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Education

Institute of Science Tokyo (formerly Tokyo Institute of Technology)[1] **Tokyo, Japan**
Doctor of Science in Mathematics *Apr 2024–Current*
Supervisor: Kazuma Shimomoto

Tokyo Institute of Technology **Tokyo, Japan**
Master of Science in Mathematics *Apr 2022–Mar 2024*
Supervisor: Kazuma Shimomoto (2nd year), Fumiharu Kato (1st year)

Tokyo Institute of Technology **Tokyo, Japan**
Bachelor of Science in Mathematics *Apr 2018–Mar 2022*
Supervisor: Fumiharu Kato

Professional Position

JSPS Research Fellow (DC1) **Apr 2024–Mar 2027**
Tokyo Institute of Technology
Host Researcher: Kazuma Shimomoto

Research Interests

Commutative algebra in mixed characteristic (via arithmetic methods such as perfectoid rings, prismatic cohomology, and almost mathematics).

Papers and Preprints

8. **R. Ishizuka** and S. Yoshikawa, "*Graded perfectoid rings*", arXiv:2511.02322, 2025.
7. **R. Ishizuka** and K. Shimomoto, "*Quasi-canonical lifting of projective varieties in positive characteristic*", arXiv:2506.01345, 2025.
6. **R. Ishizuka**, "*A higher algebraic approach to liftings of modules over derived quotients*", arXiv:2503.17964, 2025.
5. **R. Ishizuka**, "*Perfectoid towers generated from prisms*", arXiv:2409.15785, 2024.
4. **R. Ishizuka** and K. Nakazato, "*Prismatic Kunz's theorem*", arXiv:2402.06207, 2024.
3. D. Dine and **R. Ishizuka**, "*Tilting and untilting for ideals in perfectoid rings*", Math. Z. **307**, 66 (2024). arXiv:2308.09600, 2023.
2. **R. Ishizuka**, "*A calculation of the perfectoidization of semiperfectoid rings*", Nagoya Math. J. **255**, 742-759 (2024). arXiv:2305.07916, 2023.
1. K. Shimomoto and **R. Ishizuka**, "*A mixed characteristic analogue of the perfection of rings and its almost Cohen-Macaulay property*", arXiv:2303.13872, 2023.

Talks

37. Mar 2026. *"Graded perfectoid rings and their applications"*, MSJ Spring Meeting 2026, Tokyo University of Science, Japan.

[1] In Oct 2024, Tokyo Institute of Technology was merged with Tokyo Medical and Dental University and reorganized into *Institute of Science Tokyo*.

36. Dec 2025. *"TBA"*, Mini-workshop on Arithmetic Geometry in Sendai, Tohoku University, Japan.

35. Nov 2025. *"Perfectoid towers arising from Frobenius lifts"*, The 46th Japan Symposium on Commutative Algebra, Hotel Fukuracia Osaka Bay, Japan.

34. Nov 2025. *"Perfectoid towers arising from prisms"*, Workshop on Number theory at Tsuda University 2025, Tsuda University, Japan.

33. Oct 2025. *"Absolute perfectoidization of schemes and local to global principle in mixed characteristic"*, Singularity Theory Seminar, Nihon University, Japan.

32. Sep 2025. *"The Frobenius-Witt cotangent bundle"* (Survey talk), Yatsugatake Workshop, 2025, Wellness Garden in Goddess Forest : Kobuchizawa, Japan.

31. Sep 2025. *"A version of Kunz's theorem in mixed characteristic"*, Noda Algebraic Geometry Symposium, Tokyo University of Science, Japan.

30. July 2025. *"On the derived deformation functor of Frobenius liftings"* (Poster Session), 2025 Summer Research Institute in Algebraic Geometry., Corolado State University, USA.

29. July 2025. *"On computation of Tor modules over a derived quotient"*, The 36th Seminar on Commutative Algebra in Japan., Kyushu University, Japan.

28. June 2025. *"A unified construction of perfectoid towers by prisms"*, p-adic and Characteristic p Methods in Algebraic Geometry., EPFL, Switzerland.

27. May 2025. *"Approximation of perfectoid rings by Noetherian rings and prisms"*, MPIM Algebra Seminar., MPIM, Germany.

26. Mar 2025. *"On the vanishing of Ext and liftings of modules on derived quotients using higher algebras"*, MSJ Spring Meeting 2025., Waseda University, Japan.

25. Mar 2025. *"Frobenius liftability and derived algebraic geometry"*, The 29th Conference on Algebra for Young Researchers in Japan., Osaka University, Japan.

24. Mar 2025. *"Liftability results from formal moduli problems"* (including survey), Small workshop on arithmetic geometry 2025 in Hakodate., Hakodate Community Design Center, Japan.

23. Nov 2024. *"Prismatic Kunz's theorem"*, The 45th Japan Symposium on Commutative Algebra., RIMS (Kyoto University), Japan.

22. Nov 2024. *"Applications of higher algebra to the lifting problem of modules"*, Tokyo Commutative Algebra Seminar., Online (Zoom), Japan.

21. Oct 2024. *"F-liftability obstruction in singular varieties through derived algebraic geometry"*, Singularity Theory Seminar., Nihon University, Japan.

20. Sep 2024. *"Frobenius maps on mixed characteristic rings via prismatic cohomology"* (Poster Session), L-functions and Motives in Niseko 2024., Setsu Niseko and Niseko Residents Center, Japan.

19. Sep 2024. *"A generalization of Kunz's theorem to mixed characteristic via p-adic cohomology theory"*, MSJ Autumn Meeting 2024., Osaka University, Japan.

18. July 2024. *"Perfectoid spaces, tilts and untilts"* (Survey talk), Atelier de Géométrie Arithmétique 2024., RIMS (Kyoto University), Japan.

17. July 2024. *"Prismatic approach to a mixed characteristic Kunz's theorem"*, The 23nd Hiroshima-Sendai Workshop on Number Theory at Sendai., Tohoku University, Japan.

16. June 2024. *"Regularity criterion of mixed characteristic rings via prismatic cohomology"*, Keio Algebra Seminar., Keio University, Japan.

15. June 2024. *"Prisms and regular local rings"*, The 35th Seminar on Commutative Algebra in Japan., Tokushima University, Japan.

14. Apr 2024. *"Prisms and its application to regular rings"*, Saturday Seminar., Meiji University, Japan.

13. Mar 2024. *"Perfectoid ideals and its correspondence"*, The 20th Mathematics Conference for Young Researchers., Hokkaido University, Japan.
12. Feb 2024. *"Mixed characteristic Kunz's theorem with prismatic theory"*, The 28th Conference on Algebra for Young Researchers in Japan., Waseda University, Japan.
11. Dec 2023. *"Commutative ring theoretic approach for the perfectoidization of semiperfectoid rings"*, Number Theory Seminar., Kyoto University, Japan.
10. Nov 2023. *"Ideal correspondence between a perfectoid ring and its tilt"*, The 44th Japan Symposium on Commutative Algebra., LecTore Hayama, Japan.
9. Aug 2023. *"Absolute integral closure"* (Survey talk), The 18th Summer School on Commutative algebra., Tokyo Institute of Technology, Japan.
8. Aug 2023. *"On the relation between perfectoidization and p-root closure"*, The 9th China-Japan-Korea International Conference on Ring and Module Theory., Incheon National University, Republic of Korea.
7. July 2023. *"On the commutative ring-theoretic structure of the perfectoidization of semiperfectoid rings"*, The 22nd Hiroshima-Sendai Workshop on Number Theory at Hiroshima., Hiroshima University, Japan.
6. July 2023. *"On the application of perfectoidization to commutative algebra and its structure"*, The 34th Seminar on Commutative Algebra in Japan., Kitami Institute of Technology, Japan.
5. May 2023. *"On Perfectoid(ization) and its commutative ring-theoretic properties"*, Ookayama Youth Seminar in Algebra., Tokyo Institute of Technology, Japan.
4. Mar 2023. *"A mixed characteristic analogue of the perfection of rings"*, The 11th Japan-Vietnam Joint Seminar on Commutative Algebra - by and for young mathematicians -., Vietnam Academy of Science and Technology, Vietnam.
3. Mar 2023. *"An explicit construction of perfectoid almost Cohen-Macaulay algebras in mixed characteristic"*, MSJ Spring Meeting 2023., Chuo University, Japan.
2. Mar 2023. *"An explicit construction of perfectoid almost Cohen-Macaulay algebras"*, The 19th Mathematics Conference for Young Researchers., Hokkaido University, Japan.
1. Oct 2022. *"An explicit construction of perfectoid almost Cohen-Macaulay algebras in mixed characteristic"*, The 43rd Japan Symposium on Commutative Algebra., Osaka University, Japan.

Membership

- Apr 2023– . Mathematical Society in Japan (MSJ)

Languages

Japanese: Native — *Mother tangue*

English: Intermediate — *Can read, write, and, listen but may struggle with conversation*

French: Beginner — *Can only read mathematical texts*