

# 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

## EDUCATION

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Ongoing	<b>Ph.D. Astrophysics</b> AVERAGE: 4.1/4.3 ADVISOR: Paul Charbonneau	UNIVERSITÉ DE MONTRÉAL
2020	<b>M.Sc. Astrophysics</b> AVERAGE: 4.0/4.3 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> AVERAGE: 3.7/4.3 (excellence award)	UNIVERSITÉ DE MONTRÉAL
2012	<b>B.Sc. Philosophy</b> AVERAGE: 3.6/4.3	UNIVERSITÉ DE MONTRÉAL

## SCHOLARSHIPS AND AWARDS

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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\$)	REGROUPEMENT QUÉBÉCOIS SUR LES MATÉRIAUX DE POINTE
2014	Excellence scholarship (4 000\$)	UNIVERSITÉ DU QUÉBEC À MONTRÉAL
2011	Student initiative project (1 000\$)	UNIVERSITÉ DE MONTRÉAL

## SKILLS

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**Programming:** PYTHON, C++, FORTRAN,  $\text{\LaTeX}$ , MATLAB, ASSEMBLY  
**Operational:** MACHINE LEARNING, GIT, LINUX

## PUBLICATIONS

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### Papers:

Gelin, Simon and **Champagne-Ruel, Alexandre** and Mousseau, Normand. Enthalpy-entropy compensation of atomic diffusion originates from softening of low frequency phonons. *Nature Communications*, 11 (1):3977, August 2020. ISSN 2041-1723. doi: 10.1038/s41467-020-17812-2. URL <https://www.nature.com/articles/s41467-020-17812-2>

## Conferences:

La criticalité dans un système évolutif artificiel, 2019a. Centre de Recherche en Astrophysique du Québec  
- Rencontre annuelle (*in french*)

## Posters:

Self-organized criticality : A prelude to avalanche models of solar flares. Space Climate 7 Symposium, 2019b  
([link](#))

Mutation favors the emergence of cooperation. Molecular Origins of Life, 2021 ([link](#))

## PROFESSIONAL EXPERIENCES

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2021      Teaching assistant – *Introduction to astrobiology*

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## 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/>)