

TEACHING STATEMENT

PHILIPP SCHLICHT

I have over 10 years experience teaching at the Universities of Bonn and Münster, Germany and the University of Bristol, UK. I taught a variety of courses and student seminars in mathematics at all levels, most of them in mathematical logic and some in combinatorics and real analysis. Moreover, I have assisted in several first year lecture courses in analysis and linear algebra by preparing problem sets and teaching some lectures. Besides this, I have supervised many projects and worked with students at all levels. In lecture courses, I have successfully tried out pedagogical ideas such as dedicated discussion sessions and longer individual homework projects. I now describe my teaching experience in more detail.

At the University of Bristol I have been employed purely for research, but I voluntarily taught a lecture course, supervised student's projects and participated in public engagement. The topic of my lecture course in 2022 was an introduction to the forcing technique in set theory, intended for graduate students in mathematics with or without a background in mathematical logic. Since some undergraduate students participated as well, I prepared the lectures to be both accessible and interesting for both undergraduate and graduate students by providing the main material with enough detail, but giving enough outlook to advanced material and offering the advanced students longer projects that required self-study instead of weekly exercises.

In my previous jobs as temporary assistant professor and interim professor (substituting for unfilled positions) at the Universities of Bonn and Münster, I was involved in teaching beginning and advanced undergraduate students and graduate students. I created problem sheets over several years for first year students in analysis and linear algebra. Some of these were for students in other fields such as physics and math education. I taught the introduction to mathematical logic for advanced undergraduate students both in Bonn and in Münster. For this, I created lecture notes from scratch, including all standard material on logical completeness and incompleteness as well as many applications in algebra. I put a focus on applications, since this has the pedagogical advantage that it connects with material that students are already familiar with and can be useful for them later. In Münster, my mathematical logic course with around 30 students was followed by my lecture course introduction to set theory, forming a year's cycle. My mathematical logic course in Bonn in 2021 with around 60 students took place online because of the pandemic. In Bonn, I taught and co-taught several other lecture courses in mathematics and developed lecture notes from scratch. I also co-taught a number of seminars on basic and advanced topics in mathematics and a seminar for students in mathematics education.

I also supervised students at Bristol. In 2019-22, I worked with a Ph.D. student of Prof. Philip Welch in set theory at Bristol for part of his thesis. He successfully defended last November and subsequently received two offers for postdoc positions. Undergraduate and graduate students in Mathematics at the University of Bristol are free to choose projects of three different lengths (10, 20 or 40 credit points) that can replace credit points for other courses. I offered two 40 credit point projects to undergraduate and graduate students; these are in depth projects with around 9 months time between registration and completion. I aim to offer projects of general interest. The topic of one of my students was computability and group theory, he is now studying for a Ph.D. at the University of Oxford. Currently, I supervise a student's project in computability, randomness and analysis.

In Bonn, both undergraduate and graduate students have to write a thesis as an integral part of their degree that takes 6 months for undergraduate and 12 months for graduate students. I supervised and co-supervised 4 undergraduate and graduate thesis projects. Several students that

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I co-supervised continued in academia as doctoral students and postdocs. I have further worked with several doctoral students for parts of their theses. I have not yet had the opportunity to take on doctoral students myself although I had some requests, and I look forward to the chance to do so.

In the classroom, I strive to be a friendly and approachable teacher. I encourage interaction during lectures by asking simple questions to create an atmosphere where students are willing to participate actively. I may begin a lecture with a simple example that can guide the students through the remaining lecture. For example, when teaching applications of the compactness theorem in my 2021 mathematical logic course in Bonn, I began with a question about the characteristic of fields that leads to theorems that we studied in the lecture. I try to motivate a topic by its history, connections and applications. For instance, I motivated the beginning of my 2021 lecture course in Bonn by Hilbert's program to formalise mathematical proofs. In my 2017 model theory course in Bonn, I motivated abstract concepts in mathematical logic by their counterparts in algebra that are easier to grasp. Besides ample motivation, it is important to me that students see computations and proofs in detail. I aim to build up a topic from the ground up so the students build a firm mathematical foundation. Feedback has included

- The lecture was very well structured
- The lecturer engages with questions and comments very well
- There was very good visual motivation
- The lecture notes are really good
- The applications of logic that I learned in the course were exciting
- It was a wonderful opportunity for me

I have had good evaluations of my lecture courses. I take the results and feedback of my courses as an opportunity to improve next time.

SCHOOL OF MATHEMATICS, UNIVERSITY OF BRISTOL, FRY BUILDING, WOODLAND ROAD, BRISTOL, BS8 1UG, UK
Email address: philipp.schlicht@bristol.ac.uk