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## Education

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

## Professional Position

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

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

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

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 23rd 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

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

## Languages

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<b>Japanese:</b> Native	<i>Mother tongue</i>
<b>English:</b> Intermediate	<i>Can read, write, and, listen but may struggle with conversation</i>
<b>French:</b> Beginner	<i>Can only read mathematical texts</i>