Victor Ka Ming FUNG, Ph.D.

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CURRENT POSITION

Senior Data Scientist II, Agricultural Commodity Research Engine (ACRE), McKinsey & Company, USA — Sep 2021 – Present

- led teams in developing AI-powered object detection pipelines based on foundation models (e.g., YOLO, SAM)
- created simplified crop models to estimate corn and soybean yields in the US, leveraging remote sensing and geospatial climate data
- built and deployed vegetation analytics models to classify tree species and assess tree health, using machine learning

EDUCATION BACKGROUND

The Chinese University of Hong Kong (CUHK)

Doctor of Philosophy in Earth and Atmospheric Sciences — Aug 2015 – Aug 2019

- *Thesis Title*: Modeling and Assessing the Impacts of Sustainable Agricultural Practices on Air Quality and Climate

Master of Science in Mathematics — Sep 2011 – Jun 2012

Hong Kong University of Science and Technology (HKUST)

Bachelor of Engineering in Mechanical Engineering — Sep 2006 – Jun 2009

RESEARCH EXPERIENCE

Postdoctoral Associate, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology (MIT) — Sep 2019 – Aug 2021

- expanded the chemistry mechanisms in the Community Atmosphere Model with chemistry (CAM-chem) to better represent dimethyl sulfide (DMS) oxidation, validated against *in situ* measurements (ATom)
- evaluated the impact of DMS chemistry on aerosol formation and climate forcing

Visiting Researcher, Leverhulme Centre for Climate Change Mitigation, Department of Animal and Plant Sciences, The University of Sheffield — Mar – May 2019

- developed a new scheme to quantify the canopy capture of ammonia emission from vegetated land and croplands in the Community Land Model (CLM)
- validated simulated ammonia against various satellite (e.g., IASI) & *in situ* observations and emission inventories

Visiting Scholar, Department of Environmental Sciences, Emory University — Oct 2017 – Mar 2018

- implemented into CLM novel parameterizations of belowground crop-crop competition and soil ammonia volatilization
- assisted in soil sample collection and heavy metal measurement for a feasibility assessment of urban farming in Atlanta, Georgia, USA

Junior Research Assistant, Earth System Science Programme, CUHK — Apr – Jul 2015

- studied global impacts of agricultural activities using a biogeochemical model DeNitrification-DeComposition (DNDC), a 3-D global chemical transport model (GEOS-Chem), and the Community Earth System Model (CESM)
- conducted data analysis on agricultural nitrogen emissions, crop production, and soil biogeochemical processes using R

Junior Research Assistant, Department of Imaging and Interventional Radiology, CUHK — Mar 2013 – Mar 2015

- published a paper in *Nature*'s *Scientific Reports*
- prepared proposals, gave presentations to the selection committees, and obtained research grants totaled HKD3.2M from the Innovation and Technology Fund (*Project Ref.*: ITS/149/14FP and ITS/293/14FP)
- built MATLAB tools for mathematical and statistical analyses on four-dimensional medical images
- coordinated a 40-subject study involving MRI brain scanning and cognitive tests

PUBLICATIONS

1. D. S. Jo, B. A. Nault, S. Tilmes, A. Gettelman, C. S. McCluskey, A. Hodzic, D. K. Henze, M. O. Nawaz, K. M. Fung, J. L. Jimenez (2023) **Global health and climate effects of organic aerosols from different sources**, *Environmental Science & Technology* (https://doi.org/10.1021/acs.est.3c02823)
2. M. V. Martin, E. Blanc-Betes, K. M. Fung, E. P. Kantzas, I. B Kantola, I. Chiaravalloti, L. T. Taylor, L. K Emmons, W. R. Wieder, N. J. Planavsky, M. D. Masters, E. H. DeLucia, A. P. K. Tai, D. J. Beerling (2023) **Improving nitrogen cycling in a land surface model (CLM5) to quantify soil N_2O, NO, and NH_3 emissions from enhanced rock weathering with croplands**, *Geoscientific Model Development* (https://doi.org/10.5194/gmd-16-5783-2023)
3. K.M. Fung**,** A. P. K. Tai & M. Val Martin (2022) **Modeling the interinfluence of fertilizer-induced NH_3 emission, nitrogen deposition, and aerosol radiative effects using modified CESM2**, *Biogeosciences* (https://doi.org/10.5194/bg-19-1635-2022)
4. K. M. Fung, C. L. Heald, J. H. Kroll, S. Wang, D. S. Jo, A. Gettelman, Z. Lu, X. Liu, R. A. Zaveri, E. C. Apel, D. R. Blake, J.-L. Jimenez, P. Campuzano-Jost, P. R. Veres, T. S. Bates, J. E. Shilling & M. Zawadowicz (2022) **Exploring dimethyl sulfide (DMS) oxidation and implications for global aerosol radiative forcing**, *Atmospheric Chemistry and Physics* (https://doi.org/10.5194/acp-22-1549-2022)
5. X. Liu, A. P. K. Tai & K. M. Fung (2021) **Responses of surface ozone to future agricultural ammonia emissions and subsequent nitrogen deposition through terrestrial ecosystem changes**, *Atmospheric Chemistry and Physics* (https://doi.org/10.5194/acp-21-17743-2021)
6. K. M. Fung, A. P. K. Tai, T. Yong, X. Liu & H.-M. Lam (2019) **Co-benefits of intercropping as a sustainable farming method for safeguarding both food security and air quality**, *Environmental Research Letters* (https://doi.org/10.1088/1748-9326/aafc8b)
7. D. Wang, F. Zhu, K. M. Fung, W. Zhu, Y. Luo, W. C. W. Chu, V. C. T. Mok, J. Wu, L. Shi, A. T. Ahuja & Y. Mao (2015) **Predicting Cerebral Hyperperfusion Syndrome Following Superficial Temporal Artery to Middle Cerebral Artery Bypass based on Intraoperative Perfusion-Weighted Magnetic Resonance Imaging**, *Scientific Reports* (https://doi.org/10.1038/srep14140)

PRESENTATIONS

Invited Talks:

1. **Modelling and Assessing the Impacts of Intercropping, as a Sustainable Farming Practice, on Food Security, Air Quality, and Public Health**, *Centre for Atmospheric Science Seminars*, Department of Chemistry, University of Cambridge, Cambridge, UK (May 2019)

Conference Talks:

1. **Exploring natural aerosol formation from DMS oxidation and implications for aerosol forcing**, *CESM Atmosphere, Whole Atmosphere, and Chemistry-Climate Working Group Meeting 2021*, online (Feb 2021)
2. **Impacts of Ammonia-Aerosol-Climate Feedbacks on Food Security and Air Quality**, *CESM Land Model Working Group Meeting 2020*, Boulder, Colorado, USA (Mar 2020)

3. **Modeling ammonia-aerosol-climate feedback mechanisms using an earth system model: Implications for future food security and air quality**, *American Geophysical Union (AGU) Fall Meeting 2019*, San Francisco, California, USA (Dec 2019)
4. **Modeling and Assessing the Impacts of Sustainable Farming Practices on Food Security, Air Quality, and Public Health**, *The Chemistry Climate Model Initiative (CCMI) Science Workshop*, Hong Kong (Aug 2019)
5. **Improving the terrestrial N cycle modeling for a better estimation of agricultural ammonia emission under sustainable farming alternatives**, *AGU Fall Meeting 2018*, Washington DC, USA (Dec 2018)
6. **Large-scale adoption of intercropping for securing global food supply and air quality – a model study using CLM 4.5**, *CESM Land Model Working Group Meeting 2018*, Boulder, Colorado, USA (Feb 2018)
7. **Modeling large-scale adoption of intercropping as a sustainable agricultural practice for food security and air pollution mitigation around the globe**, *AGU Fall Meeting 2017*, New Orleans, Louisiana, USA (Dec 2017)
8. **Modeling and assessing effectiveness of intercropping as a sustainable agricultural practice for food security and air pollution mitigation**, *5th Integrated Land Ecosystem-Atmosphere Processes Study (iLEAPS) Science Conference*, University of Oxford, Oxford, UK (Sep 2017)

Conference Posters:

1. **Exploring natural aerosol formation from DMS oxidation and implications for aerosol forcing**, *AGU Fall Meeting 2020*, online (Dec 2020)
2. **Co-benefits of Intercropping, as a Sustainable Farming Practice, for Safeguarding Food Supply and Air Quality**, *Gordon Research Conference – Urbanization, Water and Food Security*, HKUST, Hong Kong (Jul 2019)
3. **Estimation of agricultural ammonia emission under sustainable farming practices by improving terrestrial nitrogen cycle modeling**, *7th Annual Composition-Climate Interaction Meeting*, Exeter, UK (Mar 2019)
4. **Co-benefits of maize-soybean intercropping for securing air quality and global food supply**, *Global Young Scientists Summit 2019*, Singapore (Jan 2019)
5. **Potential co-benefits of intercropping as a sustainable agricultural practice for both air pollution mitigation and global food security**, *Joint 14th iCACGP Symposium and 15th IGAC Science Conference*, Takamatsu, Japan (Sep 2018)
6. **Evaluating effectiveness of maize-soybean intercropping in securing food production and air quality in China using DNDC and GEOS-Chem**, *The 8th International GEOS-Chem Meeting*, Harvard University, Massachusetts, USA (May 2017)
7. **Effectiveness of intercropping with soybean as a sustainable farming practice to maintain food production and reduce air pollution in China**, *AGU Fall Meeting 2016*, San Francisco, California, USA (Dec 2016)

TEACHING EXPERIENCE

Guest Lecturer, Graduate Division of Earth and Atmospheric Sciences, CUHK

- EASC5001 Research Frontiers in Earth & Atmospheric Sciences I (a special lecture on nitrogen cycle modeling) — Fall 2018

Mentor, Earth System Science Programme, CUHK

- ESSC4820 Senior Project II — Spring 2017
- ESSC4810 Senior Project I — Fall 2016

Teaching Assistant, Earth System Science Programme, CUHK
- ESSC4520 Numerical Methods and Modeling for Earth and Atmospheric Sciences — Spring 2016
- ESSC2020 Climate System Dynamics — Fall 2015

AWARDS & HONORS

Outstanding Reviewer Award for *Environmental Research Communications* — 2020

Trusted Reviewer, IOP Publishing Limited — 2020

Travel Support for *CESM Land Model Working Group Meeting 2020*, National Centre for Atmospheric Research (NCAR) — 2020

Li Po Chun Charitable Trust Fund Postgraduate Scholarship — 2019

Travel Support, *7th Annual Composition-Climate Interaction Meeting*, National Centre for Atmospheric Science (NCAS), University of Leeds — 2019

Global Scholarship Programme for Research Excellence, Office of Academic Links, CUHK — 2019

Selected Attendee, *Global Young Scientists Summit 2019*, the Singapore Government — 2019

Travel Grant and Selected Attendee of the Early Career Short Course, *Joint 14th iCACGP Symposium & 15th IGAC Science Conference*, IGAC Project — 2018

Pre-doctoral Fellowship, Institute for Quantitative Theory and Methods, Emory University — 2017

Reaching Out Award, HKSAR Government — 2017

Winner of The Young Scholar Competition, *WUN Symposium cum Research Summit – Impacts of Grain Legume Research and Development in Developing Countries*, CUHK — 2017

Service Award, Earth System Science Programme, CUHK — 2015/16 & 2016/17

OTHER WORK EXPERIENCE

Mathematics Teacher, NTK Academic Group — Oct 2012 – Mar 2013
- specialized in mathematics of IB, GCE, I/GCSE curricula at various levels
- wrote study guides & exercise books

Management Trainee, The Jardine Engineering Corporation, Limited — Jul 2009 – May 2011
- managed a project to build the largest cremation system in Hong Kong
- self-initiated to automize the workflow for maintaining a database of government contracts using VBA for Excel

INTERNSHIP

Co-op Student Trainee, The Jardine Engineering Corporation, Limited — Feb – Jun 2009
- earned a return offer to join the company at the end of this internship
- participated in tender bidding and helped to win a contract worth HKD118M (*Ref.*: SST326, Architectural Services Department, HKSAR Government)

PROFESSIONAL ACTIVITIES

Host & Organizer, *Diversity and Inclusion Seminar Series*, Department of Civil and Environmental Engineering, MIT — 2020

Conference/Workshop Organizing Committee
- *CCMI Summer School & Science Workshop*, IGAC — 2019
- *Early Career Scientist Workshop, 5th iLEAPS Science Conference* — 2017
- *Workshop on Modeling Land-Atmosphere Interactions: Fire, Agricultural and Canopy Processes*, CUHK — 2017

Guest Editor

- co-edited a special issue in *Frontiers in Climate*: **Agriculture and Food Supply Challenges in a Changing Climate** 2021

Journal Reviewer

- reviewed 11 papers in *Environmental Research Communications*, *Environmental Research Letters*, *Global and Planetary Change* & *Journal of Geophysical Research: Biogeosciences* Since 2019

Regional Head (SE Asia & Pacific), Early Career Scientist Regional Network, iLEAPS 2018 – 2020

COMMUNITY SERVICE

Postdoctoral Liaison, Department of Civil and Environmental Engineering, MIT 2020

Resident Tutor & Honorary Resident Tutor, Daisy Li Hall, New Asia College, CUHK 2013 – 2019

Councilor, HKUST Students' Union (SU) Council 2008 – 2009

Student Ambassador, School of Engineering, HKUST 2008 – 2009

Publication Secretary, Glacier, HOUSE III Students' Association, HKUSTSU 2007

LANGUAGES

Chinese	fluent written, native Cantonese and conversational Mandarin
English	fluent spoken and written, attended IELTS in 2008 with an overall score of 7.0

COMPUTER SKILLS

Scientific Modeling	CESM (CAM-chem & CLM), DNDC, GEOS-Chem, WRF
Programming	C++, Fortran, MATLAB, Python, R, SQL, VBA for Excel
Cloud Computing	Linux-based clusters, AWS, Azure
Graphical Drawing	Adobe Illustrator, Photoshop
Technical Drawing	Autodesk 3ds Max, AutoCAD, SolidWorks
Video Editing	Adobe Premiere, iMovie
Website Design	Hugo, Jekyll