Division of Industrial Innovation Sciences
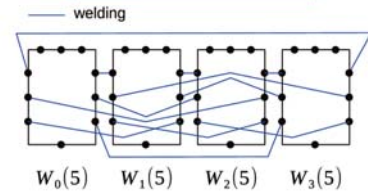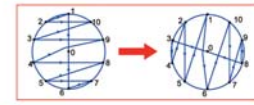
◈ Department of Computer Science

Research Area : Combinatorial Algorithm Laboratory

(URL: https://researchmap.jp/read0046679/?lang=english)

Shuji JIMBO, Senior Assistant Professor

Research Themes:

》 Algorithms and Computational Complexity on Graphs

》 The Eulerian Recurrent Lengths of Graphs

》 Primality Testing Based on Pseudosquares

》 Design of Expanding Graphs

Representative Publication:

• Shuji Jimbo, "The NP-Completeness of Eulerian Recurrent Length for 4-Regular Eulerian Graphs," Proceedings of 2014 4th International Conference on Artificial Intelligence with Applications in Engineering and Technology (ICAIET), pp. 155-159, December 2014.

### Research Area : System Software Laboratory

(URL: http://www.swlab.cs.okayama-u.ac.jp/lab/tani/index.html)

Hideo TANIGUCHI, Professor
Masaya SATO, Assistant Professor

Research Themes:

》 *Tender* Operating System

》 *AnT* Operating System

》 Mechanism for Regulating Program Execution Speed

》 Mechanism of Exchanging Parts of Programs During Execution

》 Virtual Machine Security
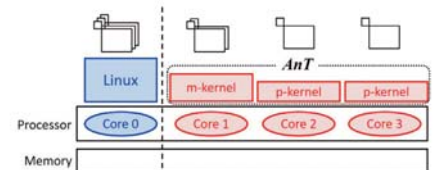
Representative Publication:

• Toshihiro Yamauchi, Masahiro Tsuruya and Hideo Taniguchi, "Fast Control Method of Software-Managed TLB for Reducing Zero-Copy Communication Overhead," IEICE Transactions on Information and Systems, Vol. E98-D, No.12, pp. 2187–2191, 2015.

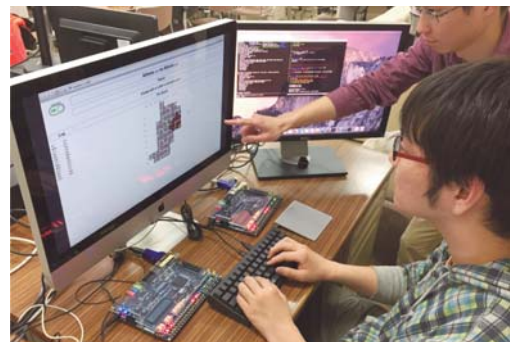### Research Area : Computer Architecture Laboratory

(URL: http://www.arc.cs.okayama-u.ac.jp/)

Akira NAGOYA, Professor
Nobuya WATANABE, Assistant Professor

Research Themes:

》 Hardware Design Automation

》 Dynamically Reconfigurable Hardware

》 High-Performance Processor Technology

》 Parallel Programming Languages and Systems

Representative Publication:

• Nobuya Watanabe and Akira Nagoya, "FSL - A Sophisticated Hardware Description Language Inheriting Design Philosophy of SFL," Conference Record of 2017 Taiwan and Japan Conference on Circuits and Systems (TJCAS 2017), 1A-6, p. 8, August 2017.

Research Area : Secure and Reliable Software Laboratory

(URL: http://www.swlab.cs.okayama-u.ac.jp/lab/yamauchi/index.html)

Toshihiro Yamauchi, Associate Professor

Overview of VMM-based Tracing Function

·Tracing classified information diffusion：collects the information needed to trace classified information and updates the diffusion information
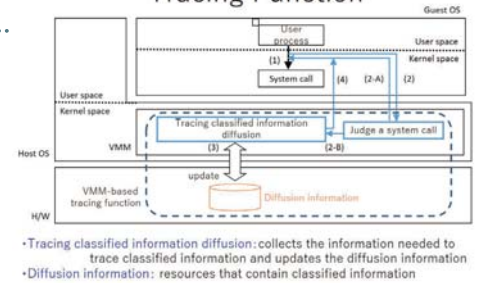·Diffusion information：resources that contain classified information

Research Themes:
》 Operating System
》 System Software
》 System Security
》 Cyber Security

Representative Publication:

• Toshihiro Yamauchi, Yuta Ikegami and Yuya Ban, "Mitigating Use-After-Free Attacks Using Memory-Reuse-Prohibited Library," IEICE Transactions on Information and Systems, Vol. E100-D, No. 10, pp. 2295-2306, DOI: 10.1587/transinf.2016INP0020, October 2017.
• Shota Fujii, Masaya Sato, Toshihiro Yamauchi and Hideo Taniguchi, "Evaluation and Design of Function for Tracing Diffusion of Classified Information for File Operations with KVM," The Journal of Supercomputing, Vol. 72, Issue 5, pp. 1841-1861, DOI: 10.1007/s11227-016-1671-5, February 2016.

Research Area : Group Collaboration Laboratory

(URL: http://www.swlab.cs.okayama-u.ac.jp/lab/nom/users/nom/index.html)

Yoshinari NOMURA, Associate Professor

作業発生の規則性を扱うモデル

Research Themes:
》 Groupware Systems
》 Event Prediction
》 DevOps for System Software

Representative Publication:

• Takuya Okada and Yoshinari Nomura, "Acquiring Application History for Successful Handover of Business Tasks," Proceedings of 2015 18th International Conference on Network-Based Information Systems, pp. 458-463, September 2015.
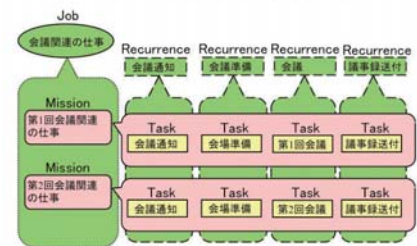
Research Area : Computer Vision Laboratory

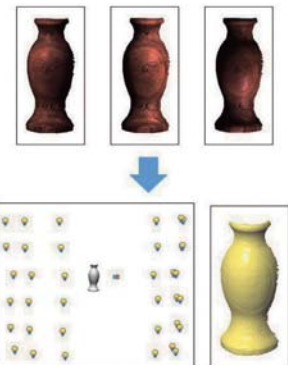(URL: http://www.chino.cs.okayama-u.ac.jp/)

Takeshi SHAKUNAGA, Professor
Tsuyoshi MIGITA, Assistant Professor

Research Themes:
》 Face Recognition/Modelling
》 Real-Time Object Tracking on Optical/Depth Images
》 Photometric Analysis for 3D Shape Reconstruction from Images

Representative Publication:

• Yuki Oka and Takeshi Shakunaga, "Real-time Face Tracking and Recognition by Sparse Eigentracker Augmented by Associative Mapping to 3D Shape," in Special Issue on "Best of Face and Gesture 2011", Image and Vision Computing, Elsevier, Vol. 30, Issue 3, pp. 147-158, March 2012.

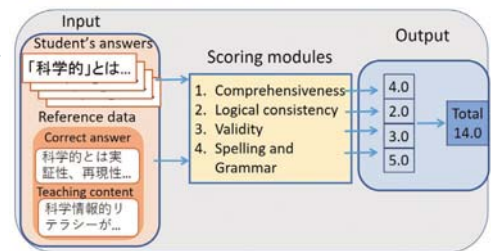## Research Area : Computational Linguistics Laboratory

(URL: http://www.cl.cs.okayama-u.ac.jp/study/take_e/)

Koichi TAKEUCHI, Senior Assistant Professor

■ System of scoring writing tests

Research Themes:
》 Construction of Predicate-Argument Structure Thesaurus
》 Analysis of Semantic Roles and Frames
》 Terminology
》 Essay Scoring System

Representative Publication:
- Masayuki Ohno, Koichi Takeuchi, Kota Motojin, Masahiro Taguchi, Yoshihiko Inada, Masaya Iizuka, Tatsuhiko Abo and Hitoshi Ueda, "Construction of Open Essay Writing Data and Automatic Essay Scoring System for Japanese," Proceedings of The 15th International Conference of the Pacific Association for Computational Linguistics, pp. 215-220, August, 2017.
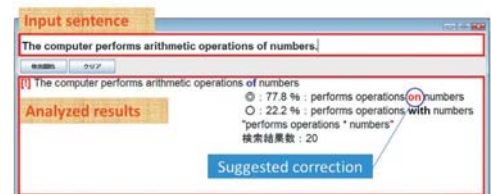
Research Area : Web Informatics Laboratory

(URL: http://www.de.cs.okayama-u.ac.jp/~ohta/index.html)

Manabu OHTA, Professor
Hirotaka NIITSUMA, Assistant Professor

Support of Correcting English Preposition Errors

- Searching the Web for phrases containing a preposition
- Vast corpora on the Web suggest its appropriate usage

Research Themes:
》 Web Information Retrieval
》 Web Mining
》 Digital Library
》 Image Processing Algorithms
》 Combinatorial Optimization Using Neural Networks

Representative Publication:
- Naomichi Kawakami, Manabu Ohta, Atsuhiro Takasu and Jun Adachi, "Cost Evaluation of CRF-Based Bibliography Extraction from Reference Strings," Proceedings of 16th International Conference on Asia-Pacific Digital Libraries (ICADL 2014), LNCS 8839, pp.268-278, November 2014.
- Ryo Asakura, Hirotaka Niitsuma and Manabu Ohta, "Recurrent Neural Networks on Convoluted Word Vectors for Aspect-Based Sentiment Analysis," Online Proceedings of 18th International Conference on Computational Linguistics and Intelligent Text Processing (CICLing 2017), 12 pages, April 2017.

Research Area : Multimedia Information System Laboratory

(URL: http://www.mis.cs.okayama-u.ac.jp/index_english.html)

Yusuke GOTOH, Associate Professor

Research Themes:
》 Spatial Query Processing
》 Research on Selective Contents Broadcasting
》 Research on P2P Streaming Systems
》 Research on Division Based Broadcasting Systems for Webcast
》 Behavior Analysis with Multi-Sensor Networks
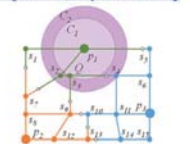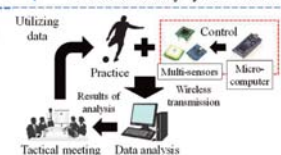
Representative Publication:
- Yusuke Gotoh and Chiori Okubo, "A Proposition of Querying Scheme with Network Voronoi Diagram in Bichromatic Reverse k-nearest Neighbor," International Journal of Pervasive Computing and Communications (IJPCC), Vol. 13, Issue. 1, pp. 62-75, May 2017.

Research Area : Information and Mathematical Engineering Laboratory

Norikazu TAKAHASHI, Professor

Research Themes:

》 Decentralized Computation in Multi-Agent Networks

》 Efficient Computational Methods for Nonnegative Matrix Factorization

》 Analysis and Design of Complex Networks

》 Efficient Learning Algorithms for Support Vector Machines

》 Stability Analysis of Nonlinear Dynamical Systems Related to Neural Networks

Representative Publication:

• Kohnosuke Ogiwara, Tatsuya Fukami and Norikazu Takahashi, "Maximizing Algebraic Connectivity in the Space of Graphs with Fixed Number of Vertices and Edges," IEEE Transactions on Control of Network Systems, Vol.4, No.2, pp.359-368, June 2017.
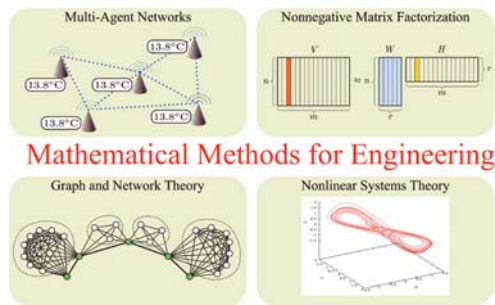

Research Area : Software Measurement and Analytics Laboratory

Akito MONDEN, Professor
Zeynep YUCEL, Assistant Professor

Research Themes:

》 Software Quality Analysis

》 Mining Software Repositories

》 Artificial Intelligence in Software Engineering

》 Software Security and Protection

》 Human Behavior Analysis

Representative Publication:

• Akito Monden, Takuma Hayashi, Shoji Shinoda, Kumiko Shirai, Junichi Yoshida, Mike Barker and Kenichi Matsumoto, "Assessing the Cost Effectiveness of Fault Prediction in Acceptance Testing," IEEE Transactions on Software Engineering, Vol. 39, No. 1, pp. 1345-1357, October 2013.

• Zeynep Yücel, Albert Ali Salah, Çetin Meriçli, Tekin Meriçli, Roberto Valenti and Theo Gevers, "Joint Attention by Gaze Interpolation and Saliency," IEEE Transactions on Cybernetics, Vol. 43, No. 3, pp. 829-842, June 2013.

Research Area : Human Computer Interaction Laboratory

Mariko SASAKURA, Assistant Professor

Research Themes:

》 Natural User Interface

》 Rehabilitation System for Aphasic Persons

》 Information Visualization
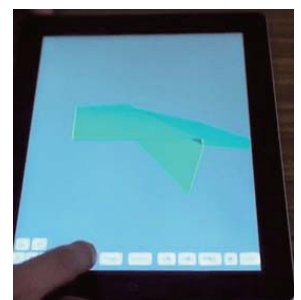
Representative Publication:

• Mariko Sasakura, Saori Iikuma and Yokihiro Izawa, "An Experience of Information Visualization and Interaction for Aphasic Persons," Proceedings of 19th International Conference on Information Visualisation (IV15), pp. 553-556, 2015.

Division of Industrial Innovation Sciences

◈ Department of Information and Communication Systems

Research Area : Information Transter Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~trans/)

Nobumoto YAMANE, Associate Professor

Research Themes :

》 Medical Image Processing and Diagnostic Imaging
》 Earth Quake Prediction
》 Multi-media Signal Processing and Compression

Representative Publication :

- Hirofumi Inoue, Nobumoto Yamane and Hisao Oka "An Automatic Visual Inspection Method Based on Supervised Machine Learning for Rapid On-Site Evaluation in EUS-FNA," IEEE Society of Instruction and Control Engineers (CISE 2014), September 2014.

Research Area : Information System Design Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~infsys/index_en.html)

Hiroto KAGOTANI, Senior Assistant Professor

Research Themes:

》 Design Methods of Asynchronous Processors
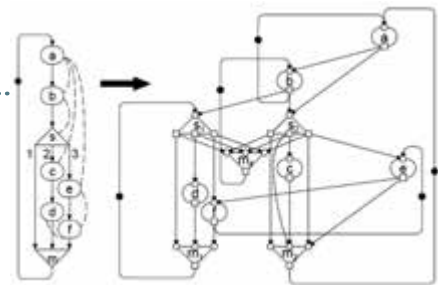》 Reconfigurable Computer Architecture
》 General Purpose Computing on GPU
》 Secure Cryptographic Hardware Implementation

Representative Publication:

- Hiroto Kagotani, Yuji Sugiyama, Takuya Okamoto "An Efficient Algorithm to Determine Equivalence of Pipelined Dependency Graphs for Their Simplification," IEICE Transactions on Information and Systems, Vol. J100-D, No. 6, pp. 616-626, June 2017.

Research Area : Network Systems Laboratory

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

Yukinobu FUKUSHIMA, Associate 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
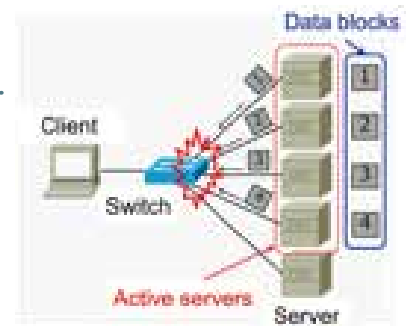
TCP incast in data center networks

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 : Mobile Communications Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~mob/index_eng.htm)

Kazuhiro UEHARA, Professor
Shigeru TOMISATO, Associate Professor

Research Themes:

》 LED Visible Light Wireless Communications
》 Radio Propagation Modeling for Transmission Paths between
   Underground and Ground
》 Non-Linear Distortion Noise Reduction in Multi-Band OFDM Transmission
》 Signal Separation Method for Sensor Terminals by Accumulation Batch Signal Processing

Representative Publication:

• Takahiro Chikamori, Shigeru Tomisato, Satoshi Denno, Kazuhiro Uehara, "Transmission Quality Improvement by LED Back-off Optimization for Visible Light Wireless Communications," Proc. of the 20th International Symposium on Wireless Personal Multimedia Communications (WPMC 2017), pp. 228-232, Dec. 2017.

Research Area : Information Security Laboratory

(URL: http://isec.ec.okayama-u.ac.jp/)

Yasuyuki NOGAMI, Professor
Takuya KUSAKA, Senior Assistant Professor

Research Themes:

》 Elliptic Curve Cryptography
》 Error Correction Code
》 Lattice-Based Cryptography
》 Discrete Mathematics
》 IoT Security

Representative Publication:

• Takuya Kusaka, Sho Joichi, Ken Ikuta, Md. Al-Amin Khandaker,, Yasuyuki Nogami, Satoshi Uehara, Nariyoshi Yamai, and Sylvain Duquesne, "Solving 114-bit ECDLP for a Barreto-Naehrig Curve," The 20th Annual International Conference on Information Security and Cryptology (ICISC2017), 2017.

Research Area : Multimedia Radio Systems Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~wcs/)

Satoshi DENNO, Professor
Yafei HOU, Assistant Professor

Research Themes:

》 Random Access Techniques for Spatial Multiplexing in Wireless Local Area Networks
》 Physical Layer Network Coding in Wireless Bidirectional Relaying Systems
》 Noise Cancellation Techniques for Electric Vehicles
》 Machine learning for cognitive radio
》 Signal process and applications, Radio over fiber

Representative Publication:

• Cao Lengchi and Satoshi Denno, "Nonlinear Precoding for XOR Physical Layer Network Coding in Bi-directional MIMO Relay Systems," IEICE Trans. Commun., Vol.E100-B, No.3, pp.440-448, Mar. 2017.
• Satoshi Denno and Yusuke Murakami, "Uplink Multiuser MIMO Access With Probe Packets in Distributed Wireless Networks," IEICE Trans. Commun., Vol.E101-B, No.6, 2018.

Research Area : Distributed System Design Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~dist/index_eng.html)

Nobuo FUNABIKI, Professor

Minoru KURIBAYASHI, Associate Professor

Research Themes:

〉 Java Programming Learning Assistant System

〉 Desktop Grid Computing System

〉 Elastic Wireless LAN System

〉 Digital Watermarking and its Applications

〉 Design of Aesthetic QR Code

Representative Publication:

- M. Kuribayashi and N. Funabiki, "Universal scoring function based on bias equalizer for bias-based fingerprinting codes," IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences, Vol.E101-A, No.1, pp.119-128, January 2018.

Research Area : Optical and Electromagnetic Waves Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~oew/index_en.html)

Yoshitaka TOYOTA, Professor

Kengo IOKIBE, Assistant Professor

Research Themes:

〉 Electromagnetic Compatible Design of Electrical and Electronic Devices and Systems

〉 Control of Electromagnetic Wave Propagation by Periodic Structure

〉 Measurement, Modeling and Simulation of EMC Characteristics of Semiconductor Devices

〉 Countermeasures Against Side-channel Attacks on Cryptographic Devices

Representative Publication:

- Yoshitaka Toyota, Shohei Kan, Kengo Iokibe, "Suppression of Mode Conversion by Using Tightly Coupled Asymmetrically Tapered Bend in Differential Lines," IEICE Transactions on Communications, Vol. E98-B, No. 7, pp. 1188-1195, July 2015.
- Kengo Iokibe, Tetsuo Amano, Kaoru Okamoto and Yoshitaka Toyota, "Equivalent Circuit Modeling of Cryptographic Integrated Circuit for Information Security Design," IEEE Transactions on Electromagnetic Compatibility, Vol. 55, No.3, pp. 581-588, June 2013.

Division of Industrial Innovation Sciences

◆ Department of Electrical and Electronic Engineering

Research Area : Applied Superconductivity Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~ase/)

SeokBeom KIM, Professor
Hiroshi UEDA, Associate Professor

Research Themes :

》 Fabrication of Superconducting Motor/Generator Using High Temperature Superconducting (HTS) Wires

》 Development of Compact NMR/MRI Magnets Using HTS Bulks and Wires

》 Developments of 3-D Superconducting Actuator and a Non-Contact Levitation System Using HTS Bulks

》 Medical Application of HTS Magnet

》 Development of Numerical Simulation Technique for HTS Application and Electrical Equipment

Representative Publication :

- SeokBeom Kim, Katusya Hojo and Daiki Miyazawa, "Study on the Magnetic Field Homogeneity of HTS Bulk Magnets Including the Degraded HTS Bulk for Developing the Compact NMR Relaxometry," IEEE Trans. on Applied Superconductivity, Vol. 26, No. 4, 4302104, January 2016.
- Hiroshi Ueda, Yohei Imaichi, Tao Wang, Atsushi Ishiyama, So Noguchi, Sadanori Iwai, Hiroshi Miyazaki, Taizo Tosaka, Shunji Nomura, Tsutomu Kurusu, Shinichi Urayama, and Hidenao Fukuyama, "Numerical Simulation on Magnetic Field Generated by Screening Current in 10-T-Class REBCO Coil," IEEE Trans. on Applied Superconductivity, Vol. 26, No. 4, 4701205, June 2016.

### Research Area :Electric Power Conversion System Engineering Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~epc/English/index.html)

Eiji HIRAKI, Professor
Nozomu NANATO, Associate Professor
Kazuhiro UMETANI, Assistant Professor

Research Themes:

》 Protection and Diagnosis of Superconducting Magnets

》 Compact and High Efficiency AC Power Supply with a Single Phase Superconducting Transformer

》 Wireless Power Transfer Systems / High Frequency Induction Heating

》 Innovative SRM Drive for EVs
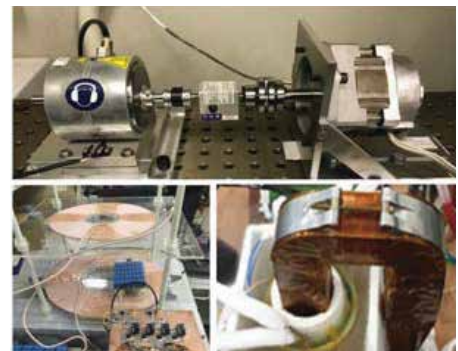
Representative Publication:

- Tomohide Shirakawa, Genki Yamasaki, Kazuhiro Umetani and Eiji Hiraki, "Extremum Co-Energy Principle for Analyzing AC Current Distribution in Parallel-Connected Wires of High-Frequency Power Inductors," IEEJ Journal of Industry Applications, Vol. 7, No.1, pp.35-42, Jan. 2018
- Kazuhiro Umetani, Kyota Aikawa and Eiji Hiraki, "Straightforward Measurement Method of Common Source Inductance for Fast Switching Semiconductor Devices Mounted On-board," IEEE Transactions on Industrial Electronics, Vol. 64, Issue 10, pp.8258-8267, Oct. 2017
- Nozomu Nanato, Noriyuki Kishi, Yuhi Tanaka and Mikishi Kondo, "Basic study for a large AC current supply with a single phase air-core Bi2223 high temperature superconducting transformer," Journal of Physics: Conference Series, Vol. 871, 012101, 2017

Research Area :Power System Control Engineering Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~psc/index.html)

Shigeyuki FUNABIKI, Professor
Jun IMAI, Associate Professor
Akiko TAKAHASHI, Assistant Professor

Research Themes:

》 Voltage Control Methods in Distribution Systems with a Large Number of PV Systems

》 Optimal Allocation of FACTS in a High-Voltage Distribution System

》 Measuring Methods for Solar Irradiance Based on Image Analyses

》 Active Vibrating Control of Robot Arms: Digital Real Time Implementation

》 Temperature Profile Control of Blast Furnaces: Sensor Optimal Location

Representative Publication:

- Akiko Takahashi, Akihiro Yamagata, Jun Imai and Shigeyuki Funabiki, "Decomposition of Fluctuating Photovoltaic Generation Power in Frequency Bands and Analysis of Chaotic Properties," Electrical Engineering in Japan, Vol. 201, No. 4, pp. 26-33, December 2017.
- Akiko Takahashi, Hiroaki Morio, Jun Imai and Shigeyuki Funabiki, "An Estimation Method for Solar Radiation Intensity Using Web Camera," Journal of the Japan Institute of Energy, Vol. 94, No. 11, pp. 1330-1336, November 2015.
- Jun Imai, Katsuyuki Noso, Akiko Takahashi, and Shigeyuki Funabiki, "On Mixed Galerkin Modeling for Controller Design of Boundary Control Systems," IFAC-PapersOnLine, Vol.50, Issue 1, pp. 7133-7138, 2017.

Research Area : Nanodevice and Materials Engineering Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~dm/index_e.html)

Yasuhiko HAYASHI, Professor
Yoshifumi YAMASHITA, Associate Professor
Takeshi NISHIKAWA, Assistant Professor
Masaki HADA, Assistant Professor

Research Themes:

》Advanced Nanocarbon Materials & Devices, Organic Electronics Materials & Devices

》Defect Properties and Engineering in Semiconductor Crystals

》Material Processing by Atmospheric Pressure Plasmas

》Photoinduced Structural Dynamics of Functional Materials Explored with Femtosecond Electron Diffraction and Optical Spectroscopy

Representative Publication:

- Masaki Hada, Yoichi Hasegawa, Ryota Nagaoka, Tomoya Miyake, Ulugbek Abdullaev, Hiromi Ota, Takeshi Nishikawa, Yoshifumi Yamashita and Yasuhiko Hayashi, " In-situ X-ray diffraction reveals the degradation of crystalline $CH_3NH_3PbI_3$ by water-molecule collisions at room temperature" Jpn. J. Appl. Phys. **57**, 028001 (2018).
- Yoshifumi Yamashita, Ryu Nakata, Takeshi Nishikawa, Masaki Hada, and Yasuhiko Hayashi, "Expansion of Shockley stacking fault observed by scanning electron microscope and partial dislocation motion in 4H-SiC," J. Appl. Phys. **123**,161580 (2018).
- Masaki Hada, Shohei Saito, Sei'ichi Tanaka, Ryuma Sato, Masahiko Yoshimura, Kazuhiro Mouri, Kyohei Matsuo, Shigehiro Yamaguchi, Mitsuo Hara, Yasuhiko Hayashi, Fynn Röhricht, Rainer Herges, Yasuteru Shigeta, Ken Onda, R. J. Dwayne Miller, " Structural Monitoring of the Onset of Excited-State Aromaticity in a Liquid Crystal Phase" J. Am. Chem. Soc. **139**, 15792–15800 (2017).

Research Area : Multiscale Device Design (Tsuruta) and Microwave Circuit (Sanagi) Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~mdd/index.html, http://www.ec.okayama-u.ac.jp/~micro/index.html)

Kenji TSURUTA, Professor
Minoru SANAGI, Associate Professor
Atsushi ISHIKAWA, Assistant Professor

Research Themes:

》 *Ab-Initio*/Multiscale Computational Design of Energy-Harvesting Nanomaterials/Nanodevices

》 Phononic Crystals and Acoustic Metamaterials for Energy Harvesting Systems

》 Plasmonic Metamaterials for Optical Functional Devices

》 Microwave Multiple-Port Power Divider/Combiner

》 Efficient Microwave-DC Interconversion

Representative Publication:

• A. Ishikawa, S. Hara, T. Tanaka, Y. Hayashi, and K. Tsuruta, "Cross-Polarized Surface-Enhanced Infrared Spectroscopy by Fano-Resonant Asymmetric Metamaterials," Scientific Reports Vol. 7, pp. 3205-1-8, June 2017.
• Y. Iwasaki, K. Tsuruta, and A. Ishikawa, "Rectification of Lamb wave propagation in thin plates with piezo-dielectric periodic structures," Japanese Journal of Applied Physics Vol. 55, pp. 07KB02-1-4, May 2016.
• M. Sanagi, J. Fujiwara, K. Fujimori, and S. Nogi, "Beam Control in Unilaterally Coupled Active Antennas with Self-oscillating Harmonic Mixers," IEICE Trans. Electron., Vol.E88-C, No.7, pp.1375-1381, July 2005.

Research Area : Optoelectronic and Electromagnetic Wave Engineering Laboratory

(URL: http://www.ec.okayama-u.ac.jp/~opt/index.html)

Hideki FUKANO, Professor
Kazuhiro FUJIMORI, Associate Professor
Shuji TAUE, Assistant Professor

Research Themes:

》 Optical Fiber Sensors

》 Optically Powered Sensor

》 Study of Wireless Power Transmission

》 Study of Antenna

Representative Publication:

• Hideki Fukano, Daichi Watanabe, and Shuji Taue, "Sensitivity characteristics of multimode-interference optical-fiber temperature-sensor with solid cladding material," IEEE Sensors Journal, Vol. 16, No. 24, pp. 8921-8927, 2016.
• Shuji Taue, Tsuyoshi Takahashi, and Hideki Fukano, "Coating-free reflection technique for fiber-optic sensors based on multimode interference: a temperature-sensing study," Jpn. J. Appl. Phys., Vol. 55, 08RE03, 2016.

Division of Industrial Innovation Sciences

◈ Department of Intelligent Mechanical Systems

Research Area : Advanced System Safety Laboratory

(URL:under construction)

Haruo SATO, Associate Professor

Research Themes :

� Study on Radioactive Waste Disposal Technology
〉 Study on Fukushima Environmental Dynamics
〉 Radiation Safety

Representative Publication :

• Haruo Sato and Masato Yoshii, "Analysis of Air Dose Rate Considered Change in Depth Profile of Radiocaesium in Soil," Proceedings of the Asia Pacific Symposium on Safety, 2017 (APSS 2017), SD-03, pp.1-8, December 2017.

Research Area : Intelligent Robotics and Control Laboratory

(URL:)

Mamoru MINAMI, Professor
Takayuki MATSUNO, Senior Assistant Professor

Research Themes:

〉 Humanoid Robot
〉 Visual Servoing
〉 Grinding Robot
〉 Robotic Interventional Radiology
〉 Recognition of Deformable Object

Representative Publication:

• Yu Cui, Kenta Nishimura, Yusuke Sunami, Mamoru Minami, Takayuki Matsuno and Akira Yanou, "Analyses about Trackability of Hand-Eye-Vergence Visual Servoing in Lateral Direction," Applied Mechanics and Materials, Vol. 772, pp. 5 12-517, July 2015.

Research Area : Human Factors and Ergonomics Laboratory

(URL: http://iims.sys.okayama-u.ac.jp/index_e.html)

Atsuo MURATA, Professor
Takehito HAYAMI, Senior Assistant Professor
Toshihisa DOI, Assistant Professor

Research Themes:

〉 Automotive Ergonomics
〉 Cognitive Engineering
〉 Safety Management
〉 Human-Computer Interaction

Representative Publication:

• Atsuo Murata, Takashi Kuroda and Waldemar Karwowski, "Effects of auditory and tactile warning on response to visual hazards under a noisy environment," Applied Ergonomics, Vol. 60, pp. 58-67, April 2017.

Research Area : Production Intelligence Laboratory

(URL:)

Ikuo ARIZONO, Professor
Yoshinari YANAGAWA, Associate Professor
Tomoko SAKIYAMA, Assistant Professor

Research Themes:

〉 Applied Statistics
〉 Operations Research
〉 Statistical Quality Management
〉 Resource Management
〉 Multi-Agent System

Representative Publication:

- Ikuo Arizono, Yusuke Okada, Ryosuke Tomohiro, and Yasuhiko Takemoto, "Rectifying Inspection for PAOSQLL Scheme Based on Variable Repetitive Group Sampling Plan," International Journal of Advanced Manufacturing Technology, Vol.94, No.1-4, pp.145-154, January 2018.
- Shin Tsurui, Yasuhiko Takemoto, Ikuo Arizono, and Ryosuke Tomohiro, "Reconsideration of Negotiation Procedure for Buyback Contract in Supply Chain," International Journal of Supply Chain and Operations Resilience, Vol.3, No.1, pp.34-55, September 2017.
- Tomoko Sakiyama, and Ikuo Arizono, "Can the Agent with Limited Information solve Travelling Salesman Problem?" Complexity, Vol.270, Article ID 9562125, 6 pages, April 2017.

Research Area : Intelligent Mechanical Control Laboratory

(URL: http://imclab.sys.okayama-u.ac.jp/)

Kentaro HIRATA, Professor
Yukinori NAKAMURA, Senior Assistant Professor
Kunihisa OKANO, Assistant Professor

Research Themes:

〉 Control Theory
〉 Mechatronics
〉 Power-Assist Control
〉 Networked Control
〉 Formation Control

Representative Publication:

- Kentaro Hirata, Tomomichi Hagiwara and Atsushi Itokazu, "Numerical Methods for Spectrum Computation of Monodromy Operators Via Non-Causal Hold Discretization," SICE Journal of Control, Measurement, and System Integration, Vol. 6, No. 1, pp. 45-53, February 2013.
- Yukinori Nakamura, Hiroki Kawakami and Shinji Wakui, "Bandwidth Expansion of a Pressure Control System for Pneumatic Anti-Vibration Apparatuses in Presence of Dead Time," Journal of Advanced Mechanical Design, Systems, and Manufacturing, Vol. 9, No. 3, pp. 1-13, July 2015.
- Kunihisa Okano, Masashi Wakaiki, Guosong Yang, and Joao P. Hespanha, "Stabilization of Networked Control Systems Under Clock Offsets and Quantization," IEEE Transactions on Automatic Control, 2017 (in printing).

Research Area : System Integration Laboratory

(URL: www.act.sys.okayama-u.ac.jp)

Takefumi KANDA, Professor
Shuichi WAKIMOTO, Associate Professor

Research Themes:

〉 Fluid Processing Devices/Systems
〉 Soft Devices Including Artificial Muscles
〉 Flexible Mechanical Systems
〉 Micro Actuators and Sensors

Representative Publication:

- Takefumi Kanda, Masaki Yabumoto, and Koichi Suzumori, "A piezoelectric polymer cavitation sensor installed in an emulsion generation microchannel device and an evaluation of cavitation state," Japanese Journal of Applied Physics, Vol.55, No.7S1, 07KE07 (6 pages), June 2016.
- Shuichi Wakimoto, Junpei Misumi, Koichi Suzumori, "New concept and fundamental experiments of a smart pneumatic artificial muscle with a conductive fiber," Sensors & Actuators: A. Physical, Vol.A250, pp.48-54, September 2016.

Research Area : Mechatronic Systems Laboratory

(URL:)

Keigo WATANABE, Professor, specially appointed
Isaku NAGAI, Assistant Professor

Research Themes:

�》Underwater Robots with Pectoral Fins or Four Thrusters

�》VTOL Aerial Robots with Tilted Rotors

�》Omnidirectional Mobile Robots with Active Casters

〲Control of Mobile Robot Using Visual Odometry

〲Motion Estimation by Image Processing

Representative Publication:

- Yin Yin Aye, Keigo Watanabe, Shoichi Maeyama, and Isaku Nagai, "An Automatic Parking System Using an Optimized Image-based Fuzzy Controller by Genetic Algorithms," Artificial Life and Robotics, Vol. 22, pp. 139-144, September 2016.
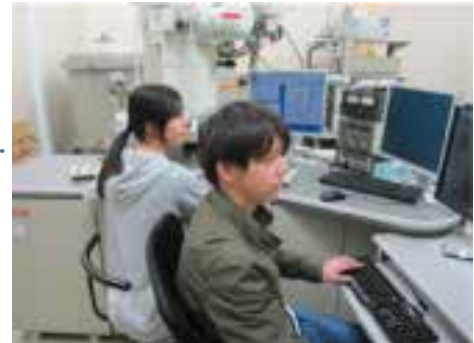
Division of Industrial Innovation Sciences

◆ Department of Advanced Mechanics

Research Area : Structural Materials Engineering Laboratory

(URL: http://kizai9.mech.okayama-u.ac.jp/index_e.html)

Mitsuhiro OKAYASU, Professor
Yoshito TAKEMOTO, Associate Professor
Yoon-Seok Lee, Assistant Professor

Research Themes :

》 Mechanical Properties of Engineering Materials
》 Cyclic Deformation Mechanism and Fatigue Behavior
》 Development of β Type Ti Alloys with Novel Functions
》 Phase Transformation and Mechanical Properties of Ti Alloys
》 Development of High Wear-resistant Al Alloys

Representative Publication :

- Mitsuhiro Okayasu, Kohei Bamba, "Domain switching behavior in lead zirconate titanate piezoelectric ceramics", Scripta Materialia, Vol. 146, pp.272-275, March 2018
- Masataka Ijiri, Yuki Tomita, Takafumi Ishikawa, Kenji Kadowaki and Yoshito Takemoto, "Influence of Nb Content of Ti-xNb-7Al Alloys on β→α" Transformation with Tempering", J. Japan Inst. Met. Mater. Vol. 81, pp. 345-351, July 2017
- Yoon-Seok Lee, Mitsuo Niinomi, Masaaki Nakai, Kengo Narita, Ken Cho, "Predominant factor determining wear properties of β-type and (α+β)-type titanium alloys in metal-to-metal contact for biomedical applications", J. Mech. Behav. Biomed. Mater. Vol. 41, pp. 208-220, October 2014

Research Area : Applied Solid Mechanics Laboratory

(URL: http://solid.mech.okayama-u.ac.jp/index-e.html)

Naoya TADA, Professor
Takeshi UEMORI, Associate Professor

Research Themes:

》 Deformation and Fracture of Solid Materials
》 Microscopic Deformation of Materials
》 Simulation of Plastic Deformation and Plastic Forming
》 Reliability and Strength of Electronic Components
》 Non-Destructive Evaluation by Electrical Potential Difference Method

Representative Publication:

- Naoya Tada, Takeshi Uemori and Toshiya Nakata, "Elastic and Plastic Microscopic Undulation on the Surface of Polycrystalline Pure Titanium Under Tension", Transactions of the ASME, Journal of Pressure Vessel Technology, Vol. 139, Issue 6, 061403 (8 Pages), October 2017.
- Takeshi Uemori, Satoshi Sumikawa, Tetsuo Naka, Ninshu Ma and Fusahito Yoshida, " Influence of Bauschinger Effect and Anisotropy on Springback of Aluminum Alloy Sheets", Material Transactions, Vol. 58, Issue 6, pp.921-926, June 2017.

Research Area : Machine Design and Tribology Laboratory

(URL: http://mdws1.mech.okayama-u.ac.jp/)

Masahiro FUJII, Professor
Yuya OMIYA, Assistant Professor

Research Themes:

》 Friction, Wear and Lubrication of High Functional Tribo-Material
》 Design of Machine Element with High Load Capacity
》 Development of Engineering Surface with Low Friction and High Strength
》 Joining and Sealing Technology of Multi-Material
》 Mechanism of Self Loosening and Seizure in Bolted Joint

Representative Publication:

- Ryousuke Ano, Masahiro Fujii and Hiroshi Ohsaki, "Observation of residual stress variation on rolling Fatigue of steel ball", Tribologist, Vol. 61, No.6, pp.393-400, June 2016.
- Yuya Omiya, Masahiro Fujii and Yuta Shibai, "Sealing Performance Evaluation for Metal Flat Gasket under Leak Test with Platens", Journal of High Pressure Institute of Japan, 2018
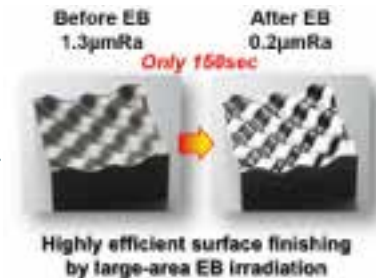
Research Area : Nontraditional Machining Laboratory

(URL: http://ntmlab.mech.okayama-u.ac.jp/index-e.html)

Akira OKADA, Professor
Yasuhiro OKAMOTO, Associate Professor
Togo SHINONAGA, Assistant Professor

Before EB 1.3μmRa   After EB 0.2μmRa
Only 150sec

Highly efficient surface finishing by large-area EB irradiation

Research Themes:

� Study on High Accuracy and Efficiency Electrical Discharge Machining
〉 Development of Novel and Functional Electrical Discharge Machining Method
〉 Development of High-Performance Laser Micro-Processing
〉 High-Efficient Laser Micro-Welding
〉 Smoothing and Surface Modification by Large-Area Electron Beam Irradiation

Representative Publication:

- Akira Okada, Atsushi Yamaguchi and Kohei Ota, "Improvement of curved hole EDM drilling performance using suspended ball electrode by workpiece vibration," CIRP Annals - Manufacturing Technology, Vol. 66, No. 1, pp. 189-192, May 2017.
- Yasuhiro Okamoto, Kiichi Asako, Norio Nishi, Tomokazu Sakagawa and Akira. Okada "Effect of Surrounding Gas Condition on Surface Integrity in Micro-drilling of SiC by ns Pulsed Laser" Applied Physics B, Laser and Optics, Vol.119, No.3, pp. 509-517, March 2015.
- Togo Shinonaga, Akira Okada , Tomoaki Miyoshi, "Prediction of rounding phenomenon at corner tips in large-area Electron Beam irradiation", International Journal of Machine Tools and Manufacture, Vol.110, pp.18-26, August 2016.

## Research Area : Manufacturing Engineering Laboratory

(URL: http://ntmlab.mech.okayama-u.ac.jp/index-e.html)

Kazuhito OHASHI, Professor
Hiroyuki KODAMA, Senior Assistant Professor
Takashi ONISHI, Assistant Professor

Research Themes:

〉 In-Process/On-Machine Measuring Technique in Grinding
〉 Grinding Mechanism of Difficult-to-Machine Materials
〉 High Performance Diamond Wheel
〉 Abrasive Machining for Surface Function
〉 Data Mining in Manufacturing
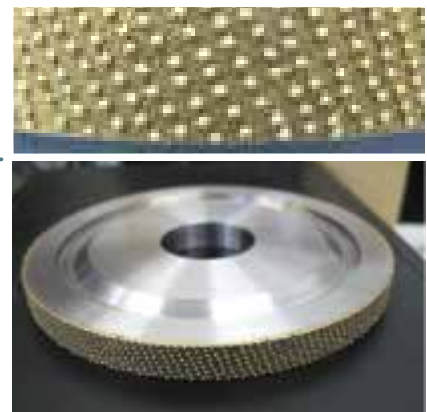
Representative Publication:

- Kazuhito Ohashi, Kazuya Tan, Tomoaki Ashida and Shinya Tsukamoto, "Quick On-Machine Measurement of Ground Surface Finish Available for Mass Production Cylindrical Grinding Processes," Int. J. of Automation Technology, Vol. 9, No. 2, pp. 176-183, March 2015.

Research Area : Fluid Dynamics and Engineering Laboratory

(URL: under construction)

Shinichiro YANASE, Professor, specially appointed
Toshinori KOUCHI, Associate Professor
Yasunori NAGATA, Assistant Professor

Research Themes:

》 Micro-Bubble Engineering
》 High Speed Propulsion
》 Gas Dynamics of Reentry Vehicle

Representative Publication:

- Anup Kumer Datta, Yasutaka Hayamizu, Toshinori Kouchi, Yasunori Nagata, Kyoji Yamamoto, Shinichiro Yanase, "Numerical study of turbulent helical pipe flow with comparison to the experimental results," Journal of Fluids Engineering, Vol.139, 091204-1. 2017.
- Toshinori Kouchi, Goro Masuya, Shinichiro Yanase, "Extracting Dominant Turbulent Structures in Supersonic Flow Using Two-Dimensional Fourier Transform," Experiments in Fluids, Vol. 58, No. 98, 2017.
- Kazuhiko Yamada, Yasunori Nagata, Takashi Abe, Kojiro Suzuki, Osamu Imamura, Daisuke Akita, "Suborbital Reentry Demonstration of Inflatable Flare-type Thin-membrane Aeroshell using a Sounding Rocket," Journal of Spacecraft and Rockets, Vol. 52, No. 1, 2015.

Research Area : Heat Power Engineering Laboratory

(URL: https://powerlab.mech.okayama-u.ac.jp/)

Eiji TOMITA, Professor
Nobuyuki KAWAHARA, Associate Professor
Kazuya TSUBOI, Assistant Professor
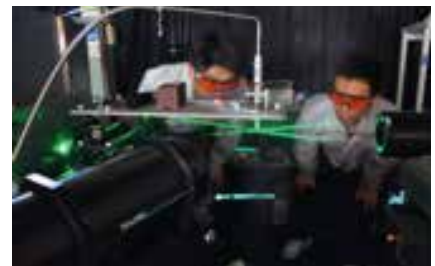
Simultaneous measurement of velocity and droplet size of gasoline spray with PDA(Phase Doppler Anemometer)

Research Themes:

》 Combustion Diagnostics with Optical Measurement
》 Gas Engine Combustion and Auto-Ignition
》 CFD Simulation of Gas Flow and Combustion in Piston Engines
》 Analysis of Turbulent Premixed Flames by Using Direct Numerical Simulation (DNS) Database

Representative Publication:

- Kazi M. Rahman, Nobuyuki Kawahara, Kazuya Tsuboi a nd Eiji Tomita, "Combustion Characteristics of Wet Ethanol Ignited Using a Focused Q-switched Nd:YAG Nanosecond Laser," Fuel, Vol. 165 (2016), pp. 331–340.
- Nobuyuki Kawahara, Shota Hashimoto, Eiji Tomita, "Spark discharge ignition process in a spark-ignition engine using a time series of spectra measurements", Proceedings of the Combustion Institute 37, Issue 3 (2017), pp. 3451–3458.

Research Area : Heat Transfer Engineering Laboratory

(URL: http://heat6.mech.okayama-u.ac.jp/dennetu/eng/home.htm)

Akihiko HORIBE, Professor
Yutaka YAMADA, Assistant Professor
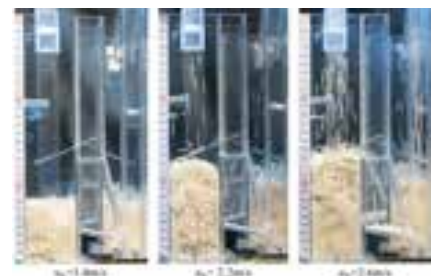
Research Themes:

》 Desiccant Air Conditioning
》 Water Vapor Sorption and Desoption Characteristics of Organic Sorption Material
》 Heat Storage and Release Characteristics of Latent Heat Storage Material
》 Static and Dynamic Wettability Characteristics of Structured Surface

Representative Publication:

- Akihiko Horibe, Hyeon Jang, Naoto Haruki, Yoshihiko Sano, Hiroaki Kanbara and Kazuo Takahashi, "Melting and Solidification Heat Transfer Characteristics of Phase Change Material in a Latent Heat Storage Vessel: Effect of Perforated Partition Plate," International Journal of Heat and Mass Transfer, Vol. 82, pp. 259-266, (2014).
- Than Tun Naing, Akihiko Horibe, Naoto Haruki, Yutaka Yamada, "Reduction of the Solidification Height of Phase-change Material in Direct-contact Latent Heat Storage Vessel", Thermal Science and Engineering, Vol. 26, No. 1, pp. 19-27 (2018)