Lim, Dong Gyu

Website: limathub.github.io
Email: limath@math.berkeley.edu   **Curriculum Vitae**

EDUCATION   **University of California at Berkeley**, Berkeley, CA
                    Ph.D in Mathematics   Aug 2018 ∼ May 2023
                          On leave for 3 years (Military Service in South Korea)
                    Master of Arts in Mathematics   Aug 2013 ∼ Aug 2015

                    Rutgers, the State University of New Jersey, New Brunswick, NJ
                    Exchange Student Program   Jan 2013 ∼ May 2013

                    Seoul National University, Seoul, South Korea
                    Bachelor of Science in Mathematics, *Summa Cum Laude*
                    Bachelor of Arts in Economics   Mar 2009 ∼ Aug 2013

RESEARCH   affine Deligne-Lusztig varieties, Shimura varieties, p-adic geometry, moduli of shtukas, Langlands Program
INTERESTS

RESEARCH   *The connected components of affine Deligne-Lusztig varieties*, with I.Gleason and Y.Xu, preprint (2022)
PAPERS   available at arxiv.org/abs/2208.07195.

                   Nonemptiness of single affine Deligne-Lusztig varieties, preprint (2023)
                                                            available at arxiv.org/abs/2302.04976.

                   A combinatorial proof of the identity of He-Nie-Yu, preprint (2023)
                                                            available at arxiv.org/abs/2302.13260.

OTHER   **Moments in Life When You Need Your Math Brain**, Tornado Press, Korea, 344 pages   July 2019
PUBLICATIONS   Written for the general public, about approachable ways to discover math in our everyday lives

INVITED TALKS   UW Algebra and Algebraic Geometry Seminar, University of Washington, Seattle, WA
                       Title: *Nonemptiness of single affine Deligne-Lusztig varieties*   Jan 2023

                   KAIST Number Theory Group Seminar, KAIST, Daejeon, South Korea
                       Title: *Nonemptiness of single affine Deligne-Lusztig varieties*   Jan 2023

                   The 10th NCTS-POSTECH-PMI Joint Workshop on Number Theory, Online Conference, link
                       Title: *Nonemptiness of single affine Deligne-Lusztig varieties*   Dec 2022

                   POSTECH Number Theory Group Seminar, POSTECH, Pohang, South Korea
                       Title: *Introduction to affine Deligne-Lusztig varieties*   Dec 2022

                   SNU Number Theory Group Seminar, Seoul National University, Seoul, South Korea
                       Title: *Connected components of affine Deligne-Lusztig varieties*   Dec 2022

                   Johns Hopkins Junior Number Theory Days 2022, Johns Hopkins University, Baltimore, MD
                       Title: *p-adic geometry and affine Deligne-Lusztig varieties*   Dec 2022

Lie Groups and Representation Theory Seminar, University of Maryland, College Park, MD, link
    Title: *Nonemptiness of single affine Deligne-Lusztig varieties*
            Connected components of affine Deligne-Lusztig varieties   Nov 2022

CAS AMSS Seminar, Chinese Academy of Sciences, Beijing, China (online), link
    Title: *Some geometry of affine Deligne-Lusztig varieties*   Nov 2022

Berkeley-Tokyo Workshop, University of California, Berkeley, CA (online), link
    Title: *Nonemptiness of (single) affine Deligne-Lusztig varieties*   Mar 2022

CUHK RANT Seminar, Chinese University of Hong Kong, Hong Kong (online), link
    Title: *Nonemptiness of affine Deligne-Lusztig varieties*   Feb 2022

SNU Number Theory Group Seminar, Seoul National University, Seoul, South Korea
    Title: *Nonemptiness of affine Deligne-Lusztig varieties*   Jan 2022

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

49th International Mathematical Olympiad (IMO), Madrid, Spain
    Gold Medal (12th 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*

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

TEACHING
EXPERIENCE

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

- Math 1B   Spring 2015
  Calculus
- Math 53   Spring 2014
  Multivariable Calculus
- Math W53   Summer 2019, 2020, 2021
  Web-based Multivariable Calculus
- Math 54 (Full-time lecturer) Summer 2014
- Math 54   Fall 2014, Fall 2018
          Spring 2019, Fall 2019
  Linear Algebra and Differential Equations

- Math 110   Fall 2020
  Linear Algebra
- Math 113   Fall 2022
  Introduction to Abstract Algebra
- Math 115   Spring 2023
  Introduction to Number Theory
- Math 126   Spring 2020, 2023
  Introduction to Partial Differential Equations
- Math 185   Fall 2021
  Introduction to Complex Analysis

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 Medal**s in IMO)
- Each ranked 37^{th}('09), 27^{th}('10), 13^{th}('11), 9th, 24th, 27^{th}('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

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-divisble group over $O_{\mathbf{C}}$

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

PROGRAMMING SageMath (intermediate)
SKILLS