

## Unit Name

Geometric Partial Differential Equations Unit  
Associate Professor Qing Liu

## Research Personnel

Made Benny Prasetya Wiranata, PhD Student

Daowen Lin, Postdoctoral Scholar

Tapio Kurkinen, Postdoctoral Scholar

Erbol Zhanpeisov, Postdoctoral Scholar, (Currently JSPS Postdoctoral Fellow, Tohoku University)

Made Benny Prasetya Wiranata, PhD Student

## Scholarly Contributions and Creative Productions (by Faculty)

### Journal Article

1. Liu, Q.; Wiranata, M. B. P.  
Monge Solutions of Time-Dependent Hamilton-Jacobi Equations in Metric Spaces. *ESAIM: Control, Optimisation and Calculus of Variations* 2026, 32, Paper No. 2, 39 pp.
2. Kijowski, A.; Liu, Q.; Zhang, Y.; Zhou, X.  
A Second-Order Operator for Horizontal Quasiconvexity in the Heisenberg Group and Application to Convexity Preserving for Horizontal Curvature Flow. *Discrete and Continuous Dynamical Systems-Series A* 2025, 45, 3483–3511.
3. Ishige, K.; Liu, Q.; Salani, P.  
A Parabolic PDE-Based Approach to Borell-Brascamp-Lieb Inequality. *Mathematische Annalen* 2025, 392, 4891–4937.
4. Liu, Q.; Shanmugalingam, N.; Zhou, X.  
Discontinuous Eikonal Equations in Metric Measure Spaces. *Transactions of the American Mathematical Society* 2025, 378, 695–729.
5. Liu, Q.; Zhanpeisov, E.  
Liouville-Type Theorems for Fully Nonlinear Elliptic and Parabolic Equations with Boundary Degeneracy. *Journal of Differential Equations* 2025, 427, 510–537.
6. Dragoni, F.; Liu, Q.; Zhang, Y.  
Horizontal Semiconcavity for the Square of Carnot-Carathéodory Distance on Step 2 Carnot Groups and Applications to Hamilton-Jacobi Equations. *Nonlinearity* 2025, 38.

## Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Made Benny Prasetya Wiranata	Journal Article	Monge solutions of time-dependent Hamilton–Jacobi equations in metric spaces	ESAIM: Control, Optimisation and Calculus of Variations	EDP Sciences	2026-1/23
Made Benny Prasetya Wiranata	Presentation at Conference	Monge solutions of time-dependent Hamilton-Jacobi equations in metric spaces	Mathematical Society of Japan Autumn Meeting 2025, Nagoya University		2025

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Daowen Lin	Presentation at Conference	Liouville type theorem for a class quasilinear p-Laplace equation on the sphere	Mathematical Society of Japan Spring Meeting 2025, Waseda University		2025
Tapio Kurkinen	Presentation at Conference	Harnack's inequalities for a nonlinear parabolic equation in non-divergence form	Mathematical Society of Japan Spring Meeting 2025, Waseda University		2025
Erbol Zhanpeisov	Presentation at Conference	Liouville-type theorems for fully nonlinear elliptic and parabolic equations with boundary degeneracy	The 1st Workshop on Viscosity Solutions, Optimal Control, and Mathematical Finance, Waseda University		2025
Erbol Zhanpeisov	Presentation at Conference	Liouville-type theorems for fully nonlinear elliptic and parabolic equations with boundary degeneracy	Muroran Institute of Technology Applied Analysis Seminar, Muroran Institute of Technology		2025
Made Benny Prasetya Wiranata	Presentation at Conference	Monge solutions of time-dependent Hamilton-Jacobi equations in metric spaces	The 22nd Mathematics Conference for Young Researchers		
Daowen Lin	Presentation at Conference	Best constant and extremal functions for a class of Hardy-Sobolev-Mazya inequalities	Mathematical Society of Japan Autumn Meeting 2025, Nagoya University		2025
Made Benny Prasetya Wiranata	Presentation at Conference	Monge solutions of time-dependent Hamilton-Jacobi equations in metric spaces	Mathematical Society of Japan Autumn Meeting 2025, Nagoya University		

### **Honors, Awards & Fellowships**

Term 1 2022 - Ongoing      14th Hukuhara Prize, 第十四回福原賞, 2022, Division of Functional Equations, the Mathematical Society of Japan [Fiscal Year: 2022-12-24]

### **Honors, Awards & Fellowships [By Unit Members Only]**

Term 1 2024 - Ongoing      Daowen Lin, The 7th Nomination of National Excellent Paper Award for Young PDE Doctors of China, The 7th Nomination of National Excellent Paper Award for Young PDE Doctors of China, 2024, Chinese mathematical community, This is a recognition organized by the Chinese mathematical community (typically under the PDE or analysis sections of national math societies) to honor outstanding PhD theses or early-career research papers in partial differential equations. [Fiscal Year: 2024-10-26]

### **External Service**

Term 3 2021 - Ongoing      Reviewer, zbMATH, Serving as a reviewer for zbMATH Open [Fiscal Year: 2021-05-01]

Term 2 2016 - Ongoing      Reviewer, Mathematical Reviews, Serving as a reviewer for Mathematical Reviews (MathSciNet) [Fiscal Year: 2016-01-01]

### **Outreach Activities [For Unit Members Only]**

Term 2 2026      Made Benny Prasetya Wiranata, PhD student [Fiscal Year: 2026-03-11]

Term 2 2026      Made Benny Prasetya Wiranata, PhD student [Fiscal Year: 2026-03-15]

Term 2 2026      Made Benny Prasetya Wiranata, PhD student [Fiscal Year: 2026-03-24]

Term 2 2025 Erbol Zhanpeisov, Postdoctoral Scholar [Fiscal Year: 2025-01-22]  
 Term 2 2025 Made Benny Prasetya Wiranata, PhD student [Fiscal Year: 2025-02-01]  
 Term 2 2025 Made Benny Prasetya Wiranata, PhD student, OIST [Fiscal Year: 2025-02-01]

**Workshops and Seminars [Organized and Hosted by Faculty/Units]**

Speaker Name(s)	Title	Location	Co-Organizers	Date
Erbol Zhanpeisov (Tohoku University)	Blow-up rate for the subcritical semilinear heat equation in non-convex domains	OIST Geometric PDE and Applied Analysis Seminar		2026-03-17
Naian Liao (University of Salzburg)	Harnack's inequality for nonlocal parabolic equations	OIST Geometric PDE and Applied Analysis Seminar		2026-01-28
Ugo Gianazza (University of Pavia)	Phragmén-Lindelöf-type results for functions in homogeneous De Giorgi classes	OIST Geometric PDE and Applied Analysis Seminar		2026-01-28
Vitaly Moroz (Swansea University)	Normalized solutions and limit profiles of the Gross-Pitaevskii-Poisson equation	OIST Geometric PDE and Applied Analysis Seminar		2026-01-14
Othmane Jerhaoui (IRMAR - INSA Rennes)	Unbounded viscosity solutions of Hamilton-Jacobi equations with mechanical Hamiltonian in Wasserstein space	OIST Geometric PDE and Applied Analysis Seminar		2025-12-18
Chun Liu (Illinois Institute of Technology)	Active materials and reactive fluids	OIST Geometric PDE and Applied Analysis Seminar		2025-06-03
Kazuhiro Ishige (University of Tokyo)	Initial traces and solvability of porous medium equation with power	OIST Geometric PDE and Applied Analysis Seminar		2025-05-15

Speaker Name(s)	Title	Location	Co-Organizers	Date
Paolo Salani (University of Florence)	Preservation of concavity properties by the Dirichlet heat flow and	OIST Geometric PDE and Applied Analysis Seminar		2025-05-15
Claudio Marchi (University of Padova)	First order mean field games on networks	OIST Geometric PDE and Applied Analysis Seminar		2025-03-06
Maria Gordina (University of Connecticut), Jeremy Tyson (University of Illinois Urbana-Champaign), Davide Barilari (University of Padova), Andrea Pinamonti (University of Trento), Ye Zhang (OIST), Kotaro Hisa (University of Tokyo), Bianca Stroffolini (University of Naples Federico II), Xiao Zhong (University of Helsinki), Luca Rizzi (SISSA), Giovanna Citti (University of Bologna), Kenshiro Tashiro (OIST), Enrico Le Donne (University of Fribourg), Luca Capogna (Smith College)	2025 OIST Conference Sub-Riemannian Analysis and Geometry	OIST	Ye Zhang (OIST), Xiaodan Zhou (OIST)	2025-01-14