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Membership of Academic Societies:

MSJ (The Mathematical Society of Japan)

Research Interest:

- homological algebra
- representation theory of algebras
- category theory

Research Summary:

By virtue of the abstraction, category theory is suitable for providing general theory applicable to a wide range of areas. My research aims to capture categorical frameworks appearing in algebra. I have been interested mainly in categories and functors used in the finite group theory and the representational theory of algebras. In particular, the representation theory of algebras involves categories in various ways, including major class of categories for homology algebra such as abelian categories, exact categories, triangulated categories, and more advanced ones. Recently I am engaged in research on the structure of categories and functors related to this area.

Major Publications:

- [1] H. Nakaoka and Y. Palu, Extriangulated categories, Hovey twin cotorsion pairs and model structures, *Cah. Topol. Géom. Différ. Catég.* **60** (2019) no. 2, 117–193.
- [2] H. Nakaoka, A simultaneous generalization of mutation and recollement on a triangulated category, *Appl. Categ. Structures*, **26** (2018) no. 3, 491–544.
- [3] H. Nakaoka, General heart construction on a triangulated category (I): unifying t -structures and cluster tilting subcategories, *Appl. Categ. Structures*, **19** (2011) no.6, 879–899.

Awards and Prizes:

- MSJ Takebe Katahiro Prize for Encouragement of Young Researchers (2010)

Education and Appointments:

- 2009 Ph.D. at The University of Tokyo
- 2009 Project Researcher, The University of Tokyo
- 2009 Project Research Associate, The University of Tokyo
- 2010 Associate Professor, Kagoshima University
- 2019 Associate Professor, Nagoya University

Message to Prospective Students:

Envisaged theme for the seminar is (some branch of) category theory used in algebra. ‘Some area of algebra mainly using category theory’ will be also possible, and the weights depend on your interest. In any case, I hope you to have a home ground (if possible, a research area dealing with concrete objects) which will become a source of your research, rather than entirely focused on abstract category theory. I recommend representation theory of algebras. The following is a candidate of textbook in this direction.

- I. Assem; D. Simson; A. Skowroński, *Elements of the representation theory of associative algebras. Vol. 1. Techniques of representation theory*. London Mathematical Society Student Texts, **65**. Cambridge University Press, 2006.

Basic knowledge on modules over rings of undergraduate level is necessary.