

Simon, Guerrero Cruz PhD.

Location: Pathum Thani, Thailand.

Nationality: **Dutch**
simongc@ait.ac.th

Amateur architect: designed and co-built a wooden cabin.
Construction of medieval dioramas scale 1:100.

General summary:

- ❖ Environmental and microbiology researcher oriented to water quality, pollution control, climate change & GHG mitigation from wastewater and rice agriculture. Experienced in microbial eco-physiology studies in bioreactor systems. Collaborated in **12 scientific papers, 1 book chapter and 1 published book**.
- ❖ Secured **359 thousand euros** in funding from international scholarships and globally important scientific funding schemes like **H2020 Marie Curie** from the European Commission.
- ❖ Researcher in microbial solutions in a biobased and circular economy using **microbial biotechnology** to convert **waste to value**.
- ❖ International industrial specialist with global experience in microbial risk management and contamination control in manufacturing and quality of vaccines and biologics.
- ❖ Native **Spanish** speaker, **English** at a business and scientific level, **Dutch** and **French** at an intermediate level.

Academic background:

- ❖ **Ph.D. in Environmental Microbiology**, Radboud Universiteit Nijmegen, The Netherlands.
01 Nov 2013 to 31 Jul 2018.
Thesis: "Eco-physiology of nitrite- and nitrate-dependent Methane Oxidation"
- ❖ **Master's degree in Environmental Sciences**. UNESCO-IHE, Institute for Water Education in Delft, The Netherlands.
17 Oct 2011 to 04 Sept 2013.
Thesis: "Next Generation Sequencing applied to the characterization of One-step anammox reactors in wastewater treatment"
- ❖ **International master's in environmental technology and engineering**. Gent Universiteit & Vysoká škola chemicko-technologická v Praze. Belgium & Czech Republic.
10 Feb 2012 to 04 Sept 2013.
- ❖ Bachelor's degree of Science in **Biology, Chemistry and Pharmaceutical technology**, Universidad de Guadalajara, Mexico. Minor in Environmental pollution control. 01 Feb 2005 to 13 Apr 2011.
Thesis: "(GT)_n genetic polymorphism of HMOX1 and the inflammatory profile in portal hypertension"

Professional experience summary: (Detailed experience in next pages)

- ❖ **Project manager and lead**, at the Catalan Institute for Water Research (ICRA), Girona, Spain.
01 Nov 2020 to 30 Jun 2021. Conceptualization, procurement, execution and managing an EU H2020, Marie Curie project with 259 thousand euros in budget.
- ❖ **Research project Lead**, at the BioCentre of the HAN University of Applied Sciences, The Netherlands.
01 Feb 2020 to Present. Research lead in microbiology projects aimed at biobased technologies in a circular economy, university lecturer at bachelor and master level in the areas of microbiology and biotechnology.
- ❖ **Senior Specialist Microbiology**, Global center of Expertise Microbiology, Merck & Sharp & Dohme.
01 Jan 2019 to 31 Dec 2019. Global consultant for microbial risk assessment and management in manufacturing and quality, and contamination investigations in pharmaceutical production processes in sites around the world.
- ❖ **Doctoral researcher**, Radboud Universiteit Nijmegen - IWWR, The Netherlands.
01 Nov 2013 – 31 Jul 2018. Fundamental and applied research in bioreactors, to investigate relevant microbiology questions to water quality and climate change in human-influenced ecosystems: wastewater and rice agriculture.
- ❖ **Analyst of Environmental risk and impact**, INAMBIO Environmental consultants S.A. de C.V, Mexico.
01 Aug 2010 to 31 Aug 2011. Environmental risk assessments of construction sites.
- ❖ **Research assistant**, Universidad de Guadalajara - Immunology research center, Mexico.
15 Jun 2009 to 31 Dec 2010. Biomedical research of liver disease.

Funding acquisition:

- ❖ European Commission, under the Horizon 2020 action call: **Marie Skłodowska Curie** Individual Fellowships 2019. Grant awarded: **€ 259,398.72** as an individual fellowship by placing in the **top 2% with a score of 98** from almost 10 thousand applications worldwide to this highly competitive call.
- ❖ Mexican Council of Science and Technology (CONACyT): **€ 48,000** as an individual doctoral fellowship.
- ❖ Ministry of Education of Mexico: **€ 3,000** as a support scholarship for postgraduate education.
- ❖ Mexican Council of Science and Technology (CONACyT): **€ 40,000** as a scholarship for Master studies.
- ❖ State council of Science and Technology, Jalisco: **MXNP 200,000** as co-applicant for research project.

Professional experience, extended:

Spain: 01 Nov 2020 – 30 Jun 2021.

Project manager at the Catalan Institute of Water Research (ICRA), Girona.

- ❖ Managing a research project funded by my self-acquired Individual Fellowship from the H2020 Marie Curie actions from the European Commission.
- ❖ Conducted research on microbial biorefineries for anaerobic waste into valuable polymers and reviewed the state-of-the-art of methane microbiology and the prospects for application at an industrial scale.
- ❖ My work resulted in one review paper published and one book chapter in the book: Clean Energy and Resource Recovery, 1st Edition. Edited by: Vinay Tyagi Manish, Kumar Alicia An, Zeynep Cetecioglu. ISBN: 9780323901789

Netherlands: 01 Feb 2020 – Present.

Research Project Lead in Microbiology. **BioCentre**, HAN University of Applied Sciences.

- ❖ I created applied project proposals for funding acquisition from industrial local subsidies, aimed for applied research on microbial applications for biobased and circular economy solutions in close cooperation with industry.
 1. “Methane to bioplastics” with the BioCentre and Sweco as industry partner.
 2. “Sugar waste to bio-based bacterial polymers” with the private start-ups.
- ❖ University lecturer at Bachelor and master level:
 1. Dutch program “*Biologie en Medisch Laboratoriumonderzoek*” teaching Biotechnology and Biorefinery.
 2. International program “*Life sciences*” teaching Microbiology in medical diagnostics.
 3. International part-time Master program “*Molecular Life Sciences*” teaching Biotechnology module and Research proposal workshops.
- ❖ Guidance of bachelor graduate research projects in microbiology:
 1. Beer waste into sustainable beer packaging through the production of bacterial nanocellulose.
 2. Optimization of the downstream processing for the purification and characterization of bacterial nanocellulose.

Global: 01 Jan 2019 – 31 Dec 2019.

Senior Specialist Microbiology at the Center of Expertise (CoE), Microbiology. **Merck & Sharp & Dohme**.

- ❖ I led global campaigns to harmonize microbial analytical methods across laboratories around the world within the Merck & Sharp & Dohme network, to ensure robust analytical platforms in compliance with regulatory frameworks.
- ❖ I resolved investigations on microbial contamination and facilitated microbial risk assessments in manufacturing and quality. Remotely assisted cases in Puerto Rico, Brazil, USA, France, Germany, Switzerland, Italy, Singapore.
- ❖ Preparation and execution of on-site & risk-based environmental monitoring and baseline plans for a new biotech facility in Dublin, Ireland. Assisted on-site in multiple site visits to supervise production processes, construction process and engineering advancements in facility design to collect information and drive discussions on microbial risk prevention and the development of disinfection plans for a new biotech facility.

- ❖ Preparation, execution, documentation and follow up; of a preventive end-2-end microbial risk assessment for vaccine production in Philadelphia USA. On-site execution of the assessment in a large multidisciplinary group and remote assistance reporting the risks identified and implementing preventive actions for microbial contamination.
- ❖ Delivered numerous technical assessments with science-based input to enable risk-based decisions on multiple aspects of microbial challenges in manufacturing and quality.

Netherlands: 01 Nov 2013 – 12 Dec 2018.

Doctoral research candidate at Radboud University at the Microbiology department from the **Institute of Water and Wetland Research (IWWR)**.

- ❖ I researched and developed new knowledge on novel microbial processes through bioreactor culturing, physiology, and metagenomic approaches (NGS); to understand the functioning of microbial communities involved in the regulation of greenhouse gases emissions in engineered ecosystems.
- ❖ I participated in 10 scientific research manuscripts at international journals and wrote a book titled: “Ecophysiology of nitrate & nitrite-dependent methane oxidation”, ISBN: 9789402812565.
- ❖ Developed my mentoring skills by managing bachelor and master research projects, and teaching university practical courses in Applied and Environmental Microbiology for 3 years.
- ❖ I developed my communication skills at international conferences (Scotland, Belgium, USA) and as invited speaker (Mexico and Spain).
- ❖ Developed my project management and grant writing skills, which ultimately led me to win a Marie Curie Individual Fellowship 2 years after my PhD was finished.

Mexico: 01 Aug 2010 – 31 Aug 2011.

Environmental risk and impact analyst at INAMBIO S.A. de C. V. Environmental Consulting.

- ❖ I guided numerous clients through compliance with environmental regulations during environmental risk assessments for diverse projects, related to the development of infrastructure for the distribution of fossil fuels and/or construction of habitational developments in urban areas.
- ❖ I grew as a risk consultant by performing site inspections, delivering successful project management, and processing of large amounts of information from multiple sources on regulatory compliance, physical environment and civil risk to yield a complete report for the client’s needs.
- ❖ Successfully established and monitor contingency plans inherent to civil risks in construction projects.

Mexico: 15 Jun 2009 to 31 Dec 2010.

Research assistant at the **Immunology and Dermatology Research Institute (CIINDE)** from the Faculty of Medicine, University of Guadalajara, in collaboration with the **Gastroenterology department of the Estate Civil Hospital**.

- ❖ Assisted in the onboarding of new interns of the group and new PhD candidates, on the molecular techniques in the lab and equipment.
- ❖ Performed molecular and genetic experiments on blood samples from patients with Liver Cirrhosis, to investigate genetic factors and their association with the inflammatory profile in serum as part of my research assistant job. This research led to my bachelor’s thesis.
- ❖ Assisted on the weekly gastroenterology meeting with presentations on immunology topics, and the collection of epidemiological data from patients admitted to our study.
- ❖ Assisted during practical laboratory courses to medical students on immunology techniques and light microscopy for the characterization of blood cell histology.

Other working experience:

Language tutor, conversation workshops to a banking executive in BANAMEX and sales personnel from ESTEE LAUDE. Freelance for GARDNER English. 6 months in 2011.

Translation of technical documents (English > Spanish) as freelance for LANSA Traducciones in Mexico. 7 months in 2010.

Technical and customer service associate, telecommunication management (Sprint, Nextel, T-Mobile). 15 Jan 2008 to 15 Jul 2009, TELETECH Corp.

❖ Served as a point of contact for clients with technical issues with telecommunication devices, account management and conflict de-escalation to solve problems inherent to telecommunication services in USA and the Caribbean.

Internships:

Microbiology department IWWR, Radboud Universiteit, Netherlands. Jul – Sept 2012, Feb to September 2013.

Next generation sequencing and bioreactor work:

I did bioreactor work to study the microbial composition and physiology of anammox granular sludge from wastewater treatment. I used next generation sequencing, based on the Ion-Torrent technology to characterize the microbial community and diversity in order to understand the role of microbial minorities in the functioning of ammonia removal from wastewater.

Sanitary microbiology department of the National ministry of Health, Mexico. Jan 2007 – Jan 2008.

Sanitary Microbiology and epidemiology:

I worked as an assistant performing microbiology tests to detect pathogenic microorganisms on food samples: *Staphylococcus aureus*, *Escherichia coli*, *Salmonella spp.*, *Vibrio cholerae*; with the goal to relate to endemic food-borne diseases and the epidemiology of seasonal outbreaks in the region.

Publications:

2021:

Guerrero-Cruz, S., Vaksmaa, A., Horn, M. A., Niemann, H., Pijuan, M., & Ho, A. "Methanotrophs: Discoveries, Environmental Relevance, and a Perspective on Current and Future Applications". *Frontiers in Microbiology*, 10.3389/fmicb.2021.678057

Guerrero-Cruz, S. & Pijuan, M. "Methanotrophic bacterial biorefineries: resource recovery and GHG mitigation through the production of bacterial biopolymers". Chapter in the book: "Clean Energy & Resource Recovery: Wastewater Treatment Plants are Biorefineries". Currently under edition at Elsevier.

2020:

De Jong A.E.E., **Guerrero-Cruz S.**, van Diggelen J.M., Vaksmaa A., Lamers L.P., Jetten M.S.M., Smolders A.J., Rasigraf O. "Changes in microbial community composition, activity, and greenhouse gas production upon rewetting of drained iron-rich peat soils". *Soil Biology and Biochemistry*. Available online 22nd June 2020.
<https://www.sciencedirect.com/science/article/pii/S0038071720301590?via%3Dihub>

2019:

Guerrero-Cruz S., Stultiens K., van Kessel M.A.H.J., Versantvoort W., Jetten M.S.M., Op den Camp H.J.M., Kartal B. "Key Physiology of a Nitrite-Dependent Methane-Oxidizing Enrichment Culture". *Applied Environmental Microbiology*. 85:e00124-19.

Stultiens K., **Guerrero-Cruz S.**, van Kessel M., Jetten M., Op den Camp H., Kartal B. "Interactions between anaerobic ammonium and methane-oxidizing microorganisms in a laboratory-scale sequencing batch reactor". *Applied Microbiology and Biotechnology*, 103, pages6783–6795(2019).

Smit N.T., Rush d., Sahonero-Canavesia D. X., Verweij M., Rasigraf O., **Guerrero Cruz S.**, Jetten M. S. M., Sinninghe Damstéa J. S., Schouten S. "Demethylated hopanoids in 'Ca. Methylomirabilis oxyfera' as biomarkers for environmental nitrite-dependent methane oxidation". *Journal of Organic Geochemistry*, 137: 103899.

2018:

Guerrero Cruz, S. "Ecophysiology of nitrate & nitrite-dependent methane oxidation", ISBN: 978-94-028-1256-5.

Guerrero-Cruz S., Cremers G., van Alen T. A., Op den Camp H. J. M., Jetten M. S. M., Rasigraf O., Vaksmaa A. "Response of the anaerobic methanotroph 'Candidatus Methanoperedens nitroreducens' to oxygen stress". *Applied and Environmental Microbiology*, 84(24): e01832-18.

Versantvoort*, W., **S. Guerrero-Cruz***, Speth D. R., Frank J., Gambelli L., Cremers J., van Alen T. A., Jetten M. S. M., Kartal B., Op den Camp H. J. M., Reimann J. "Comparative Genomics of Candidatus Methylomirabilis Species and Description of Ca. Methylomirabilis Lanthanidiphila". *Frontiers in Microbiology*, 9(1672).

Gambelli, L., **S. Guerrero-Cruz**, Mesman R. J., Cremers G., Jetten M. S. M., Op den Camp H. J. M., Kartal B., Lueke C., van Niftrik L. "Community Composition and Ultrastructure of a Nitrate-Dependent Anaerobic Methane-Oxidizing Enrichment Culture". *Applied and Environmental Microbiology*, 84(3): 567-570.

van Kessel, M. A. H. J., Stultiens K., Slegers, M. F., **Guerrero-Cruz, S.**, Jetten M. S. M., Kartal B., Op den Camp H. J. M. "Current perspectives on the application of N-damo and anammox in wastewater treatment". *Current Opinion in Biotechnology*, 50: 222-227.

2017:

Vaksmaa, A., **S. Guerrero-Cruz**, van Alen T. A., Cremers G., Ettwig K. F., Lüke C., Jetten M. S. M. "Enrichment of anaerobic nitrate-dependent methanotrophic 'Candidatus Methanoperedens nitroreducens' archaea from an Italian paddy field soil". *Applied Microbiology and Biotechnology*, 101(18): 7075-7084.

2016:

Speth, D. R., in 't Zandt, M. H., **Guerrero-Cruz, S.**, Dutilh, B. E., and Jetten, M. S. M. "Genome-based microbial ecology of anammox granules in a full-scale wastewater treatment system". *Nature Communications* (7), 11172.

Gambelli, L., Cremers, G., Mesman, R., **Guerrero, S.**, Dutilh, B. E., Jetten, M. S. M., Op den Camp H. J. M., van Niftrik L. "Ultrastructure and viral metagenome of bacteriophages from an anaerobic methane oxidizing *Methyloirabilis* bioreactor enrichment culture". *Frontiers Microbiology* (7), 1740.

Supervision and Education experience

2020, HAN University of Applied Sciences:

Period: 01 Sept 2020 – 15 Oct 2020
Program: “**Biologie en Medisch Laboratoriumonderzoek**” (Biology and medical diagnostics).
Subject: Biotechnology specialization course, 4th year. Teaching **fermentation technology and Up-Stream Processing**. 20 students.

Period: 15 May 2020 - 30 Sept 2020:
Program: International **Master of Molecular Life Sciences** (MMLS).
Subject: Module of Production of Biomolecules (PoB), teaching fermentation technology and Up-Stream Processing and workshops on Project management in life sciences to students working in industry. 16 students.

Period: 01 Mar 2020 – 10 Jul 2020.
Program: “**Biologie en Medisch Laboratoriumonderzoek**” (Biology and medical diagnostics).
Subject: Minor in Biorefinery, teaching fermentation technology and Up-Stream Processing. 5 students.
Supervision: Minor Biorefinery research project, supervising an internship research project on the optimization of bacterial nano cellulose downstream processing.
Chemical and physical treatments to produce bacterial nano cellulose films, alkaline, acid, thermal and freeze-drying processes.

Period: 01 Feb 2020 – 30 Jun 2020.
Program: “**Biologie en Medisch Laboratoriumonderzoek**” (Biology and medical diagnostics).
Supervision: 4th year graduation research project “Production of bacterial nano cellulose as sustainable packaging material from beer brewing wastewater”. Industrial project with Outlander Materials as industrial partner.
Bioreactor and bottle-based incubations of beer wastewater with selected microbial strains for the production of bacterial cellulose under different parameters to increase production yields.

Period: 01 Apr 2020 – 15 June 2020.
Program: **International Bachelor program in Life Sciences**.
Subject: **General Microbiology in medical diagnostics**, in the 1st year.

2015- 2017, Radboud University:

Period: 01 Sep 2016 – 07 Jul 2017.
Program: **International Bachelor program in Life Sciences**, from the HAN University of Applied Sciences.
Supervision: Graduation research project exchange, “Strategies to achieve a pure culture of ANME-2d archaea under antibiotic feed conditions in bioreactor systems”.

Period: 01 Feb 2017 – 04 Apr 2017.
Program: **Bachelor of Science in Biology and molecular life sciences. Radboud University Nijmegen**.
Subject: **Applied and environmental microbiology**. 22 students. Teaching biogeochemical cycles in engineered ecosystems using wastewater treatment sludge as a model for laboratory experiments.

Period: 01 Oct 2016 – 20 Dec 2016.
Program: **Master of Biology**, specialization Microbiology. Radboud University Nijmegen.
Supervision: Supervised a literature thesis “Enrichment of ANME-2d archaea from Arctic freshwater ecosystems”.

Period: 01 Feb 2015 – 04 Apr 2015 and 01 Feb 2016 – 04 Apr 2016.
Program: Bachelor of Science in Biology and molecular life sciences. Radboud University Nijmegen.
Subject: **Ecological microbiology**. 20 students. Teaching biogeochemical cycles in nature using sediments for laboratory experiments.

2009- 2011, diverse teaching experience in Mexico:

- Period: 01 Jun 2011 – 30 Aug 2011.
Subject: Private English conversation workshop, as a freelance for Gardner English. Weekly conversation workshop to help banking executives practice their English skills.
- Period: 01 Jun 2010 – 30 Jul 2010.
Subject: Molecular Biology techniques to exchange Bachelor students from other universities during summer school.
- Period: 01 Mar 2009 – 31 Jun 2009 and 01 Mar 2010 – 31 Jun 2010.
Program: Bachelor of Medicine and Surgery. University of Guadalajara, faculty of health sciences.
Subject: **Practical immunology**. 30 students. Laboratory techniques for the study of human immunology and cell histology of the immune system.

Invited presentations:

- 2018: Catalan Institute for Water research, ICRA, Girona, Spain.
“Man-made ecosystems, methane, and microbes”. Invited talk.
- 2016: Gordon conference microbial basis of C1 metabolism 2016 in Waterville Valley-New Hampshire, USA.
“Nitrogen-dependent methane oxidation: application in wastewater treatment”. Invited poster presentation.
- 2016: Innovation Match Mexico, Guadalajara.
“Potential applications of nitrate-dependent methane oxidation in wastewater treatment”. Invited speaker.

Conferences:

- 2019: Parenteral Drug association, Risk management in manufacturing and quality. Cork, Ireland.
- 2019: Pharmaceutical Water generation and quality, Washington DC, USA.
- 2019: Facilitation in risk management, MSD. Carlow, Ireland.
- 2017: IWA YWP Benelux, International Water Association, Young water professionals in Benelux. Gent, Belgium.
“Nitrogen-dependent methane oxidation: application in wastewater treatment”. Poster presentation.
- 2016: Gordon seminar on microbial basis of C1 metabolism 2016 in Waterville Valley-New Hampshire, USA.
- 2015: European nitrogen cycle 2015 in Aberdeen, Scotland.
“Nitrite is a common link between the nitrogen and carbon cycles”. Oral presentation.
- 2014: European nitrogen cycle 2014 in Gent, Belgium.
“Wastewater application of anaerobic methane oxidation”. Poster presentation.
- 2014: KNVM, Royal Dutch academy of Microbiology. Arnhem, Netherlands.
“Anaerobic methane oxidation in wastewater treatment”. Poster presentation.
- 2011: 21st International Congress of Clinical Chemistry 2011 in Berlin, Germany.
“Portal Hypertension in Liver Cirrhosis: dinucleotide (GT)_n polymorphism of HMOX1 and the inflammatory profile.”
Selected oral short presentation.