

Soyoun Park

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Educational Background

Doctor of Philosophy, Food Science & Agricultural Chemistry

September 2018 – Present

McGill University, Sainte-Anne-de-Bellevue, QC

- Lead the project on finding alternatives to antibiotics and biomarkers of animal infectious diseases (bovine mastitis) using bacteria with antagonistic activity against *Staphylococcus aureus* and healthy microbiota
- Study *S. aureus* genetic features and evolution by performing comparative genomics using *S. aureus* genomes originated from humans and dairy cows
- Develop a new plasmid-based screening method to monitor *S. aureus* growth and quorum-sensing simultaneously on agar plates by constructing plasmids carry fluorescent genes (*gfp* and *mCherry*) controlled by *S. aureus* quorum-sensing promoter
- Investigate microbiota in dairy milk before, during, and after *S. aureus* clinical mastitis via longitudinal cohort study by performing 16S rRNA gene amplicon sequencing and shotgun metagenomic sequencing
- Develop advanced lab skills such as sequencing library preparations (targeted amplicon sequencing, whole-genome sequencing, shotgun metagenomic sequencing), quality controls, and Illumina MiSeq as well as data analysis skills using FastQC, Mothur, Python, R, Trimmomatic, ProkaryoteAssembly (BBduk, Tadpole, SKESA, Pilon), Kraken2, SPAdes, MegaHIT, CONCOCT, metaBAT2, maxBIN2, Prokka, antiSMASH, VFAnalyzer, PHASTER, Abriicate, IQTREE,
- Responsible for lab SOPs and training undergraduates and graduate students

Advanced Diploma in Biotechnology & Industrial Microbiology (GPA 4.18/4.5)

September 2014 – August 2016

Centennial College, Scarborough, ON

- Trained in basic and broad laboratory skills in microbiology, including food microbiology, environmental microbiology, pharmaceutical microbiology, and systemic microbiology
- Led a team project about a new reading strategy of a whole-cell biosensor to detect heavy metals and chemicals by monitoring the expression of reporter proteins (GFPuv and beta-galactosidase)
- Achieved lab skills in isolation, enumeration, and identification of clinically important bacteria (coliform, *Listeria* spp., *Salmonella* spp., *Enterococci*, etc.) by using selective, differential media, agglutination test, biochemical assay, and ELISA

Master of Science, School of Biology Science and Biotechnology (GPA 4.15/4.5)

March 2008 – February 2010

Chonnam National University (CNU), South Korea

- Studied metagenomics through functional-based approach by constructing metagenomic library in *Escherichia coli*
- Developed new cloning and expression vectors using reporter genes and whole-expression module originated from metagenomic DNA
- Characterized a new esterase by performing cloning, protein purification, and activity assay
- Achieved advanced laboratory skills and data analysis such as column chromatography, affinity chromatography, size exclusion chromatography, high-performance liquid chromatography (HPLC), RNA extraction, RT-PCR, qPCR, density gradient ultracentrifugation, BLAST
- Responsible for lab inventory/accounting and training undergraduates and graduate students

- Achieved basic laboratory skills in molecular microbiology such as DNA extraction, plasmid cloning, PCR, plasmid transformation, transfection, DNA agarose gel electrophoresis, SDS-PAGE gel electrophoresis, native-PAGE gel electrophoresis, zymogram
- Coordinated promotions, field activities, and an annual exhibition of Student Society of Natural Collections

Publications

- (Submitted in Aug 2021) **Soyoun Park**, Dongyun Jung, Bridget O'Brien, Janina Ruffini, Forest Dussault, Alexis DubéDuquette, Élodie Demontier, Jean-François Lucier, François Malouin, Simon Dufour, Jennifer Ronholm. Comparative Genomic Analysis of *Staphylococcus aureus* Isolates Associated with Either Bovine Intramammary Infections or Human Infections Demonstrates the Importance of Restriction-Modification System in Host Adaptation. Microbial Genomics.
- **Soyoun Park**, Adam Classen, Hanny Maéva Gohou, Roberto Maldonado, Emily Kretschmann, Chloe Duvernay, Geun-Joong Kim, Jennifer Ronholm. (2021) A New, Reliable, and High-Throughput Strategy to Screen Bacteria for Antagonistic Activity against *Staphylococcus aureus*. BMC Microbiology.
- Dongyun Jung, **Soyoun Park**, Janina Ruffini, Forest Dussault, Simon Dufour, Jennifer Ronholm. (2021) Comparative genomic analysis of *Escherichia coli* isolates from cases of bovine clinical mastitis identifies nine specific pathotype marker genes. Microbial Genomics. DOI: 10.1099/mgen.0.000597
- **Soyoun Park**, Jennifer Ronholm. (2021) *Staphylococcus aureus* in Agriculture: Lessons in Evolution from a Multi-Species Pathogen. Clinical Microbiology Reviews. DOI: 10.1128/CMR.00182-20
- Dongyun Jung, **Soyoun Park**, Janina Ruffini, Simon Dufour, and Jennifer Ronholm. (2021) Draft Genome Sequences of 113 Mammary Pathogenic *Escherichia coli* strains Isolated from Intramammary Infections. Microbiology Resource Announcements. DOI: 10.1128/MRA.01464-20
- Elodie Demontier, Alexis Dubé-Duquette, Eric Brouillette, Audrey Larose, Céline Ster, Jean-François Lucier, Sébastien Rodrigue, **Soyoun Park**, Dongyun Jung, Janina Ruffini, Jennifer Ronholm, Simon Dufour, Jean-Philippe Roy, Sheela Ramanathan, François Malouin. (2021) Relative virulence of *Staphylococcus aureus* bovine mastitis strains representing the main Canadian spa types and Clonal Complexes as determined using in vitro and in vivo mastitis models. Journal of Dairy Science. DOI: 10.3168/jds.2020-19904
- Zhilong Yu, Dongyun Jung, **Soyoun Park**, Yaxi Hu, Kang Huang, Barbara A. Rasco, Shuo Wang, Jennifer Ronholm, Xiaonan Lu, Juhong Chen. (2020) Smart Traceability for Food Safety. Critical Reviews in Food Science & Nutrition.
- **Soyoun Park**, Dongyun Jung, Simon Dufour, Jennifer Ronholm. (2020) Draft Genome Sequences of 27 *Staphylococcus aureus* Strains and 3 *Staphylococcus* Species Strains Isolated from Bovine Intramammary Infections. Microbiology Resource Announcements. DOI: 10.1128/MRA.00300-20
- Cheong DE, **Soyoun Park**, Lim HD, Kim GJ. (2019) An alternative platform for protein expression using an innate whole expression module from metagenomic DNA. Microorganisms. 7(1): 9.
- **Soyoun Park**, Lee JY, Chang WS, Choy HE, Kim GJ. (2011). A coupling process for improving purity of bacterial minicells by holin/lysine. J Microbiol Methods. 86(1), 108-110.
- **Soyoun Park**, Shin HJ, Kim GJ. (2011). Screening and identification of a novel esterase EstPE from a metagenomic DNA library. J Microbiol. 49(1), 7-14.
- **Soyoun Park**, Kim GJ. (2010). Screening of Functional Promoter from Metagenomic DNA for Practical Use in Expression Systems. In Metagenomics: Methods and Protocols (2010th ed., Vol. 668, pp. 141-152).
- Cheong DE, **Soyoun Park**, Shin HJ, Kim GJ. (2009). A new cloning system using a mutant esterase containing MCS as an indicator for gene cloning. J Microbiol Methods. 77(3), 302-307.

- **Soyoun Park**, Kim GJ. (2008). A biological treasure Metagenome: pave a way for big science. Indian Journal of Microbiology, 48(2), 163

Supervisory Experience

- Roberto Maldonado J. Non-thesis Master Summer Research Project 2019
Project: Determination of the stability of the recombinant plasmid
- Maeva Hanny Gohou. Undergraduate Honours Project 2020
Project: A new strategy to screen antagonistic bacteria against *Staphylococcus aureus* for sustainable therapeutics and medical interventions

Academic Scholarships

- Fonds de recherche – Nature et technologies, Quebec \$21,000 (2021-2022)
- Schulich Fellowship, McGill University \$25,000 (2021)
- Op+lait Compléments de bourses \$20,000 (2019-2021)
- Cross-Disciplinary Exchanges Awards, CREATE in Milk Quality Program \$5,000 (2019)
- CREATE in Milk Quality Program Scholarship, CREATE in Milk Quality Program \$37,500 (2018-2022)
- Graduate Excellence Award, McGill University \$20,678 (2018-2021)
- Brain Korea 21 Program Scholarship, Korean Ministry of Education \$15,000 (2008-2010)
- Excellent Student Award, Chonnam National University \$1,755 (2005-2007)

Communication/Research Awards

- Research Communication Award, Graduate Research Symposium, McGill University \$583 (2021)
- Finalist, 3MT competition, McGill University (2021)
- Poster Presentation, Mastitis Network 2020 Annual Scientific Meeting \$250 (2020)
- The McGill Sustainability Systems Initiative (MSSI) Ideas Fund, McGill University \$7,000 (2019)
- Outstanding Poster Award, International Meeting of the Federation of Korean Microbiologist Societies (2010)
- Participation Prize, Symposium of Science College, Chonnam National University (2007)

Conference Presentations

- **Soyoun Park**, Dongyun Jung, Daryna Kurban, Simon Dufour, Jennifer Ronholm. A longitudinal cohort study of milk microbiota associated with *Staphylococcus aureus* bovine clinical mastitis. 70th Annual Conference of the Canadian Society of Microbiologists. June 16, 2021. Virtual Meeting (Poster)
- **Soyoun Park**, Dongyun Jung, Bridget O'Brien, Janina Ruffini, Forest Dussault, Dubé-Duquette, Élodie Demontier, Jean-François Lucier, François Malouin, Simon Dufour, Jennifer Ronholm. L'antagonisme intra-espèce de *Staphylococcus aureus* isolé d'une infection intramammaire chez les vaches laitières. OP+lait Annual Meeting. October 28, 2020. Virtual Meeting (Poster)
- **Soyoun Park**, Dongyun Jung, Bridget O'Brien, Janina Ruffini, Forest Dussault, Dubé-Duquette, Élodie Demontier, Jean-François Lucier, François Malouin, Simon Dufour, Jennifer Ronholm. Comparative genomic study of

Staphylococcus aureus: Lessons from its gene contents. Mastitis Network 2020 Annual Scientific Meeting. October 6, 2020. Virtual Meeting (Poster)

- Dongyun Jung, **Soyoun Park**, Janina Ruffini, Forest Dussault, Simon Dufour, Jennifer Ronholm. Comparative genomic analysis of mammary pathogenic *E. coli* and bovine commensal *E. coli*. Mastitis Network 2020 Annual Scientific Meeting. October 6, 2020. Virtual Meeting (Poster)
- **Soyoun Park** and Jennifer Ronholm. The milk storage effect on the milk microbiome and an optimized bacteria DNA extraction protocol: pave the way for a longitudinal study to control *Staphylococcus aureus* mastitis. 69th Annual Conference of the Canadian Society of Microbiologists, Sherbrooke, ON. June 2019 (Poster)
- **Soyoun Park** and Jennifer Ronholm. The milk storage effect on the milk microbiome and an optimized bacteria DNA extraction protocol: pave the way for a longitudinal study to control *Staphylococcus aureus* mastitis. Mastitis Network, 2019 Annual Scientific Meeting, Montreal, QC, May 2019 (Poster)
- **Soyoun Park**, Won-Ji Park, Hyon-El Choy, and Geun-Joong Kim. Metagenome-Derived mBFP Used for Soluble Expression of Foreign Proteins as a Fusion Partner. International Meeting of the Federation of Korean Microbiological Societies, Seoul, Korea, October 2010 (Poster)
- **Soyoun Park**, Won-Ji Park, and Geun-Joong Kim. Evaluation of an Intact Expression Module from Metagenomic DNA for the Expression of Recombinant Genes. 14th International Biotechnology Symposium and Exhibition, Rimini, Italy, September 2010 (Poster)
- Dea-Eun Cheong, **Soyoun Park**, and Geun-Joong Kim. A Novel Fusion Partner from Metagenome to Achieve a Favorable Yield of a Foreign Protein. International Symposium & Annual Meeting, Daejeon, Korea, June 2009 (Poster)

Work Experience

Council of Graduate and Postdoctoral Studies, McGill University, Montreal, QC **September 2021 – Present**

- Improve the graduate and postdoctoral programs by brainstorming at a monthly meeting

Teaching Assistant, McGill University, Montreal, QC **September 2018 – December 2018**

- FDSC 442 (Food Microbiology), tasks including lab activities & grading lab reports

Quality Control Technician, Protenergy, Richmond Hill, ON **January 2017 – July 2018**

- Audited daily Good Manufacturing Practice (GMP) and inspected critical control points
- Tested and verified manufacturing quality

Quality Assurance Technician (Co-op), Plats du Chef, Vaughan, ON **May 2015 – December 2015**

- Diligently followed GMP, SOP, HACCP, and food safety regulation
- Inspected food processing areas and warehouse inventory to keep track of perishable ingredients

Instructor, Harvard Academy, South Korea **February 2011 – August 2014**

- Taught Science and English to high school students and undergraduates

Research Assistant, Chonnam National University (CNU), South Korea **February 2010 – January 2011**

- Improved the purity of bacterial-minicell significantly by introducing autolysin genes and density gradient centrifugation for drug delivery usage
- Developed a fusion partner system with an engineered metagenome-derived blue fluorescent protein to increase the expression level of recombinant proteins and easily purified them through affinity chromatography
- Managed lab materials such as enzymes, media, stocks, cell lines, equipment, etc.

Teaching Assistant, Chonnam National University, South Korea **September 2018 – December 2018**

- Genetics, tasks including lab activities & grading student performance

Synergistic Activities

Professional Memberships

- National Mastitis Council (Since 2020)
- Canadian Society of Microbiologists (Since 2016)

Public Outreach

- STEM Fellowship McGill for the research seminar. Virtual Meeting. March 2021
- Metagenomics and the Future. Science and Engineering: Facing the Future, Toronto, ON. March 2016 (Poster)

Professional Development Training and Certificates

- CRISPR: Gene-editing Applications, Harvard University (2021)
- Microbial Ecology R workshop, Patrick D. Schloss (2021)
- COMP 598 (Computer programming for Research in Life Sciences, Python), McGill University (2020)
- Oxford Nanopore Training (2019)
- Networking Skills, MITACS (2019)
- Informatics of High Throughput Sequencing Data, Bioinformatics.ca (2019)
- Safe Use of Biological Safety Cabinet, Environmental Health and Safety, McGill University (2018)
- Workplace Hazardous Materials Information Session (WHMIS), Environmental Health and Safety, McGill University (2018)
- Introduction to Biosafety, Environmental Health and Safety, McGill University (2018)
- Image Acquisition and Analysis Workshop, McGill University (2018)
- Research Assistant Certificate from BioTalent Canada (2016)

Professional References Available Upon Request