

# Emile Takahiro Okada

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## Academic Positions

**2022-Current:** Peng Tsu Ann Assistant Professor, National University of Singapore

## Education

**2018-2022: DPhil in Mathematics, University of Oxford**

Thesis: The wavefront set of representations of  $p$ -adic groups

Supervisors: Prof. Dan Ciubotaru, Prof. Kevin McGerty

**2017-2018: Master of Mathematics, University of Cambridge**

Thesis: Modular Representations of Finite Groups of Lie Type in the Defining Characteristic.

Grade: Distinction.

**2014-2017: Bachelor of Arts in Mathematics, University of Cambridge**

Grade: First Class in all years.

## Skills

### **Computer Languages**

Python, Matlab, C++, Mathematica, GAP, L<sup>A</sup>T<sub>E</sub>X, HTML, JavaScript, CSS.

### **Languages**

Fluent in English and Norwegian. Conversant in Japanese.

## Publications

### **8. The stable wave front set of the theta representation**

*with E. Karasiewicz, R. Wang*

submitted.

### **7. Ramification of weak Arthur packets for $p$ -adic groups**

*with M. Gurevich,*

submitted.

### **6. Local character expansions and asymptotic cones over finite fields**

*with D. Ciubotaru,*

submitted.

### **5. Wavefront Sets of Unipotent Representations of Reductive $p$ -adic Groups II**

*with D. Ciubotaru, L. Mason-Brown,*

Journal für die reine und angewandte Mathematik (accepted)

### **4. Some Unipotent Arthur Packets for Reductive $p$ -adic Groups**

*with D. Ciubotaru, L. Mason-Brown,*

International Mathematics Research Notices, Volume 2024, Issue 9, May 2024, Pages 7502–7525

### **3. The Wavefront Sets of Unipotent Supercuspidal Representations,**

with D. Ciubotaru, L. Mason-Brown,  
Algebra & Number Theory, Vol. 18 (2024), No. 10, 1863–1889

**2. Wavefront Sets of Unipotent Representations of Reductive  $p$ -adic Groups I ,**  
with D. Ciubotaru, L. Mason-Brown,  
American Journal of Mathematics (accepted)

**1. The wavefront set of representations of  $p$ -adic groups,**  
PhD thesis

## **Invited Talks**

*On Lusztig's local Langlands correspondence and functoriality*, Xiamen University, China. 01/2025

*An introduction to the representation theory of  $p$ -adic groups*, Xiamen University, China. 01/2025

*On Singularities and Ramification of Arthur Packets*, Beijing International Center for Mathematical Research, Peking University, China. 12/2024

*Involutivity in the unramified local Langlands correspondence*, Yau Mathematical Sciences Center at Beijing, Tsinghua University, China. 12/2024

*On the Adams–Vogan conjecture*, NCTS Workshop on Representation Theory and Lie Groups, National Center for Theoretical Sciences, Taiwan. 12/2024

*Types, Hecke algebras, and wave front sets*, Representations of  $p$ -adic groups, Mathematisches Forschungsinstitut Oberwolfach, Germany. 12/2024

*Lecture series on the wave front set (4 lectures)*, National University of Singapore, Singapore. 11/2024

*Character sheaves, Hecke algebras, and the wavefront set*, Representation theory seminar, University of Melbourne, Australia. 08/2024

*Ramification of weak Arthur packets*, Pan Asian Number Theory Conference, Vietnam Institute of Advanced Study in Mathematics, Vietnam. 07/2024

*Ramification of weak Arthur packets*, Algebra seminar, University of Aarhus, Denmark. 07/2024

*Ramification of weak Arthur packets*, Pacific Rim Conference in Mathematics, Darwin, Australia. 06/2024

*The wavefront set of a  $p$ -adic representation*, Lie Theory seminar, Chinese University of Hong Kong, Shenzhen, China. 04/2024

*Weakly spherical representations and the weak Arthur packet conjecture*, Arthur Packets, Institute for Advanced Study in Mathematics, Hangzhou, China. 11/2023

*On some recent progress on wavefront sets in depth-0 and positive depth*, Anaparastaseis: Orbits, Hecke algebras, and representations, Nisyros. 07/2023

*The wavefront set of unipotent representations with real infinitesimal character*, Algebra Seminar, Oxford University. 06/2023

*The wavefront set of unipotent representations with real infinitesimal character*, Algebra University, Haifa University. 05/2023

*Wavefront sets of representations of  $p$ -adic groups*, Mini-workshop on  $p$ -adic group representations, Fudan University. 12/2022

*New results and open questions from the study of local wavefront sets*, Representation Theory and Number Theory Seminar, National University of Singapore. 09/2022

*On the construction of some unipotent local Arthur packets*, Minimal Representations and Theta Correspondence, Erwin Schrödinger International Institute for Mathematics and Physics. 02/2022

*The wavefront set and Arthur packets of  $p$ -adic groups*, Lie Groups Seminar, MIT. 02/2022

*Arthur packets for  $p$ -adic groups and the wavefront set*, Number Theory Seminar, University of Cambridge. 02/2022

*The wavefront set of representations of  $p$ -adic groups*, Algebraic Geometry and Representation Theory Seminar, Weizmann Institute. 01/2022

*The Wavefront Set of Spherical Arthur Representations*, Representation Theory Seminar, Purdue University. 10/2021

*The wavefront set of admissible representations of  $p$ -adic groups*, Representations of  $p$ -adic groups and related topics, Durham University. 09/2021

*The Wavefront Set of Spherical Arthur Representations*, Representation Theory and Number Theory Seminar, National University of Singapore. 09/2021

*Parameterising unramified nilpotent orbits using dual Springer parameters*, Algebra Seminar, University of Oxford. 10/2020

*A parameterisation of nilpotent orbits over a maximal unramified extension of a  $p$ -adic field using dual Springer parameters*, Junior London Algebra Colloquium, Imperial College London. 07/2020

## Conferences

**Representations of  $p$ -adic groups** December 2024

Mathematisches Forschungsinstitut Oberwolfach, Germany. 1 week.

**Representation Theory and Lie Groups** October 2024

Brin Mathematics Research Center, United States of America. 1 week.

**Pan Asian Number Theory Conference** July 2024

Vietnam Institute of Advanced Study in Mathematics, Vietnam. 1 week.

**Pacific Rim Conference in Mathematics** June 2024

Australian National University, Australia. 1 week.

**Arthur Packets** November 2023

Institute for Advanced Study in Mathematics, Hangzhou, China. 1 week.

**Anaparastaseis: Orbits, Hecke algebras, and representations** July 2023

Nisyros, Greece. 1 week.

**Representation Theory, Combinatorics and Geometry** December 2022

National University of Singapore, Singapore. 4 weeks.

**Minimal Representations and Theta Correspondence** April 2022

Erwin Schrödinger International Institute for Mathematics and Physics, Austria. 1 weeks.

**Representations of  $p$ -adic groups and related topics** September 2021

Durham University, Durham, UK. 1 day.

**Buildings and Affine Grassmannians**

*August 2019*

Centre International de Rencontres Mathématiques, Marseille, France. 2 weeks.

## Teaching

**Lecturer - National University of Singapore**

MA5211 Lie Theory, MA3201 Algebra II.

**Tutor - Somerville College, University of Oxford**

Prelims Analysis II, Prelims Analysis III, Part A Integration, Part A Topology, and Part A Groups.

**Teaching Assistant - Mathematical Institute, University of Oxford**

B2.1 Introduction to Representation Theory (x2), B2.2 Commutative Algebra (x1), B3.1 Galois Theory (x4), C2.2 Homological Algebra (x1), C2.7 Category Theory (x1).

**Master's students**

Timothy Peck Hsien Wei

*2023 - 2024*

**Undergraduate research project**

Galileo Grey

*2024 - current*

## Service

**Journal Referee**

Selecta Mathematica, Advances in Mathematics, Algebra and Number Theory, International Mathematics Research Notices.

**Seminar Organiser**

Algebraic groups

*2019*

The local Langlands correspondence for unipotent representations

*2022*

$p$ -adic Arthur packets

*2024*

## Awards and Honors

Aker Scholarship

*2018 - 2022*

Cambridge University Trust Scholarship

*2014 - 2018*

Emmanuel College Examination Prizes

*2015, 2016, 2017, 2018*

## Employment

**University of Oxford**

Stipendiary Lecturer at Somerville College

*January 2021-September 2021*

**Den Norske Bank (DNB Bank ASA)**

Foreign Exchange Desk Intern

*July - August 2018*

Digitalization, Business Development and Innovation Intern

*June - September 2017*

Awards: 1st place in hackathon.

## Summer Research in Mathematics

**Cambridge Image Analysis Group, University of Cambridge**

*June - August 2016*

## Other

**Part-Time Developer, Agora**

*November 2014 - January 2016*

**Part-Time Research Assistant, Kyoto University**

*December 2014 - October 2015*

Supervisor: Dr. Nike Dattani.

## References

**Dan Ciubotaru**, University of Oxford,

*dan.ciubotaru@maths.ox.ac.uk*

**Wee Teck Gan**, National University of Singapore,

*matgwt@nus.edu.sg*

**Maxim Gurevich**, Technion - Israel Institute of Technology,

*maxg@technion.ac.il*

**Lucas Mason-Brown**, The University of Texas at Austin,

*lucas.masonbrown@gmail.com*