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Membership of academic societies:
Mathematical Society of Japan

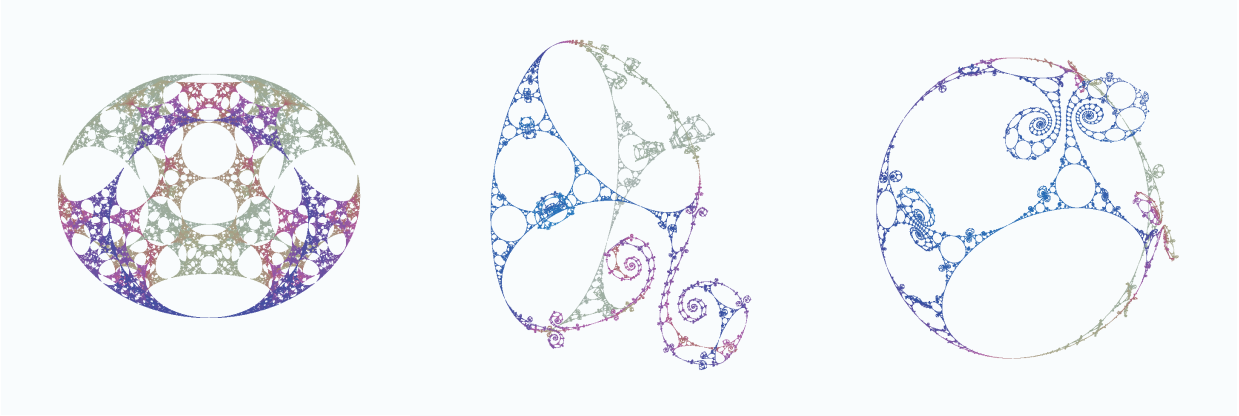
Research Interest:

- Hyperbolic geometry, conformal Geometry
- Kleinian groups, Riemann surfaces, Teichmüller theory
- Low-dimensional topology

Research Summary:

My major research interest is hyperbolic geometry. Especially I am interested in hyperbolic 3-manifolds and their deformation spaces. A hyperbolic 3-manifold is obtained as the quotient manifold of the hyperbolic 3-space by the action of a Kleinian group, a discrete subgroup of $\mathrm{PSL}(2,\mathbb{C})$. The boundary of the deformation space of a Kleinian group has fractal structure, and is very complicated. I am eager to understand the 'complexity' of the boundaries of these spaces.

I also interested in higher dimensional Kleinian groups, especially 4-dimensional Kleinian groups acting on the hyperbolic 4-space. In this case, limit sets of Kleinian groups are fractal objects in 3-sphere. Figures below are computer-generated limit sets of 4-dimensional Kleinian groups with two generators.



Major Publications:

[1] K. Ito, *Convergence and divergence of Kleinian punctured torus groups,* Amer. J. Math. 134 (2012), 861–889.

[2] Y. Araki and K. Ito, *An extension of the Maskit slice for 4-dimensional Kleinian groups,* Conform. Geom. Dyn. 12 (2008), 199–226.

[3] K. Ito, *On continuous extensions of grafting maps,* Trans. Amer. Math. Soc. 360 (2008), 3731–3749.

[4] K. Ito, *Exotic projective structures and quasi-Fuchsian space, II,* Duke Math. J. 140 (2007), 85–109.
[5] K. Ito, *Schottky groups and Bers boundary of Teichmuller space,* Osaka J. Math. 40 (2003), 639–657.
[6] K. Ito, *Exotic projective structures and quasi-Fuchsian space,* Duke Math. J. 105 (2000), 185–209.

Education and Appointments:

2000 Ph.D. at Tokyo Institute of Technology
2000 Assistant Professor, Nagoya University
2007 Associate Professor, Nagoya University

Message to Prospective Students:

Some basic references of this area are [1], [2] and [3]. More advanced topics can be found in [4], [5], [6] and [7]. Especially [5] is the best reference to get an impression of this area. Some master course students used [3], [8], [9] and [10] as textbooks of seminar. [11] will be used in the forthcoming master course seminar. [12] is a good guidebook for drawing computer graphics as in the previous page. Sutudentswho are interested in such computer graphics are also welcome.

[1] S. Katok, Fuchsian Groups, The University of Chicago Press, 1992.
[2] F. Bonahon, Low-dimensional geometry: from euclidean surfaces to hyperbolic knots, AMS, 2009.
[3] A. F. Beardon, The geometry of Discrete Groups, Springer GTM 91, 1983.
[4] A. Marden, Outer Circles, Cambridge University Press, 2007.
[5] K. Matsuzaki and M. Taniguchi, Hyperbolic Manifolds and Kleinian Groups, Oxford Science Publications, 1998.
[6] Y. Imayoshi and M. Taniguchi, An Introduction to Teichmüller Spaces, Springer, 1992.
[7] A. Fathi, F. Laudenbach and V. Poenaru, (translated by D. M. Kim and D. Margalit) Thurston's work on surfaces, Princeton University Press 2012.
[8] K. Stephenson, Introduction to Circle Packing, Cambridge University Press, 2005.
[9] P. J. Nocholls, The Ergodic Theory of Discrete Groups, Cambridge University Press, 1989.
[10] F. Dal'Bo, Geodesic and Horocyclic Trajectories, Springer, 2011.
[11] B. Farb and D. Margalit, A Primer on Mapping Class Groups, Princeton University Press, 2012.
[12] D. Mumford, C. Series, D. Wright, Indra's Pearls, Cambridge University Press, 2002.