Julia de Carvalho Santos — Curriculum Vitae

santos@strw.leidenuniv.nl

Laboratory for Astrophysics, Leiden University
PO Box 9513, 2300 RA Leiden, The Netherlands

Education

2021 - Pres. PhD in Astronomy, **Leiden University**, **The Netherlands**
Expected to defend and graduate in June 2025
Atomic surface chemistry on interstellar dust grains – the bottom-up solid state formation of complex organic molecules in space

2019 - 2021 MSc in Astronomy, **University of São Paulo**, **Brazil**
Defended and graduated in February 2021
Methyl acetylene in G331.512-0.103: Looking at Massive Star-Formation Through the Lens of Chemistry

2017 - 2019 BSc in Chemistry, **Federal University of Rio de Janeiro**, **Brazil**
Defended and graduated in July 2019
Rotational-Spectrum Simulations of Astrochemically-Relevant Asymmetric Tops

Research Experience

2021 - Pres. PhD Project, **Laboratory for Astrophysics**, **Leiden University**
Advisors: Prof. Dr. Harold Linnartz, Prof. Dr. Ewine van Dishoeck and Dr. Ko-Ju Chuang
Laboratory study of atom- and radical-addition reactions in interstellar ice analogues under dark-cloud conditions

2019 - 2021 MSc. Project, **Institute of Astronomy**, **University of São Paulo**
Advisors: Prof. Dr. Jacques R. D. Lépine and Dr. Edgar Mendoza
Submillimeter observations of molecular emission lines in massive star forming regions

2018 - 2019 Undergraduate Research, **Institute of Chemistry**, **Federal University of Rio de Janeiro**
Advisors: Prof. Dr. Alexandre B. Rocha and Prof. Dr. Ricardo. R. Oliveira
Theoretical rotational spectroscopy applied to submillimeter and millimeter observations of interstellar molecules

2017 - 2018 Undergraduate Research, **Valongo Observatory**, **Federal University of Rio de Janeiro**
Advisors: Prof. Dr. Diana Andrade and Prof. Dr. Heloísa M. Boechat-Roberty
Laboratory study of the sputtering of interstellar ice and icy satellite analogues by cosmic rays

Awards and Scholarships

2019 - 2021 **Graduate research scholarship**, Academic Excellence Program, Coordenação de Aperfeiçoamento de Pessoa de Nível Superior, Brazil

2019 **Best research of session**, 10ª Semana de Integração Acadêmica, Brazil
Ab initio Simulations of the Rotational Spectra of Asymmetric Tops Beyond the Rigid and Harmonic Approximations: Astrochemical Implications

2019 **Presentation award**, XX Brazilian Symposium of Theoretical Chemistry, Brazil
Asymmetric Tops' Rotational Spectra Simulation: Astrochemical Implications

2018 **Presentation award**, 9ª Semana de Integração Acadêmica, Brazil
Secondary-Ion Emission from Water Ice Induced by 252Cf Fission Fragments and Its Implications on the Chemical Evolution of Astrophysical Environments

2018 **Top 5 undergraduate research projects in the field of natural sciences**, XXII Encontro Latino Americano de Iniciação Científica, Brazil
Magnetospheric Ion Sputtering in Europa

2017 - 2019 **Undergraduate research scholarship**, Conselho Nacional de Desenvolvimento Científico, Brazil

2017 **Presentation award**, 8ª Semana de Integração Acadêmica, Brazil
Suggesting the radio-observation of water clusters in the interstellar medium

Conference Presentations

2021 European Conference on Laboratory Astrophysics. Ana Capri, Italy.
Poster: *A New Formation Route to CH3OH in Interstellar Ice*

2021 Annual Meeting of the European Astronomical Society. Online.
Poster: *An Observational Study of CH3CCH in the Hot Molecular Core G331.512-0.103*

2020 Physique et Chimie du Millieu Interstellaire. Online.
Poster: *Density Functional Theory for Radio Spectrum Simulations of Interstellar Organic Molecules*

2019 XX Brazilian Symposium of Theoretical Chemistry. João Pessoa, Brazil.
Poster: *Asymmetric Tops' Rotational Spectra Simulation: Astrochemical Implications*

2019 Astrochemistry LLAMA Meeting. São Paulo, Brazil.
Oral contribution: *Suggesting the Radio-Observation of Astrophysical Ices' Secondary Ions: Experimental and Theoretical Approaches*

2019 EuroPAH Summer School. Toulouse, France.
Poster: *Sputtering of Water Ice Induced by Cosmic Rays: Experimental and Theoretical Approaches*

2019 IV Winter School of the Valongo Observatory. Rio de Janeiro, Brazil.
Poster: *Secondary-Ion Emission from Water Ice Induced by MeV 252Cf Fission Fragments and Its Implications in Astrochemistry*

2019 10ª Semana de Integração Acadêmica. Rio de Janeiro, Brazil.
Oral contribution: *Ab initio Simulations of the Rotational Spectra of Asymmetric Tops Beyond the Rigid and Harmonic Approximations: Astrochemical Implications*

2019 10ª Semana de Integração Acadêmica. Rio de Janeiro, Brazil.
Oral contribution: *Sputtering of Astrophysical Ices Induced by Cosmic Rays: Experimental and Theoretical Approaches to the Radio-Observation of the Desorbed Species*

2018 41st Annual Reunion of the Brazilian Chemical Society. Foz do Iguaçu, Brazil.
Poster: *Secondary-Ion Emission from Water Ice Induced by MeV 252Cf Fission Fragments and Its Implications in Astrochemistry*

2018 9ª Semana de Integração Acadêmica. Rio de Janeiro, Brazil.
Oral contribution: *Secondary-Ion Emission from Water Ice Induced by 252Cf Fission Fragments and Its Implications on the Chemical Evolution of Astrophysical Environments*

2018 XXII Encontro Latino Americano de Iniciação Científica. São José dos Campos, Brazil.
Oral contribution: *Magnetospheric Ion Sputtering in Europa*

2017 XLI Annual Reunion of the Brazilian Astronomical Society. São Paulo, Brazil.
Poster: *Suggesting the Radio-Observation of Water Clusters in the Interstellar Medium*

2017 8ª Semana de Integração Acadêmica. Rio de Janeiro, Brazil.
Oral contribution: *Suggesting the Radio-Observation of Water Clusters in the Interstellar Medium*

Skills

Laboratory analysis and techniques	Ultra-high vacuum setups Helium cryogenic techniques Mass spectrometry Spectroscopy (infrared, UV-vis, X-rays) Plasma Desorption Mass Spectrometry
Data reduction, analysis, and modeling	GILDAS software package CASSIS software RADEX radiative transfer code Nautilus gas-grain code
Programming	Python LaTeX
Quantum-chemistry packages	Gaussian GAMESS Molpro Orca

Languages

Portuguese	First language
English	Fluent
French	Advanced
Spanish	Advanced
Japanese	Intermediate
Dutch	Basic

December, 2021