Contact Information

Takayuki Kihara, Lecturer
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Nagoya University
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Research Interests

Computability theory and its applications in other areas of mathematics, including general topology and descriptive set theory

Education

04/2009–03/2011 **Ph.D. in Mathematics** (Mathematical Institute, Tohoku University)
Advisors: Kazuyuki Tanaka, and Takeshi Yamazaki
Thesis: *Effectively Closed Sets and Degrees of Unsolvability*

04/2007–03/2009 **M.Sc. in Mathematics** (Mathematical Institute, Tohoku University)
Advisor: Takeshi Yamazaki
Thesis: *Degree Structures of Mass Problems and Formal Systems of Ramsey-Type Theorems*

04/2003–03/2007 **B.Sc. in Mathematics** (Department of Mathematics, Tohoku University)

Career

04/2017–Today **Graduate School of Informatics, Nagoya University** Lecturer

05/2015–03/2017 **Department of Mathematics, University of California, Berkeley** JSPS Postdoc
Mentor: Antonio Montalbán

04/2012–03/2015 **Japan Advanced Institute of Science and Technology** JSPS Postdoc
Mentor: Hajime Ishihara

04/2011–03/2012 **Mathematical Institute, Tohoku University** JSPS Postdoc
Mentor: Takeshi Yamazaki

04/2010–03/2011 **Mathematical Institute, Tohoku University** JSPS DC2
Mentor: Takeshi Yamazaki

04/2009–03/2010 **Mathematical Institute, Tohoku University** Research assistant
Global COE

Awards

01/2013 **The 11th LA/EATCS Best Presentation Award**
European Association for Theoretical Computer Science, Japan Chapter

03/2011 **Kawai Prize for Ph.D. thesis**
Kawai Mathematical Sciences Foundation, Mathematical Institute, Tohoku University

03/2009 **Yūsyū-sōsetsu-Ronbun-Syō (An Award for Master's thesis)**
Kawai Mathematical Sciences Foundation, Mathematical Institute, Tohoku University

Academic Society

- Mathematical Society of Japan (MSJ)
- Association for Symbolic Logic (ASL)

Publications and Preprints

Journal Papers

1. Takayuki Kihara, Borel-piecewise continuous reducibility for uniformization problems, to appear in *Logical Methods in Computer Science* **12** (4) (2016).
2. Takayuki Kihara, Decomposing Borel functions using the Shore-Slaman join theorem, *Fundamenta Mathematicae* **230** (2015), pp. 1–13.
3. Takayuki Kihara and Kenshi Miyabe, Unified characterizations of lowness properties via Kolmogorov complexity, *Archive for Mathematical Logic* **54** (2015), pp. 329–358.
4. Takayuki Kihara, Comparing the Medvedev and Turing degrees of Π^0_1 classes, *Mathematical Structures in Computer Science* **25** (8) (2015), pp. 1649–1668.
5. Kojiro Higuchi and Takayuki Kihara, Inside the Muchnik degrees I: Discontinuity, learnability, and constructivism, *Annals of Pure and Applied Logic* **165** (2014), pp. 1058–1114.
6. Kojiro Higuchi and Takayuki Kihara, Inside the Muchnik degrees II: The degree structures induced by the arithmetical hierarchy of countably continuous functions, *Annals of Pure and Applied Logic* **165** (2014), pp. 1201-1241.
7. Kojiro Higuchi and Takayuki Kihara, On effectively closed sets of effective strong measure zero, *Annals of Pure and Applied Logic* **165** (2014), pp. 1445–1469.
8. Takayuki Kihara and Kenshi Miyabe, Uniform Kurtz randomness, *Journal of Logic and Computation* **24** (2014), pp. 863–882.
9. Makoto Fujiwara, Kojiro Higuchi and Takayuki Kihara, On the strength of marriage theorems and uniformity, *Mathematical Logic Quarterly* **60** (2014), pp. 136–153.
10. Takayuki Kihara, Incomputability of simply connected planar continua, *Computability* **1** (2012), pp. 131–152.
11. Joshua A. Cole and Takayuki Kihara, The -theory of the effectively closed Medvedev degrees is decidable, *Archive for Mathematical Logic*, **49** (2010), pp. 1-16.
12. Douglas Cenzer, Takayuki Kihara, Rebecca Weber and Guohua Wu, Immunity and non-cupping for closed sets, *Tbilisi Mathematical Journal*, **2** (2009), pp. 77-94.

Proceedings

1. Takayuki Kihara, Higher randomness and lim-sup forcing within and beyond hyperarithmetic, to appear in Proceedings of the Singapore programme ”Sets and Computation”, 2016.
2. Takayuki Kihara and Arno Pauly, Dividing by zero – how bad is it, really? In Proceedings of MFCS 2016, *Leibniz International Proceedings in Informatics* **58** (2016), pp. 58:1-58:14.
3. Kojiro Higuchi and Takayuki Kihara, Effective strong nullness and effectively closed sets, How the World Computes (CiE 2012), *Lecture Notes in Computer Science*, **7318** (2012), pp. 304-313.
4. Takayuki Kihara, A hierarchy of immunity and density for sets of reals, How the World Computes (CiE 2012), *Lecture Notes in Computer Science*, **7318** (2012), pp. 385-395.

Unpublished Papers

1. Takayuki Kihara, Steffen Lempp, Keng Meng Ng, and Arno Pauly, Enumeration degrees and non-metrizable topology, in preparation.
2. Takayuki Kihara and Antonio Montalbán, On the structure of the Wadge degrees of BQO-valued Borel functions, in preparation.
3. Takayuki Kihara and Antonio Montalbán, The uniform Martin’s conjecture for many-one degrees, submitted.
4. Vassilios Gregoriades, Takayuki Kihara and Keng Meng Ng, Turing degrees in Polish spaces and decomposability of Borel functions, submitted.
5. Takayuki Kihara and Arno Pauly, Point degree spectra of represented spaces, submitted.

6. Josef Berger, Hajime Ishihara, Takayuki Kihara and Takako Nemoto, The binary expansion and the intermediate value theorem in constructive reverse mathematics, submitted.

Unrefereed Papers

1. Takayuki Kihara, An application of computability theory to decomposability problem on Borel functions: extended abstract (in Japanese), New Trends in Theoretical Computer Science, *RIMS Kôkyûroku* (proceedings) **1849** (2013), pp. 32–36.
2. Takayuki Kihara, Set theory of the real line and algorithmic randomness: a survey (in Japanese), Proof Theory and Complexity, *RIMS Kôkyûroku* (proceedings), **1832** (2013), pp. 97–113.
3. Takayuki Kihara, Computability theory of continua (in Japanese), Formal Systems and Computability Theory, *RIMS Kôkyûroku* (proceedings), **1729** (2011), pp. 48–66.
4. Takayuki Kihara, Notes on reverse recursion theory and reverse mathematics (in Japanese), Proof Theoretical Study of the Structure of Logic and Computation, *RIMS Kôkyûroku* (proceedings), **1635** (2009), pp. 51–59.

Presentations

Invited Talks (International Conferences)

1. TBA, Fourteenth International Conference on Computability and Complexity in Analysis (CCA2017), Daejeon, Republic of Korea, Jul 2017, *Invited Talk*.
2. Computability-theoretic methods in descriptive set theory, *2016 AMS Fall Central Sectional Meeting*, University of St. Thomas, Minneapolis, USA, Oct 2016, *Invited Talk*.
3. The structure of natural many-one degrees, *Workshop on Computability Theory 2016*, Ghent, Belgium, July 5, 2016, *Invited Talk*.
4. Computability theoretic methods in descriptive set theory, *South Eastern Logic Symposium 2016*, University of Florida, USA, 27 Feb 2016, *Invited Talk*.
5. Degree theory and infinite dimensional topology, *Continuity, Computability, Constructivity – From Logic to Algorithms (CCC2015)*, Schloss Aspenstein, Kochel, Germany, 14 Sep 2015, *Invited Talk*.
6. The second-level Borel isomorphism problem: An encounter of recursion theory and infinite dimensional topology, *JAIST Logic workshop series 2015: Constructivism and Computability*, Shiinoki Cultural Complex, Kanazawa, Japan, 3 Mar 2015, *Invited Talk*
7. Effective methods in descriptive set theory, *Computability Theory and Foundations of Mathematics (CTFM 2014)*, Tokyo Institute of Technology, Tokyo, Japan, 17 Feb 2014, *Plenary Talk*.
8. An application of the Shore-Slaman join theorem in descriptive set theory, *The 13th Asian Logic Conference (ALC 2013)*, Guangzhou, China, Sep 2013, *Invited Talk*.
9. An application of classical recursion theory to descriptive set theory via computable analysis, *The 10th International Conference on Computability and Complexity in Analysis (CCA 2013)*, LORIA, Nancy, France, 8 Jul 2013, *Invited Talk*.

Contributed Talks (International Conferences)

1. Topological aspects of enumeration degrees, Dagstuhl Seminar 16081 ”Computability Theory”, Schloss Dagstuhl, Germany, 20 Feb 2017, *Invited Participant*.
2. The uniform Martin conjecture and Wadge degrees, *Algorithmic Randomness Interacts with Analysis and Ergodic Theory*, Oaxaca, Mexico, 8 Dec 2016, *Invited Participant*.
3. Degrees of unsolvability in topological spaces with countable cs-networks, *Workshop on Mathematical Logic and its Application*, Kyoto University, 17 Sep 2016.
4. The uniform Martin’s conjecture and the Wadge degrees, *Computability Theory and Foundation of Mathematics (CTFM 2016)*, Tokyo Institute of Technology, Tokyo, Japan, September 21, 2016.

5. Borel isomorphism and computability, *Computability, Randomness and Applications*, CIRM Seminar, Luminy, Marseille, France, June 21, 2016, *Invited Participant*.
6. Computability-theoretic methods in descriptive set theory, *2016 ASL North American Annual Meeting*, Storrs, Connecticut, USA, May 23, 2016.
7. Weak choice principles in the Weihrauch degrees, *New Challenges in Reverse Mathematics*, Institute for Mathematical Sciences, National University of Singapore, 15 Jan 2016, *Invited Participant*.
8. Some more results around decomposability of Borel functions, *Desctiptive Set Theory in Paris 2015*, Institut de Mathematique de Jussieu, Paris, France, 8 Dec 2015, *Invited Participant*.
9. Decomposing Borel functions and generalized Turing degree theory, *Dagstuhl Seminar 15392: "Measuring the Complexity of Computational Content: Weihrauch Reducibility and Reverse Analysis"*, Schloss Dagstuhl, Saarland, Germany, September 2015, *Invited Participant*.
10. Effective reducibility for smooth and analytic equivalence relations on a cone, *Computability Theory and Foundation of Mathematics (CTFM 2015)*, Tokyo Institute of Technology, Tokyo, Japan, September 2015.
11. "Degree spectra on a cone" for Polish spaces, *Sets and Computations*, Institute for Mathematical Sciences, National University of Singapore, 13 Apr 2015, *Invited Participant*.
12. Recursion theoretic methods in topological dimension theory, *Desctiptive Set Theory in Paris 2014*, Institut de Mathematique de Jussieu, Paris, France, 9 Dec 2014, *Invited Participant*.
13. Arboreal forcings over admissible sets, *Correctness by Construction, CORCON 2014 Workshop*, Genoa, Italy, 24 Mar 2014.
14. Unfolded forcing constructions via Kreisel compactness, *Analysis, Randomness and Applications (ARA 2014)*, Shizuoka, Japan, 5 Sep 2014, *Invited Participant*.
15. On the effectively G -decomposable functions, *Eleventh International Conference on Computability and Complexity in Analysis (CCA 2014)*, Darmstadt, Germany, 21 Jul 2014.
16. Triviality within and beyond hyperarithmetic, *Ninth International Conference on Computability, Complexity and Randomness (CCR 2014)*, National University of Singapore, 11 Jun 2014.
17. Lowness for uniform Kurtz randomness, *Computability in Europe 2013, "The Nature of Computation" (CiE 2013)*, University of Milano-Bicocca, Italy, 1 Jul 2013.
18. A theorem on computable martingales, *Continuity, Computability, Constructivity — From Logic to Algorithms (CCC 2013)*, Swansea University, Gregynog, UK, 26 Jun 2013.
19. Bitwise addition and algorithmic randomness, *ELC Workshop on Randomness and Probability Through Computability*, University of Tokyo, Japan, 15 May 2013.
20. WKL for infinite trees with few infinite paths, *Workshop on Reverse Mathematics and Type Theory*, Hoam Faculty House, Seoul, Korea, March 2013.
21. An application of Turing Degree Theory to the -decomposability problem on Borel functions, *Computability Theory and Foundations of Mathematics (CTFM 2013)*, Tokyo Institute of Technology, Tokyo, Japan, February 2013.
22. Strong nullness and lowness for randomness, *Fourth Workshop on Game-Theoretic Probability and Related Topics (GTP 2012)*, The University of Tokyo, Japan, November 2012.
23. A hierarchy of immunity and density for sets of reals, *Computability in Europe 2012, "How the World Computes" (CiE 2012)*, University of Cambridge, UK, June 2012.
24. Effective strong nullness and effectively closed sets (with Kojiro Higuchi, presented by Kojiro Higuchi), *Computability in Europe 2012, "How the World Computes" (CiE 2012)*, University of Cambridge, UK, June 2012.
25. Recursive marriage theorems and reverse mathematics (with Makoto Fujiwara and Kojiro Higuchi, presented by Makoto Fujiwara), *Computability in Europe 2012, "How the World Computes" (CiE 2012)*, University of Cambridge, UK, June 2012.

26. On the computability relative to non-constructive principles, *2nd Workshop on Continuity, Computability, Constructivity – From Logic to Algorithms – (CCC 2012)*, Universitaet Trier, Germany, May 2012.
27. Topological aspects of the degrees of difficulty of Π^0_1 classes, *The twelfth Asian Logic Conference (ALC 2011)*, Victoria University of Wellington, New Zealand, December 2011.
28. Counterexamples in computable continuum theory, *Dagstuhl Seminar: "Computing with Infinite Data: Topological and Logical Foundations"*, Schloss Dagstuhl, Saarland, Germany, October 2011, *Invited Participant*.
29. Incomputability of simply connected planar continua, *Computability in Europe 2011, "Models of Computation in Context" (CiE 2011)*, Sofia University, Bulgaria, June 2011.
30. Mass problems and relative learnability (with Kojiro Higuchi), *Computability in Europe 2011, "Models of Computation in Context" (CiE 2011)*, Sofia University, Bulgaria, June 2011.
31. Medvedev and Muchnik degrees of Π^0_1 classes with incomplete c.e. filters, *Computability in Europe 2010 on "Programs, Proofs, Processes" (CiE 2010)*, University of Azores, Ponta Delgada (Azores), Portugal, June 30-July 4, 2010.
32. Degrees of co-c.e. closed sets with specific computability-theoretic properties, *Workshop on Constructive Aspects of Logic and Mathematics*, Kanazawa, Japan, March, 8-12, 2010.
33. Notions of reducibility for mass problems (with Kojiro Higuchi), *Computability in Europe 2009 on "Mathematical Theory and Computational Practice" (CiE 2009)*, Heidelberg, Germany, July 19-24, 2009.
34. Degrees of difficulty of effectively closed sets, *The 11th Asian Logic Conference (ALC 2009)*, National University of Singapore, June 22-27, 2009.

Invited Seminar Talks

1. The second level Borel isomorphism problem, *Southern Wisconsin Logic Colloquium*, University of Wisconsin–Madison, USA, 23 Jan 2017.
2. Recursion theoretic methods in descriptive set theory and infinite dimensional topology, *Berkeley Logic Colloquium*, USA, 9 Oct 2015.
3. "Degree spectra on a cone" for Polish spaces, *Recursion Theory Seminar at UC Berkeley*, USA, May 2015.
4. On methods and applications of algorithmic randomness theory (in Japanese), *Probability Theory Seminar at Osaka University*, Japan, 13 Jan 2015.
5. Recursion theoretic methods in topological dimension theory, *Logic Seminar at University of Cambridge*, United Kingdom, 2 Dec 2014.
6. Scott ideals in infinite dimensional topology, *Logic Seminar in Technische Universitat Darmstadt*, Germany, 11 Jul 2014.
7. Decomposition, dimension, and degrees, *Oberseminar Mathematische Logik Sommersemester 2014*, Mathematical Institute of the University of Freiburg, Germany, 2 Jul, 2014.
8. Recursion theoretic methods in topological dimension theory, *Logic Seminar at National University of Singapore*, 26 Nov 2014.
9. Infinite dimensional topology for computability theorists, *Matsuyama Seminar on Topology, Geometry, Set Theory and their Applications*, Ehime University, Japan, 15 Apr 2014.
10. A hierarchy of the countably computable functions, *Argentina-Japan-New Zealand workshop 2013*, University of Auckland, New Zealand, 2 Dec 2013.
11. On a question about Martin-Löf null-additivity, *Kerikeri Workshop*, Tokerau beach, New Zealand, Nov 2013.
12. Uniform lowness of randomness and null-additivity, *Logic Seminar in Victoria University of Wellington*, Nov 2013.
13. A hierarchy of nonuniformly computable discontinuous functions and semi-constructive principles, *Symposium on Computable Analysis in Kyoto*, Japan, February 2012.

14. Non-computability of planar continua, *Logic Seminar at Technische Universitat Darmstadt*, Germany, October 2011.
15. Mass problems, constructivism, and learnability, *Colloquium on Mathematical Logic*, University of Amsterdam, Netherlands, July 2011.
16. Mass problems and limit computable mathematics: hyperarithmetical hierarchy of anticupping degrees, *Logic Seminar in Ghent University*, Belgium, July 2011.
17. Natural intermediate Medvedev degrees of Π^0_1 classes: mind-change hierarchy of non-cuppable degrees, *Logic Seminar at National University of Singapore*, August 2011.
18. Deciding first order truths in the Medvedev lattice of Π^0_1 classes, *Logic Seminar at Nanyang Technological University*, Singapore, May, 2011.

Contributed Talks (Domestic Conferences)

1. Co-degree spectra of weakly infinite dimensional spaces and the second-level Borel isomorphism problem (in Japanese), *The 2nd Logic and Analysis Workshop 2015 in San'in*, Yonago, Japan, 24 Jan 2015.
2. Degree spectra and the second-level Borel isomorphism problem on C-compacta, *RIMS workshop on "Proof Theory and Computability Theory"*, Kyoto, Japan, 25 Dec 2014.
3. -homeomorphism types and point degree spectra of infinite dimensional spaces, *Mathematical Society of Japan (MSJ) Autumn meeting 2014*, Hiroshima University, Hiroshima, Japan, 25 Sep 2014.
4. Algorithmic randomness and null-additivity (with Kenshi Miyabe), *Mathematical Society of Japan (MSJ) Spring meeting 2014*, Gakushuin University, Mejiro, Tokyo, 15 Mar 2014.
5. Around Luzin's conjecture on the decomposition of Borel measurable functions into continuous functions, *Logic and Analysis Seminar 2014 in San'in*, Yonago, Japan, 1 Feb 2014.
6. Thinly-sliced Borel analysis (in Japanese), *Proof Theory Workshop 2013*, Keio University, Mita, Japan, 8 Aug 2013.
7. Lightface methods in boldface mathematics, *Logic at JAIST*, Hotel Arrowle, Ishikawa, Japan, 23 Jul 2013.
8. Lowness for randomness and set theory of the real line, *ELC Seminar on Algorithmic Randomness*, University of Tokyo, Japan, 13 May 2013.
9. An application of Kumabe-Slaman forcing to the -decomposability problem on Borel functions (in Japanese), *Mathematical Society of Japan (MSJ) Spring meeting 2013*, Kyoto University, Kyoto, March 2013.
10. An application of computability theory to decomposability problem on Borel functions (in Japanese), *LA Symposium 2012 Winter*, Kyoto University, Kyoto, January 2013.
11. An application of Turing Degree Theory to a Real Analytic Problem (in Japanese), *Young logicians' gathering 2012*, Nara ken Seishonen kaikan Youth Hostel, Nara, Japan, November 2012.
12. Strong measure zero sets in computability theory II —Kolmogorov complexity and triviality— (with Kenshi Miyabe, in Japanese), *Mathematical Society of Japan (MSJ) Autumn meeting 2012*, Kyushu University, Fukuoka, Japan, September 2012.
13. Stong measure zero sets in computability theory I —Lightface Π^0_1 sets and the perfect set property— (with Kojiro Higuchi, in Japanese), *Mathematical Society of Japan (MSJ) Autumn meeting 2012*, Kyushu University, Fukuoka, Japan, September 2012.
14. On some variants of the Jayne-Rogers Theorem via the Shore-Slaman Join Theorem (in Japanese), *SLACS 2012*, Kyoto Sangyo University, Kyoto, September 2012.
15. Low for random = strong measure zero (in Japanese), *RIMS workshop on "Proof Theory and Complexity"*, Kyoto University, Kyoto, September 2012.
16. From Gödel's Incompleteness Theorem to Topology of zero sets (in Japanese), *LA Symposium 2012 Summer*, Miyazu Royal Hotel, Amanohashidate, Kyoto, July 2012.
17. Degrees of discontinuity: the emergence of nonuniform computability theory (in Japanese), *Mathematical Society of Japan (MSJ) Spring meeting 2012*, Tokyo University of Science, Tokyo, March 2012.

18. Lowness properties and effective Borel measurable functions (with Kojiro Higuchi, presented by Kojiro Higuchi, in Japanese), *Mathematical Society of Japan (MSJ) Spring meeting 2012*, Tokyo University of Science, Tokyo, March 2012.
19. Reverse mathematics of marriage theorems (with Makoto Fujiwara and Kojiro Higuchi, presented by Makoto Fujiwara, in Japanese), *Mathematical Society of Japan (MSJ) Spring meeting 2012*, Tokyo University of Science, Tokyo, March 2012.
20. The inner structures of Turing upward closures, *Workshop on Proof Theory and Computability Theory 2012: Philosophical Frontiers in Reverse Mathematics*, Harumi Grand Hotel, Tokyo, Japan, February 2012.
21. The first step into an ocean of trees, *Young logicians' gathering 2011*, December 2011.
22. Computability and incomputability of simply connected spaces (in Japanese), *Mathematical Society of Japan (MSJ) Autumn meeting 2011*, (September, 2011, Shinshu University, Nagano, Japan).
23. The fine structures inside degree spectra, *Workshop on Proof Theory and Theory of Computing 2011*, Tokyo Metropolitan University, September, 2011.
24. Computability and incomputability of simply connected spaces (in Japanese), *Mathematical Society of Japan (MSJ) Spring meeting 2011*, (Mar 20-23, 2011, Waseda University, Tokyo, Japan).
25. Degrees of difficulty of disjunctions, *Workshop on proof theory and computability theory 2011*, (February 21-23, 2011, Iwanumaya, Sendai, Japan).
26. Global and local noncomputability of simply connected zero sets, *The 3rd GCOE International Symposium on "Weaving Science Web beyond Particle-Matter Hierarchy"*, (February 17-19, 2011, Tohoku University, Sendai, Japan).
27. When a dendroid is written on a paper by lightface (in Japanese), *Young logicians' gathering 2010*, (November 19-21, 2010, Aichi Prefectural Youth House, Aichi, Japan).
28. Π^0_1 closed sets and their generators (in Japanese), *Mathematical Society of Japan (MSJ) Autumn meeting 2010*, (Sep 22-25, 2010, Nagoya University, Nagoya, Japan).
29. Incomputability phenomena of Π^0_1 continua in R^2, *RIMS workshop on "Formal Systems and Computability Theory"*, Kyoto University, Kyoto, Japan, (Sep 13-17, 2010,).
30. Degree structures of Π^0_1 classes —priority constructions of closed sets—, *Work shop on proof theory 2009*, Inawashiro, Japan, February 21-23, 2010.
31. Godel's incompleteness theorem, recursively axiomatizable theories, and Medvedev degrees of unsolvability, *The 2nd International GCOE symposium on "Weaving Science Web beyond Particle-Matter Hierarchy"*, Tohoku University, Sendai, Japan, February 18-19, 2010.
32. Randomness, Compression, and degrees of unsolvability of sets of reals (in Japanese), *Graduate school of science six-department joint symposium*, Tohoku University, Sendai, Japan, February 16, 2010.
33. Classifying axiomatizable theories and effectively closed Medvedev degrees (in Japanese), *Young Logician's gathering 2009*, Osaka, Japan, November 27-29.
34. Embeddings finite posets into the LR degree structure and partial Sacks conjecture (in Japanese), *Mathematical Society of Japan (MSJ) Autumn meeting 2009*, Osaka University, Osaka, Japan, September 24-27, 2009.
35. On the strengths of some Ramsey-type theorems —Conservative and reverse mathematical result—, *Sendai Logic and Philosophy seminar*, Matsushima, Japan, Feb 2009.
36. An affirmative answer to the -problem on the effective closed Medvedev degrees (in Japanese), *Mathematical Society of Japan (MSJ) Tohoku lodge meeting*, Tohoku University, Japan, Feb 2009.
37. Degree structures of effectively closed sets and randomness (in Japanese), *Young Logician's gathering 2008*, (November, Tokyo, Japan)
38. Degrees of incomputability in nonstandard models and reverse mathematics for Ramseyean theorems (in Japanese), *RIMS workshop on "Proof Theoretical Study of the Structure of Logic and Computation"*, Sep 2008.

39. Is the ordering of the degrees of unsolvability of Π^0_1 mass problems dense? (in Japanese), *the-end-of-summer seminar on lambda calculus and logic 2008*, Kusatsu Seminar House, Sep 2008.
40. On the strength of Ramsey's theorem, *Sendai Logic Spring School*, Matsushima, Japan. Feb 2008.

Teaching

10/2017–02/2018	**Theory of Computability 1 & 2** Graduate School of Informatics, Nagoya University	Graduate
06/2017–07/2017	**Survey on Pure Mathematical Informatics 2 (Recursive Functions)** Graduate School of Informatics, Nagoya University	Graduate
06/2017	**Mathematical Informatics 1 (Computability and Randomness)** School of Informatics and Sciences, Nagoya University	Sophomore
04/2017–08/2017	**Linear algebra I** School of Agricultural Sciences, Nagoya University	Freshman
04/2017–08/2017	**Mathematical Informatics 6 (Mathematical Logic)** School of Informatics and Sciences, Nagoya University	Junior

Last updated: May 10, 2017