

# CHENG KAIHAO

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2N09, Kadoorie Biological Sciences Building, The University of Hong Kong, Hong Kong

## EDUCATIONAL BACKGROUND

**The University of Hong Kong** **10/2018-09/2021**

Department of Earth Sciences

Ph.D. in Hydrogeology Supervisor: *Prof. Jiu Jimmy Jiao*

**Thesis:** Submarine groundwater discharge and its ecological influences revealed by coupling radon-222, thermal remote sensing of satellite and unmanned aerial vehicles model

**Hong Kong University of Science and Technology** **09/2016-08/2018**

Department of Civil and Environmental Engineering

M.Phil. in Civil Engineering Supervisor: *Prof. Joseph Hun-wei Lee* (FREng, FHKEng)

**Thesis:** Remote sensing of coastal algal blooms using unmanned aerial vehicles (UAV)

**Jilin University** **09/2012-07/2016**

College of New Energy and Environment

B. Eng. in Groundwater Science and Engineering Supervisor: *Prof. Xueyu Lin* (Academician of CAS)

## WORKING EXPERIENCE

**The University of Hong Kong** **10/2021-Present**

School of Biological Sciences

Post-doctoral Fellow Supervisor: *Dr. Jin Wu*

## SKILLS

IT Skills: **Basic software:** AutoCAD, ArcGIS, LaTeX, MATLAB, Python, Adobe Illustrator.

**Professional software:** ENVI, Agisoft PhotoScan, AquaChem, Aquifer Test.

Laboratory Skills: Bio-chemical analysis, Gene analysis.

## RESEARCH & PUBLICATIONS

### Selected Research Experiences

#### **Coastal algal blooms controlled by water vertical stability and groundwater borne phosphate**

- Decrypt the mechanistic controls on the development of algal blooms in Hong Kong coastal waters.
- Groundwater borne  $\text{PO}_4^{3-}$  is an essential regulator of algal blooms.
- The production of  $\text{PO}_4^{3-}$  in beach aquifers are controlled by biogeochemical reaction processes.
- Constructive for the prevention of algal blooms, water security, sustainability of coastal ecosystems.

#### **Effective coastal *Escherichia coli* monitoring by unmanned aerial vehicles (UAVs)**

- Developed a robust *E. coli* predictive model and validated it against one-year field data.
- Evaluated the model performance in 50 beaches of Hong Kong.
- $^{222}\text{Rn}$  activity and *E. coli* concentration had a positive correlation via one-year field data.
- UAV thermal technology is an effective approach to measure the *E. coli* concentrations.

#### **Two-decade variations of fresh submarine groundwater discharge to Tolo Harbour and their ecological significance by coupled remote sensing and radon-222 model**

- Remote sensing is adapted to map fresh SGD (FSGD) variations for two decades.
- FSGD is much higher at wet seasons and peaked in September.
- FSGD favors algal blooms and increases *E. coli* concentrations.

- FSGD and nutrients approach highest levels ~10-20 days prior to each algal bloom.

#### **Retrieval of coastal *chlorophyll-a* concentration by Unmanned Aerial Vehicle (UAVs)**

- First time used a drone to quantitatively map surface *chlorophyll-a* concentration.
- Camera spectral response analyzed as a function of *chlorophyll-a* concentrations.
- *Chlorophyll-a* estimation model successfully validated against one-year field data.
- Success in mapping spatial and temporal variation of *chlorophyll-a* for an algal bloom.

#### **Publications & Patent**

- **Cheng, K. H.**, Chan, S. N., & Lee, J. H. (2020). Remote sensing of coastal algal blooms using unmanned aerial vehicles (UAVs). *Marine Pollution Bulletin*, 152, 110889.
- **Cheng, K. H.**, Luo, X., & Jiao, J. J. (2020). Two-decade variations of fresh submarine groundwater discharge to Tolo Harbour and their ecological significance by coupled remote sensing and radon222 model. *Water Research*, 115866.
- Conference Paper: **K.H. CHENG**, XIN LUO, JIMMY J.J. JIAO *Fresh submarine groundwater discharge in Tolo Harbour estimated by coupled remote sensing-radioactive tracer model and its implication of algal blooms*, the 6<sup>th</sup> Asia Pacific Coastal Aquifer Management Meeting (APCMM 2019).
- Conference Paper: **K.H. CHENG**, S.N. CHAN, JOSEPH H.W. LEE *Remote sensing of coastal algal blooms using unmanned aerial vehicles (UAV)*, the 13<sup>th</sup> International Conference on Hydroinformatics (HIC 2018).
- Yintao Lu, Xiaoli Hou, **Kaihao Cheng**, Wei Feng. *Photocatalytic Properties of TiO<sub>2</sub> induced by ZnFe<sub>2</sub>O<sub>4</sub> Nanoparticles under Visible Light Irradiation*. *JOURNAL OF ADVANCED OXIDATION TECHNOLOGIES*. Volume 18, ISSN: 1203-8407, No. 2, 2015, 331-338.
- Dong Liyan; **Cheng Kaihao**; Liu Lei; Wang Lei; Zhao Yan. *Study on the Mechanism of Wet-FGD Synergist*. *GuangDong Chemical Industry*, No.18,2014,41:133-134 (in Chinese).
- Patent: Chen Baiyan, **Cheng Kaihao**, Zhang Hanyu, etc. A water film visible light photochromic material and its preparation method. Patent No.: CN104263348A.

### **EXTRACURRICULAR EXPERIENCES**

#### **Scholarship:**

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|-----------------|--|
| 10/2018-09/2021 | HKU Postgraduate Scholarship   |
| 09/2016-08/2018 | HKUST Postgraduate Scholarship   |
| 09/2014-06/2015 | National Scholarship   |
| 09/2013-06/2014 | Liu Guangwen Hydrological Science and Technology Education Fund Award<br>(awarded by Hydrological Bureau of the Ministry of Water Resources) |

#### **Selected Competition & Volunteer**

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|--|-----------------------------|
| <b>The 9<sup>th</sup> Challenge Cup National College Students Business Plan Competition &amp; China College Students' Entrepreneurship Competition</b> | 11/2014                     |
| <i>(by Communist Youth League of China, Ministry of Education of the People's Republic of China, etc..)</i>  |                             |
| <b><i>Photochromic materials applied for new car window diaphragm</i></b>  | <b>National Gold prize</b>  |
| <b>The 7<sup>th</sup> National Contest of College Simulation Spokesman</b>   | 12/2012                     |
| <i>(by the Ministry of Foreign Affairs)</i>  | <b>National Third prize</b> |
| <b>The 9<sup>th</sup> China - northeast Asia exposition</b>  | 09/2013                     |
| <i>(by China Northeast Asia Expo Secretariat &amp; Communist Youth League of Jilin Province)</i>   |                             |