

# External Awards

## ITU Association of Japan—Encouragement Award

**Winner:** Junichi Kani, Optical Access System Project, NTT Access Network Service Systems Laboratories

**Date:** May 15, 2009

**Organization:** ITU Association of Japan

For contributions to the standardization activities for optical interfaces and optical access networks in SG15.

\* This award was given for his continuous contribution to the standardization of optical interfaces and optical access networks in ITU-T Study Group 15 since the start of his participation in 2003, in particular for his work on the standardization of multichannel dense wavelength division multiplexing applications (G.698.1) as the editor and on the promotion of standardization for the 10Gigabit-capable passive optical network (G.987 series) as co-chair of the next-generation passive optical network task group in the Full Service Access Network (FSAN) initiative.

## Best Paper Award of 71st IPSJ National Convention

**Winner:** Shin-ichiro Eitoku, Network Appliance and Services Project, NTT Cyber Solutions Laboratories

**Date:** July 13, 2009

**Organization:** Information Processing Society of Japan (IPSJ)

For “Study of User Support for Life Log Disclosure Control Considering 4W (When, Where, Who, What) Information.”

We studied a method of visualizing life logs and supporting users’ decisions for disclosing them to several services. We focused on the method of classifying “5W1H (When, Where, Who, What, Why, How)” information that is frequently used to represent a user’s actions and proposed a method of classifying life logs into 4W (When, Where, Who, What) information and implemented a prototype.

**Published:** Shin-ichiro Eitoku, Narimune Matsumura, Tomohiro Yamada, Shin-yo Muto, and Masanobu Abe, “Study of User Support for Life Log Disclosure Control Considering 4W (When, Where, Who, What) Information,” The 71st National Convention of IPSJ, 6E-3, Mar. 2009 (in Japanese).

# Papers Published in Technical Journals and Conferences

## Acoustic-to-articulatory inversion using a speaker-normalized HMM-based speech production model

S. Hiroya

International Seminar on Speech Production, Lorraine Lab of IT Research and its Applications, Vol. 1, No. 1, pp. 7–12, Strasbourg, France.

Acoustic-to-articulatory inverse mapping is a difficult problem because of its non-linear and one-to-many characteristics. We have previously developed a speech inversion method using a hidden Markov model (HMM)-based speech production model which takes into account the phoneme-specific dynamic constraints of articulatory parameters. We found that the constraint significantly decreases the estimation error of articulatory parameters. However, the model was trained for each speaker and articulatory parameters were estimated in a speaker-dependent manner. In this study, we present a speaker-normalized HMM-based speech production model which is constructed from a multi-speaker articulatory-acoustic database, and we estimate articulatory parameters from multiple speakers’ speech signals using the model. The results show that the estimation error of articulatory parameters for vowels is about 1.0 mm.

## Copper In-use Stock Analysis Using Satellite Nighttime Light Observation Data

K. Ichino Takahashi, R. Terakado, J. Nakamura, I. Daigo, Y. Matsuno, and Y. Adachi

Materials Transactions, The Japan Institute of Metals, Vol. 50, No. 7, pp. 1871–1874, 2009.

We have developed a novel methodology for analyzing the worldwide stock of copper in-use by using nighttime light images. Radiance calibrated nighttime light imaged data (RCD) for the entire world has been assembled from the Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS) by the National Geophysical Data Center. It has been recognized that the intensity of nighttime light is strongly associated with such aspects of human settlement as population density and energy consumption. We assumed that the presence of light implies the use of electrical conducting material, namely copper. The in-use stock data for copper in Japan, North America, Australia, and China was obtained from previous material flow analysis studies. We analyzed the relationship between light accumulation and the size of the copper stock in those countries. A significant correlation was found and the feasibility of this method was confirmed. We used this method to analyze the in-use stock in other Asian countries. The in-use stock of copper was correlated with the gross domestic product (GDP).

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**Wireless Network Coding in Slotted ALOHA with Two-hop Unbalanced Traffic**

D. Umehara, T. Hirano, S. Denno, M. Morikura, and T. Sugiyama  
IEEE J. Sel. Areas Commun., Vol. 27, No. 5, pp. 647–661, 2009.

This paper deals with two representative unbalanced traffic cases for two-hop wireless relay access systems using network coding and a slotted ALOHA protocol. Network coding is a recent and highly regarded technology for capacity enhancement by using multiple unicast and multisource multicast networks. We have analyzed the performance of network coding on a two-hop wireless relay access system using the slotted ALOHA under balanced bidirectional traffic. The relay nodes will generally handle this unbalanced multidirectional traffic but its impact on network coding has not been analyzed. This paper provides closed-form expressions for the throughput and packet delay for two-hop unbalanced bidirectional traffic cases both with and without network coding even if the buffers at nodes are unsaturated. The analytical results are mainly derived by solving queueing systems for the buffer behavior at the relay node. The results show that the transmission probability of the relay node is a

design parameter that is crucial to maximizing the achievable throughput of wireless network coding in slotted ALOHA in two-hop unbalanced traffic cases. Furthermore, we show that the throughput is enhanced even if the traffic at the relay node is unbalanced.

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**Possible Prevention of Delayed Fracture of Metal by Electrochemical Technique****—1st step: Potential Control Method for JIS SUS 304 Steel—**

H. Saito and T. Handa

Material Testing Research Association of Japan, Vol. 54, No. 3, pp. 190–194, 2009.

To build a technical foundation for extending the lifetimes of telecommunications facilities, we investigated a possible method of delaying fracture by separating the structural parts and electrochemical reaction electrode parts. This method prevented the active corrosion of JIS SUS 304 steel in situation in which all the steel parts were kept on the electrochemical cathode.

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