Curriculum Vitae May 30, 2025

Yuichi Harikane (he/him)

Institute for Cosmic Ray Research
The University of Tokyo
5-1-5 Kashiwa-no-Ha, Kashiwa City,
Chiba, 277-8582, Japan

Assistant Professor
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https://sites.google.com/view/yuichi-harikane-en

Interests

Galaxy Formation, Supermassive Black Holes, Cosmic Reionization, Large Scale Structure, Observational Cosmology

Academic Positions

Assistant Professor 6/2020-present
The University of Tokyo, Institute for Cosmic Ray Research
(Paternity leave in 2021, 2024)

Honorary Research Associate 11/2019-10/2021
University College London

JSPS Fellowship PD 4/2019-5/2020
University College London
National Astronomical Observatory of Japan

Education

Ph.D. Physics; The University of Tokyo 3/2019
Thesis: Subaru Census of Early Galaxies in the Hierarchical Structure Formation of the Universe
Adviser: Masami Ouchi

M.S. Physics; The University of Tokyo 3/2016

B.A. Physics; The University of Tokyo 3/2014

Fellowships and Awards

The ASJ Young Astronomer Award 2024
The Commendation by the Minister of Education, Culture, Sports, Science and Technology 2023
The PASJ Excellent Paper Award (first-author, Harikane et al.) 2023
The PASJ Excellent Paper Award (co-author, Matsuoka et al.) 2023
The PASJ Excellent Paper Award (co-author, Hashimoto et al.) 2022
37th Inoue Research Award for Young Scientists 2021
Best Oral Presentation Award in the 6th Galaxy Evolution Workshop 2019
JSPS PD Felllowship 2019
University of Tokyo School of Science Research Award 2019

Institute for Cosmic Ray Research President's Award[1]	2019
JSPS DC1 Fellowship	2016
ALPS Fellowship, the University of Tokyo	2014
Best Research Project Award in Spring School in Institute for Cosmic Ray Research	2013
High School Chemistry Grand Prix Silver Medal	2009

List of Publications

First-author: 13 papers (1900+ citations, ADS library)
All: 125 papers (10000+ citations, ADS library)
Selected publications: (a full list can be found in ADS)

1. **Yuichi Harikane**, et al.,
   The Astrophysical Journal, Volume 980, Issue 1, id.138, 26 pp (2025)
   "JWST, ALMA, and Keck Spectroscopic Constraints on the UV Luminosity Functions at $z \sim 7-14$: Clumpiness and Compactness of the Brightest Galaxies in the Early Universe"

2. **Yuichi Harikane**, et al.,
   The Astrophysical Journal, Volume 960, Issue 1, id.56, 22 pp (2024)
   "Pure Spectroscopic Constraints on UV Luminosity Functions and Cosmic Star Formation History From 25 Galaxies at $z_{\rm spec} = 8.61-13.20$ Confirmed with JWST/NIRSpec"

3. **Yuichi Harikane**, et al.,
   The Astrophysical Journal, Volume 959, Issue 1, id.39, 18 pp. (2023)
   "A JWST/NIRSpec First Census of Broad-Line AGNs at $z = 4-7$: Detection of 10 Faint AGNs with $M_{\rm BH} \sim 10^6 - 10^8$ $M_\odot$ and Their Host Galaxy Properties"

4. **Yuichi Harikane**, et al.,
   The Astrophysical Journal Supplement Series, Volume 265, Issue 1, id. 5, 27 pp. (2023)
   "A Comprehensive Study on Galaxies at $z \sim 9-16$ Found in the Early JWST Data: UV Luminosity Functions and Cosmic Star-Formation History at the Pre-Reionization Epoch"

5. **Yuichi Harikane**, et al.,
   The Astrophysical Journal, Volume 929, Issue 1, article id. 1, 15 pp. (2022)
   "A Search for H-Dropout Lyman Break Galaxies at $z \sim 12-16$"

6. **Yuichi Harikane**, et al.,
   The Astrophysical Journal Supplement Series, Volume 259, Issue 1, id. 20, 37 pp. (2022)
   "GOLDRUSH. IV. Luminosity Functions and Clustering Revealed with ∼4,000,000 Galaxies at $z \sim 2-7$: Galaxy-AGN Transition, Star Formation Eficiency, and Implication for Evolution at $z > 10$"

[1] Awarded by Takaaki Kajita (Nobel Laureate in Physics 2015) for the best doctor thesis.

7. **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 902, Issue 2, article id. 117, 12 pp. (2020)
"The Mean Absorption Line Spectra of a Selection of Luminous $z \sim 6$ Lyman Break Galaxies"

8. **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 896, Issue 2, article id. 93, 19 pp. (2020)
"Large Population of ALMA Galaxies at $z > 6$ with Very High [OIII]88μm to [CII]158μm Flux Ratios: Evidence of Extremely High Ionization Parameter or PDR Deficit?"

9. **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 883, Issue 2, article id. 142, 16 pp. (2019)
"SILVERRUSH. VIII. Spectroscopic Identifications of Early Large Scale Structures with Protoclusters Over 200 Mpc at $z \sim 6-7$: Strong Associations of Dusty Star-Forming Galaxies"

10. **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 859, Issue 2, article id. 84, 21 pp. (2018).
"SILVERRUSH. V. Census of Lyα, [OIII]λ5007, Hα, and [CII]158μm Line Emission with $\sim$1000 LAEs at $z = 4.9-7.0$ Revealed with Subaru/HSC"

11. **Yuichi Harikane**, et al.,
Publications of the Astronomical Society of Japan, 70, SP1, S11 (2018).
"GOLDRUSH. II. Clustering of galaxies at $z \sim 4-6$ revealed with the half-million dropouts over the 100 deg^2 area corresponding to 1 Gpc^3"

12. **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 821, Issue 2, article id. 123, 23 pp. (2016).
"Evolution of Stellar-to-Halo Mass Ratio at $z = 0-7$ Identified by Clustering Analysis with the Hubble Legacy Imaging and Early Subaru/Hyper Suprime-Cam Survey Data"

13. **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 794, Issue 2, article id. 129, 12 pp. (2014).
"MOSFIRE and LDSS3 Spectroscopy for an [OII] Blob at $z = 1.18$: Gas Outflow and Energy Source"

14. Kohei Inayoshi, **Yuichi Harikane**, et al.,
The Astrophysical Journal Letters, Volume 938, Issue 2, id.L10, 6 pp.
"A Lower Bound of Star Formation Activity in Ultra-high-redshift Galaxies Detected with JWST: Implications for Stellar Populations and Radiation Sources"

15. Ono Yoshiaki, **Yuichi Harikane**, et al.,
Submitted to the Astrophysical Journal, arXiv:2208.13582
"Morphologies of Galaxies at $z \simeq 9-17$ Uncovered by JWST/NIRCam Imaging:

Cosmic Size Evolution and an Identification of an Extremely Compact Bright Galaxy at $z \sim 12$ "

16. Hironao Miyatake, **Yuichi Harikane**, et al., (selected as Editors' Suggestion)
Physical Review Letters, Volume 129, Issue 6, article id.061301 (2022)
"First Identification of a CMB Lensing Signal Produced by 1.5 Million Galaxies at $z \sim 4$: Constraints on Matter Density Fluctuations at High Redshift"

17. Shotaro Kikuchihara, **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 931, Issue 2, id.97, 17 pp.
"SILVERRUSH. XI. Intensity Mapping for Lyα Emission Extending over 100-1000 comoving kpc around $z \sim 2-7$ LAEs with Subaru HSC-SSP and CHORUS Data"

18. Ryota Kakuma, Masami Ouchi, **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 916, Issue 1, id.22, 9 pp. (2021).
"SILVERRUSH. IX. Lyα Intensity Mapping with Star-forming Galaxies at $z = 5.7$ and 6.6: A Possible Detection of Extended Lyα Emission at ≤ 100 Comoving Kiloparsecs around and beyond the Virial-radius Scale of Galaxy Dark Matter Halos"

19. Tomoya Kinugawa, **Yuichi Harikane**, & Katsuaki Asano
The Astrophysical Journal, Volume 878, Issue 2, article id. 128, 9 pp. (2019).
"Long Gamma-Ray Burst Rate at Very High Redshift"

20. Takatoshi Shibuya, Masami Ouchi, **Yuichi Harikane**, et al.,
The Astrophysical Journal, Volume 871, Issue 2, article id. 164, 13 pp. (2019).
"Morphologies of ∼190,000 Galaxies at z = 0-10 Revealed with HST Legacy Data. III. Continuum Profile and Size Evolution of Lyα Emitters"

21. Takatoshi Shibuya, Masami Ouchi, **Yuichi Harikane**, et al.,
Publications of the Astronomical Society of Japan, 70, SP1, S15 (2018).
"SILVERRUSH. III. Deep optical and near-infrared spectroscopy for Lyα and UV-nebular lines of bright Lyα emitters at $z = 6-7$"

22. Masami Ouchi, **Yuichi Harikane**, et al.,
Publications of the Astronomical Society of Japan, 70, SP1, S13 (2018).
"Systematic Identification of LAEs for Visible Exploration and Reionization Research Using Subaru HSC (SILVERRUSH). I. Program strategy and clustering properties of ∼2000 Lyα emitters at $z = 6-7$ over the 0.3-0.5 Gpc^2 survey area"

23. Yoshiaki Ono, Masami Ouchi, **Yuichi Harikane**, et al.,
Publications of the Astronomical Society of Japan, 70, SP1, S10 (2018).
"Great Optically Luminous Dropout Research Using Subaru HSC (GOLDRUSH). I. UV luminosity functions at $z \sim 4-7$ derived with the half-million dropouts on the 100 deg^2 sky"

24. Masafumi Ishigaki, Masami Ouchi, & **Yuichi Harikane**,
The Astrophysical Journal, Volume 822, Issue 1, article id. 5, 9 pp. (2016).
"A Very Compact Dense Galaxy Overdensity with $\delta \simeq 130$ Identified at $z \sim 8$: Implications for Early Protocluster and Cluster Core Formation"

25. Takatoshi Shibuya, Masami Ouchi, & **Yuichi Harikane**,
The Astrophysical Journal Supplement Series, Volume 219, Issue 2, article id. 15, 20 pp. (2015).
"Morphologies of $\sim 190,000$ Galaxies at $z = 0 - 10$ Revealed with HST Legacy Data. I. Size Evolution"

Invited Lectures at Summer Schools

1. **ESO-Gruber summer school: From Nearby Worlds to Distant Galaxies**, Germany, 2025

2. **Astronomy and Astrophysics Young Astronomers Summer School FY2022**, Japan, 2022

Selected Talks at Conferences and Workshops

1. **Kaba Kada: Exploring the first billion years of the Universe** (invited), Australia, 2025

2. **North America-Taiwan Joint ALMA Science Workshop** (invited), Taiwan, 2025

3. **The growth of galaxies in the Early Universe - X** (invited), Itary, 2025

4. **The First Gigayear(s)** (invited), USA, 2024

5. **2024 Santa Cruz Galaxy Workshop** (invited), USA, 2024

6. **The Origin and Evolution of Supermassive Black Holes** (invited), Itary, 2024

7. **Galaxies and diffuse gas in large-scale overdense environments at high redshift** (invited, but canceled due to the 2nd baby birth), Itary, 2024

8. **COSPAR: Coevolution between high-redshift quasars and galaxies in the era of JWST** (invited), Korea, 2024

9. **Cosmic Dawn at High Latitudes Conference** (invited), Sweden, 2024

10. **Galaxy Evolution at High Resolution** (invited), Germany, 2024

11. **ELT Science in Light of JWST** (invited), Japan, 2024

12. **First Stars VII** (invited), USA, 2024

13. **Science with the Hubble and James Webb Space Telescopes VII: Stars, Gas & Dust in the Universe** (invited), Portugal, 2024
14. **Observations and models of dust in early galaxies in the JWST era** (invited), 2024
15. **i2i: back again to linking galaxy physics from ISM to IGM scales** (invited), Itary, 2024
16. **The Growth of Galaxies in the Early Universe - VIX** (invited), Itary, 2024
17. **35th Rironkon Symposium** (invited), Japan, 2023
18. **First Star and First Galaxy Workshop 2023** (invited), Japan, 2023
19. **KEK Theory Meeting on Particle Physics Phenomenology (KEK-PH2023)** (invited), Japan, 2023
20. **Development of multi-messenger astronomy** (invited), Japan, 2023
21. **HSC Medium-band filter Nagoya workshop** (invited), Japan, 2023
22. **2023 Santa Cruz Galaxy Workshop** (invited), USA, 2023
23. **Shedding new light on the first billion years of the Universe** (invited), France, 2023
24. **Observing the evolving Universe** (invited), UK, 2023
25. **Olympian Symposium 2023** (invited), Greece, 2023
26. **The Growth of Galaxies in the Early Universe - VIII** (invited), Itary, 2023
27. **9th Galaxy Evolution Workshop** (invited), Japan, 2023
28. **East-Asian ALMA Science Workshop 2023** (invited), Taiwan, 2023
29. **11th Observational Cosmology Workshop** (invited), Japan, 2022
30. **Charting the metallicity evolution of the Universe** (invited), Itary, 2022
31. **In Situ View of Galaxy Formation 2** (invited), Germany, 2022
32. **GREX-PLUS Science Workshop FY2021** (invited), Japan&onine, 2022
33. **London Cosmology Discussion Meeting** (invited), UK&online, 2022
34. **GOPIRA Symposium FY2021** (invited), online, 2022

35. **Roman Science Team Community Briefing**, online, 2021
36. **SAZERAC Sip: Early Galaxy Formation Near and Far**, online, 2021
37. **The Rise of Metals and Dust in Galaxies through Cosmic Time**, online, 2020
38. **Protoclusters: galaxies in confinement** (invited), online, 2020
39. **SAZERAC**, online, 2020
40. **First Star and First Galaxy Workshop 2020** (invited), Japan, 2020
41. **Revolutionary Spectroscopy of Today as a Springboard to Webb** (invited), The Netherlands, 2019
42. **Galaxy-IGM workshop 2019** (Invited lecturer), Japan, 2019
43. **Extremely Big Eyes on the Early Universe**, Japan 2019
44. **Panchromatic Panoramic Studies of Galaxy Clusters: from HSC to PFS and ULTIMATE**, Taiwan, 2019
45. **Understanding Emission-line galaxies for the next generation of cosmological surveys**, Spain 2018
46. **Galaxy-IGM workshop 2018** (invited), Japan, 2018
47. **The 6th Subaru International Conference**, Japan, 2016
48. **Signals from the Deep Past**, Malta, 2016
49. **SnowPAC 2016**, USA, 2016
50. **Advanced Workshop on Cosmological Structures from Reionization to Galaxies**, Itary, 2015

Scientific Research Grants and Funding

JSPS Grant-in-Aid for Scientific Research(A) (24H00245, USD 462,800/JPY 46,280,000) 2024-2029
JSPS Grant for Young Scientists (21K13953, USD 45,500/JPY 4,550,000) 2021-2024
JSPS Grant for JSPS Fellows (19J01222, USD 52,000/JPY 5,200,000) 2019-2022
JSPS Grant for JSPS Fellows (16J03329, USD 34,000/JPY 3,400,000) 2016-2019
Yukio Hayakawa Fund Travel Grant[2] (Total of USD 9,000/JPY 900,000) 2015, 2016, 2018
Foundation for Promotion of Astronomy Travel Grant (USD 2,000/JPY 200,000)

[2]Awarded by the Astronomical Society of Japan.

2015

Awarded Telescope Time as P.I.

1. **JWST**, "Spectroscopic Verification of Robust $z > 15$ Galaxy Candidates Selected with Multiple Medium-Band Datasets", JWST Cycle 4 GO, 6793, 81.2 hours

2. **JWST**, "MIRI Spectroscopy of the Brightest Galaxy Spectroscopically-Confirmed at $z > 11$ to Understand the Origin of the Overabundance of Early Luminous Galaxies", JWST Cycle 3 GO, 4586, 29.0 hours

3. **JWST**, "NIRSpec Spectroscopy of a Remarkably Luminous Galaxy at z=10.19", JWST Cycle 2 GO, 2792, 2.9 hours

4. **JWST**, "Anchoring $z > 6$ Galaxy Metallicities using $T_{\rm e}$ and $n_{\rm e}$ Diagnostics Enabled by JWST and ALMA Spectroscopy", JWST Cycle 1 GO, 1657, 24.9 hours

5. **JWST**, "H-drop galaxies: Rosetta Stones at $z \sim 13$ for galaxy formation studies", JWST Cycle 1 GO, 1740, 6.6 hours

6. **ALMA**, "ALMA-JWST Joint Efforts on Calibrating Gas-Phase Metallicities of Star-Forming Galaxies in the Reionization Era", ALMA Cycle 10, 2023.1.00022.S, 33.1 hours

7. **ALMA**, "ISM and Kinematic Properties of Unlensed Extreme Starburst Galaxies at $z \sim 6$ with SFR=1000-3000 Msun/yr", ALMA Cycle 10, 2023.1.00413.S, 36.0 hours

8. **ALMA**, "ALMA-JWST Joint Efforts on Calibrating Gas-Phase Metallicities of Star-Forming Galaxies in the Reionization Era", ALMA Cycle 9, 2022.1.00012.S, 34.5 hours

9. **ALMA**, "SERENADE: Systematic Exploration at Reionization Epoch using Nebula And Dust Emission", ALMA Cycle 9, 2022.1.00055.S, 47.2 hours

10. **ALMA**, "ALMA [OIII]88um Spectroscopy for the Most Luminous Galaxy Candidate at $z \sim 10$", ALMA Cycle 9, 2022.1.00522.S, 3.7 hours

11. **Subaru/MOIRCS**, "Black hole masses and accretion rates for radio-loud quasars at $z > 6$", Subaru, S24A-001, 1 night

12. **Keck/LRIS**, "Spectroscopy of the Most UV-Luminous Galaxies at $z \sim 7$", Subaru, S23A-001, 2 nights

13. **Subaru/SWIMS**, "Black hole masses and accretion rates for radio-loud quasars at $z > 5.6$", Subaru, S22B-001, 1 night

14. **ALMA**, "H-drop galaxies: Rosetta Stones' at $z > 12$ for galaxy formation studies", ALMA Cycle 8, 2021.1.00207.S, 11.4 hours

15. **ALMA**, "A Spectroscopic Redshift for the Most Luminous Galaxy Candidate at $z \sim 11$", ALMA Cycle 8, 2021.1.00341.S, 6.1 hours

16. **HST**, "A Spectroscopic Redshift for the Most Luminous Galaxy Candidate at $z \sim 11$", HST Cycle 28, 16295, 4 orbits

17. **Keck/MOSFIRE**, "H-drop Galaxies: Rosetta Stones at $z \sim 13$ for Galaxy Formation Studies", Subaru, S22A-001, 1 night

18. **Subaru/FOCAS**, "Spectroscopic Confirmation of LOFAR-selected Radio Sources at $z > 6.0$", Subaru, S21B-003, 2 nights

19. **Keck/MOSFIRE**, "Understanding Reionizing Source with Newly-Identified IRAC Excess Galaxy", Subaru, S21B-065, 1 night

20. **Keck/MOSFIRE**, "Understanding Reionizing Source with Newly-Identified IRAC Excess Galaxy", Subaru, S21A-001, 1 night

21. **Subaru/FOCAS**, "Detailed Spectroscopy for Extreme [OIII] Emitters with $\mathrm{EW}_0 \sim$ 5000 Å", Subaru, S20B-002, 1 night

22. **Subaru/MOIRCS**, "Remarkably Luminous $z \sim 6$ Galaxies with ALMA [CII] and [OIII] Detections", Subaru, S20A-002N, 2 nights

23. **Keck/DEIMOS**, "Completing Spectroscopy for a Galaxy Overdensity at $z = 7$", Subaru, S20A-026N, 1 night

24. **Keck/MOSFIRE**, "Understanding Reionizing Source with Newly-Identified IRAC Excess Galaxy", Subaru, S20A-085N, 1 night

25. **ALMA**, "Metal enrichment in a massive galaxy at z=6.9", cycle 7, 2019.1.00957.S 8.3 hours

26. **ESO/VLT**, "Remarkably Luminous $z \sim 6$ Galaxies with ALMA [CII] and [OIII] Detections", Period 104, 0104.A-0613 VLT/Xshooter 27 hours

27. **Subaru/FOCAS & Keck/MOSFIRE**, "Detailed Spectroscopy for Extreme [OIII] Emitters with $EW_0 \sim 5000$ Å", Subaru, S19B-052N 2 nights

28. **Keck/MOSFIRE**, "Understanding Reionizing Source with Newly-Identified IRAC Excess Galaxy III", Subaru, S19B-003N, 2 nights

29. **VLT/Xshooter**, "Deep Spectroscopy for A Luminous Galaxy at $z = 7.1520$ Detected with Multiple ALMA Lines", ESO/VLT Period 103, 0103.A-0821, 10 hours

30. **Keck/MOSFIRE**, "Understanding Reionizing Source with Newly-Identified IRAC Excess Galaxy II", Subaru, S19A-037N, 2 nights

31. **ALMA**, "Investigating ISM Physics at $z \sim 6$ with Multiple FIR Lines of Newly-Discovered Luminous Galaxies" , cycle 5, 2017.1.00508.S 17.3 hours

32. **ALMA**, "Uncovering Cold ISM of Very Massive Galaxies at $z \sim 6$ Discovered by the Extensive Large-Area Deep Subaru/HSC Survey", cycle 4, 2016.1.00521.S 5.5 hours

33. **Keck/MOSFIRE**, "Understanding Reionizing Sources with Newly-Identified IRAC Excess Galaxies", Subaru, S17B-047N, 2 nights

34. **Subaru/FOCAS**, "Detailed Spectroscopy for the Most Extreme Emission Line Galaxy", Subaru, S18B-189S, 4 hours

35. **Subaru/FOCAS**, "Spectroscopy of the Brightest Lensed Galaxy Candidate at $z \sim 6$", Subaru, S17B-179S, 3.4 hours

36. **Subaru/FOCAS**, "Newly Identified Metal-Poor Galaxy/Faint AGN Candidates at $z = 5.7$", Subaru, S17A-183S, 4 hours

Observing Experience

$>$ 20 nights with Keck, Subaru, Magellan, and Seimei

Professional Service

Referee for $>$ 30 papers in ApJ, ApJL, MNRAS, A&A, JCAP, and Nature Astronomy 2016-present

Reviewer for Magellan Telescope proposals (Taiwan) 2024-2025

Reviewer for the ERC Advanced Grant (Europe) 2024-2025

Reviewer for JWST proposals 2024-2025

Reviewer for Subaru proposals 2023-2024

Reviewer for HST proposals 2021-2022

Reviewer for grant proposals in National Research and Development Agency (Chile) 2021

Science organizing committee for "Galaxy origins in the JWST era: a "crisol" of stars, ISM, and super massive blackholes in the City of the Three Cultures" 2025

Science organizing committee for "the 40th IAP Annual Symposium: Unveiling the physics of early galaxy and black hole formation with JWST" 2024

Science organizing committee for "Workshop: Metal-poor Universe" 2021

Teaching Experience

University College London, PHAS0011 (Modern Physics, Astronomy & Cosmology), Teaching Assistant 2019

The University of Tokyo, Cosmology I, Teaching Assistant 2017

Spring School in Institute for Cosmic Ray Research, Teaching Assistant 2015

The University of Tokyo Physics Seminar, Teaching Assistant 2014-2015

Colloquia and Seminar Talks

27 talks: Groningen, Chalmers, LST, Tohoku, Toyama, Melbourne, SWIFER, ALMA-J, Leiden observatory, STScI, Penn State, Yale, Arizona, UCL, Carnegie, UCSB, MPA, LAM, NAOJ (2), Riken, Osaka (3), Ehime, IPMU, Subaru