

# External Awards

## Technical Meeting Encouragement Award

**Winner:** Hitoshi Wakita, NTT Device Technology Laboratories

**Date:** February 13, 2020

**Organization:** The Institute of Electrical Engineers of Japan (IEEJ)

For “Recent Advance in Ultra-high Bandwidth Coherent Driver Modulator.”

**Published as:** H. Wakita, M. Nagatani, H. Yamazaki, T. Fujii, M. Ida, Y. Ogiso, J. Ozaki, Y. Ueda, S. Kanazawa, Y. Hashizume, H. Tanobe, N. Nunoya, M. Ishikawa, M. Nakamura, T. Kobayashi, and Y. Miyamoto, “Recent Advance in Ultra-high Bandwidth Coherent Driver Modulator,” Proc. of technical meeting on electron devices, IEEJ, EDD-19-036-044, pp. 7–10, Mar. 2019 (in Japanese).

## Specially Selected Paper

**Winner:** Atsuhiko Maeda, NTT Network Innovation Laboratories (Presently with NTT Service Evolution Laboratories)

**Date:** February 15, 2020

**Organization:** The Information Processing Society of Japan (IPJSJ)

For “Automatic Generation of a Pedestrian Road Network Using Aerial Photographs and Maps.”

**Published as:** A. Maeda, “Automatic Generation of a Pedestrian Road Network Using Aerial Photographs and Maps,” IPSJ Journal, Vol. 61, No. 2, pp. 262–223, Feb. 2020 (in Japanese).

## Kenjiro Sakurai Memorial Prize

**Winner:** Shinji Matsuo, Takaaki Kakitsuka, Tomonari Sato, Koji Takeda, NTT Device Technology Laboratories

**Date:** February 19, 2020

**Organization:** Optoelectronics Industry and Technology Development Association (OITDA)

For the development of small-threshold-current and high-operating-speed membrane semiconductor lasers.

## 2020 PROSE Awards Subject Category Winner in Chemistry and Physics

**Winner:** Main editors: Kohji Mitsubayashi, Tokyo Medical and Dental University; Osamu Niwa, Saitama Institute of Technology; Yuko Ueno, NTT Basic Research Laboratories

Chapter authors (from NTT): Yuko Ueno, Hiroshi Nakashima, Shingo Tsukada, NTT Basic Research Laboratories; Junichi Kodate, NTT Device Innovation Center; Akihiro Chiba, Kana Eguchi, Hisashi Kurasawa, NTT Service Evolution Laboratories

**Date:** February 28, 2020

**Organization:** The Association of American Publishers

For “Chemical, Gas, and Biosensors for Internet of Things and Related Applications.”

**Published as:** “Chemical, Gas, and Biosensors for Internet of Things and Related Applications,” edited by K. Mitsubayashi, O. Niwa, and Y. Ueno, Elsevier, June 2019.

## Paper Award

**Winner:** Himma Firdaus, Tokinobu Watanabe, Masahiro Hori, Daniel Moraru, Shizuoka University; Yasuo Takahashi, Hokkaido University; Akira Fujiwara, NTT Basic Research Laboratories; Yukinori Ono, Shizuoka University

**Date:** March 13, 2020

**Organization:** Silicon Technology Division, The Japan Society of Applied Physics

For “Electron Aspirator Using Electron–Electron Scattering in Nanoscale Silicon.”

**Published as:** H. Firdaus, T. Watanabe, M. Hori, D. Moraru, Y. Takahashi, A. Fujiwara, and Y. Ono, “Electron Aspirator Using Electron–Electron Scattering in Nanoscale Silicon,” Nat. Commun., Vol. 9, 4813, 2018.

## Young Researcher’s Award

**Winner:** Kohei Saito, NTT Network Service Systems Laboratories

**Date:** March 19, 2020

**Organization:** The Institute of Electronics, Information and Communication Engineers (IEICE)

For “Evaluation of Field Transmission Performance of World’s Fastest 600-Gbps per Lambda Signals” and “Long-haul Field Transmission Performance of Real-time 400-Gbit/s/carrier Signals.”

**Published as:** K. Saito, H. Kawahara, T. Kubo, T. Seki, T. Kawasaki, H. Maeda, T. Sekino, N. Sakauchi, M. Shinkai, T. Sakamaki, K. Yamanaka, and T. Kurimoto, “Evaluation of Field Transmission Performance of World’s Fastest 600-Gbps per Lambda Signals,” Proc. of the 2019 IEICE General Conference, B-10-33, Tokyo, Japan, Mar. 2019.

K. Saito, T. Sasai, F. Hamaoka, H. Kawahara, T. Seki, A. Masuda, H. Date, and H. Maeda, “Long-haul Field Transmission Performance of Real-time 400-Gbit/s/carrier Signals,” Proc. of the 2019 IEICE Society Conference, B-10-34, Osaka, Japan, Sept. 2019.

## Young Researcher’s Award

**Winner:** Ryo Igarashi, NTT Access Network Service Systems Laboratories

**Date:** March 19, 2020

**Organization:** IEICE

For “Reach Extension of 10G-EPON Using Distributed Raman Amplification.”

**Published as:** R. Igarashi, T. Kanai, M. Fujiwara, J. Kani, and J. Terada, “Reach Extension of 10G-EPON Using Distributed Raman Amplification,” Proc. of the 2019 IEICE Society Conference, B-8-7, Osaka, Japan, Sept. 2019.

## Young Researcher’s Award

**Winner:** Rintaro Harada, NTT Access Network Service Systems Laboratories

**Date:** March 19, 2020

**Organization:** IEICE

For “Downstream Frame Forwarding Method Realizing Incremental Upgrade of PON” and “Frame Distributing Method on Incremental Upgrade of PON Using Multiple Wavelengths.”

**Published as:** R. Harada, H. Uzawa, H. Nakamura, and J. Terada, “Downstream Frame Forwarding Method Realizing Incremental Upgrade of PON,” Proc. of the 2019 IEICE General Conference, B-8-26, Tokyo, Japan, Mar. 2019.

R. Harada, H. Uzawa, H. Nakamura, and J. Terada, “Frame Distributing Method on Incremental Upgrade of PON Using Multiple Wavelengths,” Proc. of the 2019 IEICE Society Conference, B-8-12, Osaka, Japan, Sept. 2019.

# Papers Published in Technical Journals and Conference Proceedings

## **Semantic Segmentation of Sparsely Annotated 3D Point Clouds by Pseudo-labelling**

K. Xu, Y. Yao, K. Murasaki, S. Ando, and A. Sagata

Proc. of the 7th International Conference on 3D Vision, pp. 463–471, Quebec City, Canada, September 2019.

Manually labelling point clouds scenes for use as training data in machine learning applications is a time and labor intensive task. In this paper, we aim to reduce the effort associated with learning semantic segmentation tasks by introducing a semi-supervised method that operates on scenes with only a small number of labelled points. For this task, we advocate the use of pseudo-labelling in combination with PointNet, a neural network architecture for point cloud classification and segmentation. We also introduce a method for incorporating information derived from spatial relationships to aid in the pseudo-labelling process. This approach has practical advantages over current methods by working directly on point clouds and not being reliant on predefined features. Moreover, we demonstrate competitive performance on scenes from two publicly available datasets and provide studies on parameter sensitivity.

## **Evaluation of Dynamic Guidance-sign System for Controlling Pedestrians in Public Facilities**

Y. Ichikawa, A. Hayashi, Y. Mihara, K. Shimizu, and H. Mineno

IPSJ Transactions on Consumer Devices & Systems, Vol. 10, No. 1, pp. 50–57, February 2020.

Throughout 2020, the number of foreign visitors to Japan is expected to increase, resulting in congestion of public facilities. Since the congested state impairs the safety of the facility, it is important to introduce a system to alleviate such congestion by guiding facility users and controlling their movements. We measured the congestion situation in a facility the international passenger terminal at Haneda airport, which is constantly changing, and constructed a guidance-sign system to dynamically guide people to vacant routes. We present the results of this evaluation in terms of the degree of congestion.

## **Sentence-final Prosody Analysis of Japanese Communicative Speech Based on the Command-response Model**

K. Takada, H. Nakajima, and Y. Sagisaka

Proc. of the 2020 IEEE Conference on Computer Applications, pp.

235–239, Yangon, Myanmar, February 2020.

Aiming at communicative speech synthesis, we analyzed sentence-final prosody characteristics through subjective impression on constituting lexicons. Since Japanese sentence-final particles and postpositionals are expected to be employed to generate communicative prosody showing speaker's intention and attitudes, we designed 52 single-phrase utterances showing different strength of the speaker's impressions about judgment. These impressions were quantified in Semantic Differential (SD) scales. F0 contour characteristics were analyzed by using the command-response model. To cope with sentence final F0 characteristics, an additional accent command was introduced for F0 rise and drop of sentence-final particles. The analysis showed systematic communicative prosody control by the accent command reflecting effect of judgment impressions which can be obtained from constituting lexicons. These results indicate possibility of sentence-final prosody control using impression obtained from lexicons constituting output sentences.

## **Understanding Cloaking Techniques of Phishing Websites through Dynamic Analysis**

H. Kodera, T. Shibahara, D. Chiba, K. Aoki, K. Hato, and M. Akiyama

IPSJ Journal, Vol. 61, No. 3, pp. 555–566, March 2020.

Phishing attacks have been ever-increasing on the Internet today. One of the promising countermeasures for phishing attacks is filtering by using blacklists. Such blacklists are composed of URLs of phishing websites and have been maintained by accessing/detecting the URLs. However, some phishing websites have implemented a special access control technique in server-side called cloaking to prevent them from accessing/detecting by the provider of such blacklists. In order to improve blacklist-based countermeasures, we need to better understand the cloaking technique and its actual situation on the Internet. To this end, we propose a new method to analyze the cloaking techniques of phishing websites and conduct a large-scale measurement study of them. Specifically, we analyze a specific condition to activate the cloaking techniques by focusing on phishing kits which are commonly used to deploy phishing websites today. We reveal that 10.4% of 4,901 real/active phishing websites implement the cloaking technique relying on User-Agent and Referer which can be configurable by blacklist providers.