SHU SAKAMOTO

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Research Keywords: Neuroscience & Music (Neuromusic), Auditory System, Music Cognition, EEG, Machine Learning

EDUCATION

2022 – Present **Department of Psychology, Neuroscience & Behavior, Faculty of Science, McMaster University**
Research Topic: Neuroscience and Music
Research Supervisor: Dr. Laurel Trainor
GPA: 4.0

2020 – 2022 **Graduate School of Media and Governance, Keio University**
GAO Scholar (Full Scholarship)
Research Topic: Neuroscience and Music
Research Supervisor: Dr. Atsuhi Aoyama, Dr. Shinya Fujii, Dr. Patrick Savage
GPA: 3.71

2017 – 2020 **Faculty of Environment and Information Studies, Keio University**
Bachelor's-Master's Four-Year Integrated Education Program
Excellent Graduation Project
Research Topic: Neuroscience and Music
Research Supervisor: Dr. Atsuhi Aoyama, Dr. Shinya Fujii
GPA: 3.86

WORK/VOLUNTEER EXPERIENCES

2022.08 – 2024.08 **Research Team Leader**

2022.08 – 2024.08 **Affiliated Scientist**
Sandbox Inc, Tokyo. Involved in a product evaluation team utilizing neuro-marketing approach, where I am responsible for research, experiment planning, data analysis, and consulting/reporting with the clients.

2021.02 – 2022.08 **Research Assistant**
Sony Computer Science Laboratory. Supervised by Dr. Shinichi Furuya. Investigated and published regarding the impact of music and its preference on human psychophysiology, including heart rate, respiration, and pupil diameter.

2018.12 – 2022.08 **Engineer**
Freelance. Experienced as neuro-engineer at Sandbox Inc. (2018.12–2021.04) and AI competition engineer at Probspace Inc.(2019.02 – 2019.07).

2017.07 – 2022.08 **Translator**
Freelance, both at a casual and formal setting, written and verbal.

2021.04 – 2022.04 **President**
Society for Young Researchers in Neuroscience. Staff since April 2018.
Facilitated seminars, talks, and camps for neuroscience students around Japan.

2020.10 – 2021.03 **Research Intern**
International Research Center for Neurointelligence, University of Tokyo.
Supervised by Dr. Tatsuya Daikoku.
Investigated the information theory of music history by decomposing and analyzing MIDI Data.

2019.12 – 2020.06 **Writer**
Techflyer Inc.

2018.02 – 2020.04 **Research Intern**
NTT Communication Science Laboratories. Supervised by Dr. Makio Kashino.
Learned the fundamental of human psychophysics and auditory neuroscience.

SCHOLARSHIPS

Scholar, Nakajima Foundation. 2022- [<10% acceptance rate; tuition and living expenses]
GAO Scholar, Keio University. 2020-2022 [top 1.5%; full tuition for master's course]

AWARDS

2021 **SFC STUDENT AWARD**
Keio University [Outstanding extracurricular activity, top 0.08% of all students in 5 faculties at Keio SFC]

2020 **Gold Prize**
Online Conference, Keio SFC Academic Society

2020 **Excellent Graduation Project**
Faculty of Environment and Information Studies, Keio University [top 13%]

2020 **Given "Likes" (9th place)**
The 43rd Annual Meeting of the Japan Neuroscience Society

2019 **Student Paper Award (3rd Prize)**
2019 IEEE 1st Global Conference on Life Sciences and Technologies

2018 **Abe Research Award for Young Researchers** (Nominated)
The 57th Annual Conference of Japanese Society for Medical and Biological Engineering

PUBLICATIONS

Bold indicates me, underscore indicates corresponding author

Cheung, V. K. M., Harada, T., **Sakamoto, S.,** & Furuya, S. (2025). Spectral acoustic contributions to musical pleasure are dynamically shaped by autonomic neural inputs. *BioRxiv*, 2025.01.05.631396. https://doi.org/10.1101/2025.01.05.631396

Sakamoto, S., Cheung, V. K. M., & Furuya, S. (2022). RAPIDLY PREDICTING MUSIC ARTISTIC EXPRESSION PREFERENCE FROM HEART RATE AND RESPIRATION RATE. *Extended Abstracts for the Late-Breaking Demo Session of the 23rd International Society for Music Information Retrieval Conference*.

Cheung, V. K. M., & **Sakamoto, S**. (2022). Separating Uncertainty from Surprise in Auditory Processing with Neurocomputational Models: Implications for Music Perception. *The Journal of neuroscience*, *42*(29), 5657–5659. https://doi.org/10.1523/JNEUROSCI.0594-22.2022

Sakamoto, S., Aoyama, A. "Neural Oscillations and Networks in Processes Specific to Auditory Imagery". PsyArXiv: https://psyarxiv.com/ny2zv

Kobayashi, K., **Sakamoto, S.,** Sato, M., Sato, Y., Sugimoto, S., Nakata, T., Noyama, T., & Yamashita, A. (2021). *2021 nenndo jigenn kenkyuukai jisshi houkoku noukagaku wakate no kai dai 13 kai gasshuku "Wakate Kenkyuusha Ni Muketa Recucha & Wa-kushoppu Gasshuku ~Seitai Jouhou No Hikari Keisoku, Sousa Fijutu To Jinkou Chinou Ni Your Shinkei Mekanizumu No Rikai Oyobi Jissen~"* [Report on the 2021 Symposium, The 13th Symposium by Society for Young researchers on Neuroscience "Lecture & Workshop Symposium for Young Researchers: Understanding and Implementing the Neural Mechanisms by Optical Imaging and Artificial Intelligence]. *The Brain & Neural Networks*., vol. 28 (2), pp. 103-108.

Sakamoto, S., Kobayashi, A., Matsushita, K., Shimizu, R., & Aoyama, A. (2019) "Decoding Relative Pitch Imagery Using Functional Connectivity: An Electroencephalographic Study", in *Proceedings of 2019 IEEE 1st Global Conference on Life Sciences and Technologies (LifeTech)*, vol. 1, pp. 48-49.

Kawabata, M., Koyama, Y., **Sakamoto, S.,** Sato, M., Sato, Y., Takagi, S., Nagano, M., Misu, T., Yagi, S., & Yamashita, A. (2019). *2019 nenndo jigenn kenkyuukai jisshi houkoku noukagaku wakate no kai dai 11 kai gasshuku "Wakate Kenkyuusha Ni Muketa Recucha & Wa-kushoppu Gasshuku ~Shinkei Katsudou Ga Kinou Wo Umu Mekanizumu No Tankyuu, Rironn No Jissenn to Ouyou~"* [Report on the 2019 Symposium, The 11th Symposium by Society for Young researchers on Neuroscience "Lecture & Workshop Symposium for Young Researchers: Exploring Function-related Neural Mechanisms and Practice and Application of its Theory]. *The Brain & Neural Networks*., vol. 26 (3), pp. 105-109.

CONFERENCE PRESENTATIONS AND OTHERS

TALKS

Sakamoto, S., Matsushita, K., Kobayashi, A., Shimizu, R., & Aoyama, A. (2021). Oscillatory activity in multiple neural processes related to auditory imagery. Talk presented at *ICMPC16-ESCOM11 (International Conference on Music Perception and Cognition, European Society for the Cognitive Sciences of Music)*. Online.

Sakamoto, S. (2020). Oscillatory activity in multiple neural processes related to auditory imagery. Invited talk presented at Cognitive Developmental Robotics Lab, International Research Center for Neurointelligence, The University of Tokyo.

Sakamoto, S., Kobayashi, A., Matsushita, K., Shimizu, R., & Aoyama, A. (2020). *Choukaku Souki No Shinkei Shori Ni Kannsuru Ritsudou No Kaiseki* [Oscillatory analysis related to neural processes

of auditory imagery]. Talk presented at the the 29th Workshop on Multimodal Brain Information Technology, Japanese Society for Medical and Biological Engineering. Online.

Sakamoto, S. (2020). Neural Oscillations Related to Auditory Imagery and Neural Representations of Imaged Sound. Talk presented at the *Online Conference, Keio SFC Academic Society*. Online.

Sakamoto, S., Kobayashi, A., Matsushita, K., Shimizu, R., & Aoyama, A. (2019). Decoding Relative Pitch Imagery Using Functional Connectivity: An Electroencephalographic Study. Talk presented at the *2019 IEEE 1st Global Conference on Life Sciences and Technologies*. Osaka, Japan.

Watanabe, N., **Sakamoto, S.,** & Aoyama, A. (201). *Ketsugouon ni Chakumoku Shita Waon ni Kannsuru Noujouhoushori no Kentou* [Investigating Neural Processing of Chords Focusing on Combination Tones]. Talk presented at the 21st Application of Multimodal Neural Information Symposium in Japanese Society of Medical and Biological Engineering. Yokohama, Japan

POSTERS

Sakamoto, S., Wood, E., & Trainor, L.J. (2024). Early auditory stream formation of simultaneous sound: comparing music and speech. Poster presented at *SMPC2024 (Society for Music Perception and Cognition)*. Banff, AB, Canada.

Sakamoto, S., Wood, E., & Trainor, L.J. (2024). Early auditory stream formation of simultaneous musical objects. Poster presented at *Cognitive Neuroscience Society (CNS) 31st Annaul Meeting*. Toronto, Canada.

Sakamoto, S., Wood, E., & Trainor, L.J. (2023). Hierarchical neural tracking of segregated and integrated sound streams in music. Poster presented at *ICMPC17-APSCOM7 (International Conference on Music Perception and Cognition, Asian-Pasific Society for Cognitive Sciences of Music)*. Tokyo, Japan.

Sakamoto, S., Aoyama, A. (2022). Neural Oscillations and Networks in Auditory Imagery-Specific Processes. Poster presented at Society for Music Perception and Cognition Conference 2022 (SMPC 2022). Portland, OR, USA.

Sakamoto, S., Matsushita, K., Kobayashi, A., Shimizu, R., & Aoyama, A. (2021). Neural Oscillation Related to Multiple Subprocesses in Auditory Imagery. Poster presented at *The 44th Annual Meeting of the Japan Neuroscience Society.* Kobe, Japan.

Sakamoto, S., Aoyama, A. and Fujii, S. (2021). Uncertainty Resolution and Anticipation of Pleasure in Chord Progression: An EEG Study. Poster presented at *Neurosciences and Music VII*. Online.

Sakamoto, S., Aoyama, A. and Fujii, S. (2020). Electroencephalographic Activity While Anticipating Uncertainty Resolution in Music. Poster presented at *The 43rd Annual Meeting of the Japan Neuroscience Society*. Online.

Sakamoto, S., Kobayashi, A., Matsushita, K., Shimizu, R. and Aoyama, A. (2019). Classification of electroencephalographic oscillations during relative pitch imagery. *Society for Neuroscience, 2019*. Chicago, IL

Sakamoto, S., Kobayashi, A., Matsushita, K., Shimizu, R., & Aoyama, A. (2019). Classification of Electroencephalogram during Pitch Imagery based on Relative Pitch Change. Poster presented at *The 58th Annual Conference of Japanese Society for Medical and Biological Engineering.* Okinawa, Japan.

Sakamoto, S., Matsushita, K., Kobayashi, A., Shimizu, R., & Aoyama, A. (2018). Classification of EEG data during imagery of higher and lower pitched sounds. Poster presented at *The 41st Annual Meeting of the Japan Neuroscience Society.* Kobe, Japan.

Kobayashi, A., **Sakamoto, S.,** Matsushita, K., Shimizu, R., & Aoyama, A. (2018). Classification of EEG data during imaging higher and lower pitched sounds using machine learning. Poster Presented at *The 57th Annual Conference of Japanese Society for Medical and Biological Engineering.* Sapporo, Japan. (Presenter)

GRANTS

Total: 2,819,300 JPY

AS A PERSONAL RESEARCHER

Total: 1,369,300 JPY

Taikichiro Mori Memorial Research Grants. "*Choukaku Souki NI Okeru Shinkei Ritsudou to Kinouteki Nettowa-ku* [Neural Oscillations and Functional Networks in Auditory Imageru]". 240,000 JPY. 2022.

Keio SFC Academic Society. "Presentation of 'Neural Oscillations and Networks in Auditory Imagery-Specific Processes' at the Society of Music Perception and Cognition conference 2022 '" 85,000 JPY. 2022.

Koizumi Travel Grant. 150,000 JPY. 2022.

Taikichiro Mori Memorial Research Grants. "*Ongaku Choushu no Kitai ni Kansuru Shinkei Ritsudou to Sono Jikan Hendou* [Neural oscillations and temporal dynamics related to expectation during musical listening]". 210,000 JPY. 2021.

Keio SFC Eccentric Research Program. "*Kandou suru Ongaku no Himitsu: 'muzu-muzu kan' no kaiketsuni kannsuru nouha seibunn* [The secret of pleasurable music: neural components related to the resolution of 'tingle']". 150,000 JPY. 2021.

Yamagishi Student Project Support Program. "*Soukion no Picchi ni tokuiteki na Shinkei Katsudou no Doutei oyobi Tokutei* [Specification of neural activity related to pitch of imaged sound]". 150,000 JPY. 2020.

Incentive to Study and Conduct Research Through SFC Education Promotion Foundation. "*Soukion no Soutaiteki Picchi Henka ni Tokuiteki na Shinkei Ritsudou no Doutei to Sono Shikibetu* [Identification and classification of neural oscillations specific to relative pitch change of imaged sound]" 210,000 JPY. 2019.

Incentive to Study and Conduct Research Through SFC Education Promotion Foundation. "*Seiri Shihyou, Noukinou Keisoku wo Mochiita Ongaku no Raudonesu to Namidakann no Kankei no Kaimei* [Revealing the relationship between musical loudness and feeling of tears using psychophysiological measures and neural measurement]". 160,000 JPY. 2018.

Keio SFC Academic Society. "*Dai 57 kai Nihon Seitai Ikou Gakkai Taikai ni Okeru 'Kikai Gakushuu wo Mochiita Kouonn, Teionn Soukiji no Nouha Deta no Bunrui' no Kenkyuu Happyo* [Presentation of 'Classification of EEG data during high- and low-pitch imagery using machine learning' at the 57th Annual Conference of Japanese Society of Medical and Biological Engineering] '" 14,300 JPY. 2018.

AS THE PRESIDENT / STAFF OF SOCIETY FOR YOUNG RESEARCHERS IN NEUROSCIENCE

Total: 1450,000 JPY

Junior Symposium Grant, Japanese Neural Network Society. "*Wakate Kenkyuusha Ni Muketa Recucha & Wa-kushoppu Gasshuku ~Seitai Jouhou No Hikari Keisoku, Sousa Fijutu To Jinkou Chinou Ni Your Shinkei Mekanizumu No Rikai Oyobi Jissen~* [Lecture & Workshop Symposium for Young

Researchers: Understanding and Implementing the Neural Mechanisms by Optical Imaging and Artificial Intelligence]" 250, 000 JPY. 2021.

Junior Symposium Grant, Japanese Neural Network Society. "*Wakate Kenkyuusha Ni Muketa Recucha & Wa-kushoppu Gasshuku ~Jikkenn to Rironn ni your Gakushuu no Mekanizumu no Tansaku oyobi Tabunnya tono Kyoudou Kenkyuu no Keikaku Enshuu~* [Lecture & Workshop Symposium for Young Researchers: Exploring the Neural Mechanisms of Learning through Experiments and Theory, Workshop of Collaboration Research Planning]" 200, 000 JPY. 2020.

Junior Symposium Grant, Japanese Neural Network Society. "*Wakate Kenkyuusha Ni Muketa Recucha & Wa-kushoppu Gasshuku ~Shinkei Katsudou Ga Kinou Wo Umu Mekanizumu No Tankyuu, Rironn No Jissenn to Ouyou~* [Lecture & Workshop Symposium for Young Researchers: Exploring Function-related Neural Mechanisms and Practice and Application of its Theory]" 200, 000 JPY. 2019.

Symposium Grants, Kato Memorial Bioscience Foundation. "*Dai 14 kai Nou Kagaku Wakate No Kai Gasshuku* [14th Workshop Camp of Society for Young Researchers in Neuroscience]". 300,000 JPY. 2021.

Symposium Grants, Kato Memorial Bioscience Foundation. "*Dai 13 kai Nou Kagaku Wakate No Kai Gasshuku* [13rd Workshop Camp of Society for Young Researchers in Neuroscience]". 200,000 JPY. 2020.

Symposium Grants, Kato Memorial Bioscience Foundation. "*Dai 12 kai Nou Kagaku Wakate No Kai Gasshuku* [12nd Workshop Camp of Society for Young Researchers in Neuroscience]". 300,000 JPY. 2019.

TEACHING EXPERIENCE

INSTRUCTOR OF RECORD

2017.07 – 2020.02	**Private Tutor of High School Math**
2018.02 – 2020.02	**Private Tutor of Junior High School Math and Physics**
2019.10 – 2020.01	**Private Tutor of College Math**
2020.02 – 2020.06	**Private Tutor of Junior High School Math and Physics**

TEACHING ASSISTANTSHIPS

2024.01 – 2024.04	**The Multisensory Mind**, McMaster University (David Shore, Ph.D.)
2023.09 – 2023.12	**Audition**, McMaster University (Paul Faure, Ph.D.)
2023.01 – 2023.04	**The Multisensory Mind**, McMaster University (David Shore, Ph.D.)
2022.09 – 2022.12	**Human Learning and Cognition**, McMaster University (Hanna Haponenko, Ph.D.)
2020.09 – 2021.02	**Evolution of Music**, Keio University (Patrick E. Savage, Ph.D.)
2020.09 – 2021.02	**History of Music**, Keio University (Patrick E. Savage, Ph.D.)
2018.04 – 2021.07	**Calculus,** Keio University (Atushi Aoyama, Ph.D.)
2021.04 – 2021.07	**Neural Information Science**, Keio University (Atsushi Aoyama, Ph.D.)
2019.09 – 2020.02	**Neural Information Science**, Keio University (Atsushi Aoyama, Ph.D.)
2020.04 – 2020.07	**Music and Brain**, Keio University (Shinya Fujii, Ph.D.)
2020.04 – 2020.07	**Knowledge Processing and Discovery**, Keio University (Yasushi Kiyoki, Ph.D. and Atsushi Aoyama, Ph.D.)
2020.04 – 2020.07	**Sing**, Keio Unievrsity (Yoichi Kitayama)

SKIILS

LANGUAGE

Japanese	Native
English	Fluent. TOEFL iBT 111. TOEIC 990, EIKEN Grade1.

PROGRAMMING

Proficient	Matlab, Python, R, Git, LaTeX, UNIX
Basic	C, Mathematica, Haskell, HTML, Javascript, CSS

TRAINING EXPERIENCE

2021.08	**fMRI Training Workshop Camp** National Institute of Physiological Sciences
2019.09	**Free Energy Principle Workshop Camp** National Institute of Physiological Sciences
2017.09 – 2018.07	**Brain Science Training Program** RIKEN Center for Brain Science
2018.02 – 2018.04	**NICO2AI School** Dwango AI Lab.