

KEVIN CHIEN-YU LEE, PHD

Senior Research Fellow, Auckland University of Technology

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EMPLOYMENT

2019-Present Lecturer, AUT
2017-2019 Senior Research Officer – Bioinformatics, AUT
2015-2016 Research Technician – Bioinformatics, AUT
2015-2016 Research Fellow, AUT

PROJECTS

2018-ongoing Microbial conversion of kelp to high nitrogen plant and animal feeds, MBIE Endeavour Fund
2017-ongoing *Aerosol Research Project*, Core Team member, Yale-NUS
2015 *Developing sustainable fish aquaculture foods from seaweed*, MBIE Smart Idea Programme
2015 *Ecosystem connectivity and resilience in terrestrial Antarctic systems*, MBIE Programme Grant
2014 *Risk assessment of urban aerosols from microorganisms and PAH in Japan and New Zealand*
Royal Society of New Zealand
2014 *Improving fish feed quality for aquaculture using microbial fermentation*
MBIE Smart Ideas Programme

EDUCATION

2010 - 2015 **PH.D., DEPARTMENT OF BIOLOGICAL SCIENCES | EXTREMOPHILE RESEARCH GROUP**
University of Waikato in collaboration with GNS Science, New Zealand
2007 - 2009 **M.SC. (FIRST CLASS HONOURS), DEPARTMENT OF BIOLOGICAL SCIENCES | EXTREMOPHILE RESEARCH GROUP**
University of Waikato in collaboration with GNS Science, New Zealand
2004 - 2008 **BACHELOR OF SCIENCE (TECHNOLOGY), DEPARTMENT OF BIOLOGICAL SCIENCES**
University of Waikato, New Zealand

SCIENTIFIC EXPERIENCE

2015-present: *School of Science, Auckland University of Technology, New Zealand*

- Investigation of the microbial ecology in extreme environments through molecular biology and bioinformatic approach including amplicon-based community analysis, shotgun metagenomics, and transcriptomics
- Teaching post- and undergraduate courses on microbiology, statistics, and computational biology
- Supervision of postgraduate students

2008-2014: *Extremophile Research Group, GNS Science, Wairakei, New Zealand*

- Phylogenetic analyses of the novel bacterial phylum *Armatimonadetes*
- DNA extraction and molecular biological work for genomic analysis
- Bacteria cultivation physiological characterisation including chemical analysis with HPLC
- Analysis of sequencing data from multiple platforms (Illumina, Ion Torrent, 454, and Sanger)
- Processing sequencing data (16S rRNA genes and whole genome) and interacted with data archives (NCBI GenBank & EMBL-EBI) for data curation and submission
- Bacterial *de novo* genome assemblies

BIOINFORMATIC EXPERIENCE

- Microbial community analysis
- Phylogenetic analysis
- (Meta)genome assembly & analysis
- Transcriptome analysis
- Multivariate statistical modelling and analysis
- Experienced in using high performance computing cluster with NeSI
- Operating systems: Windows, Linux, Mac OS X
- Languages: R (proficient), bash shell (proficient), Python (basic), C++ (basic)

SELECTED PUBLICATIONS

For the full list, please see: <https://scholar.google.co.nz/citations?user=RLsjHSMAAAAJ>

- SDJ Archer[†], **KC Lee**[†], T Caruso, K King-Miaow, M Harvey, D Huang... & SB Pointing (2020) Air mass source determines airborne microbial diversity at the ocean–atmosphere interface of the Great Barrier Reef marine ecosystem. *The ISME Journal*, 14(3) 871–876
- SDJ Archer, **KC Lee**, T Caruso, T Maki, CK Lee, SC Cary ... & SB Pointing (2019) Airborne microbial transport limitation to isolated Antarctic soil habitats. *Nature Microbiology*, 4(6) 925-932
- KA Warren-Rhodes, **KC Lee**, SDJ Archer, N Cabrol, L Ng-Boyle, D Wettergreen ... & the NASA Life in the Atacama Project Team (2019) Subsurface Microbial Habitats in an Extreme Desert Mars-Analog Environment. *Frontiers in Microbiology*, 10:69
- T Maki, **KC Lee**, K Kawai, K Onishi, CS Hong, Y Kurosaki ... & SB pointing (2019) Aeolian dispersal of bacteria associated with desert dust and anthropogenic particles over continental and oceanic surfaces. *Journal of Geophysical Research: Atmosphere*, 124(10) 5579–5588
- **KC Lee**, T Caruso, SDJ Archer, LN Gillman, MCY Lau, SC Cary ... & SB Pointing (2018) Stochastic and deterministic effects of a moisture gradient on soil microbial communities in the McMurdo dry valleys of Antarctica. *Frontiers in Microbiology*, 9:2619
- DC Lacap-Bugler, **KC Lee**, S Archer, LN Gillman, MC Lau, S Leuzinger, ... & A de los Ríos-Murillo (2017). Global diversity of desert hypolithic cyanobacteria. *Frontiers in Microbiology*, 8, 867.
- SD Archer, A de los Ríos, **KC Lee**, TS Niederberger, SC Cary, KJ Coyne, ... & SB Pointing (2017). Endolithic microbial diversity in sandstone and granite from the McMurdo Dry Valleys, Antarctica. *Polar Biology* 1-10
- **KC Lee**, MB Stott, PF Dunfield, C Huttenhower, IR McDonald, & XC Morgan (2016). The *Chthonomonas calidirosea* genome is highly conserved across geography and distinct chemical and microbial environments in the Taupō Volcanic Zone. *Applied and Environmental Microbiology*, 82(12):3572--3581
- **KC Lee**, SDJ Archer, RH Boyle, DC Lacap-Bugler, J Belnap, & SB Pointing (2016). Niche Filtering of Bacteria in Soil and Rock Habitats of the Colorado Plateau Desert, Utah, USA. *Frontiers in Microbiology* 7:1489
- **KC Lee**, XC Morgan, JF Power, PF Dunfield, C Huttenhower, & MB Stott (2015). Complete genome sequence of the thermophilic *Acidobacteria*, *Pyrinomonas methylaliphatogenes* type strain K22^T. *Standards in Genomics Sciences*. 10, 101
- **KC Lee**, XC Morgan, PF Dunfield, I Tamas, IR McDonald, & MB Stott (2014). Genomic analysis of *Chthonomonas calidirosea*, the first sequenced isolate of the phylum Armatimonadetes. *The ISME Journal*, 8(7), 1522-1533.
- **KCY Lee**, CW Herbold, PF Dunfield, XC Morgan, IR McDonald, & MB Stott (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
- **KCY Lee**, PF Dunfield, XC Morgan, MA Crowe, KM Houghton, M Vyssotski, ... & MB Stott (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(10):2482–90

Book chapters:

- MB Stott, **KCY Lee**, XC Morgan, CR Carere (2018) Chapters: Armatimonadetes, Chthonomonadetes, Chthonomonadaceae, Chthonomonadale, Chthonomonas, *Bergey's Manual of Systematics of Archaea and Bacteria*. John Wiley & Sons and Bergey's Manual Trust
- **KCY Lee**, MB Stott, & PF Dunfield (2014). Phylum *Armatimonadetes*. In E. Rosenberg, E. F. DeLong, F. Thompson, S. Lory, & E. Stackebrandt (Eds.), *The Prokaryotes* (4th ed). Springer

ACADEMIC SUPERVISION

Primary supervision

Sarah Scott (PhD) The density and virulence of *Aspergillus fumigatus* from soil, air and nesting materials from kākāpō (*Strigops habroptilus*) and hihi (*Notiomystis cincta*) breeding sites - **Ongoing**

Co-supervision

Samantha Stevenson (MSc) A functional and taxonomic analysis of the hindgut microbiota in *Kyphosus sydneyanus*. External supervision with University of Auckland - **Completed (2019)**.

Elizabeth Buckley (PhD) Phenotypic and genomic insights into ultraviolet resistance of *Arthrobacter* and *Pseudarthrobacter* isolated from desert soil - **Completed (2020)**

SELECTED PRESENTATIONS

- Polar Alpine Biology, Hamilton, New Zealand (**2019**)
Addressing contaminants in community analysis of the Antarctic aerosphere
- Guest lecturer at Kanazawa University, Japan (**2017**)
Shifting microbial communities at the Inferno Crater Lake in New Zealand
- Institute of Nature and Environmental Technology, Kanazawa University, Japan (**2016**)
The uncultured majority of the hidden world – Microbial ecology in diverse and poorly-understood environments & Molecular microbiology – The role of nucleic acid sequencing in understanding microbial communities

SELECTED POSTER SESSION PRESENTATIONS

- New Zealand Microbial Ecology Consortium, University of Auckland (**2018**)
Soil microbial habitats in an extreme desert Mars-analogue environment
- New Zealand Microbiological Society Conference, Auckland (**2017**)
Does taxonomy matter? Investigating the functional metabolic redundancy within microbial communities across (geo)thermal radiants
- International Symposium on Microbial Ecology, Montreal, Canada (**2016**)
Towards resolving microbiology of the aerosphere
- International Symposium on Microbial Ecology (Seattle, **2010**)
Physiological characterization and genome sequence of the first cultured representative of candidate division OP10, 'Khtonomonas calidirosea

PROFESSIONAL ACTIVITIES

- Genomic Aotearoa Metagenomics Summer School (**2019**), University of Auckland
- Strategies and Techniques for Analyzing Microbial Population Structures course (**2016**)
Marine Biology Laboratory, Woods Hole, MA, USA
- Member of New Zealand Microbiological Society (NZMS)
- Member of New Zealand Microbial Ecology Consortium (NZMEC)
- Member of American Society for Microbiology (ASM)
- Member of International Society for Microbial Ecology (ISME)
- Publon verified Journal Peer-Review activity profile:
<https://publons.com/researcher/1552908/kevin-lee/peer-review/>

SCIENTIFIC OUTREACH

- Atacama Mars rover research (Warren-Rhodes et al., 2019) reported in 46 news stories from 37 outlets, including New Zealand Herald (**2019**): "Is there life on Mars? Kiwi scientists join the hunt"
- Aerosol research (Maki et al., 2019) mentioned on Forbes.com (**2019**): "Climate Change Is Worsening the Spread of Airborne Pathogens"