

Program

OIST Mini-Symposium

The 16th International Membrane Research Forum



18-20 March 2019

Featuring
2D-3D Meso-Scale
Functional Molecular Complexes and Domains
in Cellular Membranes

OIST Mini-Symposium

**The 16th
International
Membrane Research Forum**

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2D-3D Meso-Scale
Functional Molecular Complexes and Domains
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18 – 20 March 2019

**Okinawa Institute of Science and Technology
Graduate University (OIST)**

Organizing Institutions

Okinawa Institute of Science and Technology Graduate University (OIST)
Executive Committee for the International Membrane Research Forum

Co-Sponsors (Alphabetical Order)

Japan Society for Promotion of Science (JSPS), Grants-in-Aid for Scientific Research (awarded to Keiko Kono and Akihiro Kusumi)

The Naito Foundation (awarded to Keiko Kono)

Japan Science and Technology Agency (JST), CREST Program of "Creation of Fundamental Technologies for Understanding and Control of Biosystem Dynamics"
(Program Director; Prof. Tadashi Yamamoto of OIST)

Okabe Team "Understanding synapse dynamics through nanoscale structural analyses"

Kono Unit (Membranology Unit) and Kusumi unit (Membrane Cooperativity Unit), OIST
Imaging Section, Research Support Division, OIST

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Meeting Coordinators

Miwako Tokuda, Hitomi Ohtaki, Amine Betul Nuriseria Aladag, Irina Meshcheryakova,
Aya Nakamura, Hisae Tsuboi, and Hiroko Hijikata

OIST Workshop Section (Hitomi Miyazato, Shoko Nakamatsu, and Chieri Matsuda)

OIST Imaging Section (Bruno Humbel, Shinya Komoto, and Ryo Kanno)

Design and Graphics

Koji Kanemasa (President and Designer, incomings)

Welcome to The 16th International Membrane Research Forum

18 March 2019

We would like to welcome everybody who is participating in this membrane research forum, particularly the speakers from abroad who have made long trips to come to Okinawa. It is our great pleasure to report that many scientists expressed considerable interest in this forum, and volunteered to present their research results.

Singer and Nicolson's fluid mosaic model, which formed our basic concept for biological membranes, is still believed to represent the basic structure of the plasma membranes of all cells existing on earth. Such universality is comparable to that of the double helical structure of DNA, although it is not recognized as widely as it should be. This universality suggests to us that various functions and structures of biological membranes could essentially be understood based on general fundamental mechanisms, consisting of a set of simple principles for the membrane organization and dynamics, although for each particular function and structure, a variety of specialized proteins and lipids are involved for the functional specificity. Therefore, through the studies of the mechanisms for various specialized functions, we hope to extract organizing principles of the cellular membranes and to understand the general cellular strategies that enable various membrane functions, which could be called the "membrane mechanisms".

This year's forum, the 16th meeting in this series, features "two-dimensional and three-dimensional meso-scale functional molecular complexes and domains in cellular membranes." Here, the meso-scale roughly represents the space scale between 3 and 300 nm. It is an interesting scale where non-living molecules turn into living cells through the formation of key molecular complexes and membrane domains that can perform quite complex regulated functions in the processes including signal transduction, molecular transport and trafficking, organelle formation, and formation of specialized membrane domains such as synapses, clathrin-coated pits, membrane contact sites, and focal adhesion.

In the research fields of cellular membranes, the two-dimensional structures and dynamics have been emphasized. However, the three-dimensional structures and molecular interactions are often keys to understand the membrane functions. Therefore, in this year's meeting, we hope to stress the three-dimensional structures and interactions in/on cellular membranes, including the interactions between the membrane and cytoskeletal structures.

We hope that you will enjoy this meeting and mingle with other scientists having very different backgrounds.

Organizers for the 16th International Membrane Research Forum Meeting

Executive Committee for the Membrane Research Forum

Standing Committee Members: Jiro Usukura (Nagoya), Masahiro Sokabe (Nagoya),
and Aki Kusumi (Chair, OIST)

OIST Organizers

Keiko Kono and Aki Kusumi

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Please contact the staff at the reception desk in front of B250. Further information will be provided.

March 18 8:45 - 17:35 - 19:35 -

Opening 8:45 - 9:00

Aki Kusumi Membrane Cooperativity Unit
OIST

Keynote Lecture 1 9:00 - 9:40 Chair: Yves Barral

Katharina Gaus University of New South Wales
Single molecule imaging insights into T cell signaling

Seminar 1 9:40 - 10:20 Chair: Yves Barral

Takahiro K. Fujiwara Institute for Integrated Cell-Material Sciences (WPI-iCeMS)
Kyoto University
Actin-induced compartmentalization of the channels between the focal-adhesion-protein islands as revealed by simultaneous ultrafast PALM and single-molecule tracking

Jiro Usukura Nagoya University
Membrane cytoskeleton: From live cell imaging to high resolution structural analysis by high speed AFM and cryo-electron microscopy

Coffee Break 1 10:20 - 10:35

***** MEMO *****

Keynote Lecture 2 10:35 - 11:15 Chair: Harald Stenmark

Ilya Levental University of Texas Health Science Center - Houston
Structural determinants of protein affinity for ordered domains and transbilayer plasma membrane asymmetry

Seminar 2 11:15 - 12:15 Chair: Harald Stenmark

Yuji Hara Graduate School of Engineering, Kyoto University;
AMED-PRIME
Cell surface flip-flop of phosphatidylserine is critical for PIEZO1-mediated myotube formation

Takeharu Nagai ISIR, Osaka University; OTRI, Osaka University
Singularity biology

Tadashi Yamamoto OIST
Physiology of mRNA decay machinery

Lunch + Poster put-up **12:15 - 13:15** @ C700 (Bldg. 3)

Keynote Lecture 3 13:15 - 13:55

Chair: Asako Shindo

Barbara Baird Cornell University

The plasma membrane is poised and responds to stimulating ligands with receptors as mediators

Seminar 3 13:55 - 14:15

Chair: Asako Shindo

Koichiro M. Hirose Center for Highly Advanced Integration of Nano and Life Sciences (G-CHAIN), Gifu University

Three-dimensional membrane platform for signaling in immune cells

Coffee Break 2 14:15 - 14:30

Keynote Lecture 4 14:30 - 15:10 Chair: Pakorn (Tony) Kanchanawong

Anthony Watts University of Oxford
Multiple spectroscopies to resolve meso-scale GPCR oligomerization phenomena

Seminar 4 15:10 - 16:10 Chair: Pakorn (Tony) Kanchanawong

Peng Zhou Membrane Cooperativity Unit, OIST
Transient hetero-dimerization of opioid receptors (GPCRs) revealed by single-molecule tracking

Taka A. Tsunoyama Membrane Cooperativity Unit, OIST
Frequent weak anchorage of integrin is responsible for cell adhesion: unraveling by super-long single-fluorescent molecule tracking

Ichiro Maruyama OIST
Activation of type-1 transmembrane receptors via a common mechanism: The "rotation model"

Coffee Break 3 **16:10 - 16:25**

Keynote Lecture 5 16:25 - 17:05 Chair: Dragomir Milovanovic

Yves Barral Institute of Biochemistry, ETH Zürich
Mechanisms and function of ER compartmentalization during asymmetric cell division

Seminar 5 17:05 - 17:25 Chair: Dragomir Milovanovic

Yusuke Hirabayashi Department of Chemistry and Biotechnology
School of Engineering, The University of Tokyo
ER-mitochondria tethering by PDZD8 regulates Ca²⁺ dynamics in mammalian neurons

17:35 – 19:35 (Room open till 20:00)

Poster Session C700

With Hors d'oeuvre, dinner, Champagne, wine, beer, and soft drinks

The program is located at the end of this booklet

Presentation Time

3n-2 Numbers 17:35 - 18:15

3n-1 Numbers 18:15 - 18:55

3n Numbers 18:55 - 19:35

Please put the poster up during the lunch time of Day 1.

Please take the poster down by the end of the lunch time on Day 2.

19:40 - 21:30 Lab Tour

Kono's wet lab and

Kusumi's single-molecule imaging/tracking lab

With sushi, pizza, and drinks @ the Kusumi Lab

We will form 4~6 tour groups, each consisting of 5~6 people. The tour groups will leave the reception area every 5 min. Take all your belongings with you.

A demo-experiment will be performed by **Saahil Acharya**, OIST graduate student, and ultrafast single-molecule imaging cameras will be shown by **Tahahiro K. Fujiwara**, Associate Professor of Kyoto University.

Tour conductors

Amine Aladag

Taka A. Tsunoyama

Peng Zhou

Limin Chen

Alexey Yudin

Approximate Departure Time

19:30

19:35

19:40

19:45

19:50

Transportation to the Moon Beach Hotel and Seaside House.

Every 30 min (19:00 ~ 23:00)

Up to 8 passengers at a time

From the Bldg. 2 parking lot (1 min from the Kusumi lab)

Upon request, we can also arrange taxi transportation (please pay on your own).

March 19 8:45 - 16:35 - 20:00

Keynote Lecture 6 8:45 - 9:25 Chair: Katharina Gaus

Harald Stenmark Department of Molecular Cell Biology
Institute for Cancer Research, Oslo University Hospital
ESCRT proteins in cellular membrane dynamics

Seminar 6 9:25 - 10:25 Chair: Katharina Gaus

Michiko Shirane Nagoya City University
The protrudin complex at ER membrane contact sites

Ikuko Koyama-Honda Graduate School and Faculty of Medicine
The University of Tokyo
JST-ERATO Mizushima Intracellular Degradation Project
Visualization of autophagosome maturation

Issei Mabuchi The University of Tokyo
Actin dynamics in cytoplasm isolated from frog oocytes

Group Photo Shooting 10:25 - 10:35

Coffee Break 4 10:35 - 10:45

Keynote Lecture 7 10:45 - 11:25 Chair: Ilya Levental

Shindo Asako Nagoya University
Spatial and temporal regulations of membrane cytoskeleton during tissue formation in vertebrate embryos

Seminar 7 11:25 - 12:05 Chair: Ilya Levental

Masahiro Sokabe Nagoya University Graduate School of Medicine
Mechanobiology of contact inhibition/cancer: Actomyosin contractile force exerting on adherens junctions inhibits keratinocyte proliferation

Masato Umeda Department of Synthetic Chemistry and Biological Chemistry
Graduate School of Engineering, Kyoto University
Organization and deformability of insect cell membrane

Lunch 12:05 - 13:05 @ C700 (Bldg. 3)

Please take down posters during the lunch time

Keynote Lecture 8 13:05 - 13:45 Chair: Daniel Choquet

Roger Nicoll University of California San Francisco (UCSF)
In search of the molecules of memory

Coffee Break 5 **13:45 - 14:00**

Seminar 8 14:00 - 15:00 Chair: Daniel Choquet

Hideji Murakoshi National Institute for Physiological Sciences
Optogenetic manipulation of CaMKII activity in synapses

Yasunori Hayashi Kyoto University Graduate School of Medicine
Why is CaMKII so abundant at synapse?

Haruhiko Bito Department of Neurochemistry
The University of Tokyo Graduate School of Medicine
Arc-dependent regulation of long-term synaptic plasticity

Coffee Break 6 **15:00 - 15:15**

Keynote Lecture 9 15:15 - 15:55 Chair: Anthony Watts

Hiroko Bannai JST PRESTO, Single Cell Analysis / RIKEN CBS
Physiology and pathology of brains revealed by single molecule imaging

Seminar 9 15:55 - 16:35 Chair: Anthony Watts

Yuri L. Nemoto Membrane Cooperativity Unit, OIST
Fast and slow turnover of AMPA receptor and stargazin in the spine in the time scale of 0.1 s to several 100 s; unraveling by single molecule imaging

Françoise Coussen IINS, CNRS France
Role of synaptic plasticity in AMPAR intracellular transport

16:50 Bus Transportation to Regalia Okinawa – Yomitan Transit

The bus will leave from the front entrance of the auditorium (where you get off the bus in the morning). We will move to the bus stop together. So, please get together in the Main Conference Venue after the last talk by Dr. Françoise Coussen.

17:30 - 20:00 Reception at Regalia Okinawa Restaurant (see Map 2)

Welcome Speech

Masahiro Sokabe Nagoya University Graduate School of Medicine



20:10 Bus Transportation to Moonbeach Hotel, OIST, and Seaside House

If you want to leave early, we will arrange taxi transportation (please pay on your own).

March 20 8:45 - 14:30

Keynote Lecture 10 8:45 - 9:25

Chair: Barbara Baird

Pakorn (Tony) Kanchanawong National University of Singapore
Probing the actin cortex in embryonic stem cells by super-resolution microscopy

Seminar 10a

9:25 - 9:45

Chair: Barbara Baird

Sawako Yamashiro Laboratory of Single-Molecule Cell Biology
Graduate School of Biostudies, Kyoto University
Dept. of Pharmacology, Graduate School of Medicine
Kyoto University

Myosin-dependent actin stabilization as revealed by single-molecule speckle (SiMS) analysis of actin turnover

Coffee Break 7 9:45 - 10:00

Seminar 10b

10:00 - 11:20

Chair: Masahiro Sokabe

Keiko Kono Membranology Unit, OIST

Cdk1-mediated DIAPH1 phosphorylation maintains metaphase cortical tension and inactivates the spindle assembly checkpoint at anaphase

Satoshi Yoshida School of International Liberal Studies, Waseda University

Identification of genes involved in the type III unconventional protein secretion in yeast

Tsuyoshi Hirashima Graduate School of Medicine, Kyoto University

MAPK/ERK activation waves mediated by intercellular mechanical signaling during collective cell migration

Kandice Levental University of Texas Health Science Center - Houston

Homeostatic remodeling of membranes in response to dietary lipid perturbations directs stem cell differentiation

Light Snack / Coffee Break 11:20 - 11:40 @ Lobby

Sandwiches, sweet buns, pastries, and soft drinks will be served.

*If you are going on an excursion + dinner this afternoon, please pack your late afternoon snack at this bread buffet (we will provide bags/boxes for you). The dinner will not start until 7:30 p.m., and so, without the afternoon snack, you will become very hungry.

Keynote Lecture 11 11:40 - 12:20

Chair: Roger Nicoll

Dragomir Milovanovic Departments of Neuroscience and Cell Biology
Yale School of Medicine

Phase separation at the nerve terminal

Coffee Break 7 12:20 - 12:35

Seminar 11

12:35 - 13:35

Chair: Roger Nicoll

Tomoyuki Takahashi OIST

Transport of synaptic vesicles in mammalian nerve terminals

Bernd Kuhn OIST

Membrane voltage imaging with the pure electrochromic probe ANNINE-6

Makoto Kinoshita Nagoya University Graduate School of Science

Septin-dependent entry of smooth endoplasmic reticulum into dendritic spines as a synaptic basis of persistent memory

Keynote Lecture 12 13:35 - 14:15

Chair: Hiroko Bannai

Daniel Choquet CNRS-Bordeaux University

Nanoscale dynamic imaging of synapse organization: how does it impact function ?

Closing 14:15 - 14:25

Jiro Usukura Nagoya University

Keiko Kono Membranology Unit
OIST

14:55 Taxi transport to the airport

Excursion bus for the Yachimun Potter Village, Zakimi Castle Ruins (world heritage), Cape Zanpa, Uza Beach (for the sunset at ~18:40), and Dinner at Sakaé Restaurant (from ~19:30) **(see Maps 2 and 3)**

The bus (also taxis leaving for the airport) will leave from the front entrance of the auditorium (where you get off the bus in the morning). We will move to the bus and taxis together. So, please get together in the Main Conference Venue after the closing talk by Dr. Keiko Kono.

Poster Session Program

March 18 17:35 - 19:35

Presentation Time

3n-2	Numbers	17:35 - 18:15
3n-1	Numbers	18:15 - 18:55
3n	Numbers	18:55 - 19:35

Posters are listed in the alphabetical order of the presenter's last name.

The company presentation/exhibitions are given at poster numbers 27-34 (Four commercial companies-Cosponsors). Each company uses two poster boards.

1. Saahil Acharya¹, Taka A. Tsunoyama¹, Amine Aladag¹, Irina Meshcheryakova¹, Aya Nakamura¹, Takahiro K. Fujiwara², and Akihiro Kusumi^{1,2}

¹Membrane Cooperativity Unit, Okinawa Institute of Science and Technology Graduate University (OIST), Okinawa, Japan. ²Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University, Kyoto, Japan.

Transient dimerization of synaptic cell adhesion molecules neuroligin and neurexin and its implications in the regulation of trans-synaptic adhesion

2. Nikhil Bhalla¹, Kang-Yu Chu¹ and Amy Q. Shen¹

¹Micro/Bio/Nanofluidics Unit, Okinawa Institute of Science and Technology 1919-1 Tancha, Onna-son, Kunigami-gun Okinawa, 904-0495, Japan.

Portable nanoplasmonic instrumentation for sensing applications

3. Takahiro Fujiwara¹, Ziya Kalay¹, and Akihiro Kusumi^{1,2}

¹Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University, Kyoto 606-8501, Japan. ²Membrane Cooperativity Unit, Okinawa Institute of Science and Technology, Onna-son, Okinawa 904-0495, Japan.

Localized molecular complex formation induced by compartmentalized plasma membrane

4. Laurent Guillaud¹, and Tomoyuki Takahashi¹

¹Okinawa Institute of Science and Technology Graduate University, Cellular and Molecular Synaptic Function Unit, 1919-1 Tancha, Onna-son, Kunigami-kun, Okinawa 904-0495, Japan.

ATP-dependent liquid phase transitions of presynaptic bio-condensates regulate synapse organization and function

5. Koichiro M. Hirose^{1,2}, Nao Hiramoto-Yamaki², Kenta J. Yoshida², Shohei Nozaki³, Taka A. Tsunoyama^{2,4}, Bo Tang⁵, Kenichi G. N. Suzuki^{1,2}, Kazuhisa Nakayama³, Takahiro K. Fujiwara², and Akihiro Kusumi^{2,4}

¹Center for Highly Advanced Integration of Nano and Life Sciences (G-CHAIN), Gifu University, Gifu 501-1193, Japan. ²Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University, Kyoto 606-8501, Japan. ³Graduate School of Pharmaceutical Sciences, Kyoto University, Kyoto 606-8501, Japan. ⁴Membrane Cooperativity Unit, Okinawa Institute of Science and Technology, Onna-son, Okinawa 904-0495, Japan. ⁵Key Laboratory of Analytical Chemistry for Biology and Medicine, College of Chemistry and Molecular Sciences, State Key Laboratory of Virology, Wuhan University, P. R. China.

Three-dimensional membrane platform for signaling in immune cells

6. Soumen Jana¹, Eugene Khaskin², and Bernd Kuhn¹

¹Optical Neuroimaging Unit, OIST Graduate University, Onna-son, Okinawa 904-0495, Japan. ²Science and Technology Group, OIST Graduate University, Onna-son, Okinawa 904-0495, Japan.

Genetic targeting of neurons in vivo with a voltage-sensitive dye through enzymatic activation of membrane binding

7. Ryo Kanno¹, Malgorzata Hall¹, and Bruno Humbel¹

¹Imaging Section, Okinawa Institute of Science and Technology Graduate University, Okinawa 904-0495, Japan.

Cryo-EM structure of the chaperonin GroEL at 3.0 Å resolution revealed by modern techniques of single particle analysis

8. Natsumi Ageta-Ishihara¹, Yugo Fukazawa², Mineko Kengaku³, Keizo Takao⁴, Tsuyoshi Miyakawa⁵, Kaoru Inokuchi⁴, Haruhiko Bito⁶, and Makoto Kinoshita¹

¹Nagoya University Graduate School of Science. ²Department of Anatomy, Fukui University School of Medicine. ³Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University. ⁴Graduate School of Medicine and Pharmaceutical Sciences, University of Toyama. ⁵Institute for Comprehensive Medical Science, Fujita Health University. ⁶Graduate School of Medicine, The University of Tokyo.

Septin-dependent entry of smooth endoplasmic reticulum into dendritic spines as a synaptic basis of persistent memory

9. Shinya Komoto, Paolo Barzaghi, Koji Koizumi, Toshiaki Mochizuki, Toshio Sasaki, and Bruno Humbel

Imaging section, Research Support Division, Okinawa Institute of Science and Technology (OIST), 1919-1 Tancha, Onna-son, Kunigami-gun Okinawa, 904-0495 Japan.

From Nano to Macro: Advanced Imaging Techniques for Biological Applications

10. Ryusuke Kuwahara¹, Hideyuki Ihara², Yoshitaka Ikeda², and Tsumoru Shintake¹

¹Okinawa Institute of Science and Technology Graduate University (OIST) Okinawa 904-0495, Japan. ²Division of Molecular Cell Biology, Department of Biomolecular Sciences, Saga University Faculty of Medicine, 5-1-1 Nabeshima, Saga 849-8501, Japan.

Core fucosylation regulates cell expansion and neurite outgrowth

11. HooiCheng Lim^{1,2} and Tzuu-Shuh Jou³

¹Graduate Institute of Molecular Medicine, National Taiwan University. ²Membrane Cooperativity Unit, Okinawa Institute of Science and Technology. ³Graduate Institute of Clinical Medicine, National Taiwan University.

EBP50 is localized at the blebs and phosphorylated at Serine 347-348 residues in mitotic cells

12. Yumiko Masukagami¹, Yohsuke Moriyama¹, Hunter Barbee¹, Yuri Matsui¹ and Keiko Kono¹

¹Okinawa Institute of Science and Technology Graduate University, 1919-1 Tancha, Onna-son, Kunigami-gun, Okinawa, 904-0495 Japan.

The plasma membrane ultrastructure of aged cells

13. Kristopher Montrose¹, Shizuka Kobayashi², Toshiya Manabe² and Tadashi Yamamoto¹

¹Cell Signal Unit, Okinawa Institute of Science and Technology Graduate University, Okinawa 904-0495, Japan. ²Division of Neuronal Network, Institute of Medical Science, University of Tokyo, Tokyo 108-8639, Japan.

Lmtk3-KO mice exhibit a range of behavioural abnormalities and have impaired GluA1 trafficking

14. Jyoji Morise¹, Kenichi G.N. Suzuki^{2,3}, Ayaka Kitagawa¹, Yoshihiko Wakazono⁴, Kogo Takamiya⁴, Taka A. Tsunoyama⁵, Hiromu Takematsu¹, Akihiro Kusumi^{2,5}, and Shogo Oka¹

¹Department of Biological Chemistry, Division of Human Health Sciences, Graduate School of Medicine, Kyoto University, Kyoto 606-8507, Japan. ²Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University, Kyoto 606-8507, Japan. ³Center for Highly Advanced Integration of Nano and Life Sciences (G-CHAIN), Gifu University, Gifu 501-1193, Japan. ⁴Department of Integrative Physiology, Faculty of Medicine, University of Miyazaki, Miyazaki 889-1692, Japan. ⁵Membrane Cooperativity Unit, Okinawa Institute of Science and Technology, Onna-son, Okinawa 904-0495, Japan.

AMPA receptors in the synapse turnover by monomer diffusion; unraveling by single-molecule tracking

15. Yohsuke Moriyama¹, Hunter Barbee¹, Yumiko Masukagami¹, Yuri Matsui¹ and Keiko Kono¹

¹Okinawa Institute of Science and Technology Graduate University, 1919-1 Tancha, Onna-son, Kunigami-gun, Okinawa, 904-0495 Japan.

The plasma membrane ultrastructure after cellular wound healing

16. Yuri L. Nemoto¹, Kazuma Naito², Hiroko Hijikata², Taka A. Tsunoyama¹, Nao Hiramoto-Yamaki², Rinshi S. Kasai³, Yuki M. Shirai², Manami S. Miyahara², Takahiro K. Fujiwara², and Akihiro Kusumi^{1,2,3}

¹Membrane Cooperativity Unit, Okinawa Institute of Science and Technology Graduate University (OIST), Okinawa 904-0495, Japan. ²Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University, Kyoto 606-8501, Japan. ³Institute for Frontier Life and Medical Sciences, Kyoto University, Kyoto 606-8507, Japan.

Fast and slow turnover of AMPA receptor and stargazin in the spine in the time scale of 0.1 s to several 100 s; unraveling by single molecule imaging

17. Endang R. Purba¹, Reetesh R. Akhouri², Lars-Göran Öfverstedt², Ulf Skoglund², and Ichiro Maruyama¹

¹Information Processing Biology Unit, ²Structural Cellular Biology Unit, Okinawa Institute of Science and Technology Graduate University (OIST), Okinawa 904-0495, Japan.

Cryo-ET reveals EGF-induced conformational changes of the pre-formed EGF receptor dimer

18. Ei-ichiro Saita¹, and Ichiro Maruyama¹

¹Okinawa Institute of Science and Technology Graduate University (OIST), Okinawa 904-0495, Japan.

Single molecule observation reveals activation of the EGF receptor dimer by single EGF binding at the surface of living cells

19. Shivani Sathish¹ and Amy Shen¹

¹Micro/Bio/Nanofluidics Unit, Okinawa Institute of Science and Technology Graduate University, Okinawa 904-0495, Japan.

Micropatterned micro/nanofluidic devices for probing of biomolecular interactions on surfaces

20. Andrew Gallimore¹, Iain Hepburn¹, Sarah Y. Nagasawa¹, and Erik De Schutter¹

¹Computational Neuroscience Unit, Okinawa Institute of Science and Technology, Okinawa 904-0495, Japan.

Spatial Modeling of Vesicle Trafficking in Neurons

21. Bo Tang¹, En-Ze Sun¹, Zhi-Ling Zhang¹, Jia Liu², Tao Zeng¹, Ya-Feng Kang¹, and Dai-Wen Pang¹

¹Key Laboratory of Analytical Chemistry for Biology and Medicine (Ministry of Education), College of Chemistry and Molecular Sciences, State Key Laboratory of Virology, The Institute for Advanced Studies, and Wuhan Institute of Biotechnology, Wuhan University, Wuhan 430072, PR China. ²Department of Forensic Medicine, Tongji Medical College of Huazhong University of Science and Technology, Wuhan, 430030 China.

Distinct curvature-driving mechanisms were employed during clathrin-mediated endocytosis of cargoes

22. Zacharie Taoufiq¹, and Tomoyuki Takahashi¹

¹Okinawa Institute of Science and Technology Graduate University, Cellular and Molecular Synaptic Function Unit, 1919-1 Tancha, Onna-son, Kunigami-kun, Okinawa 904-0495, Japan.

Anchored protein complexes at synaptic vesicular membrane and neurotransmission regulation

23. Hsieh-Fu Tsai¹, and Amy Q. Shen¹

¹Micro/Bio/Nanofluidics Unit, Okinawa Institute of Science and Technology Graduate University, Okinawa 904-0495, Japan.

Usiigaci: Single cell segmentation and tracking in phase contrast microscopy using machine learning for directional cell migration analysis

24. Alexey Yudin¹, Takahiro K. Fujiwara², Taka A. Tsunoyama¹, and Akihiro Kusumi¹

¹Okinawa Institute of Science and Technology Graduate University, 1919-1 Tancha, Onna-son, Kunigami-gun Okinawa, Japan 904-0495. ²Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto University, Kyoto 606-8507, Japan.

Evaluating the permeability across the actin-based compartment barrier in the plasma membrane from single-molecule trajectories

25. Yan Zhen^{1,2}, H el ene Spangenberg^{1,2}, Michael Munson^{1,3}, Andreas Brech^{1,2}, Kay O. Schink^{1,2}, Kia-Wee Tan^{1,2}, Vigdis S orensen^{1,2}, Eva Marie Wenzel^{1,2}, Nikolai Engedal⁴, Anne Simonsen^{1,3}, Camilla Raiborg^{1,2}, and Harald Stenmark^{1,2,5}

¹Centre for Cancer Cell Reprogramming, Institute of Clinical Medicine, Faculty of Medicine, University of Oslo, Montebello, N-0379 Oslo, Norway. ²Department of Molecular Cell Biology, Institute for Cancer Research, Oslo University Hospital, Montebello, N-0379 Oslo, Norway.

³Department of Molecular Medicine, Institute of Basic Medical Sciences, P.O.Box 1110 Blindern, 0317 Oslo, Norway. ⁴Centre for Molecular Medicine Norway (NCMM), University of Oslo, P.O.Box 1137 Blindern, 0318 Oslo, Norway.

ESCRTIII-mediated autophagosome sealing during mitophagy

26. Peng Zhou¹, Rinshi S. Kasai², Koichiro M. Hirosawa³, Takahiro K. Fujiwara⁴, Taka A. Tsunoyama¹, Alexey Yudin¹, and Akihiro Kusumi^{1,4}

¹Okinawa institute of Science and Technology Graduate University (OIST), Membrane Cooperativity Unit, Onna-son, Japan. ²Kyoto University, Institute for Frontier Life and Medical Sciences, Kyoto, Japan. ³Gifu University, Center for Highly Advanced Integration of Nano and Life Sciences (G-CHAIN), Gifu, Japan. ⁴Kyoto University, Institute for Integrated Cell-Material Sciences (WPI-iCeMS), Kyoto, Japan.

Transient hetero-dimerization of opioid receptors (GPCRs) and their formation mechanism revealed by single-molecule tracking

Presentations and Exhibitions by Commercial Co-Sponsors

27-28. Hisashi Okugawa¹

¹**Chroma Technology Japan G.K.** Yokohama 231-0015, Japan.

a) High-performance laser diode illuminator LDI, b) Introducing acquired images by the applications using LDI

29-30. Hiroyuki Sangu¹, Takuya Azuma¹, and Yoshitaka Sekizawa¹

¹Bio Solution Center, Life Innovation Business Headquarters,

Yokogawa Electric Corporation, Ishikawa 920-0177, Japan.

Super Resolution Confocal Scanner Unit CSU-W1 SoRa

31-32. GORYO Chemical, Inc.¹

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GORYO Chemical, Inc.

33-34. PNEUM Co., Ltd¹

¹PNEUM Co., Ltd 5-15-3 Minamikoshigaya, Koshigaya-shi, Saitama-ken, 343-0845, Japan.

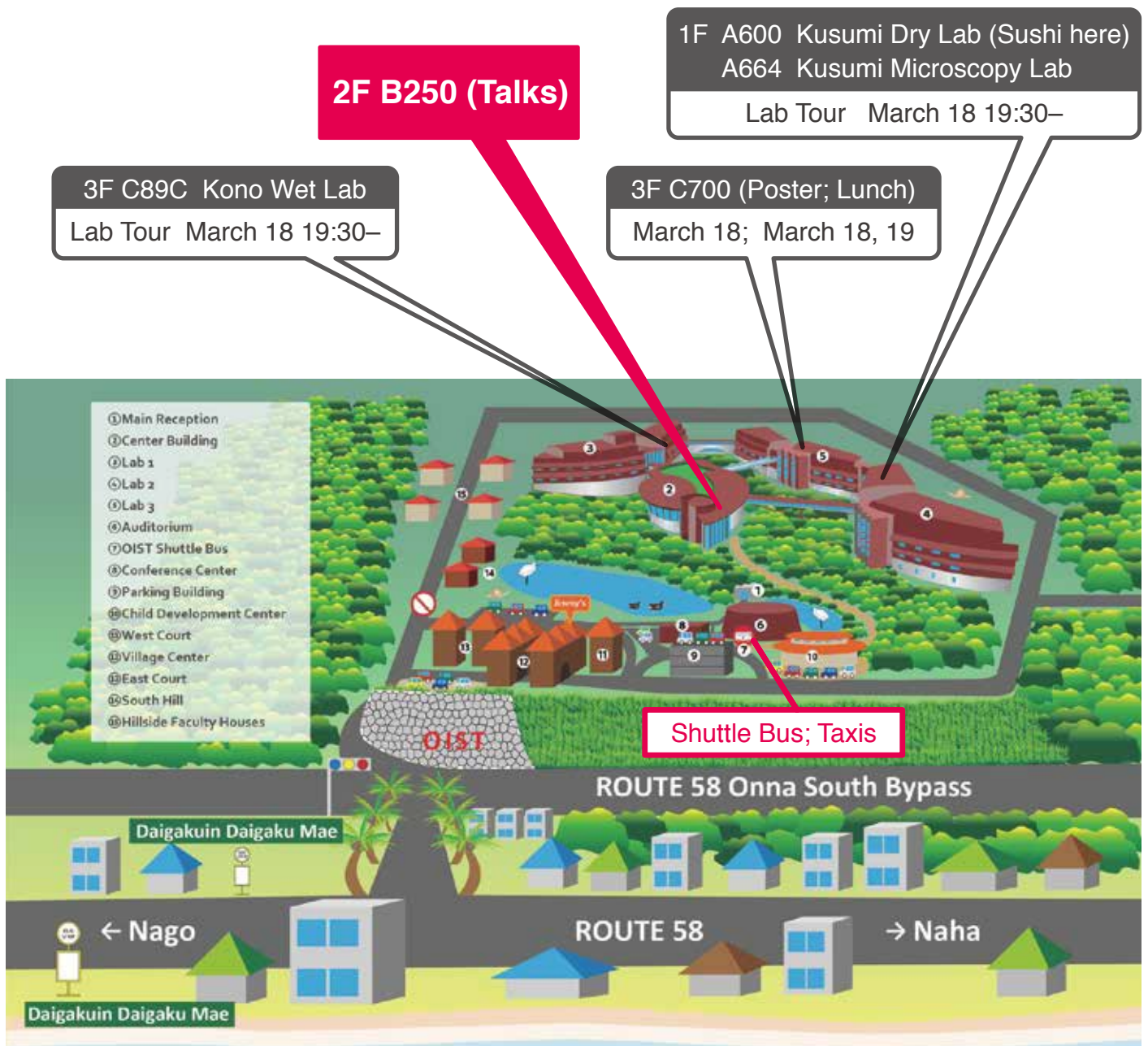
PNEUM Co., Ltd



Map 1 Okinawa Main Island



Map 2 Okinawa Main Island



Map 3 OIST

Conference Venues and the OIST Building Floor Plan



Buildings are always connected on the C Floor (a few connections on A and B Floors).

Talk sessions are held in Rm. B250 in the Center Building.

Lunches and the poster session in Rm. C700 in the Lab 3 Building across the bridge.

CENTER BUILDING

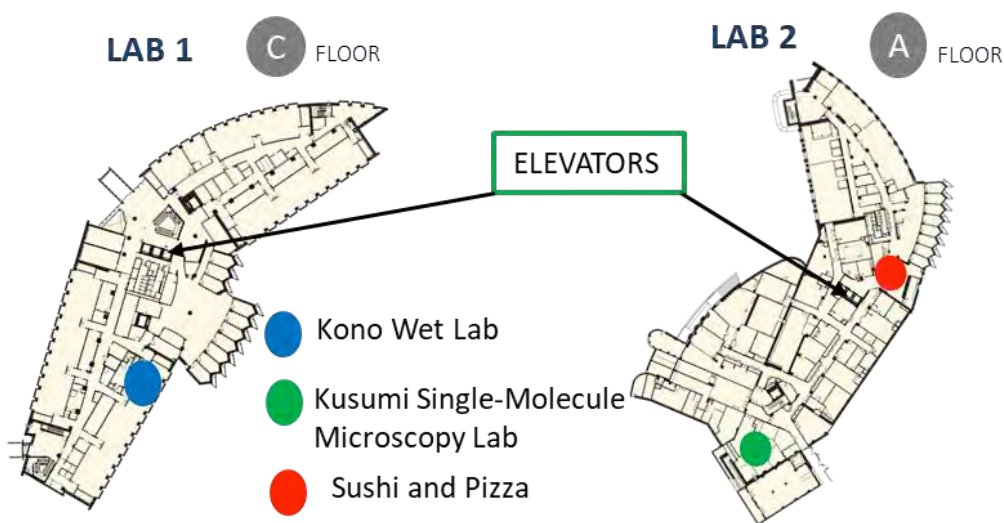
Level B: Keynote lectures + Seminars in B250



LAB 3
Level C :Lunch and Poster Session @ C700



Lab Tour: Lab 1 → Lab 2

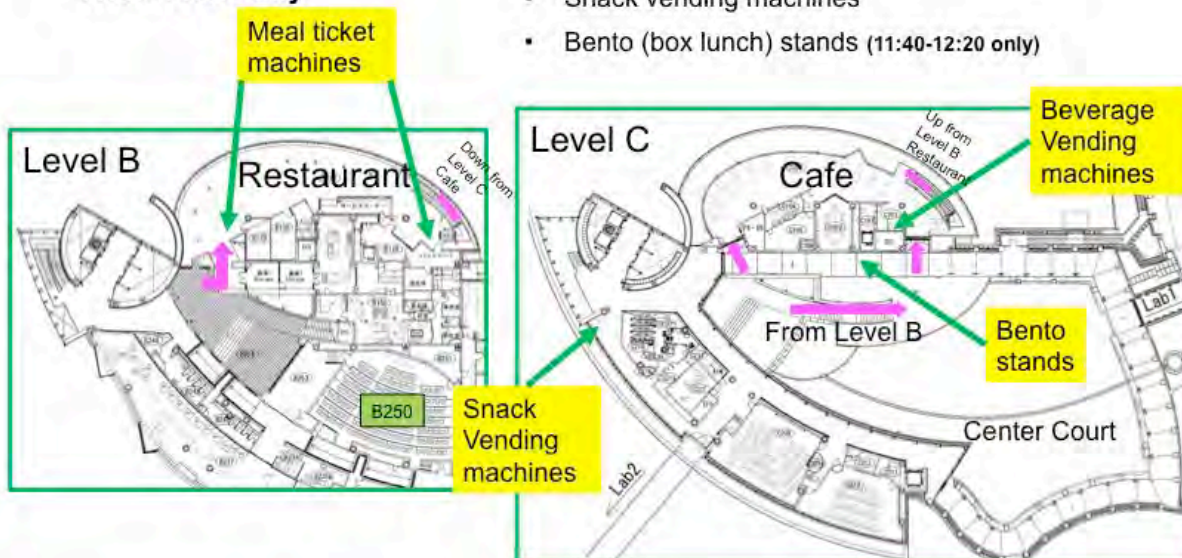


Additional Lunch, Breaks, and Better Coffee with a Great View

Restaurant Grano (B Floor)
 (All-you-can-eat buffet, set meals, or a la carte)
11:30-14:30 only

Café Grano (C Floor) 8:00 – 18:00
 (beverages, sandwiches, bakery products)

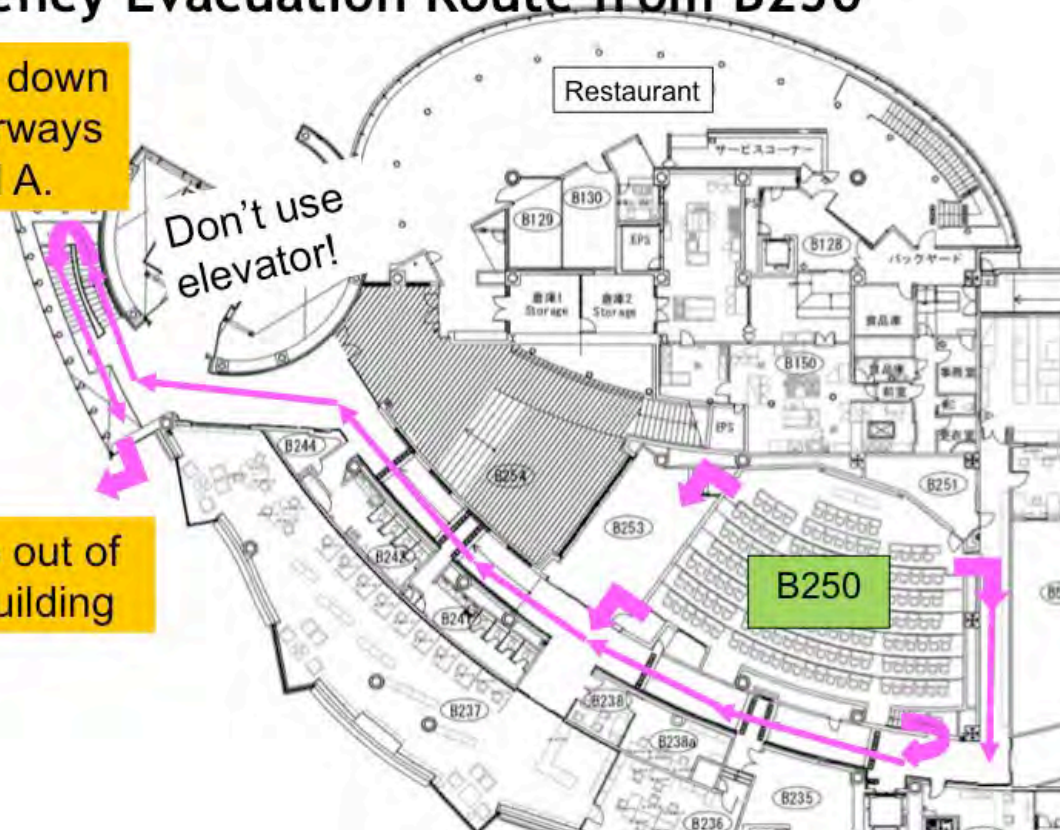
- Beverage vending machines
- Snack vending machines
- Bento (box lunch) stands (11:40-12:20 only)



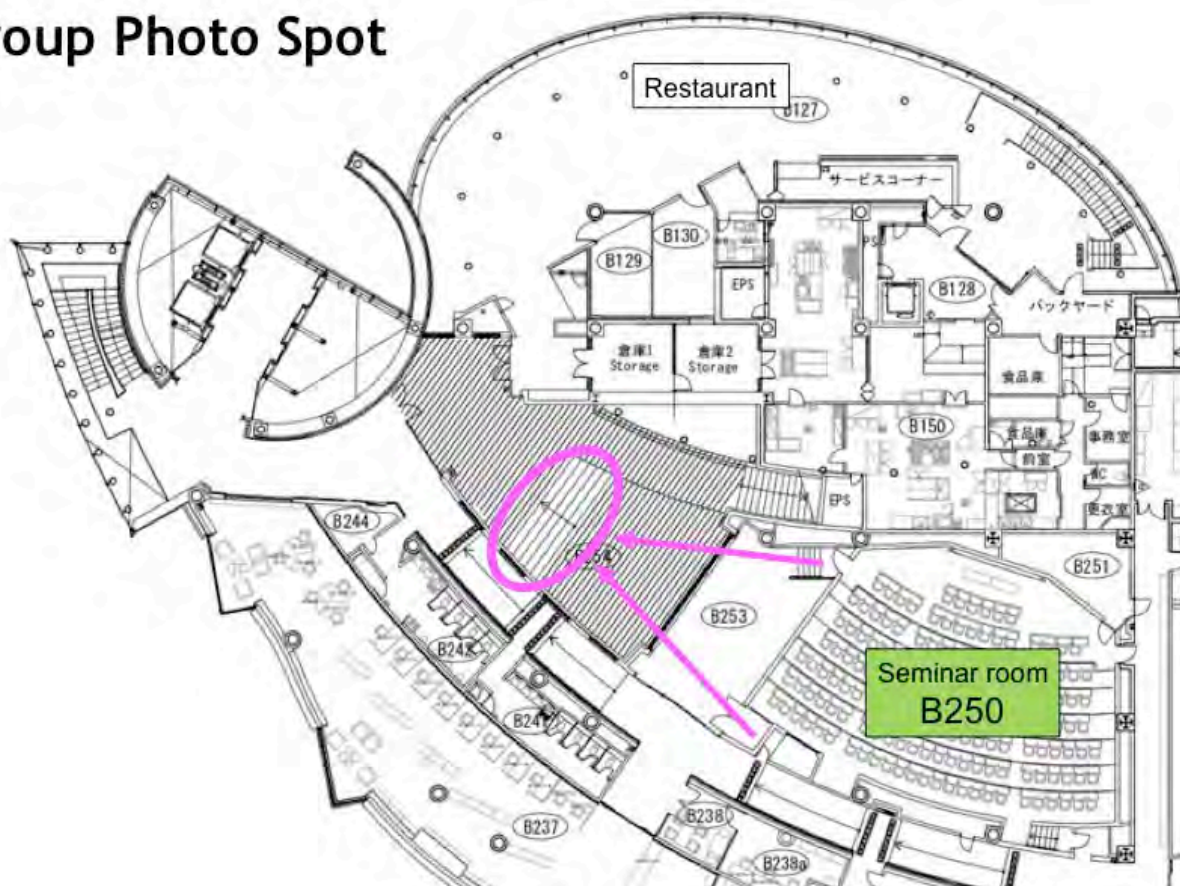
Emergency Evacuation Route from B250

1. Walk down the stairways to Level A.

2. Go out of the building



Group Photo Spot



OIST architecture

The site selected for OIST is steep and densely wooded, carved into a series of narrow ridges and deep ravines made by the heavy rainfall of the subtropical climate. The environmental impact assessment showed that the valleys and small streams shelter a valuable ecosystem with rare flora and fauna, which should be preserved at all costs.



At OIST, 15 Buildings were planned, 4 of them have been completed (picture on the top; brown figures), and 1 is being built. We at OIST are working hard to realize the original plan.

The building walls of OIST incorporate elements of the Okinawan castle architecture as shown in the pictures on the right. Local stones were used to create a castle-wall like structure in the conquest to blend into the local architecture (The excursion on March 21 includes the Zakimi Castle Ruins). Further, the earthen colour spectrum of the building walls was chosen carefully to mimic the subtropical fauna.

Construction could therefore only take place on the ridges. This condition and the 30-m vertical difference between the entrance and the site and the only practical location for the main campus higher up the hillside, provided a challenge to the architects (figure on the top-left; brownish and yellowish figures represent the OIST buildings already built and those under construction-planning, respectively). However, it also offered the opportunity to develop a university campus of unusual character, which would fit naturally into the landform of the site.

The architect who designed the OIST buildings was Kenneth A. Kornberg, who specializes in the design of laboratory buildings. He is a son of Arthur Kornberg (Nobel Prize in Physiology or Medicine in 1959) and a brother of Roger D. Kornberg (in 2006). As a child, Kenneth Kornberg often visited his father's lab. Hence, he developed from early ages quite good ideas about the ideal design of laboratory buildings.



The village center (housing students, postdocs, employees, and faculty members, including Aki Kusumi) and faculty housing buildings (picture on the right) at OIST utilize the traditional "Aka Gawara" - red tiles for their roofs. These unglazed red roof tiles are made from a mudstone called "Kucha" which have high iron mineral content. These tiles allow heat to dissipate while evaporating moisture, which allows coolness inside the house.



The tiles are molded and fixed together by plaster, so structure-wise, it is very firm and can withstand typhoon weather. For a long time, the use of these tiles was only allowed to people from Shuri, Naha (those unified Okinawa in the 15th century), and the descendants of samurais. Civilians who lived under thatched roof yearned for these tiles. Finally, in the year of 1889, the red roof tiles were open to the public without any restrictions.

Excursion on March 20th

Tour Leader: Dr. Amine Aladag (Kusumi Unit) Yachimun-Potter Village in Yomitan (~75 min)

In the Okinawa language Yachimun means pottery. Okinawa is known for its Tsuboya pottery, a type of unglazed pottery that became very popular on the island in the 16th and 17th centuries when three Korean potters were encouraged to plant roots on Okinawa and teach the locals their age-old techniques. After World War II, Yomitan Village was mostly occupied as a US military base. During the reversion, part of the village was returned (~1972). To make use of the returned area, the "Yachimun no Sato Project" was started.

A Japanese human national treasure and potter, the late **Jiro Kinjo**, relocated his furnace to this area and many other potters followed. There are ~45 practicing potters and glass artists who work in this little district.

As you continue along, you pass lots of little shops and several red-roofed kilns, including



one unique looking structure in the center of the village. This building is actually an old style "climbing kiln" or "Noborigama" (picture on the left). Several times a year this kiln is still fired up and in use.

Yachimun is mostly made from Okinawa soil. The mixture for the glaze includes natural ingredients like ore, sugar cane, ash, and coral limestone, which has been passed down, and so it is different in each studio.



Zakimi Castle Ruins (~30 min)

Okinawa's Ryukyu Kingdom rose out of the island chain's Three Kingdoms (Sanzan; San=Three, Zan=Mountain, and thus Sanzan = Three Mountains) Period, when it was divided into the principalities of



Hokuzan (north-mountain), Chuzan (central-mountain) and Nanzan (south-mountain) in the 14th century. The Three Kingdoms governed their power through strategically placed castles. One of these castles is Zakimi of the Chuzan kingdom. It was built by Lord Gosamaru, a renowned castle architect at the start of the 15th century, to fight against the rising power of the northern Kingdom Hokuzan. Lord Gosamaru supported Shō Hashi, first king of the Ryukyu Kingdom, in his conquest of Hokuzan and unification of Okinawa Island.

Today Zakimi castle ruins (picture right, above) replete with amazing sights, including the smooth curve of the castle walls and the elegant arch gateway, said to be the oldest in Okinawa. It is also a registered World Heritage Site.

The walls of OIST buildings incorporate elements of the Okinawan castle walls as seen in the Zakimi castle ruins.

Cape Zanpa (~60 min)

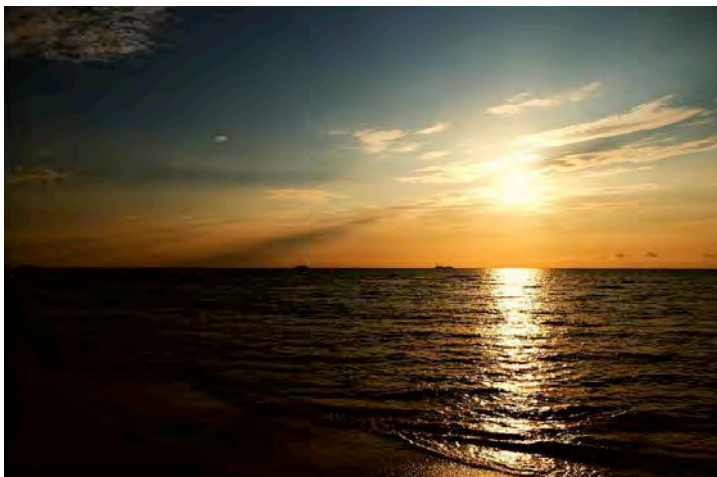
Cape Zanpa is at roughly center of west coast of Okinawa Island. To get to Cape Zanpa, the roads will take you along the ocean through sugar cane fields. Unlike the sandy white beaches of Okinawa, Cape Zanpa offers cliffs over 30-m height and strong waves crushing against these. The lighthouse itself sits on the black coral rocks of the cliff and overlooks the ocean. It was built in 1974, and the height is about 30 m. Right next to the lighthouse, you can carefully climb along the rocks to enjoy the view, but be careful as the wind can get very strong and the coral rocks are quite sharp. Please wear appropriate shoes.

This place also bears a historical significance for Okinawa and World War II. US troops occupied Kerama Islands located about 40 km south of this cape on March 26th, 1945. Then they advanced toward this cape as a landmark of Okinawa Island. And they landed on the beach to the south of Cape Zanpa on April 1st, and the Battle of Okinawa started.

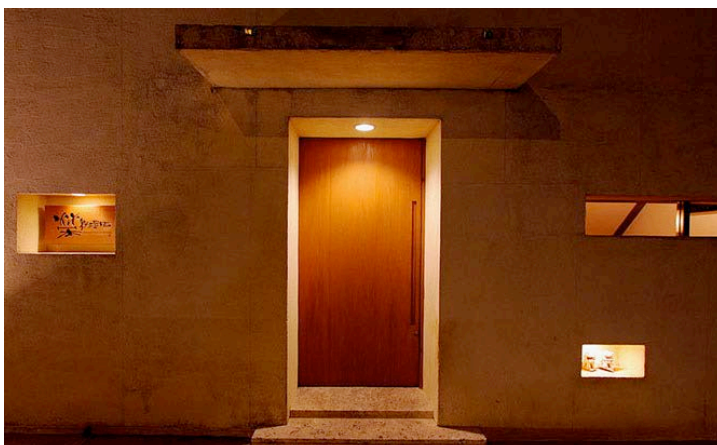


Uza Beach (30 min; Sunset at 18:40)

Beautiful, white sand beach south of Cape Zanpa. A nice spot to watch the sunset in the East-Chinese-Sea.



Sakaé Restaurant (~19:30)



Excursion on March 21

Please make sure to be **at the main entrance of the Moon Beach Hotel by 7:30 a.m.**

Brief Itinerary

07:30 Dep. Moon Beach Hotel

07:45 Dep. Seaside House (OISTers, we will gather in front of the Seaside House, and not at the OIST main campus.)

09:10 Arr. Churaumi Aquarium

11:40 Dep. Churaumi Aquarium

12:00 Arr. Café CAHAYA BULAN Lunch

13:00 Dep. Café CAHAYA BULAN

13:20 Arr. Bise Fukugi Path

14:00 Dep. Bise

15:10 Arr. Seaside House

15:20 Arr. Moon Beach Hotel