

# JEFFREY JAUREGUI | Curriculum Vitae

✉ jauregui@union.edu • 807 Union St., Schenectady NY, 12309 • 📞 518-388-6710

## POSITIONS

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### UNION COLLEGE

Professor of Mathematics (2023 - present)  
Associate Professor of Mathematics (2019 - 2023)  
John D. MacArthur Assistant Professor (2015 - 2016)  
Assistant Professor of Mathematics (2013 - 2015, 2016 - 2019)

2013 - present  
Schenectady, NY

### UNIVERSITY OF PENNSYLVANIA

Hans Rademacher Instructor of Mathematics (Postdoc)

2010 - 2013  
Philadelphia, PA

## EDUCATION

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### DUKE UNIVERSITY

Ph.D. in Mathematics  
Thesis: Mass estimates, conformal techniques, and singularities in general relativity  
Advisor: Hubert L. Bray

2005 - 2010  
Durham, NC

### HARVEY MUDD COLLEGE

B.S. in Mathematics and Physics  
Graduated with High Distinction

2001 - 2005  
Claremont, CA

## AWARDS, FELLOWSHIPS, GRANTS

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|---|--------------------------|
| Co-PI, NSF grant DMS-2154896: 2022 Union College Mathematics Conference | 2022                     |
| Union College MOSH Maker grant  | 2019                     |
| Union College Faculty Research Fund grant                               | 2017                     |
| Union College Teaching with Technology grants                           | 2015, 2016               |
| Research member: MSRI, Berkeley   | August 2013              |
| Nominee for Dean's Award for Distinguished Teaching (UPenn)             | 2013                     |
| Math Department Good Teaching Award (UPenn)                             | 2011, 2013               |
| L.P. and Barbara Smith Award for Excellence in Teaching (Duke)          | 2009                     |
| James B. Duke Fellowship  | 2005 - 2009              |
| NSF Graduate Research Fellowship  | 2006 - 2008, 2009 - 2010 |

## ARTICLES

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21. **Maximum capacity of Bartnik data and a generalization of static metrics.** [HTTPS://ARXIV.ORG/ABS/2602.12383](https://arxiv.org/abs/2602.12383)
20. (with R. Perales and J. Portegies) **Semicontinuity of capacity under pointed intrinsic flat convergence.** *Comm. Anal. Geom.*, Vol. 33, No. 3 (2025), pp. 559–621.
19. (with D. Lee and R. Unger) **A note on Huisken's isoperimetric mass.** *Lett. Math. Phys.*, Vol. 114, No. 6 (2024), Paper No. 134.
18. **ADM mass and the capacity-volume deficit at infinity,** *Comm. Anal. Geom.*, Vol. 31, No. 6 (2023), pp. 1565–1610.
17. **Scalar curvature and the relative capacity of geodesic balls.** *Proc. Amer. Math. Soc.*, Vol. 149, No. 11, (2021), pp. 4907–4921.
16. (with D. Lee) **Lower semicontinuity of ADM mass under intrinsic flat convergence.** *Calc. Var. Partial Differential Equations*, Vol. 60, No. 2, (2021).
15. **Smoothing the Bartnik boundary conditions and other results on Bartnik's quasi-local mass.** *J. Geom. Phys.*, Vol. 136, (2019), pp. 228–243.

14. **Lower semicontinuity of the ADM mass in dimensions two through seven.** Pacific J. Math., Vol. 301, No. 2, (2019), pp. 441–466.
13. (with M. Anderson) **Embeddings, immersions, and the Bartnik quasi-local mass conjectures.** Ann. Henri Poincaré, Vol. 20, No. 5, (2019), 1651–1698.
12. (with D. Lee) **Lower semicontinuity of mass under  $C^0$  convergence and Huisken’s isoperimetric mass.** J. Reine Angew. Math. (Crelle’s Journal), Vol. 756 (2019), pp. 227–257.
11. **Penrose-type inequalities with a Euclidean background.** Ann. Global Anal. Geom., Vol. 54, No. 4 (2018), pp. 509–527.
10. **On the lower semicontinuity of the ADM mass,** Comm. Anal. Geom., Vol. 26, No. 1 (2018), pp. 85–111.
9. (with H. Bray and M. Mars) **Time flat surfaces and the monotonicity of the spacetime Hawking mass II,** Ann. Henri Poincaré, Vol. 17, No. 6 (2016), pp. 1457–1475.
8. (with W. Wylie) **Conformal diffeomorphisms of gradient Ricci solitons and generalized quasi-Einstein manifolds,** J. Geom. Anal., Vol. 25, No. 1 (2015), pp. 668–708.
7. (with H. Bray) **On curves with nonnegative torsion,** Arch. Math., Vol. 104, No. 6 (2015), pp. 561–575.
6. (with H. Bray) **Time flat surfaces and the monotonicity of the spacetime Hawking mass,** Comm. Math. Phys., Vol. 335, No. 1 (2015), pp. 285–307.
5. (with H. Li et al.) **Epilepsy Treatment Simplified through Mobile Ketogenic Diet Planning,** J. Mobile Technology, Vol. 3, No. 2 (2014).
4. (with P. Miao and L.-F. Tam) **Extensions and fill-ins with nonnegative scalar curvature,** Class. Quantum Grav. Vol. 30 (2013) 195007.
3. (with H. Bray) **A geometric theory of zero area singularities in general relativity,** Asian J. Math., Vol. 17, No. 3 (2013), pp. 525–560.
2. **Fill-ins of nonnegative scalar curvature, static metrics, and quasi-local mass,** Pacific J. Math., Vol. 261, No. 2 (2013), pp. 417–444.
1. **Invariants of the harmonic conformal class of an asymptotically flat manifold,** Comm. Anal. Geom., Vol. 20, No. 1 (2012), pp. 163–202.

## TEACHING

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### UNION COLLEGE

Math 062\*: Mathematics of Elections and Polls  
 Math 100: Calculus with Precalculus  
 Math 110: Differential Calculus  
 Math 113: Accelerated Single-Variable Calculus  
 Math 115: Differential Multivariable Calculus  
 Math 117: Integral Multivariable Calculus  
 IMP 120/121: Integrated Math and Physics I and II  
 Math 130: Ordinary Differential Equations  
 Math 140\*: Applied Linear Algebra  
 Math 199: Introduction to Logic and Set Theory  
 Math 248\*: Intermediate Topics in Mathematics  
 Math 340: Linear Algebra  
 Math 336: Real Analysis  
 Math 437\*: Real Analysis II  
 Math 448: Differential Geometry  
 Math 49X: Senior Thesis

\* indicates a newly-designed (or co-designed) course

### UNIVERSITY OF PENNSYLVANIA

Math 104: Calculus I  
 Math 180: Analytical Methods in Economics, Law, and Medicine  
 Math 312: Linear Algebra  
 Math 313/513: Computational Linear Algebra  
 Math 500: Point-Set Topology  
 Math 501: Differential Geometry of Curves and Surfaces  
 Math 660: Riemannian Geometry

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| <b>Canadian Mathematical Society Winter Meeting</b><br>Scientific session on mathematical relativity and geometric analysis          | Toronto, CA<br>December 6, 2025           |
| <b>Simons Center for Geometry and Physics</b><br>Geometric Measure Theory on Metric Spaces with Applications to Physics and Geometry | Stony Brook, NY<br>September 17, 2025     |
| <b>Joint Mathematics Meetings</b><br>Special Session on Riemannian Manifolds with Scalar Curvature Lower Bounds                      | Boston, MA<br>January 4, 2023             |
| <b>GNOSC Seminar</b><br>Gromov, Hanke, Sormani, and Yu's <b>Not Only Scalar Curvature</b> Seminar (virtual talk)                     | Zoom<br>October 28, 2022                  |
| <b>Fields Institute</b><br>Mathematical Relativity, Scalar Curvature and Synthetic Lorentzian Geometry (virtual talk)                | Toronto, Canada<br>October 6, 2022        |
| <b>Joint Mathematics Meetings</b><br>Special Session on Scalar Curvature and Convergence (virtual talk)                              | Zoom<br>April 9, 2022                     |
| <b>Universität Regensburg</b><br>Mathematical Physics working seminar (virtual talk)   | Regensburg, Germany<br>November 19, 2021  |
| <b>Mathematisches Forschungsinstitut Oberwolfach</b><br>Workshop: Mathematical Aspects of General Relativity (virtual talk)          | Oberwolfach, Germany<br>September 3, 2021 |
| <b>Duke University</b><br>Geometry and General Relativity Group Seminar (virtual talk)   | Durham, NC<br>October 27, 2020            |
| <b>Harvard University</b><br>CMSA General relativity seminar (virtual talk)  | Cambridge, MA<br>October 23, 2020         |
| <b>Virtual Workshop on Ricci and Scalar Curvature</b><br>Online seminar (virtual talk)   | Zoom<br>September 2020                    |
| <b>Rutgers Univeresity</b><br>Geometric analysis seminar   | New Brunswick, NJ<br>March 10, 2020       |
| <b>University of Tokyo</b><br>Conference: Geometric Analysis and General Relativity  | Tokyo, Japan<br>November 21, 2019         |
| <b>CUNY Graduate Center</b><br>New York General Relativity Seminar   | New York, NY<br>November 29, 2018         |
| <b>Institute for Advanced Study</b><br>Emerging Topics Working Group: Scalar Curvature and Convergence                               | Princeton, NJ<br>October 18, 2018         |
| <b>Humboldt Universität</b><br>Conference: Stability Phenomena in Mathematical Physics   | Berlin, Germany<br>October 11, 2018       |
| <b>Mathematisches Forschungsinstitut Oberwolfach</b><br>Workshop: Mathematical General Relativity                                    | Oberwolfach, Germany<br>August 7, 2018    |
| <b>Simons Center for Geometry and Physics</b><br>Workshop: Mass in General Relativity  | Stony Brook, NY<br>March 30, 2018         |
| <b>Canadian Mathematical Society Winter Meeting</b><br>Scientific session on geometric analysis                                      | Waterloo, CA<br>December 10, 2017         |
| <b>CUNY Graduate Center</b><br>CUNY Flat Convergence Workshop 2017   | New York, NY<br>June 13, 2017             |
| <b>Rutgers University</b><br>Geometric analysis seminar  | New Brunswick, NJ<br>April 25, 2017       |
| <b>AMS Southeastern Section Meeting</b><br>Special session on geometric analysis and general relativity                              | Charleston, SC<br>March 12, 2017          |
| <b>Pacific Northwest Geometry Seminar</b><br>Lewis and Clark College   | Portland, OR<br>March 5, 2017             |
| <b>CUNY ADM Mass and <math>\mathcal{F}</math> convergence reading seminar</b><br>CUNY Graduate Center                                | New York, NY<br>January 10, 2017          |
| <b>University of Connecticut</b><br>PDE and Differential Geometry Seminar  | Storrs, CT<br>November 14, 2016           |
| <b>Banff International Research Station</b><br>Geometric Analysis and General Relativity   | Banff, Canada<br>July 18, 2016            |

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| <b>Universität Tübingen</b><br>Static Metrics and Bartnik's Quasi-local Mass Conjecture        | Tübingen, Germany<br>May 17, 2016    |
| <b>St. Michael's College</b><br>Hudson River Undergraduate Mathematics Conference              | Colchester, VT<br>April 2, 2016      |
| <b>AMS Eastern Section Meeting</b><br>Special Session on Mathematical and General Relativity   | Stony Brook, NY<br>March 19, 2016    |
| <b>Williams College</b><br>FrankFest 2016: Conference on Isoperimetric Problems                | Williamstown, MA<br>February 6, 2016 |
| <b>Joint Mathematics Meetings</b><br>Special Session on Analytic Methods in Geometry           | Seattle, WA<br>January 9, 2016       |
| <b>Pennsylvania State University</b><br>General Relativity and Gravitation Conference          | State College, PA<br>June 8, 2015    |
| <b>Siena College</b><br>Math Department Colloquium   | Albany, NY<br>February 18, 2015      |
| <b>CUNY Graduate Center</b><br>Differential Geometry Seminar                                   | New York, NY<br>February 10, 2015    |
| <b>Joint Mathematics Meetings</b><br>Special session on Ricci curvature and homogeneous spaces | San Antonio, TX<br>January 12, 2015  |
| <b>AMS Southeastern Section Meeting</b><br>Special session on geometric analysis               | Greensboro, NC<br>November 8, 2014   |
| <b>Syracuse University</b><br>Geometry/topology seminar  | Syracuse, NY<br>April 17, 2014       |
| <b>Fordham University</b><br>Analysis seminar  | Bronx, NY<br>March 5, 2014           |
| <b>Lehigh University</b><br>Lehigh University Conference on Geometry and Topology              | Bethlehem, PA<br>May 25, 2013        |
| <b>M.I.T.</b><br>Workshop on minimal surfaces and related topics                               | Cambridge, MA<br>April 28, 2013      |
| <b>Penn Undergraduate Math Society</b><br>Colloquium   | Philadelphia, PA<br>April 3, 2013    |
| <b>Swarthmore College</b><br>Math Department Colloquium  | Swarthmore, PA<br>February 15, 2013  |
| <b>Reed College</b><br>Math Department Colloquium  | Portland, OR<br>February 12, 2013    |
| <b>Bucknell University</b><br>Math Department Colloquium                                       | Lewisburg, PA<br>February 7, 2013    |
| <b>Joint Mathematics Meetings</b><br>Session on Differential and Hyperbolic Geometry           | San Diego, CA<br>January 10, 2013    |
| <b>Syracuse University</b><br>Analysis seminar   | Syracuse, NY<br>April 19, 2012       |
| <b>University of Miami</b><br>Geometry and physics seminar                                     | Coral Gables, FL<br>April 11, 2012   |
| <b>CUNY Graduate Center</b><br>Differential Geometry Seminar                                   | New York, NY<br>November 1, 2011     |
| <b>University of Tennessee at Knoxville</b><br>UTK Barrett Lectures on Mathematical Relativity | Knoxville, TN<br>May 14, 2011        |
| <b>AMS Eastern Section Meeting</b><br>Special Session on Topics in PDE and Geometric Analysis  | Worcester, MA<br>April 10, 2011      |
| <b>Lafayette College</b><br>Lafayette–Lehigh Geometry–Topology Seminar                         | Easton, PA<br>March 25, 2011         |
| <b>SUNY Stony Brook/Simons Center</b><br>Columbia/Stony Brook joint General Relativity Seminar | Stony Brook, NY<br>March 18, 2011    |
| <b>Haverford College</b><br>Haverford/Bryn Mawr Bi-College Colloquium                          | Haverford, PA<br>February 14, 2011   |

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| <b>Temple University</b><br>Global Analysis Seminar  | Philadelphia, PA<br>September 29, 2010 |
| <b>AMS Eastern Section Meeting</b><br>Special Session on Elliptic and Parabolic Problems in Geometry | Newark, NJ<br>May 23, 2010             |
| <b>Johns Hopkins University</b><br>Workshop on Mean Curvature Flows and Related Topics               | Baltimore, MD<br>March 15, 2010        |
| <b>Joint Mathematics Meetings</b><br>Special Session on Mathematical Challenges of Relativity        | San Francisco, CA<br>January 13, 2010  |
| <b>University of North Carolina</b><br>Analysis / PDE Seminar  | Chapel Hill, NC<br>December 2, 2009    |
| <b>AMS Southeastern Section Meeting</b><br>Special Session on General Relativity and Related PDE     | Boca Raton, FL<br>October 30, 2009     |
| <b>AMS Mathematical Research Communities</b><br>Mathematical Challenges of Relativity                | Snowbird, UT<br>June 18, 2009          |

## CONFERENCE ORGANIZATION

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| <b>Union College Math Conference</b><br>Co-organizer                                    | Union College<br>2016, 2019, 2022, 2026              |
| <b>Convergence and Low Regularity in General Relativity</b><br>Co-organizer of workshop | Simons Center for Geometry and Physics<br>April 2019 |
| <b>General Relativity and Geometric Analysis</b><br>Co-organizer of AMS Special Session | Portland State University<br>April 2018              |
| <b>Hudson River Undergraduate Math Conference</b><br>Co-organizer                       | Union College<br>April 2015 and April 2025           |

## COLLEGE SERVICE

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| <b>FACULTY COMPENSATION COMMITTEE</b><br>Appointed Position<br>Serving as chair September 2023 - present | <b>September 2022 - present</b><br>Union College     |
| <b>BENEFITS COMMITTEE</b><br>Elected Position  | <b>September 2024 - present</b><br>Union College     |
| <b>ACADEMIC AFFAIRS COUNCIL</b><br>Elected Position<br>Served as chair March 2021 - August 2022          | <b>September 2020 - August 2023</b><br>Union College |
| <b>RETIREMENT PLAN COMMITTEE</b><br>Appointed Position   | <b>October 2017 - October 2023</b><br>Union College  |
| <b>LIBRARY LIAISON COMMITTEE</b><br>Elected Position   | <b>September 2017 - June 2019</b><br>Union College   |
| <b>FACULTY REVIEW BOARD</b><br>Elected Position  | <b>September 2015 - June 2016</b><br>Union College   |

## PROFESSIONAL SERVICE

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**Journal referee**  
 Advances in Geometry  
 Asian Journal of Mathematics  
 Calculus of Variations and Partial Differential Equations  
 Classical and Quantum Gravity

Communications in Analysis and Geometry  
Differential Geometry and its Applications  
International Mathematics Research Notices  
Inventiones mathematicae  
Journal für die reine und angewandte Mathematik (Crelle's Journal)  
Journal of Differential Geometry  
Journal of Geometric Analysis  
Journal of Geometry and Physics  
Journal of Nonlinear Analysis  
Mathematical Research Letters  
Mathematische Nachrichten  
Pacific Journal of Mathematics  
SIGMA (Symmetry, Integrability and Geometry: Methods and Applications)

**Reviewer**

AMS Mathematical Reviews (MR)

17 reviews