Proceedings of
the 2016 International Symposium on Nonlinear Theory and its Applications (NOLTA2016)


New Welcity Yugawara,
Yugawara, Japan
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2016 International Symposium on Nonlinear Theory and its Applications

New Welcity Yugawara,
Yugawara, Japan
November 27–30, 2016

Organizer:
NOLTA Society, IEICE

In Cooperation with:
Technical Group on Nonlinear Problems, IEICE
Technical Group on Complex Communication Sciences, IEICE
Welcome Message from the General Chair

Welcome to Yugawara, Japan!!

On behalf of the organizing committee, we sincerely welcome all of you to Yugawara, Japan and to the 2016 International Symposium on Nonlinear Theory and Its Applications (NOLTA2016). This is the 26th NOLTA Symposium organized by the NOLTA Society, IEICE. Since the 1st NOLTA in 1991, NOLTA has been held not only in Japan, but also in various places: Canada, China, Germany, Hungary, Italy, Poland, Spain, Switzerland, and USA. Then, it is our great honor to organize the NOLTA2016 in Yugawara, Japan.

A long long time ago, a badly injured mountain animal was walking along the riverside, and by chance discovered a hot spring near the cold mountain stream. The serious injury of the animal healed rapidly by the hot spring. The riverside (“kawara” in Japanese) which flows from that magical hot spring (“yu” in Japanese) came to be called Yugawara. Today, Yugawara is one of the oldest hot spring villages in Japan, the place where the mountain animals told us of the secret power of the hot spring.

Please have fun while in Yugawara, nestled by the mountains and the sea, and enjoy the brilliant blue sea and the green mountains. You can enjoy an open-air bath, a quiet room for relaxation, and other services.

The word Yugawara can also be found in the oldest Japanese anthology of poems, “Manyoshu,” published about 1,200 years ago. Many famous Japanese poets and writers love Yugawara and have created wonderful stories there throughout the hot spring’s very long history. We support your creative activities by providing the hot spring and various types of conference rooms. Yugawara also benefits from both the mountains and sea, which enable us to provide fresh seasonal food.

The most essential aspect of NOLTA2016 is its technical program. In particular, we have a large number of special session papers at NOLTA2016. We also have a large number of regular session papers, and we are also proud to present the best student paper awards at NOLTA2016.

I would like to thank the Technical Program Chairs, Prof. Hiroo Sekiya (Chiba University) and the Technical Program Secretary, Prof. Shintaro Arai (Okayama University of Science), who have organized a high-quality technical program spanning three days of lecture sessions that cover all subjects of interest in the field of nonlinear science and engineering. We also would like to thank to the efforts of our Special Session Chair, Prof. Mikio Hasegawa (Tokyo University of Science), and the Special Session Secretary, Dr. Kaori Kuroda (Tokyo University of Science), for organizing such a huge number of special sessions.

Special thanks also go to the Technical Program Committee Members and reviewers for their dedicated service. We would also like to thank the keynote speakers and session co-chairs for their great contributions to the technical program.

Finally, we would like to express our sincere thanks to General Co-Secretaries, Prof. Takayuki Kimura (Nippon Institute of Technology) and Dr. Yutaka Shimada (Tokyo University of Science) and all the symposium committee members of NOLTA 2016.

We hope you will enjoy NOLTA2016 and Yugawara!
Technical Program Chair’s Message

On behalf of the Technical Program Committee (TPC), welcome to 2016 International Symposium on Nonlinear Theory and Its Applications (NOLTA2016) at Yugawara, where is one of the most famous hot-spring resort in Japan!

A total of 212 papers have been received from 15 countries and 208 papers are included for presentations in the technical program. We have 38 oral sessions including 30 special sessions. Additionally, it is my pleasure to have two exciting Plenary Talks: “Math Spectacle Show” by Prof. Jin Akiyama, Tokyo University of Science on Monday, and “Almighty Google knows everything! – Big-data and Network Science” by Prof. Hawoong Jeong, Korea Advanced Institute of Science and Technology (KAIST) on Tuesday.

Our program can cover hot topics in variety of research areas, which gather under the term of ‘Nonlinear’. I would like to express my appreciation for all authors who submitted papers to NOLTA 2016. It is one of the traditional features of the technical programs in NOLTA that many special sessions are organized by leading researchers. The special sessions from wide research areas may raise new collaborations among symposium participants, which is quite important for succeeding NOLTA2016. I would like to express my thanks to the special session organizers and presenters. In addition, organizing and coordinating of NOLTA2016 are impossible without contributions and services of review committee members, reviewers, and session co-chairs. I am also equally thankful for Tom Wehner’s support of web-based services.

The poster area appears for finding NOLTA2016 student paper award winners, which is the first trial in NOLTA history. All the participants including students have a right to recommend the award-winner candidates. Please visit the poster area, discuss with students, and vote the award-winner candidates.

Finally, I would like to announce the Special Section related with NOLTA2016, which will be published in NOLTA. IEICE at January 2018. The paper submission dead line is April 10, 2017. I hope that all authors, especially students, consider to submit the extended version of papers in this program to the Special Section.

I really hope participants to attend as many activities as possible, exchange and discuss ideas, enjoy the technical program and NOLTA2016!

Hiroo Sekiya
Chiba University
Technical Program Chair, NOLT2016
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Yoshito Hirata (The University of Tokyo)
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<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
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<tr>
<td>K. Aihara</td>
<td>University of Tokyo</td>
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<td>G. Chen</td>
<td>City University of Hong Kong</td>
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<td>R. Eberhart</td>
<td>IUPUI</td>
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<td>A. Fettweis</td>
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<td>E. S. Kuh</td>
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<td>T. Matsumoto</td>
<td>Fukui University of Tech.</td>
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<td>Keio University</td>
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<td>K. Nakajima</td>
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<td>J. A. Nossek</td>
<td>Tech. University of Munich</td>
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<td>S. Oishi</td>
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<td>K. Okumura</td>
<td>Simon Fraser University</td>
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<td>S. M. Rump</td>
<td>Technical University of Hamburg</td>
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<td>I. W. Sandberg</td>
<td>University of Texas at Austin</td>
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<td>W. Schwarz</td>
<td>Tech. University of Dresden</td>
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<td>R. Stoop</td>
<td>ETH / University of Zurich</td>
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<td>L. Trajkovic</td>
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<td>Y. Ueda</td>
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<td>J. Vandewalle</td>
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<td>UCLA</td>
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<td>S. Amari</td>
<td>FRP, RIKEN</td>
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<td>L. O. Chua</td>
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<td>University of Catania</td>
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<td>University of Notre Dame</td>
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<td>M. J. Ogorzalek</td>
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<td>University of Ferrara</td>
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<td>M. Tanaka</td>
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<td>C. K. Tse</td>
<td>Hong Kong Polytech. University</td>
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<td>A. Ushida</td>
<td>Tokushima Bunri University</td>
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<td>P. Werbos</td>
<td>National Science Foundation</td>
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<td>A. H. Zemanian</td>
<td>State University NY at Stony Brook</td>
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Special Session Organizers

A2L-C Time series and complex networks (1)
Organizers  Michael Small (University of Western Australia) and Yoshito Hirata (University of Tokyo)

A3L-C Time series and complex networks (2)
Organizers  Michael Small (University of Western Australia) and Yoshito Hirata (University of Tokyo)

A2L-E Electromechanical systems
Organizers  Hiroyuki Asahara (Okayama University of Science)

A2L-F Power packet: Energy-and-Information integrated technology (1)

A3L-F Power packet: Energy-and-Information integrated technology (2)
Organizers  Hiroyasu Ando (University of Tsukuba) and Ryo Takahashi (Kyoto University)

A2L-G Radio Frequency Technology
Organizers  Takeshi Kamio (Hiroshima City University) and Hisato Fujisaka (Hiroshima City University)

A3L-B Nonlinear Methods with Interaction
Organizers  Tomoya Suzuki (Ibaraki University)

A3L-D Hybrid dynamical systems: Modeling, Analysis, and Applications
Organizers  Daisuke Ito (University of Shiga Prefecture)

A3L-G Implementation technology and theory for neuronal and neuronal network models
Organizers  Takashi Kohno (University of Tokyo)

A4L-C Random Number Generation and Chaos
Organizers  Hiroshi Fujisaki (Kanazawa University)

A4L-D Collective behaviors of chemically/electrically coupled neurons
Organizers  Ryosuke Hosaka (Fukuoka University) Kantaro Fujiwara (Tokyo University of Science) and Hideyuki Kato (Tokyo University of Technology)

A4L-E Complex Communication Sciences
Organizers  Mikio Hasegawa (Tokyo University of Science)

A4L-F Simulations in Cardiovascular Systems
Organizers  Hiroyuki Kitajima (Kagawa University) and Kunichika Tsumoto (Osaka University)

B2L-B Koopman operator techniques in nonlinear dynamical systems
Organizers  Yoshihiko Susuki (Kyoto University) and Igor Mezic (University of California)
B2L-C  Coupled Nonlinear Circuits and Networks (1)
B3L-C  Coupled Nonlinear Circuits and Networks (2)
C1L-C  Coupled Nonlinear Circuits and Networks (3)

Organizers Yoko Uwate (Tokushima University) and Yoshifumi Nishio (Tokushima University)

B2L-D  Noise-Driven and Stochastic Information Processing Systems

Organizers Tetsuya Asai (Hokkaido University) and Shintaro Arai (Okayama University of Science)

B2L-F  Recent Progress in Nonlinear Optimization Algorithms and its Applications (1)
B3L-F  Recent Progress in Nonlinear Optimization Algorithms and its Applications (2)

Organizers Hidehiro Nakano (Tokyo City University) and Takuya Shindo (Nippon Institute of Technology)

B3L-B  Complex Photonics and Applications (1)
C1L-B  Complex Photonics and Applications (2)
C2L-B  Complex Photonics and Applications (3)

Organizers Kazutaka Kanno (Fukuoka University) and Atsushi Uchida (Saitama University)

B3L-D  Synchronization in real worlds and its mathematical modeling

Organizers Tohru Ikeguchi (Tokyo University of Science) and Yutaka Shimada (Tokyo University of Science)

B3L-E  AD Converters and Dynamical Systems

Organizers Yutaka Jitsumatsu (Kyushu University) and Katsutoshi Shinohara (Hitotsubashi University)

C1L-D  Localization phenomena in nonlinear lattices (1)
C2L-D  Localization phenomena in nonlinear lattices (2)

Organizers Masayuki Sato (Kanazawa University) and Masayuki Kimura (Kyoto University)

C1L-F  Cellular Dynamical Systems

Organizers Hiroyuki Torikai (Kyoto Sangyo University)

C2L-E  Applications to Temporal Nonlinear Systems

Organizers Tomoya Suzuki (Ibaraki University)

C2L-F  Information Networks as Collective Statistical Systems

Organizers Hiroyoshi Miwa (Kwansei Gakuin University)
Symposium Information

Symposium Venue

New Welcity Yugawara
107 Izumi, Atami-city, Shizuoka, Japan

[Opening Ceremony & Plenary Talks]
Hall TAIKAN on Floor 2

[Parallel Sessions]
Six rooms on Floors 1, 2 & 3

[Poster Session, presented by Award candidates]
Lobby on Floor 2

Symposium Registration

Nov. 27, 16:30 – 19:30 on the Floor B1, New Welcity Yugawara
Nov. 28, 8:15 – 18:30 on the Floor B1, New Welcity Yugawara
Nov. 29, 8:30 – 17:00 on the Floor B1, New Welcity Yugawara
Nov. 30, 8:30 – 14:30 on the Floor B1, New Welcity Yugawara

Social Events

- Nov. 27, 18:00 – 19:30, Welcome reception: Hall TAIKAN
- Nov. 29, 19:00 – 21:00, Banquet: Hall TAIKAN
- Nov. 30, 15:30 – 17:00, Farewell party and Student paper award ceremony: Hall TAIKAN
Session Room Information

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<td>Room 3</td>
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<td>Room 5</td>
<td>TATIBANA on Floor 3</td>
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<td>SAIUN on Floor 2</td>
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<td>Room 4</td>
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<td>Room 6</td>
<td>TENSHO on Floor 1</td>
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Session room
### Session at a Glance

**November 28, 2016 (Monday)**

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<td>Hall TAIKAN</td>
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<td>Coffee break</td>
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<td>15:50–18:30</td>
<td>A4L-D Special Session: Collective Behaviors of Chemically/Electrically Coupled Neurons, Chair: Ryosuke Hosaka, Page xxvii</td>
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<td>15:50–18:30</td>
<td>A4L-E Special Session: Complex Communication Sciences, Chairs: Mikio Hasegawa and Hidehiro Nakano, Page xxvii</td>
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<tr>
<td>15:50–18:30</td>
<td>A4L-F Special Session: Simulations in Cardiovascular Systems, Chairs: Hiroyuki Kitajima and Kunichika Tsumoto, Page xviii</td>
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**November 29, 2016 (Tuesday)**

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<th>Time</th>
<th>Session</th>
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| 9:00–10:00    | Plenary Talk 2, Prof. Hawoong Jeong (Korea Advanced Institute of Science and Technology, Korea)  
                Chair: Hiroo Sekiya (Chiba University)  
                Place: Hall TAIKAN |
| 10:00–10:20   | Coffee break                                                           |
| 10:20–12:40   | B2L-B Special Session: Koopman Operator Techniques in Nonlinear Dynamical Systems  
                Chair: Yoshihiko Susuki  
                Page xxx             |
| 10:20–12:40   | B2L-C Special Session: Coupled Nonlinear Circuits and Networks 1  
                Chair: Yoko Uwate  
                Page xxxi           |
| 10:20–12:40   | B2L-D Special Session: Noise-Driven and Stochastic Information Processing Systems  
                Chairs: Tetuya Asai and Shintaro Arai  
                Page xxxi           |
                Chairs: Francis C.M. Lau and Yuko Osana  
                Page xxxii          |
| 10:20–12:40   | B2L-F Special Session: Recent Progress in Nonlinear Optimization Algorithms and its Applications 1  
                Chair: Hidehiro Nakano  
                Page xxxiii         |
| 12:40–14:00   | Lunch break                                                            |
| 14:00–16:00   | B3L-B Special Session: Complex Photonics and Applications 1 and Random Number Generation  
                Chair: Atsushi Uchida  
                Page xxxiv          |
| 14:00–16:00   | B3L-C Special Session: Coupled Nonlinear Circuits and Networks 2  
                Chair: Thomas Ott  
                Page xxxiv          |
| 14:00–16:00   | B3L-D Special Session: Synchronization in Real Worlds and its Mathematical Modeling  
                Chairs: Tohru Ikeuchi and Yutaka Shimada  
                Page xxxv            |
| 14:00–16:00   | B3L-E Special Session: AD Converters and Dynamical Systems  
                Chair: Yutaka Jitsumatsu  
                Page xxxvi           |
| 14:00–16:00   | B3L-F Special Session: Recent Progress in Nonlinear Optimization Algorithms and its Applications 2  
                Chair: Takuya Shindo  
                Page xxxvi           |
| 19:00–21:00   | Banquet  
                Place: Hall TAIKAN  
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November 30, 2016 (Wednesday)

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<td>9:00–10:15</td>
<td>Poster Session, presented by Award candidates</td>
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<td>Place: Lobby on Floor 2</td>
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<td>10:15–10:30</td>
<td>Coffee break</td>
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<td>C1L-B Special Session: Complex Photonics and Applications 2 -Photonic integrated circuits- Chair: Kazutaka Kanno Page xxxvii</td>
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<td>C1L-C Special Session: Coupled Nonlinear Circuits and Networks 3 Chair: Kyohei Kamiyama Page xxxviii</td>
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<td>C1L-D Special Session: Localization Phenomena in Nonlinear Lattices 1 Chair: Masayuki Kimura Page xxxviii</td>
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<td>C1L-F Special Session: Cellular Dynamical Systems Chair: Hiroyuki Torikai Page xxxix</td>
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<td>12:30–13:50</td>
<td>Lunch break</td>
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<td>13:50–15:30</td>
<td>C2L-D Special Session: Localization Phenomena in Nonlinear Lattices 2 Chair: Masayuki Sato Page xli</td>
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<td>15:30–17:00</td>
<td>Farewell party and Student paper award ceremony</td>
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Technical Program

A1L-A Plenary Talk 1

DATE: 2016/11/28 09:10–10:10
ROOM: Hall
Chair: Tohru Ikeguchi (Tokyo University of Science)

A1L-A1 Math Spectacle Show
Jin Akiyama (Tokyo University of Science)

A2L-B Chaos and Bifurcation 1

DATE: 2016/11/28 10:30–12:30
ROOM: Room 1
Chairs: Kyohei Kamiyama (University of Tokyo) and Marco Reit (Leibniz Universität Hannover)

A2L-B1 Detecting Bifurcations from Time Series Data
Kazuto Ogoshi (Kagawa University), Hiroyuki Kitajima (Kagawa University), Toru Yazawa (Kagawa University)

A2L-B2 Bifurcation Analysis for Early Afterdepolarization in Shannon Model
Ai Takahashi (Kagawa University), Hiroyuki Kitajima (Kagawa University), Toru Yazawa (Kagawa University)

A2L-B3 Analysis of a 3-Dimensional Piecewise-Constant Chaos Generator Without Constraint
Shuntaro Hamatani (Nagaoka University of Technology), Tadashi Tsubone (Nagaoka University of Technology)

A2L-B4 Shishi-Odoshi and Large Deviations
Syuji Miyazaki (Kyoto University), Kenta Yamada (Kyoto University)

A2L-B5 Properties of Discrete-Time Bifurcation-Based Amplifiers
Marco Reit (Leibniz Universität Hannover), Sven Feldkord (Leibniz Universität Hannover), Wolfgang Mathis (Leibniz Universität Hannover)
A2L-C Special Session: Time Series and Complex Networks 1

DATE: 2016/11/28 10:30–12:30
ROOM: Room 2
Chair: Michael Small (University of Western Australia)

A2L-C1 Detecting Directional Couplings from Time Series: Joint Distribution of Distances
Yoshito Hirata (University of Tokyo), José Amigó (Universidad Miguel Hernández), Kazuyuki Aihara (University of Tokyo)

A2L-C2 On Ranking and Mining Universities with the Encyclopedia Wikipedia
Zongjian Li (Fudan University), Cong Li (Fudan University), Xiang Li (Fudan University)

A2L-C3 Characterization and Control of Chimera State Collapses
Ralph Andrzejak (Universitat Pompeu Fabra), Christian Rummel (University Bern), Florian Mormann (University Bonn), Kaspar Schindler (University Bern)

A2L-C4 Extremal Optimisation Approaches for Building Complex Geometric Structures in 3D Integrated Circuits
Maciej Ogorzalek (Jagiellonian University), Katarzyna Grzesiak-Kopec (Jagiellonian University), Piotr Oramus (Jagiellonian University)

A2L-C5 The Anatomy of the Global Football Player Transfer Network: Club Functionalties Versus Network Properties
Xiao Fan Liu (Southeast University)

A2L-D Neural Networks and Optimization

DATE: 2016/11/28 10:30–12:30
ROOM: Room 3
Chair: Hiroyuki Yasuda (University of Tokyo)

A2L-D1 Letter Reproduction Using a Cellular Neural Network Consisting of Simplified Neurons and Synapses Fabricated by Thin-Film Transistors
Mutsumi Kimura (Nara Institute of Science and Technology / Ryukoku University), Ryohei Morita (Ryukoku University), Sumio Sugisaki (Ryukoku University), Tokiyoshi Matsuda (Ryukoku University), Tomoya Kameda (Nara Institute of Science and Technology), Yasuhiko Nakashima (Nara Institute of Science and Technology)

A2L-D2 Letter Reproduction Simulator for Hardware Design of Cellular Neural Network Consisting of Neurons Using Large-Scale Integration Chip and Synapses Using on-Deposited Amorphous in-Ga-Zn-O Films
Tomoya Kameda (Nara Institute of Science and Technology), Mutsumi Kimura (Nara Institute of Science and Technology / Ryukoku University), Yasuhiko Nakashima (Nara Institute of Science and Technology)

A2L-D3 Multilayer Perceptron Including Different Amplitude Random Noise
Chihiro Ikuta (Anan National College of Technology), Yoko Uwate (Tokushima University), Yoshi-
A2L-D4  Modified Inductive Search for Solving Global Optimization Problems  
Hideo Kanemitsu (Hokkaido University of Education)  

A2L-D5  A Chaotic Search with the Effect of Wide Range Search for Solving QAP  
Hikaru Ohnishi (Tokyo University of Science), Yutaka Shimada (Tokyo University of Science), Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeuchi (Tokyo University of Science)

A2L-D6  Speeding Up of the Traffic Congestion Mitigation by Stochastic Optimization in Deep Learning  
Shinnnosuke Nakamura (Sojo University), Takumi Uemura (Sojo University), Gou Koutaki (Kumamoto University), Keiichi Uchimura (Kumamoto University)

A2L-E Special Session: Electromechanical Systems

DATE: 2016/11/28 10:30–12:30  
ROOM: Room 4  
Chair: Hiroyuki Asahara (Okayama University of Science)

A2L-E1  Dynamic Behavior of a Bouncing Ball  
Shu Karube (Oita National College of Technology), Takuji Kousaka (Oita University), Yuya Kawazu (Oita National College of Technology)

A2L-E2  Slip Compensation of Induction Motor Using Sensorless Control  
Tomoyuki Dansako (Okayama University of Science), Nobuyuki Kasa (Okayama University of Science), Hiroyuki Asahara (Okayama University of Science)

A2L-E3  Nonlinear Oscillation of a Photovoltaic Cell Booster  
Yushi Hasesaka (Okayama University of Science), Keisuke Mori (Okayama University of Science), Takuji Kousaka (Oita University), Hirokazu Ohtagaki (Okayama University of Science), Hiroyuki Asahara (Okayama University of Science)

A2L-E4  Chaos Controlling with Clock Pulse Modulation for DC-DC Converter Circuit  
Daisuke Ito (University of Shiga Prefecture)

A2L-E5  Circuit Characteristics of DC/DC Converter for Waste Heat Recovery Power System  
Kouji Nakasuka (Okayama University of Science), Nobuyuki Kasa (Okayama University of Science), Hiroyuki Asahara (Okayama University of Science), Kenichi Takarabe (Okayama University of Science), Masahiro Minowa (SWCC Showa Cable Systems CO., LTD.), Tsutomu Iida (Tokyo University of Science)
A2L-F Special Session: Power Packet: Energy-and-Information Integrated Technology 1

DATE: 2016/11/28 10:30–12:30
ROOM: Room 5
Chair: Hiroyasu Ando (University of Tsukuba)

A2L-F1 Research Related to Power Packet and its Application 77
Takashi Hikihara (Kyoto University)

A2L-F2 A Packet-Based Energy Management System for Multi-Legged Walking Robots 80
Yusuke Kojima (Kyoto University), Shun-Ichi Azuma (Kyoto University), Taichi Kitao (Kyoto University), Ichiro Maruta (Kyoto University), Toshiharu Sugie (Kyoto University)

A2L-F3 Design and Implementation of a Routing Protocol for Power Packet Network 82
Yusuke Ikuma (Tokyo University of Science), Thong Huynh (Tokyo University of Science), Kaori Kuroda (Tokyo University of Science), Mikio Hasegawa (Tokyo University of Science)

A2L-F4 A Simulation Study of an Algorithm for Distributing Power Packets in a Network 86
Hiroyasu Ando (University of Tsukuba), Shun-Ichi Azuma (Kyoto University), Ryo Takahashi (Kyoto University)

A2L-F5 A Study of Pulse Shape Suitable for Power Packet Dispatching on Power Transmission Line 87
Ryo Takahashi (Kyoto University), Takuya Kajiyama (Kyoto University), Takafumi Okuda (Kyoto University), Takashi Hikihara (Kyoto University)

A2L-G Special Session: Radio Frequency Technology

DATE: 2016/11/28 10:30–12:30
ROOM: Room 6
Chairs: Takeshi Kamio (Hiroshima City University) and Hisato Fujisaka (Hiroshima City University)

A2L-G1 Power Conversion Efficiency of RF-DC Rectifier for RF Energy Harvesting 89
Chang-Jun Ahn (Chiba University), Takeshi Kamio (Hiroshima City University), Hisato Fujisaka (Hiroshima City University), Kazuhisa Haeiwa (Hiroshima City University)

A2L-G2 Performance Enhancement Using Unitary Frequency Modulation with PLC and VLC Cooperation 91
Chang-Jun Ahn (Chiba University), Yeon-Ho Chung (Pukyong National University)

A2L-G3 Novel Channel Estimation and Compensation Schemes for Massive MIMO-OFDM 95
Masaya Okamura (Chiba University), Chang-Jun Ahn (Chiba University), Ken-Ya Hashimoto (Chiba University)
A2L-G4 Packet Splitting and Adaptive Modulation Based on Time Domain CSI for Cooperative OFDM Systems
  Yuta Ida (Yamaguchi University), Takahiro Matsumoto (Yamaguchi University), Shinya Matsufuji (Yamaguchi University)

A2L-G5 Analysis of Antenna Pattern Change Caused by Architectures Close by Radio Transmitting Station
  Kazuhisa Haeiwa (Hiroshima City University), Kazuhiko Kitayama (NHK Integrated Technology Inc), Takeshi Kamio (Hiroshima City University), Hisato Fujisaka (Hiroshima City University)

A2L-G6 Influence of Coupling Loop Interference on Equivalent C/N Degradation Under SFN in a Ship
  Takeshi Kamio (Hiroshima City University), Kazuhisa Haeiwa (Hiroshima City University), Hisato Fujisaka (Hiroshima City University)

A3L-B Special Session: Nonlinear Methods with Interaction
ROOM: Room 1
Chair: Tomoya Suzuki (Ibaraki University)

A3L-B1 An Improved Multi-Objective Particle Swarm Optimization Using an Efficient Gbest Selection Method
  Yuki Hasegawa (Nippon Institute of Technology), Takayuki Kimura (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)

A3L-B2 Principal Component Stock Portfolio Based on Nonlinear Prediction
  Kazuki Yanagisawa (Ibaraki University), Tomoya Suzuki (Ibaraki University)

A3L-B3 Biased Reactions to Abnormal Stock Prices Detected by Autoencoder During Daytime and Nighttime
  Hiroyuki Gotou (Ibaraki University), Tomoya Suzuki (Ibaraki University)

A3L-B4 An Alternative to Basic Log-Likelihood for Bayesian Network Clustering
  Rei Oshino (Ibaraki University), Koujin Takeda (Ibaraki University)

A3L-B5 A Construction Method for the Steiner Tree Problem Using Betweenness Centrality
  Misa Fujita (Nippon Institute of Technology), Takayuki Kimura (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)

A3L-C Special Session: Time Series and Complex Networks 2
ROOM: Room 2
Chair: Yoshito Hirata (University of Tokyo)
On Constructing Networks from Multivariate Nonlinear Time Series
Tomomichi Nakamura (University of Hyogo), Toshihiro Tanizawa (Kochi National College of Technology), Michael Small (University of Western Australia)

A New Approach to Non-Uniformed Sampled Time Series using Ordinal Partitions
Thomas Stemler (University of Western Australia), Konstantinos Sakellariou (University of Western Australia), Michael McCullough (University of Western Australia), Ben Luo (University of Western Australia)

String Entropy as a Measure of Complexity in Chaotic Time Series
Takaya Miyano (Ritsumeikan University), Kenichiro Cho (Ritsumeikan University)

Analysis on Differences of Japanese and English Languages by the Complex Network Theory
Mayumi Tatara (Tokyo University of Science), Yutaka Shimada (Tokyo University of Science), Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

Irregularity of Inter-Event Interval of Diastrophism
Keisuke Miyata (Tokyo University of Tokyo), Yutaka Shimada (Tokyo University of Science), Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

A3L-D Special Session: Hybrid Dynamical Systems: Modeling, Analysis, and Applications

ROOM: Room 3
Chair: Daisuke Ito (University of Shiga Prefecture)

A Spiking Neuron Model with Two Slopes and Triangular Wave Base Signal
Yusuke Matsuoka (National Institute of Technology, Yonago College)

A Switching Ripple Reduction Technique for Current-Controlled 1-Dimensional DC/DC Boost Converter
Hiroyuki Fukue (Okayama University of Science), Takuji Kousaka (Oita University), Tetsushi Ueta (Tokushima University), Daisuke Ito (University of Shiga Prefecture), Hirokazu Ohtagaki (Okayama University of Science), Hiroyuki Asahara (Okayama University of Science)

Chaos Near the Chenciner Bubbles from a Piecewise-Constant System
Tri Quoc Truong (Nagaoka University of Technology), Tadashi Tsubone (Nagaoka University of Technology), Naohiko Inaba (Meiji University), Tetsuro Endo (Meiji University)

Homoclinic Bifurcations in a Piece-Wise Constant Neuron Model
Chiaki Matsuda (Kyoto Sangyo University), Hiroyuki Torikai (Kyoto Sangyo University)

Qualitative Behavior of Nonideal Switching Circuit with Two-Periodic Inputs
A3L-E Control and Robotics

ROOM: Room 4
Chairs: Keiji Konishi (Osaka Prefecture University) and Yoshiki Sugitani (Ibaraki University)

A3L-E1 Modeling and Simulation of Motion of an Underwater Robot 161
Ryo Inohara (Shonan Institute of Technology), Kaito Isogai (Shonan Institute of Technology), Hideo Nakano (Shonan Institute Of Technology), Hideaki Okazaki (Shonan Institute of Technology)

A3L-E2 Modeling and Simulation of Motion of a Quadcopter 165
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A3L-E3 Robust Performance of Two-Wheeled Mobile Robot Circular Formations Controlled by Coupled Oscillators 169
Tadashi Nakamura (Osaka Prefecture University), Koki Yoshida (Osaka Prefecture University), Keiji Konishi (Osaka Prefecture University), Naoyuki Hara (Osaka Prefecture University)

A3L-E4 Modeling and Stabilization of the Novel Quadrotor with Tilting Propeller 173
Takumi Fukuda (Osaka University), Akinori Sakaguchi (Osaka University), Takashi Takimoto (Kitakyushu National College of Technology), Toshimitu Ushio (Osaka University)

A3L-F Special Session: Power Packet: Energy-and-Information Integrated Technology 2

ROOM: Room 5
Chair: Ryo Takahashi (Kyoto University)

A3L-F1 A Charge-Based SiC Power MOSFET Model Considering on-State Resistance 177
Rui Zhou (Kyoto University), Michihiro Shintani (Kyoto University), Masayuki Hiromoto (Kyoto University), Takashi Sato (Kyoto University)

A3L-F2 A Design Example of Class-E Based Gate Driver for High Frequency Operation of SiC Power MOSFET 181
Michihiro Shintani (Kyoto University), Yuchong Sun (Chiba University), Hiroo Sekiya (Chiba University), Takashi Sato (Kyoto University)

A3L-F3 Design Example of SiC Isolated Soft-Switching Driver 182
Ryoko Sugano (Chiba University), Yuchong Sun (Chiba University), Hiroo Sekiya (Chiba Univer-
Flyback Converter Using SiC Power-MOSFET to Achieve High Frequency Operation Over 10MHz

Nobuo Satoh (Chiba Institute of Technology), Yasuyuki Nishida (Chiba Institute of Technology)

A3L-G Special Session: Implementation Technology and Theory for Neuronal and Neuronal Network Models

ROOM: Room 6
Chairs: Kazuyuki Aihara (University of Tokyo) and Takashi Kohno (University of Tokyo)

A Three-Variable Ultralow-Power Analog Silicon Neuron Circuit
Takashi Kohno (University of Tokyo), Kazuyuki Aihara (University of Tokyo)

Two Heuristic Approaches to Parameter Tuning for an Analog Silicon Neuron Circuit
Ethan Joseph Green (University of Tokyo), Takashi Kohno (University of Tokyo)

Elliptic and Parabolic Bursting in a Digital Silicon Neuron Model
Takuya Nanami (University of Tokyo), Kazuyuki Aihara (University of Tokyo), Takashi Kohno (University of Tokyo)

Spiking Neural Network Simulation on FPGAs with Automatic and Intensive Pipelining
Taro Kawao (University of Tokyo), Masato Neishi (University of Tokyo), Tomohiro Okamoto (University of Tokyo), Amir Masoud Gharehbaghi (University of Tokyo), Takashi Kohno (University of Tokyo), Masahiro Fujita (University of Tokyo)

External Input-Facilitated Onset of Chaos in Recurrent Neural Networks
Muyuan Xu (University of Tokyo), Yuichi Katori (Future University Hakodate), Takashi Kohno (University of Tokyo), Kazuyuki Aihara (University of Tokyo)

A4L-B Chaos and Bifurcation 2

DATE: 2016/11/28 15:50–18:40
ROOM: Room 1
Chairs: Yusuke Matsuoka (National Institute of Technology, Yonago College) and Martin Schüle (Zurich University of Applied Sciences)

Control of Avoidance for Chaos by Using Downhill Simplex Method
Kohsuke Yamato (Anan National College of Technology), Akihiro Kawabata (Anan National College of Technology), Mio Kobayashi (Anan National College of Technology), Tetsuya Yoshinaga (Tokushima University)
Experimental Verification of Amplitude Death in a Pair of Double-Scroll Circuits Coupled by a One-Way Partial Time-Varying Delay Connection
Shinnosuke Masamura (Osaka Prefecture University), Yoshiki Sugitani (Ibaraki University), Keiji Konishi (Osaka Prefecture University), Naoyuki Hara (Osaka Prefecture University)

An Implementation of Fault-Tolerant FSSP Algorithms
Naoki Kamikawa (Osaka Electro-Communication University), Hiroshi Umeo (Osaka Electro-Communication University)

Steady State Analysis of Digital Return Maps and Cellular Automata
Naoki Tada (Hosei University), Hiroki Yamaoka (Hitachi Kokusai Electric Inc.), Toshimichi Saito (Hosei University)

A Variety of Super-Stable Periodic Orbits in a Simple Dynamical System with Integrate-and-Fire Switching
Risa Takahashi (Hosei University), Toshimichi Saito (Hosei University)

A4L-C Special Session: Random Number Generation and Chaos

DATE: 2016/11/28 15:50–18:40
ROOM: Room 2
Chair: Hiroshi Fujisaki (Kanazawa University)

Homomorphisms from the Logistic Map to the Quadratic Maps Over Zp
Takeru Miyazaki (University of Kitakyushu), Shunsuke Araki (Kyushu Institute of Technology), Satoshi Uehara (University of Kitakyushu), Yasuyuki Nogami (Okayama University)

A Biased Distribution of Truncated Values in the Logistic Map Over Integers
Hideyuki Muraoka (Kyushu Institute of Technology), Shunsuke Araki (Kyushu Institute of Technology), Takeru Miyazaki (University of Kitakyushu), Satoshi Uehara (University of Kitakyushu), Ken’ichi Kakizaki (Kyushu Institute of Technology)

The Period of Chebyshev Polynomial Sequences Modulo a Prime Power $p^k$
Daisaburo Yoshioka (Sojo University), Kento Kawano (Sojo University)

Pseudo Random Binary Sequence Generated by Trace and Legendre Symbol with Non Primitive Element in $\mathbb{F}_p$
Chiaki Ogawa (Okayama University), Ali M. Arshad (Okayama University), Yasuyuki Nogami (Okayama University), Satoshi Uehara (University of Kitakyushu), Kazuyoshi Tsuchiya (Koden Electronics Co. Ltd.), Robert Morelos Zaragoza (San Jose State University)

Performance Analysis of the Interval Algorithm for Random Number Generation in the Case of Markov Coin Tossings
Yasutada Oohama (University of Electro-Communications)

Random Number Generation Using Outputs from Multiple Beta Encoders
Koji Itaya (Kyushu University), Yutaka Jitsumatsu (Kyushu University)
A Realization of Optimum Binary Spreading Sequences of Markov Chains
Based on Discretized $\beta$-Transformations
Hiroshi Fujisaki (Kanazawa University)

A4L-D Special Session: Collective Behaviors of Chemically/Electrically Coupled Neurons

DATE: 2016/11/28 15:50–18:40
ROOM: Room 3
Chair: Ryosuke Hosaka (Fukuoka university)

A4L-D1 Synchronization in a Coupled Izhikevich Neuron Model
Kaede Naiki (Tokyo University of Science), Yutaka Shimada (Tokyo University of Science), Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

A4L-D2 Analysis of Synaptic Dynamics During Infra-Slow Oscillation
Toshihiro Kobayashi (Tokyo University of Science), Yutaka Shimada (Tokyo University of Science), Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

A4L-D3 Emergent Oscillatory Activities of Plastic Neural Networks
Ryosuke Hosaka (Fukuoka university)

A4L-D4 Connectivity Analyses on Self-Organized Neural Competition Networks
Hideyuki Kato (Tokyo University of Technology)

A4L-D5 Computation of Visual Neurons in LGN-V1 Transmission
Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

A4L-D6 A Computational Model for Pitch Pattern Perception with the Echo State Network
Miwa Fukino (University of Tokyo / Panasonic Corporation), Yuichi Katori (Future University Hakodate), Kazuyuki Aihara (University of Tokyo)

A4L-D7 Encoding Multi-Dimensional Time Series Data with Reservoir Computing
Yuichi Katori (Future University Hakodate)

A4L-E Special Session: Complex Communication Sciences

DATE: 2016/11/28 15:50–18:40
ROOM: Room 4
Chairs: Mikio Hasegawa (Tokyo University of Science) and Hidehiro Nakano (Tokyo City University)

A4L-E1 Reproduction of Nonlinear Cochlea Response by Asynchronous Bifurcation Processor
Kentaro Takeda (Kyoto Sangyo University), Hiroyuki Torikai (Kyoto Sangyo University)

**A4L-E2**  **Network Analyses of Chaotic Systems**  283
Miki U. Kobayashi (Rissho University), Yoshitaka Saiki (Rissho University)

**A4L-E3**  **A Hierarchical Routing Algorithm for MANET Based on Multi-Agent Learning**  284
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**A4L-E4**  **An Improved Routing Method Using Transmission Memory Information for Wireless Communication Networks**  288
Tokuma Sato (Nippon Institute of Technology), Takayuki Kimura (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)

**A4L-E5**  **A Study of a Probabilistic Routing Method Based on Packet Transmission Capacity**  292
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**A4L-E6**  **A Solution Strategy for Packet Routing Problem by Chaotic Neurodynamics with Degree Information**  296
Yuuki Morita (Nippon Institute of Technology), Takayuki Kimura (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)

**A4L-E7**  **Performance Evaluation and Analysis of Chaotic CDMA Considering Synchronization Acquisition**  300
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**A4L-F Special Session: Simulations in Cardiovascular Systems**

DATE: 2016/11/28 15:50–18:40
ROOM: Room 5
Chairs: Hiroyuki Kitajima (Kagawa University) and Kunichika Tsumoto (Osaka University)

**A4L-F1**  **Abnormal Cardiac Conduction in Acquired Heart Disease: a Simulation Study**  306
Kunichika Tsumoto (Osaka University), Yoshihisa Kurachi (Osaka University)

**A4L-F2**  **Simulation of Cardiac Excitation Propagation and the Circulatory Dynamics**  310
Akira Amano (Ritsumeikan University), Hiromasa Utaki (Ritsumeikan University), Kosuke
A4L-F3  Mechanisms of Sinoatrial Node Pacemaking: Novel Insights into Roles of the Pacemaker Current $I_f$ from Bifurcation Analysis of Mathematical Models
Yasutaka Kurata (Kanazawa Medical University), Ichiro Hisatome (Tottori University), Toshishige Shibamoto (Kanazawa Medical University)

A4L-F4  Oscillations, Bistabilities and Bifurcations in a Cardiac Pacemaker Cell Model
Takumi Nagai (Kyoto University), Shinji Doi (Kyoto University)

A4L-F5  Alternans Generation in the Crustacean Heart Model: a Simulation - Electrophysiology Study
Toru Yazawa (Tokyo Metropolitan University), Hiroyuki Kitajima (Kagawa University)

A4L-F6  Alternans in a Crustacean Cardiac Model
Akatsuki Abe (Kagawa University), Hiroyuki Kitajima (Kagawa University), Toru Yazawa (Tokyo Metropolitan University)

A4L-F7  Discordant Alternans and Codimension-Three Bifurcations in Coupled Luo-Rudy Models
Hiroyuki Kitajima (Kagawa University), Toru Yazawa (Kagawa University)

A4L-G  Synchronization

DATE: 2016/11/28 15:50–18:40
ROOM: Room 6
Chair: Kuniyasu Shimizu (Chiba Institute of Technology)

A4L-G1  Secure Communication via Cluster Synchronization of Chaotic Systems
Zekeriya Sarı (Dokuz Eylül University), Serkan Günel (Dokuz Eylül University)

A4L-G2  Desynchronization Induced by Highly Heterogeneous Strengths of Inhibitory Current on Electronic Neuron
Hisashi Kada (Ritsumeikan University), Isao Tokuda (Ritsumeikan University)

A4L-G3  Synchronization Phenomena of Piecewise-Linear Oscillators Coupled by a Hysteresis Element
Makoto Sudou (Nagaoka University of Technology), Tadashi Tsubone (Nagaoka University of Technology)

A4L-G4  Stability Analysis of Phase-Inversion Waves in Coupled Piecewise-Constant Oscillators as a Ladder
Ryohei Hirota (Nagaoka University of Technology), Tadashi Tsubone (Nagaoka University of Technology)

A4L-G5  Interval Estimation of Coupling Delay Time from Phase Time Series
Boris Bezrucho (Saratov State University), Elena Sidak (Saratov State University), Dmitry Smirnov (Yandex / V.A. Kotel’nikov Institute of Radioengineering and Electronics RAS)
Synchronized Bifurcation in a Two-Coupled Izhikevich Neuron Model
Yuu Miino (Tokushima University), Tetsushi Ueta (Tokushima University)

B1L-A Plenary Talk 2
DATE: 2016/11/29 09:00–10:00
ROOM: Hall
Chair: Hiroo Sekiya (Chiba University)

Almighty Google Knows Everything! - Big-data and Network Science
Hawoong Jeong (KAIST)

B2L-B Special Session: Koopman Operator Techniques in Nonlinear Dynamical Systems
DATE: 2016/11/29 10:20–12:40
ROOM: Room 1
Chair: Yoshihiko Susuki (Osaka Prefecture University)

Koopman Operator Theory for Nonlinear Dynamical Systems: an Introduction with Engineering Applications
Yoshihiko Susuki (Osaka Prefecture University), Igor Mezić (University of California, Santa Barbara)

Modeling of Effective Heat Diffusion in a Building Atrium via Koopman Mode Decomposition
Yohei Kono (Kyoto University), Yoshihiko Susuki (Osaka Prefecture University), Mitsunori Hayashida (OMRON Corporation), Takashi Hikihara (Kyoto University)

On Smoothing Effects of Wind Power via Koopman Mode Decomposition
Fredrik Raak (Kyoto University), Yoshihiko Susuki (Osaka Prefecture University), Kazuha Tsuboki (Nagoya University), Masaya Kato (Nagoya University), Takashi Hikihara (Kyoto University)

Optimal Parameter Selection for Kernel Dynamic Mode Decomposition
Wataru Kurebayashi (Aomori University), Sho Shirasaka (Tokyo Institute of Technology), Hiroya Nakao (Tokyo Institute of Technology)

Revisiting Delay Embedding: Dynamical Reconstruction Based on Sturm-Liouville Theory
Naoto Nakano (Japan Science and Technology Agency-PRESTO / Hokkaido University)

A Schrödinger-Type Formalism and Observable Wavefunctions in Dynamical Systems
Igor Mezić (University of California, Santa Barbara)
**B2L-C Special Session: Coupled Nonlinear Circuits and Networks 1**

DATE: 2016/11/29 10:20–12:40  
ROOM: Room 2  
Chair: Yoko Uwate (Tokushima University)

- **B2L-C1** Lyapunov Bundle on 0-Dimensional Section Torus and Bifurcation of Quasi-Periodic Solution 378  
  Kyohei Kamiyama (University of Tokyo), Motomasa Komuro (Teikyo University of Science), Tetsuro Endo (Meiji University), Kazuyuki Aihara (University of Tokyo)

- **B2L-C2** Partial Chaotic Synchronization of Coupled Nonidentical Augmented Lorenz Oscillators 381  
  Kenichiro Cho (Ritsumeikan University), Takaya Miyano (Ritsumeikan University)

- **B2L-C3** Investigation of Attracting Force to Synchronization States on Coupled Oscillator System by Using Electric Power 385  
  Ryoji Fukumasa (Hiroshima Institute of Technology), Masayuki Yamauchi (Hiroshima Institute of Technology), Yoshifumi Nishio (Tokushima University)

- **B2L-C4** Clustered Multidimensional Scaling with Rulkov Neurons 389  
  Thomas Ott (Zurich University of Applied Sciences), Martin Schüle (Zurich University of Applied Sciences), Jenny Held (Swiss Federal Institute of Aquatic Science and Technology / Eidgenössische Technische Hochschule Zür), Carlo Albert (Swiss Federal Institute of Aquatic Science and Technology), Ruedi Stoop (Universität Zürich / Eidgenössische Technische Hochschule Zürich)

- **B2L-C5** Nonparametric Clustering Approach Towards Big Data 393  
  Tom Lorimer (Universität Zürich / Eidgenössische Technische Hochschule Zürich), Jenny Held (Swiss Federal Institute of Aquatic Science and Technology / Eidgenössische Technische Hochschule Zür), Carlo Albert (Swiss Federal Institute of Aquatic Science and Technology), Ruedi Stoop (Universität Zürich / Eidgenössische Technische Hochschule Zürich)

**B2L-D Special Session: Noise-Driven and Stochastic Information Processing Systems**

DATE: 2016/11/29 10:20–12:40  
ROOM: Room 3  
Chairs: Tetsuya Asai (Hokkaido University) and Shintaro Arai (Okayama University of Science)

- **B2L-D1** [Invited Talk by SS Organizers] Architectural Approach on Approximate Computing for Media Processing 397  
  Yuko Hara-Azumi (Tokyo Institute of Technology), Hisashi Osawa (Tokyo Institute of Technology), Tanvir Ahmed (Tokyo Institute of Technology)

- **B2L-D2** Highly Nonrandom Synaptic Connectivity and Spontaneous Ongoing Fluctuation in Cortical Networks 398  
  Jun-Nosuke Teramae (Osaka University)
A Study on Performance of Hopfield-Tank Neural Networks Running on Coherent Ising Machine
Hiroyuki Yasuda (University of Tokyo), Mikio Hasegawa (Tokyo University of Science), Kazuyuki Aihara (University of Tokyo)

Distributed Multipath Routing with Packet Allocation Based on the Attractor Renewal Model
Yoshihiko Saitoh (Osaka University), Jun-Nosuke Teramae (Osaka University), Naoki Wakamiya (Osaka University)

Effect of a Root-Raised-Cosine Filtered BPSK Signal on a Stochastic Resonance Receiver
Yasuho Nakashima (Nagoya University), Hiroya Tanaka (Nagoya University), Takaya Yamazato (Nagoya University), Yukihiro Tadokoro (TOYOTA Central R&D Labs., Inc.), Shintaro Arai (Okayama University of Science)

Robust Detection of Surface Myoelectric Signal Using a Nonlinear Device Network for Intuitive Man-Machine Interface
Yuki Inden (Hokkaido University), Kento Shirata (Hokkaido University), Seiya Kasai (Hokkaido University)

B2L-E Communication Systems and Signal Processing
DATE: 2016/11/29 10:20–12:40
ROOM: Room 4
Chairs: Francis C.M. Lau (Hong Kong Polytechnic University) and Yuko Osana (Tokyo University of Technology)

Subcarrier Allocation in Multi-Carrier DCSK System for Performance Enhancement
Hua Yang (Nanjing University of Posts and Telecommunications), Guo-Ping Jiang (Nanjing University of Posts and Telecommunications)

Robust Scale-Free Luby Transform Code and its Performance
Yuli Zhao (Northeastern University), Francis C.M. Lau (Hong Kong Polytechnic University), Zhiliang Zhu (Northeastern University), Hai Yu (Northeastern University), Li Guo (Northeastern University)

Regional Activation Based on P2P Network Architecture
Yutaka Naito (Sojo University), Chiaki Katsuki (Sojo University), Nozomi Suehiro (Sojo University), Takashige Hoshiai (Sojo University)

Local Noise Sensitivity in Human Photoplethysmogram
Nina Sviridova (Meiji University), Kenshi Sakai (Tokyo University of Agriculture and Technology)

Security Analysis of a Chaos Based Random Number Generator
Salih Ergün (Scientific and Technological Research Council of Turkey)

Application of a Bivariate Fractal Interpolation Surface to an Analysis of Perspective Painting Images
Automatic Melody Generation Considering Chord Progression Using Genetic Algorithm
Kodai Wakui (Tokyo University of Technology), Yoshinori Hatori (Tokyo University of Technology), Yuko Osana (Tokyo University of Technology)

B2L-F Special Session: Recent Progress in Nonlinear Optimization Algorithms and its Applications 1

DATE: 2016/11/29 10:20–12:40
ROOM: Room 5
Chair: Hidehiro Nakano (Tokyo City University)

A Study on Satisfaction Method of Constraints by Approximating Constraints
Ryo Ooe (Nagoya University), Tomohiro Yoshikawa (Nagoya University)

A Proposal of a New Approach for Strengthening the Search Ability of EMO Algorithm -SPLASH-
Hibiki Samonji (Muroran Institute of Technology), Shinya Watanabe (Muroran Institute of Technology)

A Proposal on a New Efficient Framework Dedicated to Large Scale Vehicle Routing Problems -FOCUS-
Masashi Ito (Muroran Institute of Technology), Shinya Watanabe (Muroran Institute of Technology), Kazutoshi Sakakibara (Toyama Prefectural University)

Application of Artificial Bee Colony Algorithm to Maximum Power Point Tracking in Photovoltaic Systems
Hideto Sakamoto (Hosei University), Toshimichi Saito (Hosei University)

Multi-Point Search Algorithm with Rotation Angle Dependent on the Best Position
Kenta Kohinata (Nippon Institute of Technology), Takuya Kurihara (Nippon Institute of Technology), Takuya Shindo (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)

The Application of the ES Operation in Firefly Algorithm
Takuya Shindo (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)

On a Rotationally Invariant of PSO
Yosuke Hariya (Nippon Institute of Technology), Takuya Shindo (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)
B3L-B Special Session: Complex Photonics and Applications 1 - Random Number Generation -

DATE: 2016/11/29 14:00–16:00
ROOM: Room 1
Chair: Atsushi Uchida (Saitama University)

B3L-B1 Nondeterministic Random Bits Extraction from Injected Chaotic Semiconductor Lasers

Xiao-Zhou Li (City University of Hong Kong), Jun-Ping Zhuang (City University of Hong Kong), Song-Sui Li (City University of Hong Kong), Sze-Chun Chan (City University of Hong Kong)

B3L-B2 Fast Physical Random Bit Generation by Chaotic Lasers with Delayed Feedback Using Extremely Short External Cavities

Shin Suzuki (Waseda University), Satoshi Sunada (Kanazawa University), Susumu Shinohara (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories), Takehiro Fukushima (Okayama Prefectural University), Takahisa Harayama (Waseda University)

B3L-B3 Optimal Design of Two-Dimensional External Cavities for Delayed Optical Feedback

Shinji Orihara (Waseda University), Koei Koyama (Waseda University), Susumu Shinohara (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories), Satoshi Sunada (Kanazawa University), Takehiro Fukushima (Okayama Prefectural University), Takahisa Harayama (Waseda University)

B3L-B4 Intermittent Dynamics in Lasers: Distribution Mapping and Random Number Generation

Andreas Karsakian Dal Bosco (Saitama University), Naoki Sato (Saitama University), Shoma Ohara (Saitama University), Yuta Terashima (Saitama University), Atsushi Uchida (Saitama University), Takahisa Harayama (Waseda University), Kazuyuki Yoshimura (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories)

B3L-B5 Fast Physical Random Bit Generation Using a Photonic Integrated Circuit

Yuta Terashima (Saitama University), Kazusa Ugajin (Saitama University), Atsushi Uchida (Saitama University), Takahisa Harayama (Waseda University), Kazuyuki Yoshimura (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories)

B3L-C Special Session: Coupled Nonlinear Circuits and Networks 2

DATE: 2016/11/29 14:00–16:00
ROOM: Room 2
Chair: Thomas Ott (Zurich University of Applied Sciences)

B3L-C1 Stability Analysis of Periodic Orbits in Dynamic Binary Neural Networks

Shunsuke Aoki (Hosei University), Ryuji Sato (Hosei University), Kazuma Makita (Hosei University), Toshimichi Saito (Hosei University)

B3L-C2 Multi-Compartment Neuron Model Based on Asynchronous Bifurcation Processor
Taiki Naka (Kyoto Sangyo University), Hiroyuki Torikai (Kyoto Sangyo University)

**B3L-C3 Neural Avalanches at the Edge-of-Chaos?**

Karlis Kanders (Universität Zürich / Eidgenössische Technische Hochschule Zürich), Ruedi Stoop (Universität Zürich / Eidgenössische Technische Hochschule Zürich)

**B3L-C4 Novel Insights Into Cochlear Information Processing**

Ruedi Stoop (Universität Zürich / Eidgenössische Technische Hochschule Zürich), Karlis Kanders (Universität Zürich / Eidgenössische Technische Hochschule Zürich), Leonardo Novelli (Universität Zürich / Eidgenössische Technische Hochschule Zürich), Florian Gomez (Universität Zürich / Eidgenössische Technische Hochschule Zürich)

**B3L-C5 Forecasting Correlation Structures**

Martin Schüle (Zurich University of Applied Sciences), Thomas Ott (Zurich University of Applied Sciences), Peter Schwendner (Zurich University of Applied Sciences)

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**B3L-D Special Session: Synchronization in Real Worlds and its Mathematical Modeling**

**B3L-D1 Modeling of Human Spontaneous Eyeblinks**

Ryota Nomura (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

**B3L-D2 Numerical Analysis on Synchronization of Four Metronomes**

Yusuke Shiomi (Tokyo University of Science), Yutaka Shimada (Tokyo University of Science), Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

**B3L-D3 Comparison of Resource Budget Models for Nonlinear Dynamics in Alternate Bearing of Tree Crops**

Xujun Ye (Hirosaki University), Kenshi Sakai (Tokyo University of Agriculture and Technology)

**B3L-D4 Understanding the Some Aspects of Alternate Bearing Phenomenon: Cycle of Three Years**

Awadhesh Prasad (University of Delhi), Kenshi Sakai (Tokyo University of Agriculture and Technology), Yoshinobu Hoshino (Tokyo University of Agriculture and Technology)

**B3L-D5 Spatial Dynamics of Acorn Masting and Tree Crops Alternate Bearing**

Kenshi Sakai (Tokyo University of Agriculture and Technology), Yoshinobu Hoshino (Tokyo University of Agriculture and Technology)
B3L-E Special Session: AD Converters and Dynamical Systems

DATE: 2016/11/29 14:00–16:00
ROOM: Room 4
Chair: Yutaka Jitsumatsu (Kyushu University)

B3L-E1 Fredholm Determinants of Generalized $\beta$-Transformations and MSE Estimates of Corresponding AD-Converters 514
Katsutoshi Shinohara (Hitotsubashi University), Kenta Koayashi (Hitotsubashi University)

B3L-E2 Pseudo Random Numbers Generated by Dynamical Systems 518
Makoto Mori (Nihon University)

B3L-E3 Estimation of Beta-Value for Pipelined Beta Encoders 522
Yeelai Chew (Kyushu University), Yutaka Jitsumatsu (Kyushu University)

B3L-E4 A Switched-Current Golden Ratio Encoder Circuit 526
Takayoshi Fujino (Tokyo Denki University), Yoshihiko Horio (Tohoku University)

B3L-F Special Session: Recent Progress in Nonlinear Optimization Algorithms and its Applications 2

DATE: 2016/11/29 14:00–16:00
ROOM: Room 5
Chair: Takuya Shindo (Nippon Institute of Technology)

B3L-F1 Parameter Optimization for Power Line Communications Considering Operational Status of Electrical Appliances 530
Takeshi Kamio (Hiroshima City University), Ena Kono (Hiroshima City University), Hisato Fujisaka (Hiroshima City University)

B3L-F2 Piecewise-Linear Particle Swarm Optimizer Networks 534
Tomoyuki Sasaki (Tokyo City University), Hidehiro Nakano (Tokyo City University), Arata Miyauchi (Tokyo City University), Akira Taguchi (Tokyo City University)

B3L-F3 Applying Evolutionary Design of Experiments to Sensitivity Analysis of Tsunami Evacuation Simulation 538
Takeshi Uchitane (RIKEN), Chenting Zhou (Osaka University), Toshiharu Hatanaka (Osaka University)

B3L-F4 Hybrid Method of Genetic Algorithm and Firefly Algorithm Distinguishing Between Males and Females 542
Masaki Takeuchi (Tokushima University), Haruna Matsushita (Kagawa University), Yoko Uwate (Tokushima University), Yoshifumi Nishio (Tokushima University)

B3L-F5 Tabu Search Method for Solving Covering Salesman Problem with Nodes and Segments 546
Takafumi Matsuura (Nippon Institute of Technology)
C1L-B Special Session: Complex Photonics and Applications 2 - Photonic integrated circuits -

DATE: 2016/11/30 10:30–12:30
ROOM: Room 1
Chair: Kazutaka Kanno (Fukuoka University)

C1L-B1 Analysis of Resonator Modes in a Penrose Unilluminable Room
Takehiro Fukushima (Okayama Prefectural University), Takao Sarata (Okayama Prefectural University), Koichiro Sakaguchi (Okayama Prefectural University), Yasunori Tokuda (Okayama Prefectural University)

C1L-B2 Wave-Chaos-Induced Single-Frequency Lasing in Microcavities
Satoshi Sunada (Kanazawa University), Susumu Shinohara (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories), Takehiro Fukushima (Okayama Prefectural University), Takahisa Harayama (Waseda University)

C1L-B3 Asymmetric Emission Caused by Chaos-Assisted Tunneling and Synchronization in Two-Dimensional Microcavity Lasers
Yuta Kawashima (Waseda University), Susumu Shinohara (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories), Satoshi Sunada (Kanazawa University), Takehiro Fukushima (Okayama Prefectural University), Takahisa Harayama (Waseda University)

C1L-B4 Chaos Synchronization and Nonlinear Dynamics in a Photonic Integrated Circuit with Two Semiconductor Lasers
Shoma Ohara (Saitama University), Andreas Karsaklian Dal Bosco (Saitama University), Kazusa Ugajin (Saitama University), Atsushi Uchida (Saitama University), Takahisa Harayama (Waseda University), Kazuyuki Yoshimura (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories)

C1L-B5 Common-Signal-Induced Synchronization in Photonic Integrated Circuits Driven by Constant-Amplitude Random-Phase Light
Takuma Sasaki (Saitama University), Izumi Kakesu (Saitama University), Atsushi Uchida (Saitama University), Satoshi Sunada (Kanazawa University), Kazuyuki Yoshimura (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories), Kenichi Arai (Nippon Telegraph and Telephone Corporation / NTT Communication Science Laboratories)
C1L-C Special Session: Coupled Nonlinear Circuits and Networks

DATE: 2016/11/30 10:30–12:30
ROOM: Room 2
Chair: Kyohei Kamiyama (University of Tokyo)

C1L-C1 Demonstration of Chaos Synchronization of Sampled-Data Coupled Piecewise-Linear Systems
Hoangdao Nguyen (Nagaoka University of Technology), Tadashi Tsubone (Nagaoka University of Technology)

C1L-C2 Investigation of Phase Itinerancy of Complex Waves on a Ring Constructed by Van der Pol Oscillators
Ryouhei Takano (Hiroshima Institute of Technology), Masayuki Yamauchi (Hiroshima Institute of Technology)

C1L-C3 Synchronization in Dynamical Polygonal Oscillatory Networks with Switching Topology
Yoko Uwate (Tokushima University), Yoshifumi Nishio (Tokushima University), Ruedi Stoop (Universität Zürich / Eidgenössische Technische Hochschule Zürich)

C1L-C4 Review of Tuned Power Oscillators
Hiroo Sekiya (Chiba University)

C1L-D Special Session: Localization Phenomena in Nonlinear Lattices

DATE: 2016/11/30 10:30–12:30
ROOM: Room 3
Chair: Masayuki Kimura (Kyoto University)

C1L-D1 Intrinsic Localized Modes in Saturable Inductor Transmission Lines
Masayuki Sato (Kanazawa University), Toshio Mukaide (Kanazawa University), Takahiro Nakaguchi (Kanazawa University), Albert J. Sievers (Cornell University)

C1L-D2 Search for Discrete Breathers in Unstrained Graphene
Sergey Dmitirev (Russian Academy of Science), Ivan Lobzenko (Russian Academy of Science), Elena Korznikova (Russian Academy of Science)

C1L-D3 Discrete Breathers: Affecting the Density Shapes of Heat Transport
Daxing Xiong (Fuzhou University), Jun Zhang (Fuzhou University)

C1L-D4 Tunable Wave Propagation in Mechanical Metamaterials Made of Triangulated Cylindrical Origami
Hiromi Yasuda (University of Washington), Jinkyu Yang (University of Washington)

C1L-D5 Localization and Multimode Oscillations in Coupled Bistable Oscillators

C1L-E Complex Networks and Systems

DATE: 2016/11/30 10:30–12:30
ROOM: Room 4
Chair: Michael Small (University of Western Australia)

C1L-E1 Extensions of a Theorem on Algebraic Connectivity Maximizing Graphs
Ryoya Ishii (Okayama University), Norikazu Takahashi (Okayama University)

C1L-E2 Theory for Dynamical Robustness of Complex Networks Against Targeted Attacks
Tianyu Yuan (University of Tokyo), Kazuyuki Aihara (University of Tokyo), Gouhei Tanaka (University of Tokyo)

C1L-E3 A Network Analysis of World’s Metro Systems
Xingtang Wu (Beijing Jiaotong University), Chi K. Tse (Hong Kong Polytechnic University), Hairong Dong (Beijing Jiaotong University), Ivan Wang-Hei Ho (Hong Kong Polytechnic University), Francis C.M. Lau (Hong Kong Polytechnic University)

C1L-E4 Bus Transport Network in Hong Kong: Scale-Free or Not?
Tanuja Shanmukhappa (Hong Kong Polytechnic University), Ivan Wang-Hei Ho (Hong Kong Polytechnic University), Chi K. Tse (Hong Kong Polytechnic University)

C1L-E5 A Fast Method for Finding the Edge to Be Added to Minimize Betweenness Centrality of a Specified Vertex
Toshibuki Namba (Okayama University), Tatsuki Kohno (Okayama University), Norikazu Takahashi (Okayama University)

C1L-E6 Which Vertices Affect the Spread of Disease in Temporal Networks?
Koshi Abe (Tokyo University of Science), Yutaka Shimada (Tokyo University of Science), Kantaro Fujiwara (Tokyo University of Science), Tohru Ikeguchi (Tokyo University of Science)

C1L-F Special Session: Cellular Dynamical Systems

DATE: 2016/11/30 10:30–12:30
ROOM: Room 5
Chair: Hiroyuki Torikai (Kyoto Sangyo University)

C1L-F1 A Hardware Cellular-Automaton Architecture for Spatial Pattern Generation Towards Motion-Vector Estimation of Textureless Objects
Aoi Tanibata (Hokkaido University), Miho Ushida (Hokkaido University), Alexandre Schmid (École Polytechnique Fédérale de Lausanne), Masayuki Ikebe (Hokkaido University), Tetsuya Asai (Hokkaido University), Masato Motomura (Hokkaido University)

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C1L-F2 A Probabilistic Model of Nano-Carbon Materials Based on Probabilistic Current  
Shohei Hamada (Hiroshima City University), Aiko Kawane (Hiroshima City University), Hisato Fujisaka (Hiroshima City University), Takeshi Kamio (Hiroshima City University)

C1L-F3 Super-Stabilization of Periodic Spike-Trains in the Digital Spiking Neuron  
Kei Yamaoka (Hosei University), Toshimichi Saito (Hosei University)

C1L-F4 Efficient Implementation of Boltzmann Machine Using Asynchronous Network of Cellular Automaton-Based Neurons  
Takashi Matsubara (Kobe University), Kuniaki Uehara (Kobe University)

C1L-F5 Development of Discrete Mechanics for 2-Dimensional Distributed Parameter Mechanical Systems and its Application to Vibration Suppression Control of a Film  
Tatsuya Kai (Tokyo University of Science), Kouhei Yamaki (Tokyo University of Science)

C1L-F6 A Hardware-Efficient Gene Network Model Based on Asynchronous Bifurcation Processor  
Takuya Yoshimoto (Kyoto Sangyo University), Hiroyuki Torikai (Kyoto Sangyo University)

C2L-B Special Session: Complex Photonics and Applications 3 - Reservoir Computing and Laser Dynamics-

ROOM: Room 1
Chair: Andreas Karsaklian Dal Bosco (Saitama University)

C2L-B1 Space-Time Analogy in Delay Systems for Chimera States and Reservoir Computing  
Laurent Larger (FEMTO-ST institute / CNRS / Université de Bourgogne Franche-Comté), Bicky Marquez (FEMTO-ST Institute), Bogdan Penkovsky (FEMTO-ST Institute), Maxime Jacquot (FEMTO-ST Institute), Yanne Chembo (FEMTO-ST Institute), Daniel Brunner (FEMTO-ST Institute)

C2L-B2 Fast Information Processing by Using Fast Transient Response in a Semiconductor Laser with Strong Optical Injection  
Kazutaka Kanno (Fukuoka University), Masatoshi Bunsen (Fukuoka University)

C2L-B3 Experiment on Reservoir Computing Using Consistency of a Semiconductor Laser  
Yoma Kuriki (Saitama University), Joma Nakayama (Saitama University), Kosuke Takano (Saitama University), Atsushi Uchida (Saitama University)

C2L-B4 Period-One Nonlinear Dynamics of Semiconductor Lasers for Photonic Microwave Mixing  
Yu-Han Hung (National Cheng Kung University), Sheng-Kwang Hwang (National Cheng Kung University)

C2L-B5 Effects of Phase Space Sticky Motions in Nearly-Integrable Dielectric Billiards on Far-Field Patterns  

C2L-C Stability of Power Systems and Oscillators

ROOM: Room 2
Chair: Yoko Uwate (Tokushima University)

C2L-C1 Tracking of Operating Point in DC Bus System with Delayed Feedback Control for Time-Varying Loads
Koki Yoshida (Osaka Prefecture University), Keiji Konishi (Osaka Prefecture University), Naoyuki Hara (Osaka Prefecture University)

C2L-C2 Stability Analysis of Amplitude Death in Cartesian Product Networks of Delay-Coupled Landau-Stuart Oscillators
Yoshiki Sugitani (Ibaraki University)

C2L-C3 Stability of Paralleled Boost Converters with WTA Switching
Yasuo Murata (Hosei University), Toshimichi Saito (Hosei University)

C2L-C4 Basins of Attraction of Steady Operating Conditions in a Two-Site Electricity and Heat Supply System
Hikaru Hoshino (Kyoto University), Yoshihiko Susuki (Osaka Prefecture University), Takashi Hikihara (Kyoto University)

C2L-D Special Session: Localization Phenomena in Nonlinear Lattices 2

ROOM: Room 3
Chair: Masayuki Sato (Kanazawa University)

C2L-D1 Existence and Stability of Odd and Even Parity Discrete Breathers in Fermi-Pasta-Ulam Lattices
Kazuyuki Yoshimura (Tottori University)

C2L-D2 Generalised Weierstrass Elliptic Functions and Nonlinear Wave Equations
Chris Eilbeck (Heriot-Watt University)

C2L-D3 Mobility of Discrete Breather in Truncated Pairwise Interaction Symmetric Lattices
Yusuke Doi (Osaka University), Kazuyuki Yoshimura (Tottori University)

C2L-D4 Experimental Excitations of Intrinsic Localized Modes in an Air-Levitation-Type Coupled Oscillator Array
C2L-E Special Session: Applications to Temporal Nonlinear Systems

ROOM: Room 4
Chair: Tomoya Suzuki (Ibaraki University)

C2L-E1 Technical Trading Strategy Using Reactions to Stock Price Jumps
Tokimaru Tsuruta (Ibaraki University), Tomoya Suzuki (Ibaraki University)

C2L-E2 Koopman Operator Approach to Vital Sign Detection
Yui Kawamura (Aomori University), Sho Shirasaka (Tokyo Institute of Technology), Hiroya Nakao (Tokyo Institute of Technology), Wataru Kurebayashi (Aomori University)

C2L-E3 Large Graph Laplacian Matrix and Functional Map of Whole Brain of C. elegans
Hiromu Sakuma (Ibaraki University), Takayuki Teramoto (Kyushu University), Sayuri Kuge (Kyushu University), Takeshi Ishihara (Kyushu University), Yuishi Iwasaki (Ibaraki University)

C2L-E4 A Construction Method for Disjoint Paths with Transmission Reliability on Communication Networks
Sho Nishi (Nippon Institute of Technology), Takayuki Kimura (Nippon Institute of Technology), Kenya Jin’no (Nippon Institute of Technology)

C2L-E5 Efficient Board Feature Extraction for Strategy Improvement in Computer Go
Hayato Mitsuoka (Ibaraki University), Koujin Takeda (Ibaraki University)

C2L-F Special Session: Information Networks as Collective Statistical Systems

ROOM: Room 5
Chair: Hiroyoshi Miwa (Kwansei Gakuin University)

C2L-F1 [Invited Talk by SS Organizer] Internet Traffic Anomalies and Their Detection Techniques
Kensuke Fukuda (National Institute of Informatics / Graduate University for Advanced Studies)
Approaching Rate Distortion Bound with Reinforcement Message Passing

Takumi Fujita (University of Toyama), Koji Okino (University of Toyama), Tatsuto Murayama (University of Toyama)

Network Coding and Dynamical Systems

Yusuke Iseki (Hitachi Solutions, Ltd.), Koji Okino (University of Toyama), Tatsuto Murayama (University of Toyama)

Shortest-Path Queries by Using Property of Geographical Density in Road Network

Yukitoshi Senshu (Kwansei Gakuin University), Hiroyoshi Miwa (Kwansei Gakuin University)
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