

Masao Oi (大井 雅雄)

National Taiwan University, Department of Mathematics
Astronomy Mathematics Building 427, No. 1, Sec. 4, Roosevelt Rd., Taipei 10617
masaooi@ntu.edu.tw
<https://masaooi.github.io>
(December 11, 2025)

Academic Positions

- Assistant Professor (Tenured-track), National Taiwan University, August 2024–
- Assistant Professor (program-specific), Kyoto University, October 2019–July 2024
Mentor: Atsushi Ichino
- JSPS postdoctoral fellow, Kyoto University, April 2019–September 2019
Mentor: Atsushi Ichino

Education

- Doctor, Mathematical Science, University of Tokyo, April 2016–March 2019
Thesis: *On depth in the local Langlands correspondence*
Supervisor: Yoichi Mieda
Tasho Kaletha (2018 winter; short-term stay at University of Michigan)
- Master, Mathematical Science, University of Tokyo, April 2014–March 2016
Thesis: *On the endoscopic lifting of simple supercuspidal representations*
Supervisor: Naoki Imai (April 2014–September 2014),
Yoichi Mieda (October 2014–March 2016)
- Bachelor, Mathematics, University of Tokyo, April 2010–March 2014

Research Interests

- Harmonic analysis and representation theory of reductive groups over local/global fields
- Langlands correspondence and Langlands functoriality

Grants/Fellowships

- Yushan Young Fellow (Sciences), August 2024–July 2029.
- JSPS KAKENHI Grant Number: 24K16899, “Generalization of Deligne–Lusztig theory and the local Langlands correspondence”, April 2024–March 2028 (suspended since August 2024).
- JSPS KAKENHI Grant Number: 20K14287, “Study of the Langlands functoriality via an explicit local Langlands correspondence”, April 2020–March 2024.
- JSPS Research Fellow (PD) Grant Number: 19J00846, “Study of the Langlands functoriality via twisted harmonic analysis”, April 2019–September 2019.
- JSPS Research Fellow (DC2) Grant Number: 17J05451, “Study of the Langlands functoriality from the viewpoint of harmonic analysis”, April 2017–March 2019.
- FMSP course student, The Leading Graduate Course for Frontiers of Mathematical Sciences and Physics, September 2014–March 2019.

Awards

- Takebe Katahiro Prize for Encouragement of Young Researchers, The Mathematical Society of Japan, September 2019.
- Dean's Award (Doctor's course, valedictorian), Graduate School of Mathematical Sciences, the University of Tokyo, March 2019.
- Dean's Award (Master's course), Graduate School of Mathematical Sciences, the University of Tokyo, March 2016.

Papers

Published or Accepted:

- [1] (with Guy Henniart) *On Swan exponents of symmetric and exterior square Galois representations*, Rad Hrvat. Akad. Znan. Umjet. Mat. Znan. 28 (558) (2024) (special issue for the 70th birthday of Marko Tadić), 151–184.
 - [2] (with Moshe Adrian, Guy Henniart, and Eyal Kaplan) *Simple supercuspidal L-packets of split special orthogonal groups over dyadic fields*, to appear in J. Lond. Math. Soc., 52 pages.
 - [3] (with Alexander Bertolini Meli) *The $B(G)$ -parametrization of the local Langlands correspondence*, Accepted by Amer. J. Math., 40 pages.
 - [4] (with Guy Henniart) *Simple supercuspidal L-packets of symplectic groups over dyadic fields*, Represent. Theory **29** (2025), 108–135.
 - [5] (with Hiraku Atobe and Seidai Yasuda) *Local newforms for generic representations of unramified odd unitary groups and the Fundamental Lemma*, Duke Math. J. **173** (2024), no. 12, 2447–2479.
 - [6] (with Charlotte Chan) *Geometric L-packets of Howe-unramified toral supercuspidal representations*, J. Eur. Math. Soc. (JEMS) **27** (2025), no. 1, 1465–1526.
 - [7] (with Kazuki Tokimoto) *Local Langlands correspondence for regular supercuspidal representations of $GL(n)$* , Int. Math. Res. Not. IMRN (2021), no. 3, 2007–2073.
 - [8] (with Ryotaro Sakamoto and Hiroyoshi Tamori) *Iwahori–Hecke algebra and unramified local L-functions*, Math. Z. 303 (2023), no. 3, Paper No. 59, 42 pp.
 - [9] *Simple supercuspidal L-packets for quasi-split classical groups*, Mem. Amer. Math. Soc. **297** (2024), no. 1483, v+161.
 - [10] *Depth preserving property of the local Langlands correspondence for non-quasi-split unitary groups*, Math. Res. Lett. **28** (2021), no. 1, 175–211.
 - [11] *Depth preserving property of the local Langlands correspondence for quasi-split classical groups in a large residual characteristic*, Manuscripta Math. **171** (2023), no. 3–4, 529–562.
 - [12] *Unramified base change of simple supercuspidal L-packets of quasi-split classical groups*, Algebraic Number Theory and Related Topics 2017, RIMS Kôkyûroku Bessatsu B83 (2020), 061–081.
 - [13] *Endoscopic lifting of simple supercuspidal representations of unramified $U(N)$ to $GL(N)$* , Publ. Res. Inst. Math. Sci. 55 (2019), 895–938.
 - [14] *Endoscopic lifting of simple supercuspidal representations of $SO(2n+1)$ to $GL(2n)$* , Amer. J. Math., 141 (2019), 169–217.
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Preprints:

- [15] (with Charlotte Chan) *Green functions for positive-depth Deligne-Lusztig induction*, arXiv: 2506.04449, preprint (submitted), 57 pages.
- [16] *Twisted endoscopic character relation for toral supercuspidal L-packets of classical groups*, 127 pages, preprint, available at <https://www.math.kyoto-u.ac.jp/~masaooi/TECR.pdf>.
- [17] (with Charlotte Chan) *Characterization of supercuspidal representations and very regular elements*, arXiv:2301.09812, preprint (submitted), 75 pages.

Talks in Seminars/Workshops/Conferences

- (1) CART 2025, Beijing Normal University, December 5, 2025.
- (2) Number theory and p-adic methods, Toyama University, November 23, 2025.
- (3) Number Theory and Representation Theory Seminar, Zhejiang University, October 29, 2025.
- (4) 13th Kurashiki Number Theory Meeting, Kurashiki Seaside Hotel (Japan), September 11, 2025.
- (5) 2025 Japan-Taiwan Joint Workshop on Number Theory, KYUKAMURA SHIKANOSHIMA (Japan), September 4, 2025.
- (6) BIRS-IASM workshop "New Tools in the Local and Global Langlands Programs", Hangzhou, China, July 29, 2025.
- (7) 2025 Cross Strait Workshop on Arithmetic Geometry, Nanjing University (online talk), April 12, 2025.
- (8) Zhongguancun Number Theory Colloquium, Yau Mathematical Sciences Center, Tsinghua University (China), February 28, 2025.
- (9) 2025 TMS Annual TMS meeting, National Central University (Taiwan), January 15, 2025.
- (10) NCTS One-Day Workshop on Number Theory, National Tsing Hua University (Taiwan), December 18, 2024.
- (11) Pan Asia Number Theory Conference 2024, VIASM (Vietnam), July 15-19, 2024.
- (12) Kagura-zaka algebra seminar, Tokyo University of Science, May 23, 2024.
- (13) NTU Mathematics Colloquium, December 27, 2023.
- (14) Algebraic Number Theory and Related Topics 2023, RIMS, December 12, 2023.
- (15) BIRS-IASM workshop "Arthur packets", Hangzhou, China, November 7, 2023.
- (16) Representations of reductive p-adic groups, L-functions and relative matters: a conference in honor of Guy Henniart, Amiens University, France, September 13, 2023.
- (17) The 5th Japan-Taiwan Number theory conference, Penghu University of Science and Technology (PUST), August 22, 2023.
- (18) RIMS workshop "Recent developments in representation theory and related topics", RIMS, June 20, 2023.
- (19) Ehime University Algebra Seminar (online), June 24, 2023.
- (20) Number Theory in Tokyo, Tokyo Institute of Technology, March 24, 2023.
- (21) Mini-workshop on the geometrization of the local Langlands correspondences and related topics, Kyoto University, December 23, 2022.

- (22) Group, Lie and Number Theory, University of Michigan, October 24, 2022.
- (23) 11th Kurashiki Number Theory Meeting, Kurashiki Seaside Hotel, September 11-12, 2022.
- (24) Revisiting Some Aspects of the Works of Harish-Chandra and Weil, NUS, Singapore, July 5, 2022.
- (25) The 7th KTGU Mathematics Workshop for Young Researchers, Kyoto University (online), February 14, 2022.
- (26) RIMS conference: Automorphic forms, automorphic L-functions, and its related topics, RIMS (online), January 27, 2022.
- (27) POSTECH-PMI number theory seminar, online, December 23, 2021.
- (28) The 9th East Asia Number Theory Conference, online, August 26, 2021.
- (29) Keio algebra seminar, Keio University (online), August 2, 2021.
- (30) Automorphic Project & Research Seminar, online, May 14, 2021.
- (31) RIMS conference: Automorphic forms, automorphic representations, Galois representations, and its related topics, RIMS (online), January 29, 2021.
- (32) MIT Lie Groups Seminar, MIT (online), December 2, 2020.
- (33) Kobe number theory mini-workshop, Kobe University (online), November 19, 2020.
- (34) 65th Symposium of Algebra, Chiba University (online), September 4, 2020.
- (35) Number theory seminar, Kyoto University (online), May 22, 2020.
- (36) Kyoto University Colloquium, Kyoto University, January 15, 2020.
- (37) Mathematics seminar, KIAS, January 6, 2020.
- (38) 22nd Hakuba Autumn Workshop on Number Theory "Application of Arthur's multiplicity formula to Siegel modular forms", November 2, 2019.
- (39) Oberwolfach workshop "New Developments in Representation Theory of p-adic Groups", Oberwolfach, October 1, 2019.
- (40) Regulators in Niseko 2019, Hilton Niseko Village, Hokkaido, September 9, 2019.
- (41) 10th Kurashiki Number Theory Meeting, Kurashiki Seaside Hotel, July 26, 2019.
- (42) Workshop on Shimura varieties, representation theory, and related topics, Hokkaido University, July 18, 2019.
- (43) Number theory seminar, Kyoto University, April 12, 2019.
- (44) Workshop on arithmetic geometry, Tokyo-Princeton at Komaba, the University of Tokyo, March 20, 2019.
- (45) On the Langlands Program: Endoscopy and Beyond, National University of Singapore, December 26, 2018.
- (46) Kagawa Seminar, Kagawa university, October 21, 2018.
- (47) 9th Kurashiki Number Theory Meeting, Kurashiki Seaside Hotel, September 19, 2018.
- (48) The 4th Japan-Taiwan Joint Conference on Number Theory, Campina Hotel, Fukue, Goto-city, September 3, 2018.

- (49) 17th Sendai-Hiroshima Workshop on Number theory, Tohoku University, July 13, 2018.
- (50) 5th Kyoto conference on automorphic forms, Kyoto University, June 29, 2018.
- (51) Mathematical Society of Japan Spring Meeting 2018, the University of Tokyo, March 18, 2018.
- (52) Algebraic Number Theory and Related Topics 2017, RIMS, December 6, 2017.
- (53) 8th Kurashiki Number Theory Meeting, Kurashiki Seaside Hotel, July 24-25, 2017.
- (54) 4th Kyoto conference on automorphic forms, Kyoto University, June 17, 2017.
- (55) On the endoscopic character relation, Kinosaki seminar 2017, Kinosaki, Japan, February 15, 2017.
- (56) Automorphic forms and related topics, RIMS, February 10, 2017.
- (57) Number theory seminar, Waseda University, January 20, 2017.
- (58) Representation theory seminar, Hokkaido University, January 17, 2017.
- (59) Workshop on Shimura varieties, representation theory and related topics, Kyoto University, November 22, 2016.
- (60) 7th Kurashiki Number Theory Meeting, Kurashiki Seaside Hotel, July 21-22, 2016.
- (61) 15th Sendai-Hiroshima Workshop on Number theory, Tohoku University, July 14, 2016.
- (62) Number theory seminar, Kyoto University, May 13, 2016.
- (63) Number theory seminar, the University of Tokyo, April 27, 2016.
- (64) Algebra seminar, Tohoku University, April 21, 2016.
- (65) Langlands and Harmonic Analysis, Kyushu University, March 7, 2016.

Conferences/Workshops I have (co-)organized & Other Activities

- (1) Arizona Winter School 2025: Representation theory of p -adic groups, University of Arizona, March 8–12, 2025 (Project Assistant of Charlotte Chan group).
- (2) NCTS One-Day Workshop on Arithmetic and Algebraic Geometry, National Taiwan University, Taiwan, February 20, 2025.
- (3) “Arithmetic Geometry and Representation Theory”, Toyama, Japan, December 16–18, 2019.

Teaching Experiences

Lectures

- (1) Fall 2025, “Theory of algebraic groups”, National Taiwan University.
 - (2) Spring 2025, “Introduction to the local Langlands correspondence”, National Taiwan University.
 - (3) Fall 2024, “Representation theory of finite groups of Lie type”, National Taiwan University.
 - (4) Winter 2023, “Linear Algebra B”, Kyoto University.
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Teaching Assistant

- (5) Winter 2018, Teaching assistant, “Algebra (Representation Theory)”, University of Tokyo.
- (6) Winter 2017, Teaching assistant, “Algebra (Representation Theory)”, University of Tokyo.
- (7) Winter 2016, Teaching assistant, “Calculus”, University of Tokyo.
- (8) Summer 2016, Teaching assistant, “Calculus”, University of Tokyo.
- (9) Summer 2016, Teaching assistant, “Linear Algebra”, University of Tokyo.
- (10) Winter 2014, Teaching assistant, “Algebra III (Galois Theory)”, University of Tokyo.
- (11) Summer 2014, Teaching assistant, “Algebra I (Group Theory)”, University of Tokyo.

References

I have asked the following professors to write a recommendation letter in my past applications:

- Atsushi Ichino (Kyoto University)
- Tamotsu Ikeda (Kyoto University)
- Tasho Kaletha (University of Michigan)
- Yoichi Mieda (University of Tokyo)
- Sug Woo Shin (UC Berkeley)