

Ivan Martino

Teaching Portfolio

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Teaching, mentoring and supervising are a relevant part of my academic activity. I have taught in several languages (English, Swedish, French, and Italian) at University of Catania (2008-2009), at Stockholm University (2009-2014), at University of Fribourg (2014-2016) and at Northeastern University (From 2016). My teaching portfolio has a large spectrum of courses at any academic level. My experience includes supervising more than ten undergraduate and graduate students for bachelor, master and research projects.

Teaching Portfolio

At Northeastern University

- Autumn 2018 **Experiential Ed Directed Study - MATH 4996 (Master level)**, Advisor of Zheyang Yu.
- Autumn 2018 **Introduction to mathematical reasoning – MATH 1365**, Instructor, Undergraduate course for mathematicians; Three hours per week and weekly homework corrections.
- Spring 2018 **Jr/Sr Honors Project – MATH 4970-36155**, Advisor of Jai Aslam.
- Aut 2017 **Math Club**, Faculty Advisor for the Mathematical Club.
- Spring 2017 **Jr/Sr Honors Project – MATH 4970-38489**, Advisor of Jai Aslam.
- Autumn 2016 **Undergraduate research – Math 4020**, Math Department consultant, Mathematics Capstone course, Undergraduate research – Math 4020.
- Autumn 2016 **Introduction to Mathematical Reasoning – MATH 1365**, Instructor, Undergraduate course for mathematicians; Three hours per week and weekly homework corrections.

At University of Fribourg

- Spring 2016 **Algebra and Geometry II**, Teaching Assistant, Undergraduate course for mathematicians, Two hours per week and weekly homework corrections.
- Jan 24-29, 2016 **SM'ART - Borel Seminar 2016**, Instructor, Lesson in Matroid Theory and Commutative Algebra, Seminar on Matroids in Algebra, Repr. theory and Topology, Les Diablerets.
- Autumn 2015 **Algebra and Geometry I**, Teaching Assistant, Undergraduate course for mathematicians, Two hours per week and weekly homework corrections.
- Spring 2015 **The cohomology of toric varieties using shellability**, Instructor, Graduate minicourse in connection with the Thematic Semester in Topology.
- Spring 2015 **Resolution of singularities**, Instructor, Graduate minicourse in connection with the Thematic Semester in Topology.
- Spring 2015 **Introduction to toric varieties**, Instructor, Graduate minicourse in connection with the Thematic Semester in Topology.
- Spring 2015 **Combinatorial methods in topology**, Teaching Assistant, Master/Graduate course for mathematicians, Two hours per week and weekly homework corrections.

- Autumn 2014 **Mathematical methods in computer science (MMI)**, *Teaching Assistant*, Master course for computer-scientists, Two hours per week and weekly homework corrections.
- At Stockholm University**
- Mar-May 2014 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- Jan-May 2014 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- Oct-Dec 2014 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- 2013-2014 ***Kappa competition 2013***, *Mathematical Competition*, Sweden, 75 hours.
- Jan-May 2013 ***Matematik I***, *Teaching Assistant - Seminarisgruppen*, Undergraduate course for the class of science, Algebra, Linear Algebra and Analysis, 48 hours.
- Jan-May 2013 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- Mar-May 2012 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- Jan-May 2012 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- Jan-May 2012 ***Matematik I***, *Tutoring - Handledning*, Undergraduate course for the class of science, Algebra, Linear Algebra and Analysis, 40 hours.
- Sept-Dec 2011 ***Matematik I***, *Teaching Assistant - Räkneövning*, Undergraduate course for the class of science, Algebra, Linear Algebra and Analysis, one hour per week.
- Oct-Dec 2011 ***Matematik I***, *Tutoring - Seminarisgruppen*, Undergraduate course for the class of science, Algebra, Linear Algebra and Analysis, 48 hours.
- Oct-Dec 2011 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- Jan-May 2011 ***Matematik I***, *Tutoring - Handledning*, Undergraduate course for the class of science, Algebra, Linear Algebra and Analysis, 40 hours.
- Oct-Dec 2010 ***Matematik I***, *Tutoring - Handledning*, Undergraduate course for the class of science, Algebra, Linear Algebra and Analysis, 40 hours.
- Oct-Dec 2010 **Optimization**, *Instructor*, Master course, 8 hours.
- Oct-Dec 2010 **Advanced Seminar - *Extraseminars***, *Instructor*, Undergraduate course for the class of science, Two hours per week and weekly homework corrections.
- At University of Catania**
- 2008-2009 ***Geometria***, *Teaching Assistant*, Undergraduate course for mathematicians, 150 hours.

Relevant Didactic Experience and Course Development

I present my teaching portfolio in a separate section, see page 1. Here I highlight a few relevant didactic experiences.

- **Extraseminars course** (2010-2014). One of the most interesting part of my teaching is the *Extraseminars* course, a experimental *Math Circle* style course started in October 2010 (supported

by Boris Shapiro) and continued until 2014. We organized *student-oriented* supplementary lectures for the most interested students of the first academic year of the science program of Stockholm University. *The experience was successful*. I selected attractive mathematical topics following the taste of the students. For instance, I introduced projective geometry and let the students play with curves and surfaces.

A good part of my job was mentoring these *excellent* students in their first steps in Topology, Algebra and basic Algebraic Geometry. This experience has let me start mentoring and supervising students since the beginning of my academic career and I have always enjoyed that.

For instance, I had the pleasure to *mentor Victor Lisinski*, now accepted for his PhD studies in Oxford (Sept 2017), after been selected in April 2015 as a master students in the ALGANT¹ project.

- **Mini-courses at graduate level** (2015). I organized and taught three Mini-courses at the University of Fribourg (Switzerland) in connection with the Thematic Semester in Topology.
 1. Introduction to toric varieties;
 2. Resolution of singularities;
 3. The cohomology of toric varieties using shellability.
- **Math Consultant for undergraduate research** (2017). During the autumn of 2017, I was *Math Department consultant* of the mathematics capstone course "*Math 4020 – Undergraduate research*". In this course the students choose a topic, develop a proposal, write up and present a project of from 10 to 20 pages, involving some original thought. A large part of the course is practice in presenting the topic, and related mathematics. Students have used Math 4020 to get a feel for what research is like, and to help make a decision about whether to continue on to graduate school. Some of them have pursued further research, for instance by participating during summer 2018 at the Research Experiences for Undergraduates (REU)² organized at Northeastern University.
- **Math Club at Northeastern** (2017-2018). I have been appointed as the Faculty Advisor and main organizer of the Math Club during the Academic year 2017-2018. *The Northeastern Math Club is a place where students interested in mathematics can get together and further explore mathematics outside of a classroom setting. We have weekly meetings which consist of a mix of both open discussions and talks given by professors, graduate students, and also some undergraduates.* When appointed as Faculty Advisor, the Math Club was run independently by the students. I shaped this Club as place where undergraduate students could meet different type of math and interact with the faculty of the math department.
- **Supervising and Mentoring**. During 2012, I joined the Swedish International Development Cooperation Agency (SIDA) project for Mathematics³ and I have been thesis advisor of three master students: Manishimwe Alexis, Janvier Ndahimana Rukundo , and Jean Harerimana. While in Stockholm, I have also supervised for the Bachelor thesis Niklas Hedberg (a student of the Extraseminar course) and I mentored Victor Lisinski. In Autumn 2017, I was *Math Department consultant* and, later, *supervisor* of Jai Aslam, accepted in Sept 2018 for graduate study at North Carolina State University. To conclude, in 2018, I have organized a *Research Experience for Undergraduates*, with Emanuele Macrì and I have the opportunity to mentor and supervise several students in their first step in the research world. Currently, I am supervising Alessio Borzì for research project.

¹Established in 2004, the ALGANT (ALgebra, Geometry and Number Theory) consortium now consists of ten research and educational establishments on four continents, namely the universities of Bordeaux (France), Duisburg-Essen (Germany), Leiden (Netherlands), Milano (Italy), Concordia (Montréal, Canada), Padova (Italy), Paris-Sud (France), Regensburg (Germany), Stellenbosch (South Africa) and the Chennai Mathematical Institute (India).

²NSF funds a large number of research opportunities for undergraduate students through its REU Sites program. An REU Site consists of a group of ten or so undergraduates who work in the research programs of the host institution. Each student is associated with a specific research project, where he/she works closely with the faculty and other researchers.

³Stockholm University, the National University of Rwanda (NUR), Linköping University and SIDA - offers to supervise a Master project in Mathematics to some selected students at NUR.

Supervising and Mentoring

For sake of completeness, some information given in the previous pages are repeated also here.

During 2012, I have been thesis advisor of three master students under the the Swedish International Development Cooperation Agency (SIDA) project for Mathematics: Manishimwe Alexis, Janvier Ndahimana Rukundo , and Jean Harerimana. While in Stockholm, I have also supervised for the Bachelor thesis Niklas Hedberg.

In Autumn 2017, I was *Math Department consultant* and, later, *supervisor* of Jai Aslam, accepted in Sept 2018 for graduate study at North Carolina State University. Finally, I have organized a *Research Experience for Undergraduates*, with Emanuele Macrì and I have the opportunity to mentor and supervise several undergraduate students in their first step in the research world. Currently, I am supervising **Alessio Borzì** for research project.

- Dec 2018 **Experiential Educational Direct Study – Zheyang Yu**, Northeastern University.
Thesis title: 'Introduction to Matroid Theory'.
- Sept 2018 **REU Student – Alon Duvall**, Northeastern University.
Together with Brian Hepler;
- Sept 2018 **REU Student – Timothy Jackman**, Northeastern University.
Together with Whitney Drazen;
- Sept 2018 **REU Student – Walker Miller-Breetz**, Northeastern University.
Together with Rahul Singh;
- Sept 2018 **REU Student – Benjamin Bonenfant**, Northeastern University.
Together with Reuven Hodges;
- Sept 2018 **REU Student – Christina Nguyen**, Northeastern University.
Together with Whitney Drazen;
- July 2018 **REU Student – Zheyang Yu**, Northeastern University.
Together with Celine Bonandrini;
- July 2018 **REU Student – Kevin Su**, Northeastern University.
Together with Jonier Antunes;
- June 2018 **REU Student – Noah Lichtblau**, Northeastern University.
Together with Mikhail Mironov;
- June 2018 **REU Student – Felipe Castellano-Macias**, Northeastern University.
Together with Alex Sorokin;
- May 2017 **BSc thesis advisor of Jai Aslam**, Northeastern University.
Thesis title: 'Group actions on Knots'.
- June 2016 **MSc thesis advisor of Jean Harerimana**, Stockholm University, National University of Rwanda and Linköping University.
Thesis title: 'Some mathematical models for Population Growth and Crowd Motion'.
- Nov 2013 **BSc thesis advisor of Niklas Hedberg**, Stockholm University.
Thesis title: 'Derivation of Runge-Kutta order conditions'.
- Oct 2013 **MSc thesis advisor of Manishimwe Alexis**, Stockholm University, National University of Rwanda and Linköping University.
Thesis title: 'Hausdorff's measure and the Isoperimetric problem'.
- Oct 2013 **MSc thesis advisor of Janvier Ndahimana Rukundo**, Stockholm University, National University of Rwanda and Linköping University.
Thesis title: 'Genetic Algorithms and their applications'.