Alexandre Champagne-Ruel

Ph.D candidate – astrophysics

Université de Montréal

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Research interests

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

Publications

Under review:

Published:

A. Champagne-Ruel and P. Charbonneau, "A Mutation Threshold for Cooperative Takeover", Life **12**, 254 (2022).

S. Gelin, **A. Champagne-Ruel**, and N. Mousseau, "Enthalpy-entropy compensation of atomic diffusion originates from softening of low frequency phonons", Nature Communications **11**, 3977 (2020).

Conferences:

A. Champagne-Ruel, "A Mutation Threshold for Cooperative Takeover", Talk, AbSciCon, 2022.

A. Champagne-Ruel, "Mutation Favors the Emergence of Cooperation", Talk, Life and Space Poland, 2021.

A. Champagne-Ruel, "La Criticalité Dans Un Système Évolutif Artificiel", Talk, Centre de Recherche En Astrophysique Du Québec (CRAQ) - Rencontre Annuelle, 2019.

Posters:

S. Asche, **A. Champagne-Ruel**, S. F. Jordan, M. Preiner, A. d. N. Vieira, J. C. Xavier, and C. Mathis, "OoLEN - The Origin of Life Early-career Network: Building the Community Needed to Solve the Problem", Poster, AbSciCon 2022 Atlanta, 2022.

A. Champagne-Ruel, "Les Mutations Favorisent La Coopération En Contexte Évolutif", Poster, Centenaire, Département de Physique, Université de Montréal, 2021.

A. Champagne-Ruel, "Mutation Favors the Emergence of Cooperative Behavior", Poster, Molecular Origins of Life Munich, 2021.

A. Champagne-Ruel, "Mutations Promote Cooperation in an Evolutionary Setting", Poster, XIXth ISSOL Conference, 2021.

A. Champagne-Ruel, "Self-Organized Criticality : A Prelude to Avalanche Models of Solar Flares", Poster, Space Climate 7 Symposium, 2019.

Education

ongoing	**Ph.D. Astrophysics** Advisor: Paul Charbonneau	Université de Montréal
2020	**M.Sc. Astrophysics** Thesis: *From game theory to exobiology – the emergence of cooperation as a critical phenomenon* (link) Advisor: Paul Charbonneau	Université de Montréal
2018	**B.Sc. Physics**	Université de Montréal
2012	**B.Sc. Philosophy**	Université de Montréal

Scholarships and awards

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

Languages:	Python/NumPy/SciPy/Matplotlib, C/C++, Fortran, LaTeX, MatLab, Assembly, Bash scripting
Tools:	Machine/statistical learning, web development, network security
Operational:	Git, Linux, Parallel/high performance computing

Conferences & Workshops

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

2022–	Member of the Executive Board	Origin of Life Early-career Network
2021–2022	Conference organizer – *OoLEN Annual Meeting*	Origin of Life Early-career Network
2021–2022	Teaching assistant – *Introduction to astrobiology*	Université de Montréal
2018–2019	Local organizing commitee – Space Climate 7	Université de Montréal
2018–2022	Tutoring – undergraduate level	Université de Montréal

Memberships

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)
Complex Systems Society (https://cssociety.org)