

# JAEHYUN WOO

wjhwsh1@snu.ac.kr

1, Gwanak-ro, Gwanak-gu, Seoul, Republic of Korea

<https://jaehwoo.github.io/mypage/>

## EDUCATION

---

### Seoul National University

Ph.D. Student in Mathematics

*Mar 2025 - Current*

### Seoul National University

B.S. in Mathematics (minor in chemistry); *summa cum laude*

*Mar 2019 - Feb 2025*

GPA: 4.16/4.3

Thesis: Restriction Estimates for Hypersurfaces (Advisor: Changkeun Oh)

Leave for Mandatory Military Service: Sep 2022 - Aug 2024

## RESEARCH INTERESTS

---

My research interest is in harmonic analysis and related fields. I'm currently interested in applying methods from geometric measure theory to problems in harmonic analysis.

## RESEARCH EXPERIENCE

---

### Undergraduate Research Internship, Seoul National University

*Sep 2024 - Jan 2025*

Topic: "Multilinear Estimates, Broad-narrow Analysis and Induction on Scales" (Advisor: Changkeun Oh)

- Studied the evolution of restriction theory: bush and hairbrush argument for Keakeya type estimates, multilinear estimates, polynomial partitioning method, broad-narrow analysis and induction on scales.
- Studied the evolution of decoupling theory and its application to Vinogradov's mean value theorem in analytic number theory.
- Done in tandem with undergraduate thesis.
- Keywords: restriction inequalities, decoupling inequalities, multilinear estimates, broad-narrow analysis, induction on scales

### Undergraduate Research Internship, Seoul National University

*Jun 2022 - Aug 2022*

Topic: "Small Scale Formation of 2D Incompressible Euler Equations on a Domain with Smooth Boundary" (Advisor: In-Jee Jeong)

- Showed vorticity gradient growth for a long time in a smooth domain similar to a disc or a strip, by applying the notion of Hausdorff convergence and gamma-convergence to the hyperbolic flow scenario near the boundary
- Keywords: 2D incompressible Euler equations, long-time behavior, Green's function for elliptic equations, boundary regularity, linear and nonlinear advection, Hausdorff convergence,  $\gamma$ -convergence, tubular neighborhood

### Undergraduate Research Internship, Seoul National University

*Dec 2021 - Feb 2022*

Topic: "Global-in-time Gevrey-1/s Regularity of Incompressible Euler Equations on 2D Torus" (Advisor: In-Jee Jeong)

- Studied recent results on inviscid damping, and obtained Gevrey-1/s norm estimates with decreasing radius of analyticity by using paraproduct decomposition, which demonstrates global-in-time Gevrey-1/s regularity
- Keywords: 2D incompressible Euler equations, inviscid damping, long-time behavior, Fourier multiplier, paraproduct decomposition, Gevrey space, radius of analyticity

## TEACHING EXPERIENCE

---

**Teaching Assistant**, Seoul National University

*Mar 2025 - Current*

Calculus Practice 1 (2025 Spring)

· Organized exercise sessions and graded exams and quizzes

**Undergraduate Tutoring**, Seoul National University

*Mar 2022 - Jun 2022*

Basic Mathematics 1

· Organized exercise sessions on basic single and multivariable calculus, ordinary differential equations and dynamical systems

## SKILLS

---

### **Programming Languages**

· Numerical Analysis with Python and Julia

· Computational Chemistry: GAMESS, ORCA (quantum computations), LAMMPS (classical molecular dynamics)