



# Masao Horiba Awards 堀場雅夫賞

## Call for Applications 2018

### Message from the Chairman & Group CEO

The Masao Horiba Award was established in 2003, to highlight innovative work in analytical measurement technologies. This information is critical to understanding many phenomena and, thus, forms the basis of new scientific research. These properties also form the foundation for the transition of materials to industrial production. For the product and process optimization, these analytical and measurement technologies are indispensable. I hope that the Masao Horiba Award, named after the founder of HORIBA, Ltd., will contribute to illuminating the achievement of researchers who are working hard in the field of analytical and measurement technology. We look forward to receiving many applications for this year's award.

Atsushi Horiba  
Chairman & Group CEO  
HORIBA, Ltd.



## 2018 Masao Horiba Awards

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The Masao Horiba Award was created to encourage researchers and engineers in universities or public laboratories worldwide who are contributing to the field of science and technology through their research related to analysis and measurement. We are now inviting entries for the 15th Masao Horiba Award in 2018 under the theme of "Advanced analytical and measurement technologies in semiconductor manufacturing processes."

The First Industrial Revolution came with the invention of the steam engine. The Second was brought about by mass production using electricity and oil. The Third was driven by computer based automation. Following these, the Fourth Industrial Revolution, characterized by the Internet of things (IoT) and artificial intelligence (AI), has already begun. As a foundation to support major changes in the industrial structure like this, semiconductors are becoming increasingly important. For instance, if you want to realize better services and improved productivity by leveraging IoT and AI technologies, it will be important to generate massive data by activating a large number of sensors through IoT and to appropriately analyze the data by AI. To this end, semiconductor devices to activate these sensors are necessary, as well as processors and memory devices capable of processing bulk data. From the viewpoint of productivity improvement, further automation of manufacturing processes and the introduction of cutting-edge robot technologies will be required, thereby driving the demand for a wide range of semiconductor devices that support various sensors adopted in these technologies. Moreover, considering the future streamlining of the power infrastructure and electrification of automobiles, the development of power semiconductors with higher performance that reduce power loss is also indispensable. Thus, semiconductor devices are further growing in importance as a key to industrial technologies.

To meet the abovementioned demands, next-generation semiconductor devices will need to be based on process technologies that efficiently achieve further miniaturization of devices, as well as improvement of performance and reliability. In addition, they will also require mass manufacturing processes pursuing yield and energy-saving performance more extensively than ever. In a series of processes, thin-film deposition on the substrate, along with etching, are very important manufacturing processes that greatly contribute to device performance and reliability, thereby requiring delicate and precise control. For example, there has been an expectation for the development of process control technology for feedforward and feedback of a huge quantity of parameters, which are output from monitoring and control instruments surrounding the thin-film process chamber, to the very process of thin-film deposition. In other words, a sophisticated, organic connection between analytical and measurement technologies and control technologies is necessary for the future evolution of semiconductors.

Against this backdrop, the 2018 Masao Horiba Award is accepting entries themed on analytical and measurement technologies contributing to the sophistication of thin-film deposition and etching processes, which are particularly important among the manufacturing processes of semiconductor devices indispensable to industrial progress. We welcome applications from motivated researchers and engineers in and outside Japan, who are devoting themselves to unique, creative research and development activities in the field of analytical and measurement technologies that support further innovation of semiconductor devices closely linked with our lives.



Masayuki Adachi, Dr. Eng.  
Chief of the Organizing Committee for 2018 Masao Horiba Awards  
President & COO  
HORIBA, Ltd.



# Guidelines for 2018 Masao Horiba Awards

## Outline

The purpose of this award is to encourage and recognize scientists and engineers relatively early in their careers who are achieving distinguished results in the field of analytical science and technology. We cordially invite applications from researchers all over the world who are enthusiastically engaged in original research and development at universities or public research facilities.

## Eligible Field of Technology: "Advanced analytical and measurement technology in the semiconductor manufacturing process."

We are looking for advanced analysis and measurement technologies that can contribute process control for semiconductor manufacturing process, especially deposition and etch processes.

The monitoring points are not only the device portion on wafer but also the portion including process chambers and fluid delivery systems that can contribute to device performance improvements, and to achieve high efficiency processes, energy savings and yield improvement.

The target manufacturing processes are IC (logic, memory, analog IC), optical devices (display, LED, solar), discrete devices (diode, power IC) and sensor devices (temperature sensor, pressure sensor) and cannot include research of materials and device characterization.

## Eligibility of Applicant

An applicant should be a researcher or an engineer at a university or a public research facility worldwide, engaged in research and development in the field described above. The applicant should fulfill one of the following criteria:

- The applicant is expected to achieve outstanding academic or technological inventions or discoveries in research or development in a field eligible for this award.
- The applicant is expected to solve important academic or technological issues in the field eligible for this award.

Potential of the applicant is highly evaluated rather than his/her current achievement.

Applications from outside Japan must be made at the invitation from an employee of a HORIBA Group company.

## Incentive

A certificate of commendation will be presented to each recipient of the 2018 Masao Horiba Awards at the award ceremony.

A supplementary award will also be made. Research subsidy of JPY1,000,000 yen will be presented in the first year and the same amount JPY1,000,000 yen for the next year.

The award and the supplementary award will be given on the condition that the winners accept the invitation to attend the award ceremony held in Kyoto on Oct. 17, 2018 and that the winners continue to meet the eligibility described above.

## Application for the 2018 Masao Horiba Awards

Applicants are required to submit:

- i) an original completed application form with 1 copy for the 2018 Masao Horiba Awards and a CD-R or DVD which was stored in a PDF file form,
- ii) an original signed recommendation letter written by the director/president of the institution or his/her supervisor using the designated form with 1 copy, and a CD-R or DVD which was stored in a PDF file form, and
- iii) a maximum three publications which are central to the applied research with 1 copy each, and a CD-R or DVD which was stored in a PDF file form.

For detailed information, please contact HORIBA office in your region.

## Submission Deadline

Applicants must submit the above original application documents with 1 copy, and a CD-R or DVD to the HORIBA Group company employee who invited them to apply for the award by Friday, May 18, 2018.

## Screening

The members of the Screening Committee for the 2018 Masao Horiba Awards listed below will determine the winners through examination of the achievements and future prospects of the applicants, based on their application documents.

## Screening Committee for the 2018 Masao Horiba Awards

Chairperson:	Toshihiko Kanayama Fellow National Institute of Advanced Industrial Science and Technology (AIST)
Judges:	Srini Raghavan Professor, Materials Science and Engineering, University of Arizona  Masaharu Shiratani Professor, Department of Electronics, Graduate School of Information Science and Electrical Engineering, Kyushu University  Akinobu Teramoto Professor, New Industry Creation Hatchery Center, Tohoku University  Takeo Watanabe Professor, Laboratory of Advanced Science and Technology for Industry (LASTI), University of Hyogo  Masaki Inoue Department Manager, Research & Development Department, HORIBA STEC, Co., Ltd.  Tetsuo Fujii Team Leader, Business Strategy Division, HORIBA STEC, Co., Ltd.
Award Director:	Atsushi Horiba, Chairman & Group CEO HORIBA, Ltd.
Chief of the Organizing Committee for 2018 Masao Horiba Awards	Masayuki Adachi, President & COO HORIBA, Ltd.
Advisor for 2018 Masao Horiba Awards	Kozo Ishida, Senior Corporate Advisor HORIBA, Ltd.

## Results

Applicants will be notified of the screening results by the end of July, 2018.

## Award Ceremony and Commemorative Seminar

Award ceremony and commemorative seminar for the 2018 Masao Horiba Awards, followed by a reception, will be held on October 17, 2018 at Shiran Kaikan, Kyoto University, Kyoto, Japan.

## Publication of Awarded Research

Award-winning research will be published in HORIBA's technical journal *Readout*.

