ZHONG Cheng

Earth and Atmospheric Sciences
University of Alberta
Address: #1406 8515-112 Street, Edmonton, Alberta, Canada
Email: czhong@ualberta.ca
Tel: +1 780-695-6734

Education

2017-present PhD University of Alberta, Canada

- Earth Environmental Sciences (GPA: 4.0)
- Advisor：Prof. Daniel S. Alessi
- Dissertation：Microbial Ecology associated with Hydraulic Fracturing Water cycle

2016-2017 MSc University of Alberta, Canada

- Earth Environmental Sciences
- Advisor：Prof. Daniel S. Alessi
- Dissertation：Microbial Community Dynamics in the Hydraulic Fracturing Water Cycle from Two Newly Fractured Shale Gas Wells in the Duvernay Formation, Alberta

2014-2015 MSc University of Alberta, Canada

- Integrated Petroleum Geosciences
- Advisor：Prof. Karlis Muehlenbachs
- Dissertation：Stable Isotope $\delta^{18}O$ and $\delta^{13}C$ analysis of the Woodford Source Rock, Permian Basin

2010-2014 Honored BE Southwest Petroleum University, China

- Resource Exploration
- Advisor：Prof. Shijia Chen
- Honored thesis：Characteristics of Permian tight oil accumulation in eastern Junggar Huoshao Moutain and Northern Huoshao Mountain regions

Research Interests

Bioinformatics & Metagenomics Microbial Ecology Geobiology & Geochemistry

Skills

Programming and data processing

- R, Python, MATLAB, Photoshop, Adobe Illustrator, popular bioinformatic pipelines

Lab

- Metagenome-assembled genomes, 16S rRNA, DNA extraction, PCR, GC-MS, ICP-MS, Orbitrap-HPLC-MS, TEM, SEM, Fluorescence Microscope

Languages

- Chinese (native), English (fluent), Japanese (beginner)

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Research Experience

2016.1-present RA, Earth and Atmospheric Sciences, University of Alberta (Prof. Daniel S. Alessi)

- Metagenomics and geochemical analyses of deep terrestrial subsurface microbiome (in collaboration with Prof. Kelly C. Wrighton, Colorado State University).
- Metagenomics and metabolic analyses of contaminated aquatic and soil microbiome (in collaboration with Prof. Kurt Konhauser and Prof. Greg G. Goss)

2019 Winter Visiting Scientist, Environmental School, Tsinghua University (Prof. Deyi Hou)

- Convolutional neural networks of image processing for environmental risk assessment.
- Critical review on sustainability of the hydraulic fracturing water cycle in North America and China

2015 Summer RA, Earth and Atmospheric Sciences, University of Alberta (Prof. Karlis Muehlenbachs)

- Reconstructed the paleo-environment and -climate based oxygen and carbon stable isotope of source rock in Permian Basin.

Publication

2020

8. Impacts of Hydraulic Fracturing Flowback and Produced Water on Soil Microbial Communities

Cheng Zhong, Konstantin von Gunten, Camilla L. Nesbø, Yifeng Zhang, Xiaoqing Shao, Rong Jin, Kurt O. Konhauser, Greg G. Goss, Brian D. Lanoil, Daniel S. Alessi

(2020) Under Review

7. Comparative Metagenomics Uncover Distinct Shale Microbiome in Deep Fractured Subsurface

Cheng Zhong, Mikayla A. Borton, Camilla L. Nesbø, Fu Chen, Malcolm D. Forster, Liaozi Han, Greg G. Goss, Kelly C. Wrighton, Brian D. Lanoil, Daniel S. Alessi.

(2020) Under Review

6. Assessing Sustainability of Hydraulic Fracturing Water Cycle in North America and China: A Critical Review

Cheng Zhong, Deyi Hou, Ashkan Zolfaghari, Greg G. Goss, Brian D. Lanoil, Daniel S. Alessi.

(2020) Proposal accepted by Journal of Environmental Science & Technology, Under Review.

5. Response of Aquatic Microbial Communities and Bioindicator Modelling of Hydraulic Fracturing Flowback and Produced Water

Cheng Zhong, Camilla L. Nesbø, Greg G. Goss, Brian D. Lanoil, Daniel S. Alessi

FEMS Microbiology Ecology, 2020, 96(5): fiaa068.

2019

4. Temporal Changes in Microbial Community Composition and Geochemistry in

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Flowback and Produced Water from the Duvernay Formation

Cheng Zhong, Jiaying Li, Shannon L. Flynn., Camilla L. Nesbø, Chenxin Sun, Konstaintin von Gunten, Brian D. Lanoil, Greg G. Goss, Jonathan W. Martin, Daniel S. Alessi

ACS Earth and Space Chemistry, 2019, 3(6): 1047–1057.

2018

3. Electron Donor-Driven Bacterial and Archaeal Community Patterns Along Forest Ring Edges in Ontario, Canada

Konstantin von Gunten, Stewart M. Hamilton, **Cheng Zhong**, Camilla Nesbø, jiaying Li, Karlis Muehlenbachs, Kurt O. Konhauser, Daniel S. Alessi

Environmental Microbiology Reports, 2018, 10(6): 663-672.

2013

2. Research on the Adaptability between Acidizing Fluid and Reservoir Core with Special Lithology

Cheng Zhong, Xuandong Liu, Fu Chen, Yuting Han and Yuan Xu

Oil Drilling & Production Technology 2013. Iss. 01

2012

1. Research on Acidizing Fluids for Rock of Special Lithology

Cheng Zhong, Xuandong Liu, Fu Chen, Yuting Han and Yuan Xu

Chemical Engineering of Oil & Gas 2012. Iss. 06

Conferences

2019 American Chemical Society (ACS) Conference (Talk), San Diego, USA

Talk：Microbial Community Dynamics in The Hydraulic Fracturing Water Cycle of A Newly Fractured Shale Gas Well in Western Canada

Co-session chair: remediation of wastewater from energy usage

2019 Geobiology Conference (Poster), Banff, Canada

2018 Resources for Future Generation Conference (Talk), Vancouver, Canada

Talk: Microbial Community Dynamics in Flowback and Produced Water from Unconventional Hydrocarbon Wells

2017 Gas Research Institute of Southwest Oil & Gas Field Company, Chengdu, China

Co-organizer

2017 European Innovation Partnership Water Conference, Porto, Portugal

Co-chair: innovative products and Chinese market

2017 Geobiology Conference (Poster), Banff, Canada

2017 American Chemical Society (ACS) Conference (Talk), San Francisco, USA

Talk：Microbial Community Dynamics in The Hydraulic Fracturing Water Cycle of A Newly Fractured Shale Gas Well in Western Canada

Awards and Media

2019 Media interview for research outcome

Link: Press release of Faculty of Science in University of Alberta

2017 University of Alberta J Gordin Kaplan Student award

2017 University of Alberta GSA travel award

2016 University of Alberta PhD fully funded

2015 University of Alberta MSc fully funded

2014 Southwest Petroleum University honored undergraduate degree

2013 Southwest Petroleum University second-price scholarship

2013 Sichuan Province Environment Protection Scientific Technology Award

Title：Treating drilling mud real time during drilling to prevent drilling mud falling ground

Co-applicant

2013 Southwest Petroleum University second prize in undergraduate innovation experiment

2012 Southwest Petroleum University second-price scholarship

2012 Southwest Petroleum University first-price scholarship

Community Service

- Reviewer (Journal of Marine and Petroleum Geology)
- Undergraduate mentor (one student has been accepted by University of Toronto)
- English translation for commercial contract

References

Daniel S. Alessi
M.Sc. & Ph.D. advisor
Geochemistry mentor
Earth and Atmospheric Sciences
University of Alberta
alessi@ualberta.ca

Deyi Hou
Visiting host-lab mentor
Environmental School
Tsinghua University
houdeyi@tsinghua.edu.cn

Camilla D. Nesbø
Bioinformatics mentor
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Kurt Konhauser
Major collaborator
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Earth and Atmospheric Sciences
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Brian D. Lanoil
M.Sc. & Ph.D. co-advisor
Microbiology mentor
University of Alberta
Biological Sciences
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