

# Julia C. Santos

Leiden Observatory, Leiden University – PO Box 9513, 2300 RA Leiden, The Netherlands

✉ santos@strw.leidenuniv.nl | 🏠 juliacsantos.com

## Education

---

### Leiden University

PH.D. IN ASTRONOMY

- Thesis: Unraveling the origin and fate of interstellar ices

Leiden, the Netherlands

July 2021 - Expected: June 2025

### São Paulo University

M.Sc. IN ASTRONOMY

- Thesis: Methyl acetylene in G331. 512-0.103: Looking at massive star formation through the lens of chemistry

São Paulo, Brazil

August 2019 - February 2021

### Federal University of Rio de Janeiro

B.Sc. IN CHEMISTRY

- Thesis: Rotational spectrum simulations of astrochemically-relevant asymmetric tops

Rio de Janeiro, Brazil

August 2017 - July 2019

## Publications

---

### FIRST-AUTHOR PAPERS (9)

- J. C. Santos**, H. Linnartz, K.-J. Chuang. Formation of carbonyl sulfide (OCS) via SH radicals in interstellar CO-rich ice under dense cloud conditions. Submitted to A&A.
- J. C. Santos**, J. Enrique-Romero, T. Lamberts, H. Linnartz, K.-J. Chuang. Formation of S-bearing complex organic molecules in molecular clouds via ice reactions with C<sub>2</sub>H<sub>2</sub>, HS, and atomic H. Accepted in ACS Earth Space Chem.
- J. C. Santos**, M. L. van Gelder, P. Nazari, A. Ahmadi, E. F. van Dishoeck. SO<sub>2</sub> and OCS toward high-mass protostars: A comparative study between ice and gas. Accepted in A&A.
- J. C. Santos**, H. Linnartz, K.-J. Chuang. Interaction of H<sub>2</sub>S with H atoms on grain surfaces under molecular cloud conditions. 2023, A&A, 678, A112.
- J. C. Santos**, K.-J. Chuang, J. G. M. Schrauwen, A. Traspas Muiña, J. Zhang, H. M. Cuppen, B. Redlich, H. Linnartz, S. Ioppolo. Resonant infrared irradiation of CO and CH<sub>3</sub>OH interstellar ices. 2023, A&A 672, A112.
- J. C. Santos**, K.-J. Chuang, T. Lamberts, G. Fedoseev, S. Ioppolo, H. Linnartz. Experimental confirmation of a new formation route to CH<sub>3</sub>OH in interstellar ices: CH<sub>3</sub>O + H<sub>2</sub>CO → CH<sub>3</sub>OH + HCO. 2022, ApJL, 931, L33.
- J. C. Santos**, F. Fantuzzi, H. M. Quitián-Lara, Y. Martins-Franco, K. Menéndez-Delmestre, H. M. Boechat-Roberty, R. R. Oliveira. Structure and stability of multiply charged naphthalene and its C<sub>10</sub>H<sub>8</sub> isomers: bonding, spectroscopy, and astrophysical implications. 2022, MNRAS, 512, 4669.
- J. C. Santos**, L. Bronfman, E. Mendoza, J. R. D. Lépine, N. U. Duronea, M. Merello, R. A. Finger. A spectral survey of CH<sub>3</sub>CCH in the Hot Molecular Core G331.512-0.103. 2022, ApJ, 925, 3.
- J. C. Santos**, A. B. Rocha, R. R. Oliveira. Rotational spectrum simulations of asymmetric tops in an astrochemical context. 2020, J. Mol. Model., 26, 278.

### CONTRIBUTED PAPERS (5)

- K. Slavicinska, A. C. A. Boogert, Ł. Tychoniec, E. F. van Dishoeck, M. L. van Gelder, M. G. Navarro, **J. C. Santos**, P. D. Klaassen, P. J. Kavanagh, and K.-J. Chuang. Ammonium hydrosulfide (NH<sub>4</sub>SH): a potential significant sulfur sink in interstellar ices. Submitted to A&A.
- J. Zhang, A. Traspas Muiña, D. V. Mifsud, Z. Kaňuchová, K. Cielinska, P. Herczku, K. K. Rahul, S. T. S. Kovács, R. Rácz, **J. C. Santos**, A. T. Hopkinson, L. Craciunescu, N. C. Jones, S. V. Hoffmann, S. Biri, I. Vajda, I. Rajta, A. Dawes, B. Sivaraman, Z. Juhász, B. Sulik, H. Linnartz, L. Hornekær, F. Fantuzzi, N. J. Mason, S. Ioppolo. A systematic FTIR and VUV spectroscopic investigation of ion, electron, and thermally processed ethanolamine ice. Accepted in MNRAS.
- K.-J. Chuang, C. Jäger, **J. C. Santos**, Th. Henning. Formation of N-bearing complex organic molecules in molecular clouds: Ketenimine, acetonitrile, acetaldimine, and vinylamine via the UV photolysis of C<sub>2</sub>H<sub>2</sub> ice. 2024, accepted in A&A.

- T. Lamberts, G. Fedoseev, M. van Hemert, D. Qasim, K.-J. Chuang, **J. C. Santos**, H. Linnartz. Methane formation in cold regions from carbon atoms and molecular hydrogen. 2022, ApJ, 928, 48.
- H. B. A. Cerqueira, **J. C. Santos**, F. Fantuzzi, F. de A. Ribeiro, M. L. M. Rocco, R. R. Oliveira, A. B. Rocha. Structure, stability, and spectroscopic properties of small acetonitrile cation clusters. 2020, J. Phys. Chem. A, 124, 34, 6845 – 6855.

## Awards, Scholarships, & Grants

---

- 2024 **LUF CWB grant**, for a research stay of five weeks at the Center for Astrophysics, Harvard University, USA
- 2023 **IAU travel grant**, to attend the 2023 Kavli-IAU Astrochemistry Symposium
- 2023 **LKBF travel grant**, to attend the 2023 Kavli-IAU Astrochemistry Symposium
- 2019 - 2021 **Graduate research scholarship**, Academic Excellence Program, Coordenação de Aperfeiçoamento de Pessoa de Nível Superior, Brazil
- 2019 **First-ranked candidate**, for the M.Sc. program in Astronomy at São Paulo University, Brazil
- 2019 **EuroPAH travel grant**, to attend the EuroPAH Summer School
- 2019 **Best research of session**, 10a Semana de Integração Acadêmica, Brazil
- 2019 **Presentation award**, XX Brazilian Symposium of Theoretical Chemistry, Brazil
- 2018 **Presentation award**, 9a Semana de Integração Acadêmica, Brazil
- 2018 **Top 5 undergraduate research projects in the field of natural sciences**, XXII Encontro Latino Americano de Iniciação Científica, Brazil
- 2017 - 2019 **Undergraduate research scholarship**, Conselho Nacional de Desenvolvimento Científico, Brazil
- 2017 **Presentation award**, 8a Semana de Integração Acadêmica, Brazil

## Mentorship Experience

---

- 2024-Pres. **Kelly Ma**, M.Sc. student, Leiden University. Thesis: Directly testing hot core gas vs ice chemistry: ALMA vs JWST
- 2023-Pres. **Iara Tiago**, M.Sc. student, Leiden University. Thesis: Non-thermal desorption of interstellar ices induced by H<sub>2</sub> formation: an experimental investigation

## Presentations

---

### INVITED AND CONTRIBUTED TALKS

- Chemistry and Physics at Low Temperatures.** 2024, Niseko, JP - *Contributed*
- Seminar at the Astronomy department, Universidade Federal do Rio de Janeiro.** 2024, Online - *Invited*
- QuantumGrain Workshop.** 2024, Barcelona, ES - *Contributed*
- InterCat Retreat.** 2024, Hella, IS - *Invited*
- Seminar at the Astronomy department, Columbia University.** 2024, New York, USA - *Invited*
- Seminar at the Center for Astrophysics, Harvard University.** 2024, Cambridge, USA - *Invited*
- Seminar at the Astrochemistry Reading Club, Harvard University.** 2024, Cambridge, USA - *Invited*
- Seminar at the Chemistry department, Massachusetts Institute of Technology.** 2024, Cambridge, USA - *Invited*
- Netherlands ALMA+JWST Joint Science Day.** 2024, Groningen, NL - *Contributed*
- Workshop on Interstellar Catalysis.** 2023, Fuglsøcentret, DK - *Invited*

**Origins Center Conference.** 2023, Groningen, NL - *Contributed*  
**InterCat Retreat.** 2022, Helsingør, DK - *Invited*  
**NOVA Network II Meeting.** 2022, Leiden, NL - *Contributed*  
**Astrochemistry LLAMA Meeting.** 2019, São Paulo, BR - *Contributed*  
**10a Semana de Integração Acadêmica.** 2019, Rio de Janeiro, BR - *Contributed*  
**9a Semana de Integração Acadêmica.** 2018, Rio de Janeiro, BR - *Contributed*  
**XXII Encontro Latino Americano de Iniciação Científica.** 2018, São José dos Campos, BR - *Contributed*  
**8a Semana de Integração Acadêmica.** 2017, Rio de Janeiro, BR - *Contributed*

#### POSTER PRESENTATIONS

**Kavli-IAU Astrochemistry Symposium.** 2023, Traverse City, USA  
**Laboratory Astrophysics: Tracking the Evolution of Cosmic Matter Towards Molecular Complexity.** 2022, Les Houches, FR  
**Niels Bohr Legacy Symposium in Astrochemistry.** 2022, Copenhagen, DK  
**European Conference on Laboratory Astrophysics.** 2021, Ana Capri, IT  
**Annual Meeting of the European Astronomical Society.** 2021, Online  
**Physique et Chimie du Milieu Interstellaire.** 2020, Online  
**XX Brazilian Symposium of Theoretical Chemistry.** 2019, João Pessoa, BR  
**EuroPAH Summer School.** 2019, Toulouse, FR  
**IV Winter School of the Valongo Observatory.** 2019, Rio de Janeiro, BR  
**41st Annual Reunion of the Brazilian Chemical Society.** 2018, Foz do Iguaçu, BR  
**XLI Annual Reunion of the Brazilian Astronomical Society.** 2017, São Paulo, BR

#### Teaching Experience

---

2023 **Guest lecture, Astrochemistry course,** Bachelors degree in Astronomy, Federal University of Rio de Janeiro, Brazil  
2021 - Pres. **Bachelor Research Project,** Teaching Assistant, Leiden Observatory, Leiden University  
2021 **Astrochemistry course,** Invited lecturer, 24th Chemistry Week of the Chemistry Institute, Federal University of Rio de Janeiro, Brazil

#### Service & Outreach

---

2023-Pres. **Reviewer,** ACS Earth and Space Chemistry  
2023-Pres. **Reviewer,** The Astrophysical Journal  
2021 - 2024 **Organizer,** Weekly meetings of the Laboratory for Astrophysics group, Leiden University  
2023 **Interview about Laboratory Astrophysics,** Brazilian podcast “Café Debug”  
2023 **Interview about Laboratory Astrophysics,** Brazilian YouTube channel “Astrotubers”, live broadcast  
2021 - 2023 **Organizer,** Biweekly journal club of Leiden Observatory on interstellar ices