

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 H₂ 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 H₂ 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)
- 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], NH₃, and H₂: Implications for prebiotic molecules in hydrothermal vents. *Chemical Geology* (**in press**).
- **Hao, J.**, Sverjensky, D.A., and Hazen, R.M. Importance of Atmospheric H₂ in Surficial Environments of the Archean. *Geobiology* (**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

- 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