# Curriculum Vitae: Jihua Hao

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## Education

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

## Employment

- Postdoctoral Fellow in Observatoire de Lyon, Université Claude Bernard Lyon1 (UCBL), Lyon, France, December, 2016 – Now
- Research Assistant, Dept. of Earth & Planetary Sciences, JHU, June, 2014 – December, 2016.
- Teaching Assistant, Dept. of Earth & Planetary Sciences, JHU, 2013 - 2014
- Research Assistant, Prof. Liguang Sun, USTC, 2010 - 2012
- Research Assistant, Prof. Xiaodong Liu, USTC, 2009 summer

## Research Interests

- Early Earth Surface Environment
- Origin of Life
- Interfacial Geochemistry between Water and Minerals
- High Temperature and Pressure Aqueous Geochemistry
- Thermodynamic Chemistry: Theories and Applications
- Mineral Evolution & Ecology
- Coevolution of Biosphere and Geosphere

## Research Experience

- PhD Thesis, "***Geochemical Signatures of Weathering and Surface Water Chemistry in the Late Archean***", 2016. Advisor: Prof. Dimitri A. Sverjensky, JHU.
- Research Assistant in Dept. of Earth & Planetary Sciences, JHU, 2013, summer – December, 2016. Advisor: Prof. Dimitri A. Sverjensky
- Pre-doctoral Associate in Geophysical Lab, Carnegie Institution of Washington, DC, USA, 2013, summer – December, 2016. 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 $H_2$ 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 [$Mg(OH)_2$]"***, Goldschmidt Conference, Prague, Czech Republic, 2015.
- Poster, ***"Limits on the Partial Pressure of $H_2$ 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"***, 1st SUCOS Academic Forum Meeting in Qingdao, China, 2012

## Publications

- **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* (2017)
- **Hao, J.**, Sverjensky, D.A., and Hazen, R.M. Importance of Atmospheric $H_2$ in Surficial Environments of the Archean. *Geobiology* **(in revision)**
- Estrada, C.F., Mamajov, I., **Hao, J.**, Sverjensky, D.A., Cody, G.D., Hazen, R.M. Aspartate transformation at 200 °C with brucite [$Mg(OH)_2$], $NH_3$, and $H_2$: Implications for prebiotic molecules in hydrothermal vents. *Chemical Geology* **(in revision)**.
- **Hao, J.**, Sverjensky, D.A., and Hazen, R.M. Mobility of nutrients and trace elements during weathering on the Archean. *Earth and Planetary Science Letters* **(in revision)**
- **Hao, J.**, Sverjensky, D.A., and Hazen, R.M. Chromium Redox Equilibria in Fluids and under Hydrothermal and Subduction-zone Conditions **(**in preparation for *Geochemical Perspective Letters***)**
- Moore, E.K., **Hao, J.**, Sverjensky, D.A., Jelen, B.I., Meyer, M., Hazen, R.M., Falkowski, P.G. Geological and Chemical Factors that Impacted the Biological Utilization of Cobalt in the Archean Era. (in preparation for *Journal of Geophysical Research: Biogeosciences*)

## 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 JIUZHANG Scholarship, Chinese Academy of Sciences, China, 2011
- National Scholarship, Ministry of Education, China, 2010

## Field Experience

- The oldest life on Earth in the Pilbara Craton, astrobiology field trip led by Prof. M.V. Kranendonk and Ms T. Djokic (UNSW). July 13 - 17 2016.
- Second DCO Yellowstone Summer School fieldtrip led by Prof. Lisa Morgan, Prof. Pat Shanks, and Prof. A. Reysenbach. July 23 - 30, 2016.
- East Shore Field Trip to Assateague National Park, Department field study of JHU, led by Prof. K. 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. C. Parker.
- AS.270.114.01.SP14 Guided Tour: The Planets, Johns Hopkins University, 2014 Spring. Teaching assistant, with Prof. Bruce Marsh and Prof. D. Strobel.
- AS.270.102.01/02.FA13 Conversations with the Earth, Johns Hopkins University, 2013 Fall. Teaching assistant, with Prof. B. Marsh and Prof. D. Strobel.

## Languages

- Mandarin Chinese, English, French (beginner)

## 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 Model
  **Surface chemistry modelling**: Geosurf.

## Laboratory Skills

- **Analytical techniques**: Ion Chromatography with Dionex ICS-5000 DP dual pump system, UV-spectroscopy, Raman Spectroscopy, Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), X-ray Diffraction (XRD).
- **Hydrothermal experiments**: PUK 3S Plus Professional Precision Welder, gold tubes/gold bag hydrothermal techniques, Teflon autoclave reactors, high T-P adsorption facility.

## Related Experience

- Co-chair of the 2017 Goldschmidt session "Geobiology in the Time of Big Data".
- Participant in the project "Adsorption mechanisms of nucleotides on mineral surfaces relevant to the prebiotic Earth. Implications for the origin of life." Diamond Light Center, UK.
- Participant in the PREBIOME project "Primitive Earth - Biomolecules Interacting with hydrothermal Oceanic Minerals", 2016-Present.
- 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