

## Curriculum Vitae of Eric Anders Carlen

January 2024

### PERSONAL DATA:

### EDUCATIONAL BACKGROUND:

**Undergraduate:** B.A. with highest honors in Mathematics and Physics, University of Virginia, 1980 (Awarded E.J. McShane Prize for outstanding mathematics major)

**Graduate:** Ph.D. in Physics, Princeton University, 1984

**Postdoctoral:** Supported by an NSF postdoctoral fellowship during 1986-87 and 1989-90 while at Princeton University.

**Graduate and Postdoctoral Advisors:** Edward Nelson (thesis advisor), Department of Mathematics, Princeton University Elliott Lieb, (postdoctoral advisor) Departments of Mathematics and Physics, Princeton University

### EMPLOYMENT HISTORY:

Distinguished Professor of Mathematics, Rutgers University., 2007 to present.

Professor of Mathematics, Georgia Institute of Technology, 1997 to 2007.

Associate Professor of Mathematics, Georgia Institute of Technology, 1991-1997 (on leave the first year)

Assistant Professor of Mathematics, Princeton University, 1986-1992

C.L.E. Moore Instructor, Department of Mathematics, M.I.T., 1984-1986

### CURRENT FUNDING:

I have been fully supported by the NSF with Summer salary every year since my start at Georgia Tech in 1992 through the present, including every year at Rutgers. My current grant is NSF Award Number DMS-2055282 in the Analysis program, June 2021 to July 2024, This grant supports my research and that of several students working with me, David Herrera (who will defend his thesis in 2024) and Trung Nghia Nguyen (starting thesis work).

### Ph.D. STUDENTS:

#### Doctoral Thesis defended

(1) Victoria Chayes, April, 2023.

(2) Francis Seufferth, April, 2016.

(3) Kathleen Craig, Rutgers thesis defended April 2014. Awarded an N.S.F. Postdoctoral Fellowship,

(4) Gabe Bouch, Rutgers thesis defended April 2011.

(5) Jogia Bandyopadhyay, Ga Tech thesis defended April 2008.

(6) Suleyman Ulusoy, Ga Tech thesis defended May 2007.

(7) Clayton Kerce, Ga Tech thesis defended May 2000.

### REFEREED PUBLICATIONS:

[1] Carlen, E.A.: *Conservative diffusions*, Commun. Math. Phys., **94** 1984, pp.293-315.

[2] Carlen, E.A.: *Potential scattering in stochastic mechanics*, Ann. Inst. H. Poincare, Phys. Thorique, **42**, 1985 pp.402-428.

[3] Carlen, E.A., Kusuoka, S. and Stroock, D.W.: *Upper bounds for Symmetric Markov transition functions*, Ann. Inst. H. Poincare, Prob. and Stat., **23**, sup. au. no. 2, 1987 pp.245-287.

[4] Blanchard, Ph., Carlen, E.A. and Dell'Antonio G.F.: *Particles and "bumps" in quantum field configurations*, Jour. Stat. Phys., **55**, 1989 pp.769-787.

- [5] Carlen, E.A. and Loffredo, M.: *The correspondence between stochastic mechanics and quantum mechanics on multiply connected configuration spaces*, Physics Letters A, **141**, 1989 pp.9-13.
- [6] Carlen, E.A. and Loss, M.: *Extremals of functionals with competing symmetries*, Jour. of Func. Analysis, **88**, 1990 pp.437-456.
- [7] Carlen, E.A. and Kr'ee, P.:  *$L^p$  estimates on iterated stochastic integrals*, Ann. of Prob., **19**, 1991 pp.354-358.
- [8] Carlen, E.A.: *Some integral identities for entire functions and their application to the coherent state transform*, Jour. of Func. Analysis, **97**, 1991 pp.231-249.
- [9] Carlen, E.A. and Soffer, A.: *Entropy production by block summation and central limit theorems*, Comm. Math. Phys. **140**, 1991 pp.339-371.
- [10] Carlen, E.A.: *Superadditivity of Fisher information and logarithmic Sobolev inequalities*, Jour. of Func. Analysis, **101**, 1991 pp.194-211.
- [11] Carlen, E.A. and Protter, P.: *On semimartingale decompositions of convex functions of semimartingales*, Ill. Jour. of Math., **36**, 1992 pp.420-427
- [12] Carlen, E.A. and Loss, M.: *Competing symmetries, the logarithmic Hardy-Littlewood-Sobolev inequality and Onofri's inequality on  $S^n$* , Jour. Geom. and Func. Analysis, **2**, 1992 pp.90-104
- [13] Carlen, E.A. and Kr'ee, P.: *On the method of  $H^p$  estimates on iterated stochastic integrals*, C.R.A.S. **304**, S'erie I, 1992 pp.393-398.
- [14] Carlen, E.A. and Carvalho, M.C.: *Strict entropy production bounds and stability of the rate of convergence to equilibrium for the Boltzmann equation*, Jour. of Stat. Phys. **67**, 1992 pp.432-485.
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- [16] Carlen, E.A. and Loss, M.: *Sharp constant in Nash's inequality*, International Math. Res. Notices, Duke Math. Journal, **71**, 1993 pp.213-216
- [17] Carlen, E.A. and Carvalho, M.C.: *Entropy production estimates for Boltzmann equations with physically realistic collision kernels*, Jour. of Stat. Phys. **74** (1994) pp. 743-782.
- [18] Carlen, E.A. and Loss, M.: *On the minimization of symmetric functionals*, Rev. in Math. Phys., Special Issue 1994 pp. 1011-1032.
- [19] Ball, K., Carlen, E.A. and Lieb, E.H.: *Sharp uniform convexity and smoothness inequalities for trace norms*, Invent. Mathematica **115** (1994) 463-482.
- [20] Carlen, E.A. and Loss, M.: *Optimal smoothing and decay estimates for viscously damped conservation laws, with applications to the 2-D Navier-Stokes equation*, Duke Math Jour **80** 1995 pp. 1-23.
- [21] Carlen, E.A., Esposito, R., Lebowitz J.L., Marra, R., and Rokhlenko A., *Nonunique stationary states in driven kinetic systems with applications to plasmas*, Phys. Rev. E, **52** (1995) pp. 40-43.
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- [25] Carlen, E.A. and Kr'ee, P.: *On Martingale Inequalities in Non-commutative Stochastic Analysis*, Jour Func Analysis **158** (1998) 475-508.
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- [127] E.A. Carlen *Dynamics and Quantum Optimal Transport: Three lectures on quantum entropy and quantum Markov semigroups*, to appear in *Optimal Transport on Quantum Structures*, eds. J. Maas, S. Rademacher, T. Titkos, D. Viosztek, Bolyai Society Mathematical Studies (BSMS, volume 29), Springer, Heidelberg.
- [128] E.A. Carlen and M.P. Loss, *Spectrum for some Quantum Markov semigroups describing N-particle systems evolving under a binary collision mechanism*, submitted to Discrete Math, Phys., arXiv:2204.07860.
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#### Monographs:

- [1] Carlen, E.A., Loss, M and Harrell, E., editors, *Advances in differential equations and mathematical physics*. Papers from the International Conference on Differential Equations and Mathematical Physics held at the Georgia Institute of Technology, Atlanta, GA, March 23–29, 1997. Contemporary Mathematics, 217. American Mathematical Society, Providence, RI, 1998. x+221 pp.

[2] Carlen, E.A. and Carvalho, M.C. *Linear Algebra, From the Beginning* W.H. Freeman and Co., New York, New York, 2006. (A preliminary edition has been in use for some years at Georgia Tech. The final first edition is now published, and in use at Georgia Tech.

[3] Bianchini, Stefano; Carlen, Eric A.; Mielke, Alexander; Villani, Cédric *Nonlinear PDE's and applications. Notes of the C.I.M.E. Summer School held in Cetraro, June 23-28, 2008*. Edited by Luigi Ambrosio and Giuseppe Savar. Lecture Notes in Mathematics, 2008. Centro Internazionale Matematico Estivo (C.I.M.E.) Summer Schools. Springer, Heidelberg; Fondazione C.I.M.E., Florence, 2011. xiv+224 pp. ISBN: 978-3-642-21718-0

[4] E.A.Carlen, *Inequalities in Matrix Algebras*, text submitted to the series *Graduate studies in Mathematics* of the A.M.S. Currently being used as the text in my graduate course, Math 509, spring 2024.

### **Recent Awards**

**2008** I was awarded a *Chiare Pierre de Fermat*, a six month chair for visiting professors of exceptional qualification, at the University of Toulouse, Paul Sabatier. I visited there September-December 2008 and in September and December 2009.

**2011** I was one of two winners of the 2011 Tullio Levi Civita Prizes, awarded by the Fondazione Tullio Levi Civita.

**2012** I was selected to give the 2012 Seymour Sherman Memorial Lecture at Indiana University, which comes with an endowed honorarium.

**2015** Fellow of the A.M.S.

**2017** Jubilee Professor at Chalmers Institute of Technology, University of Gothenburg.

**2023** Elected Foreign Member of the Lisbon Academy of Sciences (Portugal).