

# Loreno Heer

Dr. sc. nat.

Institute for Theoretical Physics, D-PHYS  
ETH Zürich (Eidgenössische Technische Hochschule Zürich)  
Switzerland

loreno-heer.github.io  
lheer@ethz.ch  
(Pronouns: he/him/his)  
Citizenship: Swiss

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## Research interest

Analysis in metric spaces, in particular quasiconformal, quasi-symmetric and quasi-Möbius geometry. (Gromov-)hyperbolic geometry and geometric group theory. Furthermore geometric analysis in general and low-dimensional topology. Besides pure mathematics I am interested in mathematical physics, in particular the geometry of space-time and string theory. My current research centers on the study of the conformal horizon of de Sitter space in general relativity with a positive cosmological constant and in particular the study of gravitational waves in this setting.

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## Education

- 11/2015 – 01/2021 **PhD in Mathematics**, University of Zurich.  
Thesis: *The Boundary at Infinity of Gromov-Hyperbolic Spaces*, supervised by Prof. Dr. Viktor Schroeder, defended January 27, 2021.
- 09/2012 – 09/2015 **Master of Science ETH in Mathematics**, ETH Zurich.  
Thesis: *Undistortedness of Lipschitz  $n$ -connected closed subsets in quasi-convex metric spaces of finite Assouad-Nagata dimension*, supervised by Prof. Dr. Urs Lang.
- 09/2008 – 09/2012 **Bachelor of Science in Mathematics**  
(with minor Physics and Computer Science), University of Bern.  
Thesis: *Low-dimensional linear representations of mapping class groups and their triviality in certain cases*, supervised by Prof. Dr. Sebastian Baader.
- 09/2000 – 09/2004 **EFZ Computer Science**

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## Appointments

- 06/2022 – **Postdoctoral Researcher, Astrophysics**, ETH Zurich, Institute for Theoretical Physics.  
Research group of Lavinia Heisenberg
- 11/2015 – 01/2021 **PhD Student and Teaching Assistant**, University of Zurich.
- 09/2004 – 06/2006 **Java Software-Engineer**, Swisscom IT-Services.
- 02/2003 – 02/2004 **Internship**, Swisscom IT-Services.
- 02/2002 – 07/2002 **Internship**, Swisscom IT-Services.

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## Publications and Preprints

- [1] Loreno Heer. “Some Invariant Properties of Quasi-Möbius Maps”. In: *Analysis and Geometry in Metric Spaces* 5.1 (28 Aug. 2017), pp. 69–77. DOI: <https://doi.org/10.1515/agms-2017-0004>. URL: <https://www.degruyter.com/view/journals/agms/5/1/article-p69.xml>.
- [2] Loreno Heer. “The Boundary at Infinity of Gromov Hyperbolic Spaces”. PhD thesis. University of Zurich, 2021. DOI: <https://doi.org/10.5167/uzh-217863>. URL: <https://doi.org/10.5167/uzh-217863>.

## Workshops and Conferences

- *Reading Seminar: Teichmüller Theory*, University of Fribourg, Switzerland (Fall 2021).
- *going the MATH way (goMATH 2019)*, Symposium, Zurich, Switzerland (12 to 14 March 2019).
- *Groups, geometries, and spaces in honour of Alessandra Iozzi*, ETH Zurich, Switzerland (22 to 25 January 2019).
- *Young Geometric Group Theory VII*, Les Diablerets, Switzerland (12 to 16 March 2018).
- *23rd Rolf Nevanlinna Colloquium*, ETH Zurich, Switzerland (12 to 16 June 2017).

## Talks given

- 10/2019    Geometric Analysis Seminar / Oberseminar Geometrie  
            *Möbius maps and the boundary at infinity of metric spaces*  
            University of Fribourg
- 09/2016    Informal Seminar on Topics of Möbius Geometry  
            University of Zürich
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## Professional memberships and refereeing

- since 2022    Referee for Journal of Mathematical Analysis and Applications.
- since 2021    American Mathematical Society.
- since 2017    Reviewer for MathSciNet (Mathematical Reviews).
- since 2014    Reviewer for zbMATH.
- since 2014    Swiss Mathematical Society.
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## Teaching experience

### As an assistant / teaching assistant at University of Zurich

(Responsible for discussion sections, grading, and partly for creating homework assignments, supervising projects.)

FS16	MAT151	Grundbegriffe der Mathematik
FS16	MAT153	Zahlentheorie
HS16	MAT101	Programming
FS17	MAT112	Lineare Algebra II
HS17	MAT101	Programming
FS18	MAT823	Introduction to Computability and Complexity Theory
HS18	MAT101	Programming
FS19	MAT184	Analysis für die Chemie
HS19	MAT101	Programming
FS20	MAT184	Analysis für die Chemie
HS20	MAT101	Programming

### MSc Thesis Co-Advisor

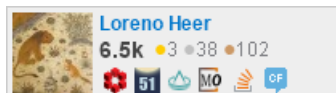
- FS18    Andresen, Silke Berit    Low-dimensional Boundaries of CAT(0) Spaces

### Additional tasks

- FS16    Correction MAT183
- FS17    Correction MAT183
- HS18    Correction MAT182
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## Other activities and outreach

Active on [mathoverflow.com](https://mathoverflow.com) and [math.stackexchange.com](https://math.stackexchange.com) to help answer mathematics questions:



Solving puzzles on <https://projecteuler.net/> and similar websites.

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## Other skills

Languages	German / Swiss German (native). English (proficient). Persian (beginner).
Software	$\text{\LaTeX}$ , C, C++, Python, R, Linux, Bash, emacs, vim, PARI/GP, SageMath, Lean.
Leasure activities	Playing piano and church organ, in particular the works of Bach.

## References

*Prof. Dr. Viktor Schroeder*  
Institut für Mathematik  
Universität Zürich  
Winterthurerstrasse 190  
8057 Zürich - Switzerland  
viktor.schroeder@math.uzh.ch

*Prof. Dr. Stefan Wenger*  
Department of Mathematics  
Universität Freiburg  
PER 11 bu. 2.103  
Ch. du Musée 23  
1700 Fribourg - Switzerland  
stefan.wenger@unifr.ch

*Prof. Dr. Urs Lang*  
Department of Mathematics  
ETH Zurich, HG G 27.3  
Rämistrasse 101  
8092 Zurich - Switzerland  
lang@math.ethz.ch

*Prof. David Matthew Freeman, PhD*  
University of Cincinnati Blue Ash  
College  
Muntz Hall 355C  
9555 Plainfield Rd  
Blue Ash, OH 45236 - USA  
freemadd@ucmail.uc.edu

*Reference concerning teaching:*  
*Prof. Dr. Asieh Parsania*  
Bernern Fachhochschule  
School of Engineering and Com-  
puter Science  
Abt MNG Allgemeinbildung  
Pestalozzistrasse 20  
3400 Burgdorf - Switzerland  
asieh.parsania@gmail.com

*Prof. Dr. Lavinia Heisenberg*  
Department of Physics  
ETH Zurich, HIT K 22.2  
Wolfgang-Pauli-Str. 27  
8093 Zurich - Switzerland  
laviniah@ethz.ch