

# JEEHYUN YANG

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Laboratory Studies group, Planetary Science section, Science division (3227)

## EDUCATION

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**Massachusetts Institute of Technology**

Cambridge, MA, USA

Ph.D. in Physical Chemistry

2016-2022

Thesis: Experiment and Modeling Combined Kinetic Study of Bottom-up Polycyclic Aromatic Hydrocarbon Formations

Advisor: Prof. William H Green Jr.

**Hokkaido University**

Sapporo, Hokkaido, Japan

B.E. in Sustainable Resources Engineering

2010-13, 2015-16

Thesis: Experimental study for understanding hydrothermal alteration of iron and chromium oxides using a flow-through system

Advisor: Prof. Tsubasa Otake

*Highest honor in the school of engineering*

## EMPLOYMENT

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**NASA Jet Propulsion Laboratory**

2022 - present

*JPL Postdoctoral Fellow*

*Pasadena, CA, USA*

- Laboratory simulations of surface and atmospheric processes on exoplanets
- Automated chemical reaction network generation and its application to exoplanet atmospheres

**Massachusetts Institute of Technology**

2016 - 2022

*Research Assistant*

*Cambridge, MA, USA*

- Development of a FTIR experimental system of an analogue for Titan's atmosphere
- Development of a broadband UV experimental system of an analogue for the early Earth's atmosphere
- Measurement of quadruple sulfur isotopes using Isotope Ratio Mass Spectrometry
- Measurement of chemical reaction kinetics of PAH formation using Time-of-Flight Mass-Spectrometry combined with Laser Absorption
- Maintenance of unique customized Time-Resolved Laser Absorption and Photoionization Time-of-Flight Mass Spectrometry

**Hokkaido University**

2015 - 2016

*Undergraduate Research Assistant*

*Sapporo, Hokkaido, Japan*

- Development of flow-through type experimental system of hydrothermal vent analogues

**Gyeonggi Province Water Resource Headquarters**

2013 - 2015

*Military Service*

*Gwangju, Gyeonggi, South Korea*

- Served as surveillance agent for drinking water in areas around Seoul

## HONORS, AWARDS AND SPECIAL ACTIVITIES

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10 <sup>th</sup> Korea-Japan Joint Government Scholarship (Tuition fee + \$1,000/ month)	2009-13, 2015-16
Nitobe Award (\$2,000). Hokkaido University, Japan	2011
William Wheeler Prize (Highest honor in the department), Hokkaido University, Japan	2016
MIT Presidential Fellowship, Massachusetts Institute of Technology, USA	2016-17
Whiteman Fellowship, Massachusetts Institute of Technology, USA	2017-18
2019 OTEFE Award (\$2,000). Opportunity to Earn Future Education Scholarship, USA	2019

## PUBLICATIONS

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### Year 2023

- Tsai S-M, Lee EKH, Powell D, Gao Peter, Zhang X, Moses J, Hébrard E, Venot O, Parmentier V, Jordan S, Hu R, Alam MK, Alderson L, Batalha NM, Bean JL, Benneke B, Bierson CJ, Brady RP, Carone L, Carter AL, Chubb KL, Inglis J, Leconte J, Lopez-Morales M, Miguel Y, Molaverdikhani K, Rustankulov Z, Sing DK, Stevenson KB, Wakeford HR, **Yang J** *et al.* Photochemically-produced SO<sub>2</sub> in the atmosphere of WASP-39b. *Nature, in print*
- **Yang J**, Gudipati MS, Henderson BL, Fleury B. High-fidelity reaction kinetic modeling of hot-Jupiter atmospheres incorporating thermal and UV-photochemistry enhanced by metastable CO (a<sup>3</sup>Π). *The Astrophysical Journal*, 2023, 947, 1, 26, <https://doi.org/10.1039/D1CP01565F>

### Year 2022

- Ohmoto Y., **Yang J**, Nishikata M., Kawamoto D., Kimura Y., Otake T., Sato T. Low-temperature hydrothermal synthesis of chromian spinel from Fe-Cr hydroxides using a flow-through reactor *Minerals*, 2022, 12, 9, 1110, <https://doi.org/10.3390/min12091110>

### Year 2021

- **Yang J**, Smith MC, Prendergast BM, Chu T-C, Green WH. C<sub>14</sub>H<sub>10</sub> Polycyclic Aromatic Hydrocarbons Formation by Acetylene Addition to Naphthalenyl Radicals Observed. *Physical Chemistry Chemical Physics*, 2021, 23, 14325-14339, <https://doi.org/10.1039/D1CP01565F>

### Year 2020

- Chu T-C, Smith MC, **Yang J**, Liu M, Green WH. Theoretical study on the HACA chemistry of naphthalenyl radicals and acetylene: the formation of C<sub>12</sub>H<sub>8</sub>, C<sub>14</sub>H<sub>8</sub>, and C<sub>14</sub>H<sub>10</sub> species. *International Journal of Chemical Kinetics*, 2020, 52, 11, 752-768, <https://doi.org/10.1002/kin.21397>
- Smith MC, Liu G, Buras ZJ, Chu T-C, **Yang J** and Green WH. Direct Measurement of Radical-Catalyzed C<sub>6</sub>H<sub>6</sub> Formation from Acetylene and Validation of Theoretical Rate Coefficients for C<sub>2</sub>H<sub>3</sub>+C<sub>2</sub>H<sub>2</sub> and C<sub>4</sub>H<sub>5</sub> + C<sub>2</sub>H<sub>2</sub> Reactions, *Journal of Physical Chemistry A*, 2020, 124, 14, 2871-2884, <https://dx.doi.org/10.1021/acs.jpca.0c00558>

## CONFERENCES

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### Year 2020

- **Yang J**, Smith MC, Chu T-C, Green WH. Experimental Investigation of Naphthyl radical Hydrogen Abstraction Acetylene Addition (HACA) mechanism. **Oral presentation** at *American Chemical Society Virtual National Fall Meeting and Expo*, Virtual, 18 August 2020.
- **Yang J**, Smith MC, Chu T-C, Green WH. Experimental Investigation of Naphthyl radical Hydrogen Abstraction Acetylene Addition (HACA) mechanism. **Oral presentation** at *38th Northeast Regional Meeting on Kinetics and Dynamics*, Cambridge, Massachusetts, U.S.A, 25 January 2020.

#### Year 2018

- **Yang J**, Hull A, Field R, Ono S. Mass Independent Sulfur Isotope Fractionation during Elemental-Sulfur Photolysis. **Poster presentation** at *2018 Goldschmidt Conference*, Boston, Massachusetts, U.S.A, 13 August 2018.
- **Yang J**, Hull A, Field R, Ono S. Mass Independent Sulfur Isotope Fractionation during Carbonyl Sulfide Photolysis. **Oral presentation** at *2018 International Symposium on isotopomers*, Baton Rouge, Louisiana, U.S.A, 27 March 2018.

#### Year 2016

- Otake T, **Yang J**, Ohtomo Y, Sato T. Experimental study for the Formation of Chromian Spinel under Low-Temperature Hydrothermal Conditions using a Flow-Through Apparatus. **Oral presentation** at *2016 The Geochemical Society of Japan*, Osaka City University, Japan, 14 Sep 2016.
- **Yang J**, Otake T, Sato T. Experimental Study to Understand the Hydrothermal Alteration of Iron and Chromium Hydroxides in a Flow-Through System. **Oral presentation** at *2016, Goldschmidt Conference* Yokohama, Japan, 28 June 2016.

### PEER-REVIEWING ACTIVITY

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#### Year 2021

- *The Journal of Physical Chemistry A*, American Chemical Society, ISSN: 1520-5215

### TEACHING EXPERIENCE

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**Massachusetts Institute of Technology**

Cambridge, MA, USA

*Teaching Assistant*

*2019-2020*

- 12.335 / 12.835 Experimental Atmospheric Chemistry

**Hokkaido University**

Sapporo, Hokkaido, Japan

*Teaching Assistant*

*2015-2016*

- Construction and interpretation of topographic and geological map

**Hokkaido University**

Sapporo, Hokkaido, Japan

*Preliminary education instructor*

*2015 - 2016*

- General Physics
- General Chemistry

## INTERNSHIP EXPERIENCE

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**Mitsubishi Material**

*Summer Internship*

Higashitani mine, Kyushu, Japan

*2012*

- Field assistant for limestone mining in Higashitani mine

## MILITARY SERVICE

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**Gyeonggi Province Water Resource Headquarters**

*Surveillance Agent*

Gwangju, Gyeonggi

*2013-2015*

- Served as surveillance agent for drinking water in areas around Seoul