# Antoine Allard

Université Laval, Québec, Canada
antoineallard.info | antoine.allard@phy.ulaval.ca

## Experience and affiliations

- Associate professor, U. Laval (2023– )
- Assistant professor, U. Laval (2018–2023)
- External member, BIFI, U. Zaragoza (2023– )
- External faculty, Complex Systems Institute, U. Vermont (2021– )
- Associate researcher, CERVO Brain Research Centre (2020– )
- Postdoctoral fellow, U. Barcelona (2014–2016, 2018)
- Postdoctoral fellow, Centre de Recerca Matemàtica (2017)

## Expertise

Complex systems and networks, Nonlinear dynamics, Statistical physics
Mathematical epidemiology, Theoretical ecology, Neuroscience

## Awards and honors

- 2024 Erdős-Rényi Prize in Network Science (Network Science Society)

  > *"For the breadth and depth of his contributions to modeling complex systems as networks, including the geometry of networks and the role of heterogeneity and superspreading in contemporary diseases and complex contagions."*

- Sentinelle Nord Research Chair on Applications and Theory of Network Analysis (2018–2024)
- 8 awards for excellence in teaching (since 2018)
- Scientific event of the year, Québec City (NetSci2024)
- Board of Honor for PhD and MSc theses (2009, 2014)
- Rouge et Or Distinction for excellence in academic results (2006)

## Scientific contributions

- 66 refereed articles (36 since 2020), gathering over 3100 citations (2100 citations since 2020)
- 2 book chapters
- 4 opinion pieces
- 22 invited seminars
- 62 contributed presentations (47 done by mentees)

## Education

- Ph.D. in Physics, U. Laval (2014)
- M.Sc. in Physics, U. Laval (2008)
- B.Sc. in Theoretical Physics, U. Laval (2006)

## Training and mentoring

- 3 postdocs (2 completed; 1 ongoing)
- 8 PhD (2 completed; 6 ongoing)
- 10 MSc (8 completed; 1 ongoing; 1 forthcoming)
- 7 summer internships
- 4 honor theses

## Teaching

- Computational physics
- Nonlinear dynamics, chaos and complexity
- Non-Euclidean and differential geometry
- Statistical physics
- Theory of Complex Systems and Networks

## Events organization

- Codirector of the Complex Networks Winter Workshop (5 editions since 2018)
- Chair of the flagship conference of the Network Science Society (NetSci2024; ∼500 participants)

## Funding (since 2018)

- 16.5M CAD in team grants
- 1M CAD in individual grants
- 800k CAD in grants to support research group

## Community service

- Associate editor at npj Complexity
- Board member of the Network Science Society
- Board member of the CIMMUL research center

## Selected publications (since 2020)

- Pandemic monitoring with global aircraft-based wastewater surveillance networks, Nature Medicine (2025)
- Duality between predictability and reconstructability in complex systems, Nature Communications (2024)
- Escherichia coli CRISPR arrays from early life fecal samples preferentially target prophages, The ISME Journal (2024)
- The low-rank hypothesis of complex systems, Nature Physics (2024)
- Geometric description of clustering in directed networks, Nature Physics (2024)
- The umbrella value of caribou management strategies for biodiversity. . . , Science of the Total Environment (2024)
- Nonlinear bias toward complex contagion in uncertain transmission settings, PNAS (2023)
- The $D$-Mercator method for the multidimensional hyperbolic embedding of real networks, Nature Communications (2023)
- The role of directionality, heterogeneity and correlations in epidemic risk and spread, SIAM Review (2023)
- Universal Nonlinear Infection Kernel from Heterogeneous Exposure on Higher-Order Networks, Physical Review Letters (2021)
- Deep learning of contagion dynamics on complex networks, Nature Communications (2021)
- Social Confinement and Mesoscopic Localization of Epidemics on Networks, Physical Review Letters (2021)
- Geometric renormalization unravels self-similarity of the multiscale human connectome, PNAS (2020)