

# Žan Grad – Curriculum Vitae

Email: [zan.grad@protonmail.com](mailto:zan.grad@protonmail.com) | Personal webpage: [zangrad.github.io](https://zangrad.github.io)

## EDUCATION

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**Doctoral degree in Mathematics (Ph. D.)** 2021 – ongoing

Instituto Superior Técnico, University of Lisbon

- Member of Centre for Mathematical Analysis, Geometry, and Dynamical Systems.
- Topics: *Lie categories* and *Yang–Mills theory for multiplicative Ehresmann connections*.
- Supervisors: Ioan Mărcuț and Pedro Resende.

**Master of Mathematics (M. Sc.)** 2017 – 2020

University of Ljubljana, Faculty of Mathematics and Physics

- Master's thesis: *Gauge field theory, Yang–Mills–Higgs equations and spin structures on Lorentzian manifolds*.
- Thesis awarded with the Prešeren award of University of Ljubljana.
- Supervisor: Sašo Strle.

**Bachelor of Physics (B. Sc.)** 2012 – 2017

University of Ljubljana, Faculty of Mathematics and Physics

- Bachelor's thesis: *Wave function collapse upon measuring the number of photons in a cavity*.
- Supervisor: Tomaž Rejec.

## TEACHING EXPERIENCE

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**Teaching assistant of mathematics** Sep 2020 – Sep 2021

University of Ljubljana, Faculty of Mathematics and Physics

- Employed full time for two semesters, with an average load of 10 hours of teaching per week.
- Held exercise sessions, constructed written exams, graded students.
- Taught two master-level courses: Analysis on manifolds and Differential geometry.
- Taught five bachelor-level courses: Analysis IV for financial mathematicians, Mathematics 2 for physicists, Mathematics 4 for physicists, Basics of mathematical analysis for computer engineers, Mathematics for pharmacists.

Recorded exercise sessions for these courses are available on my personal webpage, in the [teaching section](#).

## PUBLICATIONS

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[1] Žan Grad, *Yang–Mills theory for multiplicative Ehresmann connections*. Work in progress, to appear in 2025.

[2] ———, *Fundamentals of Lie categories*, to appear in J. Noncommut. Geom., posted on 2023, DOI 10.4171/JNCG/563. ([arXiv](#)).

## TALKS

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- *The covariant derivative in the generalized Bott–Shulman complex*, JMU Würzburg, January 31, 2025 (planned).
- *The exterior covariant derivative of multiplicative forms*, IMPA (Rio de Janeiro), November 14, 2024.
- *Mini course on Lie categories, Lie groupoid and algebroid week in Coimbra II*, July 2023.
- *Lie categories*, Geometry Seminar of Lisbon, May 9, 2023. Link: [recording and slides](#).
- *Lie categories*, for graduate students of Radboud University Nijmegen, April 2023.
- Two talks on *Lie categories*, Topology Seminar of Ljubljana, [March 20](#) and [March 27](#), 2023. Recordings: [Part 1](#), [Part 2](#).
- *Mini course on Minkowski space and the theory of relativity*, Summer school of Mathematics and Physics at University of Ljubljana, August 2019.

In the spring semester of 2024, I organized an online reading seminar on the integration of Lie algebroids to Lie groupoids, where we discussed and proved the well-known result by Crainic and Fernandes stating the precise obstructions to the integrability of Lie algebroids. This seminar was co-organized by fellow PhD students from University of Coimbra and Radboud University.

## CONFERENCES AND WORKSHOPS

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The following list contains attended and planned conferences and workshops.

- [Higher Geometric Structures along the Lower Rhine XVIII](#), January 23-24, 2025 (Nijmegen).
- [XI Workshop on Poisson Geometry and Related Topics](#), November 4-8, 2024 (Manaus).
- [XXXII International Fall Workshop on Geometry and Physics](#), September 2-5, 2024 (Coimbra).
- [Poisson School & Conference 2024](#), July 1-12, 2024 (Naples).
- [Lie groupoid and algebroid week III](#), June 3-7, 2024 (Coimbra).
- [Higher Geometric Structures along the Lower Rhine XVII](#), May 2-3, 2024 (Bonn).
- [Lie groupoid and algebroid week II](#), July 10-14, 2023 (Coimbra).
- [The many interactions of symplectic and Poisson geometry](#), June 19-23, 2023 (Paris).
- [Lie groupoid and algebroid week I](#), September 26-30, 2022 (Coimbra).
- [Poisson School & Conference 2022](#), July 18-29, 2022 (attended online).

## POSTERS

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- [The exterior covariant derivative of multiplicative forms](#) for XI Workshop on Poisson Geometry and Related Topics (Poisson in the Amazon), November 2024.

## GRANTS

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- [COST CaLISTA](#) European grant for short-term scientific missions. This grant enabled me to visit Ioan Mărcuț in person in Nijmegen, in the period of April and May 2024.
- PhD grant [UI/BD/152069/2021](#) by Fundação para a Ciência e a Tecnologia (FCT), Portugal.

## AWARDS

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- *Prešeren award of University of Ljubljana* for master's thesis *Gauge field theory, Yang–Mills–Higgs equations and spin structures on Lorentzian manifolds*, 2020.

## MENTORING

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- Master's student: *Matthijs Lau*, Radboud University Nijmegen. Topic: *Symplectic groupoid fibrations*. Expected to graduate in 2025. This is a joint supervision with Ioan Mărcuț.

## OTHER KNOWLEDGE

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### Physics

The theory of general relativity, quantum mechanics, many-body quantum mechanics, quantum field theory, classical mechanics, classical field theory (hydrodynamics, electromagnetism, elastomechanics and gauge field theory).

### Programming languages

Mathematica and Python; some familiarity with C. Advanced knowledge of languages of the web: PHP, Javascript, HTML, CSS. Principles of backend and frontend frameworks, together with concrete advanced implementations of frameworks Laravel (PHP) in VueJS (Javascript). To support myself, I worked a part-time job as a full-stack web developer between 2010 and 2016.

### Languages

Native speaker of Slovenian language; fluent in both written and spoken English.

### Other

Interdisciplinary cooperation, fondness of relaxed interpersonal relations, familiarity with public speaking and presenting advanced mathematical and physical subjects (applies to non-specialist and inquisitive-minded audiences as well).