

Patrick Charbonneau – CV

ACADEMIC COURSE	Professor of Chemistry and Physics <i>Duke University, Durham, North Carolina</i>	<i>2020–present</i>
	Associate Professor of Chemistry and Physics <i>Duke University, Durham, North Carolina</i>	<i>2015–2020</i>
	Assistant Professor of Physics (secondary appointment) <i>Duke University, Durham, North Carolina</i>	<i>2009–2015</i>
	Assistant Professor of Chemistry (primary appointment) <i>Duke University, Durham, North Carolina</i>	<i>2008–2015</i>
	Postdoctoral Research Scientist <i>FOM Institute for Atomic and Molecular Physics (Amolf), Amsterdam, The Netherlands</i> <ul style="list-style-type: none">• Project Supervisor: Prof. dr. Daan Frenkel• Project: <i>Simulation and test of the ideal glass model</i>	<i>2006–2008</i>
	Ph.D. in Chemical Physics <i>Harvard University, Cambridge, Massachusetts</i> <ul style="list-style-type: none">• Advisor: Prof. David R. Reichman• Thesis: <i>Theory and simulation of equilibrium and out-of-equilibrium behavior in glasses and gels</i>	<i>2001–2006</i>
	B.Sc. Honours in Chemistry <i>McGill University, Montréal, Québec</i>	<i>1998–2001</i>

DISTINCTIONS

APS Fellow, 2021.
Journal of Chemical Physics Top Reviewer, 2016 and 2018.
Alfred P. Sloan Research Fellow, 2013–2015.
Invited Researcher at CEA-Saclay, Winter 2015.
Invited Researcher at Université Montpellier 2, Fall 2014.
Invited Researcher at La Sapienza – Università di Roma, May 2014.
Invited Professor of Physics at ENS-Paris, December 2013.
Visitor at ENS-Paris Meyer Institute, June 2013.
Journal of Chemical Physics Top 20 Reviewers, 2012.
Mention for Teaching Excellence, Duke University, Spring 2012.
ACS HP Outstanding Junior Faculty Award, 2012.
NSF Faculty Early Career Development (CAREER) Award, 2011.
CNRS Invited Researcher at Université Paris VI, Summer 2011.
ORNL Ralph E. Powe Junior Faculty Enhancement Award, 2009.
EU Marie-Curie Incoming International Fellowship, 2006–2008.
FQRNT Master’s and Ph.D. Fellowships, 2001–2006.
Certificate of Distinction in Teaching, 2003.
Society of Chemical Industry Merit Award, 2001.

DUKE TEACHING

- History of Chemistry (2022)
- Science of Cooking (2013, 2016, 2020 ×2, and 2021).
- Introduction to Research in Chemistry (2014, 2016, and 2022).
- (Graduate) Data, Algorithms, and Statistical Mechanics (2016).

- (Graduate) Statistical Mechanics (2008–present).
- Physical Chemistry: Thermodynamics, Statistical Mechanics, and Kinetics (2010–2012).

STUDENT AND
POSTDOCTORAL
SCHOLAR
SUPERVISION

Undergraduate and Masters Students

Clemence Lee '12: Fall 2011.
Dr. Timothy Barnum: REU Summer 2012 (PhD at MIT).
Dr. Giulia Carra: ENS Masters intern Spring 2013 (PhD at Paris-Sud)
Samuel Wentworth: REU Summer 2013.
David Sandberg: REU Summer 2014.
Hao Zhao '17: 2014-15.
Daming Li '15: 2015 (current: PhD candidate at Yale).
Cathy Li '16: 2016–2017 (current: PhD candidate at U Penn).
Caitlin M. Gish: REU Summer 2019 (current: PhD candidate at Yale).

PhD Thesis Students

Kai Zhang: 2008–2012 (current: Assistant Professor at DKU).
Diana Fusco: 2011–2014 (current: Lecturer at Cambridge University).
Yuan Zhuang: 2012–2016 (current: Microsoft Inc.).
Lin Fu: 2012–2017 (current: Duoyi Inc.).
Irem Altam: 2015–2020 (current: postdoc at Yale University).
Yi Hu: 2016–2021 (current: software engineer at Google).
Mingyuan Zheng: 2018–

Postdoctoral scholars

Pablo Palafox: 2011–2012 (current: Assistant Professor at The College of St. Scholastica).
Yuliang Jin: 2012–2014 (current: Assistant Professor at ITP-CAS).
Sho Yaida: 2014–2018 (current: Research Scientist at Facebook AI Research).
Joyjit Kundu: 2017–2019 (current: High Performance Future Computing System at imec).
Bijoy Daga: 2019–2022 (current: postdoctoral scholar).
Peter K. Morse: 2019–2022 (current: postdoctoral scholar at Princeton).
Giampaolo Folena: 2022–

EXTERNAL
RESEARCH FUNDING

Simons Collaborations in Mathematics and the Physical Sciences: Cracking the Glass Problem
Simons Foundation
05/01/2020-04/30/2023
\$ 6,000,000 (\$330,000 to Charbonneau + shared resources)
05/01/2016-04/30/2020
\$10,000,000 (\$500,000 to Charbonneau + shared resources)
Soft Matter Simulation and Theory of the Crystal Assembly of Globular and Membrane Proteins
National Science Foundation, DMR-CMMT
04/15/2018-03/31/2022
\$270,000
Continuous Acoustic Assembly of Metallic Nanoparticles in Microfluidic Systems
National Science Foundation, CMMI-NM
06/30/2014-12/31/2018
\$540,000 (\$150,000 to Charbonneau)
Triangle Center for Excellence for Materials Research and Innovation: Programmable Assembly of Soft Matter
National Science Foundation, DMR-MRSEC
09/15/2011-08/31/2017
\$13,680,000 (~ \$300,000 to Charbonneau)
CAREER: Soft Matter Self-Assembly: Protein Crystallization and Colloidal Microphase Formation
National Science Foundation, DMR-CMMT
06/01/2011-12/31/2017

\$450,000

DEPARTMENTAL
AND UNIVERSITY
SERVICE
(SELECTION)
NOTE: ON FAMILY
LEAVE, SPRING
2021.

Data Policy Advisory Group, April 2021–.
Duke Digital Repository Faculty Advisor, 2016–.
University Priorities Committee, August 2022–June 2025.
Faculty in Residence, August 2011–June 2014 & August 2017–June 2023.
Pre-major advisor, 2011-2014 & 2017–2023
Academic Council, May 2011–May 2013 & May 2020–May 2023.
Library Council, September 2017–August 2023 (chair 2020–2023).
University Librarian Search Committee, 2021-2022 (chair).
Library 2030 Faculty Steering Group, 2021 (chair).
Authorship Dispute Board, July 2019–June 2022.
Standing Committee for Misconduct in Research, July 2019–June 2023.
Marshall Scholarship Mock Interview, November 2021.
Executive Council of the Graduate Faculty, July 2019–June 2021.
AB Duke Scholars Selection Committee, 2020.
OUSF Finalists Faculty Dinners, 2013, 2014 & 2019.
Associate Chair of the Chemistry Department, July 2017–June 2019.
Academic Programs Committee, September 2015–May 2018.
Information Technology Advisory Council, September 2015–August 2018.

PUBLICATIONS
Note that different
subfield-dependent
author ordering
conventions are
followed.

104. P. Charbonneau and P. K. Morse, Comment on “Explicit Analytical Solution for Random Close Packing in $d = 2$ and $d = 3$ ”, <https://doi.org/10.48550/arXiv.2205.06794> (2022).
103. M. Zheng, M. Tarzia and P. Charbonneau, Avoiding critical slowdown in models with SALR interactions, *Journal of Chemical Physics* **in press**, <https://doi.org/10.48550/arXiv.2208.04234> (2022).
102. P. Charbonneau and J. M. Pilcher, From Panocha to Fudge, *Gastronomica* **in press**, <https://doi.org/10.31235/osf.io/f2yvz> (2022).
101. V. Bouchard, P. Charbonneau, J. de Valicourt, Pralines des Voyageurs: an iconic intercultural food, *CuiZine* **in press** (2022).
100. L. Kool, P. Charbonneau, and K. E. Daniels, Gardner-like transition from transient to persistent force contacts in granular crystals, *Physical Review E* **in press**, <https://doi.org/10.48550/arXiv.2205.06794> (2022).
99. P. Charbonneau, From the replica trick to replica symmetry breaking, *IAMP News Bulletin* **October 2022**, 5-25 (2022).
98. G. Folena, G. Biroli, P. Charbonneau, Y. Hu, F. Zamponi, Equilibrium Fluctuations in Mean-field Disordered Models, *Physical Review E* **106**, 024605 (2022).
97. G. Biroli, P. Charbonneau, G. Folena, Y. Hu, F. Zamponi, Local dynamical heterogeneity in glass formers, *Physical Review Letters* **128**, 175501 (2022).
96. P. Charbonneau, Y. Hu, J. Kundu, and P. K. Morse, The dimensional evolution of structure and dynamics in hard sphere liquids, *Journal of Chemical Physics* **156**, 134502 (2022).
95. P. Charbonneau, P. K. Morse, W. Perkins, and F. Zamponi, Three simple scenarios for high-dimensional sphere packings, *Physical Review E* **104**, 064612 (2021).
94. Y. Hu and P. Charbonneau, Numerical transfer matrix study of frustrated next-nearest-neighbor Ising models on square lattices, *Physical Review B* **104**, 144429 (2021).
93. P. Charbonneau, C. M. Gish, R. S. Hoy, P. K. Morse, Thermodynamic stability of hard sphere crystals in dimensions 3 through 10, *European Physical Journal E* **44**, 101 (2021).
92. B. Charbonneau, P. Charbonneau, Y. Hu, and Z. Yang, High-dimensional percolation criticality and hints of mean-field-like caging of the random Lorentz gas, *Physical Review E* **104**, 024137 (2021).
91. Y. Hu, P. Charbonneau, Comment on “Kosterlitz-Thouless-type caging-uncaging transition in a quasi-one-dimensional hard disk system”, *Physical Review Research* **3**, 038001 (2021).
90. P. Charbonneau, M. Tarzia, Solution of Disordered Microphases in the Bethe approximation, *Journal of Chemical Physics* **155**, 024501 (2021).
89. M. Zheng, P. Charbonneau, Characterization and Efficient Monte Carlo Sampling of Disordered Microphases, *Journal of Chemical Physics* **154**, 244506 (2021).
88. P. Charbonneau, E. I. Corwin, C. Dennis, R. Díaz Hernández Rojas, H. Ikeda, G. Parisi, F. Ricci-Tersenghi, Finite size effects in the microscopic critical properties of jammed configurations: a comprehensive study of the effects of different types of disorder, *Physical Review E* **104**, 014102 (2021).
87. G. Biroli, P. Charbonneau, Y. Hu, H. Ikeda, G. Szamel, F. Zamponi, Mean-field caging in a random Lorentz gas, *Journal of Physical Chemistry B* **125**, 6244–6254 (2021).
86. Y. Hu, P. Charbonneau, Percolation thresholds on high dimensional D_n and E_8 related lattices, *Physical Review E* **103**, 062115 (2021).
85. P. Charbonneau, P. K. Morse, Memory formation in jammed hard spheres, *Physical Review Letters* **126**, 088001 (2021).
84. M. Downey, S. Lafferty-Hess, P. Charbonneau, A. Zoss, Engaging Researchers in Data Dialogues: Designing Collaborative Programming to Promote Research Data Sharing, *Journal of eScience Librarianship* **10**, e1193 (2021).

83. G. Biroli, P. Charbonneau, E. I. Corwin, Y. Hu, H. Ikeda, G. Szamel, F. Zamponi, Interplay between percolation and glassiness in the random Lorentz gas, *Physical Review E* **103**, 030104 (2021).
82. L. Berthier, P. Charbonneau, J. Kundu, Finite-dimensional vestige of spinodal criticality above the dynamical glass transition, *Physical Review Letters* **125**, 108001 (2020).
81. J. Kundu, P. Charbonneau, Postponing the dynamical transition density using competing interactions, *Granular Matter* **22**, 55 (2020)
80. I. Altan, A. R. Khan, S. James, M. K. Quinn, J. McManus, P. Charbonneau, Using schematic models to understand the microscopic basis for inverted solubility in γ D-crystallin, *Journal of Physical Chemistry B* **123**, 10061–10072 (2019).
79. E. Flenner, L. Berthier, P. Charbonneau, C. Fullerton, Front-mediated melting of ultrastable glasses, *Physical Review Letters* **123**, 175501, (2019).
78. A. R. Khan, S. James, M. K. Quinn, I. Altan, P. Charbonneau, J. J. McManus, Temperature-dependent non-covalent protein-protein interactions explain normal and inverted solubility in a mutant of human gamma D-crystallin, *Biophysical Journal* **117**, 930-937 (2019).
77. L. Berthier, G. Biroli, P. Charbonneau, E. I. Corwin, S. Franz, F. Zamponi, Gardner Physics in Amorphous Solids and Beyond, *Journal of Chemical Physics*, **151**, 010901 (2019).
76. G. Biroli, P. Charbonneau, Y. Hu, Dynamics around the Site Percolation Threshold on High-Dimensional Hypercubic Lattices, *Physical Review E* **99**, 022118 (2019).
75. L. Berthier, P. Charbonneau, J. Kundu, Bypassing sluggishness: SWAP algorithm and glassiness in high dimensions, *Physical Review E* **99**, 031301(R) (2019).
74. P. Charbonneau, Y. Hu, A. Raju, J. P. Sethna, S. Yaida, Morphology of renormalization-group flow for the de Almeida-Thouless-Gardner universality class, *Physical Review E* **99**, 022132 (2019).
73. L. Berthier, P. Charbonneau, A. Ninarello, M. Osawa, S. Yaida, Zero-temperature glass transition in two dimensions, *Nature Communications* **10**, 1508 (2019).
72. P. Charbonneau, E. I. Corwin, L. Fu, G. Tsekis, M. van der Naald, Glassy, Gardner-like phenomenology in minimally polydisperse crystalline systems, *Physical Review E* **99**, 020901(R) (2019).
71. J. Norman, E. L. Sorrell, Y. Hu, V. Siripurapu, J. Garcia, J. Bagwell, P. Charbonneau, S. R. Lubkin, M. Bagnat, Tissue self-organization underlies morphogenesis of the notochord, *Philosophical Transactions of the Royal Society B: Biological Sciences* **373** 1759 (2018).
70. A. E. Bruno, P. Charbonneau, J. Newman, E. H. Snell, D. R. So, V. Vanhoucke, C. J. Watkins, S. Williams, J. Wilson, Classification of crystallization outcomes using deep convolutional neural networks, *PLOS ONE* **13**(6), e0198883 (2018).
69. Y. Hu, L. Fu, P. Charbonneau, Correlation lengths in quasi-one-dimensional systems via transfer matrices, *Molecular Physics* **116** 3345-3354 (2018).
68. B. Charbonneau, P. Charbonneau, G. Szamel, A Microscopic Model of the Stokes-Einstein Relation in Arbitrary Dimension, *Journal of Chemical Physics* **148**, 224503 (2018).
67. C. Reyes, L. Fu, P. P. A. Suthanthiraraj, C. E. Owens, C. W. Shields IV, G. P. López, P. Charbonneau, B. J. Wiley, The Limits of Primary Radiation Forces in Bulk Acoustic Standing Waves for Concentrating Nanoparticles, *Particle & Particle System Characterization* **35**, 1700470 (2018).
66. Y. Hu, P. Charbonneau, Clustering and assembly dynamics of a one-dimensional microphase former, *Soft Matter* **14**, 4101 (2018).
65. I. Altan, D. Fusco, P. Afonine, P. Charbonneau, Learning about Biomolecular Solvation from Water in Protein Crystals, *Journal of Physical Chemistry B* **122**, 2475-2486 (2018).
64. L. Berthier, P. Charbonneau, E. Flenner, F. Zamponi, How to create equilibrium vapor-deposited glasses, *Physical Review Letters* **119**, 188002 (2017).

63. L. Berthier, P. Charbonneau, D. Coslovich, A. Ninarello, M. Ozawa, S. Yaida, Breaking the glass ceiling: convergent measurements of the configurational entropy in extremely supercooled liquids, *Proceedings of the National Academy of Sciences* **119**, 11356-11361 (2017).
62. Y. Zhuang, P. Charbonneau, Communication: Microphase Equilibrium and Assembly Dynamics, *Journal of Chemical Physics* **147**, 091102 (2017).
61. P. Charbonneau, Y. Li, H. D. Pfister, S. Yaida, Lyapunov exponent and susceptibility, *Physical Review E* **96**, 032129 (2017).
60. P. Charbonneau, S. Yaida, A nontrivial critical fixed point for replica-symmetry-breaking transitions, *Physical Review Letters* **118**, 215701 (2017).
59. A. T. Pham, Y. Zhuang, J. E. S. Socolar, P. Charbonneau, B. B. Yellen, Rotating magnetic fields control colloidal self-assembly and phase transitions, *Physical Review E* **95**, 052607 (2017).
58. L. Fu, C. Bian, D. F. Cruz, C. W. Shields IV, G. P. López, P. Charbonneau, Assembly of hard spheres in a cylinder: a computational and experimental study, *Soft Matter* **13**, 3296-3306 (2017).
57. P. Charbonneau, J. Kurchan, G. Parisi, P. Urbani, F. Zamponi, Glass and Jamming Transitions: From Exact Results to Finite-Dimensional Descriptions, *Annual Review of Condensed Matter Physics* **8**, 265-288 (2017).
56. S. Yaida, L. Berthier, P. Charbonneau, G. Tarjus, Point-to-set lengths, local structure, and glassiness, *Physical Review E* **94**, 032605 (2016).
55. Y. Zhuang and P. Charbonneau, Recent Advances in the Theory and Simulation of Model Colloidal Microphase Formers, *Journal of Physical Chemistry B* **120**, 7775-7782 (2016).
54. L. Berthier, P. Charbonneau, Y. Jin, G. Parisi, B. Seoane, F. Zamponi, Growing timescales and lengthscales characterizing vibrations of amorphous solids, *Proceedings of the National Academy of Sciences* **113**, 8397-8401 (2016).
53. P. Charbonneau, E. I. Corwin, G. Parisi, A. Poncet, F. Zamponi, Universal non-Debye scaling in the density of states of amorphous solids, *Physical Review Letters* **117**, 045503 (2016).
52. Y. Zhuang and P. Charbonneau, Equilibrium Phase Behavior of the Square-Well Linear Microphase-Forming Model, *Journal of Physical Chemistry B* **120**, 6178-6188 (2016).
51. I. Altan, P. Charbonneau, E. H. Snell, Computational Crystallization, *Archives of Biochemistry and Biophysics* **602**, 12-20 (2016).
50. P. Charbonneau, E. Dyer, J. Lee, S. Yaida, Order-agnostic link between statics and dynamics in glass-forming liquids, *Journal of Statistical Mechanics: Theory and Experiments*, **2016**, 074004 (2016).
49. J. J. McManus, P. Charbonneau, E. Zaccarelli, N. Asherie, The Physics of Protein Self-Assembly, *Current Opinion in Colloid & Interface Science* **22**, 73 (2016).
48. R. Tavarone, P. Charbonneau, H. Stark, Kinetic Monte Carlo Simulations for Birefringence Relaxation of Photo-Switchable Molecules on a Surface, *Journal of Chemical Physics* **144**, 104703 (2016).
47. L. Fu, W. Steinhardt, H. Zhao, J. E. S. Socolar, P. Charbonneau, Hard sphere packings within cylinders, *Soft Matter* **12**, 2505-2514 (2016).
46. Y. Zhuang, K. Zhang, P. Charbonneau, Equilibrium Phase Behavior of a Continuous-Space Microphase Former, *Physical Review Letters* **116**, 098301 (2016).
45. L. Berthier, P. Charbonneau, S. Yaida, Efficient measurement of point-to-set correlations and overlap fluctuations in glass-forming liquids, *Journal of Chemical Physics* **144**, 024501 (2016).
44. C. E. Owens, C. W. Shields IV, D. F. Cruz, P. Charbonneau, G. P. Lopez, Highly Parallel Acoustic Assembly of Microparticles into Well-Ordered Colloidal Crystallites, *Soft Matter* **12**, 717 (2016).
43. D. Fusco, P. Charbonneau, Soft Matter Perspective on Protein Crystal Assembly, *Colloids and Surfaces B: Biointerfaces* **137**, 22 (2016).

42. R. Tavarone, P. Charbonneau, H. Stark, Phase ordering of zig-zag and bow-shaped hard needles in two dimensions, *Journal of Chemical Physics* **143**, 114505 (2015).
41. P. Charbonneau, Y. Jin, G. Parisi, B. Seoane, F. Zamponi, Numerical detection of the Gardner transition in a mean-field glass former, *Physical Review E* **92**, 012316 (2015).
40. Y. Jin, P. Charbonneau, Dimensional study of the dynamical arrest in a random Lorentz gas, *Physical Review E* **91**, 042313 (2015).
39. P. Charbonneau, E. I. Corwin, G. Parisi, F. Zamponi, Jamming Criticality Revealed by Removing Localized Buckling Excitations, *Physical Review Letters* **119** 125504 (2015).
38. Y. Yang, L. Fu, C. Marcoux, J. E. S. Socolar, P. Charbonneau, B. B. Yellen, Phase transformations in binary colloidal monolayers, *Soft Matter* **11**, 2404 (2015).
37. P. Charbonneau, J. Kurchan, G. Parisi, P. Urbani, F. Zamponi, Exact theory of dense amorphous hard spheres in high dimension III. The full RSB solution, *Journal of Statistical Mechanics: Theory and Experiment* **2014**, P10009 (2014).
36. P. Charbonneau, J. Kurchan, G. Parisi, P. Urbani, F. Zamponi, Fractal free energy landscapes in structural glasses, *Nature Communications* **5**, 3725 (2014).
35. P. Charbonneau, Y. Jin, G. Parisi, F. Zamponi, Hopping and the Stokes-Einstein relation breakdown in simple glass formers, *Proceedings of the National Academy of Sciences* **111**, 15025 (2014).
34. D. Fusco, T. J. Barnum, A. E. Bruno, J. R. Luft, E. H. Snell, S. Mukherjee, P. Charbonneau, Statistical analysis of crystallization database links protein physicochemical features with crystallization mechanisms, *PLOS ONE* **9**, e101123 (2014).
33. D. Fusco, P. Charbonneau, Competition between monomeric and dimeric crystals in schematic models for globular proteins, *Journal of Physical Chemistry B* **118**, 8034 (2014).
32. D. Fusco, J. J. Headd, A. de Simone, J. Wang, and P. Charbonneau, Characterizing protein crystal contacts and their role in crystallization: rubredoxin as a case study, *Soft Matter* **10**, 290 (2014).
31. C. Marcoux, T. W. Byington, Z. Qian, P. Charbonneau, J. E. S. Socolar, Emergence of stable limit-periodicity in tiling models, *Physical Review E* **90**, 012136 (2014).
30. B. Charbonneau, P. Charbonneau, Y. Jin, G. Parisi, and F. Zamponi, Stokes-Einstein relation violation and the upper critical dimension of the glass transition, *Journal of Chemical Physics* **139**, 164502 (2013).
29. D. Fusco and P. Charbonneau, Crystallization of asymmetric patchy models for globular proteins in solution, *Physical Review E* **88**, 012721 (2013).
28. P. Charbonneau, and G. Tarjus, Geometrical frustration and static correlations in hard-sphere glass formers, *Physical Review E* **87**, 042305 (2012).
27. B. Charbonneau, P. Charbonneau, and G. Tarjus, Geometrical Frustration and Static Correlations in Simple Glass Formers, *Journal of Chemical Physics* **138**, 12A515 (2013).
26. P. Charbonneau, E. Corwin, G. Parisi, and F. Zamponi, Universal microstructure and mechanical stability of jammed packings, *Physical Review Letters* **109**, 205501 (2012).
25. K. Zhang and P. Charbonneau, [N]pT ensemble and finite-size scaling study of the GEM-4 critical isostructural transition, *Physical Review E* **86** 042501 (2012).
24. P. Charbonneau, A. Ikeda, G. Parisi, and F. Zamponi, Dimensional Study of the Caging Order Parameter at the Glass Transition, *Proceedings of the National Academy of Sciences of the United States of America* **100**, 13939 (2012).
23. K. Zhang and P. Charbonneau, [N]pT Monte Carlo Simulations of the Cluster-Crystal-Forming Penetrable Sphere Model, *Journal of Chemical Physics* **136**, 214106 (2012).
22. B. Charbonneau, P. Charbonneau, and G. Tarjus, Geometrical Frustration and Static Correlations in a Simple Glass Former, *Physical Review Letters* **108**, 035701 (2012).

21. S. M. Bergin, A. R. Rathmell, Y.-H. Chen, P. Charbonneau, Z.-Y. Li, and B. J. Wiley, The Effect of Nanowire Length and Width on the Properties of Transparent Conducting Films, *Nanoscale* **4**, 1996 (2012).
20. P. Charbonneau, A. Ikeda, G. Parisi, and F. Zamponi, Glass transition and random close packing above three dimensions, *Physical Review Letters* **107**, 185702 (2011).
19. K. Zhang and P. Charbonneau, A Monte Carlo Approach for Studying Microphases Applied to the Axial Next-Nearest-Neighbor Ising and the Ising-Coulomb Models, *Physical Review B* **83**, 214203 (2011).
18. K. Zhang, P. Charbonneau, and B. M. Mladek, Reentrant and isostructural transitions in a cluster-crystal former, *Physical Review Letters* **105**, 245701 (2010).
17. Y. Jin, P. Charbonneau, S. Meyer, C. Song, and F. Zamponi, Application of Edwards statistical mechanics to high-dimensional jammed sphere packings, *Physical Review E* **82**, 051126 (2010).
16. K. Zhang and P. Charbonneau, Monte Carlo study of the axial next-nearest-neighbor Ising model, *Physical Review Letters* **104**, 195703 (2010).
15. P. Charbonneau, A. Ikeda, J. A. van Meel, and K. Miyazaki, Numerical and theoretical study of a monodisperse hard-sphere glass former, *Physical Review E* **81**, 040501(R) (2010).
14. J. A. van Meel, B. Charbonneau, A. Fortini, and P. Charbonneau, Hard-sphere crystallization gets rarer with increasing dimension, *Physical Review E* **80**, 061110 (2009).
13. J. A. van Meel, D. Frenkel, and P. Charbonneau, Crystallization without geometrical frustration: A study of four-dimensional hard spheres, *Physical Review E* **79**, 030201(R) (2009).
12. B. M. Mladek, P. Charbonneau, C. N. Likos, D. Frenkel, and G. Kahl, Multiple-occupancy crystals formed by purely repulsive, soft particles, *Journal of Physics: Condensed Matter* **20**, 494245 (2008).
11. P. Charbonneau, C. Das, and D. Frenkel, Dynamical heterogeneity in a glass forming ideal gas, *Physical Review E* **78**, 011505 (2008).
10. B. M. Mladek, P. Charbonneau, and D. Frenkel, Phase coexistence of cluster crystals: beyond the Gibbs phase rule, *Physical Review Letters* **99**, 235702 (2007).
9. P. Charbonneau and D. R. Reichman, Dynamical heterogeneity and nonlinear susceptibility in supercooled liquids with short-range attraction, *Physical Review Letters* **99**, 135701 (2007).
8. P. Charbonneau and D. Frenkel, Gas-solid coexistence of adhesive spheres, *Journal of Chemical Physics* **126**, 196101 (2007).
7. P. Charbonneau and D. R. Reichman, Phase behavior and far-from-equilibrium gelation in charged attractive colloids, *Physical Review E* **75**, 050401(R) (2007).
6. P. Charbonneau and D. R. Reichman, Systematic Characterization of Thermodynamic and Dynamical Phase Behavior in Systems with Short-ranged Attraction, *Physical Review E* **75**, 011507 (2007).
5. D. R. Reichman and P. Charbonneau, Mode-Coupling Theory (MCT) Lecture Notes, *Journal of Statistical Mechanics: Theory and Experiment*, P05013 (2005).
4. C. Chamon, P. Charbonneau, L. F. Cugliandolo, D. R. Reichman, and M. Sellitto, Out of equilibrium dynamical fluctuations in glassy systems, *Journal of Chemical Physics* **121**, 10120–10137 (2004).
3. C. J. Barden, P. Charbonneau, and H. F. Schaefer III, Group 13-Group 16 Heterocubanes $[\text{RM}(\mu_3 - \text{E})]_4$ (R = H, CH₃; M = Al, Ga, In; E = O, S, Se, Te) and Group 13 Cubanes $[\text{RM}(\mu_3 - \text{M})]_4$ (R = F, Cl, CH₃, NO₂; M = Al, Ga, In): A Structural Study, *Organometallics* **21**, 3605–3609 (2002).
2. A. C. Spivey, P. Charbonneau, T. Fekner, D. H. Hochmuth, A. Maddaford, C. Malardier-Jugroot, A. J. Redgrave, and M. A. Whitehead, Energy Barriers to Rotation in Axially Chiral Analogues of 4-(Dimethylamino)pyridine, *Journal of Organic Chemistry* **66**, 7394–7401 (2001).
1. P. Charbonneau, B. Jean-Claude, and M. A. Whitehead, Synthesis of a Prodrug: a Semi-empirical PM3 Study, *THEOCHEM* **574**, 85–91 (2001).

BOOK CHAPTERS

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34. “‘Seeing the Invisible’ exhibit opens in the Chappell Family Gallery,” The Chronicle, March 7, 2020, <https://www.dukechronicle.com/article/2020/03/seeing-the-invisible-exhibit-opens-i>
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29. “Teaching a Machine to Spot a Crystal,” Kara Manke, *Duke Research Blog*, June 20, 2018.
28. “Cheating Time to Watch Liquids do the Slow Dance,” Kara Manke, *Duke Research Blog*, November 2, 2017.
27. “The Time for Disorder Has Come,” Patrick Charbonneau, *Journal Club for Condensed Matter Physics*, September 2017.
26. “Glasses and Friendships: a French-American Scientific Collaboration,” Patrick Charbonneau, Valérie Trentesaux, *Office for Science & Technology at the Embassy of France in the United States*, June 9, 2017.
25. “Scientists Reignite 30-Year-Old Debate About Glass With New Calculation,” Ryan F. Mandelbaum, *Gizmodo*, June 4, 2017.
24. “Breaking Glass in Infinite Dimensions” Kara Manke, *Duke Today*, May 30, 2017.
23. “La théorie du verre de plus en plus solide,” Ludovic Berthier, Patrick Charbonneau, Francesco Zamponi, *La Recherche*, **Number 510**, April 2016.
22. “Soft Matter and Cooking”, by Département de Physique Colloquium, École Normale Supérieure, <http://www.phys.ens.fr/spip.php?article2048>, January 2015.
21. “Through the Theoretical Glass” by Katie L. Burke, *American Scientist* **103**, January-February, 2015, p. 4, www.americanscientist.org/science/pub/through-the-theoretical-glass.
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19. “Non c’è vetro senza frattali” by Folco Claudi, *Le Scienze*, May 27, 2014.
18. “When Things Get Glassy, Molecules Go Fractal” by Erin Weeks, *Duke Research Blog*, April 23, 2014.
17. “How fractals jam glassy materials” by Ashley Yeager, *Science News Science Ticker Blog*, April 24, 2014.
16. “Spherical Cows Help Turn Proteins to Crystals” by Ashley Yeager, *Duke Research Blog*, November 13, 2013.

15. “Through the Theoretical Glass” by Katie L. Burke, *American Scientist Pizza Lunch Podcast*, September 2013 (November 5, 2014). <http://amscimag.sigmaxi.org/4lane/pizza/2013-09Charbonneau.mp3>
14. “Scientists Get Best View Yet of the Structure of Glass” by Elizabeth Quill, *Smithsonian Magazine Blog*, July 12, 2013.
13. “The Science of Life – Through a glass, less darkly” by Robert Frederick, *Science News* **183**(2), 4, January 26, 2013.
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11. “Final Banquet Closes First Science of Cooking Class” by Ashley Yeager, *Duke Today*, April 24, 2013.
10. “Chemistry in the Kitchen, Cooking in the Classroom” by Ezgi Ustundag, *Duke Today*, April 10, 2013.
9. “Chocolate’s crisp crack comes from chemistry” by Ashley Yeager, *Duke Research Blog*, March 28, 2013.
8. “Meat Glue – True to its Name” by Ashley Yeager, *Duke Research Blog*, March 8, 2013.
7. “Diffusion à la Chocolate Lava Cake” by Ashley Yeager, *Duke Research Blog*, February 21, 2013.
6. “Cooking up chemistry with candy” by Ashley Yeager, *Duke Research Blog*, January 23, 2013.
5. “Soft Matter, Or Just Marshmallows?” by Ashley Mooney, *Duke Research Blog*, November 15, 2012.
4. “A second crack at the nature of glass” by Ashley Yeager, *Duke Research Blog*, August 13, 2012.
3. “Shaping and shattering theories of glass” by Ashley Yeager, *Duke Research Blog*, October 25, 2011.
2. “Tangling the microscopic ladder” by Ashley Yeager, *Duke Research Blog*, December 15, 2010.
1. “Patrick Charbonneau: Chemist has all the right ingredients” by Bronwyn Chester, *McGill Reporter*, January 11, 2001.

SELECTED
SEMINARS AND
CONFERENCES
Invited oral
contributions, unless
otherwise noted.

139. *Quantum Physics and Complex Systems*, City University of Hong Kong, Hong Kong, December 2022.
138. *Nordita: Current and Future Themes in Soft & Biological Active Matter*, Stockholm, Sweden, July-August 2022.
137. *Disorder’s Role in Glass Formation and Deformation*, Utrecht, Netherlands, July 2022.
136. *Women in Quantum Physics History: Hermann and Friends*, Leiden, Netherlands, July 2022.
135. *Canadian Association of Physicists Annual Meeting*, Hamilton, ON, June 2022.
134. *ACS Spring Meeting*, San Diego, CA, March 2022.
133. *McMaster University Physics Colloquium*, Hamilton, ON, December 2021.
132. *Duke University Physics Colloquium*, Durham, NC, October 2021.
131. *Glassy Systems and Inter-Disciplinary Application*, Cargèse, France (hybrid), July 2021.
130. *Mainz Materials Simulation Days 2021*, virtual, June 2021.
129. *APS March Meeting*, virtual, March 2021.
128. *DKU Soft Matter Symposium: Bridging ‘Micro-Meso-Macro’ Scales in Particulate and Biological Systems*, Kunshan, China (hybrid), December 2020.
127. *Recent progress in glassy systems: Marginally Stable Phases, Quantum Behaviour, Machine Learning and Mathematical Physics*, Les Houches School of Physics, France, February 2020.
126. *Bristol University Physics Seminar*, Bristol, UK, November 2019.
125. *TU Eindhoven Physics Colloquium*, Eindhoven, Netherlands, November 2019.

124. *Centro Internacional de Ciencias Workshop on Amorphous Solids*, Cuernavaca, Mexico, October 2019.
123. *Mini-symposium on glass and jamming physics*, Beijing, China, July 2019.
122. *Chinese Academy of Sciences – Institute of Physics Seminar*, Beijing, China, July 2019.
121. *Frontiers of soft matter and amorphous materials*, Shanghai, China, July 2019.
120. *4th International Conference on Packing Problems*, New Haven, CT, June 2019.
119. *KITP Seminar*, Santa Barbara, CA, January 2019.
118. *Dynamical equations for dense liquids*, Paris, France, December 2018.
117. *U Mass-Amherst Physics Seminar*, Amherst, MA, November 2018.
116. *ICTS Program - Entropy, Information and Order in Soft Matter*, Bangalore, India, September 2018.
115. *Disordered serendipity: a glassy path to discovery*, Rome, Italy, September 2018.
114. *University of Toronto Chemistry Seminar*, Toronto, ON, April 2018.
113. *ICERM: Computation and Optimization of Energy, Packing, and Covering*, Providence, RI, April 2018.
112. *FSU Applied Mathematics Seminar*, Tallahassee, FL, February 2018.
111. *Beyond Mean-Field Theory*, Rome, Italy, January 2018.
110. *Geometrically Frustrated Self-Assembly*, Princeton, NJ, November 2017.
109. *University of Virginia Physics Seminar*, Charlottesville, VA, November 2017.
108. *Simons Group Meeting*, Paris, France, October 2017.
107. *10th Liquid Matter Conference*, Keynote Lecturer, Ljubljana, Slovenia, July 2017.
106. *Maynooth University Chemistry Seminar*, Maynooth, Ireland, May 2017.
105. *Hong Kong Polytechnic University Physics Seminar*, Hong Kong, May 2017.
104. *Shenzhen Graduate School of the Harbin Institute of Technology Seminar*, Shenzhen, China, May 2017.
103. *Cracking the Glass Problem Simons Foundation Annual Meeting*, New York, NY, March 2017.
102. *Systems with competing electrostatic and short-range interactions*, Warsaw, Poland, February 2017.
101. *Institut Lumière Matière de l'Université de Lyon Seminar*, Lyon, France, January 2017.
100. *Nestlé RDLS*, Lausanne, Switzerland, January 2017.
99. *Emory University Physics Seminar*, Atlanta, GA, December 2016.
98. *University of Waterloo Chemistry Seminar*, Waterloo, ON, November 2016.
97. *Kansas State University Physics Seminar*, Manhattan, KS, November 2016.
96. *Journées Cristech*, Autrans, France, October 2016.
95. *Yale University Mechanical Engineering and Materials Science Seminar*, New Haven, CT, September 2016.
94. *Packing Across Length Scales*, Shanghai, China, August 2016.
93. *Université de Grenoble Physics Seminar*, Grenoble, France, July 2016.
92. *Georgetown Physics Seminar*, Georgetown, DC, April 2016.
91. *NC-ACS Triangle Soft Matter Discussion Group*, Chapel Hill, NC, April 2016.
90. *APS March Meeting*, Baltimore, MD, March 2016.
89. *UNC-CH Physical Chemistry Seminar*, Chapel Hill, NC, January 2016.
88. *Extended WG3 meeting*, Ein Gedi, Israel, November 2015.
87. *East Carolina University Physics Seminar*, Greenville, NC, October 2015.
86. *The Role of Structure in Dynamical Arrest*, Mainz, Germany, July 2015.
85. *University of Waterloo Chemistry Seminar*, Waterloo, ON, May 2015.
84. *International Workshop on Dynamics in Viscous Liquids IV*, Montpellier, France, May 2015.

83. *Laboratoire PHENIX Seminar*, UPMC, Paris, France, April 2015.
82. *University of Oklahoma Chemistry Seminar*, Monroe, OK, March 2015.
81. *Dynamics in soft and hard condensed matter*, Buenos Aires, Argentina, March 2015.
80. *Paris Séminaire Vitreux*, ENS-Paris, France, February 2015.
79. *ENS-Paris Physics Colloquium*, France, January 2015.
78. *Hauptman-Woodward Medical Research Institute Seminar*, Buffalo, NY, December 2014.
77. *Cambridge Theoretical Chemistry Seminar*, Cambridge, UK, October 2014.
76. *Bristol Theoretical Physics Seminar*, Bristol, UK, October 2014.
75. *U Montpellier 2 Physics Seminar*, Montpellier, France, October 2014.
74. *Critical Phenomena in Random and Complex Systems*, Capri, Italy, September 2014.
73. *Spin Glasses: An old tool for new problems*, Cargèse, France, August 2014.
72. *American Conference of Theoretical Chemistry*, Telluride, CO, July 2014.
71. *ACS Colloids*, Philadelphia, PA, June 2014.
70. *Triangle Soft Matter*, Chapel Hill, NC, May 2014.
69. *U Oregon Chemistry Seminar*, Eugene, OR, May 2014.
68. *U Penn Condensed Matter Seminar*, Philadelphia, PA, February 2014.
67. *XLIII Winter Meeting on Statistical Physics*, Taxco, Mexico, January 2014.
66. *Leiden Lorenz Institute Seminar*, Leiden, Netherlands, December 2013.
65. *ESPCI, PCT-Gulliver Seminar*, Paris, France, December 2013.
64. *Roskilde University Glass and Time Seminar*, Roskilde, Denmark, November 2013.
63. *U Penn Chemistry Seminar*, Philadelphia, PA, November 2013.
62. *Stanford Physical Chemistry Seminar*, Stanford, CA, November 2013.
61. *UC Berkeley Statistical Mechanics Seminar*, Berkeley, CA, October 2013.
60. *Oak Ridge National Lab Computational Science Seminar*, Oak Ridge, TN, October 2013.
59. *Brandeis Physics Colloquium*, Waltham, MA, October 2013.
58. *UC Boulder Chemical Physics/Physical Chemistry Seminar*, Boulder, CO, October 2013.
57. *Penn State Physical Chemistry Seminar*, State College, PA, October 2013.
56. *Bucknell Physics Seminar*, Lewisburg, PA, October 2013.
55. *Caltech Chemical Physics Seminar*, Pasadena, CA, October 2013.
54. *UCLA Chemistry and Biochemistry Seminar*, Los Angeles, CA, September 2013.
53. *UCSB Physical/Theoretical Chemistry Seminar*, Santa Barbara, CA, September 2013.
52. *NYU Soft Condensed Matter Seminar*, New York, NY, September 2013.
51. *UW-Madison, Chemistry Seminar*, Madison, WI, September 2013.
50. *7th international Discussion Meeting on Relaxations in Complex Systems*, Barcelona, Spain, July 2013.
49. *MPI for Dynamics and Self-Organization Seminar*, Göttingen, Germany, July 2013.
48. *TU Berlin, IGR TG 1524 Colloquium*, Berlin, Germany, July 2013.
47. *CECAM: The Role of Interfaces in Crystallization*, Lausanne, Switzerland, May 2013.
46. *UIUC, Chemistry Department Seminar*, Champaign, IL, May 2013.
45. *University of Chicago James Franck Institute Seminar*, Chicago, IL, May 2013.
44. *Northwestern University Chemistry Department Seminar*, Evanston, IL, May 2013.
43. *University of Maryland Informal Statistical Physics Seminar*, College Park, MD, April 2013.
42. *APS March Meeting*, Baltimore, MD, March 2013.
41. *MRS Symposium*, Boston, MA, November 2012.
40. *Florida State University Chemistry Seminar*, Tallahassee, FL, October 2012.
39. *14th International Conference on the Crystallization of Biological Macromolecules*, Huntsville, AL, September 2012.

38. *Syracuse University Condensed Matter & Biological Physics Seminar*, Syracuse, NY, September, 2012.
37. *University of Waterloo Physics and Chemistry Seminars*, Waterloo, ON, September 2012.
36. *ACS Fall Meeting*, contributed talk, Philadelphia, PA, August 2012.
35. *Florida Annual Meeting and Exposition (FAME ACS)*, Tampa Bay, FL, May 2012.
34. *ACS Spring Meeting*, invited (award) poster, San Diego, CA, March 2012.
33. *APS March Meeting*, contributed talk, Boston, MA, February 2012.
32. *Unifying Concepts in Glass Physics V*, contributed talk, Paris, France, December 2011.
31. *Washington University Physics Seminar*, St. Louis, MO, October 2011.
30. *Sphere packing and amorphous materials*, Trieste, Italy, July 2011.
29. *Université Pierre et Marie Curie LPTMC Seminar*, Paris, France, June 2011.
28. *École Normale Supérieure Paris Physics Seminar*, Paris, France, June 2011.
27. *DLR Institute of Materials Physics in Space Seminar*, Köln, Germany, June 2011.
26. *Université du Luxembourg Physics Seminar*, Luxembourg, May 2011.
25. *4th International Soft Matter Workshop*, Cornwall, U.K., May 2011.
24. *International Workshop on Dynamics in Viscous Liquids*, Rome, Italy, March 2011.
23. *APS March Meeting*, Dallas, TX, contributed talk, March 2011.
22. *Bath Theoretical Physics Colloquium*, Bath, U.K., October 2010.
21. *Cambridge Theoretical Chemistry Seminar*, Cambridge, U.K., October 2010.
ACS Fall National Meeting, Boston, MA, contributed talk, August 2010.
20. *CECAM Crystallisation: from colloids to pharmaceuticals*, Lausanne, Switzerland, July 2010.
19. *KITP Physics of Glasses: Relating Metallic Glasses to Molecular, Polymeric and Oxide Glasses*, Santa Barbara, CA, May 2010.
18. *APS March Meeting*, Portland, OR, contributed talk, March 2010.
17. *University of Kansas*, Lawrence, KS, December 2009.
16. *McGill University Chemistry Seminar*, Montréal, QC, November 2009.
15. *UNC-Chapel Hill Physical Chemistry Seminar*, Chapel Hill, NC, September 2009.
14. *NCSU Physics Seminar*, Raleigh, NC, March 2009.
13. *APS March Meeting*, Pittsburgh, PA, contributed talk, March 2009.
12. *University of Utah Physical Chemistry Seminar*, Salt Lake City, UT, February 2009.
11. *Surrey University Condensed Matter Seminar*, Guilford, UK, January 2009.
10. *Unifying Concepts in Glass Physics IV*, Kyoto, Japan, November 2008.
9. *Southeastern Theoretical Chemistry Association*, Tuscaloosa, AL, May 2008.
8. *Dutch Soft Matter Meeting*, Eindhoven, The Netherlands, April 2008.
7. *Université de Montréal Physics Seminar*, Montréal, QC, July 2007.
6. *CECAM Glasses meet glasses*, Lyon, France, June 2007.
5. *Lorentz Institute Seminar*, Leiden, The Netherlands, April 2007.
4. *JNCASR Nucleation, Aggregation and Growth Conference*, Bangalore, India, January 2007.
3. *Dutch Soft Matter Meeting*, Amsterdam, The Netherlands, December 2006.
2. *U Penn Center for Molecular Modeling Seminar*, Philadelphia, PA, January 2006.
1. *Yale University Mechanical Engineering Seminar*, New Haven, CT, January 2006.

CONFERENCE AND
WORKSHOP
ORGANIZATION

- CECAM: Recent advances on the glass problem*, co-organizer, virtual, January 2022.
- Simons Collaboration on Cracking the Glass Problem Seminar Series*, co-organizer, virtual, May 2020-September 2021
- CECAM: Recent advances on the glass problem*, co-organizer, virtual, January 2021.
- APS March Meeting Task Force*, Governance and Logistics Subcommittee Chair, June 2020-November 2021.
- APS March Meeting*, GSNP Invited Session, Glassy dynamics: from simple models to biological tissues, co-organizer, March 2021.
- 40 Years of Replica Symmetry Breaking, 30 years of RFOT*, co-organizer, Rome, Italy, September 2019.
- APS March Meeting*, GSOF/GSNP Invited Session: Marginal Stability in Amorphous Materials and Beyond, co-organizer, Boston, MA, March 2019.
- KITP Workshop: The Rough High-Dimensional Landscape Problem*, co-organizer, Santa Barbara, CA, January-February 2019.
- APS March Meeting*, GSOF Program Chair, Los Angeles, CA, March 2018.
- Boulder Summer School on Condensed Matter Physics: Frustrated and Disordered Systems*, co-organizer, Boulder, CO, July 2017.
- APS March Meeting GSOF/DBIO Invited Session: Biological Materials Self-Assembly*, co-organizer, New Orleans, March 2017.
- CECAM Workshop: Recent Advances on the Glass and Jamming Transitions*, co-organizer, Lausanne, Switzerland, January 2017.
- ICERM Workshop: Stochastic topology and thermodynamic limits*, co-organizer, Providence, RI, October 2016.
- CECAM Workshop: The Physics of Protein Self-Assembly*, co-organizer, Lausanne, Switzerland, June 2015.
- Unifying Concepts in Glass Physics VI*, co-organizer, Aspen, CO, February 2015.
- CUNY-GC Workshop: Shaping Amorphous Thoughts – Recent Advances in Glass and Jamming Physics*, New York, NY, May 2014.
- APS March Meeting GSNP Focus Session: A Soft Matter Perspective on Protein Assembly*, organizer, Denver, CO, March 2014.
- ACS March Meeting DCP Focus Session: Physics of glasses and viscous liquids*, co-organizer, Baltimore, MD, March 2013.
- SERC Conference Solar Energy Research Center*, scientific committee, Durham, NC, January 2012.
- Dynamics Days 2011*, scientific committee, Chapel Hill, NC, January 2011.
- MPI Particulate Matter: Does Dimensionality Matter?*, co-organizer, Dresden, Germany, June 2010.
- Southeastern Theoretical Chemistry Association*, co-organizer, Durham, NC. May 2009.
- OTHER SERVICE
- 2023 Irwin Oppenheim Award Selection Committee*, APS, 2022.
- 2024 Irwin Oppenheim Award Selection Committee Chair*, APS, 2023.