

Yusuke Iguchi, PhD

Senior Research Scientist | Co-Founder, JASS | Co-Founder, GWCJ | Green card holder

Geballe Laboratory for Advanced Materials, Stanford University
476 Lomita Mall, Rm 137, Stanford, CA 94305, USA

Education

- Ph.D.** (2018) Basic Science, University of Tokyo, Tokyo
- M.S.** (2015) Basic Science, University of Tokyo, Tokyo
- B.S.** (2013) Physics, Tokyo University of Science, Tokyo
with **Teaching certification** for Science in middle/high schools

Research Experience

Sr. Research Scientist, Geballe Laboratory for Advanced Materials, Stanford University, CA
2020-current

- **Mentored students and helped to manage the group's operation.**
- **Led the research team** on the local superconductivity in quasi-2D superconductors Pd_xErTe_3 , observing the anomalous superfluid density potentially linked to quantum fluctuations. [PRL 2024]
- **Led the research team** examining the local superconductivity in a chiral superconductor candidate UTe_2 , visualizing single-phase superconductivity and superfluid density. [PRL 2023]
- **Led an international research team** in the investigation of states of vortex in a multi-band superconductor $\text{K}_{0.77}\text{Ba}_{0.23}\text{Fe}_2\text{As}_2$, **discovering the Un-Quantized Vortex**. [Science 2023]

JSPS Overseas Postdoc Research Fellow, Applied Physics, Stanford University
2018–2020 (Advisor: Kathryn Ann Moler)

- **Launched the scanning SQUID microscopy system in the cryogenic dilution unit.**
- Observed local linear- T superfluid density and coexisting ferromagnetic domains with the superconductivity in a chiral superconductor candidate URu_2Si_2 . [PRB(Letter) 2021]

JSPS Research Fellow/Grad student, University of Tokyo
2013–2018 (Advisor: Yoshinori Onose)

- **A first member** of Prof. Onose's Laboratory.
- **Launched the 20/40 GHz microwave measurement systems** and implemented the creation of single crystals, the design of the microwave antenna, and the micro-fabrication technique.
- **Discovered the nonreciprocal magnon propagation** via the relativistic effect in a chiral lattice system. [PRB 2015]
- Electrically and magnetically controlled the nonreciprocal microwave propagation in multiferroics. [Nat. Commun. 2017; PRB 2018]

Graduation Research, Tokyo University of Science
2012–2013 (Advisor: Setsuo Mitsuda)

- **Launched the strain device for Synchrotron Radiation**, revealing the significant lattice response to a pressure near the phase transition point in spin-frustrated CuFeO_2 [JPSJ 2013].

Fellowships and Awards

2024/9	PRB Editors' Suggestion
2024/7	PRL Editors' Suggestion
2024/5	UJA Outstanding Paper Award in Physics
2024/2	Phys. Rev. Mater. Editors' Suggestion
2023/10	PRB Editors' Suggestion
2022/11	Appl. Phys. Lett. Editors' Picks
2018/4	Overseas Research Fellowship , Japan Society for the Promotion of Science
2017/1	J. Phys. Soc. Jpn. Papers of Editors' Choice
2016/4	Research Fellowship (DC2) of Japan Society for the Promotion of Science
2015/4	Scholarship for Excellent Ph.D. Students , Japan Student Services Organization
2015/3	Outstanding Graduate Student Award , Arts and Sciences, University of Tokyo
2013/4	Scholarship for Excellent Master Students , Japan Student Services Organization

Competitive Research Funding

2016/4 – 2018/3	Japan Society for the Promotion of Science Fellows (PI : \$13K for two years) “Study of relativistic magnonics by using microfabricated microwave circuits”
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Invited Talks

Anomalous Superfluid Density in Quasi-2D Superconductors Pd_xErTe₃

2024 He Lab Seminar, Yale University, CT

Observation of Unquantized Vortices in Superconductor

2025	Beyond standard superconducting and superfluid states , Nordita, Stockholm, Sweden
2024	UJA Outstanding Paper Award 2024, Award Ceremony in Physics, USA (online)
2024	American Physical Society March Meeting 2024 (Minneapolis), M41.00005
2023	Quantum Seminar, Tsung-Dao Lee Institute, Shanghai (online)
2023	7 th KUJI QMAT Seminar, Cambridge, Kyoto, Seoul, and Salerno (online)
2023	12 th JASS Seminar, Stanford University, CA

Microscopic Imaging Homogeneous and Single-Phase Superfluid Density in UTe₂

2022	UTe ₂ seminar, Tohoku University, Japan and University of Grenoble Alpes, France (online)
2022	Onose Lab seminar, Tohoku University, Japan
2022	Matsueda Lab seminar, Tohoku University, Japan

Scanning SQUID Microscopy on Chiral Superconductor Candidates

2021	73 rd BJAN Seminar, UC Berkeley, CA (online)
2019	32nd International Symposium on Superconductivity , Kyoto

Scanning SQUID Microscopy on Superconducting Vortices

2019	11 th Stanford Visitors Meetup, Stanford University, CA
2019	56 th BJAN Seminar, UC Berkeley, CA
2019	JSPS Researcher Gatherings, Berkeley, CA

Non-Reciprocity of Magnon Excitations in Non-Centrosymmetric Magnets

2021	59 th Risou Doctoral group, Tokyo University of Science, Tokyo (online)
2017	NTT Basic Research Laboratories, Japan

Publications

(ORCID ID: [0000-0001-9695-4586](https://orcid.org/0000-0001-9695-4586), [Google Scholar](#))

- [18] **Y. Iguchi**, H. Man, S.M. Thomas, F. Ronning, J. Ishizuka, M. Sigrist, P.F.S. Rosa, and K.A. Moler, [Magnetic edge fields in \$UTe_2\$ near zero background fields](#), *arXiv:2409.07668*
- [17] E. Mueller, **Y. Iguchi**, F. Jerzembeck, J.O. Rodriguez, M. Romanelli, E. Abarca-Morales, A. Markou, N. Kikugawa, D.A. Sokolov, G. Oh, C.W. Hicks, A.P. Mackenzie, Y. Maeno, V. Madhavan, and K.A. Moler, [Superconducting Penetration Depth Through a Van Hove Singularity: \$Sr_2RuO_4\$ Under Uniaxial Stress](#), **Phys. Rev. B** 110, L100502 (2024). **[Letter] [Editors' Suggestion]**
- [16] H. Man, **Y. Iguchi**, J. Bao, D.Y. Chung, and M.G. Kanatzidis, [In-situ local imaging of ferromagnetism and superconductivity in \$RbEuFe_4As_4\$](#) , **Nano Lett.** 24, 9082 (2024).
- [15] **Y. Iguchi**, J.A. Straquadine, C. Murthy, S.A. Kivelson, A. Singh, I.R. Fisher, and K.A. Moler, [Anomalous superfluid density in a disordered charge density wave material: Pd-intercalated \$ErTe_3\$](#) , **Phys. Rev. Lett.** 133, 036001 (2024). **[Editors' Suggestion] [On the Cover]**
- [14] R.A. Shi, B.Y. Wang, **Y. Iguchi**, M. Osada, K. Lee, B.H. Goodge, L.F. Kourkoutis, H.Y. Hwang, and K. A. Moler, [Scanning SQUID study of ferromagnetism and superconductivity in infinite-layer nickelates](#), **Phys. Rev. Mater.** 9, 024802(2024). **[Editors' Suggestion]**
- [13] E. Mueller, **Y. Iguchi**, C.A. Watson, C.W. Hicks, Y. Maeno, and K.A. Moler, [Constraints on a split superconducting transition under uniaxial strain in \$Sr_2RuO_4\$ from scanning SQUID microscopy](#), **Phys. Rev. B** 108, 144501(2023). **[Editors' Suggestion]**
- [12] **Y. Iguchi**, R.A. Shi, K. Kihou, C.-H. Lee, M. Barkman, A.L. Benfenati, V. Grinenko, E. Babaev, and K.A. Moler, [Superconducting vortices carrying a temperature-dependent fraction of the flux quantum](#), **Science** 380, 1244-1247 (2023).
- [11] **Y. Iguchi**, H. Man, S.M. Thomas, F. Ronning, P.F.S. Rosa, and K.A. Moler, [Microscopic imaging homogeneous and single phase superfluid density in \$UTe_2\$](#) , **Phys. Rev. Lett.** 130, 196003 (2023).
- [10] S. Hirose, **Y. Iguchi**, Y. Nii, T. Kimura, and Y. Onose, [Nonreciprocal microwave response at room temperature in multiferroic Y-type hexaferrite \$BaSrCo_2Fe_{11}AlO_{22}\$](#) , **Appl. Phys. Lett.** 121, 222401 (2022). **[Editor's Choice]**
- [9] **Y. Iguchi**, I.P. Zhang, E.D. Bauer, F. Ronning, J.R. Kirtley, and K.A. Moler, [Local observation of linear- \$T\$ superfluid density and anomalous vortex dynamics in \$URu_2Si_2\$](#) , **Phys. Rev. B** 103, L220503 (2021). **[Letter]**
- [8] I.P. Zhang, J. C. Palmstrom, H. Noad, L. Bishop-Van Horn, **Y. Iguchi**, Z. Cui, E. Mueller, J.R. Kirtley, I.R. Fisher, and K.A. Moler, [Imaging anisotropic vortex dynamics in \$FeSe\$](#) , **Phys. Rev. B** 100, 024514 (2019).

- [7] **Y. Iguchi**, Y. Nii, M. Kawano, H. Murakawa, N. Hanasaki, and Y. Onose, [Microwave non-reciprocity of magnon excitations in a non-centrosymmetric antiferromagnet Ba₂MnGe₂O₇](#), **Phys. Rev. B** 98, 064416 (2018).
- [6] **Y. Iguchi**, Y. Nii, and Y. Onose, [Magnetolectrical control of nonreciprocal microwave response in a multiferroic helimagnet](#), **Nat. Commun.** 8, 15252 (2017).
- [5] Y. Nii, R. Sasaki, **Y. Iguchi**, and Y. Onose, [Microwave Magneto-Chiral Effect in a Noncentrosymmetric Magnet CuB₂O₄](#), **J. Phys. Soc. Jpn.** 86, 024707 (2017). **[Editors' choice]**
- [4] R. Sasaki, Y. Nii, **Y. Iguchi**, and Y. Onose, [Nonreciprocal propagation of surface acoustic wave in Ni/LiNbO₃](#), **Phys. Rev. B** 95, 020407(R) (2017). **[Rapid Communications]**
- [3] Y. Kinoshita, N. Kida, M. Sotome, T. Miyamoto, **Y. Iguchi**, Y. Onose, and H. Okamoto, [Terahertz Radiation by Subpicosecond Magnetization Modulation in the Ferrimagnet LiFe₅O₈](#), **ACS photon.** 3, 1170 (2016). **[Letter]**
- [2] **Y. Iguchi**, S. Uemura, K. Ueno, and Y. Onose, [Nonreciprocal magnon propagation in a noncentrosymmetric ferromagnet LiFe₅O₈](#), **Phys. Rev. B** 92, 184419 (2015).
- [1] T. Nakajima, **Y. Iguchi**, H. Tamatsukuri, S. Mitsuda, Y. Yamasaki, H. Nakao, and N. Terada, [Uniaxial-Pressure Effects on Spin-Driven Lattice Distortions in Geometrically Frustrated Magnets CuFe_{1-x}Ga_xO₂ \(x=0, 0.035\)](#), **J. Phys. Soc. Jpn.** 82, 114711 (2013).

Reviewer

- 2024/8 **Judge for 2024 Poster Award**, Japan Society for the Promotion of Science, San Francisco Office, Researcher gathering 2024 Summer
- 2023/9 **Judge for Student Best Presentation Award**, 78th Ann. Meeting, The Physical Society of Japan, Sendai, Japan
- Peer-review** Science, npj Quantum Materials, Scientific Reports, Science Progress

Teaching Experience

- 2024/4/2 **Teacher**, JASS special lecture, Stanford University, CA
Lecture about Superconductivity for primary school students.
- 2024/3/19 **Teacher**, JASS special lecture, Stanford University, CA
Lecture about Scanning SQUID study for high school students.
- 2023/9/7 **Teacher**, JASS special lecture, Stanford University, CA
Lecture about Scanning SQUID study for senior students from Ritsumeikan Univ.
- 2022 Summer **Teacher**, Girls Who Code in Japanese, Japan and USA (online)
Programming class making a story using Scratch for primary school students.
- 2022/5/19 **Guest Teacher**, nano@stanford, Greenleaf TK-8 School, CA
Science laboratory about the electric circuit in 8th-grade classes.

2021/12/8	Guest Teacher , Skype a Scientist, Chardon Primary School, NE(online) Lecture about the States of Matter in 2nd-grade class.
2013–2014	Teaching Assistant , the University of Tokyo, Japan Material Science Laboratory II and III for senior students' classes
2012 Summer	Guest Teacher , Kumagaya High School, Japan Lecture about Equations of Motion for 10th-grade classes
2012/9	Guest Teacher , Oji Special Needs School, Tokyo Teach/Care for students with mental disabilities
2012/9-10	Private Teacher , Self-employed, Saitama, Japan Teach Mathematics for a 4th grade student
2009-2010	Private Teacher , Daiichi Tutoring School, Saitama, Japan Teach Science/Math/English for 6-9th grade students

Mentoring Experience

2022/1–2024/5	Mentoring Logan Bishop-Van Horn, Stanford University (<i>awarded Ph.D. in 2024</i>)
2019/9–2024/4	Mentoring Eli Mueller, Stanford University (<i>awarded Ph.D. in 2024</i>)
2019/11–2023/6	Mentoring Ruby A. Shi, Stanford University (<i>awarded Ph.D. in 2023</i>)
2018/4–2022/6	Mentoring Irene P. Zhang, Stanford University (<i>awarded Ph.D. in 2022</i>)

Synergistic Activities

2022/6–	Co-Founder & Organizer , Japanese Academic Seminars at Stanford (JASS), Stanford, CA: I have founded and organized a non-profit community, JASS, which comprises 300 top scientists who speak Japanese from various fields, including physics, engineering, mathematics, data science, and medicine. Monthly research presentations by members provide a unique network that allows them to perform multidisciplinary research.
2022/7–	Co-Founder & Organizer , Girls Who Code in Japanese (GWCJ), Japan Co-founder of GWCJ, a non-profit initiative offering STEM education to girls and gender minorities . Developed and disseminated Japanese-adapted programming resources, enhancing access to coding education. Collaborated with Japanese NGOs to integrate these resources into broader educational programs.
2024/1–	Project Leader , Community Launching Support, Working Group 10, non-profit organization, United Japanese researchers Around the world (UJA)
2024/9–	Vice Director , North California area, UJA Paper Award 2025
2024/8	Facilitator , Networking session, JSPS Researcher gathering 2024 Summer
2024/3	Session chair , American Physical Society March Meeting (Minneapolis) 2024, D16
2023/12	Speaker , “Unleashing Children’s Potential: How to Raise Kids Who Love Math!”, ECC public webinar
2023/11	Panelist , “The Interaction Crisis: Reshaping Synchronous Online Education,” SpatialChat public webinar
2023/9	Panelist , “Network Enhancement for Overseas Japanese Research Community,” 1st UJA General Meeting, Consulate-General of Japan in Boston
2023/9	Organizer , “The Overseas Career for Women Researchers,” 1st JASS&SA Webinar
2023/9	Session chair , 78th Ann. Meeting, The Physical Society of Japan, Sendai, Japan

Curriculum Vitae

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2022/8

Session chair, 29th Inter. Conf. on Low Temperature Physics (LT29), Sapporo

2020/5–2021/7

Organizer, TED Circle at Bechtel International Center, Stanford University, CA

2019/12

Session chair, 32nd International Symposium on Superconductivity (ISS), Kyoto