VU DUC CANH

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EMPLOYMENT

Faculty of Environment and Labour Safety — **Ho Chi Minh, Vietnam**
Ton Duc Thang University — *Aug. 2025 – Now*

International Wastewater-based Epidemiology Lab., — **Tokyo, Japan**
The University of Tokyo — *Apr. 2022 – Jul.2025*
Project Researcher

- *Airport wastewater surveillance for imported pathogens*
- *Wastewater surveilance at elderly health care facilities in Japan*
- *Establishment of wastewater-based epidemiology (WBE) for early detection and surveillance of tuberculosis (TB).*

Environmental Public Health Engineering Lab., — **Tokyo, Japan**
The University of Tokyo — *Apr. 2022 – Mar. 2024*
Project Researcher

- *Development of virus concentration method to investigate removal of viruses in portable water resuse facilities.*
- *Rapid and low-cost virus detection method*
- *Simple and low-cost virus concentration method*
- *Free chlorine for virus inactivation in drinking water*
- *A low-cost filtration to remove viruses in drinking water*

Japan Society for the promotion of Science — **Tokyo, Japan**
Research Fellowships for Young Scientists, the University of Tokyo — *Apr. 2020 – Mar. 2022*

- *The fate and transport of enteric viruses through unplanned potable reuse;*
- *Virus removal in water and wastewater treatment systems*
- *The occurrence of infectious SARS-CoV-2 in wastewater;*
- *Porous Carbon Adsorbents Made from Rice Husks for Virus Removal in Water;*
- *UV-LED mechanism for virus inactivation*

Institute of Environmental Science and Engineering — **Hanoi, Vietnam**
Project research assistant — *Apr. 2012 – Mar. 2015*

- *The performance of anaerobic membrane bioreactor (AnMBR) to treat slaughter wastewater and domestic wastewater*

RESEARCH PROJECT

Project leader

- *Establishment of wastewater-based epidemiology (WBE) for early detection and surveillance of tuberculosis (TB).* — **JSPS, 2024-2026** (¥2.6 million)
- *The fate and transport of enteric viruses through unplanned potable reuse* — **JSPS, 2020-2022** (¥2.6 million)

Project participation:

1. Asia-Pacific Network for Global Change Research (2018-2021)
"Potential Impact Of Climate Change On Norovirus Incidence And Seasonality: Water Ecology And Human Health"

2. JST-Mirai (Japan) (2022-2027)
"Realization of Safe and Secured Water Cycle System Supporting Healthy Society and People"

3. NEXUS (Networked Exchange, United Strength for Stronger Partnerships between Japan and ASEAN) (Japan and Philippines) (2025-2027)
"*Assessment Of Emerging Microbial Contaminants In The Aquatic Environment And Water/Wastewater Treatment Systems To Enhance Water Security And Public Health In The Philippines***"**

4. JSPS Bilateral Joint Research Projects (Japan and New Zealand) (2025-2027)
"*Development of Aptasensor Technology for Rapid and Highly Sensitive On-site Detection of Pathogenic Viruses in Environmental Water*"

EDUCATION

The University of Tokyo, — **Tokyo, Japan**
Ph.D. in Environmental Engineering, Department of Urban Engineering — *Apr. 2017 – Mar. 2020*
Research topic: Molecular Detection Methods for Assessing Virus Occurrence and Viability in Water Sypply Systems

The University of Tokyo — **Tokyo, Japan**
M.Eng in Environmental Engineering, Department of Urban Engineering — *Apr. 2015 – Mar. 2017*
Research topic: Impact of various humic acids on EMA-RT-qPCR to selectively detect intact viruses in drinking water

Hanoi University of Civil Engineering — **Hanoi, Vietnam**
B.Eng in Water Supply and Sanitation, Department of Environmental Engineering — *Sept. 2007 – Mar. 2012*
Thesis topic: Designing sewage system for Long Bien district in Hanoi

SKILLS

Molecular biology, Health-Related Water Microbiology, Environmental engineering	Molecular detection methods, qPCR, digital PCR, NGS sequencing, cell culture methods, virus cultivation and purification, virus and bacteria concentration methods, microbial risk assessment, wastewater-based epidemiology (WBE), designing wastewater and water treatment systems, membrane technology, emergencing contaminants.
Language Proficiency	English (business), Vietnamese (native)
Personal skills	Critical thingking, problem-solving, willingness to learn, teamworking

MAIN RESEARCH AREA IN THE LAST 5 YEARS

My current research interests focus on controlling the risks of viral infection spreading in urban water systems. Specifically, I focused on developing and applying a virus detection method (namely, capsid-integrity qPCR) to monitor infectious pathogenic viruses in water environments. Capsid-integrity qPCR method has the advantage of efficiently detecting infectious viruses in water and so can be applied as an effective monitoring tool for pathogenic viruses in water environments. This method had overcome a major drawback of current popular virus detection methods (such as conventional qPCR) that are not able to distinguish between infectious and inactivated viruses. We optimized the method by using platinum chemical (cis-dichlorodiammineplatinum, CDDP) at 1000 uM in combination with pretreatment with sodium deoxycholate (SD) surfactant at a concentration of 0.1% (*Publication 10,* IF=4.034). Besides, we also successfully applied this method (SD-CDDP-qPCR) to monitor the presence of human enteric viruses in drinking water (*Publication 6,* IF=13.400) and SARS-CoV-2 in wastewater (*Publication* 5, IF=10.753).

Regarding the field of controlling the risk of viral infection in urban water system, I also carried out some other research directions such as evaluating the virus removal efficiency of full-scale water treatment systems (*Publication 9,* IF=12.779), identifying the suitable virus indicator to assess water safety and quality (*Publication 4*), evaluating the effectiveness of activated carbon made from rice husks in removing viruses in water (*Publication* 7, IF=3.530), investigating the mechanism of virus inactivation in water by UV-LED disinfection treatment (*Publication 1,* IF= 5.819)

I have been working on various research areas: (i) identify a suitable indicator virus for assessing virus removal efficiency in wastewater treatment plants, and (ii) evaluate virus inactivation by free chlorine. Recently, my research has expanded to include the surveillance of pathogenic viruses in wastewater using next-generation sequencing techniques (such as NGS and Nanopore). I am also developing a simple filtration method using Moringa seeds for water purification, investigating virus removal in portable water reuse systems, and designing a low-cost method for virus recovery and detection. Additionally, my recent focus has been on wastewater surveillance to monitor community health regarding infectious diseases at international airports and in elderly healthcare facilities

AWARDS

- JSPS Fellowship for Young Scientists, Japan Society for the Promotion of Science, 2020.
- 1st Place of the JSWE-ORGANO Doctoral Research Award, the Japan Society on Water Environment, Japan 2019.
- Excellent Presentation Award, Water and Environment Technology conference (WET2019), the Japan Society on Water Environment, Japan 2019.
- Excellent Presentation Award, International Symposium on Sustainable Urban Environment, India 2017.
- Award for Asian Young Professional on Water Research, the 11th International Symposium on Southeast Asian Water Environment, Thailand 2014.
- Loa Thanh Award for Excellent Bachelor Thesis, Vietnam 2012.
- Do Quoc Sam Scholarship award, based on the results of study and good practice in the academic year 2010-2011, National University of Civil Engineering, Vietnam 2011.

PUBLICATIONS

ORCID: https://orcid.org/0000-0002-6612-276X

Google scholar: https://scholar.google.com/citations?user=e3PjqI4AAAAJ&hl=en

Journal Papers: 19 (First author: 13)

[1] **Canh, V.D.,** Torii, S., Singhopon, T., Katayama, H. (2023). Inactivation of coxsackievirus B5 by free chlorine under conditions relevant to drinking water treatment. Journal of Water and Health, 21 (9), 1318-1324. ISSN / eISSN: 1477-8920 / 1996-7829, (IF=2.5).

[2] **Canh, V.D**., Nga, T.T., Lien, N.T., Katayama, H. (2023). Development of a simple and low-cost method using Moringa seeds for efficient virus concentration in wastewater. Science of the Total Environment, 950, 167101. ISSN / eISSN: 0048-9697 / 1879-1026, (IF=10.753).

[3] **Canh, V.D.,** Midori Y., Shotaro T., Kumiko O., Hiroyuki K. (2023). Susceptibility of enveloped and non-enveloped viruses to ultraviolet light-emitting diode (UV-LED) irradiation and implications for virus inactivation mechanisms. Environmental Science: Water Research and Technology. ISSN / eISSN: 2053-1400/2053-1419, (IF= 5.819)

[4] Tran Thi Viet, N., **Canh, V.D.,** Duong, T.H., 2023. Effect of Hydraulic retention time on performance of anaerobic membrane bioreactor treating slaughterhouse wastewater. Environmental Research, 233, 116522. ISSN / eISSN: 1096-0953 / 0013-9351 (IF=8.3)

[5] **Canh, V.D.,** Liu, M., Sangsanont, J., Katayama, H. (2022). Capsid integrity detection of pathogenic viruses in waters: Recent progress and potential future applications. Science of The Total Environment, 827 154258. ISSN / eISSN: 0048-9697 / 1879-1026, (IF=10.753).

[6] **Canh, V.D.,** Lien, N. T., Nga, T.T.V. (2022). Evaluation of the suitability of pepper mild mottle virus (PMMoV) as an indicator virus for water safety and quality. Journal of Science and Technology in Civil Engineering (STCE)-HUCE, 16 (2), 76-88.

[7] **Canh, V.D.,** Torii, S., Yasui, M., Kyuwa, S., Katayama, H. (2021). Capsid integrity RT-qPCR for the selective detection of intact SARS-CoV-2 in wastewater. Science of the Total Environment, 791. ISSN / eISSN: 0048-9697 / 1879-1026, (IF=10.753).

[8] **Canh, V.D.,** Torii, S., Furumai, H., Katayama, H. (2021). Application of Capsid Integrity (RT-)qPCR to Assessing Occurrence of Intact Viruses in Surface Water and Tap Water in Japan. Water Research, 189 116674. ISSN / eISSN: 0043-1354 / 1879-2448, (IF=13.400).

[9] **Canh, V.D.,** Tabata, S., Yamanoi, S., Onaka, Y., Yokoi, T., Furumai, H., Katayama, H. (2021). Evaluation of porous carbon adsorbents made from rice husks for virus removal in water. Water (Switzerland), 13 (9): 1–10. ISSN / eISSN: 2073-4441, (IF=3.530).

[10] Kumar, M., Ram, B., Honda, R., Poopipattana, C., **Canh, V.D.,** Chaminda, T., Furumai, H. (2019). Concurrence of antibiotic resistant bacteria (ARB), viruses, pharmaceuticals and personal care products (PPCPs) in ambient waters of Guwahati, India: Urban vulnerability and resilience perspective. Science of the Total Environment, 693. ISSN / eISSN: 0048-9697 / 1879-1026, (IF=10.753).

[11] **Canh, V.D.,** Furumai, H., Katayama, H. (2019). Removal of pepper mild mottle virus by full-scale microfiltration and slow sand filtration plants. Npj Clean Water, 2 (18): 1–7. ISSN / eISSN: 2059-7037, (IF=12.779).

[12] **Canh, V.D.,** Kasuga, I., Furumai, H., Katayama, H. (2019). Viability RT-qPCR Combined with Sodium Deoxycholate Pre-treatment for Selective Quantification of Infectious Viruses in Drinking Water Samples. Food and Environmental Virology, 11 (1): 40-51. ISSN / eISSN: 1867-0334 / 1867-0342, (IF=4.034).

[13] **Canh, V.D.,** Osawa, H., Inoue, K., Kasuga, I., Takizawa, S., Furumai, H., Katayama, H. (2019). Ferrihydrite treatment to mitigate inhibition of RT-qPCR virus detection from large-volume environmental water samples. Journal of Virological Methods, 263 60–67. ISSN / eISSN: 0166-0934 / 1879-0984, (IF=2.623).

[14] **Canh, V.D.,** Kasuga, I., Furumai, H., Katayama, H. (2018). Impact of Various Humic Acids on EMA-RT-qPCR to Selectively Detect Intact Viruses in Drinking Water. Journal of Water and Environment Technology, 16 (2): 83–93. ISSN / eISSN: 1348-2165, (IF=1.07).

[15] Kuroda, K., Hayashi, T., Funabiki, A., Do, A.T., **Canh, V.D.,** Nga, T.T.V., Takizawa, S. (2017). Holocene estuarine sediments as a source of arsenic in Pleistocene groundwater in suburbs of Hanoi, Vietnam. Hydrogeology Journal, 25 (4): 1137–1152. ISSN / eISSN: 1431-2174 / 1435-0157, (IF=3.151).

[16] Kuroda, K., Hayashi, T., Do, A.T., **Canh, V.D.,** Nga, T.T.V., Funabiki, A., Takizawa, S. (2017). Groundwater recharge in suburban areas of Hanoi, Vietnam: effect of decreasing surface-water bodies and land-use change. Hydrogeology Journal, 25 (3): 727–742. ISSN / eISSN: 1431-2174 / 1435-0157, (IF=3.151).

[17] **Canh, V.D.,** Furumai, H., Katayama, H. (2020). Effect of viral genome property on the efficiency of viability (RT-)qPCR. Journal of Japan Society of Civil Engineers, Ser. G (Environmental Research), 76 (7): III_189-III_196. (eISSN: 2185-6648; ISSN-L: 2185-6648)

[18] Nga, T.T.V., & **Canh, V.D.,** (2014). Nghiên cứu phát triển công nghệ sinh học kỵ khí kết hợp màng vi lọc để xử lý nước thải đô thị ở Việt Nam. Tạp chí cấp thoát nước. 4 (96): 40-43. (ISSN 1859-36-23)

[19] Nga, T.T.V., **Canh, V.D.,** Kobayashi, M., & Wakahara, S., (2013). Đánh giá hiệu quả xử lý nước thải sinh hoạt bằng công nghệ sinh học kị khí kết hợp màng vi lọc trong điều kiện khí hấu Việt Nam. Tạp chí Khoa học và Công nghệ. 51(3B):154-159 (In Vietnamese, Abstract in English).

Book chapters: 2

[1] Bao, P.N., **Canh, V.D.** (2021). Addressing associated risks of COVID-19 infections across water and wastewater service chain in Asia. in: Environmental Resilience and Transformation in Times of COVID-19, Elsevier Inc., pp. 103–114 (ISBN:978-0-32-385512-9).

[2] J. E. Alegado, J. M. Aliño, S. C. F. Chow, M. B. L. Diola, P. J. D. GAMARALALAGE, L. Gurrero, M. HENGESBAUGH, V. Hernandez, Y. Ishimura, M. KATO, E. Kim, C. LIU, M. MOINUDDIN, D. Moon, M. Okuno, S. OLSEN, G. Pelogio, P. Pey, Ngoc-Bao P., T. Samson, S. S. Swain, M. A. Tanchuling, **V. D. Canh** (2021). Water: FROM THE RIVERS TO THE OCEANS. Plastic Atlas Asia Edition: Facts and Figures about the World of Synthetic Polymers, 28–29 (ISBN 978-988-75619-0-3).

Proceeding papers: 7

[1] Ngoc Bao, P., **Canh, V.D**, Kumer Mitra, B. Addressing the Associated Risks of COVID-19 Infections from Water and Wastewater Services in Asia through a Decentralised Wastewater Treatment Approach. ISAP2020 International Forum for Sustainable Asia and the Pacific, ISSUE BRIEF november, 1–12, 2020.

[2] **Canh, V. D.,** Hijikata, I., Kasuga, I., Furumai, H. & Katayama, H., Application of ferrihydrite treatment to improve RT-qPCR virus detection in Tokyo coastal water after rainfall event. Proceeding of International Symposium on Sustainable Urban Environment, Assam, India, pp 106-108, 23-24 June 2017.

[3] **Canh, V. D**., Furumai, H. & Katayama, H., Behavior of humic acid recovery during the Mg^{2+} concentration method for drinking water samples. *Proceeding* of *the 12th International Symposium on Southeast Asian Water Environment*, Bangkok, Thailand, 28-30 November 2016.

[4] **Canh, V. D**., Nga, T.T. V., Kobayashi, M., & Wakahara, S., Anaerobic membrane bioreactor for low-strength wastewater treatment in Hanoi City. Effect of HRT on treatment efficiency and membrane fouling. *Proceeding* of *the 11th International Symposium on Southeast Asian Water Environment*, Bangkok, Thailand, 26-28 November 2014.

[5] Tran T. Nga, **V.D. Canh**, M. Kobayashi, S. Wakahara. Treatment efficiency and membrane fouling of a lab-scale anaerobic membrane bioreactor treating dilute municipal wastewater. Sustainable water and sanitation services for all in a fast changing world: *Proceedings of the 37th WEDC International Conference*, Hanoi, Vietnam, pp 1-7, 15-19 September, 2014 (ISBN 978-604-82-1337-4).

[6] Tran T. Nga, **V.D. Canh**, M. Kobayashi, S. Wakahara. Anaerobic submerged membrance bioreactor (AnMBR) for decentralized municipal wastewater treatment in Vietnam conditions. *Proceeding of international symposium on new technologies for urban safety of mega cities in Asia (USMCA2013),* Hanoi, Vietnam, pp 997-1003, October 2013 (ISBN: 4-903661-64-4).

Conference presentations: 11

[1] **Canh, V.D.,** Nga, T.T., Lien, N.T., & Katayama H., Low-cost virus concentration method for wastewater-based epidimiology. Singapore International Water Week (SIWW), Singapore, 18-22 June, 2024 [Oral]

[2] **Canh, V.D.,** Nga, T.T., Lien, N.T., & Katayama H., Development of virus concentration method using moringa oleifera extract. 8th International Society for Food and Environmental Virology (ISFEV), Japan, 9-14 June, 2024 [Oral]

[3] **Canh, V.D.,** Torii S., Yasui M.,, Kyuwa S., & Katayama H., Detection of intact SARS-CoV-2 in wastewater in Japan ussing capsid-integrity RT-qPCR. 4th International Forum on Asian Water Environment Technology (IFAWET-4), Hong Kong, 10-11 December, 2021 [Oral] (online)

[4] **Canh, V. D.,** Furumai, H. & Katayama, H. Effect of viral genome property on the efficiency of viability (RT-)qPCR, 57th Japan Society of Civil Engineers, Japan, 2020. [Oral] (online)

[5] **Canh, V. D**., Furumai, H. & Katayama, H., Stability of PMMoV and enteric viruses in tap water using viability qPCR. *20th International Symposium on Health-Related Water Microbiology*, Vienna, Austria, 15-20 September 2019. [Oral].

[6] **Canh, V. D**., Furumai, H. & Katayama, H., Suitability of CDDP-qPCR to discriminate between infectious and noninfectious enteric viruses in drinking water source and tap water in Japan. *Water and Environment Technology Conference*, Osaka, Japan, 13-14 July 2019. [Oral + poster].

[7] **Canh, V. D**., Furumai, H. & Katayama, H., Effectiveness of sodium deoxycholate pre-treatment to improve viability RT-qPCR for discrimination of inactivated viruses in drinking water, *The 6th Food and Environmental Virology Conference,* Arizona, US, 7 - 10 October 2018. [Oral].

[8] **Canh, V. D**., Kasuga, I., Furumai, H. & Katayama, H., Impacts of various humic acids on EMA-RT-qPCR used for selectively detect intact viruses in drinking water. *Water and Environment Technology conference*, Hokkaido, Japan, 22-23 July 2017. [Oral + poster].

[9] **Canh, V. D**., Hijikata, I., Kasuga, I., Furumai, H. & Katayama, H., Application of ferrihydrite treatment to improve RT-qPCR virus detection in Tokyo coastal water after rainfall event. *Proceeding of International Symposium on Sustainable Urban Environment*, Assam, India, pp 106-108, 23-24 June 2017. [Oral].

[10] **Canh, V. D**., Kasuga, I., Furumai, H. & Katayama, H., Applicability of EMA-qPCR method to assess microbial safety of drinking water under presence of organic compounds. *The 51st Annual Conference of JSWE*, Kumamoto, Japan, 15-17 March 2017. [Oral].

[11] **Canh, VD**., Katayama, H., Osawa, H., Takizawa, S., and Furumai, H., (2016). Application of ferrihydrite to remove the inhibition of humic acids in molecular-based detection methods. *The 5th International Society for Food and Environmental Virology conference,* Gunma, Japan, 13-16 September 2016. [Oral].

[12] **Canh, V. D**., Kasuga, I., Furumai, H. & Katayama, H., Behavior of humic acid recovery during the Mg^{2+} concentration method for drinking water samples. T*he 12th International Symposium on Southeast Asian Water Environment,* Hanoi, Vietnam, 28-30 November 2016. [Poster].

[13] **Canh, V. D**., Nga, T.T. V., Kobayashi, M., & Wakahara, S., Anaerobic membrane bioreactor for low-strength wastewater treatment in Hanoi City. Effect of HRT on treatment efficiency and membrane fouling. *The 11th International Symposium on Southeast Asian Water Environment*, Bangkok, Thailand, 26-28 November 2014. [Oral].

VOLUNTEER

◊ **Topic editor** (2020-now): Water (IF=3.4) (https://www.mdpi.com/journal/water)

◊ **Editorial Board (**2023-now**):** Frontier in water, Water and Human Health (speciality section) (IF=2.9) (https://www.frontiersin.org/journals/water/sections/water-and-human-health)

◊ **Reviewer:** Water research (IF=13.4), Science of the Total Environment (IF=10.753), ISME communication (IF=13.214), Water and Health (IF= 2.3) Water (IF=3.4), Environment (IF=3.7)

◊ **Project board member** (2021): Science and Technology in Japan vol. 1 (https://jst.vanj.jp)

◊ **co-editor in chief** (2023): Science and Technology in Japan vol. 2 (https://jst.vanj.jp)

◊ **Co-founder and President** (2020-2021): the Vietnamese Academic Network in Japan (https://vanj.jp)

◊ **Co-chair:** Vietnamese Academic Network in Japan Conference 2021, Vietnam summit in Japan 2019

◊ **Technical Program Committee**: 10th Vietnam-Japan Scientific Exchange Meeting 2017, Japan Science and Technology Symposium 2019

◊ **Coordinator** (2023-now): International Young Researchers's Conference (IYRC) (https://www.the-iyrc.org)

◊ **Special correspondent:** International Research Network for Low Carbon Societies and Low Carbon Asia Research Network.