External Awards

Fellow
Winner: Seishi Takamura, NTT Media Intelligence Laboratories
Date: March 11, 2021
Organization: The Institute of Electronics, Information and Communication Engineers (IEICE)

For his research and development on video coding and its dissemination.

Paper Award
Winners: Ryota Tanaka, Kyosuke Nishida, and Sen Yoshida, NTT Media Intelligence Laboratories
Date: March 18, 2021
Organization: The 27th Annual Meeting of the Association for Natural Language Processing (NLP2021)

For "VisualMRC: Machine Reading Comprehension on Document Images."
Published as: R. Tanaka, K. Nishida, and S. Yoshida, "VisualMRC: Machine Reading Comprehension on Document Images," NLP2021, A5-1, Fukuoka, Japan, Mar. 2021 (in Japanese).

Shigeo Tsujii Security Paper Award
Winners: Takuya Watanabe, Eitaro Shioji, Mitsuaki Akiyama, NTT Secure Platform Laboratories; Tatsuya Mori, Waseda University
Date: April 22, 2021
Organization: Japan Society of Security Management

For "Melting Pot of Origins: Compromising the Intermediary Web Services that Rehost Websites."
Published as: T. Watanabe, E. Shioji, M. Akiyama, and T. Mori, "Melting Pot of Origins: Compromising the Intermediary Web Services that Rehost Websites," The 26th Network and Distributed System Security Symposium (NDSS 2020), San Diego, CA, USA, Feb. 2020.

Best Paper Award
Winners: Tomoya Kageyama, NTT Network Innovation Laboratories; Osamu Muta, Kyushu University; Haris Gacanin, Nokia Bell Labs
Date: April 27, 2021
Organization: IEICE

For "Enhanced Selected Mapping for Impulsive Noise Blanking in Multi-carrier Power-line Communication Systems."
Published as: T. Kageyama, O. Muta, and H. Gacanin, "Enhanced Selected Mapping for Impulsive Noise Blanking in Multi-carrier Power-line Communication Systems," IEICE Trans. Commun., Vol. E102-B, No. 11, pp. 2174–2182, 2019.

ITU-AJ Accomplishment Award
Winner: Jun-ichi Kani, NTT Access Network Service Systems Laboratories
Date: May 17, 2021
Organization: The ITU Association of Japan (ITU-AJ)

For his leadership in standardization activities regarding optical access systems as a rapporteur at Study Group 15 in the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T), thus contributing to the acceleration and sophistication of optical access networks. He also facilitated discussion on optical access systems and promoted the formation of a technology roadmap in the Full Service Access Network initiative, contributing to speeding up the development of ITU-T recommendations.

Papers Published in Technical Journals and Conference Proceedings

Aging Estimation of an AC Adapter from Generated Electromagnetic Noise

F. Ishiyama and Y. Toriumi
The 20th IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2020), December 2020.

Capacitors are the parts of a power supply unit that deteriorate most easily. Among types of power supply unit, alternating current (AC) adapters are the ones for which it is not possible to check the leakage or bulging of capacitors, because they are sealed and invisible. Therefore, we focused on the electromagnetic noise which deteriorated AC adapters emit on the power line. We measured their noise and analyzed them with our own method of mode decomposition. It was found that the intensity of the noise is proportional to the internal resistance of the deteriorated capacitors measured in the hot condition.

Identification of Transcription Factors and the Regulatory Genes Involved in Triacylglycerol Accumulation in the Unicellular Red Alga *Cyanidioschyzon merolae*

S. Takahashi, R. Okubo, Y. Kanesaki, B. Zhou, K. Takaya, S. Watanabe, K. Tanaka, and S. Imamura

Microalgal triacylglycerols (TAGs) are a good feedstock for liquid biofuel production. Improving the expression and/or function of transcription factors (TFs) involved in TAG accumulation may increase TAG content; however, information on microalgae is still lacking. In this study, 14 TFs in the unicellular red alga *Cyanidioschyzon merolae* were identified as candidate TFs regulating TAG accumulation using available transcriptome and phosphoproteome data under conditions driving TAG accumulation. To investigate the roles of these TFs, we constructed TF-overexpression strains and analyzed lipid droplet (LD) formation and TAG content in the cells grown under standard conditions. Based on the results, we identified four TFs involved in LD and TAG accumulation. RNA-Seq analyses were performed to identify genes regulated by the four TFs using each overexpression strain. Among the TAG biosynthesis-related genes, only the gene encoding the endoplasmic reticulum-localized lysophosphatidic acid acyltransferase 1 (LPAT1) was notably increased among the overexpression strains. In the LPAT1 overexpression strain, TAG accumulation was significantly increased compared with the control strain under normal growth conditions. These results indicate that the four TFs positively regulate TAG accumulation by changing their target gene expression in *C. merolae*.

Anonymous Quantum Sensing

H. Kasai, Y. Takeuchi, H. Hakoshima, Y. Matsuzaki, and Y. Tokura

A lot of attention has been paid to a quantum-sensing network for detecting magnetic fields in different positions. Recently, cryptographic quantum metrology was investigated where the information of the magnetic fields is transmitted in a secure way. However, sometimes, the positions where non-zero magnetic fields are generated could carry important information. Here, we propose an anonymous quantum sensor where an information of positions having non-zero magnetic fields is hidden after measuring magnetic fields with a quantum-sensing network. Suppose that agents are located in different positions and they have quantum sensors. After the quantum sensors are entangled, the agents implement quantum sensing that provides a phase information if non-zero magnetic fields exist, and positive operator-valued measure (POVM) measurement is performed on quantum sensors. Importantly, even if the outcomes of the POVM measurement is stolen by an eavesdropper, information of the positions with non-zero magnetic fields is still unknown for the eavesdropper in our protocol. In addition, we evaluate the sensitivity of our proposed quantum sensors by using Fisher information when there are at most two positions having non-zero magnetic fields. We show that the sensitivity is finite unless these two (non-zero) magnetic fields have exactly the same amplitude. Our results pave the way for new applications of quantum-sensing network.