Algebra</i>	Fall 2020
• Math 53 <i>Multivariable Calculus</i>	Spring 2014	• Math 113 <i>Introduction to Abstract Algebra</i>	Fall 2022
• Math W53 <i>Web-based Multivariable Calculus</i>	Summer 2019, 2020, 2021	• Math 126 <i>Introduction to Partial Differential Equations</i>	Spring 2020, 2023
• Math 54 (Full-time lecturer)	Summer 2014	• Math 185 <i>Introduction to Complex Analysis</i>	Fall 2021
• Math 54 <i>Linear Algebra and Differential Equations</i>	Fall 2014, Fall 2018 Spring 2019, Fall 2019	• Math 250B <i>Commutative Algebra</i>	Spring 2023

Directed Reading Program (DRP), Department of Mathematics, UC Berkeley  
Mentored undergraduate students for independent reading projects

- *Introduction to Model Theory* (Mentee: Erika Lin) Spring 2015
- *Arithmetic of Elliptic Curves* (Mentee: Kai Shaikh) Spring 2020

Preparation Class for IMO, Private tutoring 2009 ~ 2012  
Taught six representatives (all won **Gold Medals** in IMO)  
• Each ranked 37<sup>th</sup>('09), 27<sup>th</sup>('10), 13<sup>th</sup>('11), 9<sup>th</sup>, 24<sup>th</sup>, 27<sup>th</sup>('12).

Teaching Assistant, Summer & Winter Schools, Korean Mathematical Society (KMS) 2009 ~ 2012  
Taught students (selected based on their performance in the Korean Mathematical Olympiad)  
at the official math bootcamps of the KMS

AWARDS &  
CERTIFICATES

**Undergraduate Mathematical Competition**, Korean Mathematical Society  
2 Gold Awards Nov 2010 and Nov 2011

**Korean Injae Award**, Presidential Award  
awarded by Lee MyungBak, President of Republic of Korea Dec 2008

**49<sup>th</sup> International Mathematical Olympiad (IMO)**, Madrid, Spain  
Gold Medal (12<sup>th</sup> out of 535 students) Jul 2008

SCHOLARSHIPS  
& FELLOWSHIPS

**Lehmer Fellowship in Number Theory**, Department of Mathematics, UC Berkeley Spring 2022

**Presidential Scholarship of Science**, Korea Foundation for the Advancement of Science & Creativity  
Mar 2009 ~ Feb 2013

**Scholarship for Studying Abroad Students**, Korea Foundation for Advanced Studies  
2013-14, 14-15, 18-19, 19-20, 20-21

MATHEMATICS  
OUTREACH

**Door-to-Door Math Talk Concerts**, almost everywhere in Korea Sep 2015 ~ Aug 2018  
Short, enjoyable math talks on miscellaneous everyday thoughts as a math person  
for students and adults (>50 times, >5000 people)

Science Night Live, University of California, Berkeley, CA Sep 2022  
 Delivered a talk about the beauty of number theory to non-math graduate students and postdocs  
 Title: *What is ANT? with interesting coincidences around Heegner Numbers*

INTERNAL  
SEMINAR TALKS

**Berkeley Number Theory Learning Seminar**

Hodge Cycles on Abelian Varieties Spring 2019  
*Stabilizers of Hodge cycles and of absolute Hodge cycles in the Mumford-Tate group*  
 Arithmetic Statistics of Function Fields via Hurwitz space Fall 2019  
*On a homological spectral sequence converging to the homology group of Hurwitz space*  
 Eichler-Shimura Relation Spring 2021  
*Description of  $X_0(Np)$  as two copies of  $X_0(N)$  intersecting transversally at supersingular points*  
 $p$ -adic Modular Forms Fall 2021  
*The proof of Coleman Classicality Theorem*  
 Arithmetic of Algebraic Differential Equations Fall 2022  
*Global nilpotence and some bound via the conjugate spectral sequence and Hodge cohomology*

**Berkeley-Stanford Learning Seminar**

Bruhat-Tits Theory Spring 2020  
*Explicit descriptions of buildings for  $SL_n$  and  $SP_{2g}$*   
 $p$ -divisible Groups Fall 2020  
*Adic generic fiber of Rapoport-Zink space, Fargues-Fontaine curve, and  $p$ -divisible group over  $O_C$*   
 Perverse Sheaves Fall 2021  
*Sheaf-function dictionary via the trace map*  
 Emerton-Gee Stacks Fall 2022  
*Crystalline representations and the structure theorem of Breuil-Kisin modules*

**Student Number Theory Seminar**

The Kottwitz conjecture for local shtuka spaces Fall 2019  
*Dualizing complex and trace distribution on Artin  $v$ -stacks*  
 The cohomology of compact unitary Shimura varieties Spring 2020  
*Vector bundles on the Fargues-Fontaine curve*  
*Rapoport-Zink spaces and the dimension of strata in the flag varieties*

WORK  
EXPERIENCE  
AND SOCIAL  
SERVICE

**Chief Olympiad Assistant**, Korean Mathematical Society 2010-11  
 Led official KMS Olympiad events for the 2010-11 season up to the team selection and participated in IMO 2011 as an Observer C  
 Researcher, Education & Culture, **National Institute for Mathematical Sciences**, South Korea  
 • General focus: Studied and developed mathematical culture in South Korea  
 • Personal focus: Created math outreach activities for students with underrepresented backgrounds  
 Sep 2015 ~ Aug 2018  
 President, Korean Graduate Student Association, UC Berkeley Jul 2014 ~ Jun 2015  
 Organized social events, friendly sports matches (with Stanford), and job recruiting events  
 Co-founder and Vice President, Easy Bay Korean Tennis Club, Berkeley and SF Area  
 Contributed to integration of the Korean community in Bay Area through tennis  
 Jun 2021 ~ May 2022

PROGRAMMING  
SKILLS

SageMath (intermediate)