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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. Especially in recent years I have been interested mainly in categories and functors used in the representation theory of algebras. 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 category theory appearing in the representation theory of algebras. Mainly supposed are category theory related to homological algebra in abelian categories and triangulated categories. I hope you to have a home ground (a research area dealing with concrete objects) which will become a source of your research, rather than entirely focused on abstract category theory, so I recommend to the learn 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 of linear algebra, group theory and ring theory are desirable prior to entering the master course. In particular, it is necessary to have knowledge of modules over rings dealt in the undergraduate course. Besides, it is desirable to have some familiarity with homological algebra in abelian categories or like that.