

# Ryo ISHIZUKA | 石塚 伶

Institute of Science Tokyo

2-12-1 Ookayama 152-8551 Meguro-ku Tokyo – Japan

✉ ishizuka.r.ac@m.titech.ac.jp • <https://ryo1203.github.io>

## 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>
--	--------------------------

## 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”, J. Algebra **693**, 732–769 (2026). 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.

<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*.

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. Nov 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*