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Membership of academic societies:

(The Mathematical Society of Japan)

Research Interest:

- Algebraic Geometry
- Singularity theory

Research Summary:

I studied on the singularities in the classification theory of algebraic varieties when I was graduate student and I was interested in the generalization of the McKay correspondence in dimension 2 to dimension 3. Then I constructed a crepant resolution of 3-dimensional quotient singularities by finite subgroups in $SL(3, \mathbb{C})$ and consider the McKay correspondences.

Now several generalization of the McKay correspondence in higher dimensions are studied assuming existence of a crepant resolution, but I would like to know when a crepant resolution exist and how to obtain it. Moreover, I studied G-Hilbert schemes as a crepant resolution in dimension 2 and 3. They are related with representation theory of the McKay quiver, moduli space of the representation of quivers and Groebner basis. The study on the McKay correspondence are very interesting because it relates not only with several mathematical subjects, but also with physics.

Major Publications:

- [1] Y. Ito: (with Akira Ishii and Alvaro Nolla de Celis) On G/N-Hilb of N-Hilb, to appear in Kyoto Mathematical Journal, (2013),
- [2] Y. Ito: Minimal resolution via Gröbner basis, Algebraic Geometry in East Asia, (IAS, 2001), World Scientific, (2003), 165–174.
- [3] Y. Ito: Special McKay correspondence, Geometry of Toric Varieties (Grenoble 2000), Séminaires et Congrès 6, SMF (2002) 213–223.
- [4] Y. Ito: (with Hiraku Nakajima) McKay correspondence and Hilbert schemes in dimension three, Topology 39, (2000) 1155–1191.
- [5] Y. Ito: (with Iku Nakamura) Hilbert schemes and simple singularities, New Trends in Algebraic Geometry, Proc. of EuroConference on Algebraic Geometry, Warwick 1996, ed. by K. Hulek et al., CUP, (1999), pp. 151–233.
- [6] Y. Ito: (with Miles Reid) The McKay correspondence for finite subgroups of $SL(3, \mathbb{C})$, Higher Dimensional Complex Varieties, Proc. of Internat. Conference, Trento 1994, de Gruyter, (1996), pp. 221–240.
- [7] Y. Ito: Crepant resolution of trihedral singularities and the orbifold Euler characteristic, Internat. J. Math. 6, (1995), 33–43.

Awards and Prizes:

- the MSJ Takebe Katahiro Prize (2001)

Education and Appointments:

- 1996 JSPS Post-doc at Kyoto University
- 1996 Assistant Professor, Tokyo Metropolitan University
- 2003 Lecturer, Nagoya University
- 2006 Associate Professor, Nagoya University

Message to Prospective Students:

We are studying mainly on singularity theory. As graduate seminar, I am planing to read some books and papers on resolution of singularities and the McKay correspondence and study on several problem later. The McKay correspondence is known in dimension 2, and there are still many interesting problems in higher dimension. if you want to know about the McKay correspondence and try new problems on singularities, then you may find something interesting in the following references.

- [1] G. Gonzalez-Sprinberg and J.-L. Verdier: Construction g ´ eom ´ etrique de la correspondance de McKay, Ann. Sci. Ecole Norm. Sup. (4) 16 (1983), no. 3, 409-449 (1984).
- [2] M. Reid: Undergraduate algebraic Geometry, Cambridge.
- [3] M. Reid: Young person's guide to canonical singularities, in " Algebraic. Geometry Bowdoin 1985," Proc. Symp. Pure Math. vol. 46, (1987) 345–416.
- [4] P. Slodowy: Simple Singularities and Simple Algebraic Groups (Lecture Notes in Mathematics), Springer.