# CURRICULUM VITAE

**ZELONG (ERIC) ZHANG**

Baton Rouge, LA 70803 (631) 605-2687 zelongz@lsu.edu https://er1czz.github.io

## Core Competency

- Characterizing fluid/solid interfacial interactions
- Experimental: crystal growth, leaching test, ICP-MS, IR, NMR, Raman, SEM/ EDS, XRD, etc.
- Computational: MD and DFT simulations, HPC, Jupyter Notebook, RStudio, TensorFlow, etc.

## Education

**Louisiana State University**, Geology & Geophysics, Baton Rouge, LA Anticipated May 2020

Ph. D. Geology (Earth materials) Advisor: Dr. Jianwei Wang

Dissertation: Investigating Geochemical Processes of Fluid-rock Interactions of Materials Related to Energy and Environment

**Stony Brook University,** Department of Geosciences, Stony Brook, NY May 2014

M. Sc. Geosciences (Biomineral) Advisor: Dr. Brian L. Phillips

Thesis: NMR Investigation of Organic Phosphorus in Calcite, 117 p.

**China University of Geosciences,** School of Earth Sciences, Wuhan, China Jul 2010

B. Sc. Geochemistry Advisor: Dr. Shucheng Xie & Dr. Junhua Huang

Thesis: Study on 3-hydroxy Acids Distribution in Stalagmite as a Record of Microbial Response to Paleoclimate Variation, 51 p.

## Research Experience

**Louisiana State University**, Department of Geology & Geophysics, LA Sep 2014 – Present

Research Assistant:

1) Study the degradation of nuclear waste form materials in aqueous environments

U.S. Department of Energy, EFRC WastePD & NEUP (Nuclear Energy University Program)

- Adopt the standard leach test method ASTM C1308-08 to evaluate the long-term leaching behavior of iodine in the nuclear waste form lead vanadate iodoapatite $Pb_5(VO_4)_3I$
- Characterize the chemical and physical alterations with SEM, Raman, IR, XRD, ICP-MS, etc.
- Investigate the gel formation of wollastonite $CaSiO_3$ during acid leaching
- Compute the energetics of sodium ion exchange in albite $NaAlSi_3O_8$ using ReaxFF MD
- Study the ion-exchange of apatite and silicate minerals by leaching experiments

2) Investigate the geochemistry of fluid/rock interfacial interactions in shale

- Simulate oil interactions with calcite and kerogen by Molecular Dynamics modeling
- Calculate the energetics of oil desorption from shale surface by Umbrella Sampling
- Evaluate the temperature effect on the desorption of oil from calcite and kerogen surfaces

**Lawrence Berkeley National Lab**, Deep Learning for Science School, Berkeley, CA Jul 2019

- Gained hands-on experience using TensorFlow 2.0 on Kera at NERSC HPC

**Stony Brook University,** Department of Geosciences, Stony Brook, NY Jul 2011 – May 2014

Research Assistant: Developed methodology with NMR to study organophosphates in calcite matrix
U.S. National Science Foundation, EAR, Division of Earth Sciences

- Managed laboratory such as categorizing inventory (SOP, SDS) and coordinating experiments
- Incorporated organic phosphate into calcite $CaCO_3$ using seeded constant-addition method
- Independently performed solid-state NMR experiments and data analysis

**Stony Brook University,** Department of Geosciences, Stony Brook, NY Mar 2011 – Jun 2011

Research Assistant: Reconstructed magnetic record from core logging data in Flathead Lake, MT

**State Key Lab of Geological Processes and Mineral Resources**, Hubei, China Jun 2008 – Jul 2010

Research Assistant: Provided geobiological evaluation of hydrocarbon rocks by biomarkers

**China University of Geosciences,** School of Earth Sciences, Wuhan, China Jan 2008 – Jun 2010

Research Co-leader: Invented an experimental apparatus to physically simulate geology structures

**Wuhan Polytechnic University**, School of Chemistry, Hubei, China Jan 2009 – Oct 2009

Research Assistant: Developed methodology to test the viscosity of liquid crystal

## Teaching Experience

**Louisiana State University,** Geology & Geophysics, Baton Rouge, LA Jan 2020 – Present

Teaching Assistant: Teach historical geology lab for non-major college students

**Louisiana State University,** Geology & Geophysics, Baton Rouge, LA Aug 2017 – Dec 2017

Student mentor: Supervised research of undergraduate student

**Stony Brook University,** Department of Geosciences, NY Sep 2010 – Jul 2011

Teaching Assistant: Assisted in three undergraduate courses

## Professional Experience

**Lawrence Berkeley National Laboratory**, Berkeley, CA July 2019

Deep Learning for Science School (Summer School)

**Goldschmidt 2018**, Boston, MA Aug 2018

Data Science in Geochemistry (Workshop)

**Louisiana State University,** Geology & Geophysics, Baton Rouge, LA 2015-2016

Boresight Geosteering (BHL)

LWD Technologies & Capabilities (Baker Hughes)

Volumetric Calculation and Risk Analysis of Hydrocarbon Reservoir (Talisman)

**Shell Exploration and Production Co. and AAPG**, New Orleans, LA Oct 2013

Imperial Barrel Award Training – Integrated Basin and Play Analysis

## Field Experience

**Louisiana State University,** Geology & Geophysics, Baton Rouge, LA — Apr 2015

AAPG Spring Break Field Trip, Big Bend National Park, TX (1 week)

**China University of Geosciences (Wuhan),** School of Earth Sciences, Hubei, China — 2007-2009

On-site practicum in SINOPEC Jianghan Oilfield, Hubei, China (2 weeks)

Geochemical survey in Three Gorges Dam area, China (3 weeks)

Geological survey in Zhoukoudian District, Beijing, China (6 weeks)

Geology field practicum in Beidaihe District, Hebei, China (2 weeks)

## Certificate and Award

**Certificate**

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| Logging for Oil and Gas Evaluation (issued by Total S.A.) | 2019 |
| Petrel Fundamentals; Petrel Geology; Petrel Property Modeling (issued by Schlumberger) | 2016 |

**Award**

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| People's Choice Award, Best Writing Award, US D.O.E. Video Contest II | Jul 2019 |
| The New Orleans Geological Society Memorial Foundation Scholarship | May 2019 |
| Laura Cordell & John P "Jay" Moffitt Scholarship | Jan 2018 |
| Goldschmidt 2016 Travel Grant | May 2016 |
| LSU Graduate School Dean's Travel Awards | May 2016 |
| Leadership LSU 2015 | Apr 2015 |
| Excellence Award of National Undergraduate Innovation Experimental Project | Sep 2010 |

## Patent and Publication

Zhang, Z., **Zhang**, **Z**., Deng, M., Dai, Z., & Zhan. Z. The Preparation and use of low viscosity liquid crystal materials at low-temperature, China Patent 200910273196.0, issued Dec 2009.

**Zhang, Z**. Stephens, A., & Wang, J. (2020). Temperature Effect on the Interfacial Interactions of Hydrocarbon Fluids with Kerogen and Calcite using Molecular Modeling. Manuscript in preparation.

**Zhang, Z**., Liu, H., & Wang, J. (2020). Energetics of Interfacial Interactions of Hydrocarbon Fluids with Kerogen and Calcite using Molecular Modeling. Manuscript submitted for publication.

**Zhang, Z**., Liu, H., & Wang, J. (2019). Energetics of Interfacial Interactions of Hydrocarbon Fluids with Kerogen and Calcite using Molecular Modeling. *EarthArXiv Preprints* July 31. doi:10.31223/osf.io/sfhqn.

**Zhang, Z**., Gustin, L., Xie, W., Lian, J., Valsaraj, K. T., & Wang, J. (2019). Effect of solution chemistry on the iodine release from iodoapatite in aqueous environments. *Journal of Nuclear Materials, 525*, 161-170

**Zhang, Z**., Ebert, W. L., Yao, T., Lian, J., Valsaraj, K. T., & Wang, J. (2019). Chemical durability and dissolution kinetics of iodoapatite in aqueous solutions. *ACS Earth and Space Chemistry*, *3* (3), 452-462

**Zhang, Z**., Heath, A., Valsaraj, K. T., Ebert, W. L., Yao, T., Lian, J., & Wang, J.(2018). Mechanism of

iodine release from iodoapatite in aqueous solution. *RSC advances*, *8*(8), 3951-3957.

Yao, G., **Zhang, Z**., & Wang, J. (2017). Beta transmutations in apatites with ferric iron as an electron acceptor–implication for nuclear waste form development. *Physical Chemistry Chemical Physics*, *19*(37), 25487-25497.

Phillips, B. L., **Zhang, Z**., Kubista, L., Frisia, S., & Borsato, A. (2016). NMR spectroscopic study of organic phosphate esters coprecipitated with calcite. *Geochimica et Cosmochimica Acta*, *183*, 46-62.

**Zhang, Z**., Deng, M., Zhang, Z., Wei, B., & Xuan, L. Study on the synthesis of difluorooxymethylene alkybenzene and the properties of low temperature viscosity *Digest of Technical Paper*, ASID' 09, (2009)190-1

## Professional Communication (Talk, Video, and Poster)

**EFRC WastePD Meeting at University of North Texas**, Denton, TX Oct 2019

Poster: Iodine Release from Apatite Ceramic Waste Form in Aqueous Environments

**Life at the Frontiers of Energy Research Video Contest II**, US D.O.E. July 2019

Video: **Nuclear Energy Waste and WastePD** (on behalf of WastePD)

**Deep Learning for Science School**, Lawrence Berkeley National Lab, Berkeley, CA July 2019

Poster: An integrated approach to study the iodine immobilization in apatite ceramic waste forms - from Artificial Neural Network to First Principle Calculation

**EFRC WastePD Meeting at University of Virginia**, Charleville, VA Sep 2018

Poster: Long Term Chemical Durability of Iodine-bearing Apatite

**Goldschmidt Conference**, Boston, MA Aug 2018

Workshop: Data Science in Geochemistry

Poster: Energetics of the Oil Interaction with Calcite and Kerogen – Implication for Hydrocarbon Transport and Storage in Shale

**D.O.E. EFRC Mid-term Review Meeting**, Gaithersburg, MD Apr 2018

Poster: Long-term Chemical Duration of Iodine-bearing Apatite in Aqueous Environments

**MRS Spring**, Phoenix, AZ Mar 2018

Poster: Release Mechanism of Iodine Retained by Apatite Structure Waste Form in Aqueous Environments

**WastePD Monthly Research Highlight Webinar** Dec 2017

Talk: Mechanisms of Iodine Release from Iodoapatite in Aqueous Solution

**AGU Fall**, New Orleans, LA Dec 2017

Talk: Mechanisms of Iodine Release from Iodoapatite in Aqueous Solution

Poster: The interfacial energetics of the oil molecules interactions with shale media using molecular dynamics simulation

**EFRC WastePD Meeting at Pacific Northwest National Lab**, Richland, WA Sep 2017

Poster: Mechanisms of Iodine Release from Iodoapatite in Aqueous Solution

**WastePD Design Workshop at QuesTek Innovations, LLC**, Evanston, IL April 2017

**EFRC WastePD Kick-off Meeting**, OSU, Columbus, OH Dec 2016

**4th Annual LONI HPC Parallel Programming Workshop**, LSU, Baton Rouge, LA Jun 2015

**Gordon Research Conferences, Biomineralization**, New London, NH Aug 2014

Poster: NMR Investigation of Organic Phosphoesters Coprecipitated with Calcite

**Gordon Research Conferences, Organic Geochemistry**, Holderness, NH Aug 2014

Poster: Biomarker Phospholipids in Calcite – NMR evidence

**Goldschmidt Conference,** Sacramento, CA Jun 2014

**16th Annual Chemistry Event Symposium**, Boston, MA May 2014

Poster: Organic Phosphorus Speciation in Carbonate Mineral – NMR Study

**AAPG Eastern Section**, Morgantown, WV Nov 2013

Student Chapter Leadership Workshop

**SPE ATCE international**, New Orleans, LA Sep2013– Oct 2013

**SEG International Exposition and Annual Meeting**, Houston, TX Sep 2013

**IEEE 23rd Magnet Technology Conference**, Boston, MA Jul 2013

## Review

NeurIPS 2019 workshop on Machine Learning and the Physical Sciences, Canada Sep 2019

## Volunteer Experience

**Fundraising**

Science & Sprits, College of Science, LSU, Baton Rouge, LA Oct 2019

**Science Education**

GSA, South Central Section 50th Annual Meeting, Baton Rouge, LA Mar 2016

Louisiana Children's Museum, 15th Super Saurus Saturday, New Orleans, LA Apr 2015

Louisiana State University, Baton Rouge, LA

Live Gold Leadership Conference Nov 2014

Super Science Saturday Oct 2014

New York City FIRST Mega Celebration of Science and Technology, NY Mar 2013

Conference on the Geology of Long Island and Metropolitan New York (Annual) 2011-2012

**Social Welfare**

Louisiana State University, Baton Rouge, LA

6th Annucal Spring Greening Day Apr 2015

"Geaux BIG Baton Rouge" LSU 3rd Annual Day of Service — Mar 2015

Habitat for Humanity, Baton Rouge, LA — Mar 2015

International Thanksgiving Banquet, Baton Rouge, LA — Nov 2014

**Animal Welfare**

Cat Haven, Baton Rouge, LA — May 2019 - Present

Companion Animal Alliance, Baton Rouge, LA — Jul 2018 – May 2019

# References

**Jianwei Wang**, Ph.D.
Assistant Professor
Department of Geology & Geophysics
Louisiana State University
E235 Howe-Russell-Kniffen
Baton Rouge LA 70803
Tel: (225) 578-5532
E-mail: jianwei@lsu.edu

**Gerald Frankel**, Ph.D.
Distinguished Professor of Engineering
Department of Materials Science Engineering
Ohio State University
Watts Hall Room 484
Columbus, OH 43210
Tel: (614) 688-4128
E-mail: frankel.10@osu.edu

**Kalliat T Valsaraj**, Ph.D.
Charles & Hilda Roddey Distinguished Professor of Chemical Engineering
Ike East Professor of Chemical Engineering
Cain Department of Chemical Engineering
Louisiana State University
3314R Patrick F Taylor Hall
Baton Rouge, LA 70803
Tel: (225) 578-6522
Email: valsaraj@lsu.edu