# Ruoyu P. T. Wang

# **Research** Interests

Pure and applied analysis of PDE: microlocal analysis, spectral and scattering theory, mathematical physics, control theory and dynamical systems.

## Education

- 2023 **Ph.D. Mathematics**, Northwestern University, US. Advisor: Jared Wunsch.
- 2017 M.A.St. Mathematics, University of Cambridge, UK.
- 2016 B.Sc. Mathematics, University College London, UK.

## Appointments

- From 2024 Gibbs Assistant Professor, Yale University, US.
- 2023–2024 Research Fellow, University College London, UK.

# Visiting Appointments

- From 2024 Honorary Research Fellow, University College London, UK.
- 2024/05,11 Chercheur Invité, I.H.É.S., Université Paris-Saclay, France.

# Awards and Honours

- 2023 Graduate Thesis Award, International Congress of Chinese Mathematicians.
- 2022 Outstanding Student Teacher Award, Northwestern University.
- 2020 Graduate Teaching Assistant Award, Northwestern University.
- 2016 Wynne–Roberts Prize, University College London.
- 2016 IMA Graduate Prize, University College London.
- 2016 MAPS Dean's List, University College London.
- 2015 Summer Student Scholarship in Mathematics, University College London.
- 2015 Bosanquet Prize, University College London.
- 2014 Undergraduate Prize in Mathematics, University College London.

# Grant Support

- 2024 LMS Early Career Researcher Travel Grant (ECR-2324-25)
- 2024 LMS Scheme 4 Research Grant (42303)

# Publications

- [7] Weakly elliptic damping gives sharp decay Submitted (from 2024/03), with Lassi Paunonen and Nicolas Vanspranghe.
- [6] Optimal backward uniqueness and polynomial stability of second order equations with unbounded damping Preprint (2023/10), with Perry Kleinhenz.
- [5] Control estimates for 0th order pseudodifferential operators Int. Math. Res. Not. IMRN 2024 (2024), 6656–6679, with Hans Christianson and Jian Wang.
- [4] Sharp polynomial decay for polynomially singular damping on the torus Submitted (from 2023/05), with Perry Kleinhenz.
- [3] Stabilisation of waves on product manifolds by boundary strips *Proc. Amer. Math. Soc.* **152** (2024), 2423–2437.
- [2] Sharp polynomial decay for waves damped from the boundary in cylindrical waveguides *Math. Res. Lett.* **30** (2023), 1253–1298.
- [1] Exponential decay for damped Klein–Gordon equations on asymptotically cylindrical and conic manifolds

Ann. Inst. Fourier (Grenoble), published online.

## Reviews and Expositions

[R1] Quantitative unique continuation on conic manifolds In press (2024/02).

## Research Talks

- [29] 2024/06 Microlocal Analysis and Quantum Dynamics (poster), Northwestern.
- [28] 2024/02 Analysis Seminar, Loughborough University.
- [27] 2024/02 Informal Spectral and Scattering Theory Seminar, University College London.
- [26] 2024/01 Applied Mathematics Seminar, University College London.
- [25] 2024/01 AMS Special Session on "Dynamics and Regularity of PDEs";
- [24] 2024/01 AMS Special Session on "Advances in Analysis, PDE's and Related Applications", Joint Mathematics Meetings, San Francisco.
- [23] 2024/01 International Congress of Chinese Mathematicians, Shanghai.
- [22] 2023/11 London Analysis and Probability Seminar.
- [21] 2023/11 Problèmes Spectraux en Physique Mathématique, Inst. Henri Poincaré.
- [20] 2023/10 M. E. Taylor Analysis & PDE Seminar, UNC Chapel Hill.
- [19] 2023/10 Calderón–Zygmund Analysis Seminar, University of Chicago.
- [18] 2023/10 Analysis Seminar, Northwestern.
- [17] 2023/07 Analysis & PDE Seminar, Tsinghua.
- [16] 2023/07 Microlocal and Probabilistic Methods in Geometry and Dynamics (poster), Inst. Math. Jussieu.
- [15] 2023/06 Differential Geometry Seminar (virtual), UC Santa Barbara.
- [14] 2023/05 Analysis Seminar, Yale.
- [13] 2023/05 Midwest PDE Seminar, Notre Dame.
- [12] 2023/04 Mathematical Physics and Harmonic Analysis Seminar, Texas A&M.
- [11] 2023/04 Analysis Seminar, Northwestern.

- [10] 2022/10 Trends in Soliton Dynamics and Singularity Formation for Nonlinear Dispersive PDEs, Texas A&M.
- [9] 2022/06 Analysis and PDE Seminar (virtual), University of Kentucky.
- [8] 2022/05 Midwest Dynamical Systems Early Career Conference (poster), Notre Dame.
- [7] 2022/04 AMS Special Session on "Asymptotic Behavior of Evolution Equations" (virtual), Joint Mathematics Meetings, Seattle.
- [6] 2021/11 Analysis & PDE Seminar (virtual), Tsinghua.
- [5] 2021/10 Informal Geometric Analysis Seminar, Northwestern.
- [4] 2021/10 Spectral and Scattering Theory Seminar, Purdue.
- [3] 2021/09 Analysis and PDE Seminar (virtual), Michigan State University.
- [2] 2021/06 Analysis Summer School (virtual), Imperial College London.
- [1] 2020/10 Harmonic Analysis and Differential Equations Seminar (virtual), UC Berkeley.

## Research Visits

- 2025/05 University College London.
- 2024/11–12 IHÉS, Laboratoire Math. Orsay.
- 2024/05–06 IHÉS, Laboratoire Math. Orsay.
  - 2024/04 Inst. Henri Poincaré, Université Paris-Est Créteil.
  - 2024/01 Tampere University.
  - 2023/11 Inst. Henri Poincaré, Laboratoire Math. Orsay.
  - 2023/10 Northwestern University, UNC Chapel Hill.

## Instructorships

#### Yale University

- 2025/01 Partial Differential Equations
- 2024/08 Introduction to Functions and Calculus I

#### Northwestern University

2023/03 Single-Variable Integral Calculus

#### Minicourses

- 2023/06 Analysis Preliminary Bootcamp (4 hours), Northwestern.
- 2019/09 Analysis Preliminary Bootcamp (3 hours), Northwestern.

# Teaching Assistantships

## Northwestern University

- 2022/09 MATH321: Real Analysis. Also in 2021/01, 2020/01, 03, 09.
- 2022/09 MATH351: Fourier Analysis and Boundary Value Problems.
- 2021/01 MATH368: Introduction to Optimization.
- 2020/09  $\,$  MATH342: Introduction to Differential Geometry.
- 2020/06 MATH100: Quantitative Reasoning (Northwestern Bridge Program).
- 2020/04 MATH230-2: Multivariable Integral Calculus.

- 2020/01 MATH226: Sequences and Series.
- 2019/09 MATH250: Elementary Differential Equations.
- 2019/09 MATH228-1: Multivariable Differential Calculus for Engineering.
- 2019/01 MATH230: Differential Calculus of Multivariable Functions.
- 2018/09 MATH224: Integral Calculus of One Variable Functions.

### Professional Service

Referee Service

Journals: J. Math. Pures Appl..

#### Educational Service

#### Mentorship

- 2023/10–24/06 Mentor, Undergraduate Research, UCL.
  - 2022/06–09 Mentor, Undergraduate Summer Research, Northwestern University.
- 2021/09–22/06 Mentor, Directed Reading Program, Northwestern University.
- 2021/09–22/06 Mentor, Causeway Postbaccalaureate Program, Northwestern University.
  - 2020/06–09 Mentor, Undergraduate Summer Research, Northwestern University.
  - 2020/06–08 Teaching Assistant, Northwestern Bridge Program.
  - 2019/01–06 Mentor, Directed Reading Program, Northwestern University. Examinations and Assessment
    - 2024/03 Examiner, MSci Project, UCL Maths.
    - 2024/01 Reviewer, Undergraduate Poster Session, Joint Math Meetings, San Francisco.
    - 2023/12 **Judge**, Undergraduate Summer Projects Poster Competition, UCL Maths. Committees and Panels
    - 2023/04 Graduate Panel in Mathematics, Northwestern.
    - 2022/05 Graduate Panel in Mathematics, Northwestern.
  - 2013–2016 Staff-Student Consultative Committee, UCL Maths.

## Community Service

#### Seminar Organisation

- 2023 Analysis Seminar, University College London.
- 2022–2023 Analysis Seminar, Northwestern University.
  - 2023 PDE Seminar, Northwestern University. Volunteering
- 2018–2023 Volunteer, Evanston Math Circle.
- 2013–2014 Academic Supporting, IntoUniversity, London.
- 2014/01–06 Mentor, UCL Academy.

#### Expository and Outreach Talks

- 2022/01 Graduate Student Seminar, Northwestern.
- 2021/10~ Undergraduate Math Society, Northwestern.
- 2020/10 Graduate Student Seminar (virtual), Northwestern.

- 2019/10 Undergraduate Math Society, Northwestern.
- 2017/03 Part III Seminar, Cambridge.
- 2017/03 Undergraduate Colloquium, UCL.
- 2016/12~ Part III Seminar, Cambridge.
- 2016/10 Undergraduate Colloquium, UCL.
- 2016/02 Tomorrow's Mathematicians Today, Greenwich. Professional Training and Certificates
- 2023/02 Universal Design for Learning Practicum, Northwestern University.
- 2021/12 "Mentoring Up & Down" Workshop, Northwestern University.

# Languages

Mandarin Chinese	Bilingual
Japanese	Fluent
French	Intermediate
Korean	Elementary
German	Elementary