RIKEN–Osaka–OIST Joint Workshop 2016

# *Big Waves of Theoretical Science in Okinawa*



## Program

### July 8th (Fri.) @ B250

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| **8:45 – 9:45 (40+20)** | Invited talk on Soft matter physics – E. Fried (OIST)<br>"Geometric variational problems involving competition between line and surface energy" |
| (10 min break) | |
| **9:55 – 10:55 (40+20)** | Invited talk on Machine learning – K. Doya (OIST)<br>"Machine learning and brain science" |
| (10 min break) | |
| **11:05 – 11:25 (15+5)** | M. Taki (RIKEN)<br>"Open Theoretical Questions in Deep Learning" |
| **11:25 – 11:45 (15+5)** | T. Tokuda (OIST)<br>"Multiple co-clustering and its application" |
| (Lunch: 11:45– 13:30) | |
| **13:30 – 14:30 (40+20)** | Invited talk on Quantum physics – K. Hashimoto (Osaka Univ.)<br>"Chaos and quantum field theory" |
| (10 min break) | |
| **14:40 – 15:20 (30+10)** | Invited talk on Quantum physics – Y. Hidaka (RIKEN)<br>"The power of symmetry" |
| (40 min Break with Coffee) | |
| **16:00 – 16:20 (15+5)** | M. Sano (UTokyo)<br>"Research Overview on Soft Active Matter" |
| **16:20 – 16:40 (15+5)** | D. Nishiguchi (UTokyo)<br>"Long-range nematic order and anomalous fluctuations in collective motion of filamentous bacteria" |
| **16:40 – 17:00 (15+5)** | T. Yamamoto (UTokyo)<br>"Chirality-induced helical self-propulsion of chiral liquid crystal droplets" |
| (20 min Break) | |
| **17:20 – 17:40 (15+5)** | K. Tamai (UTokyo)<br>"Experimental Study on the Universal Route to Turbulence" |
| **17:40 – 18:00 (15+5)** | A. Kato (UTokyo)<br>"Collective motion of reciprocating self-propelled colloidal particles" |

### July 9th (Sat.) @ C209

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| **9:00 – 10:00 (40+20)** | Invited talk on Theoretical biology – A. Mochizuki (RIKEN )<br>"Studying dynamics of complex biological systems from structure of networks" |
| (10 min break) | |
| **10:10 – 10:50 (30+10)** | Invited talk on Quantum physics – S. Hikami (OIST)<br>"Random matrix models and applications" |
| **10:50 – 11:10 (15+5)** | H. Shimada (OIST)<br>"Polymer dimension from fractal trajectories in 3D conformal field theory" |
| (10 min break) | |
| **11:20 – 11:45 (3 min × 7)** | Poster Short Introduction given by<br>A. Tanaka (RIKEN), M. Hongo(RIKEN), N. Tanahashi (Osaka Univ.),<br>S. Sugishita (Osaka Univ.), H. Mori (Osaka Univ.), M. Nishida (Osaka Univ.) J. Iwasaka (UTokyo) |
| (Lunch: 11:45– 13:30) | |
| **13:30 – 13:50 (15+5)** | T. Hiraiwa (UTokyo)<br>"Active mechanics of cells" |
| **13:50 – 14:10 (15+5)** | R. Schulz (Free Univ. Berlin)<br>"Data-based stochastic modeling of drug transport" |
| **14:10 – 14:30 (15+5)** | A. Kikkawa (OIST)<br>"Random matrix analysis for the gene co-expression experiments in cancer cells" |
| (30 min Break with Coffee) | |
| **15:00 – 15:20 (15+5)** | N. Ogawa (RIKEN)<br>"Physical Modeling of Growing Cellular Mosaic Patterns in Fish Retina" |
| **15:20 – 15:40 (15+5)** | K. Uchinomiya (RIKEN)<br>"Mathematical model of evolution of chemical production and sensitivity in social amoeba" |
| **15:40 – 16:00 (15+5)** | Y. Sakai (RIKEN)<br>"Controlling chromosome segregation dynamics by the shapes" |
| **16:00 – 18:00** | Poster session A @ C210 |
| **18:30 –** | Banquet @ Rizzan Hotel |

**Poster short presentations**

- A. Tanaka (RIKEN): "Machine learning and mathematical physics"
- M. Hongo (RIKEN): "Thermally emergent curved spacetime"
- N. Tanahashi (Osaka Univ.): "Gravitational wave propagation and shock formation in modified gravity theory"
- S. Sugishita (Osaka Univ.): "Random volumes from matrices"
- H. Mori (Osaka Univ.): "Integrable Lattice Models and Supersymmetric Gauge Theories in 4d"
- M. Nishida (Osaka Univ.): "Entanglement in quantum physics"
- J. Iwasawa (UTokyo): "Properties of the collective motion of asymmetric self-propelling particles"

## July 10th (Sun.)

(Free discussion day)

## July 11th (Mon.) @ B250

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| **9:30 – 10:30 (40+20)** | Invited talk on Theoretical biology – J. Miller (OIST)<br>"Psychotroctopus" |
| (10 min break) | |
| **10:40 – 11:40 (40+20)** | Invited talk on Quantum physics – T. Busch (OIST)<br>"Controlling Quantum Systems" |
| (Lunch: 11:45– 13:30) | |
| **13:30 – 15:30** | Poster session B @ Cafeteria, floor B |
| **15:30 – 16:30** | OIST and RIKEN iTHES seminar – T. Hatsuda (RIKEN)<br>"From Quarks to Neutron Stars" |
| **16:30 – 18:00** | Poster session B @ Cafeteria, floor B |

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## Poster Session

**Poster Session A on July 9th (@ C210)**

1. A. Tanaka (RIKEN): "Machine learning and mathematical physics"
2. M. Hongo (RIKEN): "Thermally emergent curved spacetime"
3. N. Tanahashi (Osaka Univ.): "Gravitational wave propagation and shock formation in modified gravity theory"
4. S. Sugishita (Osaka Univ.): "Random volumes from matrices"
5. H. Mori (Osaka Univ.): "Integrable Lattice Models and Supersymmetric Gauge Theories in 4d"
6. M. Nishida (Osaka Univ.): "Entanglement in quantum physics"
7. J. Iwasawa (UTokyo): "Properties of the collective motion of asymmetric self-propelling particles"
8. M. Sano (UTokyo): "Research Overview on Soft Active Matter"
9. D. Nishiguchi (UTokyo): "Long-range nematic order and anomalous fluctuations in collective motion of filamentous bacteria"
10. T. Yamamoto (UTokyo): "Chirality-induced helical self-propulsion of chiral liquid crystal droplets"
11. K. Tamai (UTokyo): "Experimental Study on the Universal Route to Turbulence"
12. A. Kato (UTokyo): "Collective motion of reciprocating self-propelled colloidal particles"

**Poster Session B on July 11th (@ Cafeteria, floor B)**

1. H. Shimada (OIST): "Polymer dimension from fractal trajectories in 3D conformal field theory"
2. M. Taki (RIKEN): "Open Theoretical Questions in Deep Learning"
3. T. Tokuda (OIST): "Multiple co-clustering and its application"
4. T. Hiraiwa (UTokyo): "Theory on active stress generation in a cytoskeletal network"
5. R. Schulz (Free Univ. Berlin): "Data-based stochastic modeling of drug transport"
6. N. Ogawa (RIKEN): "Physical Modeling of Growing Cellular Mosaic Patterns in Fish Retina"
7. K. Uchinomiya (RIKEN): "Mathematical model of evolution of chemical production and sensitivity in social amoeba"
8. Y. Sakai (RIKEN): "Controlling chromosome segregation dynamics by the shapes"