Nima Moshayedi   Teaching Statement

Teaching Philosophy

Mathematics is a difficult subject to teach, and even more difficult to learn. The first step for me is always to demonstrate to a student why certain problems or constructions are important to study and how it can be embedded into a larger setting. Many times, this step is rather important to motivate students at the beginning of their undergraduate studies. Exactly at this point, I think it is necessary to explain how mathematics should be viewed as a language encapsulating logical implications which is well-founded through rigorous proofs and not just rules that can be applied in an algorithmic way. Moreover, I think that one should also emphasize that doing mathematics requires a lot of creativity in order to come up with new conjectures and ideas, making the subject very diverse and interesting in its own way. Very often at the beginning, it is hard for students to phrase in an exact way what they don't understand. Therefore, it is important to make them think carefully about the problem in order to capture the exact thing within a certain construction where the lack of understanding takes place. The crucial point is that the student develops his/her own way of solving a given problem by getting a better understanding of the underlying concepts. I think that as a teacher one should try to lead the student towards this goal. Of course, this might be difficult for the students at the beginning. However, I try to be very friendly and open minded for any type of question such that they feel comfortable to ask but still realize where the actual mistakes in their approach have been. A challenging but also interesting aspect is to provide them with exactly enough material to still be able to think about problems independently instead of giving the solutions right away. This is an important process to understand the idea and meaning behind abstract formulae and constructions.

Teaching Experience

University of California, Berkeley

As a Postdoc:

- In the fall semester 2021, I am teaching a course called *A Medley of Quantum Gauge Theories* for advanced undergraduate students and graduate students. This is a course consisting of two hours of lectures each week.

University of Zurich

As a Postdoc:

- I have organized a reading seminar for Master and Ph.D. students on *Shifted Symplectic Structures* based on the paper arXiv:1111.3209 by *Pantev, Toën, Vaquié and Vezzosi* in spring 2021 consisting of two hours per week.

- In the fall semester 2020, I taught a course on *Poisson Geometry and Deformation Quantization* for Master and Ph.D. students. This was a course consisting of four hours of lectures each week and two hours of exercise classes. Moreover, I wrote lecture notes which are available on my website.

As a Ph.D. student:

I was an assistant for several courses at the University of Zurich during my time as a Ph.D. student. Each course consisted of two hours teaching per week including corrections of exercise sheets and question hours. Moreover, I was responsible for writing exercise sheets and the final exam.

- **Geometry and Topology**: Assistant, University of Zurich, Sep. 2019 – Dec. 2019
  Target Audience: Bachelor Students in Mathematics (third semester)
- **Linear Algebra for Natural Sciences**: Assistant, University of Zurich, Sep. 2018 – Dec. 2018
  Target Audience: First Year Students in Biology/Chemistry/Physics/Geology
- **Differentiable Manifolds**: Assistant, University of Zurich, Feb. 2018 – June 2018
  Target Audience: Bachelor and Master Students in Mathematics (fifth semester and above)
- **Geometry and Topology**: Assistant, University of Zurich, Sep. 2017 – Dec. 2017
  Target Audience: Bachelor Students in Mathematics (third semester)
- **Quantum Field Theory from a Functional Integral Point of View**: Assistant, University of Zurich, Feb. 2017 – June 2017
  Target Audience: Master Students in Mathematics
- **Algebra**: Assistant, University of Zurich, Sep. 2016 – Dec. 2016
  Target Audience: Bachelor Students in Mathematics (third semester)

As a B.Sc. / M.Sc. student:

- **Foundation Course for Mathematics and Physics**: Assistant, University of Zurich, Sep. 2015
  High school Students who want to study Mathematics or Physics
- **Analysis for Natural Sciences**: Assistant, University of Zurich, Sep. 2015 – Dec. 2015
  Target Audience: First Year Students in Biology/Chemistry/Physics/Geology
- **Stochastics for Natural Sciences**: Assistant, University of Zurich, Feb. 2015 – June 2015
  Target Audience: First Year Students in Biology/Chemistry/Physics/Geology
- **Analysis for Natural Sciences**: Assistant, University of Zurich, Sep. 2014 – Dec. 2014
  Target Audience: First Year Students in Biology/Chemistry/Physics/Geology

Moreover, I have organized several seminars at different levels. Each seminar consisted of a two hours session per week where a student gave a presentation on a chosen topic including one-to-one meetings with students for answering questions and helping them to prepare their talk.

- **Symplectic Geometry**: Seminar instructor, University of Zurich, Feb. 2020 – June 2020
  Target Audience: Bachelor and Master Students in Mathematics
- **Euclidean Geometry**: Seminar instructor, University of Zurich, Feb. 2019 – June 2019
  Target Audience: First Year Students in Mathematics
- **Selected Topics in Quantum Field Theory**: Seminar, University of Zurich, Feb. 2017 – June 2017
  Target Audience: Master Students in Mathematics

ETH Zurich

As a M.Sc. student:

I was a teaching assistant for a first year course on Linear Algebra. It consisted of two hours teaching including corrections of exercise sheets. Moreover, I have organized additional two hours of session each week for further questions, discussions and additional material. I have also written lecture notes with additional exercises (in German).

- **Linear Algebra II**: Assistant, ETH Zurich, Feb. 2016 – June 2016
  Target Audience: First Year Students in Mathematics and Physics
- **Linear Algebra I**: Assistant, ETH Zurich, Sep. 2015 – Dec. 2015
  Target Audience: First Year Students in Mathematics and Physics

Supervision of Students

I have supervised various students, either for a semester thesis, semester project, or a master thesis. With each student I have spend many hours for discussions and explaining. Additionally, I have corrected their final work and provided them with many different comments and remarks.

Supervision of Students

- **Xiangling Xu**: ETH Zurich, Semester thesis (Master level): *Constructing the Quantum BCOV Theory on Calabi–Yau Manifolds*, Nov. 2021, official advisor: Prof. Dr. Giovanni Felder
- **Davide Saccardo**: ETH Zurich, Master thesis: *Globalization of the Rozansky–Witten model in the BV-BFV formalism*, June 2021, official advisor: Prof. Dr. Thomas Willwacher
- **Raphaël Binda**: ETH Zurich, Semester thesis (Master level): *Global Gauge Conditions in the Batalin-Vilkovisky Formalism*, Oct. 2020, official advisor: Prof. Dr. Matthias Gaberdiel
- **Fabio Musio**: University of Zurich, Master thesis: *Computation of Kontsevich Weights of Connection and Curvature Graphs for Symplectic Poisson Structures*, Dec. 2019, official advisor: Prof. Dr. Alberto S. Cattaneo
- **Davide Saccardo**: ETH Zurich, Semester thesis (Master level): *Short Star Products for Filtered Quantization*, Dec. 2019, official advisor: Prof. Dr. Giovanni Felder
- **Aurelia Schumacher**: University of Zurich, Master thesis on *Strict Deformation Quantization*, ongoing, official advisor: Prof. Dr. Alberto S. Cattaneo
- **Zhongyu Zhang**: ETH Zurich, Semester project (Master level) on the paper arXiv:1801.04525 of *Ezra Getzler* called *Covariance in the Batalin-Vilkovisky formalism and the Maurer-Cartan equation for curved Lie algebras*, ongoing, no official advisor needed
- **Hugo Burkardt**: ETH Zurich, Master thesis on *equivariant BV formalism*, ongoing, official advisor: Prof. Dr. Thomas Willwacher
- **Kaylee Graham**: UC Berkeley, Project (graduate level) on *Logarithms and deformation quantization*, ongoing
- **Ivan Burbano**: UC Berkeley, Project (graduate level) on *JT gravity in the BV-BFV formalism*, ongoing

Reviews and Lecture Notes (partially available on my [WEBSITE](#))

During my time as a student and lecturer, I have written several lecture notes, either for courses that I have attended, assisted or lectured. This was done with the intention to provide students with comprehensive and compact material in order to encourage a better understanding of the subject.

- **1**: "*Lectures on Symplectic Geometry, Poisson Geometry, Deformation Quantization and Quantum Field Theory*"
  [arXiv:2012.14662](#) **(2020)**, University of Zurich
  (under revision for publication in *Lecture Notes in Mathematics*)
- **2**: "*Notes on Geometric Quantization*"
  [arXiv:2010.15419](#) **(2020)**, University of Zurich
- **3**: "*Quantum Field Theory and Functional Integrals*"
  [arXiv:1902.08652](#) **(2019)**, University of Zurich
- **4**: "*Linear Algebra I/II*"
  (in German) ETH Zurich
- **4**: "*Geometry and Topology*"
  University of Zurich
- **5**: "*Classical Mechanics*"
  University of Zurich

Books

I have written a book on probability theory for undergraduate students which will be published by *World Scientific* in 2022.

- **[Introduction to Probability Theory: A First Course on the Measure-Theoretic Approach](#)**: to appear in *World Scientific Series on Probability Theory and Its Applications* Vol. 3 **(2022)**

Some other minor notes written by me:

- **Introduction to Mathematical Finance**: ETH Zurich
- **Notes on Differential Geometry**: University of Zurich
- **Notes on A_∞-algebras**: ETH Zurich