

EDUCATION

2010-2015: PH.D., DEPARTMENT OF BIOLOGICAL SCIENCES/ EXTREMOPHILE RESEARCH GROUP

University of Waikato in collaboration with GNS Science, New Zealand

- Advisors: Ian R. McDonald, Matthew B. Stott, Xochitl C. Morgan
- Thesis: "*The First Insights into the Phylogeny, Genomics, and Ecology of the Novel Bacterial Phylum Armatimonadetes*"
- Microbiology, Molecular Ecology, and Comparative Genomics

2007 - 2009: MASTER OF SCIENCE WITH FIRST CLASS HONOURS

University of Waikato, New Zealand

- Thesis: "*The Physiological and Ecological Characterisation of the First Cultivated Species of the Candidate Division OP10*"

2004 - 2008: BACHELOR OF SCIENCE (TECHNOLOGY)

University of Waikato, New Zealand

- Microbiology, Biochemistry, and Genetics

SCIENTIFIC EXPERIENCE

2015-Present: Institute for Applied Ecology NZ, Auckland University of Technology, New Zealand

- Conduct research as a postdoctoral Research Fellow, with primary focus on the investigation of the microbial ecology of poorly-understood ecosystems (e.g., desert and aerosol) through the analysis of bioinformatic data from methods including 16S rRNA gene amplicon sequencing, (meta)genomics, and metatranscriptomics.

2009-2014: Extremophile Research Group, GNS Science, Wairakei, New Zealand

- Conducted phylogenetic analyses to determine the boundaries of the novel bacterial phylum *Armatimonadetes* and closely-associated candidate division. Correlated the resulting clades with established taxonomic designations (Dunfield *et al.*, AEM, 2012; Lee *et al.*, AEM, 2013)
- Assembled genome of *Chthonomonas calidirosea*, utilised primer-walking techniques to improve the assembly, and conducted genome analysis (Lee *et al.* ISMEJ, 2014)
- Cultured *C. calidirosea* and conducted sugar-utilisation experiments with HPLC analysis
- Extracted DNA from several recalcitrant *C. calidirosea* strains, performed mapping assemblies, and conducted a comparative genomic study (manuscript in revision)
- Analysis of sequencing data from multiple platforms (Illumina, Ion Torrent, 454, and Sanger)
- Processed and analysed sequencing data (16S rRNA genes and whole genome) and interacted with data archives (NCBI GenBank & EMBL-EBI) for data curation and submission
- *De novo* hybrid assembly (454 and Illumina) and characterisation of a novel group 4 thermophilic *Acidobacteria* sp. genome (Lee *et al.*, SIGS, 2015).

2008-2009: Extremophile Research Group, GNS Science, Wairakei, New Zealand

- Physiological characterisation of the novel species *C. calidirosea*, including a wide range of substrate utilisation and temperature/pH growth ranges (Lee, MSc. thesis, 2009, Lee *et al.*, IJSEM, 2011)
- Designed specialised PCR primers to assist in the detection and isolation of the candidate division OP10/*Armatimonadetes* in environmental samples and mixed cultures.

SOFTWARE EXPERIENCE

- Phylogenetic analysis – ARB, SILVA database, MrBayes, RAxML, PhyML, Phylip, PhyloPhlAn
- (Meta)genome assembly & analysis – MIRA & SPAdes assemblers, bedtools, samtools, Artemis, Staden package, Bowtie2, Mauve
- Microbial community analysis: QIIME, Mothur, USEARCH, Primer 6
- Linux, R (e.g., vegan, phyloseq, ggplot2), Python

PUBLICATIONS

- **Lee, K. C.**, Archer, D.J.S., Boyle, R.H., Lacap-Bugler, D.C., Belnap J., Pointing S.B. Niche filtering of bacteria in soil and rock habitats of the Utah Desert. *Frontiers in Microbiology* (Submitted)
- Archer, S.D.J., de los Ríos, **Lee, K.C.**, Niederberger, T.S., Cary, S.C., Coyne, K.J., Douglas, S., Lacap-Bugler, D.C., Pointing, S.B. Endolithic microbial diversity in sandstone and granite from the McMurdo Dry Valleys, Antarctica. *Polar Biology* (Submitted)
- **Lee, K. C.**, Stott, M. B., Dunfield, P. F., Huttenhower, C., McDonald, I. R., and Morgan, X. C. The *Chthonomonas calidirosea* genome is highly conserved across geography and distinct chemical and microbial environments in the Taupō Volcanic Zone. *Applied Environmental Microbiology* doi: 10.1128/AEM.00139-16
- **Lee, K. C.**, Morgan, X. C., Power, J. F., Dunfield, P. F., Huttenhower, C., & Stott, M. B. (2015). Complete genome sequence of the thermophilic *Acidobacteria*, *Pyrinomonas methylaliphatogenes* type strain K22^T. *Standards in Genomics Sciences*. 10, 101.
- **Lee, K. C.**, Morgan, X. C., Dunfield, P. F., Tamas, I., McDonald, I. R., & Stott, M. B. (2014). Genomic analysis of *Chthonomonas calidirosea*, the first sequenced isolate of the phylum Armatimonadetes. *The ISME Journal*, 1–12
- **Lee, K. C.-Y.**, Stott, M. B., & Dunfield, P. F. (2014). Phylum *Armatimonadetes*. In E. Rosenberg, E. F. DeLong, F. Thompson, S. Lory, & E. Stackebrandt (Eds.), *The Prokaryotes* (4th ed). Springer
- **Lee, K. C. Y.**, Herbold, C. W., Dunfield, P. F., Morgan, X. C., McDonald, I. R., & Stott, M. B. (2013). Phylogenetic delineation of the novel phylum *Armatimonadetes* (former candidate division OP10) and definition of two novel candidate divisions. *Applied and environmental microbiology*, 79(7), 2484–7
- Dunfield, P. F., Tamas, I., **Lee, K. C.**, Morgan, X. C., McDonald, I. R., & Stott, M. B. (2012). Electing a candidate: a speculative history of the bacterial phylum OP10. *Environmental microbiology*, 14(12), 3069–80
- Vyssotski, M., **Lee, K. C.-Y.**, Lagutin, K., Ryan, J., Morgan, X. C., & Stott, M. B. (2011). Fatty Acids of *Chthonomonas calidirosea*, of a novel class *Chthonomonadetes* from a recently described phylum *Armatimonadetes*. *Lipids*, 46(12), 1155–61
- **Lee, K. C.-Y.**, Dunfield, P. F., Morgan, X. C., Crowe, M. A., Houghton, K. M., Vyssotski, M., ... Stott, M. B. (2011). *Chthonomonas calidirosea* gen. nov., sp. nov., an aerobic, pigmented, thermophilic micro-organism of a novel bacterial class, *Chthonomonadetes* classis nov., of the newly described phylum *Armatimonadetes* originally designated candidate division OP10. *International Journal of Systematic and Evolutionary Microbiology*, 61(Pt 10), 2482–90.

AWARDS

- **2010:** Sarah Beanland Memorial Ph.D. Fellowship, GNS Science
- **2009:** Masters Research Scholarship, University of Waikato
- **2009:** Masters Research Study Award, GNS Science
- **2004:** Tearaway Scholarships, Waikato University

SELECTED PRESENTATIONS

- New Zealand Microbiological Society 58th Annual Conference, University of Waikato. Nov 2013. The genomics and ecology of the extremophilic scavenger *Chthonomonas calidirosea*
- Huttenhower Lab, Department of Biostatistics, Harvard School of Public Health. Jul 2013. The genomic and ecological characterisation of *Chthonomonas calidirosea* T49
- New Zealand Microbial Ecology Consortium, University of Auckland. Jan 2012. Ecological implications of the genomic and phenotypic characteristics of an *Armatimonadetes* strain

POSTER SESSION PRESENTATIONS

- **Lee, K.C.**, Archer, S., Boyle, R. H., Lacap-Bugler, D., Belnap J., Pointing S.B. Niche filtering of bacteria in soil and rock habitats of the Utah Desert. NZ Microbial Ecology Consortia (Auckland, NZ, 2016)
- **Lee, K.C.**, Morgan, X.C., Ryan, J., Lagutin, K., Vyssotski, M., McDonald, I.R., Stott, M.B. Physiological characterization and genome sequence of the first cultured representative of candidate division OP10, 'Khthonomonas calidirosea'. 13th International Symposium on Microbial Ecology (Seattle, USA, 22-27 Aug 2010)
- **Lee, C.K.**, Morgan, X.C., Ryan, J., Lagutin, K., Vyssotskii, M. McDonald, I.R. and Stott, M.B. The physiological and ecological characterisation of the first cultivated species of candidate division OP10. COMBIO conference (Christchurch, New Zealand, 6-10 Dec 2009)

PROFESSIONAL ACTIVITIES

- Member of New Zealand Microbiological Society (NZMS)
- Member of New Zealand Microbial Ecology Consortium (NZMEC)
- Member of American Society for Microbiology (ASM)

LANGUAGES

- Spoken: English (fluent), Mandarin Chinese (native)

REFERENCES

- Available upon request