

13th International Conference on **Q**uality **C**ontrol by **A**rtificial **V**ision

QCAV 2017

May 14 – 16, 2017, Tokyo, JAPAN

<http://www.tc-iaip.org/QCAV2017/>



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CHUO UNIVERSITY
— Knowledge into Action —

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INTRODUCTION

We are pleased to welcome you all to the 13th International Conference on Quality Control by Artificial Vision (QCAV2017). As you know, QCAV started in 1993 at Le Creusot, France, and this year we have the 13th QCAV conference in Tokyo, that is the fourth one held in Japan after Kagawa in 1998, Nagoya in 2005, and Fukuoka in 2013. The objective of the QCAV2017 conference continues the previous ones: to provide a forum for researchers, engineers, suppliers and users of vision systems to present and discuss the state-of-the-art in machine and computer vision and image processing techniques, with an emphasis on quality control.

We have 46 papers that were reviewed and selected from 52 submitted papers. All presentations are oral in a single track. We believe this makes the conference more unified and helps producing deep and intensive discussions on the presented papers.

And we are proud to have three fabulous plenary talks:

- Prof. Mohit Gupta (University of Wisconsin-Madison): Towards Next Generation 3D Cameras
- Prof. Stéphane Canu (INSA de Rouen, Normandie Université): Machine Learning, Deep Learning and Optimization in Computer Vision
- Dr. Yukiyasu Domaie (Mitsubishi Electric Corporation): Machine vision for various manipulation tasks

We really appreciate the plenary speakers to give their cutting-edge research/development results to us.

The conference is sponsored by the Technical Committee on Industrial Application of Image Processing (IAIP), The Japan Society for Precision Engineering. In addition, we thank the ten organizations that contribute to the conference as the technical sponsors.

We hope all attendees enjoy not only the conference itself, but also Tokyo, one of the largest megalopolises in the world and the venue of next summer Olympic games in 2020.

QCAV2017 Organizing Committee

PROGRAM OVERVIEW

DAY 1 (Sunday, 14 May)	
10:00-10:10 AM	Opening
10:10-11:30 AM	Session 1 Image Analysis
11:30 AM – 13:00 PM	Lunch Break
13:00-14:00 PM	Plenary Talk 1 Towards Next Generation 3D Cameras Prof. Mohit Gupta, University of Wisconsin-Madison
14:00-14:10 PM	Break
14:10-16:10 PM	Session 2 Camera and Sensing
16:10-16:20 PM	Break
16:20-17:40 PM	Session 3 Face and Gesture
18:00-20:00 PM	Reception (at restaurant "Prior" in the same building)

DAY 2 (Monday, 15 May)	
9:30-11:30 AM	Session 4 Machine Learning
11:30 AM – 13:00 PM	Lunch Break
13:00-14:00 PM	Plenary Talk 2 Machine Learning, Deep Learning and Optimization in Computer Vision Prof. Stéphane Canu, INSA de Rouen, Normandie Université
14:00-14:10 PM	Break
14:10-16:10 PM	Session 5 3D measurement
16:10-16:20 PM	Break
16:20-18:00 PM	Session 6 Object Classification and Tracking
19:00-21:00 PM	Banquet (at Hisagoan, ASAKUSA)

DAY 3 (Tuesday, 16 May)	
9:30-11:30 AM	Session 7 Human Factor
11:30 AM – 13:00 PM	Lunch Break
13:00-14:00 PM	Plenary Talk 3 Machine vision for various manipulation tasks Dr. Yukiyasu Domae, Mitsubishi Electric Corporation
14:00-14:10 PM	Break
14:10-15:50 PM	Session 8 Autonomous Vehicle
15:50-16:00 PM	Break
16:00-17:20 PM	Session 9 Inspection
17:20-17:30 PM	Closing

PLENARY SPEAKERS



Plenary Talk 1:
Towards Next Generation 3D Cameras
Prof. Mohit Gupta
University of Wisconsin-Madison, USA

Abstract:

We are in the midst of a 3D revolution. Robots enabled by 3D cameras are beginning to autonomously drive cars, perform surgeries, and manage factories. However, when deployed in the real-world, these cameras face several challenges that prevent them from measuring 3D shape reliably. These challenges include large lighting variations (bright sunlight to dark night), presence of scattering media (fog, body tissue), and optically complex materials (metal, plastic). Due to these factors, 3D imaging is often the bottleneck in widespread adoption of several key robotics technologies. I will talk about our work on developing 3D cameras based on time-of-flight and active triangulation that addresses these long-standing problems. This includes designing 'all-weather' cameras that can perform high-speed 3D scanning in harsh outdoor environments, as well as cameras that recover shape of objects with challenging material properties. These cameras are, for the first time, capable of measuring detailed (<100 microns resolution) scans in extremely demanding scenarios with low-cost components. Several of these cameras are making a practical impact in industrial automation, being adopted in robotic inspection and assembly systems.



Plenary Talk 2:

Machine Learning, Deep Learning and Optimization in
Computer Vision

Prof. Stéphane Canu

INSA de Rouen, Normandie Université, France

Abstract:

As quoted in the Large Scale Computer Vision Systems NIPS workshop, computer vision is a mature field with a long tradition of research, but recent advances in machine learning, deep learning, representation learning and optimization have provided models with new capabilities to better understand visual content. The presentation will go through these new developments in machine learning covering basic motivations, ideas, models and optimization in deep learning for computer vision, identifying challenges and opportunities. It will focus on issues related with large scale learning that is: high dimensional features, large variety of visual classes, and large number of examples.



Plenary Talk 3:

Machine vision for various manipulation tasks

Dr. Yukiyasu Domae

Mitsubishi Electric Corporation, Japan

Abstract:

Bin-picking, re-grasping, pick-and-place, kitting, etc. There are many manipulation tasks in the fields of automation of factory, warehouse and so on. The main problem of the automation is that the target objects (items/parts) have various shapes, weights and surface materials. In my talk, I will show latest machine vision systems and algorithms against the problem.

PROGRAM

SUNDAY 14 MAY

Opening

10:00 - 10:10

Session 1: Image Analysis

10:10-11:30

Chair: Yasushi Makihara (Osaka University, Japan)

Robust feature estimation by non-rigid hierarchical image registration and its application in disparity measurement

Author(s): Amir Badshah, International Islamic University (Pakistan); Aadil Jaleel Choudhry, Shan Ullah, National University of Sciences and Technology (Pakistan)

Detection and localization of underground networks by fusion of electromagnetic signal and GPR images

Author(s): Meriem HAFSI, Philippe Bolon, Richard Dapoigny, LISTIC Université Savoie Mont Blanc (France)

3D geometrical characterization and modelling of solid oxide cells electrodes microstructure by image analysis

Author(s): Hamza Moussaoui, CEA (France); Johan Debayle, Yann Gavet, Ecole Nationale Supérieure des Mines de Saint-Etienne (France); Gérard Delette, Maxime Hubert, CEA (France); Peter Cloetens, ESRF - The European Synchrotron (France); Jérôme Laurencin, CEA (France)

A belief-propagation-based decoding method for two-dimensional barcodes with monochrome auxiliary lines robust against non-uniform geometric distortion

Author(s): Kohei Kamizuru, Kazuya Nakamura, Hiroshi Kawasaki, Satoshi Ono, Kagoshima University (Japan)

Lunch Break

11:30 - 13:00

Plenary Talk 1:

13:00 - 14:00

Chair: Hajime Nagahara (Osaka University, Japan)

Towards Next Generation 3D Cameras

Author(s): Mohit Gupta, University of Wisconsin-Madison (United States)

Break

14:00 - 14:10

Session 2: Camera and Sensing

14:10 - 16:10

Chair: Chikahito Nakajima (Central Research Institute of Electric Power Industry, Japan)

Interests of refocused images calibrated in depth with a multi-view camera for control by vision

Author(s): Cécile Riou, Bruno Colicchio, Jean-Philippe Lauffenburger, Christophe Cudel, University de Haute Alsace (France)

Ultrasonic imaging for non-destructive evaluation of standing trees: effect of anisotropy on image reconstruction

Author(s): Luis Fernando Espinosa Moreno, Flavio Prieto, University Nacional de Colombia (Colombia); Loïc Brancheriau, CIRAD (France)

An omni-RGB+D camera rig calibration and fusion using unified camera model for 3D reconstruction

Author(s): Ahmad Zawawi Jamaluddin, Osama Mazhar, Cansen Jiang, Ralph Seulin, Olivier Morel, David Fofi, Université Bourgogne Franche-Comté (France)

Synthesis filter bank and pupil function for perfect reconstruction of all-in-focus image from focal stack

Author(s): Akira Kubota, Chuo University (Japan)

Estimation of extrinsic parameters of multiple fish-eye cameras using calibration markers

Author(s): Hiroya Okamoto, Yuki Tanaka, Akihiko Hishigi, Chuo University (Japan); Abdelaziz Khiat, Noriko Shimomura, Nissan Motor (Japan); Gakuto Masuyama, Kazunori Umeda, Chuo University (Japan)

Underwater 3D scanning using Kinect v2 time of flight camera

Author(s): Atif Anwer, Syed Saad A Ali, Amjad Khan, Fabrice Mériaudeau, Universiti Teknologi PETRONAS (Malaysia)

Break

16:10 - 16:20

Session 3: Face and Gesture

16:20 - 17:40

Chair: Takashi Komuro (Saitama University, Japan)

A visual surveillance system for person re-identification

Author(s): Hazem El-Alfy, Daigo Muramatsu, Osaka University (Japan); Yuuichi Teranishi, Nozomu Nishinaga, National Institute of Information and Communications Technology (Japan); Yasushi Makihara, Yasushi Yagi, Osaka University (Japan)

Mixed features for face detection in thermal image

Author(s): Chao Ma, Thanh Ngo Trung, Hideaki Uchiyama, Hajime Nagahara, Atsushi Shimada, Rin-ichiro Taniguchi, Kyushu University (Japan)

Spatial and temporal segmented dense trajectories for gesture recognition

Author(s): Kaho Yamada, Takeshi Yoshida, Kazuhiko Sumi, Aoyama Gakuin University (Japan); Hitoshi Habe, Kindai University (Japan); Ikuhisa Mitsugami, Osaka University (Japan)

Development of facial aging simulation system combined with three-dimensional shape prediction from facial photographs

Author(s): Takeshi Nagata, Kazutoshi Matsuzaki, Mizuho Information & Research Institute, Inc. (Japan); Kei Taniguchi, Yoshinori Ogawa, Kazuhiko Imaizumi, National Research Institute of Police Science (Japan)

Reception

18:00 - 20:00

MONDAY 15 MAY

Session 4: Machine Learning

9:30 - 11:30

Chair: Joan Debayle (École nationale supérieure des mines de Saint-Étienne, France)

Deep learning for evaluating difficult-to-detect incomplete repairs of high fluence laser optics at the National Ignition Facility

Author(s): Nathan Mundhenk, Laura Mascio Kegelmeyer, Scott K Trummer, Lawrence Livermore National Lab (United States)

A method based on machine learning using hand-crafted features for crack detection from asphalt pavement surface images

Author(s): Yusuke Fujita, Koji Shimada, Yamaguchi University (Japan); Manabu Ichihara, Wesco Co. Ltd. (Japan); Yoshihiko Hamamoto, Yamaguchi University (Japan)

Training sample selection based on self-training for liver cirrhosis classification using ultrasound images

Author(s): Yusuke Fujita, Yamaguchi University (Japan); Yoshihiro Mitani, National Institute of Technology, Ube College (Japan); Yoshihiko Hamamoto, Makoto Segawa, Yamaguchi University (Japan); Shuji Terai, Niigata University (Japan); Isao Sakaida, Yamaguchi University (Japan)

Recognition and defect detection of dot-matrix text via variation-model based learning

Author(s): Wataru Ohyama, Koushi Suzuki, Tetsushi Wakabayashi, Mie University (Japan)

Convolution neural network for contour extraction of corneal endothelial cells

Author(s): Saya Katafuchi, Motohide Yoshimura, University of Nagasaki (Japan)

Development of a classification method for a crack on a pavement surface images using machine learning

Author(s): Akiyoshi Hizukuri, Takeshi Nagata, Mizuho Information & Research Institute, Inc. (Japan)

Lunch Break

11:30 - 13:00

Plenary Talk 2:

13:00 - 14:00

Chair: Philippe Bolon (Université Savoie Mont Blanc, France)

Machine Learning, Deep Learning and Optimization in Computer Vision

Author(s): Stéphane Canu, INSA de Rouen, Normandie Université (France)

Break

14:00 - 14:10

Session 5: 3D Measurement

14:10 - 16:10

Chair: Yann Gavet (École nationale supérieure des mines de Saint-Étienne, France)

Microgeometry capture and RGB albedo estimation by photometric stereo without demosaicing

Author(s): Yvain Quéau, Technical University Munich (Germany); Mathieu Pizenberg, Jean-Denis Durou, IRIT, CNRS, University de Toulouse (France) Daniel Cremers, Technical University Munich (Germany)

Dent detection method by high gradation photometric stereo

Author(s): Akihisa Hasebe, Kunihiro Kato, Gifu University (Japan); Hideki Tanahashi, Naoki Kubota, Gifu Prefectural Research Institute of Information Technology (Japan)

Use of polarimetric imaging of emissive objects

Author(s): Abir Zanzouri Kechiche, O.Aubret, Université Bourgogne Franche-Comté (France); A.Mathieu, Laboratoire LE2I Le creusot (France); C.Stolz, Université Bourgogne Franche-Comté (France)

Joint technique of fine object boundary recovery and foreground image deblur for video including moving objects

Author(s): Yuki Matsushita, Hiroshi Kawasaki, Kagoshima University (Japan); Teruhisa Takano, The University of Tokyo (Japan); Shintaro Ono, Kagoshima University (Japan); Katsushi Ikeuchi, The University of Tokyo (Japan)

3D shape measurement with defect detection

Author(s): Hiroyuki Ukida, Tokushima University (Japan)

Three dimensional measurement using likelihood function by multi-camera

Author(s): Tsuyoshi Shimizu, University of Yamanashi (Japan)

Break

16:10 - 16:20

Session 6: Object Classification and Tracking

16:20 - 18:00

Chair: Yvain Quéau (Technical University Munich, Germany)

Object classification with range and reflectance data from a single laser scanner

Author(s): Shuji Oishi, Toyohashi University of Technology (Japan); Naoaki Kondo, Ryo Kurazume, Kyushu University (Japan)

Evidential multi-class classification from binary classifiers: application to waste sorting quality control from hyperspectral data

Author(s): Marie Lachaize, Veolia Recherche et Innovation (France); Sylvie Le Hégarat-Masclé, Emanuel Aldea, Université Paris Sud (France); Aude Maitrot, Veolia Recherche et Innovation (France); Roger Reynaud, Université Paris Sud (France)

Affordance-based 3D feature for generic object recognition

Author(s): Masaki Iizuka, Shuichi Akizuki, Manabu Hashimoto, Chukyo University (Japan)

Visual object tracking based on disc-harmonic moments features invariants

Author(s): Driss Moujahid, Omar Elharrouss, Hamid Tairi, Sidi Mohamed Ben Abdellah University (Morocco)

Tracking and removal of suspended matter from underwater video images

Author(s): Takashi Komuro, Kun Chen, Saitama University (Japan); Koichiro Enomoto, Niigata University (Japan); Masashi Toda, Kumamoto University (Japan); Naoaki Tezuka, Japan Fisheries Research and Education Agency (Japan)

Banquet

19:00 – 21:00

TUESDAY 16 MAY

Session 7: Human Factor

9:30 - 11:30

Chair: Fabrice Meriaudeau (Universiti Teknologi Petronas, Malaysia)

Hyperspectral imaging using flickerless active LED illumination

Author(s): Makoto Ohsaki, Hajime Nagahara, Kyushu University (Japan); Tetsuo Ikeda, Kyushu University Hospital (Japan); Rin-ichiro Taniguchi, Kyushu University (Japan)

Method for evaluating the uniformity of projector luminance distribution

Author(s): Naoki Sakai, Yumiko Kishi, Toru Suino, Makoto Hino, Ricoh Company, Ltd. (Japan)

Attention retargeting in real space with projector camera system

Author(s): Katsumi Yamamoto, Hironori Takimoto, Akihiro Kanagawa, Okayama Prefectural University (Japan)

Evaluating the visibility of presentation slides

Author(s): Genki Sugawara, Nobuyuki Umezu, Ibaraki University (Japan)

Features contributing sense of scale in photographs

Author(s): Nobuyuki Umezu, Ibaraki University (Japan)

Prototype implementation of mirror with built-in display

Author(s): Misaki Tani, Nobuyuki Umezu, Ibaraki University (Japan)

Lunch Break

11:30 - 13:00

Plenary Talk 3:

13:00 - 14:00

Chair: Hiroyasu Koshimizu (Chukyo University, Japan)

Machine vision for various manipulation tasks

Author(s): Yukiyasu Domae, Mitsubishi Electric Corporation (Japan)

Break

14:00 - 14:10

Session 8: Autonomous Vehicle

14:10 - 15:50

Chair: Shuji Oishi (Toyohashi University of Technology, Japan)

Studying the response of drivers against different collision warning systems: a review

Author(s): Muhammad Muzammel, Mohd Zuki Yusoff, Aamir Saeed Malik, Mohamad Naufal Mohamad Saad, Fabrice Meriaudeau, Universiti Teknologi Petronas (Malaysia)

Fast and robust-vanishing point detection system using Fast M-estimation method and regional division for in-vehicle camera

Author(s): Yuki Kondo, Hosei University (Japan); Munetoshi Numada, Hiroyasu Koshimizu, Chukyo University (Japan); Ichiro Yoshida, Yuki Morishita, Hosei University (Japan)

Motorcyclists safety system to avoid rear end collisions based on acoustic signatures

Author(s): Muhammad Muzammel, Mohd Zuki Yusoff, Aamir Saeed Malik, Mohamad Naufal Mohamad Saad, Fabrice Meriaudeau, Universiti Teknologi Petronas (Malaysia)

Plugin-docking system for autonomous charging using particle filter

Author(s): Hiroshi Koyasu, Masayoshi Wada, Tokyo University of Agriculture and Technology (Japan)

Real-time flight altitude estimation using phase correlation with Gram polynomial decimation

Author(s): Aadil J. Choudhry, National University of Sciences and Technology (Pakistan); Amir Badshah, International Islamic University (Pakistan); Saadullah Amin, National University of Sciences and Technology (Pakistan)

Break

15:50 - 16:00

Session 9: Inspection

16:00 - 17:20

Chair: Akira Kubota (Chuo University, Japan)

Automatic construction of image inspection algorithm by using image processing network programming

Author(s): Yuichiro Yoshimura, Kimiya Aoki, Chukyo University (Japan)

Computer vision based nacre thickness measurement of Tahitian pearls

Author(s): Martin Loesdau, Sébastien Chabrier, Alban Gabillon, Université de la Polynésie française (French Polynesia)

A novel quantitative methodology for age evaluation of the human corneal endothelium

Author(s): Klervi Rannou, Ecole Nationale Supérieure des Mines de Saint-Etienne (France); Gilles Thuret, Philippe Gain, University Jean Monnet (France); Jean-Charles Pinoli, Yann Gavet, Ecole Nationale Supérieure des Mines de Saint-Etienne (France)

Component extraction on CT volumes of assembled products using geometric template matching

Author(s): Katsutoshi Muramatsu, Yutaka Ohtake, Hiromasa Suzuki, Yukie Nagai, University of Tokyo, School of Engineering (Japan)

Closing

17:20 – 17:30

CONFERENCE VENUE

Surugadai Memorial Hall, Chuo University, Tokyo, Japan.



RECOMMENDED TOURIST ATTRACTIONS

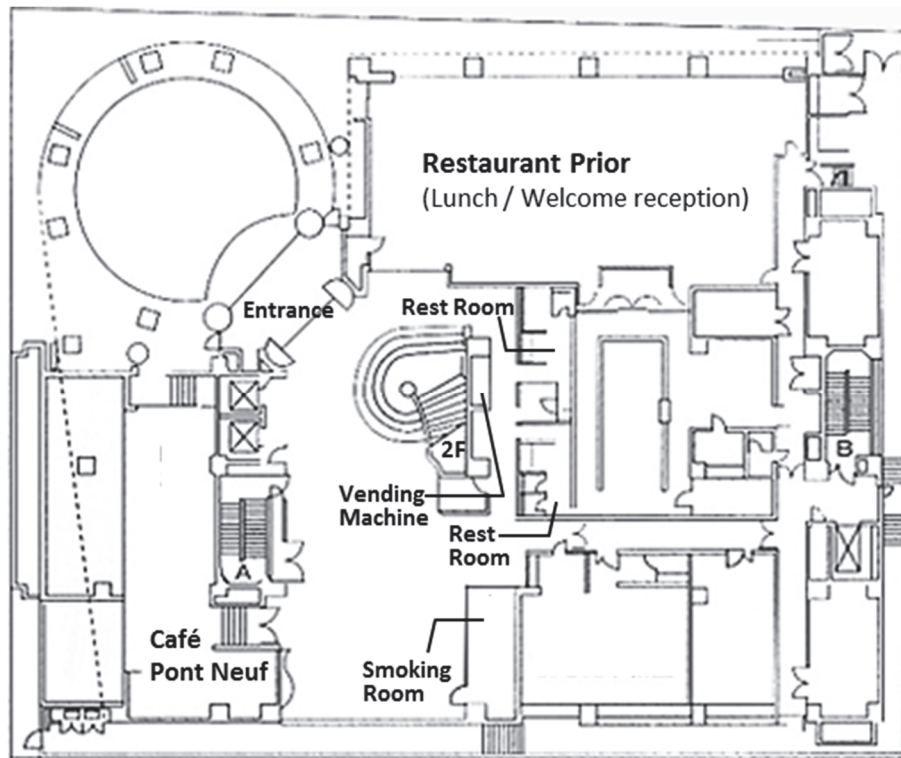
National Museum of Western Art registered as a World Heritage Site in July 2016!!

The main building is one of the 17 works designated as World Heritage Sites "The Architectural Work of Le Corbusier, an Outstanding Contribution to the Modern Movement".

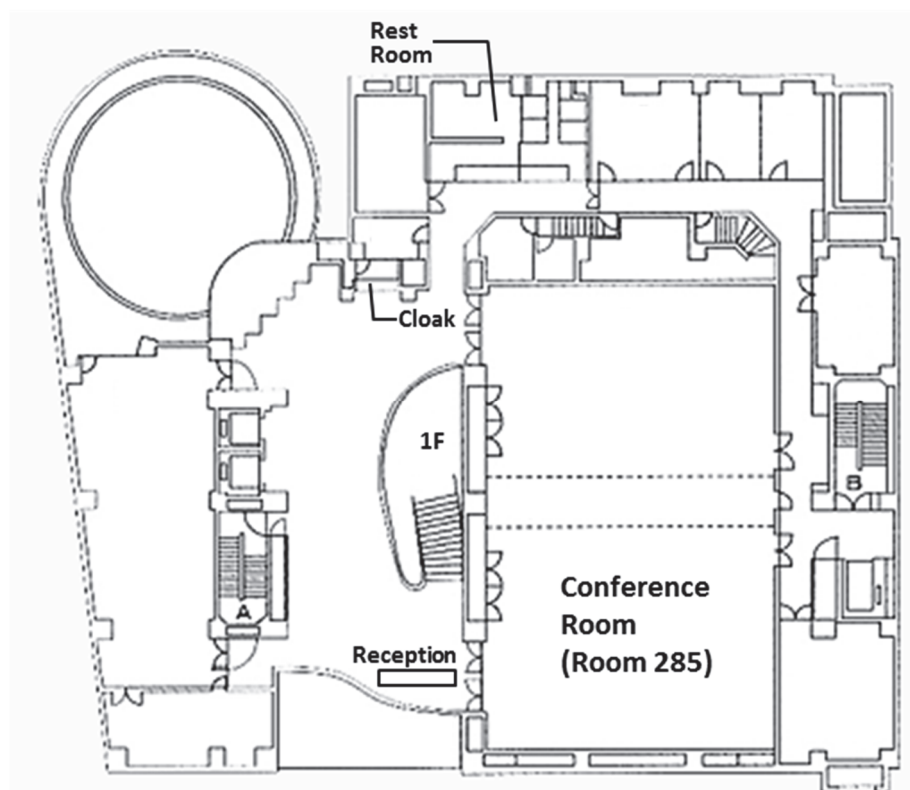


0. QCAV2017, 1. National Museum of Western Art / Ueno, 2. Yushima Seido,
3. Holy Resurrection Cathedral in Tokyo, 4. Nezu Shrine, 5. Senso-ji / Tokyo Skytree,
6. Rikugien Garden, 7. Meiji Shrine, 8. Shinjuku Gyoen, 9. Akihabara

FLOOR MAP



1st floor



2nd floor

QCAV2017 Banquet

• Date: May 15, 2017 19:00-21:00

• Place: HISAGOAN

3-34-11 Asakusa, Taisho-ku,
Tokyo 111-0032 Japan

• Transportation *about 40-45 minutes*

Surugadai Memorial Hall (Conference Venue)

-[walk (5 minutes)]-

Ochanomizu Station (JR)

-[JR Chuo Line (2 minutes)]-

Kanda Station (JR / Tokyo Metro Ginza Line)

-[Tokyo Metro Ginza Line (10 minutes)]-

Asakusa Station (Tokyo Metro Ginza Line)

-[Exit 6 / walk (15 minutes)]-

Hisagoan

• Notice

- ✓ Basically, the participants are supposed to get together and break up by themselves at Hisagoan.
- ✓ We will prepare a small bus only for the outward trip. Foreigners or VIPs have priority to board the bus.
- ✓ We will not prepare the return means of transportation.



<https://goo.gl/DqGtw2>

