

Christopher K. Henderson

EMPLOYMENT	University of Arizona , Tucson, AZ USA Assistant Professor, Department of Mathematics Affiliate member, Program in Applied Mathematics University of Chicago , Chicago, IL USA LE Dickson Instructor, Department of Mathematics École Normale Supérieure de Lyon , Lyon, France LabEx Milyon Postdoctoral Fellow, Unité de Mathématiques Pures et Appliquées	2019-Present 2016-2019 2015-2016
EDUCATION	Stanford University , Stanford, California USA PhD, <i>Mathematics</i> , June 2015 Advisor: Lenya Ryzhik Dissertation Title: Propagation Phenomena in Reaction-Advection-Diffusion Equations University of Chicago , Chicago, Illinois USA B.S. (Honors), <i>Mathematics</i> , June 2010 Phi Beta Kappa	
FUNDING	<ul style="list-style-type: none">• National Science Foundation CAREER, DMS-2337666• National Science Foundation, DMS-2204615• National Science Foundation, DMS-1907853/2003110	2024-2029 2022-2025 2019-2023

PUBLICATIONS

*SELECTED PUBLICATIONS

37. C. Henderson, S. Snelson, A. Tarfulea, Decay estimates and continuation for the non-cutoff Boltzmann equation. Submitted to *Math. Ann.*
[arxiv:2311.02235](#).
36. J. An, C. Henderson, L. Ryzhik, Front location determines the convergence rate to traveling waves. *Ann. Inst. H. Poincaré Anal. Non Linéaire*, *accepted*.
[arxiv:2307.09523](#).
35. C. Henderson, M. Rezek, Traveling waves for the Keller-Segel-FKPP equation with strong chemotaxis. *J. Differential Equations*, **379** (2024), 497-523.
[10.1016/j.jde.2023.10.030](#).
- 34.* C. Henderson, S. Snelson, A. Tarfulea, Classical solutions of the Boltzmann equation with irregular initial data. *Ann. Sci. Éc. Norm Supér.*, *accepted*.
[arxiv:2207.03497](#).
33. C. Henderson, W. Wang, Kinetic Schauder estimates with time-irregular coefficients and uniqueness for the Landau equation. *Discrete Contin. Dynam. Syst.*, **44** (2024), no. 4, 1026-1072.
[DOI:10.3934/dcds.2023137](#).
32. J. An, C. Henderson, L. Ryzhik, Voting models and semilinear equations. Submitted to *Nonlinearity*, **36**, 2023, no. 11, 6104-6123.
[DOI:10.1088/1361-6544/ad001c](#).
- 31.* Q. Griette, C. Henderson, O. Turanova, Speed-up of traveling waves by negative chemotaxis. *J. Funct. Anal.*, **285**, (2023), no. 10, Paper No. 110115.
[DOI:10.1016/j.jfa.2023.110115](#)

- 30.* J. An, C. Henderson, L. Ryzhik, Quantitative steepness, semi-FKPP reactions, and pushmi-pullyu fronts. *Arch. Ration. Mech. Anal.*, **247**, 88 (2023).
DOI:10.1007/s00205-023-01924-2.
- 29.* J. An, C. Henderson, L. Ryzhik, Pushed, pulled, and pushmi-pullyu fronts of the Burgers-FKPP equation. *J. Eur. Math. Soc. (JEMS)*, *accepted*.
arxiv:2108.07861.
28. Y. Gu, C. Henderson, Long-time behavior for a nonlocal model from directed polymers. *Nonlinearity* 36 (2023), no. 2, 902-954.
DOI:10.1088/1361-6544/aca9b3.
27. C. Henderson, Slow and fast minimal speed traveling waves of the FKPP equation with chemotaxis. *J. Math. Pures Appl.* (9) 167 (2022), 175-203.
DOI:10.1016/j.matpur.2022.09.004.
26. C. Henderson, W. Wang, Local well-posedness for the Boltzmann equation with very soft potentials and polynomially decaying initial data. *SIAM J. Math. Anal.* 54 (2022), no. 3, 2845-2875.
DOI:10.1137/21M1427504.
- 25.* V. Calvez, C. Henderson, S. Mirrahimi, O. Turanova, Non-local competition slows down front acceleration during dispersal evolution. *Ann. H. Lebesgue* 5 (2022), 1-71.
DOI:10.5802/ahl.117.
24. Y. Gu, C. Henderson, A PDE hierarchy for directed polymers in random environments. *Nonlinearity* 34 (2021), no. 10, 7335-7370.
DOI:10.1088/1361-6544/ac23b7.
23. E. Bouin, C. Henderson, The Bramson delay in a Fisher-KPP with log-singular nonlinearity. *Nonlinear Anal.* 213 (2021), Paper No. 112508, 30 pp.
DOI:10.1016/j.na.2021.112508.
- 22.* J.J. Bramburger, C. Henderson, The speed of traveling waves in a FKPP-Burgers system. *Arch. Ration. Mech. Anal.* 241 (2021), no. 2, 643-681.
DOI:10.1007/s00205-021-01660-5.
21. C. Henderson, S. Snelson, A. Tarfulea, Self-generating lower bounds and continuation for the Boltzmann equation. *Calc. Var. Partial Differential Equations* 59 (2020), no. 6, Paper No. 191, 13 pp.
DOI:10.1007/s00526-020-01856-9.
20. C. Henderson, S. Snelson, A. Tarfulea, Local well-posedness of the Boltzmann equation with polynomially decaying initial data. *Kinet. Relat. Models* 13 (2020), no. 4, 837-867.
10.3934/krm.2020029.
- 19.* C. Henderson, S. Snelson, A. Tarfulea, Local solutions of the Landau equation with rough, slowly decaying initial data. *Ann. Inst. H. Poincaré Anal. Non Linéaire* 37 (2020), no. 6, 1345-1377.
DOI:10.1016/j.anihpc.2020.04.004.
18. C. Henderson, P.E. Souganidis, Brownian fluctuations of flame fronts with small random advection. *Math. Methods Models Appl. Sci.* 30 (2020), no. 7, 1375-1406.
DOI:10.1142/S0218202520500256.
17. É. Bouin, C. Henderson, L. Ryzhik, The Bramson delay in the non-local Fisher-KPP equation. *Ann. Inst. H. Poincaré Anal. Non Linéaire*, 37 (2020), no. 1, 51-77.
DOI:10.1016/j.anihpc.2019.07.001.

16. F. Hamel, C. Henderson, Propagation in a Fisher-KPP equation with non-local advection. *J. Funct. Anal.*, 278 (2020), no. 7, 108426, 53 pp.
DOI:10.1016/j.jfa.2019.108426.
15. C. Henderson, S. Snelson, C^∞ smoothing for weak solutions of the inhomogeneous Landau equation. *Arch. Ration. Mech. Anal.*, 236 (2020), no. 1, 113-143. DOI:10.1007/s00205-019-01465-7.
14. C. Henderson, S. Snelson, A. Tarfulea, Local existence, lower mass bounds, and a new continuation criterion for the Landau equation. *J. Differential Equations*, 266 (2019), no. 2-3, 1536-1577. DOI:10.1016/j.jde.2018.08.005.
13. É. Bouin, J. Garnier, C. Henderson, F. Patout, Thin front limit of an integro-differential Fisher-KPP equation with fat-tailed kernels. *SIAM J. Math. Anal.*, 50 (2018), no. 3, 3365-3394.
DOI:10.1137/17M1132501.
12. C. Henderson, B. Perthame, P.E. Souganidis, Super-linear propagation for a general, local cane toads model. *Interface Free Bound.*, 20 (2018), no. 4, 483-509.
DOI: 10.4171/IFB/409.
11. É. Bouin, M. Chan, C. Henderson, P. Kim, Influence of a mortality trade-off on the spreading rate of cane toads fronts. *Comm. Partial Differential Equations*, 43 (2018), no. 11, 1627-1671.
DOI:10.1080/03605302.2018.1523190
10. C. Henderson, P.E. Souganidis, The reactive-telegraph equation and a related kinetic model. *NoDEA Nonlinear Differential Equations Appl.*, 24 (2017), no. 6, Art. 66, 33 pp.
DOI:10.1007/s00030-017-0488-0.
9. É. Bouin, C. Henderson, L. Ryzhik, The Bramson logarithmic delay in the cane toads equation. *Q. Appl. Math.*, 75 (2017), no. 4, 599-634.
DOI:10.1090/qam/1470.
8. É. Bouin, C. Henderson, Super-linear spreading for the local bistable cane toads equation. *Nonlinearity*, 30 (2017), no. 4, 1356-1375.
DOI:10.1088/1361-6544/aa5d65.
7. M. Erbar, C. Henderson, G. Menz, P. Tetali, Ricci curvature bounds for weakly interacting Markov chains. *Electron. J. Probab.*, 22 (2017), Paper No. 40, 23 pp.
DOI:10.1214/17-EJP49.
6. É. Bouin, C. Henderson, L. Ryzhik, Super-linear spreading in local and non-local cane toads equations. *J. Math. Pures Appl.*, (9) 108 (2017), no. 5, 724-750.
DOI:10.1016/j.matpur.2017.05.015.
5. C. Henderson, Propagation of solutions to the Fisher-KPP equation with slowly decaying initial data. *Nonlinearity*, 29 (2016), no. 11, 3215-3240.
DOI:10.1088/0951-7715/29/11/3215.
4. C. Henderson, G. Menz, Equivalence of decay of correlations, log-Sobolev inequalities, and Poincare inequalities in spin systems with infinite range interactions. *Stochastic Process. Appl.*, 126 (2016), no. 10, 2877-2912.
DOI:10.1016/j.spa.2016.03.005.
3. G.-M. Gie, C. Henderson, G. Iyer, L. Kavlie, J. Whitehead, Stability of vortex solutions to an extended Navier-Stokes system. *Commun. Math. Sci.*, 14 (2016), no. 7, 1773-1797.
DOI:10.4310/CMS.2016.v14.n7.a1.

2. C. Henderson, Population stabilization in branching Brownian motion with drift and absorption. *Commun. Math. Sci.*, 14 (2016), no. 4, 973-985.
DOI:10.4310/CMS.2016.v14.n4.a5.
1. C. Henderson, Pulsating fronts in a 2D reactive-Boussinesq system. *Comm. Partial Differential Equations*, 39 (2014), no. 8, 1555-1595.
DOI:10.1080/03605302.2013.850726.

EXTERNAL
TALKS (SINCE
FALL 2019)

(# denotes
upcoming talk)

- # *Duke Kunshan University* – December 2023 – “Recent advances in fluid dynamics: singularity, regularity and mixing”
- # *Beijing International Center for Mathematic Research* – December 2023 – “Recent advances in kinetic theory and related models”
- Yale University* – October 2023 – Analysis Seminar
- University of Ottawa* – October 2023 – Applied Analysis Day
- Illinois Institute of Technology* – September 2023 – Applied Mathematics Colloquium
- The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications* – June 2023 – Special Session on “Stochastic Partial Differential Equations”
- The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications* – June 2023 – Special Session on “Stochastic Analysis and Large Scale Interacting Systems”
- AMS Sectional Meeting, “Nonlinear PDEs in fluid dynamics”* – May 6, 2023 – PDE seminar
- University of Wisconsin* – May 2023 – PDE and Geometric Analysis seminar
- Brin Mathematics Research Center (Univ. Maryland)* – March 2023 – Workshop on Branching Processes and Reaction-Diffusion Equations
- University of Ottawa* – March 2023 – Applied Mathematics Seminar
- University of Houston* – March 2023 – PDE Seminar
- Banff International Research Station* – November 2022 – Workshop: Recent progress in kinetic and integro-differential equations
- Institut de Mathématiques de Toulouse* – September 2022 – Workshop: Parabolic and kinetic models in population dynamics
- Université de Bordeaux* – June 2022 – Séminaire de Physique Mathématiques – EDP
- Centre de Recherches Mathématiques* – May 2022 – Workshop: Unifying concepts in PDEs with randomness
- Centre de Recherches Mathématiques* – May 2022 – Workshop: Branching systems, reaction-diffusion equations and population models
- Joint Math Meetings* – April 2022 – Special session “Presenting Research Mathematics through Visual Storytelling: Slides without Words and Equations”
- Institut Henri Poincaré* – March 2022 – Workshop: Mathematical models in ecology and evolution
- Arizona State University* – November 2021 – Mathematical Biology Seminar
- Louisiana State University* – November 2021 – Applied Analysis Seminar
- Florida Institute of Technology* – March 2021 – Colloquium
- Stanford University* – March 2020 – Applied Mathematics Seminar
- Michigan State University* – February 2020 – Applied Mathematics Seminar
- UCLA* – January 2020 – Analysis and PDE Seminar
- UC San Diego* – December 2019 – Analysis Seminar
- SUNY Stony Brook* – October 2019 – Analysis Seminar

HONORS, AND
AWARDS

- College of Science Distinguished Early-Career Teaching Award (nominated, pending)
- Institut Henri Poincaré long-term invited visitor (Winter 2022); thematic program ‘Mathematical modeling of organization in living matter’

SERVICE/OUTREACH

Conference/Workshop Organization

- AMS Fall Central Sectional Meeting special session “Nonlocality in Models for Kinetic, Chemical, and Population Dynamics,” 2018
- AIMS Conference on Dynamical Systems, Differential Equations and Applications minisymposium “Nonlinear models in kinetic theory, collective behavior, and fluid dynamics” 2023
- Banff International Research Station five day workshop “Emerging connections between reaction-diffusion, branching processes, and biology” 2025

University Committees

- Program in Applied Math GIDP: Admissions (2020-present), Theoretical Foundations of Applied Math qualifying exam committee (2020-present), ad hoc committee to evaluate a Master’s degree in applied math (2023)

College Committees

- College of Science Faculty Council (2022-2024)

Departmental Committees and Service

- Colloquium Committee (2019-2020)
- Instructional Faculty Personnel Committee (2021-2022)
- Hybrid Meeting Task Force (2022)
- Seminar organizer – Analysis, Dynamics, and Applications Seminar (2020-present)
- Postdoc committee (2023-present)

Other committees and service (Internal or external)

- Discussion panels in support of the postdoctoral and graduate programs: academic job market (2019), publishing (2021), teaching (2022)
- NSF Division of Mathematical Sciences panel member
- Refereeing – various journals for a total of approximately 5-10 articles per year

Mentorship:

- Postdoctoral: Weinan Wang (first job: assistant professor Univ. Oklahoma); Maria Deliyanni (current); Mete Demircigil (beginning winter 2024)
- Graduate: Maximilian Rezek (current); Ryan Patterson (current)
- Undergraduate: Bryan Castillo (now mathematics graduate student at Duke University)
- Long-term visitors: graduate students Mete Demircigil (Univ. Lyon 1, winter 2022) and Giacomo Lucertini (Univ. Bologna, spring 2023)