

Cluster Preface: Japan/Netherlands Gratama Workshop

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Koichi Fukase is an Executive Vice President at Osaka University and a full Professor at the Graduate School of Science. He received his B.Sc. in Chemistry from the Faculty of Science, Osaka University in 1982, and his Ph.D. in Chemistry from the same university in 1987. After working as a Research Fellow of the Japan Society for the Promotion of Science for about one year, he became an Assistant Professor at Faculty of Science, Osaka University in 1988. In 1994, he joined the Department of Chemistry at Columbia University as a Research Fellow. He was promoted to Lecturer in 1996, Associate Professor in 1998, and Full Professor in 2004 at Graduate School of Science, Osaka University. From 2020 to 2024, he was the Dean of the Graduate School of Science, Osaka University. In 2024, he was appointed as an Executive Vice President. His research interests include carbohydrate chemistry, organic synthesis, chemical biology, glycobiology, innate immunity, and targeted radionuclide therapy. He received the Chemical Society of Japan Award for Young Chemists in 1994, the Chemical Society of Japan Award for Creative Work in 2011, Honorary Life Membership in the International Endotoxin and Innate Immune Society in 2021, and the Chemical Society of Japan Award in 2024.

The Gratama Workshop, established by the late Professor Tetsuo Shiba of Osaka University in 2000, honors the legacy of the Dutch chemist Dr. Koenraad Wolter Gratama (1831–1888), who founded a school of chemistry in Osaka and introduced systematic education in physical and chemical sciences to Japan for the first time. Since the first Gratama Workshop in 2000 in Osaka,¹ subsequent workshops have been organized approximately every three to four years, with locations including Utrecht (2nd), Hyogo (3rd), Delft (4th), Tokyo (5th), and Groningen (6th). The 7th Gratama Workshop was recently held (May 10th to 12th) in Nagasaki Brick Hall, Nagasaki, Japan. The objectives of the workshops have been to honor Gratama's legacy, to explore the role of chemistry and chemical technology in building a sustainable future for humanity, and to enhance the bond between Japan and the Netherlands. They serve as platforms for exchanging academic insights and fostering col-

laboration between emerging and established scientists from both nations, focusing on the advancement of chemical sciences and technology. This special issue of *Synlett* is published in conjunction with the 7th Gratama Workshop. Dr. Yashuhiro Uozumi, the associate editor (*Synlett*) and one of the workshop organizers, and Dr. Koichi Fukase, one of the chairs, oversee this issue, which features presentations from the event or compiled subsequently.

Additionally, I would like to take this opportunity to introduce Dr. Gratama's achievements as follows. On April 19, 1600, the Dutch ship *De Liefde* drifted ashore in Usuki Bay, Oita Prefecture. This event marked the beginning of a long and strong friendship between the Netherlands and Japan, a relationship that continued even during Japan's period of national isolation (1639–1854). In the year 2000, to commemorate the 400th anniversary of Dutch–Japanese friendship, various events were held in the fields of economy, culture, and academics based on a bilateral agreement between Japan and the Netherlands.² The first Gratama Workshop was held in Osaka as part of the 400th anniversary commemoration activities, coinciding with the Dutch Week starting on April 19.

During the period of national isolation, Japan's foreign relations were limited to diplomatic exchanges with Korea and the Ryukyu Kingdom, and trade relations with China and the Netherlands. Even during this period of isolation, Dejima in Nagasaki served as the sole trading post with the Netherlands. This artificial island became a crucial site for the exchange of goods, culture, and knowledge between Japan and the West, playing a significant role in the introduction of Western science and technology to Japan. After the policy of national isolation was abolished, Japan advanced rapidly towards modernization. During this process, Dutch medical and chemical scholars played a bridging role in the development of medicine and scientific technology as part of Japan's modernization process. Their contributions allowed Japan to quickly adopt advanced Western technologies and transform into a modern nation. Dr. Koenraad

Wolter Gratama (1831–1888) was the first foreign professional chemist to come to Japan, contributing significantly to the development of chemistry from the end of the Edo period to the beginning of the Meiji era. He founded the country's first formal and organized school of chemistry, the 'Seimikyoku', in Otemae, Osaka, marking a pivotal moment in the advancement of chemical sciences in Japan.

Dr. Gratama arrived in Nagasaki in April 1866, invited by the Edo Shogunate, the governing Japanese authority at that time. He was appointed as a teacher of physical and chemical sciences at the 'Bunseki Kyurisho' (Analytical Laboratory) in 'Seitokukan' (which was later renamed Nagasaki Prefectural Medical School in 1868), marking a significant step in the formal introduction of Western scientific disciplines to Japan. Gratama's responsibilities encompassed supervising hospital operations, including dispensing medications, and delivering lectures on natural sciences—chemistry, physics, pharmacology, mineralogy, and botany—at the Analytical Laboratory. In February 1867, with plans to further modernize scientific education, the Shogunate intended to establish a new school for physical and chemical sciences in Edo (now Tokyo) and relocated Gratama there. However, the outbreak of the Boshin War, a pivotal conflict leading to the fall of the Shogunate and the rise of the Meiji government, interrupted these plans.

Under the new Meiji government, Gratama's expertise was once again sought after, leading to the establishment of the Osaka 'Seimikyoku' in May 1869. The term 'Seimi' is derived from 'Chemie', the Dutch and German word for chemistry, designating the Seimikyoku as a pioneering institution for chemical education in Japan. This initiative, beginning with foreign-led specialized chemical education, symbolizes the inception of modern scientific educational institutions in Japan, evolving from the earlier foundation laid at the Bunseki Kyurisho in Nagasaki. Gratama invested in hands-on experimental education in physical and chemical sciences, employing state-of-the-art equipment and chemicals imported from the Netherlands, thereby significantly contributing to the advancement of Japan's scientific capabilities during a critical period of national transformation.

In the year 2000 in Osaka, the location of the original Seimikyoku, a workshop that honors the name of Dr. Gratama was held in close cooperation with Osaka University, the Osaka National Research Institute, Delft University of Technology, and Utrecht University, under the auspices of The Royal Netherlands Academy of Arts and Sciences. The conference focused on the challenges of creating a sustainable society, a subject of key interest in both the Netherlands and Japan, concentrating on how chemistry and chemical technology can contribute to the realization of a sustainable society. Fruitful discussions were held in three areas: energy and environmental chemical technology, precision chemistry and catalysis, and green chemistry.

Building on the tradition of its six predecessors, the 7th Gratama Workshop was hosted in Nagasaki in 2023,³ under the esteemed chairmanship of Prof. Jun Ishihara and Prof. Asako Yamayoshi from the Graduate School of Biomedical Sciences at Nagasaki University. Representing the Dutch side were Prof. Hermen Overkleeft and Prof. Jeroen Codee, both from Leiden University. This iteration of the workshop continued the dialogue on the pivotal role of chemistry, chemical technology, and biotechnology in advancing human society in the 21st century.

The legacy of the workshop also traces back to the Medical Training Institute in Nagasaki,⁴ established in 1857, which laid the groundwork for what would become Nagasaki University's Medical School and School of Pharmacy. It is within this historical context that the workshop drew inspiration, particularly from Dr. Gratama's early contributions to chemistry education in Japan.

This edition of the workshop received generous support from several key grants provided by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), highlighting the collaborative efforts across multiple research areas:

A Grant-in-Aid for Transformative Research Areas (A) 'Biophysical Chemistry for Material Symbiosis', led by Prof. Asako Yamayoshi.

A Grant-in-Aid for Transformative Research Areas (A) 'Digitalization-Driven Transformative Organic Synthesis', spearheaded by Prof. Takashi Ohshima of Kyushu University.

A Grant-in-Aid for Transformative Research Areas (B) 'Elucidation of the Mechanism for Dimensional Response Genome Across Species Regulated by Nucleic Acid Structures', under the leadership of Prof. Hisae Tateishi-Karimata from Konan University.

We express our deepest gratitude to all those involved in organizing this enriching workshop and for contributing to this publication. Looking ahead, the next Gratama Workshop is slated for Leiden in 2026, continuing the enduring legacy of fostering scientific exchange and development between Japan and the Netherlands.

Conflict of Interest

The author declares no conflict of interest.

References

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- (4) Medical Training Institute in Nagasaki, <https://www.ph.nagasaki-u.ac.jp/history/research/cp2/chapter2-1.html> (accessed Jun 04, 2024).