

Department of Medical Bio Engineering

Research Area : Design of Biofunctional Molecules Laboratory

(URL: http://www.gnst.okayama-u.ac.jp/en/dc_division/med_en.html)

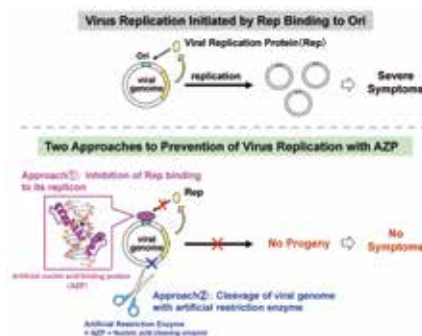
Takashi SERA, Professor
Takamasa TOBIMATSU, Associate Professor
Koichi MORI, Assistant Professor
Kazuko KAWANAMI Research Associate

Research Themes :

- 》 Design and Application of Artificial DNA/RNA-Binding Proteins
- 》 Regulation of Endogenous Gene Expression by Using Zinc-Finger-Based Artificial Transcription Factors
- 》 Development of Plants Resistant to Virus Infection and Antivirus Drugs
- 》 Development of Molecular Tools for Genome Engineering
- 》 Analysis of Enzyme Mechanisms and Molecular Engineering of Enzymes

Representative Publication :

- Etsuko Yokota, Tomoki Yamatsuji, Munenori Takaoka, Minoru Haisa, Nagio Takigawa, Noriko Miyake, Tomoko Ikeda, Tomoaki Mori, Serika Ohno, Takashi Sera, Takuya Fukazawa, Yoshio Naomoto, "Targeted silencing of SOX2 by an artificial transcription factor showed antitumor effect in lung and esophageal squamous cell carcinoma," *Oncotarget*, Volume 8, No.61, pp.103063-103076, October 2017.
- Tomoaki Mori, Kento Nakamura, Keisuke Masaoka, Yusuke Fujita, Ryosuke Morisada, Koichi Mori, Takamasa Tobimatsu, and Takashi Sera, "Cleavage of influenza RNA by using a human PUF-based artificial RNA-binding protein–staphylococcal nuclease hybrid," *Biochemical and Biophysical Research Communications*, Vol. 479, Issue 4, pp. 736-740, October 2016.
- Takashi Mino, Tomoaki Mori, Yasuhiro Aoyama and Takashi Sera, "Gene- and Protein-Delivered Zinc Finger-Staphylococcal Nuclease Hybrid for Inhibition of DNA Replication of Human Papillomavirus," *PLoS ONE*, 8(2):e56633, February 2013.



Research Area : Single Molecule Biology Laboratory

(URL:)

Toru IDE, Professor
Tohru HAYAKAWA, Assistant Professor

Research Themes:

- 》 Structure-Function Relationship of Ion-Channel Proteins
- 》 Development of High Throughput Screening Device for Ion-Channel Drugs
- 》 Development of Mosquito Control System Using *Bacillus Thuringiensis* Insecticidal Toxins
- 》 Development of Novel Protein Production System Using Polypeptides from Mosquitocidal Toxins

Representative Publication:

- Mitsunori Kitta, Toru Ide, Minako Hirano, Hiroyuki Tanaka, Toshio Yanagida and Tomoji Kawai, "Direct Manipulation of a Single Potassium Channel Gate with an Atomic Force Microscope Probe," *Small*, Vol. 7, No. 16, pp. 2379-2383, August 2011.

Research Area : Applied Cell Biology Laboratory

(URL: <http://www.okayama-u.ac.jp/user/saibou/>)

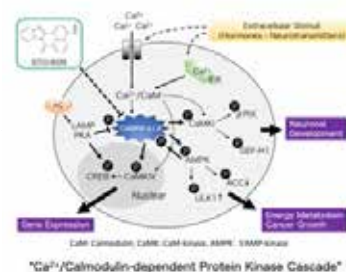
Hiroshi TOKUMITSU, Professor
Naoki KANAYAMA, Associate Professor
Masaki MAGARI, Assistant Professor

Research Themes:

- 》 Molecular Mechanism of Intracellular Ca^{2+} -Signal Transduction in Eukaryotic Cells
- 》 Structure and Function of Protein Kinases Including Development of Pharmacological Inhibitors
- 》 Cellular and Molecular Mechanisms of Immune Cell Functions Using Animal Cell Lines and Laboratory Animals Such as Mice

Representative Publication:

- Akihiro Nakanishi, Noya Hatano, Yuya Fujiwara Y, Arian Sha'ri, Shota Takabatake, Hiroki Akano, Naoki Kanayama, Masaki Magari, Naohito Nozaki, and Hiroshi Tokumitsu, "AMP-activated protein kinase-mediated feedback phosphorylation controls the Ca^{2+} /calmodulin (CaM) dependence of Ca^{2+} /CaM-dependent protein kinase kinase β ," *Journal of Biological Chemistry* Vol. 292 No. 48, pp.19804-19813, December 2017
- Yuya Fujiwara, Yoshinori Kawaguchi, Tomohito Fujimoto, Naoki Kanayama, Masaki Magari, and Hiroshi Tokumitsu, "Differential AMP-activated Protein Kinase (AMPK) Recognition Mechanism of Ca^{2+} /Calmodulin-dependent Protein Kinase Kinase Isoforms," *Journal of Biological Chemistry* Vol. 291 No. 26, pp.13802-13808, May 2016



Research Area : Biomaterials Engineering Laboratory

(URL: <http://apatite.biotech.okayama-u.ac.jp/en/index.html>)

Satoshi HAYAKAWA, Professor

Tomohiko YOSHIOKA, Associate Professor

Toshiisa KONISHI, Assistant Professor

Research Themes:

- 》 Development of Bioactive Nanophase Ceramics for Biomedical Application
- 》 Structure and Physico-Chemical Properties of Calcium Phosphate-Based Ceramic Materials
- 》 Surface Modification of Metallic Implant Materials
- 》 Preparation of Novel Biomaterials by Electrochemical Techniques
- 》 Development of Calcium-Phosphate Bioceramics with Enhanced Biological Properties

Representative Publication:

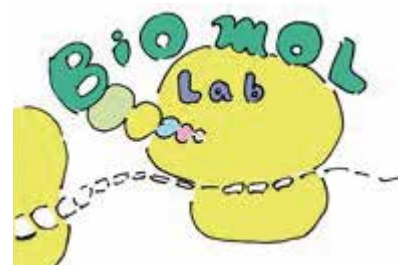
- Satoshi Hayakawa, Yuko Matsumoto, Keita Uetsuki, Yuki Shirotsuki and Akiyoshi Osaka, "In Vitro Apatite Formation on Nanocrystalline Titania Layer Aligned Parallel to Ti6Al4V Alloy Substrates with Sub-Millimeter Gap," *Journal of Materials Science: Materials in Medicine*, Vol. 26, Issue 6: 190, 8 Pages, June 2015.

Research Area : Biomolecular Engineering Laboratory

(URL: <http://www.okayama-u.ac.jp/user/ohtsuki/field8-e.html>)

Takashi OHTSUKI, Professor

Kazunori WATANABE, Assistant Professor



Research Themes:

- 》 Photochemical and Sonochemical Methods for Spatiotemporal Control of Cellular Functions
- 》 RNA Drug Delivery
- 》 Expansion of Translation System
- 》 Stress Response of Mammalian Cells

Representative Publication:

- Takashi Ohtsuki, Shigeto Kanzaki, Sae Nishimura, Yoshio Kunihiro, Y., Masahiko Sisido, Kazunori Watanabe, "Phototriggered protein syntheses by using (7-diethylaminocoumarin-4-yl)methoxycarbonyl-caged aminoacyl tRNAs." *Nature Communications*, Vol.7, pp, 12501, August 2016.

Research Area : Medical Protein Engineering Laboratory

(URL:)

Junichiro FUTAMI, Associate Professor

Research Themes:

- 》 Solubilization Techniques of Denatured Protein
- 》 Development of Companion Diagnostics for Cancer Immunotherapy
- 》 Intracellular Delivery of Protein and in Cell Protein Folding

Representative Publication:

- Junichiro Futami, Hidenori Nonomura, Momoko Kido, Naomi Niidoi, Nao Fujieda, Akihiro Hosoi, Kana Fujita, Komako Mandai, Yuki Atago, Rie Kinoshita, Tomoko Honjo, Hirokazu Matsushita, Akiko Uenaka, Eiichi Nakayama and Kazuhiro Kakimi, "Sensitive Multiplexed Quantitative Analysis of Autoantibodies to Cancer Antigens with Chemically S-Cationized Full-Length and Water-Soluble Denatured Proteins," *Bioconjugate Chemistry*, Vol. 26, No. 10, pp. 2076-2084, October 2015.

Research Area : Nano-Biotechnology Laboratory

(URL: <http://www.cyber.biotech.okayama-u.ac.jp/senolab/>)

Masaharu SENO, Professor

Hiroshi MURAKAMI, Associate Professor

Junko MASUDA, Assistant Professor

Research Themes:

- » Development of Cancer Stem Cells from Pluripotent Stem Cells
- » Tumor Microenvironment
- » Drug Delivery System Targeting Cancer Cells and Cancer Stem Cells
- » Analyses and Application of Factors that Control Cellular Growth and Differentiation

Representative Publication:

- Nair N, Calle AS, Zahra MH, Prieto-Vila M, Oo AKK, Hurley L, Vaidyanath A, Seno A, Masuda J, Iwasaki Y, Tanaka H, Kasai T, Seno M. A cancer stem cell model as the point of origin of cancer-associated fibroblasts in tumor microenvironment. Sci Rep. 2017 Jul 28;7(1):6838. doi: 10.1038/s41598-017-07144-5. PubMed PMID: 28754894.

Research Area : Organelle System Biotechnology Laboratory

(URL:)

Ayano SATOH, Associate Professor

Research Themes:

- » Membrane Trafficking
- » Organelle Biogenesis
- » Cell Biology and Diseases
- » Post-Translational Modifications

Representative Publication:

- COPI-TRAPP II activates Rab18 and regulates its lipid droplet association, Li C, Luo X, Zhao S, Siu GK, Liang Y, Chan HC, Satoh A, Yu SS, EMBO J. 2017 Feb 15;36(4):441-457

Research Area : Human Centric Information Processing Laboratory

(URL: <http://site330980-8020-5442.strikingly.com/>)

Masanobu ABE, Professor

Sunao HARA, Assistant Professor

Research Themes :

- » Speech Signal Processing
- » Spoken Dialog System
- » Life Log Processing



Representative Publication :

- Kei Tanaka, Sunao Hara, Masanobu Abe, Masaaki Sato and Shogo Minagi, "Speaker Dependent Approach for Enhancing a Glossectomy Patient's Speech via GMM-based Voice Conversion," Interspeech 2017, pp. 3384–3388, August 2017.
- Sunao Hara, Asako Hatakeyama, Shota Kobayashi and Masanobu Abe, "Sound sensing using smartphones as a crowdsourcing approach," APSIPA Annual Summit and Conference 2017, FA-02.2, 6 pages, December 2017.

Research Area : Statistical Information Processing Laboratory

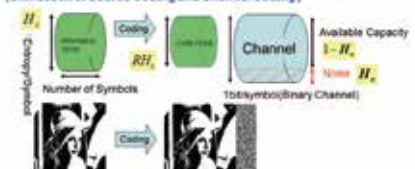
(URL: http://www.sc.cs.okayama-u.ac.jp/index_e.htm)

Toshiaki AIDA, Senior Assistant Professor

Research Themes:

- » Bayesian Statistical Inference
- » Compressed Sensing
- » Nonparametric Statistical Inference

- Improvement of the Performance of Statistical Inference by Compressed Sensing
 - Unification of Source Coding and Channel Coding by LDPC Codes
 - Renormalization Theory in Bayesian Statistical Inference
- Single step coding through the adjustment of coding rate according to the values of entropy of an information source and channel capacity (Unification of Source Coding and Channel Coding)



Representative Publication:

- Toshiaki Aida, "Compressed Sensing for Phase Unwrapping of Interferometric SAR Data," Proceedings of 2017 17th International Conference on Control, Automation and Systems (ICCAS2017), pp. 989-993, October 2017

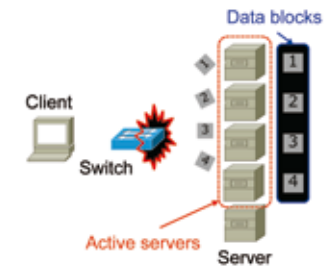
Research Area : Information Networks Technologies for Medical Engineering Laboratory

(URL: <http://www.ec.okayama-u.ac.jp/~net/index-en.html>)

Tokumi YOKOHIRA, Professor

Research Themes:

- 》 Highly Distributed Cloud Computing Environment
- 》 Design of Virtual Networks
- 》 Technologies to Improve the Performance of Internet Communication Protocols
- 》 Design of Optical Networks



TCP incast in data center networks

Representative Publication:

- Yukinobu Fukushima, Wenjie Chen and Tokumi Yokohira, "A Trail Multi-Splitting Method for Throughput Improvement in Light Trail Networks," *Photonic Network Communications*, Vol. 30, pp. 178-189, May 2015.
- Shigeyuki Osada, Ryo Miyayama, Yukinobu. Fukushima, and Tokumi Yokohira, "TCP Incast Avoidance Based on Connection Serialization in Data Center Networks," *International Journal of Computer Networks and Communications*, Vol. 8, pp. 83-102, July 2016.

Research Area : Advanced Electro Measurement Technology Laboratory

(URL: <http://www.ec.okayama-u.ac.jp/~sense/>)

Keiji TSUKADA, Professor

Toshihiko KIWA, Associate Professor

Kenji SAKAI, Assistant Professor

Research Themes:

- 》 Highly Sensitive Magnetic Measurement System
- 》 Non-Destructive Evaluation by a Magnetic Method
- 》 Gas and Ion Sensing System
- 》 Terahertz Measurement System



Representative Publication:

- Keiji Tsukada, Yatsuse Majima, Yoshihiro Nakamura, Takuya Yasugi, Nangnang Song, Kenji Sakai, and Toshihiko Kiwa, "Detection of inner cracks in thick steel plates using unsaturated AC magnetic flux leakage testing with a magnetic resistance gradiometer", *IEEE TRANSACTIONS ON MAGNETICS*, Vol. 53, No. 11, 2501305, Nov. 2017
- Takuya Kuwana, Masahiro Ogawa, Kenji Sakai, Toshihiko Kiwa and Keiji Tsukada, "Label-free detection of low-molecular-weight samples using a terahertz chemical microscope", *Applied Physics Express*, Vol. 9, No. 4, 042401, March 2016
- Kenji Sakai, Tsubasa Kizu, Toshihiko Kiwa and K. Tsukada, "Magnetic AC impedance analysis method using high-Tc SQUID based magnetic measurement system", *IEEE Transactions on Applied Superconductivity*, Vol. 27, No. 4, 1601205, July 2017

Research Area : Interface Systems Laboratory

(URL:)

Akio GOFUKU, Professor

Tetsushi KAMEGAWA, Senior Assistant Professor

Taro SUGIHARA, Assistant Professor

Research Themes:

- 》 Man-Machine Interface Systems for Large-Scale Industrial Plants
- 》 New-Type Motors
- 》 Robotics for Practical Use
- 》 Medical Support Systems Applying Information and Robot Technologies
- 》 User Research of Human-Computer Interaction

Representative Publication:

- Akio Gofuku, Kazuma Takata, Kenji Takatori and Makoto Takahashi, "Integration Technique of Diagnostic Results in Hybrid-Type Agent System," *E-Journal of Advanced Maintenance*, Vol. 6, No. 3, pp. 48-56, November 2014.

Research Area : Cognitive Neuroscience Laboratory

(URL: <http://www.biolab.mech.okayama-u.ac.jp/indexE.html>)

Jinglong WU, Professor

Satoshi TAKAHASHI, Associate Professor

Jiajia YANG, Assistant Professor



Research Themes:

- 》 Study on Human Visual, Auditory and Tactile Mechanism
- 》 Study on Human Higher Functions by EEG/ERP and fMRI
- 》 Study on Early Detection of Dementia
- 》 Study on Rehabilitation Technology

Representative Publication:

- Jiajia Yang, Ryo Kitada, Takanori Kochiyama, Yinghua Yu, Kai Makita, Yuta Araki, Jinglong Wu, and Norihiro Sadato, “Brain networks involved in tactile speed classification of moving dot patterns: the effects of speed and dot periodicity,” *Science Reports*, 7, 40931. (2017)
- Yanna Ren Weiping Yang Kohei Nakahashi, Satoshi Takahashi Jinglong Wu, “Audiovisual Integration Delayed by Stimulus Onset Asynchrony Between Auditory and Visual Stimuli in Older Adults” *Perception* Vol 46, Issue 2, pp.205-218. (2017)
- Yinghua Yu, Jiajia Yang, Hiroki Matsumoto, Jinglong Wu, “Interactions Between Haptic and Visual Perceptions of Fine Surface Texture,” *Neuroscience and Biomedical Engineering*, Volume 4, Number 2, pp. 113-119(7), (2016)