Curriculum Vitae

Name: Takumi Sase

Place of birth: Nagano, Japan

Birth date: April 18th 1987

Nationality: Japanese

Research Scientist,

Rhythm-based Brain Information Processing Unit,

RIKEN BSI – TOYOTA Collaboration Center, RIKEN Brain Science Institute

2-1 Hirosawa, Wako, 351-0198, Saitama, Japan,

Phone: +81-48-462-1111 ext. 7188, Facsimile: +81-48-467-6859,

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Academic Appointments:

April, 2016 – Present: Research Scientist, Rhythm-based Brain Information Processing Unit, RIKEN BSI – TOYOTA Collaboration Center, RIKEN Brain Science Institute

October, 2015 – March, 2016: Technical Staff, Rhythm-based Brain Information Processing Unit, RIKEN BSI – TOYOTA Collaboration Center, RIKEN Brain Science Institute

April, 2015 – September, 2015: Research Assistant, Rhythm-based Brain Information Processing Unit, RIKEN BSI-TOYOTA Collaboration Center, RIKEN Brain Science Institute

August, 2012 – May, 2014: Research Assistant, Neuroinformatics Japan Center, RIKEN Bran Science Institute

June, 2014 – September, 2014: Research Assistant, The University of Tokyo "Formulating an approximate method for fractal dimensions of time series"

June, 2013 – November, 2013: Research Assistant, The University of Tokyo "A study on time series analysis for the local field potential (LFP) data in the brain"

December, 2012 – February, 2013: Research Assistant, The University of Tokyo "A study on network analysis for the scalp EEG signals"

August, 2012 – November, 2012: Research Assistant, The University of Tokyo "A study on formulating a basis for EEG fractal analysis towards the development of sensibility-oriented products"

Education:

April, 2012 – October, 2015: Ph.D. in Information Science and Technology, Laboratories for Mathematics, Lifesciences, and Informatics, Graduate school of Information Science and Technology, The University of Tokyo: March, 2016: Ph.D. in Information Science and Technology "Analyses on Nonlinear Dynamics with Multiple Time-Scales in the Brain"

April, 2010 – March, 2012: M.Sc. in Engineering, Chaos and Fractals Informatics Laboratory, Graduate school of Engineering, Nagaoka University of Technology "Fractal Analysis on Higher Brain Functions by Simultaneously Recorded Hemodynamics and EEG Dynamics"

April, 2008 – March, 2010: B.Sc. in Engineering, Chaos and Fractals Informatics Laboratory, Faculty of Engineering, Nagaoka University of Technology "Correlation Analysis on Spike Trains of Purkinje cells and Eye Movement in the Monkey Cerebellum"

April, 2003 – March, 2008: A.Sc. in Engineering, Integrated Informatics Laboratory, Department of Information and Computer Engineering, Kisarazu National Institute of Technology "Development of Interactive Brain Function Analyzer for Near-Infrared Spectroscopy"

Major Fields:

Mathematical Engineering, including Dynamical systems theory, Mathematical modelling, Nonlinear time series analysis, Bifurcation analysis, Machine learning, Artificial intelligence (AI) etc.

Information Engineering, including Signal processing, Programming, Electric/electronic circuits, Operating system, Logic circuits, (Linear or standard) time series analysis etc.

Others:
Applied Mathematics
Computational Neuroscience

Membership of Academic Societies:

Society for Neuroscience (2016 – Present)

The Japan Neuroscience Society (2016 – Present)

External Grants:

RIKEN Research Funds for Data Assimilation, 1 million yen (October, 2016 – March, 2017)

Honors and Awards:

Presentation Award, "Sensibility analysis for fragrance using EEG signals (I): What is Emotion Fractal Analysis Method (EFAM)?" Proceedings of the 13rd Annual Conference of JSKE, C02, Tokyo, Japan, September, 2011

Presentation Award, "Sensibility analysis for fragrance using EEG signals (II): What is fragrance for panty liner?" Proceedings of the 13rd Annual Conference of JSKE, C03, Tokyo, Japan, September, 2011

Student Award, "Approach to practical use of wearable optical topography using brain-affective interface," SHINNETSU-SHIBU TAIKAI, 7A-5, Niigata, Japan, October, 2010

Poster Award, "Fractal analysis for higher brain functions using simultaneous recording of hemodynamics and EEG dynamics," Symposium on bio- and higher-information processing, P-43, Niigata, Japan, January, 2011

Poster Award, "Emotion state discrimination using local and simultaneous recording of hemodynamics and EEG dynamics," Symposium on bio- and higher-information processing, P-50, Niigata, Japan, January, 2010

Poster Award, "Interactive brain function analyzer for near-infrared spectroscopy," The 13rd Japan NIT Annual Meeting, 29, Chiba, Japan, September, 2007

Educational Talk:

"The world of oscillatory synchronization phenomena in the brain opened by nonlinear dynamical systems," in RIKEN Brain Science Institute, Wako, Japan, June, 2016

Invited Talk:

"Towards formulation of time series analysis theory for near-infrared spectroscopy," in Kisarazu National Institute of Technology, Kisarazu, Chiba, Japan, October, 2012

Teaching Experience:

September, 2011 – December, 2011: Teaching Assistant, Project-Based Programming, Nagaoka University of Technology

November, 2011: Teaching Assistant, Youngsters' Science Festival, Niigata, Japan

August, 2011: Teaching Assistant, Training Program for High School Students, Faculty of Engineering, Nagaoka University of Technology

July, 2011 – September, 2011: Teaching Assistant, Training Program for National Institute of Technology Students, Chaos and Fractals Informatics Laboratory, Faculty of Engineering, Nagaoka University of Technology

September, 2010 – December, 2010: Teaching Assistant, Mathematics, Nagaoka University of Technology

April, 2010 – July, 2010: Teaching Assistant, Mathematics, Nagaoka University of Technology

April, 2010 – March, 2012: Tutor for Exchange Student (Vietnamese), Nagaoka University of Technology

April, 2008 – March, 2012: Private Tutor, Mathematics and English, Niigata, Japan
April, 2007 – March, 2008: Private Tutor, Mathematics and English, Chiba, Japan

Supervision Experience:

Student, Integrated Information laboratory, Advanced Course of Control and Information Engineering, Kisarazu National Institute of Technology (April, 2016 – Present)

Ad-hoc Reviewer:

Information Sciences, Elsevier
Clinical EEG and Neuroscience, SAGE

International Papers:

Takumi Sase, Yuichi Katori, Motomasa Komuro, and Kazuyuki Aihara, "Bifurcation analysis on phase-amplitude cross-frequency coupling in neural networks with dynamic synapses," Frontiers in Computational Neuroscience, **11**:18, doi: 10.3389/fncom.2017.00018, 2017

Takumi Sase, Jonatán Peña Ramírez, Keiichi Kitajo, Kazuyuki Aihara, and Yoshito Hirata, "Estimating the level of dynamical noise in time series by using fractal dimensions," Physics Letters A, **380**:11-12, 1151–1163, doi: 10.1016/j.physleta.2016.01.014, 2016

Takumi Sase and Keiichi Kitajo, "The repertoire of metastable states associated with attention for the resting healthy human brain," in preparation

Takumi Sase, "Unorthodox fractal dimensions can predict epileptic seizure onset," in preparation

Kazuki Kamata, Takumi Sase, and Ikusaburo Kurimoto, "EEG Hurst exponents can detect metacognitive dynamics," in preparation

Japanese Papers:

Takumi Sase, Keiichi Kitajo, Kazuyuki Aihara, and Yoshito Hirata, "Temporal changes of the level of dynamical noise in EEG dynamical systems: A representation using fractional Brownian motion," SEISAN KENKYU, **66**:3, 299-303, 2014

Takumi Sase, Keiichi Kitajo, and Kazuyuki Aihara, "Effect of gamma waves on EEG fractal structure," SEISAN KENKYU, **65**:3, 325-328, 2013

Takumi Sase and Masahiro Nakagawa, "Olfactory and sensibility: On the emotion fractal analysis method by EEGs," Journal of Aroma Science of Technology, **13**:1, 16-20, 2012

Chiemi Habu, Hiromi Yamamoto, Kiyoshi Miyazawa, Takumi Sase, and Masahiro Nakagawa, "The fragrance requested from the parity liner: Affective effects of fragrance on fractal analysis," Journal of Aroma Science of Technology, **13**:1, 21-25, 2012

Takumi Sase, Takeo Kondo, and Masahiro Nakagawa, "Relationship between oxyhemodynamics and EEG dynamics of primary sensory area," IEICE Technical Report, **111**:217, 21-26, 2011

Takumi Sase, Takeo Kondo, and Masahiro Nakagawa, "Relationship between oxyhemodynamics and EEG dynamics of primary sensory area," IEICE Technical Report, **111**:217, 21-26, 2011

Takumi Sase and Masahiro Nakagawa, "A study on the high frequency components of EEGs and the evaluation methods of fractal dimensions," IEICE Technical Report, **110**:465, 105-110, 2011

Takumi Sase, Takeo Kondo, and Masahiro Nakagawa, "An attempt of emotional state determination by the local-simultaneous measurement of hemodynamics and EEG dynamics," IEICE Technical Report, **110**:294, 57-62, 2010

Takumi Sase and Masahiro Nakagawa, "On the NIRS emotion analysis by with semi-parametric statistics," IEICE Technical Report, **110**:122, 1-6, 2010

Takumi Sase and Masahiro Nakagawa, "A study on the relationship between hemodynamics and EEG dynamics of cerebral cortex," IEICE Technical Report, **109**:50, 9-14, 2009

Takumi Sase, Ikusaburo Kurimoto, and Masahiro Nakagawa, "Interactive brain functional analyzer for near-infrared spectroscopy," Journal of JACT, **13**:2, 61-66, 2008

International Presentations:
Takumi Sase and Keiichi Kitajo, "EEG metastable states and individual differences for the resting human brain," The 47th Annual Meeting of Society for Neuroscience, Washington, USA, November, 2017 (Tentative)

Takumi Sase and Keiichi Kitajo, "The Kuramoto model-based EEG-data assimilation for the resting human brain," The 40th Annual Meeting of the Japan Neuroscience Society, Chiba, Japan, July, 2017

Takumi Sase and Keiichi Kitajo, "EEG attractor landscape in the resting human brain," The 23rd Annual Meeting of the Organization for Human Brain Mapping, Vancouver, British Columbia, Canada, June, 2017

Keiichi Kitajo, Takumi Sase, Yoko Mizuno, and Hiromichi Suetani, "Noise-induced nonlinear neural dynamics as an individual trait," The 23rd Annual Meeting of the Organization for Human Brain Mapping, Vancouver, British Columbia, Canada, June, 2017

Takumi Sase and Keiichi Kitajo, "Metastability and multistability in the resting human brain," International Symposium Neural Oscillation Conference 2017, Tokyo, Japan, June, 2017

Takumi Sase and Keiichi Kitajo, "EEG-data assimilation for the resting human brain," The 7th Annual Japanese Data Assimilation Workshop, Kobe, Japan, March, 2017

Keiichi Kitajo, Takumi Sase, Yoko Mizuno, and Hiromichi Suetani, "Individual differences in noise-induced human brain dynamics," The 46th Annual Meeting of Society for Neuroscience, San Diego, USA, November, 2016

Takumi Sase and Keiichi Kitajo, "EEG metastable states in the resting human brain," The 46th Annual Meeting of Society for Neuroscience, San Diego, USA, November, 2016

Takumi Sase and Keiichi Kitajo, "Metastable states and information flow in the resting-state human brain," The 39th Annual Meeting of the Japan Neuroscience Society, Kanagawa, Japan, July, 2016

Keiichi Kitajo, Takumi Sase, Yoko Mizuno, and Hiromichi Suetani, "Consistency and individuality of human brain responses to noisy visual inputs," The 39th Annual Meeting of the Japan Neuroscience Society, Kanagawa, Japan, July, 2016

Takumi Sase, Yuichi Katori, and Kazuyuki Aihara, "Bifurcation analysis of inhibitory neural network with stochastic neurons and dynamic synapses," The 1st International Symposium on Neuromorphic and Nonlinear Engineering, P1-12, Tokyo, Japan, February, 2014

Takumi Sase, Yuichi Katori, and Kazuyuki Aihara, "Bifurcation analysis of stochastic inhomogeneous neural network with excitatory and inhibitory neurons," The 3rd International Symposium on Innovative Mathematical Modelling, P3-14, Tokyo, Japan, November, 2013

Takumi Sase and Ikusaburo Kurimoto, "Development of interactive brain functional analyzer for near-infrared spectroscopy," The 21st Century COE Program, B116, Niigata, Japan, January, 2008

Japanese Presentations:
Takumi Sase and Keiichi Kitajo, "The relationship between attention and spontaneous transitions among attractors of resting EEG dynamics," The 1st meeting on Human Brain Imaging, Tokyo, Japan, September, 2017 (Tentative)

Takumi Sase and Keiichi Kitajo, "Fluctuation-induced transition among metastable states in the resting human brain," Workshop on RIKEN Data Assimilation, Hyogo, Japan, October, 2016

Takumi Sase, Yuichi Katori, Yoshito Hirata, and Kazuyuki Aihara, "A parameter detection behind EEG signals by using an integrated approach of nonlinear time series anlaysis and mathematical modelling," ImPACT YAMAMOTO PM The 1st General Meeting, Tokyo, Japan, March, 2015

Takumi Sase, Yuichi Katori, and Kazuyuki Aihara, "Diverse cross-frequency coupling on a neural network with dynamic synapses," Winter Workshop on Mechanism of Brain and Mind, 27, Rusutsu Resort Hotel, Hokkaido, Japan, January, 2015

Takumi Sase and Masahiro Nakagawa, "Emotion analysis using auto-association memory," SHINNETSU-SHIBU TAIKAI, 7C-3, Niigata, Japan, October, 2011

Takumi Sase, Chiemi Habu, Hiromi Yamamoto, Kiyoshi Miyazawa, and Masahiro Nakagawa, "Sensibility analysis for fragrance using EEG signals (I): What is Emotion Fractal Analysis Method (EFAM)?" Proceedings of the 13rd Annual Conference of JSKE, C02, Tokyo, Japan, September, 2011

Chiemi Habu, Hiromi Yamamoto, Kiyoshi Miyazawa, Takumi Sase, and Masahiro Nakagawa, "Sensibility analysis for fragrance using EEG signals (II): What is fragrance for panty liner?" Proceedings of the 13rd Annual Conference of JSKE, C03, Tokyo, Japan, September, 2011

Takumi Sase and Masahiro Nakagawa, "Fractal analysis for higher brain functions using simultaneous recording of hemodynamics and EEG dynamics," Symposium on bio- and higher-information processing, P-43, Niigata, Japan, January, 2011

Takumi Sase, Takeo Kondo, and Masahiro Nakagawa, "Approach to practical use of wearable optical topography using brain-affective interface," SHINNETSU-SHIBU TAIKAI, 7A-5, Niigata, Japan, October, 2010

Takumi Sase and Masahiro Nakagawa, "Emotion state discrimination using local and simultaneous recording of hemodynamics and EEG dynamics," Symposium on bio- and higher-information processing, P-50, Niigata, Japan, January, 2010

Takumi Sase and Ikusaburo Kurimoto, "Interactive brain function analyzer for near-infrared spectroscopy," The 13rd Japan NIT Annual Meeting, 29, Chiba, Japan, September, 2007