

## Curriculum Vitae: Jihua Hao

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### Education

- **Ph.D.** candidate in Geochemistry, Johns Hopkins University, Baltimore, Maryland, USA, August, 2012 – December, 2016 (Expected completion)
- **M.A.** in Geochemistry, Johns Hopkins University, Baltimore, Maryland, USA, August 2012 - March, 2014
- **B.Eng.** in Environmental Science, University of Science & Technology (USTC), Hefei, Anhui, China, August, 2008 - July, 2012

### Research Interests

- Evolution of Early Earth Atmosphere
- Archean Weathering and Riverine Transport
- Mineral Evolution & Ecology
- Coevolution of Biosphere and Geosphere
- Formation and Diagenesis of Banded Iron Formations
- Interfacial Geochemistry between Water and Minerals
- Stability of Biomolecules in Hydrothermal Systems
- High Temperature and Pressure Aqueous Geochemistry

### Research Experience

- Research Assistant in Dept. of Earth & Planetary Sciences, Johns Hopkins University, 2013, summer - Present. Advisor: Prof. Dimitri A. Sverjensky
- Pre-doctoral Associate in Geophysical Lab, Carnegie Institution of Washington, DC, USA, 2013, summer - Present. Mentor: Dr. Robert M. Hazen.
- Undergraduate Graduation Thesis, “*Holocene Climate and extreme environment events deciphered from the sedimentary records of Southern Yellow Sea, China*”, 2012. Advisor: Prof. Liguang Sun, USTC
- Undergraduate Research Project, “*The Historical Record of Pb in the Mud Sediments of Southern Yellow Sea and its Paleoenvironmental Meaning*”, 2011. Advisor: Prof. Liguang Sun, USTC
- Research Assistant, “*Deposition History of Black Carbon in Past 400 Years in Xisha Islands of South China Sea*”, 2009. Supervisor: Prof. Xiaodong Liu, USTC

## **Presentations**

- Poster (Co-author), ***“THE CO-EVOLUTION OF THE GEO- AND BIOSPHERES: AN INTEGRATED PROGRAM FOR DATA-DRIVEN, ABDUCTIVE DISCOVERY IN THE EARTH SCIENCES”***, GSA Annual Meeting in Denver, Colorado, USA, 2016.
- Poster, ***“Importance of Atmospheric H<sub>2</sub> in Surficial Environments of the Archean”***, Second DCO Yellowstone Summer School, USA, 2016.
- Oral, ***“Weathering and late Archean riverine transport”***, Australasian Astrobiology Meeting in Perth, Australia, 2016
- Poster (Co-author), ***“Lithium adsorption on kaolinite, gibbsite, goethite, and hematite”***, Goldschmidt Conference in Yokohama, Japan, 2016.
- Oral, ***“Weathering and Late Archean World Average River Water”***, Goldschmidt Conference in Yokohama, Japan, 2016
- Oral, ***“Chromium Redox Equilibria in Fluids and Minerals under Hydrothermal and Subduction-zone Conditions”***, AGU Fall Conference, San Francisco, USA, 2015.
- Oral, ***“Protection of Amino Acids by Magnetite in Hydrothermal Systems”***, Dept. of Earth & Planetary Sciences, Johns Hopkins University, Baltimore, USA, 2015.
- Oral (INVITED), ***“Earth Prebiotic Environment & the Origin of Life”***, Dept. of Earth & Space Sciences, USTC, Hefei, China, 2015.
- Poster, ***“Equilibrium Chromium Isotopic Fractionation as Functions of Redox and pH on the Early Earth”***, Goldschmidt Conference in Prague, Czech Republic, 2015
- Poster (Co-author), ***“Aspartate Transformation Under Hydrothermal Conditions with Brucite [Mg(OH)<sub>2</sub>]”***, Goldschmidt Conference, Prague, Czech Republic, 2015.
- Poster, ***“Limits on the Partial Pressure of H<sub>2</sub> in the Archean Atmosphere during Weathering of Basaltic Minerals”***, Goldschmidt Conference, Sacramento, California, USA, 2014
- Oral, ***“Basaltic and Granitic Weathering During the Archean: including thermodynamic properties of ferrous-clay minerals”***, Geophysical Laboratory, Carnegie Institution of Washington, USA, 2014
- Oral, ***“Constraints on the Archean atmospheric composition and the weathering of basaltic minerals”***, Dept. of Earth & Planetary Sciences, Johns Hopkins University, USA, 2014
- Poster, ***“Sedimentary Record of Pb in the Mud Region of Southern Yellow Sea and its Paleoenvironmental Meaning”***, 1<sup>st</sup> SUCOS Academic Forum Meeting in Qingdao, China, 2012

## **Manuscripts**

- **Hao, J., Sverjensky, D.A. and Hazen, R.M.** A Model for Late Archean Chemical Weathering and World Average River Water. *Earth and Planetary Science Letters*

(in press)

- **Hao, J.**, Sverjensky, D.A., and Hazen, R.M. Importance of Atmospheric H<sub>2</sub> in Surficial Environments of the Archean. *Geobiology* (**submitted**)
- Estrada, C.F., Mamajov, I., **Hao, J.**, Sverjensky, D.A., Cody, G.D., Hazen, R.M. Aspartate transformation at 200 °C with brucite [Mg(OH)<sub>2</sub>], NH<sub>3</sub>, and H<sub>2</sub>: Implications for prebiotic molecules in hydrothermal vents. *Chemical Geology* (**submitted**).
- **Hao, J.**, Sverjensky, D.A., and Hazen, R.M. Mobility of nutrients and trace elements during weathering on the Archean (**in preparation**)
- **Hao, J.**, Sverjensky, D.A., and Hazen, R.M. Chromium Redox Equilibria in Fluids and Water-Rock Interactions under Hydrothermal and Subduction-zone Conditions (**in preparation**)

### **Honors and Awards**

- Pre-doctoral Fellow, Geophysical Laboratory, Carnegie Institution of Washington, USA, 2013, summer-Present.
- Ph.D. Fellowship, Johns Hopkins University, USA, 2012
- Zhao JIUTZHANG Scholarship, Chinese Academy of Sciences, China, 2011
- National Scholarship, Ministry of Education, China, 2010

### **Field Experience**

- The most convincing evidence of the oldest life on Earth in the Pilbara Craton, astrobiology field trip led by Prof. Martin Van Kranendonk and Ms Tara Djokic (UNSW). July 13 - 17 2016.
- Geology and geochemistry of Yellowstone hydrothermal vents, Second DCO Yellowstone Summer School fieldtrip led by Prof. Lisa Morgan, Prof. Pat Shanks, and Prof. Anna-Louise Reysenbach. July 23 - 30, 2016.
- East Shore Field Trip to Assateague National Park, Department field study of JHU, led by Prof. Kevin Lewis, April 15-17, 2016.

### **Short-courses or Workshops**

- EPS Software Carpentry Coding Workshop by D. Wheeler and M. Sadjadi about Unix shell, Python, Git, Aug 22 -23, 2016, Johns Hopkins University, USA.
- “Keck-RPI Science Day” by Prof. P. Fox and others, about visualizing big data, June 8 - 10, 2016, Rensselaer Polytechnic Institute, USA.
- “Keck-Rutgers Protein Boot Camp” by Prof. P. Falkowski and others, about protein structure and data resources, Jan 28 2016, Rutgers University, USA.
- “Hydrothermal experimental techniques” short-course by Dr. D. Foustoukos, Oct 28 - 30 2015, Geophysical Laboratory, USA.

### **Teaching Activities**

- AS.271.107.01.SP15 Introduction to Sustainability, Johns Hopkins University, 2015 Spring. Teaching assistant, with Prof. Cindy Parker.
- AS.270.114.01.SP14 Guided Tour: The Planets, Johns Hopkins University, 2014 Spring. Teaching assistant, with Prof. Bruce Marsh and Prof. Darrell Strobel.
- AS.270.102.01/02.FA13 Conversations with the Earth, Johns Hopkins University, 2013 Fall. Teaching assistant, with Prof. Bruce Marsh and Prof. Darrell Strobel.

### **Employment**

- Research Assistant, Dept. of Earth & Planetary Sciences, Johns Hopkins University, June, 2014 - Now
- Teaching Assistant, Dept. of Earth & Planetary Sciences, Johns Hopkins University, 2013 - 2014
- Research Assistant, Prof. Liguang Sun, USTC, 2010 - 2012
- Research Assistant, Prof. Xiaodong Liu, USTC, 2009 summer

### **Languages**

- Mandarin Chinese, English

### **Computer Skills**

- C, Python, JMP11, KaleidaGraph, DeltaGraph, Matlab, SPSS, ChemBioDraw, CrystalMaker, Inkscape, Endnote
- **Aqueous speciation & water-rock interaction modeling:** SUPCRT92b, EQ3/6 codes, EQPT, Deep Earth Water Calculator

**Surface chemistry:** Geosurf.

### **Laboratory Skills**

- **Batch adsorption experiment:** X-ray Diffraction (XRD), Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), Ion Chromatography with Dionex ICS-5000 DP dual pump system.
- **Hydrothermal experiments:** PUK 3S Plus Professional Precision Welder, gold tubes/gold bag hydrothermal techniques, Teflon autoclave reactors, Gas Chromatography-Mass Spectrometry (GCMS), High-Performance Liquid Chromatography (HPLC), Metrohm 850 Ion Chromatography System.

### **Related Experience**

- Participant in the Keck project “The Co-Evolution of the Geo- and Biospheres: An Integrated Program for Data-Driven, Abductive Discovery in the Earth Sciences”, 2015-Present
- Supervisor in charge of living affairs of the School of Earth & Space Sciences, USTC, 2008-2012
- Volunteer for the Summer Practice of USTC in undeveloped areas of Anhui Province, 2009

- Volunteer for the Sci-Tech Week of USTC, 2009 & 2012
- Volleyball team leader, School of Earth & Space Sciences, USTC, 2009-2010.