CHRISTINA SORMANI

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EDUCATION:

1996   **Courant Institute of Mathematical Sciences, Ph.D., May 1996.**
Adviser: Professor Jeff Cheeger, *Bella Manel Prize*

1991   **College of Arts and Science, NYU, B.A.,** *Magna cum Laude*, ΦBK
Majors: Mathematics and English, **Minor:** Physics,

EXPERIENCE:

2013 (Fall)   **Mathematical Sciences Research Institute, Visiting Professor**
Mathematical General Relativity and Optimal Transport Programs
Supervised Postdocs and Organized a Reading Seminar

2003-present   **Graduate Center, City University of New York, Doctoral Faculty**
Supervising Postdoc: *Carlos Vega* (U Miami PhD 2013)
Supervising Doctoral Students: *Raquel Perales and Jorge Basilio*
Supervised Doctoral Students: *Sajjad Lakzian* (CUNY PhD 2013),
Pedro Solorzano (SUNYSB PhD 2011), *Michael Munn* (CUNY PhD 2008)

1999-present   **Lehman College, Full Professor (2010) Associate Professor (2005)**
Taught: *Analysis I-II, Modern Geometry, Differential Geometry,*
Partial Differential Equations, Linear Algebra, Calculus I-III, Precalculus
Continuously reelected member of the Educational Policy Committee
Redesigned Calculus Sequence and regularly assessed Mathematics Major
Designed College Now courses and served as College Now adviser
Supervised LSAMP students and served on the LSAMP committee

1997-1999   **Johns Hopkins University, Assistant Professor**
Taught: *Analysis I-II, Graduate Riemannian Geometry I-II*
Differential Geometry, Partial Differential Equations with Applications
Served as Faculty Adviser to the Mathematics Club

1996-1997   **Harvard University, Lecturer**
Taught: *Real Analysis, Multivariable Calculus.*

AWARDS:

2013-2016   **NSF Research Grant in Geometric Analysis: DMS-1309360**
Applications of the Convergence of Manifolds to General Relativity

2010-2013   **NSF Research Grant in Geometric Analysis: DMS-1006059**
Convergence of Riemannian Manifolds

2008-2010   **NSF Mathematical Sciences Partneship Grant: MSP-0832247**
Mathematics Teacher Transformation Institute (MTTI)
Lead PI with coPIs M. Wolfe, S. Gningue, S. Libfield, and S. Menendez

2001-2006	**NSF Research Grant: DMS-0102279** *The Topology of Open Manifolds with Nonnegative Ricci Curvature*
1999-2014	**PSC CUNY Research Grants**
1991-1996	**National Science Foundation Fellowship**
1990-1991	**Alumni Anniversary Prize** for Academic Excellence **Sidney Goldwater Roth Memorial Prize** for Mathematics
1987-1991	**Alumni Scholarship** for NYU Undergraduate Tuition

SERVICE:

2000-present	**Association of Women in Mathematics** Member of the AWM Meetings Committee (2012-present) Coorganized the January Joint Meeting AWM panels on *"Building a Research Career in Mathematics"* (2014) *"Retention of Women Faculty in Mathematics"* (2013) *"Coauthoring and Collaboration in Mathematics"* (2012) *"Supporting the Diverse Personal Lives of Mathematicians"* (2004) Wrote *"A Report on How to Increase the Number of Tenured* *Women in Mathematics"* for the AWM newsletter (2000).
2006-present	**College Now Mathematics Advisor** Taught and developed courses for the College Now Program which offers serious proof-oriented mathematics and college credit to top math students at local public high schools in the Bronx
2004-present	**Elected Member of the Educational Policy Committee of the** **Lehman College Mathematics and Computer Science Department** Submitted suggestions for Strategic Plan and College Assessment Redesigned the courses for the masters program in mathematics Implemented uniform detailed syllabi for Precalculus-Calculus III Organized the assessment of the Mathematics Major
2003-present	**AMS Riemannian Geometry Media Contact** Interviewed for Frank Morgan's Huntington Post blog Interviewed regarding teacher preparation in NYS for Geometry Regents Interviewed by a variety of journalists writing articles on Perelman Edited *Poincare's Prize* by George Szpiro for mathematical content
2008-2010	**Mathematics Teacher Transformation Institute (MTTI)** Co-wrote the NSF grant application and NSF annual reports in 2008-2010 Developed masters level geometry courses for MTTI Designed teacher content assessment tools for MTTI
2000-2013	**Conferences and Colloquia Coorganized** New York General Relativity Seminar 2013 CUNY Colloquium 2013: Perspectives on the Ricci Flow 2009 CUNY Differential Geometry Workshop CUNY Geometric Analysis 2006: The Laplace and Length Spectra 2006 Joint CUNY/Courant NYC Rigidity Theory Workshop CUNY Geometric Analysis 2005 2004 CUNY Geometric Analysis and Applications Conference Spring 2004 Eastern AMS Sectional Special Session Spring 2002 Eastern AMS Sectional Special Session Spring 2001 Eastern AMS Sectional Special Session Fall 2000 Eastern AMS Sectional Special Session

PLENARY ADDRESSES:

2013   **Workshop on Infinite-Dimensional Geometry, UC Berkeley**
"Intrinsic Flat Metric and PreCompactness of Spaces of Riemannian Manifolds"

2013   **MSRI Optimal Transportation Geometry and Dynamics**,
"Convergence of manifolds and metric measure spaces"

2012   **Midwest Geometry Conference**
"The Positive Mass Theorem and the Intrinsic Flat Distance"

2011   **Pacific Northwest Geometry Seminar**
"The Positive Mass Theorem, the Penrose Inequality and the $\mathcal{F}$ Distance"

2010   **Notre Dame Interactions between Geometry and Analysis**
"Intrinsic Flat Convergence of Manifolds and Integral Current Spaces"

2009   **Geometry Festival XXIV**
"The intrinsic flat distance between Riemannian manifolds"

2009   **Workshop on Riemannian and Non-Riemannian Geometry, IUPUI**
"The intrinsic flat distance between oriented Riemannian manifolds"

2008   **UNAM Workshop Global Riemannian Geometry, Mexico**
"Open Questions on Open Manifolds with $Ricci \geq 0$"

2008   **Southeast Geometry Conference, March 14-6, 2008**
"Understanding the Topology of Manifolds with Nonnneg Ricci Curvature"

2007   **Texas Geometry and Topology Conference**
"Various Covering Spectra Spectra and Shift Spectra "

2007   **Bloomington Geometry Workshop,**
"The Cut-off Covering Spectrum and Gromov-Hausdorff Convergence"

2006   **Midwest Geometry Conference**
"The Topology of Rioemannian Manifolds with Nonnegative Ricci Curvature"

2004   **Spectral Geometry Workshop, CRM , Montreal**
"The Covering Spectrum, the Length Spectrum and Convergence"

2002   **Stanford University and AIM, General Relativity Workshop**
"Using Gromov-Hausdorff Convergence to understand the Spacelike Cosmos"

INVITED LECTURE SERIES:

2013   **ICMS Ricci Curvature Workshop July 1-12 2013**
"Comparison Geometry with Ricci Bounds" (4 lectures)

2008   **Seminaire Borel: New Approaches to Curvature August 24-29, 2008**
"Gromov Hausdorff Convergence and the Covering Spectrum" (4 lectures)

SELECTED INVITED TALKS:

2013   **MSRI Evans Lecture**
"Applications of the Convergence of Metric Measure Spaces"

2013   **Stanford Geometry Seminar**
"The Intrinsic Flat Distance and Open Questions Concerning Almost Rigidity"

2012   **Lehigh Geometry and Topology Seminar Session Speaker**
"The Sliced Filling Volume and new Compactness Theorems"

2013   **Rice University, Seminar Speaker**
"Intrinsic Flat Convergence and Integral Current Spaces"

2012   **U Penn, Differential Geometry Seminar and followup seminar**
"Intrinsic Flat Convergence and Smooth Convergence away from Singular Sets"

2013   **Urbana Champaign, Seminar Speaker**
"Integral Current spaces, Sliced Filling Volumes and the Tetrahedral Property"

2013   **UC San Diego, Seminar Speaker**
"The Tetrahedral Property and Intrinsic Flat Convergence"

2012   **Oberwolfach: Mathematical Aspects of General Relativity**
"The Intrinsic Flat Convergence as a Weak Convergence of Manifolds"

2012   **Lehigh Geometry and Topology Conference**
"Properties of Intrinsic Flat Convergence"

2012   **MIT Geometric Analysis Seminar**
"Properties of Intrinsic Flat Convergence"

2011   **Stony Brook Geometry-Topology Seminar**
"Estimating the Intrinsic Flat Distance"

2011   **MIT Geometric Analysis Seminar**
"Intrinsic Flat Convergence of Manifolds and Integral Current Spaces"

2011   **Harvard University Differential Geometry Seminar**
"Applications of Intrinsic Flat Convergence"

2011   **University of Vienna, Gravitational Physics Seminar**
"The Stability of the Positive Mass Theorem and the Intrinsic Flat Distance"

2011   **ETH Zurich, Analysis Seminar**
"Near Equality in the Positive Mass Theorem and the Penrose Inequality"

2010   **UC Santa Barbara, Geometry/Topology Seminar**
"The intrinsic flat convergence of manifolds and integral current spaces"

2009   **University of Pennsylvania, Geometry-Topology Seminar**
"The intrinsic flat distance between oriented Riemannian manifolds"

2009   **Dartmouth University, Geometry and Topology Seminar**
"The intrinsic flat distance between oriented Riemannian manifolds"

2009   **Johns Hopkins University, Analysis Seminar**
"Intrinsic flat convergence of oriented Riemannian manifolds"

2009   **Rutgers University, Differential Geometry Seminar**
"The intrinsic flat distance between oriented Riemannian manifolds"

2009	**Harvard University, Differential Geometry Seminar** "Intrinsic Flat Convergence of Riemannian Manifolds"
2009	**NYU Polytechnic Colloquium** "Perelman's proof of the Poincare Conjecture"
2009	**Dartmouth University Colloquium and Seminar** "Distances between Riemannian manifolds and metric spaces"
2009	**Columbia University, Analysis Seminar** "The intrinsic flat distance between oriented Riemannian manifolds"
2009	**AMS Meeting, short talk** "A new distance between Riemannian manifolds"
2008	**University of Arizona, Colloquium, January 24, 2008** "An Almost Isotropic Universe"
2007	**Brown University, Extreme Geometry Seminar, March 1, 2007** "Covering Spectra of Riemannian Manifolds and Length Spaces"
2007	**University of Connecticut, Geometry Seminar, March 13, 2007** "The Rescaled and Cut-off Covering Spectra"
2007	**Urbana-Champagne, Differential Geometry Seminar, April 12, 2007** "Almost Isotropy and Exponential Length Spaces"
2006	**Princeton University, Geometric Analysis Seminar,** "The Spacelike Stability of the Isotropic Friedmann Model"
2006	**Semi-Annual Workshop in Dynamical Systems and Related Topics** Geometry session talk on Riemannian manifolds with $Ricci \geq 0$
2006	**Cornell University, Analysis Seminar,** "Ricci Curvature and the Topology of Open Manifolds"
2005	**Harvard University, Differential Geometry Seminar,** "The Covering Spectrum and Convergence of Manifolds"
2005	**Rutgers University, Topology/Geometry Seminar,** "Subsets of the Length Spectrum and Convergence"
2005	**Penn State Univ, Geometry and Topology Seminar,** "Gromov-Hausdorff Stability of Schur's Lemma"
2004	**Dartmouth College, Colloquium,** "Inhomogeneity and the Curvature of the Spacelike Cosmos"
2004	**U. Penn Analysis Seminar,** "The Covering Spectrum"
2004	**Rutgers University at Newark, Colloquium** "The Gromov-Hausdorff Stability of the Friedman Model"
2004	**Dartmouth College, Differential Geometry Seminar,** "The Length and Covering Spectra"
2003	**Lehigh University, Conference on Geometry and Topology** "The Stability of Isotropy and the Friedmann Model "
2003	**University of Maryland, College Park, Geometry-Topology Seminar** "Exponential Length Spaces "
2003	**U Penn, Differential Geometry and Analysis Seminar** "Almost Isotropy, Schur's Lemma and Cosmology"
2003	**Spring Eastern Sectional Meeting of the AMS** **Nonlinear Partial Differential Equations in Differential Geometry** "Almost Rigidity and Stability"
2003	**Joint Mathematics Meetings, Baltimore, January** **Recent Advances in Riemannian and Lorentzian Geometry,** "The Stability of the Friedmann Model"

PUBLISHED RESEARCH PAPERS:

[PS-Pacific]   **"Sequences of Open Riemannian manifolds with Boundary"**
written with doctoral student Raquel Perales
to appear in *Pacific Journal of Mathematics.*

[LS-Crelle]   **"Stability of the Positive Mass Theorem for Rotationally Symmetric Riemannian Manifolds"**
written with Dan Lee,
Journal fur die Riene und Ang Mathematik: Crelle's Journal Vol 686 (2014) 187-220.

[LkS-CAG]   **"Smooth Convergence Away from Singular Sets"**
written with doctoral student Sajjad Lakzian
Communications in Analysis and Geometry Vol 21, No 1, pp 39-104 (2013).

[S-Tetra]   **"The Tetrahedral Property and a new Gromov-Hausdorff Compactness Theorem"**
Comptes Rendus Vol 351, Issues 3-4, pp 119-122 (2013)

[LS-Poincare]   **"Almost Equality in the Penrose Inequality for Rotationally Symmetric Riemannian Manifolds"**
written with Dan Lee
Annales Henri Poincare Vol 13, Issue 7, pp 1537-1556 (2012)

[SW-JDG]   **"The Intrinsic Flat Distance between Riemannian Manifolds and Integral Current Spaces"**
written with Stefan Wenger
Journal of Differential Geometry, Vol. 87 (2011) 117-199.

[SW-CVPDE]   **"Weak Convergence of Currents and Cancellation"**
written with Stefan Wenger
Calculus of Variations and P.D.E., Vol. 38, No 1-2, May, (2010) 183-206.
Appendix by Raanan Schul and Stefan Wenger, 22 pp.

[SWei-T10]   **"The Cut-off Covering Spectrum"**
written with Guofang Wei
Transactions of the American Mathematical Society 362, 2339-2391 (2010).

[ShS-AIM]   **"Conjugate Points in Length Spaces"**
written with Krishnan Shankar
Advances in Mathematics, 220, 791-830 (2009).

[S-AIM]   **"Convergence and the Length Spectrum".**
Advances in Mathematics, Vol 213, Issue 1, (August 2007), pp 405-439.

[SWei-JDG]   **"The Covering Spectrum of a Compact Length Space".**
written with Guofang Wei,
Journal of Differential Geometry 67 (2004) 35-77.

[SWei-T04]   **"Universal Covers for Hausdorff Limits of Noncompact Spaces"**.
written with Guofang Wei, 34 pages
Transactions of the AMS 356 (2004), no. 3 pp. 1233-1270.

[S-GAFA-04]   **"Friedmann Cosmology and Almost Isotropy"**.
Geometric and Functional Analysis, Vol. 14 (2004) 853-912.

[SWei-T01]   **"Hausdorff Convergence and Universal Covers"**.
written with Guofang Wei
Transactions of the American Mathematical Society 353 (2001), 3585-3602.

[SShen-AJM]   **"The Codimension One Homology of a Complete Manifold with Nonnegative Ricci Curvature"**
written with Zhongmin Shen
American Journal of Mathematics 123 (2001) , 515-524.

[S-Ind]   **"On Loops Representing Elements of the Fundamental Group of a Complete Manifold with Nonnegative Ricci Curvature"**
Indiana Univ. Math. Journal 50 (2001), no. 4, 1867–1883.

[S-JDG-00]   **"Nonnegative Ricci Curvature, Small Linear Diameter Growth and Finite Generation of Fundamental Groups"**.
Journal of Differential Geometry 54 (2000) 547-559.

[S-PJMS]   **"Harmonic Functions on Manifolds with Nonnegative Ricci Curvature and Linear Volume Growth"**.
Pacific Journal of Mathematics, Vol 192, No 1, (2000) 183-189.

[S-CAG]   **"The Almost Rigidity of Manifolds with Lower Bounds on Ricci Curvature and Minimal Volume Growth"**.
Communications in Analysis and Geometry Vol 8 No. 1 (2000) 159-212.

[S-JDG-98]   **"Busemann Functions on Manifolds with Lower Bounds on Ricci Curvature and Minimal Volume Growth"**.
The Journal of Differential Geometry, Vol 48, (1998) 557-585.

BOOKS EDITED:

[Szpiro]   **Poincare's Prize: The Hundred-Year Quest to Solve One of Math's Greatest Puzzles** by George G. Szpiro
PLUME, Penguin Group, ISBN 978-0-525-95024-0 (2008)
Mathematical Editing by Christina Sormani

PROCEEDINGS:

[S-ICGTMP]   **"The Stability of the Spacelike Friedmann Model"**
XXVI International Colloquium on Group Theoretical Methods in Physics,
Edited by J.L. Birman, S. Catto, and B. Nicolescu, (2009), pp 495-500.

CONFERENCE REPORTS:

[S-OBER-11]   **Oberwolfach Report: 38/2011**
Partial Differential Equations Workshop
Organized by Ambrosio, Chang, Schatzle and Weiss

[S-OBER-12]   **Oberwolfach Report: 37/2012**
Mathematical Aspects of General Relativity Workshop,
Organized by Dafermos, Isenberg and Ringstrom

SURVEY ARTICLES:

[S-PiM]   **"How Riemannian Manifolds Converge: a Survey"**
Progress in Mathematics, (2010), 27pp

[SShen-CMA]   **"The Topology of Open Manifolds of Nonnegative
Ricci Curvature"**
written with Zhongmin Shen, Midwest Geometry Conference 2006,
Communications in Mathematical Analysis, Conf. 01. (2008) pp 11-19.

PREPRINTS:

[SWei-V]   **"Various Covering Spectra for Complete Metric Spaces"**
written with Guofang Wei, arXiv:0705.3822v1, submitted, 32 pp

[S-ArzAsc]   **"Intrinsic Flat Arzela-Ascoli Theorems"**
arXiv:1402.6066, submitted, 32 pages

[SLeFl-S]   **"Stability Estimates for Rotationally Symmetric Spaces
with Low Regularity"**
written with Philippe LeFloch, arXiv:1401.6192, submitted, 38 pages

IN PROGRESS:

[S-Prop]   **"Properties of the Intrinsic Flat Distance"**
arXiv:1210.3895, some material moved to [S-ArzAsc]
update expected soon, 63+ pp,

[SBas-1]   **"Sequences of 3 dim'l Manifolds with Positive Scalar Curvature"**
writing with doctoral student Jorge Basilio, 32+ pp

[SBas-2]   **"An Intrinsic Flat Limit of Riemannian Maniflds with no Geodesics"**
writing with doctoral student Jorge Basilio, 12+ pp

[SV-1]   **"Big Bang Spacetimes"**
writing with postdoc Carlos Vega, 26+ pp