Yusuke Iguchi, PhD

Senior Research Scientist | Co-Founder, JASS | Co-Director, UJAW | Green Card Holder

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Education

Ph.D. in Basic Science (Condensed Matter Physics), University of Tokyo, *Tokyo, Japan* 2018

M.S. in Basic Science (Condensed Matter Physics), University of Tokyo, *Tokyo, Japan* 2015

B.S. in Physics, Tokyo University of Science, *Tokyo, Japan* 2013
– Completed Japan's national teacher training program and earned **Teaching Certification in Science (middle/high school level)** licensed by the Japanese Ministry of Education (MEXT)

Research Experience (Selected)

Senior Research Scientist July 2020–Present
Geballe Laboratory for Advanced Materials, Stanford University, CA

- Mentored graduate students and contributed to group management.
- Led projects on quasi-2D superconductors (Pd_xErTe_3), revealing **anomalous superfluid density** potentially linked to quantum and classical fluctuations [PRL 2024].
- Directed studies on UTe_2, a chiral superconductor candidate, visualizing **single-phase superconductivity and chiral edge currents-like edge fields** [PRL 2023, PRB 2024].
- Coordinated an international collaboration that discovered the **Un-Quantized Vortex** in $K_{0.77}Ba_{0.23}Fe_2As_2$, suggesting multicomponent superconductivity [Science 2023].

JSPS Overseas Postdoctoral Fellow March 2018–June 2020
Dep of Applied Physics, Stanford University, CA *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 Ph.D. Research Fellow April 2013–March 2018
Dep of Basic Science, University of Tokyo, Tokyo *Advisor:* Yoshinori Onose

- Founding member of Prof. Onose's Laboratory.
- Launched the 20 GHz and 40 GHz microwave measurement systems; developed single crystal growth, thin film deposition, microwave antenna design, and micro-fabrication techniques.
- Discovered the **nonreciprocal magnon propagation in a chiral lattice system** via the relativistic effect [PRB 2015].
- Demonstrated **electric and magnetic control of nonreciprocal microwave propagation in multiferroics** [Nat. Commun. 2017; PRB 2018].

Undergraduate Researcher April 2012–March 2013
Dep of Physics, Tokyo University of Science, Tokyo *Advisor:* Setsuo Mitsuda

- Built a strain device for synchrotron radiation, revealing the significant lattice response near a phase transition in spin-frustrated $CuFeO_2$ [JPSJ 2013].

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Publications: Refereed Journal Articles

[23] **Y. Iguchi**, K. Inoh, R. Koizumi, & M. Yokoyama, Magnetic Quantum Criticality inside the Superconducting State Revealed by Penetration Depth Scaling with Local T_c
preprint at arXiv:2604.27507

[22] **Y. Iguchi**, N. Nandi, & M. Oudah, Visualizing Vortex Cluster Dynamics in the Weak Type-II Superconductor $CaSb_2$
preprint at arXiv:2604.23117

[24] F. Bahrami, M.P. Bland, N. Shumiya, R.D. Chang, E. Hedrick, R.A. McLellan, K.D. Crowley, A. Dutta, L. Bishop-Van Horn, **Y. Iguchi**, A.K. Anbalagan, G. Cheng, C. Yang, N. Yao, A.L. Walter, A.M. Barbour, S. Gopalakrishnan, R.J. Cava, A.A. Houck, & N.P. de Leon, Vortex Motion Induced Losses in Tantalum Resonators,
Physical Review B 113, 054505 (2026). [Editors' Suggestion]

[23] N. Wadehra, B. Gregory, S. Zhang, N. Schnitzer, **Y. Iguchi**, Y.E. Li, B. Pamuk, D.A. Muller, A. Singer, K.M. Shen, & D. Schlom, Strain-Induced Superconductivity in RuO_2(100) Thin-Films, Communications Materials 6, 135 (2025).

[22] **Y. Iguchi**, (in Japanese) Scanning Magnetic Probe Microscopy on Superconductors,
Solid State Physics, AGNE Gijutsu Center, vol.60, No.6(712), (2025) [Invited Review]

[21] **Y. Iguchi**, H. Man, S.M. Thomas, F. Ronning, J. Ishizuka, M. Sigrist, P.F.S. Rosa, & K.A. Moler, Magnetic Edge Fields in UTe_2 Near Zero Background Fields,
Physical Review B 110, 214505 (2024).

[20] 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, & K.A. Moler, Superconducting Penetration Depth Through a Van Hove Singularity: Sr_2RuO_4 Under Uniaxial Stress,
Physical Review B 110, L100502 (2024). [Letter][Editors' Suggestion]

[19] H. Man, **Y. Iguchi**, J. Bao, D.Y. Chung, & M.G. Kanatzidis, In-situ Local Imaging of Ferromagnetism and Superconductivity in $RbEuFe_4As_4$,
Nano Letters 24, 9082 (2024).

[18] **Y. Iguchi**, J.A. Straquadine, C. Murthy, S.A. Kivelson, A. Singh, I.R. Fisher, & K.A. Moler, Anomalous Superfluid Density in a Disordered Charge Density Wave Material: Pd-Intercalated $ErTe_3$,
Physical Review Letters 133, 036001 (2024). [Editors' Suggestion][On the Cover]

[17] R.A. Shi, B.Y. Wang, **Y. Iguchi**, M. Osada, K. Lee, B.H. Goodge, L.F. Kourkoutis, H.Y. Hwang, & K.A. Moler, Scanning SQUID Study of Ferromagnetism and Superconductivity in Infinite-Layer Nickelates,
Physical Review Materials 9, 024802 (2024). [Editors' Suggestion]

[16] E. Mueller, **Y. Iguchi**, C.A. Watson, C.W. Hicks, Y. Maeno, & K.A. Moler, Constraints on a Split Superconducting Transition Under Uniaxial Strain in Sr_2RuO_4 from Scanning SQUID Microscopy,
Physical Review B 108, 144501 (2023). [Editors' Suggestion]

[15] **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).

[14] **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,
Physical Review Letters 130, 196003 (2023).

[13] S. Hirose, **Y. Iguchi**, Y. Nii, T. Kimura, and Y. Onose, Nonreciprocal Microwave Response at Room Temperature in Multiferroic Y-type Hexaferrite $BaSrCo_2Fe_{11}AlO_{22}$,
Applied Physics Letters 121, 222401 (2022). [Editor's Choice]

[12] **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,
Physical Review B 103, L220503 (2021). [Letter]

[11] 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,
Physical Review B 100, 024514 (2019).

[10] **Y. Iguchi**, Y. Nii, M. Kawano, H. Murakawa, N. Hanasaki, and Y. Onose, Microwave Non-Reciprocity of Magnon Excitations in a Non-Centrosymmetric Antiferromagnet $Ba_2MnGe_2O_7$,
Physical Review B 98, 064416 (2018).

[9] **Y. Iguchi**, Y. Nii, and Y. Onose, Magnetoelectrical Control of Nonreciprocal Microwave Response in a Multiferroic Helimagnet,
Nature Communications 8, 15252 (2017).

[8] Y. Nii, R. Sasaki, **Y. Iguchi**, and Y. Onose, Microwave Magneto-Chiral Effect in a Noncentro-symmetric Magnet CuB_2O_4,
Journal of the Physical Society of Japan 86, 024707 (2017). [Editors' choice]

[7] R. Sasaki, Y. Nii, **Y. Iguchi**, and Y. Onose, Nonreciprocal Propagation of Surface Acoustic Wave in Ni/$LiNbO_3$,
Physical Review B 95, 020407(R) (2017). [Rapid Communications]

[6] Y. Kinoshita, N. Kida, M. Sotome, T. Miyamoto, **Y. Iguchi**, Y. Onose, and H. Okamoto, Terahertz Radiation by Subpicosecond Magnetization Modulation in the Ferrimagnet $LiFe_5O_8$,
ACS photonics 3, 1170 (2016). [Letter]

[5] **Y. Iguchi**, S. Uemura, K. Ueno, and Y. Onose, Nonreciprocal Magnon Propagation in a Noncentrosymmetric Ferromagnet $LiFe_5O_8$,
Physical Review B 92, 184419 (2015).

[4] 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 $CuFe_{1-x}Ga_xO_2$ (x=0, 0.035),
Journal of the Physical Society of Japan 82, 114711 (2013).

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Mentoring Experience

Mentoring D. Wright *(Ph.D. student, Stanford University)*	Jan 2025–present
Mentoring L. Bishop-Van Horn, Stanford University (*awarded Ph.D. in 2024*)	Jan 2022–May 2024
Mentoring E. Mueller, Stanford University (*awarded Ph.D. in 2024*)	Sep 2019–Apr 2024
Mentoring R. A. Shi, Stanford University (*awarded Ph.D. in 2023*)	Nov 2019–Jun 2023
Mentoring I. P. Zhang, Stanford University (*awarded Ph.D. in 2022*)	Apr 2018–Jun 2022

Invited Talks (Selected)

International Conferences and Symposia

ISSP Workshop on Measurement Techniques in Condensed Matter Research Univ. Tokyo — Apr 2026
Local Magnetism in Superconductors by Scanning SQUID Microscopy

IEEE Symposium on Superconducting Electronics and Materials, Yokohama National Univ. — Mar 2026
Scanning SQUID Microscopy for Local Diagnostics of Superconducting Films and Devices

Materials Research Meeting (MRM2025), Yokohama, Japan — Dec 2025
Magnetic Imaging of Un-Quantized Vortices and Chiral Edge Currents

70th Magnetism and Magnetic Materials Conference (MMM2025), Florida, USA — Oct 2025
Magnetic Imaging of Chiral and Magnetic Superconductors

Beyond standard superconducting and superfluid states, Nordita, Stockholm, Sweden — May 2025
Magnetic Imaging Chiral Superconductors and Un-Quantized Vortex

Gordon Research Conference, 2025 Superconductivity, Switzerland — May 2025
Un-Quantized Vortex and Edge Fields in Multicomponent Superconductors

The International Conf. on Superconductivity and Magnetism (ICSM2025), Türkiye — May 2025
Un-quantized Vortex and Edge Fields in Multicomponent Superconductors

Materials Research Society(MRS) Spring Meeting 2025,Seattle,USA(Symposium EL07) — Apr 2025
Magnetic Imaging of Chiral and Magnetic Superconductors

American Physical Society (APS) March Meeting 2024, Minneapolis, USA (M41.00005) — Mar 2024
Superconducting Vortices Carrying a Temperature-Dependent Fraction of the Flux Quantum

Academic Seminars

FCMP Columbia 2026 Spring Online Lectures, Columbia University, NY — Apr 2026
Multicomponent Superconductivity and Flux Quantization

Colloquium, Department of Physics, University of Cincinnati, OH — Feb 2026
Is magnetic flux always quantized in superconductors?

Special CM Seminar, University of British Columbia, Vancouver — Dec 2025
Quantum Magnetism in Superconductors at the Mesoscopic Scale: Multicomponent Systems

CMP & MS Seminar, Brookhaven National Laboratory, NY — Nov 2025
Imaging Toward Emergent Control of Quantum Magnetism: Multicomp. SCs to Quant. Devices

CMP Seminar, University of Connecticut, CT — Oct 2025
Quantum Magnetism in Superconductors at the Mesoscopic Scale: Multicomponent Systems

Outreach and Community Lectures

ECC Public Webinar, *Unleashing Children's Potential: How to Raise Kids Who Love Math* — Dec 2023

12th JASS Seminar, Stanford University, CA — Jul 2023

73rd BJAN Seminar, UC Berkeley (online) — Jun 2021

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Fellowships and Awards

Competitive Research Funding

Japan Society for the Promotion of Science (JSPS) Research Fellowship (DC2) Apr 2016–Mar 2018
PI, approx. $13K for two years
Study of relativistic magnonics by using microfabricated microwave circuits

Major Fellowships and Awards

• Outstanding Paper Award in Physics	United Japanese researchers Around the world	May 2024
• Overseas Research Fellowship	Japan Society for the Promotion of Science	Apr 2018
• Research Fellowship (DC2)	Japan Society for the Promotion of Science	Apr 2016
• Outstanding Graduate Student Award	Arts and Sciences, University of Tokyo	Mar 2015
• Scholarship for Excellent Ph.D. Students	Japan Student Services Organization	Apr 2015
• Scholarship for Excellent Master Students	Japan Student Services Organization	Apr 2013

Editorial Recognitions

• PRL Editors' Suggestion	Jul 2024
• PRB Editors' Suggestion	Oct 2023, Sep 2024 Feb 2026
• Phys. Rev. Mater. Editors' Suggestion	Feb 2024
• Appl. Phys. Lett. Editors' Picks	Nov 2022
• J. Phys. Soc. Jpn. Papers of Editors' Choice	Jan 2017

Teaching Experience (Selected)

Academic Outreach *(Guest Lectures and Special Seminars at Stanford University)*

Topic: Scanning SQUID study*, Audience:* Senior students from Ritsumeikan University	Sep 11, 2025
Topic: Scanning SQUID study*, Audience:* Grad. Stud. from Tokyo University of Science	Aug 22, 2025
Topic: Research Overseas*, Audience:* Graduate students from Osaka University	Feb 17, 2025
Topic: Scanning SQUID study*, Audience:* High school students	Feb 4, 2025

STEM Outreach *(K-12 and Community Programs)*

Instructor, *Girls Who Code in Japanese* (Japan/ USA, online)	Summer 2022
Guest Teacher, *nano@stanford*, Greenleaf TK-8 School, CA	May 19, 2022
Guest Teacher, *Skype a Scientist*, Chardon Primary School, NE(online)	Dec 8, 2021
Guest Teacher, Oji Special Needs School, Tokyo	Sep 2012
Guest Teacher, Kumagaya High School, Japan	Summer 2012

Formal Teaching

Teaching Assistant, The University of Tokyo, Japan 2013–2014
Material Science Laboratory II & III (senior-level undergraduate course)

Reviewer/Judge

Peer Review

Served as reviewer for journals, including *Science, Science Advances, Physical Review Letters, Physical Review X, Physical Review B, Nature Communications, npj Quantum Materials, Scientific Reports, ACS Nano, ACS Applied Electronic Materials, National Science Review, The Innovation Materials, Science Progress*

Award Judge/ Review

Experimental Physics Investigators initiative, Gordon and Betty Moore Foundation 2026
The 30th Outstanding Paper Award of the Physical Society of Japan 2025
Researcher Gathering Poster Award, JSPS San Francisco Office, Berkeley 2024, 2025
Student Best Presentation Award, 78th Ann. Meeting, The Physical Society of Japan 2023

Synergistic Activities

Leadership in Research Communities

Co-Founder, *Japanese Academic Seminars at Stanford (JASS)*, Stanford, CA: 2022–Present
Founded and continue to direct an independent research community of 300+ Japanese-speaking scientists across disciplines. Organize and host monthly research seminars at Stanford with official facility permission, fostering interdisciplinary collaboration.

Co-Director, *United Japanese researchers Around the world (UJAW)*, USA 2024–Present
Direct a global non-profit organization of 5,500+ researchers; oversee initiatives for scientific exchange, career development, and fostering the next-gen global researchers.

Project Leader, Community Launching Support, UJA Working Group 10 2024–Present
Vice Chair, UJA Working Group 9 2025–Present
Vice Chair, North California Area, UJA Paper Award 2025, 2026 2024–2026

Conference and Academic Service

- **Seminar Host:** *GLAM Special Seminar*, Stanford University (May 2026, Mar 2025); *JASS Monthly Seminars* (2022–Present)
- **Session Chair:** *UJA Global Gathering 2026* (Los Angeles); *ICSM 2025* (Türkiye); *UJA Global Gathering 2025* (Cincinnati); *MRS Spring Meeting 2025* (Seattle); *APS March Meeting 2024* (Minneapolis); *JPS March Meeting 2023* (Sendai); *LT29* (2022, Sapporo); *ISS2019* (2019, Kyoto)

Professional Development and Outreach

Co-Founder, *Girls Who Code in Japanese (GWCJ)*, Japan 2022–Present
Developed and disseminated programming resources adapted for Japanese learners; partnered with NGOs to broaden STEM access for girls and gender minorities.

Facilitator, Career Networking sessions, JSPS Researcher Gathering, Berkeley, CA 2024, 2025
Panelist, *Reshaping Synchronous Online Education*, SpatialChat Webinar Nov 2023
Organizer, *The Overseas Career for Women Researchers*, 1st JASS & SA Webinar Sep 2023