Name: Hokuto Konno

Research field : Geometry and Topology

Key words : 4-manifold, gauge theory, diffeomorphism group

Present research : I am engaged in the development of gauge theory and its applications to topology and differential geometry. Dimension 4 is particularly unique in the classification theory of manifolds. It is known that considering a certain nonlinear partial differential equation derived from physics gauge theory on a 4-manifold reveals intriguing geometric information about that manifold.

The central focus of my research lies in establishing the foundations of gauge theory for families of 4-manifolds and applying it to various geometric problems. Specifically, I am investigating the diffeomorphism groups of 4-manifolds, with a particular emphasis on comparing them to other dimensions and exploring them from the point of view of comparisons between topological and smooth categories.

I also study Floer theory for 3-manifolds. Other than the above, some of my previous research includes exotic 4-manifolds, exotic submanifolds and embeddings of codimensions 1 and 2 in 4-manifolds, group actions on 4-manifolds, the existence of and spaces of positive scalar curvature metrics on 4-manifolds, and the study of knots in 3-manifolds and the surfaces they bound in 4-manifolds.

Notice for the students :

1. Discovering Fascinating Research Topics: You should find research topics that captivate you beyond measure. I suggest being proactive in identifying such topics and engaging in discussions with others.
2. Balancing Depth and Breadth: Both deepening your expertise in a specific area and broadening your horizons are essential aspects of research. My suggestion is to start by becoming the foremost expert in a particular field—use that as your foundation—and then expand your interests from there.
3. Avoiding Dogmatic Claims: In my experience, claims that assert specific conditions for success (e.g., "You must do X to be a successful researcher" or "If you do Y, you'll definitely succeed") often have exceptions. There is no one-size-fits-all path. Instead, find your own way. Interacting with people who have diverse perspectives can be valuable during this process.