

Europass Curriculum Vitae

Personal information

Surname(s) / First name(s)

Brunetto Domenico

Education

Feb. 2018

PhD: Mathematical Models and Methods in Engineering

Dipartimento di Matematica, Politecnico di Milano, Milan, Italy.

Title of Dissertation: MOOCs and active learning in mathematics: educational and mathematical modelling for classroom practices

Oct. 2011

Master degree in Mathematics

Università degli studi di Milano Bicocca, Milan, Italy.

Title of Thesis: Mathematical aspects of Computer-aided tomography (CAT)
103/110

Research experience

Apr. 2018 - present

Post-doc at Dipartimento di Matematica, Politecnico di Milano, Milan, Italy.

Development of innovative teaching tools to empower the mathematical thinking among young people living in difficult contexts, with the goal of fostering social inclusion.

Dec. 2017 - Apr. 2018

Scientific collaborator at Laboratorio FDS, Dipartimento di Matematica, Politecnico di Milano, Milan, Italy.

Analysis of students' interactions online (within the Pre-Calculus MOOC) and in classroom.

Nov. 2014 - Nov. 2017

Ph.D. candidate at Dipartimento di Matematica, Politecnico di Matematica.

Scholarship on the topic: "development of MOOC-based teaching techniques for mathematics and other scientific disciplines".

Mar. 2014 - Oct. 2014

Research fellow at Laboratorio FDS, Dipartimento di Matematica, Politecnico di Milano, Milan, Italy.

Design of innovative didactical methodology in order to develop a Pre-Calculus MOOC course.

Mar. 2013- Feb. 2014

Research fellow at Laboratorio MOX, Dipartimento di Matematica, Politecnico di Milano, Milan, Italy.

Developing of mathematical models and algorithms for industrial problems (Crash test phenomena).

Dec. 2011- Feb. 2013

Research fellow at Laboratorio MOX, Dipartimento di Matematica, Politecnico di Milano, Milan, Italy.

Developing of mathematical models and algorithms for industrial problems (Rubber extrusion).

Skill and competence

Mathematics Educations

MOOCs, Flipped Classroom, Active learning, Group work activities, Student attitudes, Teacher attitudes, TPACK, MKT, Formative assessment.

<p>Programming and Software</p>	<ul style="list-style-type: none"> – MS Windows, Linux, Mac iOS. – MS Office suit, L^AT_EX, Scratch, MITAI2, GeoGebra. – Matlab, Scilab, Octave, R. – Bash, Unix, Java, Python, html, php. – Ansys-PolyFlow, LS-Dyna, Paraview, ANSA - Beta CAE system.
<p>Social and Personal</p>	<p>Communication, Time Managing, Teamwork, Organization, Management, Leadership.</p>
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<p>Research Interest</p>	
<p>MOOC</p>	<p>I am studying the effect of MOOCs on math education and how users interact each others. This interest prompts me to design and produce some MOOCs in collaboration with others researchers. In particular, I am one of the authors and the tutor of Pre-Calculus MOOC, designed to prepare students to face STEM programs. (see e.g., publications 3, 11, and 21)</p>
<p>Flipped classroom</p>	<p>My researches in this field regards two aspects: the usage of multimedia during the classroom practices (e.g. flipped classroom) and the affective dimensions which are crucial during the classroom practices (e.g. group work activities) and their planning and managing (e.g. teacher in the context). (see publications 2, 4, 6, 7, 9, 18, and 20)</p>
<p>Group work</p>	<p>Student interactions, during classroom activities, are the core of my research. By interactions, students can learn new mathematical idea solving problems. However, the group work activity is not always positive in terms of learning. My research aims to investigate what are the positive dynamics and how teachers can intervene to improve such activities. (see publications 1, 2, 19, and 20)</p>
<p>Student transition</p>	<p>Understanding the student transition between High School and University is crucial to figure out one of the main causes of student drop out. My research aims at studying both the cognitive aspects (e.g. the mathematical knowledge) and affective dimensions (e.g. the procedural views of mathematics). (see publications 6, 7, 11, 12, 16, and 17)</p>
<p>Network Analysis</p>	<p>Community detection is my main interest in this topic, in particular the design of indexes to better identify medium size networks (e.g. criminal networks), and networks from educational context (e.g forums). (see publications 4, 11, 14, 16, and 17)</p>
<p>Research project</p>	<p>My research project aims at developing an innovative educational trajectory to teach mathematics to young immigrants. The main idea is to expose teenagers to mathematical experiences in order to empower their status of immigrants, helping them to deal with daily needs. The founded idea is that mathematics can play a crucial role in the social integration of disadvantaged students. To that end, a digital learning environment, delivered through a web-app, has been developing. The web-app is composed of scenarios where the teenagers can be in, and each scenario is made of brief tasks strongly characterized by image to aid users to understand the task easily. (see publications 13, and 14)</p>
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<p>Publications</p> <p>International Journals (Scopus - WoS)</p>	<hr/>

1. Brunetto, D., Andrà, C., Parolini, N., & Verani, M. (2018). Student interactions during class activities: a mathematical model. *Communications in Applied and Industrial Mathematics*. 9(2), 91-105. doi:<https://doi.org/10.2478/caim-2018-0011>
2. Andrà, C., Brunetto, D., Parolini, N., & Verani, M. (2018). Four fundamental modes of engaging in mathematics group interactions. *International Journal of Science and Mathematics Education*. 1-21. doi:<https://doi.org/10.1007/s10763-018-09940-5>
3. Brunetto, D., & Magli, G. (2018) An educational project in archeoastronomy: the POK-Coursera MOOC course. *Mediterranean Archaeology and Archaeometry Journal*. 18(4), 469-475. doi:10.5281/zenodo.1477050
4. Brunetto, D., Calderoni, F., & Piccardi C. (2017). Communities in criminal networks: A case study. *Social Network*. 48, 116-125. doi: <https://doi.org/10.1016/j.socnet.2016.08.003>
5. Andrà, C., & Brunetto, D. (2017). The first research paper in Mathematics Education: a beginner and his young mentor talk about their experience. *Canadian Journal of Science, Mathematics and Technology Education*. 1-8. doi: <https://doi.org/10.1080/14926156.2017.1400130>

Other Journals

6. Brunetto, D. (2019). Insegnare matematica a scuola attraverso i video. *L'insegnamento della matematica e delle scienze integrate*. 42A-B(3) (Numero Speciale AIRDM), 282-304.
7. Iaderosa, R., Andrà, C., & Brunetto, D. (2019) Spunti per una "educazione logica" nella formazione matematica pre-universitaria. *L'insegnamento della matematica e delle scienze integrate*. 42B(1), 7-38.
8. Andrà, C., Brunetto, D., Parolini, N., & Verani M. (2018). Una scommessa sulla matematica a scuola. *Nuova secondaria*. 10, 34-37.

Book chapters

9. Brunetto, D., & Kontorovich, I. (2017) Math lessons: from flipped to amalgamated, from teacher - to learner-centered. In: Andrà, C., Brunetto, D., Levenson, E., Liljedahl, P. (eds), *Teaching and Learning in Maths Classrooms. Research in Mathematics Education*. (pp. 119-129). Springer, Charm [WoS]

Editor of contributed books

10. Andrà, C., Brunetto, D., Levenson, E., Liljedahl, P. (eds). (2017). *Teaching and Learning in Maths Classrooms. Research in Mathematics Education*. Springer, Charm. doi:<https://doi.org/10.1007/978-3-319-49232-2> [WoS]

Ph.D. thesis

11. Brunetto. (2018). MOOCs and active learning in mathematics: educational and mathematical modelling for classroom practice. Italy.

Conference papers

International conferences
(with review process and presentation)

12. Andrà, C., Bernardi, G., & Brunetto, D. (2019). Teaching with emerging technologies in a STEM university math class. In Domenech, J., Merello, P., de la Poza, E., Blazquez, D., Peña-Ortiz, R. *Proceedings of 5th International Conference on Higher Education Advance. HEAd'19* (pp. 963-971). Valencia, Spain. Editorial Universitat Politècnica de València.
13. Andrà, C., Brunetto, D., Parolini, N., & Verani, M. (2019). Experiences of empowerment in mathematics. In Andrà, C., Brunetto, D., Martignone, F. *Proceedings of 25th International Conference on Mathematical Views. MAVI25*. (accepted).
14. Bernardi, G., & Brunetto, D. (2019). Using a mathematical forum in a graduate course: the nature of Rick's and John's participation. In *Proceedings of 14th International Conference on Technology in Mathematics Teaching. ICTMT14*. (accepted)
15. Andrà, C., & Brunetto, D. (2019). TEEN-immigrants explore a math mobile app. In *Proceedings of 14th International Conference on Technology in Mathematics Teaching. ICTMT14*. (accepted)
16. Kock, Z.J., Brunetto, D., & Pepin, B. (2019) Students choice and perceived importance of resources in first-year university calculus and linear algebra. In *Proceedings of 14th International Conference on Technology in Mathematics Teaching. ICTMT14*. (accepted)
17. Andrà, C., Brunetto, & D., Repossi, E. (2018). Designing mathematical tasks to promote students' online interaction. In Hans-Georg Weigand, Alison Clark-Wilson, Ana Donevska *Proceedings of 5th ERME topic Conference Mathematics Education in Digital Age. MEDA 2018*. (pp. 27-34). Copenhagen, Denmark. University of Copenhagen.
18. Andrà, C., Brunetto, & D., Kontorovich, I. (2017). There is more than one flipped classroom. In Aldon, G., Trgalova, J. *Proceedings of the 13th International Conference on Technology in Mathematics Teaching. ICTMT13*. (pp. 190-197). France.
19. Brunetto, D., Andrà, C., Parolini, N., & Verani, M. (2015). Teachers' perspective on group dynamics. In *Proceedings of 9th Congress of the European Society for Research in Mathematics Education. CERME9*. (pp. 1309-1310). [poster]. Prague, Czech Republic.
20. Andrà, C., Brunetto, D., Parolini, N., & Verani, M. (2015). 'I can-you can': Cooperation in group activities. *Proceedings of 9th Congress of the European Society for Research in Mathematics Education. CERME9*. (pp. 1109-1115). Prague, Czech Republic.
21. Brunetto, D. & Andrà, C. (2014). What is a "good" Massive open online course?. In Sumpter, L. *Proceedings of 20th Mathematical Views Conference. MAVI20*. (pp. 89-102). Sweden. Högskolan Dalarna.

Presentation and Talk

Conferences and workshops

Seminars
(by invitation)

- I Brunetto, D. (2018). Design Mathematical Activities for mobile app. In *Digital Tools and Mathematical Modelling in Mathematics Education*. Wurzburg, Germany, 2018.
- II Brunetto, D. (2017). Students interaction during classroom practices: a mathematical model. In *XII Seminario Nazionale Giovani*. Rimini, Italy..
- III Alberti, V., Andr , C., Brunetto, D., Lazzati, A., Monastirli, N., Reposi, E., Rezoagli, F. Una flipped classroom, tante classi. In *XXXI Convegno Nazionale Matematica, Didattica e Scuola: fra ricerca e prassi quotidiana*. Castel San Pietro Terme (BO), Italy.
- IV Brunetto, D. Small group students activity: a mathematical model to improve the dynamics. In *2nd Edition of workshop Problems in discrete dynamics*. Arcidosso (GR), Italy.
- V Brunetto, D., Hendrickx, J.M. (2017) The optimal strategy to control a non linear monotone system with unilateral interactions. In *Benelux Meeting on Systems and Control*. Spa, Belgium.
- VI Brunetto D. (2014). A MOOC Project to Reduce Gap Between High School and University. In *20th International Conference on technology supported learning and training. OEB14*. Berlin, Germany.

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- i Brunetto, D. (2019). Design, produce and use (math) contents. In *PhD course: Innovative teaching*. Politecnico di Milano, Milan, Italy.
 - ii Brunetto, D. (2018). Streetmath: The mathematics for young immigrants. In *2Teach seminars*. Politecnico di Milano, Milan, Italy.

Teaching

AY 2019-20

Politecnico di Milano, Milan, Italy

sept. 2019 **Tutor** of Precalculus: Introduction to calculus and geometry (Bridge-Course) - Faculty of Engineering - *32hrs*. [delivered using FlippedClassroom]

1st sem: **Lecturer** of Elements of Mathematics A/B - Architectural Design MAT05, MAT03 - *8cfu*

AY 2018-19

Politecnico di Milano, Milan, Italy

sept. 2018: **Tutor** of Precalculus: Introduction to calculus and geometry (Bridge-Course) - Faculty of Engineering - *32hrs*. [delivered using FlippedClassroom]

1st sem: **Teaching assistant** of Mathematical Analysis (Matlab) - Mathematical Engineering. MAT08 - *8hrs/group, 2 groups*

2nd sem: **Teaching assistant** of Analytic and Numerical Methods for Engineering - Energy Engineering MAT08 - *24hrs*

2nd sem: **Tutor** of Analytic and Numerical Methods for Engineering - Energy Engineering MAT08 - *6hrs*

AY 2017-18	<p>Politecnico di Milano, Milan, Italy</p> <p>sept 2017: Tutor of Precalculus: Introduction to calculus and geometry (Bridge-Course) - Faculty of Engineering - <i>32hrs</i>. [delivered using FlippedClassroom]</p> <p>2nd sem: Teaching assistant of Analytic and Numerical Methods for Engineering - Energy Engineering MAT08 - <i>24hrs</i></p>
AY 2016-17	<p>Politecnico di Milano, Milan, Italy</p> <p>2nd sem: Teaching assistant of Analytic and Numerical Methods for Engineering - Energy Engineering MAT08 - <i>24hrs</i></p>
AY 2015-16	<p>Politecnico di Milano, Milan, Italy</p> <p>sept 2015: Tutor of Precalculus: Introduction to calculus and geometry (Bridge-Course) - Faculty of Engineering - <i>30hrs</i>. [delivered using FlippedClassroom]</p> <p>1st sem: Teaching assistant of Mathematical Analysis and Geometry - Managment and Production Engineering. MAT05, MAT03 - <i>48hrs</i></p>
AY 2014-15	<p>Politecnico di Milano, Milan, Italy</p> <p>sept 2014: Tutor of Precalculus: Introduction to calculus and geometry (Bridge-Course) - Faculty of Engineering - <i>18hrs</i>. [delivered using FlippedClassroom]</p> <p>1st sem: Teaching assistant of Mathematical Analysis and Geometry - Managment and Production Engineering. MAT05, MAT03 - <i>48hrs</i></p> <p>2nd sem: Teaching assistant of Numerical Mathematics - Mathematical Engineering. MAT08 - <i>50hrs</i></p>
AY 2013-14	<p>Politecnico di Milano, Milan, Italy</p> <p>1st sem: Teaching assistant of Mathematical Analysis and Geometry - Managment and Production Engineering. MAT05, MAT03 - <i>48hrs</i></p> <p>2nd sem: Teaching assistant of Numerical Mathematics - Mathematical Engineering. MAT08 - <i>50hrs</i></p>

MOOCs

Apr. 2018 - present	Designer and Instructor of the MOOC: "Equazioni differenziali del secondo ordine" (Second-order linear differential equation) on the platform www.pok.polimi.it . [ITA]
Apr. 2018 - Jan. 2019	Instructor and advisor of the MOOC: "Laboratorio di matematica per architettura" (Mathematics laboratory for architecture) on the platform www.pok.polimi.it . [ITA]
Oct. 2014 - present	Tutor and Moderator of the MOOC: "Introduzione alla matematica per l'università: Precalculus" (Pre-Calculus: introduction to mathematics for the university) on the platform www.pok.polimi.it . [ITA]
Jan. 2016 - Apr. 2016	Designer and tutor of the MOOC: "Archeoastronomy: the science of stars and stones" on the platform www.pok.polimi.it . [ENG]
Sept. 2015 - Dec. 2015	Instructor of the MOOC: "To Flip or Not to Flip - Discover the flipped classroom methodology" on the platform www.pok.polimi.it . [ENG]

<p>Apr. 2015 - Sept. 2015</p> <p>Mar. 2014 - Oct. 2014</p>	<p>Designer, Author and Instructor of the MOOC: “BetOnMath4Citizens: scommetti sulla matematica” (BetOnMath4Citizens, to prevent gambling abuse) on the platform www.pok.polimi.it. [ITA]</p> <p>Designer, Author and Instructor of the MOOC: “Introduzione alla matematica per l’università: Pre-calculus” (Pre-Calculus: introduction to mathematics for the university) on the platform www.pok.polimi.it. [ITA]</p>
<p>Referee</p>	<ul style="list-style-type: none"> - The Open Education Global 2019 Conference “Open Education for an Open Future”. (2019) - The 25th International Conference on Mathematical Views. (2019) - The 14th International Conference on Technology in Mathematics Teaching. (2019) - Interdisciplinary Scientific Conference ‘Higher Education Advances’. (2019) - Interdisciplinary Scientific Conference ‘Mathematical Transgressions’. (2017) - The 10th Congress of European Research in Mathematics Education - Thematic Group Work TW14 (CERME10). (2017) - Canadian Journal of Science, Mathematics and Technology Education. (2016) - The 21st International Conference on Mathematical View (MAVI21) (2015) - The 9th Congress of European Research in Mathematics Education - Thematic Group Work TW8 (CERME9). (2015) - The 20th International Conference on Mathematical View (MAVI20). (2014)
<p>Committee</p> <p>Mar. 2019 - present</p> <p>Mar. 2019 - present</p> <p>Nov. 2018 - present</p> <p>Jun. 2015 - Jun. 2016</p>	<p>Member of high school committee of the Engineering faculty of Politecnico di Milano.</p> <p>Member of program committee of Open Education Global 2019 Conference “Open Education for an Open Future”.</p> <p>Member of scientific and organization committee of 25th International Conference on Mathematical View (MAVI25).</p> <p>Member of scientific and organization committee of 21st International Conference on Mathematical View (MAVI21).</p>
<p>Other Activities</p> <p>Feb. 2019 - present</p> <p>Mar. 2015 - June 2018</p> <p>Sept. 2015 - present</p> <p>June. 2017 - Sept. 2017</p> <p>Jan. 2015 - Sept. 2017</p> <p>June. 2015 - Jan. 2016</p> <p>Feb. 2016</p>	<p>Designer and Coordinator of Innovative teaching for Mathematical Analysis for Engineering. Faculty of Engineering of Politecnico di Milano. MAT05 - <i>24courses, 1cfu/course</i></p> <p>Author, Designer and Tutor of “XpLab: maths beyond a click”. An activity dedicated to high school students to teach the mathematics of raster graphics editors.</p> <p>Member and co-coordinator of local unit of PLS project. “Progetto Lauree Scientifiche”, national project devoted to foster students to enrol to scientific program.</p> <p>Author, Designer and Tutor of “MATEC: mathematics for technical school”. A workshop dedicated to students from technical high school to introduce mathematical modelling.</p> <p>Author and Instructor of the “FlipMath” project, devoted to teachers who are interested in carrying out flipped classroom.</p> <p>Designer and Instructor of “Warning: MathInside”. A project to introduce mathematical modelling to high school programs.</p> <p>Co-advisor - Bachelor thesis: <i>Thermal optimization of an electronic board by optimal control theory and FEM</i>. Candidate: Carriero Simone.</p>

Aug. 2014 - Dec. 2015

Member of local unit and **designer** of the mathematical activities in the context of ECO project. Elearning, Communication and Open-data: Massive Mobile, Ubiquitous and Open Learning. *Project funded by ICT Policy Support Programme as part of the Competitiveness and Innovation framework Programme (CIP)*

Oct. 2018 - present

Member of UMI (Unione matematica italiana)

Feb. 2016 - present

Member of AIRDM (Associazione Italiana di Ricerca in Didattica della Matematica)

Sept. 2012 - Sept. 2018

Author, Designer and Tutor of several labs and activities to communicate science and math at *MeetMeTonight*, the national research exhibition.

Autorizzo il Politecnico di Milano a pubblicare il presente curriculum sul sito WEB di Ateneo, ai fini istituzionali e in ottemperanza al D. Lgs n. 33 del 14 marzo 2013 "Decreto trasparenza" come modificato dal D. Lgs. 97 del 2016

Milano, 20/04/2020

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