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<b>Currently</b>	<p>Assistant Professor (Ricercatore ‘tipo b’) at University of Pavia, Italy.  <a href="#">Department of Mathematics</a>  September ‘22 - Current</p>
<b>Previous Academic Positions 2016 - 2022</b>	<p>Oberassistent at <b>ETH, Zürich</b>, Switzerland.  <a href="#">Department of Mathematics</a>  <a href="#">Institute for Theoretical Physics</a>  Co-funded by <a href="#">SNF Swiss National fund</a>, <a href="#">SwissMAP</a>  October ‘21 - August ‘22</p> <p>Postdoctoral fellow at <b>ETH, Zürich</b>, Switzerland.  <a href="#">Department of Mathematics</a> - Prof. Giovanni Felder  <a href="#">Institute for Theoretical Physics</a> - Prof. Niklas Beisert  Co-funded by <a href="#">SNF Swiss National fund</a>, <a href="#">SwissMAP</a>  February ‘19 - September ‘21.</p> <p>Postdoctoral fellow at <b>University of California, Berkeley</b>, USA.  Department of Mathematics - Prof. Nicolai Reshetikhin.  Funded by <a href="#">SNF Swiss National Science Foundation</a> - “Advanced Mobility” Postdoc grant  August ‘18 - February ‘19.</p> <p>Guest Researcher at <b>Max Planck Institute, Bonn</b>, Germany.  March ‘18 - August ‘18.</p> <p>Visiting Scholar at <b>University of California, Berkeley</b>, USA.  February ‘18 - August ‘18.</p> <p>Postdoctoral fellow at <b>University of California, Berkeley</b>, USA.  Department of Mathematics - Prof. Nicolai Reshetikhin.  Funded by <a href="#">SNF Swiss National Science Foundation</a> - “Early Mobility” Postdoc grant  August ‘16 - February ‘18.</p>
<b>PhD 2012 - 2016</b>	<p>Doctor of Natural Sciences - <b>Mathematics</b>.  <a href="#">Zürich Graduate School in Mathematics</a>, University of Zürich, Switzerland.  Institut für Mathematik - Prof. Alberto S. Cattaneo.  Jan ‘12 - July ‘16 (employed as postdoc since the awarding of the title, 29/04/2016).</p>
<b>Habilitation</b>	<p>Italian National Scientific Habilitation, Associate professor level - Mathematical Physics (Mat/07)  French ‘Maître de Conférence’ Habilitation - Mathematics (Section 25)  French ‘Maître de Conférence’ Habilitation - Applied Mathematics (Section 26)</p>
<b>Education 2006 - 2011</b>	<p>University of Bologna, Italy.</p> <ul style="list-style-type: none"> <li>• Bachelor and Master of Science in Physics.  Prof. Elisa Ercolessi and Prof. Luca Migliorini.</li> <li>• Diploma of advanced and interdisciplinary excellence studies - <i>Collegio Superiore</i>, UniBo.  Prof. Ettore Remiddi.</li> </ul>

## Publications

Preprints (authors in alphabetical order)

- with A. Riello, [Preprint arXiv: arXiv:2207.00568 \[math-ph\]](#)  
*Hamiltonian gauge theory with corners: constraint reduction and flux superselection*
- with C. Blohmann and A. Weinstein, [Preprint arXiv: arXiv:2201.02883 \[math-ph\]](#)  
*A Lie-Rinehart algebra in general relativity*
- with F. M. C. Simão and A. S. Cattaneo, [Preprint arXiv:2109.05268 \[math-ph\]](#)  
*BV equivalence with boundary*
- with S. M. Griffin, [Preprint arXiv:2008.08066 \[cond-mat.mtrl-sci\]](#)  
*Generalized spontaneous symmetry breaking*

Published and accepted papers

1. with S. Martinoli, [Letters in Mathematical Physics](#), **112** 35 (2022)  
*BV analysis of Polyakov and Nambu-Goto theories with boundary*
2. with Canepa G., [To appear in Advances in Theoretical and Mathematical Physics](#), **26** (3)  
[Preprint arXiv:1905.09333 \[math-ph\]](#)  
*Fully extended BV-BFV description of General Relativity in three dimensions.*
3. with G. Canepa and A. S. Cattaneo, [Communications in Mathematical Physics](#), **385**, 1571-1614 (2021). DOI: 10.1007/s00220-021-04127-6  
*General Relativity and the AKSZ construction.*
4. with Rejzner, K., [Communications in Mathematical Physics](#), **385**, 1083-1132 (2021). DOI: 10.1007/s00220-021-04061-7  
*Asymptotic symmetries in the BV-BFV formalism.*
5. with Canepa G. and Cattaneo A. S., [Advances in Theoretical and Mathematical Physics](#) **25** (2), 327-377 (2021).  
*Boundary structure of General Relativity in tetrad variables.*
6. with Contreras I., [Manuscripta Mathematica](#) (2021)  
DOI: 10.1007/s00229-021-01311-9  
*Kähler fibrations in quantum information theory.*
7. with Hadfield C. and Kandel S., [Annales Henri Poincaré](#), **21** (12), 3835-3867 (2020)  
*Ruelle zeta function from field theory.*
8. with Cattaneo A. S., [Advances in Theoretical and Mathematical Physics](#), **23** (8) (2019),  
*BV-BFV approach to General Relativity: Palatini–Cartan–Holst action.*
9. with P. Mnev and K. Wernli, [Annales Henri Poincaré](#), **21** (3), 993-1044 (2020)  
*Towards Holography in the BV-BFV setting.*
10. with Cattaneo A. S., [Annales Henri Poincaré](#), **20** (2), 445-480 (2019)  
*The reduced phase space of Palatini–Cartan–Holst theory.*
11. with Cattaneo A. S. and Seliash I., [Letters in Mathematical Physics](#), **108** (8), 1873–1884 (2018)  
*BV equivalence between triadic gravity and BF theory in three dimensions.*
12. with Cattaneo A.S., [Letters in Mathematical Physics](#), **107**(2), 375-408, (2016/17)  
*On time.*
13. with Contreras I. and Ercolessi E., [Journal of Mathematical Physics](#) **57**(6), 062209 (2016)  
*On the geometry of mixed states and the Fisher information tensor.*  
**JMP Editor’s Pick**
14. with Cattaneo A. S., [Journal of Mathematical Physics](#) **57**(2), 023515 (2015/16)  
*BV-BFV approach to General Relativity: Einstein Hilbert action.*

15. with Micheli G., *Advances in Mathematics of Communications* **8** (3), 343-358 (2014)  
*A general construction for monoid-based knapsack protocols.*
  16. with Ercolessi E., *Physics Letters A* **377** (34-36), 1996-2002 (2013)  
*Symmetric logarithmic derivative for general n-level systems and the quantum Fisher information tensor for three-level systems.*
  17. with Ercolessi E., *Journal of Physics A* **45** 365303 (2012)  
*Geometry of mixed states for a q-bit and the quantum Fisher information tensor.*
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18. *PhD Thesis, University of Zürich* (2015),  
*BV-BFV Approach to General Relativity.*

### Approved Research Projects

#### Lawrence Berkeley National Laboratory

- *Molecular Foundry*, User Proposal Program - Research Collaboration, Jan/2019 - Feb/2020

#### SNF Swiss National Science Foundation

- *Advanced Mobility* Postdoc Grant (USD 76.150), 01/Aug/2018 - 31/Jan/2020  
(Interrupted 31/Jan/19 to accept ETH offer)
- *Early Mobility* Postdoc Grant (USD 70.650), 01/Aug/2016 - 31/Jan/2018
- *Forschungskredit* Research Grant (CHF 55.200), 01/Jul/2013 - 31/Aug/2014

### Awards & Scholarships

#### Collegio Superiore, University of Bologna

- Excellence Studentship (EUR 13.250 + tuition), during Bachelor and Master, Sep/06-Jul/11.

### Students' Supervision

#### Master Theses

- Leon Geiger, Master Thesis, Spring '22 (Ongoing) - ETH Zurich
- Endrit Konjuhi, Master Thesis, Fall '21 (Ongoing, with G. Felder) - ETH Zurich
- Thomas Stucker, Master Thesis, Spring '21 - ETH Zurich  
*Gauge Fixing Independence and the Partition Function of BF Theory, With an Application to the Analytic Torsion and the Ruelle Zeta Function*
- Francisco Castela Simao, Master Thesis, Spring '20 - ETH Zurich  
*BV equivalence between one-dimensional reparametrisation invariant models*
- Sebastiano Martinoli, Master Thesis, Fall '19 - ETH Zurich  
*BV equivalence between Nambu-Goto and Polyakov theories with boundary.*
- Iswaryaa Selliah, Master Thesis, '17 - University of Zurich  
*BV equivalence between triadic gravity and BF theory in three dimensions.*

#### Semester Theses

- Sylvain Rossi, Semester Project, Fall '20  
*Comparing perturbative algebraic quantum field theories and factorization algebras.*
- Thomas Stucker, Semester Project, Fall '20  
*Flat regularisation in field theory.*
- Leonardo Fossati, Semester Project, Spring '20  
*Cohomological ambiguities in General Relativity.*
- Francisco Castela Simao, Semester Project, Fall '19  
*1d models in the BV-BFV formalism.*
- Enya Hsiao, Summer research project, '17 - University of California, Berkeley  
*The boundary structure of two dimensional Einstein–Hilbert gravity.*

## Teaching

### Full Courses

- *Geometric methods for mathematical physics*, 28 hours (4 ECTS), ETH Zürich, Spring '22
- *Mathematical aspects of classical and quantum field theory*, 56 hours (8 ECTS), ETH Zürich, Spring '21
- *Field theory with symmetries and the Batalin–Vilkovisky formalism*, 28 hours (4 ECTS), ETH Zürich, Fall '19
- *General Relativity for mathematicians*, 28 hours (4 ECTS), University of Zürich, Spring '16

### Head assistance and coordination

- *Allgemeine Mechanik* (Classical Mechanics), ETH Zürich, Fall '20

### Minicourses (as lecturer, partially or entirely)

- Max Planck Institute, Bonn - April to June '18  
*Quantum field theory and BV formalism.*
- Collegio superiore, University of Bologna - Feb '14  
*Geometric methods for physics and quantisation.*
- Collegio superiore, University of Bologna - Feb '13  
*Co-adjoint orbit of compact Lie groups.*

### Reading Seminars Organisation

- *Learning seminar on quantum field theory and BV formalism.*, Bonn, Spring '18.
- *Log-symplectic geometry and applications*, Zürich, Autumn '15.
- *Mathematical methods in quantum field theory*, Zürich, Spring '15.

### Teaching Assistance

- *Introduction to general relativity and gauge theories for mathematicians* - Zürich, Spring '15
- *Quantum mechanics for mathematicians* - Zürich, Autumn '14
- *Classical mechanics for mathematicians* - Zürich, Spring '14
- *Lie groups and Lie algebras* - Zürich, Autumn '13
- *Linear algebra II* - Zürich, Spring '13
- *Linear algebra I* - Zürich, Autumn '12
- *Mathematics for chemistry II* - Zürich, Spring '12

### Organised seminar series

- *Talks in mathematical physics*, ETH Zürich - Fall '21 and Spring '22
- *Representation Theory and Mathematical Physics Seminar*, UC Berkeley - Fall '17
- *Graduate talks in mathematics*, University of Zürich - Spring '14 through Spring '16

## Scientific Duty

### PhD Committee

- University of Zürich, March 2021

### Editor for

- European Physical Journal Plus (EPJP, Springer)

### Member of

- International Association of Mathematical Physics
- Alumni Collegio di Studi Superiori, Università di Bologna

Referee for

- Communications in Mathematical Physics
- Letters in Mathematical Physics
- Journal of Mathematical Physics
- Mathematical Physics, Analysis and Geometry
- Sigma
- Scipost

Reviewer for

- American Mathematical Society

## Outreach

Interviews

- Perspectives, journal of the Swiss Mathematical Physics Research Network  
[Issue 6, 2021](#)

## Academic activities

Organisation of International Conferences and Workshops

- [GAP XVIII, Séminaire itinérant “Géométrie et Physique”](#): Homotopy algebras and higher structures - May ‘23, Paris, France  
Organised with A. Cattaneo, M. Jotz Lean, H.-Y. Liao, M. Stiénon and P. Xu
- [Noncommutative Geometry and Higher Structures](#) - June ‘22, Scalea, Italy  
Organised with F. D’Andrea, G. Dito, M. Jotz Lean and P. Xu - [Workshop]

Conference talks, posters and workshops

- *LOOPS ‘22* - July ‘22  
ENS Lyon [Contributed Conference Talk]
- *Informal Workshop on Corners* - May ‘22  
Online, Centre de Physique Theorique, University of Marseille [Invited Workshop Attendance]
- *Informal Workshop on Corners* - November ‘21  
Online, Centre de Physique Theorique, University of Marseille [Invited Workshop Talk]
- *A gauge summer with BV* - September ‘21  
Scalea, Italy [Invited Conference Talk]
- *Geometry for Higher Spin Gravity: Conformal Structures, PDEs, and Q-manifolds*,  
Erwin Schrödinger Institute, Austria, August ‘21 [Invited Conference Talk] - [Watch](#)
- *International Congress on Mathematical Physics*,  
Switzerland, August ‘21 [Contributed Conference talk]
- *SwissMap general meeting poster session*,  
Switzerland, August ‘20 [Contributed Poster]
- *A gauge summer with BV - teaser*,  
Online, June ‘20 [Invited Conference Talk]
- *Field Theories and Higher Structures in Mathematics and Physics*,  
Banff center for Mathematical Research, Oaxaca, ME - June ‘17 [Invitation to Workshop]
- *Quantum Field Theory on Manifolds with Boundary and the BV Formalism*,  
Perimeter Institute, Waterloo, CA - May ‘17 [Invited Conference Talk]

- *Lichnerovicz Memorial Conference*,  
IHP, Paris, FR - Dec '15 [Contributed Poster]
- *Algèbres  $L_\infty$ , Homotopie rationnelle, opérades et super géométrie*,  
Rabat, MO - Jun '15 [Invited Conference Talk]
- *Perspectives in Physical Mathematics*,  
University of Bologna, IT - Dec '14 [Invited Conference Talk]

Invited research talks

One World IAMP Mathematical Physics Seminar, Online, January '22  
*Ruelle Zeta Function from Field Theory* - [Watch](#)

Joint Heidelberg-Mainz-Munich-Wien "RIND" Math-Physics seminar, November '21  
*BV-BFV approach to General Relativity*

Department of Mathematics, University of California, Davis, November '21  
*BV-BFV approach to General Relativity*

Department of mathematics, University of Lyon 1, Lyon, October '21  
*BV-BFV approach to General Relativity*

Department of mathematics, University of Padua, Italy, April '21  
*Ruelle zeta function from field theory. [online]*

Department of mathematics, ETH Zürich, Switzerland, April '21  
*Ruelle zeta function from field theory.*

Department of Mathematics, University of California, Davis, November '20  
*Ruelle zeta function from field theory. [online]*

Department of Mathematics, University of Zürich, November '20  
*Ruelle zeta function from field theory. [online]*

Department of physics, ETH Zürich, Switzerland, March '19  
*Field theory on manifolds with boundary.*

Department of mathematics, ETH Zürich, Switzerland, February '19  
*Towards Holography in the BV-BFV formalism.*

Perimeter Institute, Canada, November '18  
*Quantum Gravity Group Meeting: On the BV-BFV Formalism.*

Northwestern University, USA, November '18  
*Equivalence of gauge theories in the presence of boundaries: insights from General Relativity - Part 1.*

Northwestern University, USA, November '18  
*Equivalence of gauge theories in the presence of boundaries: insights from General Relativity - Part 2.*

University of Freiburg, Germany, June '18  
*Equivalence of field theories in the BV-BFV formalism. Insights from General Relativity.*

Max Planck Institute for Mathematics, Bonn, Germany, Mar '18  
*Equivalence of field theories in the BV-BFV formalism. The example of (three dimensional) General Relativity.*

Univeristy of Bologna, Italy - June '17  
*Equivalence of theories in the BV-BFV formalims, the case of GR.*

Perimeter Institute, Waterloo, Canada - May '17 - [Watch](#)  
*Equivalence of theories in the presence of boundaries: the example of General Relativity.*

Northwestern University, Evanston, USA - May '17

*BV-BFV formalism and General Relativity.*

University of Illinois at Urbana Champaign, USA - May '17

*A geometrical perspective on the quantum Fisher information index.*

University of California at Davis, USA - Apr '17

*BV-BFV formalism and General Relativity.*

University of California at Berkeley, USA - Mar '17

*BV-BFV formalism and General Relativity.*

University of California at Davis, USA - Feb '17

*A geometrical perspective on the quantum Fisher information index.*

UFR de mathématiques de l'université Paris Diderot, Paris, Fr - Dec '15

*BV-BFV approach to General Relativity.*

Max Planck Institute for Mathematics, Bonn, De - Nov '15

*Semiclassical BV-BFV approach to General Relativity.*

Perimeter Institute for Theoretical Physics, Waterloo, Ontario, Ca - Oct '15

*BV-BFV approach to General Relativity.*

University of California, Berkeley, USA - Feb '15

*Gauge theories on manifolds with boundaries.*

University of Bologna, It - Feb '14

*Classical and quantum gauge theories on manifolds with boundaries.*

ETH Zürich, Ch - Apr '13

*What is... a BV-BFV theory.*

University of Lille, Fr - Jan '13

*Coadjoint orbits of classical Lie groups.*