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Education

Institute of Science Tokyo (formerly Tokyo Institute of Technology)¹ <i>Doctor of Science in Mathematics</i> Supervisor: Kazuma Shimomoto	Tokyo, Japan <i>Apr 2024–Current</i>
Tokyo Institute of Technology <i>Master of Science in Mathematics</i> Supervisor: Kazuma Shimomoto (2nd year), Fumiharu Kato (1st year)	Tokyo, Japan <i>Apr 2022–Mar 2024</i>
Tokyo Institute of Technology <i>Bachelor of Science in Mathematics</i> Supervisor: Fumiharu Kato	Tokyo, Japan <i>Apr 2018–Mar 2022</i>

Professional Position

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

36. Dec 2025. “*Global singularities in mixed characteristic and graded perfectoid rings*”, Mini-workshop on Arithmetic Geometry in Sendai, Tohoku University, Japan.

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

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., Colorado 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 tongue

English: Intermediate

Can read, write, and, listen but may struggle with conversation

French: Beginner

Can only read mathematical texts