

Yasuki Tachibana

AKITA INTERNATIONAL UNIVERSITY, YUWA, AKITA-CITY, 010-1292 JAPAN

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Personal Details

First Name Yasuki
Last Name Tachibana
Nationality Japan

Position & Affiliation

ASSISTANT PROFESSOR

Golbal Connectivity Program, Faculty of International Liberal Arts,
Akita International University

Research Interests

The dynamics of the QGP created in relativistic heavy-ion collisions.
In particular, the interplay between the QGP fluid and jets.

Emproyment

Apr. 2020–	ASSISTANT PROFESSOR Faculty of International Liberal Arts, Akita International University
Oct. 2017–Mar. 2020	POST-DOCTORAL RESEARCHER Department of Physics and Astronomy, College of Liberal Arts and Sciences, Wayne State University
Mar. 2016–Sep. 2017	POST-DOCTORAL RESEARCHER Institute of Particle Physics, and Key Laboratory of Quark and Lepton Physics (MOE), Central China Normal University
Sep. 2015–Feb. 2016	SHORT-TERM LECTURER Nishinippon Institute of Technology
Apr. 2015–Sep. 2015	POST-DOCTORAL RESEARCHER Theoretical Research Division, Nishina Center for Accelerator-Based Science, RIKEN
Apr. 2013–Mar. 2015	RESEARCH FELLOW Japan Society for the Promotion of Science (JSPS) for Young Scientists (DC2)

Other Experiences

Mar. 2012–Mar. 2015	COURSE STUDENT (<i>Secondary Supervisor: Prof. Takao Someya</i>) Advanced Leading Graduate Course for Photon Science (ALPS), The University of Tokyo
Apr. 2012–Present	CO-RESEARCHER PARTNERSHIP (<i>Host Professor: Prof. Tetsufumi Hirano</i>) Faculty of Science and Technology, Sophia University
Apr. 2012–Mar. 2015	STUDENT TRAINEE (<i>Host Scientist: Prof. Tetsuo Hatsuda</i>) Theoretical Research Division, Nishina Center for Accelerator-Based Science, RIKEN

Research Collaboration

Oct. 2017– JETSCAPE Collaboration [National Science Foundation (NSF) funded]
Convener of Physics Modeling Working Group [Jun. 2020–]

Education

- Apr. 2012–Mar. 2015 DOCTOR OF PHILOSOPHY (*Ph.D.*)
Department of Physics, Graduate School of Science,
The University of Tokyo
Supervisor: *Prof. Tetsuo Hatsuda*
Thesis title: “*Hydrodynamic response to jet propagation in quark-gluon plasma*”
- Apr. 2010–Mar. 2012 MASTER OF SCIENCE (*M.Sc.*)
Department of Physics, Graduate School of Science,
The University of Tokyo
Supervisor: *Prof. Tetsuo Hatsuda*
Thesis title: “*A Relativistic Hydrodynamic Model with Source Terms and its Application to Heavy Ion Collisions*”
- Apr. 2006–Mar. 2010 BACHELOR OF SCIENCE (*B.S.*)
Department of Physics, Faculty of Science,
The University of Tokyo

Honors & Awards

- Mar. 2019 YOUNG SCIENTIST AWARD OF THE PHYSICAL SOCIETY OF JAPAN (Theoretical Nuclear Physics)
- Aug. 2012 INVITATION TO A POSTER FLASH TALK IN PLENARY SESSION (*Quark Matter 2012*, Washington D.C.)

Grants

- Apr. 2022–Mar. 2025 PRINCIPAL INVESTIGATOR
Grant-in-Aid for Early-Career Scientists, Grant No. 22K14041
“*Jet thermalization in quark-gluon plasma*”
Japan Society for the Promotion of Science (JSPS)
JPY 3,500,000
- Apr. 2020–Mar. 2021 CO-INVESTIGATOR (Principal Investigator: Tetsufumi Hirano)
Grant-in-Aid for Scientific Research (B), Grant No. 17H02900
“*Development of unified model for high-energy nuclear collisions and physics of quark gluon plasma*”
Japan Society for the Promotion of Science (JSPS)
JPY 600,000
- Apr. 2013–Mar. 2014 PRINCIPAL INVESTIGATOR
Grant-in-Aid for JSPS Fellows, Grant No. 13J02554
“*Integration of jet and QGP fluid dynamics in high-energy heavy-ion collisions*”
Japan Society for the Promotion of Science (JSPS)
JPY 2,200,000

Fellowships/Scholarships

- Apr. 2013–Mar. 2015 Research Fellowships of Japan Society for the Promotion of Science (JSPS) for Young Scientists (DC2)
- Mar. 2012–Mar. 2015 Advanced Leading Graduate Course for Photon Science (ALPS) course,
The University of Tokyo

Community Services

REFeree FOR: Physical Review Letters (*American Physical Society*)
Physical Review C (*American Physical Society*)
Nuclear Physics A (*Elsevier*)
European Physical Journal C (*Springer*)
Chinese Physics C (*Chinese Physical Society*)

ORGANIZER FOR: *SoftJet 2024* (International Workshop)
September 28 and 29, 2024, University of Tokyo, Japan
Co-Chair

Hard Probes 2024 (International Conference)
September 22–27, 2024, Nagasaki, Japan
Local Organizing Committee, *Chair of Scientific Program Committee*

Teaching Experiences

• LECTURES (IN ENGLISH)

–At Akita International University–

- Sep. 2024– LECTURE FOR UNDERGRADUATE CLASS “*Math for Liberal Arts*”
- Teach logic, set theory, and probabilities for undergraduate students.
 - Total number of class hours is 30[†] for each class.
- Apr. 2024– LECTURE FOR UNDERGRADUATE CLASS “*Linear Algebra*”
- Teach linear algebra for undergraduate students.
 - Total number of class hours is 30[†] for each class.
- Apr. 2020– LECTURE FOR UNDERGRADUATE CLASS “*College Algebra*”
- Teach basics of algebra for undergraduate students.
 - Total number of class hours is 30[†] for each class.
- Sep. 2020– LECTURE FOR UNDERGRADUATE CLASS “*Calculus*”
- Teach basics of calculus for undergraduate students.
 - Total number of class hours per year is 30[†] for each class.
- Sep. 2020– LECTURE FOR UNDERGRADUATE CLASS “*Information Science*”
- Teach basics of computer science and information theory for undergraduate students.
 - Total number of class hours per year is 30[†] for each class.

[†]Equivalent to 37.5 hours (75 min/class). Teach 6–8 classes per academic year.

• LECTURES (IN JAPANESE)

–At Nishinippon Institute of Technology–

- Sep. 2015–Mar. 2016 LECTURE FOR UNDERGRADUATE CLASS “*Fundamental Physics*” (2 classes)
- Taught compulsory course on basics of physics for first-year undergraduate students.
 - Took charge of 2 classes (14 students on average in each class).
 - Total number of class hours is 15* including midterm and term-end examinations.
- Sep. 2015–Mar. 2016 LECTURE FOR UNDERGRADUATE CLASS “*Fundamental Physics (S)*”
- Taught advanced course on basics of physics for first-year undergraduate students.
 - Took charge of 1 class with 24 students.
 - Total number of class hours is 15* including midterm and term-end examinations.

*Equivalent to 22.5 hours (90 min/class).

–At Department of Physics, the University of Tokyo–

Apr. 2010–Mar. 2011 TEACHING ASSISTANT FOR UNDERGRADUATE CLASS “*Computational Experiments*”

- Responded to questions and marked test in course.
- Course was on basics of computer operation and numerical calculation for third-year undergraduate students.
- Managed computer room of Department of Physics.

Visits

Jul. 2024	WAYNE STATE UNIVERSITY	(Host: <i>Prof. Abhijit Majumder</i>)
Mar. 2019	CENTRAL CHINA NORMAL UNIVERSITY	(Hosts: <i>Prof. Guang-You Qin</i>)
May 2017	INSTITUTE FOR NUCLEAR THEORY	(INT Program INT-17-1b)
Feb. 2017	LAWRENCE BERKELEY NATIONAL LABORATORY	(Host: <i>Prof. Xin-Nian Wang</i>)
Mar. 2015	CENTRAL CHINA NORMAL UNIVERSITY	(Hosts: <i>Prof. Xin-Nian Wang and Prof. Guang-You Qin</i>)
Mar. 2014	INSTITUT DE PHYSIQUE THÉORIQUE DE SACLAY	(Host: <i>Prof. Jean-Yves Ollitrault</i>)
Mar. 2014	UNIVERSIDAD DE SANTIAGO DE COMPOSTELA	(Host: <i>Prof. Carlos A. Salgado</i>)

Computer Skills

Operating Systems	Macintosh, Linux, Microsoft Windows
Programming Languages	C/C++, Python, JavaScript (Google Apps Script), Perl
Softwares	JETSCAPE, Root, Pythia, FastJet

Languages Skill

Japanese	Native
English	Fluent

● PAPERS (SELECTED)

–Published Papers–

- [1] Y. Tachibana, A. Kumar, A. Majumder *et al.* [JETSCAPE],
“Hard jet substructure in a multistage approach,” Phys. Rev. C **110**, no.4, 044907 (2024).
- [2] A. Kumar, Y. Tachibana, C. Sirimanna *et al.* [JETSCAPE],
“Inclusive jet and hadron suppression in a multistage approach,” Phys. Rev. C **107**, no.3, 034911 (2023).
- [3] Y. Kanakubo, Y. Tachibana and T. Hirano,
“Nonequilibrium components in the region of very low transverse momentum in high-energy nuclear collisions,” Phys. Rev. C **106**, no.5, 054908 (2022) Editors' Suggestion [arXiv:2207.13966 [nucl-th]].
- [4] Y. Kanakubo, Y. Tachibana and T. Hirano,
“Interplay between core and corona components in high-energy nuclear collisions,” Phys. Rev. C **105**, no.2, 024905 (2022) [arXiv:2108.07943 [nucl-th]].
- [5] Y. Tachibana, C. Shen and A. Majumder,
“Bulk medium evolution has considerable effects on jet observables,” Phys. Rev. C **106**, no.2, L021902 (2022)
Editors' Suggestion [arXiv:2001.08321 [nucl-th]].
- [6] Y. Kanakubo, Y. Tachibana and T. Hirano,
“Unified description of hadron yield ratios from dynamical core-corona initialization,” Phys. Rev. C **101**, no.2, 024912 (2020) [arXiv:1910.10556 [nucl-th]].
- [7] A. Kumar, Y. Tachibana, D. Pablos, C. Sirimanna, R. J. Fries *et al.* [JETSCAPE],
“JETSCAPE framework: $p + p$ results,” Phys. Rev. C **102**, no.5, 054906 (2020) [arXiv:1910.05481 [nucl-th]].
- [8] N. B. Chang, Y. Tachibana and G. Y. Qin,
“Nuclear modification of jet shape for inclusive jets and γ -jets at the LHC energies,” Phys. Lett. B **801**, 135181 (2020) [arXiv:1906.09562 [nucl-th]].
- [9] Y. Kanakubo, M. Okai, Y. Tachibana and T. Hirano,
“Enhancement of strange baryons in high-multiplicity proton–proton and proton–nucleus collisions,” PTEP **2018**, no.12, 121D01 (2018) [arXiv:1806.10329 [nucl-th]].
- [10] M. Okai, K. Kawaguchi, Y. Tachibana and T. Hirano,
“New approach to initializing hydrodynamic fields and mini-jet propagation in quark-gluon fluids,” Phys. Rev. C **95**, no.5, 054914 (2017) [arXiv:1702.07541 [nucl-th]].
- [11] Y. Tachibana, N. B. Chang and G. Y. Qin,
“Full jet in quark-gluon plasma with hydrodynamic medium response,” Phys. Rev. C **95**, no.4, 044909 (2017)
Editors' Suggestion [arXiv:1701.07951 [nucl-th]].
- [12] Y. Tachibana and T. Hirano,
“Interplay between Mach cone and radial expansion and its signal in γ -jet events,” Phys. Rev. C **93**, no.5, 054907 (2016) [arXiv:1510.06966 [nucl-th]].
- [13] Y. Tachibana and T. Hirano,
“Momentum transport away from a jet in an expanding nuclear medium,” Phys. Rev. C **90**, no.2, 021902 (2014) [arXiv:1402.6469 [nucl-th]].

Presentations

● INVITED TALKS

–International–

- [1] “Dynamical Core-Corona Initialization Model for High Energy Nuclear Collisions,”
ExHIC-p workshop on polarization phenomena in nuclear collisions,
Institute of Physics, Academia Sinica, Taipei, Taiwan, March 15th, 2024.
- [2] “Modification of hard and soft components of jets,”
Sixth Joint Meeting of the Nuclear Physics Divisions of the APS and the Physical Society of Japan,
Waikoloa, Hawaii, November 27th, 2023.
- [3] “Jets and medium response (theory),”
ATHIC 2023, Hiroshima, Japan, April 24th, 2023.
- [4] “Overview and recent progress on JETSCAPE,”
Workshop: Jet Physics: From RHIC/LHC to EIC, Center for Frontiers in Nuclear Science, Stony Brook Univ.
[Online], June 29th, 2022
(for the JETSCAPE Collaboration).
- [5] “Medium response to jets in JETSCAPE,”
Jet Quenching In The Quark-Gluon Plasma, ECT*, Trento, Italy, June 15th, 2022
(for the JETSCAPE Collaboration).
- [6] “Hydrodynamic response to jets,”
Probing QCD at High Energy and Density with Jets (INT Program 21-2b),
Institute for Nuclear Theory, University of Washington [Online], July 27th, 2021.
- [7] “Jet back reaction on the medium,”
Hard Probes 2020, The University of Texas at Austin [Switched to Online], June 3rd, 2020.
- [8] “Interaction with jet and its medium response in quark-gluon plasma,”
Thermal quantum field theory and its application,
Yukawa Institute for Theoretical Physics, Kyoto University, September 4th, 2019.
- [9] “Status of JETSCAPE,”
2019 RHIC & AGS Annual Users’ Meeting, Brookhaven National Laboratory, New York, June 4th, 2019
(for the JETSCAPE Collaboration).
- [10] “Jets in QGP and medium response theory,”
Fifth Joint Meeting of the Nuclear Physics Divisions of the APS and the Physical Society of Japan,
Waikoloa, Hawaii, October 23rd 2018.
- [11] “Jets with medium response,”
The Definition of Jets in a Large Background, RIKEN BNL Research Center, New York, June 26th, 2018.
- [12] “Medium response to jet-induced excitation: theory overview,”
Quark Matter 2018, Venice, May 18th, 2018.
- [13] “Medium response to jets in heavy ion collisions,”
ISMD 2017, Tlaxcala City, Mexico, September 15th, 2017.
- [14] “Jet medium interactions,”
ATHIC 2016, New Delhi, India, February 19th, 2016.
- [15] “Momentum Transport in Dijet+QGP-fluid,”
Quadrangle 2014, High Energy Strong Interactions: A School for Young Asian Scientists,
Central China Normal University, September 23rd, 2014.
- [16] “Emission of Low Momentum Particles at Large Angles from Jet,”
Quark Matter 2012, Washington D.C., August 18th 2012.

–Domestic (given in Japanese)–

- [17] “Exploring the Interplay Between Jet Showers and Quark-Gluon Plasma Fluid via Heavy-Ion Collisions,” Symposium “Exploring the creation of matter and structure in the universe from extreme non-equilibrium phenomena”, Spring meeting of Physics Society of Japan 2024, Online, March 20, 2024.
- [18] “Recent aspects of quark-gluon plasma through high-energy nuclear collisions,” Symposium “The Next Generation of High-Energy Heavy-Ion Collisions: What Is Understood and What Should Be Understood?,” Spring meeting of Physics Society of Japan 2023, Online, March 22nd, 2023.
- [19] “Summary of Hard Probe-related Talks in Quark Matter 2022,” 39th Heavy Ion Cafe & 35th Heavy Ion Pub Joint Workshop “Post QM”, KMI, Nagoya Univ., April 30th, 2022.
- [20] “Fluid+Jets,” Workshop towards understanding the space-time evolution of heavy-ion collisions by modeling the QCD phase transition and QGP production from theoretical and experimental approaches, Online, September 24th, 2021.
- [21] “Broadening of full jet in quark-gluon plasma with hydrodynamic medium response,” Spring meeting of Physics Society of Japan 2019, Kyushu University, March 15th, 2019.

● INVITED LECTURE TALKS

–International–

- [22] “Jet-medium excitation hands-on session [Hands-on Session],” JETSCAPE Online Summer School 2022, Online, August 1st, 2022.
- [23] “Jet physics [Hands-on Session],” JETSCAPE Online Summer School 2021, Online, July 26th, 2021.
- [24] “Medium Excitation by Jets,” JETSCAPE Online Summer School 2021, Online, July 23rd, 2021.
- [25] “Medium Excitation by Jets [Hands-on Session],” JETSCAPE Online Summer School 2020, Online, July 20th, 2020.
- [26] “Medium Excitation by Jets,” JETSCAPE Online Summer School 2020, Online, July 17th, 2020.

–Domestic (given in Japanese)–

- [27] “Jet (Overview and Theory),” Tutorial workshop on physics in high-energy heavy-ion collisions, Osaka University, August 6th, 2024.
- [28] “Phenomenology of Quark-gluon Plasma and Jet in Relativistic Heavy-ion Collisions,” Extended lecture, Particle and Hadron Theory Group, Department of Physics, Hiroshima University, November 17-18th, 2022.

● CONTRIBUTED TALKS

–International–

- [29] “Extraction of jet-medium interaction details through jet substructure for inclusive and gamma-tagged jets,” Hard Probes 2024, Nagasaki, Japan, September 23rd, 2024 (for the JETSCAPE Collaboration).
- [30] “Effects of multi-scale jet-medium interactions on jet substructures,” Hard Probes 2023, Aschaffenburg, Germany, March 29th, 2023 (for the JETSCAPE Collaboration).
- [31] “Comprehensive study of multi-scale jet-medium interaction,” Quark Matter 2022, Kraków, April 5th, 2022 (for the JETSCAPE Collaboration).
- [32] “Jets: back reaction onto the medium,” The 38th Heavy Ion Cafe, Online, September 18th, 2020.

- [33] “Medium response and bulk fluid-velocity effect in jet quenching,”
3rd JETSCAPE Winter School and Workshop 2020,
University of Tennessee Knoxville [Switched to Online], March 19th, 2020.
 - [34] “Hydrodynamic response to jets with a source based on causal diffusion,”
Quark Matter 2019, Wuhan, China, November 5th, 2019 (for the JETSCAPE Collaboration).
 - [35] “Jet substructure modification in multi-stage jet evolution with JETSCAPE,”
2nd JETSCAPE Winter School and Workshop 2019, Texas A&M University, January 12th, 2019
(for the JETSCAPE Collaboration).
 - [36] “Jet substructure modifications in a QGP from multi-scale description of jet evolution with JETSCAPE,”
Hard Probes 2018, Aix-Les-Bains, France, October 30th, 2018 (for the JETSCAPE Collaboration).
 - [37] “Jet modification with hydro medium response,”
Precision Spectroscopy of QGP Properties with Jets and Heavy Quarks (INT Program INT-17-1b),
Institute for Nuclear Theory, University of Washington, May 10th, 2017.
 - [38] “Jet modification in QGP and hydrodynamic medium response,”
Santa Fe Jets and Heavy Flavor Workshop, Santa Fe, February 14th, 2017
 - [39] “Effect of hydrodynamic response in QGP on full jet,”
Quark Matter 2017, Chicago, February 8th, 2017.
 - [40] “Full jet including hydrodynamic response in heavy ion collisions,”
The 32nd Heavy Ion Cafe, RIKEN, January 21st, 2017.
 - [41] “Flow excited by full jet shower in quark-gluon plasma fluid and its effect on jet shape,”
Flow, Jet Quenching and Strong Coupling Physics, Huzhou University, China, December 17th, 2016.
 - [42] “Flow excited by full jet shower in QGP fluid and its effect on jet shape,”
Hard Probes 2016, Wuhan, China, September 25th, 2016.
 - [43] “Interplay between Mach cone and radial expansion in jet events,”
Quark Matter 2015, Kobe, Japan, September 28th, 2015.
 - [44] “Hydrodynamic excitation by jets in the expanding QGP,”
Hard Probes 2015, McGill University, Montréal, June 30th, 2015.
 - [45] “Collective dynamics in dijet+QGP-fluid system,”
Fourth Joint Meeting of the Nuclear Physics Divisions of the APS and the Physical Society of Japan,
Waikoloa, Hawaii, October 9th, 2014.
 - [46] “Momentum flow in dijet+QGP-fluid system,”
ATHIC 2014, Osaka University, August 6th, 2014.
 - [47] “Collective flow induced by energetic partons in heavy-ion collisions,”
The 26th Heavy Ion Cafe, The University of Tokyo, July 19th, 2014.
 - [48] “Di-jet asymmetric momentum transported by QGP fluid,”
Hard Probes 2013, Stellenbosch Institute for Advanced Study, November 7th, 2013.
 - [49] “Collective Flow in the QGP Induced by Jets,”
Phenomenology and Experiments at RHIC and LHC, KMI, Nagoya University, September 25th, 2012.
 - [50] “Emission of Low Momentum Particles at Large Angles from Jet,”
Jet Modification in the RHIC and LHC Era (QM12 Satellite Workshop), Wayne State University, August 21st,
2012.
- Domestic (given in Japanese)–
- [51] “Hydrodynamic response to jet quenching in QGP,”
HadNucl2015, KEK, 26 November 2015.
 - [52] “Transport of momenta from a jet in an expanding QGP fluid,”
Autumn Meeting of Physical Society of Japan 2013, Kochi University, 21 September 2013.

- [53] “Flows in the QGP Fluid Induced by Jets,”
Autumn Meeting of Physical Society of Japan 2012, Kyoto Sangyo University, 12 September 2012.
- [54] “Relativistic Hydrodynamic Model with a Source Term Induced by Jets,”
Spring meeting of Physics Society of Japan 2012, Kwansei Gakuin University, 24 March 2012.

● POSTER PRESENTATIONS

–International–

- [55] “Jets as sources of acoustic probes for flowing quark-gluon plasma,”
Quark Matter 2022, Kraków, March 6th, 2022.
- [56] “Interference effect between jet-induced flows in dijet events,”
Quark Matter 2018, Venice, May 5th, 2018.
- [57] “Medium response in asymmetric di-jet events from full 3-D hydro,”
Quark Matter 2014, Darmstadt, May 20th, 2014.
- [58] “Emission of Low Momentum Particles at Large Angles from Jet,”
Quark Matter 2012, Washington D.C., August 16th, 2012.