

July 18, 2024 The Institute of Statistical Mathematics (ISM) Japanese Federation of Statistical Science Associations (JFSSA)

# Announcement of the Awardee of the Fifth Akaike Memorial Lecture Award



Awardee/Speaker: Professor Arnaud Doucet (University of Oxford, UK and Senior Staff Research Scientist, Google DeepMind)

Lecture Title: "Schrödinger Bridges - Computation and Applications" Time and Date: 10:00–12:00 Monday, September 2, 2024 (\*)

- Professor Doucet's lecture will be presented at the plenary session of the Japanese Joint Statistical Meeting 2024. Professor Doucet will speak on-site.
- The Japanese Joint Statistical Meeting 2024 will be held in a hybrid format with online and on-site participation options.

**Venue:** Tokyo University of Science, Kagurazaka Campus (https://www.tus.ac.jp/en/campus/kagurazaka.html)

(\*) Detailed information will be uploaded on the websites of ISM (http://www.ism.ac.jp/index\_e.html) and related organizations.

### **Professor Arnaud Doucet**

Born in 1970, Professor Doucet is a leading international researcher in Monte Carlo methods and their applications to Bayesian statistics, and more recently, in machine learning. He has significantly contributed to the rapid advancement of these fields. Active in both academia and industry, Professor Doucet has recently focused on pioneering research using machine learning techniques. His innovative approach has led to remarkable results in new areas, placing him at the forefront of the industry.



#### Dr. Hirotugu Akaike (https://www.ism.ac.jp/akaikememorial/index-e.html)

The late Dr. Akaike was a statistician who proposed the Akaike Information Criterion (AIC). He established a novel paradigm of statistical modeling, characterized by a predictive point of view, that was completely distinct from traditional statistical theory. Dr. Akaike's research has greatly influenced a wide range of research areas. To recognize his achievements, the Akaike Memorial Lecture Award was launched in May 2016.

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#### **♦** Summary

The Akaike Memorial Lecture Award was launched in May 2016. The purpose of this award is to commemorate the achievements of the late Dr. Akaike, who established a novel paradigm to evaluate the predictive accuracy of statistical modeling. Dr. Akaike proposed a metric for model selection, the Akaike Information Criterion (AIC), based on an approach completely different from the statistical theories common at the time. Dr. Akaike's ideas have influenced a wide range of theoretical and applied research areas.

This award is now jointly managed by the Institute of Statistical Mathematics (ISM) and the Japanese Federation of Statistical Science Associations (JFSSA). The awardee is selected and the memorial lecture by the awardee is held at the Japanese Joint Statistical Meeting (JJSM) once every two years.

The Fifth Award goes to Professor Arnaud Doucet, a professor at the University of Oxford and a Senior Staff Research Scientist of Google DeepMind. Professor Doucet is a leading international researcher in Monte Carlo methods and their applications to Bayesian statistics and, more recently, in machine learning. With his innovative approach, Professor Doucet has achieved remarkable results in new areas as well. The award ceremony and memorial lecture will be held during at the plenary session of JJSM 2024 which will be held in a hybrid format with online and on-site participation options on September 2 at the Tokyo University of Science, Kagurazaka, Tokyo. Professor Doucet will visit the venue and deliver the memorial lecture on-site.

#### **Reasons for the Award**

Professor Doucet is a leading international expert in Monte Carlo methods and their application to Bayesian statistics and, more recently, in machine learning. Since the early 2000s, he has published a series of innovative studies on the theory and applications of particle filter, contributing to the rapid progress of the corresponding field. More recently, Professor Doucet has shifted to pioneering research incorporating machine learning techniques, and his innovative approach with outstanding results in new areas has led the industry to the forefront.

Professor Doucet was appointed to ISM in 2009 as a full-time project professor and has frequently visited ISM as a visiting professor since then to continue to promote collaborative research. Professor Doucet has also been in close contact with researchers in the field of statistical science in Japan, presenting lectures at workshops and seminars organized by ISM and at the Japan Statistical Society (JSS) when he travels to Japan. Professor Doucet is active not only in academia but also in industry, becoming a full-time Senior Staff Research Scientist at Google DeepMind in April 2023.



Professor Doucet's outstanding international contributions to the broad field of statistical science are worthy of the Akaike Memorial Lecture Award. For these reasons, the Selection Committee has decided to award the Fifth Akaike Memorial Lecture Award to Professor Doucet.

#### The Fifth Awardee: Professor Arnaud Doucet

#### **Research Achievements**

Professor Arnaud Doucet is widely recognized as a prominent contributor to the theory and computational methods of Bayesian statistics and machine learning. He has published more than 300 research papers and books. In particular, Professor Doucet's work on particle filtering and its related technologies has strongly influenced both the theory and applications of statistics.

Particle filtering is a technique for sequentially estimating and generating missing variables, and it is used in a wide range of fields, including robotics, econometrics, geolocation systems, and biomedicine. Professor Doucet has achieved various research outcomes in this area. For example, the Particle Markov Chain Monte Carlo method developed by Professor Doucet and his colleagues elegantly combines particle filtering with Markov Chain Monte Carlo, enabling the simultaneous estimation of missing variables and parameters.

Although the comprehensive understanding of such methods has advanced today, at the time, the seamless combination of the two techniques was met with astonishment. These achievements have earned him numerous awards, including the Guy Medal in Silver from the Royal Statistical Society. In recent years, he has also been actively advancing research on generative models and optimal transport, yielding important results.

In the field of education, Professor Doucet is highly regarded internationally. Through lectures at numerous universities around the world and collaborative work with young researchers, he is actively involved in educating the next generation of researchers. Many of the doctoral students he has supervised have succeeded in both industry and academia, significantly influenced by his mentorship.

Professor Doucet has also served as a professor at ISM in Tokyo. He frequently visits Japan, delivering keynote speeches at events such as at the 18th Spring Meeting of the Japanese Statistical Society, and actively presenting his research at numerous institutions across Japan.

CV Name: Arnaud Doucet

Current Position: Professor of Statistics, Department of Statistics, University of Oxford, Senior Staff Research Scientist, Google DeepMind

Born: 1970



Education: Ph.D. from University Paris-XI (Orsay) in 1997

#### **Professional Summary:**

2001 - 2002	Assistant Professor, University of Melbourne, Australia
2002 - 2005	Assistant Professor, University of Cambridge, UK
2009 - 2009	Project Professor, The Institute of Statistical Mathematics, Japan
2005 - 2011	Associate Professor, University of British Columbia, Canada
2011-present	Professor of Statistics, University of Oxford, UK
2019-present	Senior Staff Research Scientist, Google DeepMind (*becoming full-time since
April 2023)	

#### Details of the Fifth Akaike Memorial Lecture

The Fifth Akaike Memorial Lecture will be jointly hosted by ISM and JFSSA.

Session Title:	The plenary session of JJSM 2024: the Akaike Memorial Lecture
Speaker:	Professor Arnaud Doucet, University of Oxford, UK, and Google DeepMind
Lecture Title:	"Schrödinger Bridges - Computation and Applications"
Organizers:	Professor Kengo Kamatani (ISM) Professor Yuko Araki (Tohoku University)
Moderator:	Professor Hiroshi Yadohisa (Director General, JFSSA)
Chair:	Professor Hiroe Tsubaki (Director-General, ISM)
Discussants:	Professor Christophe Andrieu (University of Bristol, UK)
	Professor Sumeetpal Singh (University of Wollongong, Australia)
Time and Date:	10:00 a.m. to 12:00 p.m., Monday, September 2, 2024 *The entire session will be presented in English.
Venue:	Kagurazaka Campus, Tokyo University of Science 1-3 Kagurazaka, Shinjuku-ku, Tokyo 162-8601, Japan ( <u>https://www.tus.ac.jp/en/campus/kagurazaka.html</u> ) *The lecture will be held in a hybrid format with online and in- person participation options. Professor Doucet will speak on-site.

For more details of the lecture, please visit the official web sites of the following organizations:

- ISM (https://www.ism.ac.jp/index\_e.html),
- JJSM 2024 (<u>https://pub.confit.atlas.jp/en/event/jfssa2024</u>)



#### The Purpose of the Akaike Memorial Lecture Award

In 2014, ISM and JSS started discussions to launch the Akaike Memorial Lecture Award as their joint program to commemorate the late Dr. Hirotugu Akaike's achievements and impact in statistical science. (\*)

The awardee will deliver the lecture (hereinafter referred to as the "Akaike Memorial Lecture"). This award aims to provide Japanese and other statistical scientists with opportunities to network and interact with each other, nurture junior researchers, and advance statistical science. Since October 2023, this award has been jointly managed by ISM and JFSSA.

Once every two years, one awardee is selected from among international researchers who have made far-reaching and pioneering achievements similar to those of Dr. Akaike. The scope of nomination covers pure and applied research in mathematical science, mathematical engineering, and other statistical sciences (including, for example, system control and optimization algorithms). The awardee receives an honorarium of 100,000 yen, a commemorative award plaque, and travel expenses.

As a means for researcher development, several discussants selected from among promising graduate students and junior researchers will have an opportunity to participate in a question-and-answer session with the awardee. Each lecture presentation and a summary of subsequent discussions will be published as an invited article in the *Annals of the Institute of Statistical Mathematics*.

#### (\*) About the Late Dr. Hirotugu Akaike

Dr. Akaike was born in Shizuoka Prefecture, Japan, on November 5, 1927. After graduating from the Naval Academy of Japan, the First High School, and the Department of Mathematics, School of Science, The University of Tokyo, he joined ISM in 1952.

In the 1960s, Dr. Akaike made pioneering contributions in the field of time-series analysis. He developed new methodologies for spectral analysis, multivariate time-series analysis, and statistical system control, contributing to the development of the Time Series Analysis and Control (TIMSAC) software package. In the 1970s, he introduced the Akaike Information Criterion (AIC), which led to a new paradigm of statistical modeling that enables estimations of the goodness of predictive fits. This approach was a radical departure from the statistical approaches common at the time and profoundly influenced a wide array of research fields. In the 1980s, he developed methods that facilitate the practical application of Bayesian modeling. His works paved a path to novel information processing analytics in the "big data" era. For his widely acknowledged and long-lasting contributions to the statistical sciences, he received the Purple Ribbon Medal of Honor, the Gold and Silver Star (Second Class) of the Sacred Treasure, the Kyoto Prize, and numerous other prestigious awards.

While serving as the Director-General of ISM from 1986, he also engaged in postgraduate education when the Graduate University for Advanced Studies known as SOKENDAI (Kanagawa, Japan) launched the Department of Statistical Science. After his term as Director-General expired in 1994, he became Professor Emeritus both at ISM and at the Graduate University for Advanced Studies. After Dr. Akaike retired from full-time posts, his passion for statistical research remained insatiable and he continued to work on Bayesian and other statistical approaches. He published several journal articles analyzing the relationship between golf-swing motion parameters and driving distance as an illustrative example of

### The Institute of Statistical Mathematics



mathematical modeling. From January 1989 to December 1990, he served as the 19th President of JSS.

On August 4, 2009, he passed away at the age of 81 in Ibaraki Prefecture. On November 5, 2017, a commemorative doodle was posted on the Google search screen in 16 countries and regions to celebrate "Hirotugu Akaike 90th Birthday"

(source: https://www.google.com/doodles/hirotugu-akaikes-90th-birthday).

Hirotugu Akaike Memorial Website: https://www.ism.ac.jp/akaikememorial/index\_e.html

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