Luiz Hartmann

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Personal

Born on July 05, 1983.

Brazilian Citizen.

Research Interests

Differential Geometry, Algebraic Topology, Global Analysis, Geometric Analysis, Singular Spaces.

University Education

B.S. Mathematics, Universidade Estadual Paulista, UNESP, January/2005.

M.A. Mathematics, Universidade de São Paulo, USP, February/2007.

Ph.D. Mathematics, Universidade de São Paulo, USP, December/2009.
Advisor: Mauro Spreafico. FAPESP grant.
Thesis: *Torção Analítica e extensões para o Teorema de Cheeger–Müller*.

Habilitation (Livre-docência), Instituto de Ciências Matemáticas e de Computação, ICMC-USP, November/2019.
Thesis: *Análise Global e Teoria Espectral de Pseudovariedades*.

Academic Positions

Full Professor, Universidade Federal de São Carlos, June/2010 – present.

Administration Duties

Vice-coordinator of the Graduate Program in Mathematics (PPGM/UFSCar), August/2017 – August/2021.

Coordinator of the Graduate Program in Mathematics (PPGM/UFSCar), September/2021 – August/2023.

Academic Long Term Visits

May–July/2012, Heidelberg University, Heidelberg, Germany, cooperation with Markus Banagl.

Nov/2013, University of Salento, Lecce, Italy, cooperation with Mauro Spreafico.

Aug/2015 – Jul/2016, University of Bonn, Germany, cooperation with Matthias Lesch. FAPESP grant 2015/01923-0.

Honors, Awards and Grants

Award Carlos Gutierrez, ICMC-USP, 2010.

Honors Thesis (Menção Honrosa), CAPES, 2011.

Research grant by FAPESP, 2010–2012. FAPESP: 2010/16660-1.

Research grant by CNPq, 2013–2016. CNPq: 476876/2013-3.

Research grant by FAPESP, 2013–2015. FAPESP: 2013/04396-6.

Research grant by FAPESP (Visiting Researcher), 2015–2016. FAPESP: 2015/01923-0.

Research grant by CAPES (Special Visiting Researcher), 2015–2019. CAPES: 88881.068165/2014-01.

Research grant by FAPESP, 2016–2018. FAPESP: 2016/16949-8.

Research grant by FAPESP, 2019–2021. FAPESP: 2018/23202-1.

Research grant by FAPESP, 2022–2024. FAPESP: 2019/08834-4.

Research grant by FAPESP, 2022–2024. FAPESP: 2021/09534-4.

CNPq Research Productivity Grant (Bolsa de Produtividade), Level 2, 2024 – present.

Current Research Projects

Geometric and Topological Analysis of Manifolds and Pseudomanifolds (Coordinator). CNPq Productivity Grant, 2024 – present.

Algebraic, Geometric and Differential Topology (Member). Coordinator: Daciberg Lima Gonçalves. FAPESP Thematic Project, 2024 – present.

Singularities in Algebra and Geometry (Coordinator). In collaboration with Mathias Lesch (Bonn), Boris Vertman (Oldenburg), et al. UFSCar grant, 2023 – present.

Modern Methods in Differential Geometry and Geometric Analysis (Member). Coordinator: Paolo Piccione. FAPESP Thematic Project, 2023 – present.

Invited Presentations

R torsion and analytic torsion of a conical frustum, Workshop on Analytical Torsion and Applications, Orsay, France, June/2012.

The Cheeger-Müller Theorem and generalizations, FSU Topology Week and FSU-UF Meeting 2013, Tallahassee, USA, February/2013.

The analytic torsion of the finite metric cone over a compact manifold, Global Analysis Seminar, University of Bonn, Germany, December/2015.

Zeta determinants of Sturm-Liouville operators with quadratic potentials at infinity, Global Analysis Seminar, University of Bonn, Germany, May/2017.

Cheeger-Müller theorem on manifolds with conical singularities, Global Analysis Seminar, University of Bonn, Germany, January/2020.

An extension of the Cheeger-Muller theorem for manifolds with conical singularities, Differential Geometry Seminar, Stanford University, USA, September/2022.

The Cheeger-Müller theorem and extensions, Analysis Seminar, University of Milano-Bicocca, Italy, October/2022.

Rotational surfaces with second fundamental form of constant length, Global Analysis Seminar, University of Bonn, Germany, October/2022.

Zeta and Fredholm determinants of self-adjoint operators, Analysis Seminar, University of Oldenburg, Germany, October/2022.

Zeta and Fredholm determinants of self-adjoint operators, Analysis Seminar, Temple University, Philadelphia, USA, September/2023.

Atiyah-Bott formula for the Lefschetz number of a singular foliation, Analysis Seminar, University of Oldenburg, Germany, October/2023.

Atiyah-Bott formula for the Lefschetz number of a singular foliation, PDE/Analysis Seminar, MIT, Cambridge, USA, 2024.

Selected Conference Talks

An extension of the Cheeger-Muller theorem for a cone, Heidelberg Laureate Forum, Heidelberg University, September/2013.

Spectral geometry on singular spaces, International Congress of Mathematicians, Rio de Janeiro, July/2018.

Cheeger-Müller theorem on spaces with conical singularities, XXII Encontro Brasileiro de Topologia, 2022.

An Atiyah-Bott formula for the Lefschetz number of a singular foliation, XXIII Encontro Brasileiro de Topologia, 2024.

Generalizations of the implicit and inverse function theorem: a topological and homological approach, Mathematical Congress of Americas, 2025.

Organized Conferences

Geometry and Topology School of UFSCar, January/2012.

XVIII Brazilian Topology Meeting, August/2012.

Brazil-Italy Geometry Meeting, July/2012.

II Colóquio de Matemática da Região Sudeste, January/2013.

XIX Brazilian Topology Meeting, July/2014.

I Encontro de Álgebra e Topologia da UFSCar, February/2015.

I Mathematical Week of UFSCar, October/2018.

Workshop on Submanifold Theory and Geometric Analysis, August/2019.

II Mathematical Week of UFSCar, October/2019.

III Mathematical Week of UFSCar (online), October/2020.

IV Mathematical Week of UFSCar (online), October/2021.

São Carlos Conference in Geometry, June/2022.

I Encontro de Egressos do PPGM/UFSCar, August/2023.

Postdoc Supervision

Thaís Maria Dalbelo, Sep/2016 – Aug/2017. CAPES grant.

Fabiani Aguiar Coswosck, Feb/2017 – Jan/2018. CAPES grant.

Thaís Maria Dalbelo, Jan/2018 – Jul/2018. FAPESP grant.

Matheus Hudson Gama dos Santos, 2024 – present. *Solitons da curvatura média em espaço ambiente com fluxo de Ricci estendido*. FAPESP grant.

Fabiani Aguiar Coswosck, 2026 – present.

Students

Current Students

Pedro Santos Almeida Neto, *Invariantes de torção e grupos de transformações finitos*, Master's degree, started 2025.

Gustavo de Oliveira Cardoso dos Santos, *Invariantes combinatoriais em espaços estratificados*, PhD, started 2024. FAPESP grant.

Pedro Henrique Muller Bortolucci, *Topological Invariants of 3-manifolds*, PhD, started 2023. FAPESP grant.

Claudinei Caetano Junior, *Global analysis on the Torricelli's trumpet*, PhD, started 2023.

João Medeiros dos Santos Neves, *General problems related to maps between manifolds*, PhD, started 2026.

Completed Master's Dissertations

Gustavo de Oliveira Cardoso dos Santos, *Torsion invariant on cellular complexes*, 2024.

Claudinei Caetano Junior, *Campos de Yang-Mills fracamente estáveis na esfera de dimensão quatro*, 2023. CAPES grant.

Kevin Moradel Bautista, *Sobre fibrados e poliedros de dimensão finita*, 2021. CAPES grant.

Raúl Armando Gomes Tarazona, *O princípio de tangência*, 2021. CAPES grant.

Mateus da Silva Rodrigues Antas, *Determinante regularizado do Laplaciano e conjuntos isoespectrais em superfícies*, 2019. FAPESP grant.

Felipe de Aguilar Franco, *O princípio do Máximo de Omori-Yau e aplicações*, 2014. CAPES grant.

Francisco Carlos Caramello Junior, *Folheações Riemannianas Singulares em variedades de Hadamard*, 2014. CNPq grant.

Completed PhD Theses

Maicom Douglas Varela da Costa, *Newton polyhedra and invariants of determinant singularities*, 2024. CAPES grant.

Bruno Caldeira Carlotti de Souza, *Heat equation and the Yamabe flow on manifolds with fibered boundary metric*, 2021. CAPES grant.

Francisco Carlos Caramello Junior, *Killing foliations on positively curved manifolds*, 2018 (co-supervisor). CAPES grant.

Rafael Ferreira da Silva, *Determinantes regularizados e o Teorema de Cheeger-Müller em Espaços Projetivos*, 2016. CNPq grant.

Publications and Students – Summary

Papers published and accepted: 25;

Submitted manuscripts: 2;

Master's dissertations supervised (completed): 7;

PhD theses supervised (completed): 4;

Postdocs supervised (completed): 3.

Complete List of Publications

Published and Accepted

Hartmann, L.; Lesch, M. Divided differences and multivariate holomorphic calculus. *Documenta Mathematica*, p. 1–27, 2026.

Dalbelo, T. M.; Hartmann, L.; Varella, M. Newton polyhedra and Whitney equisingularity for isolated determinantal singularities. *Israel Journal of Mathematics*, 2026 (accepted).

Hartmann, L.; Vertman, B. Cheeger-Müller theorem for a wedge singularity along an embedded submanifold. *Revista Matemática Complutense*, v. 38, p. 343–355, 2025.

Barreto, A. P.; Fontenele, F.; Hartmann, L. Rotational surfaces with constant second fundamental form. *Communications in Analysis and Geometry*, v. 31, p. 2269–2296, 2023.

Coswosck, F. A.; Barreto, A. P.; Hartmann, L. Curvature estimates for graphs in warped product spaces. *Differential Geometry and its Applications*, v. 86, p. 101973, 2023.

Caldeira, B.; Hartmann, L.; Vertman, B. Normalized Yamabe flow on manifolds with bounded geometry. *Annals of Global Analysis and Geometry*, v. 63, p. 1–32, 2023.

Hartmann, L.; Lesch, M. Zeta and Fredholm determinants of self-adjoint operators. *Journal of Functional Analysis*, v. 283, p. 109491, 2022.

Barreto, A. P.; Fontenele, F.; Hartmann, L. On regular algebraic hypersurfaces with non-zero constant mean curvature in Euclidean spaces. *Proceedings of the Royal Society of Edinburgh Section A: Mathematics*, v. 152, p. 1081–1088, 2022.

Hartmann, L.; Lesch, M.; Vertman, B. Resolvent trace asymptotics on stratified spaces. *Pure and Applied Analysis*, v. 3, p. 75–108, 2021.

Dalbelo, T. M.; Hartmann, L. Brasselet number and Newton polygons. *Manuscripta Mathematica*, v. 162, p. 241–269, 2020.

de Oliveira, C. R.; Hartmann, L.; Verri, A. A. Effective Hamiltonians in surfaces of thin quantum waveguides. *Journal of Mathematical Physics*, v. 60, p. 022101, 2019.

Hartmann, L.; Spreafico, M. Zeta determinant of the Laplacian on the real projective spaces. *International Journal of Number Theory*, v. 15, p. 373–388, 2019.

Hartmann, L.; Lesch, M.; Vertman, B. On the domain of Dirac and Laplace type operators on stratified spaces. *Journal of Spectral Theory*, v. 4, p. 1295–1348, 2018.

Hartmann, L.; Lesch, M.; Vertman, B. Zeta-determinants of Sturm-Liouville operators with quadratic potentials at infinity. *Journal of Differential Equations*, v. 262, p. 3431–3465, 2017.

Hartmann, L.; Spreafico, M. The analytic torsion of the finite metric cone over a compact manifold. *Journal of the Mathematical Society of Japan*, v. 69, p. 311–371, 2017.

Hartmann, L.; Spreafico, M. Analytic torsion of half spheres. *International Journal of Mathematics*, p. 1750072, 2017.

Barreto, A. P.; Fenille, M. C.; Hartmann, L. Inverse mapping theorem and local forms of continuous mappings. *Topology and its Applications*, v. 197, p. 10–20, 2016.

Hartmann, L.; Spreafico, M. On the Cheeger-Müller theorem for an even-dimensional cone. *St. Petersburg Mathematical Journal*, v. 27, p. 137–154, 2015.

Hartmann, L.; Melo, T.; Spreafico, M. The analytic torsion of a disc. *Annals of Global Analysis and Geometry*, v. 42, p. 29–59, 2012.

Hartmann, L.; Spreafico, M. R torsion and analytic torsion for a conical frustum. *Journal of Gökova Geometry Topology*, v. 6, p. 28–57, 2012.

Hartmann, L. The boundary term from the analytic torsion of a cone over a m-dimensional sphere. *Matemática Contemporânea*, v. 43, p. 133–169, 2012.

Hartmann, L.; Spreafico, M. The analytic torsion of a cone over an odd dimensional manifold. *Journal of Geometry and Physics*, v. 61, p. 624–657, 2011.

Hartmann, L.; Spreafico, M. The analytic torsion of a cone over a sphere. *Journal de Mathématiques Pures et Appliquées*, v. 93, p. 408–435, 2010.

Hartmann, L.; Melo, T.; Spreafico, M. Reidemeister torsion and analytic torsion of discs (announcement). *Bollettino della Unione Matematica Italiana*, v. 9, p. 529–533, 2009.

Submitted Manuscripts

Hartmann, L.; Mendoza, G. An Atiyah-Bott formula for the Lefschetz number of a singular foliation, 2025 (submitted).

Hartmann, L.; Spreafico, M. Intersection torsion and analytic torsion of spaces with conical singularities, 2020 (submitted).