

Biographical Sketch

MARKUS J. PFLAUM

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Education

Institution	Area	Degree/Level	Year(s)
Universität München, Germany	Physics	Undergraduate	1987 - 1989
University of Texas at Austin	Physics	Graduate	1990 - 1991
Universität München, Germany	Physics	Diploma	1992
Universität München, Germany	Mathematics	PhD	1995
Humboldt-Universität, Berlin, Germany	Mathematics	Habilitation	2001

Appointments

University of Colorado at Boulder	Professor of Mathematics	2012/06 - present
University of Colorado at Boulder	Associate Professor (tenured)	2007/08 - 2012/05
Goethe-Universität Frankfurt, Germany	Professor (C3, Mathematics)	2004 - 2007
Goethe-Universität Frankfurt, Germany	Dozent (C2, Mathematics)	2002 - 2004
Institut de Mathématiques de Luminy, Marseille, France	Postdoc (Mathematics)	2001 - 2002
Humboldt-Universität, Berlin, Germany	Scientific Assistant (Mathematics)	1995 - 2001

Grants (since 2018)

- PI on Simons Foundation Collaboration Grant *Noncommutative geometry of stratified spaces and groupoids*, award nr. 359389 in the amount of \$35 000, 2015 - 2020.
- coPI on the CU Boulder RIO Seed Grant in the amount of \$45 000 for the project *Mathematical Physics of Quantum Matter* (PI Michael Hermele, further coPI Agnès Beaudry), 2020 - 2021.
- coPI on *Descriptors of Energy Landscapes by Topological Analysis (DELTA)* (PI A. Clark, further coPIs H. Adams, R. Sundararaman, Y.Z.), OAC 1934725, 2019 - 2022.
- PI on NSF award DMS 2055501 *Topological and C^* -Algebraic Quantum Matter*, in the amount of \$385 878, 2021 - 2024.

Significant Publications

- [1] Martin Bordemann, Hans-Christian Herbig, and Markus J. Pflaum, *A homological approach to singular reduction in deformation quantization*, Singularity theory (D. Cheniot et. al., ed.), World Sci. Publ., Hackensack, NJ, 2007, pp. 443–461.
- [2] Jean-Paul Brasselet and Markus J. Pflaum, *On the homology of algebras of Whitney functions over subanalytic sets*, Ann. of Math. (2) **167** (2008), no. 1, 1–52.
- [3] Batu Güneysu and Markus J. Pflaum, *The profinite dimensional manifold structure of formal solution spaces of formally integrable PDE's*, SIGMA Symmetry Integrability Geom. Methods Appl. **13** (2017), no. 003, 44 pp, <https://www.emis.de/journals/SIGMA/2017/003/>.
- [4] Matthias Lesch, Henri Moscovici, and Markus J. Pflaum, *Connes-Chern character for manifolds with boundary and eta cochains*, Memoirs AMS **220** (2012), no. 1036, <http://dx.doi.org/10.1090/S0065-9266-2012-00656-3>.
- [5] J. Mirth, Y. Zhai, J. Bush, E.G. Alvarado, H. Jordan, M. Heim, B. Krishnamoorthy, M. Pflaum, A. Clark, Y.Z., and H. Adams, *Representations of energy landscapes by sublevelset persistent homology: An example with n-alkanes*, J. Chem. Phys. **154** (2021), 114114,19, <http://dx.doi.org/10.1063/5.0036747>.
- [6] Markus J. Pflaum, *Analytic and geometric study of stratified spaces*, Lecture Notes in Mathematics, vol. 1768, Springer-Verlag, Berlin, 2001.
- [7] Markus J. Pflaum, Hessel Posthuma, and Xiang Tang, *An algebraic index theorem for orbifolds*, Adv. Math. **210** (2007), no. 1, 83–121.
- [8] ———, *Geometry of orbit spaces of proper Lie groupoids*, J. für die Reine und Angew. Math. **694** (2014), 49–84, <http://dx.doi.org/10.1515/crelle-2012-0092>.
- [9] Markus J. Pflaum, Gerd Rudolph, and Matthias Schmidt, *Deformation Quantization and Homological Reduction of a Lattice Gauge Model*, Comm. Math. Phys. **382** (2021), no. 2, 1061–1109, <https://doi.org/10.1007/s00220-020-03896-w>.
- [10] Daniel Spiegel, Juan Moreno, Marvin Qi, Michael Hermele, Agnès Beaudry, and Markus J. Pflaum, *Continuous dependence on the initial data in the Kadison transitivity theorem and GNS construction*, Rev. Math. Phys. **34** (2022), no. 9, Paper No. 2250031, 84, <https://doi.org/10.1142/S0129055X22500313>.

Invited Presentations (summary of 2020-23)

- Talk on *Localization in Hochschild Homology and Applications* in the AMS Special Session on Noncommutative Geometry and Applications at the Joint Mathematics Meeting 2020, Denver, January 15 to 18, 2020.
- Online talk on *Relative K-theory* at the conference Microlocal and Global Analysis, Interactions with Geometry, University of Potsdam from February 15 to 19, 2021.
- Online talk *On the Hochschild homology of convolution algebras of proper Lie groupoids* at the Fields Institute workshop *Cyclic Cohomology at 40: achievements and future prospects* from Sep. 27 to Oct. 1, 2021.
- Talk at Humboldt University Berlin on *Persistent homology and the Morse-Smale complex as tools in topological data analysis and an application in chemistry*, June 29, 2022.
- Talk *Continuous families of GNS constructions* at the Technical University Chemnitz, Germany, July 6 2022.
- Talk at the Max-Planck Institute for the Mathematics of the Sciences in Leipzig, Germany, on *Algebraic Machine Learning*, July 11, 2022.

Mentoring

- Mentoring of presently one postdoc; mentored two postdocs before who both have tenure track positions now, one in the US, the other in the UK.
- Supervision of presently seven dissertation projects for PhD students on topics from mathematical physics, topology, real and computational algebraic geometry, or differential geometry.
- Supervision of presently two undergraduate honors thesis projects.
- Graduated two Master's degree students in Fall 2021 and Spring 2022 on topics within Topological Data Analysis and Computational Algebraic Geometry.
- Mentoring of departmental summer research projects for undergraduate students at the University of Colorado in the summers of 2014 to 2023.
- Taught yearly Augmester Special Topics courses on the topics *Hilbert Spaces and the Mathematics of Quantum Mechanics* and *Topological Data Analysis* since August 2015.

Synergistic Activities

- Founder and maintainer of online Mathematics website *Libri Mathematicae*
<http://www.librimath.org>.
- Associate editor for *Rocky Mountain Journal of Mathematics* and editorial board member of *De Gruyter Expositions in Mathematics*.
- Joint organization with A. Beaudry (PI), M. Hill, and D. Wilson of the conference *Chromatic Homotopy Theory: Journey to the Frontier* at the University of Colorado, Boulder, May 2018.
- Joint organization with M. Khalkhali of the AMS Special Session on *Quantum Theory of Matter Meets Noncommutative Geometry and Topology* at the Joint Mathematics Meeting 2020, Denver, January 17 and 18, 2020.
- Maintainer of the *Rocky Mountain Mathematical Physics Seminar* youtube channel
<https://www.youtube.com/@rockymountainmathematicalp8387>.