

# Alexandre Champagne-Ruel

Ph.D candidate – astrophysics

UNIVERSITÉ DE MONTRÉAL

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## RESEARCH INTERESTS

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major evolutionary transitions – origin of life – complex systems – information theory

## PUBLICATIONS

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Under review:

**Alexandre Champagne-Ruel** and Paul Charbonneau. “A Mutation Threshold for Cooperative Takeover”. Submitted for publication. 2021.

Published:

Simon Gelin, **Alexandre Champagne-Ruel**, and Normand Mousseau. “Enthalpy-Entropy Compensation of Atomic Diffusion Originates from Softening of Low Frequency Phonons”. In: *Nature Communications* 11.1 (1 Aug. 7, 2020), p. 3977.

Conferences:

**Alexandre Champagne-Ruel**. “Mutation Favors the Emergence of Cooperation”. Talk. Life and Space Poland. 2021.

**Alexandre Champagne-Ruel**. “La Criticalité Dans Un Système Évolutif Artificiel”. Talk. Centre de Recherche En Astrophysique Du Québec (CRAQ) - Rencontre Annuelle. 2019.

Posters:

**Alexandre Champagne-Ruel**. “Les Mutations Favorisent La Coopération En Contexte Évolutif”. Poster. Centenaire, Département de Physique, Université de Montréal. 2021.

**Alexandre Champagne-Ruel**. “Mutation Favors the Emergence of Cooperation”. Poster. Molecular Origins of Life Munich. 2021.

**Alexandre Champagne-Ruel**. “Mutations Promote Cooperation in an Evolutionary Setting”. Poster. XIXth ISSOL Conference. 2021.

**Alexandre Champagne-Ruel**. “Self-Organized Criticality : A Prelude to Avalanche Models of Solar Flares”. Poster. Space Climate 7 Symposium. 2019.

## EDUCATION

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ongoing	<b>Ph.D. Astrophysics</b> ADVISOR: Paul Charbonneau	UNIVERSITÉ DE MONTRÉAL
2020	<b>M.Sc. Astrophysics</b> THESIS: <i>From game theory to exobiology – the emergence of cooperation as a critical phenomenon</i> ( <a href="#">link</a> ) ADVISOR: Paul Charbonneau	UNIVERSITÉ DE MONTRÉAL
2018	<b>B.Sc. Physics</b>	UNIVERSITÉ DE MONTRÉAL
2012	<b>B.Sc. Philosophy</b>	UNIVERSITÉ DE MONTRÉAL

## SCHOLARSHIPS AND AWARDS

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2021	Best poster award (250\$)	UNIVERSITÉ DE MONTRÉAL
2021	Student initiative project (2 000\$)	UNIVERSITÉ DE MONTRÉAL
2020	Scholarship for transition to PhD (2 500\$)	UNIVERSITÉ DE MONTRÉAL
2020	Excellence award (1 000\$)	UNIVERSITÉ DE MONTRÉAL
2018	Excellence award (10 000\$)	UNIVERSITÉ DE MONTRÉAL
2017	John Low Brebner scholarship (2 500\$)	RQMP
2014	Excellence scholarship (4 000\$)	UNIVERSITÉ DU QUÉBEC À MONTRÉAL
2011	Student initiative project (1 000\$)	UNIVERSITÉ DE MONTRÉAL

## SKILLS

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<b>Languages:</b>	PYTHON/NUMPY/SCIPY/MATPLOTLIB, C/C++, FORTRAN, $\LaTeX$ , MATLAB, ASSEMBLY, BASH SCRIPTING
<b>Tools:</b>	MACHINE/STATISTICAL LEARNING, WEB DEVELOPMENT, NETWORK SECURITY
<b>Operational:</b>	GIT, LINUX, PARALLEL/HIGH PERFORMANCE COMPUTING

## CONFERENCES & WORKSHOPS

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2021	Environments for the Origins of Life and Habitability	GORDON RESEARCH CONFERENCE
2021	Challenging Paradigms in Prebiotic Chemistry	GORDON RESEARCH SEMINAR
2021	XIXth ISSOL conference	INTER. SOC. FOR THE STUDY OF THE ORIGIN OF LIFE
2021	Life and Space Conference	POLISH ASTROBIOLOGICAL SOCIETY
2021	Molecular Origins of Life Munich	CRC 235 EMERGENCE OF LIFE
2019	Space Climate 7	UNIVERSITÉ DE MONTRÉAL
2019	Annual Meeting	CENTER FOR RESEARCH IN ASTROPHYSICS OF QUÉBEC

## PROFESSIONAL EXPERIENCES

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2021–2022	Conference organizer – <i>OoLEN Annual Meeting</i>	ORIGIN OF LIFE EARLY-CAREER NETWORK
2021–2022	Teaching assistant – <i>Introduction to astrobiology</i>	UNIVERSITÉ DE MONTRÉAL
2018–2019	Local organizing committee – Space Climate 7	UNIVERSITÉ DE MONTRÉAL
2018–2022	Tutoring – undergraduate level	UNIVERSITÉ DE MONTRÉAL

## MEMBERSHIPS

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Center for Research in Astrophysics of Québec (<http://craq-astro.ca/>)  
Canadian Association of Physicists (<https://www.cap.ca/>)  
Canadian Astronomical Society (<https://casca.ca/>)  
Origin of Life Early-career Network (<https://oolen.org/>)  
International Society for the Study of the Origin of Life (<https://issol.org/>)