

CRISTINA SABENA - CURRICULUM VITAE

PERSONAL INFORMATION

Birth date: May 12, 1978

Nationality: Italian

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CURRENT POSITION

Full Professor in Mathematics Education at the Department of Philosophy and Education, University of Torino, Italy.

STUDIES

- March 18, 2002: Master degree in Mathematics with full marks, 110/110 cum laude, University of Torino (Italy). Title of the thesis: "Meaning construction of the integral starting from measure promems (La costruzione di significato di integrale a partire da problemi di misura)". Supervisor: Prof. O. Robutti.
- February 19, 2007: PhD title in Mathematics, University of Torino (Italy). PhD thesis titled "Body and Signs: A Multimodal Semiotic Approach to Teaching-Learning Processes in Early Calculus". Supervisors: Proff. F. Arzarello and L. Radford.

GRANTS AND COMPETITIONS

- October 2002: I win "Premio Optime (Menzione)" of the Industrial Union (Unione Industriale) to best graduated students of the University of Torino and Polytechnique of Torino.
- October 2002: I win a PhD grant in the competition in the University of Torino and I enter the PhD program.
- March 2007: I win post-doc grant at the Department of Mathematics and Computer science of the University of Siena, within the European Project "Representing Mathematics with Digital Media" (ReMath). Local Unit Coordinator: Prof. M.A. Mariotti.
- February 2008: I win a Post-doc grant, Department of Mathematics, University of Torino, with the research program: "Elaboration of a model of mathematics learning processes with the use of ICT technologies". Supervisor: Prof. F. Arzarello.
- October 2010: I win Premio Giorgio Tomaso Bagni (second position) of the Research Center "U. Morin" to the best research works in Mathematics Education produced by Italian young researchers, with the paper: 'On the semiotics of gestures'.
- December 2010: I win a permanent position at the University of Torino, as Research Assistant in Mathematics Education (MAT/04 Matematiche Complementari).
- April 2019: National Scientific Qualification as Full Professor in Mathematics Education (Abilitazione Scientifica Nazionale alle funzioni di professore di prima fascia per il settore concorsuale 01/A1 – Logica Matematica e Matematiche Complementari).

SCIENTIFIC POSITIONS AND INVITATIONS

- September 2004 to May 2005: I was invited by prof. L. Radford at the *Laboratoire de recherche en sémiotique culturelle et pensée mathématique*, École du sciences de l'éducation, Laurentian University (Sudbury, CA). I contributed to theoretical and methodological aspects of the theory, as

the several co-authored publications witness. My stay has been supported by a grant of the Project “*Artefact-Mediated Kinaesthetic Actions, Semiotic Activity, and Algebraic Thinking*” funded by the Conseil de Recherche en Sciences Humaines du Canada CRSH / Social Sciences and Humanities Research Council of Canada SSHRC. (Subvention ordinaire de recherche).

- Team Member of the Topic Study Group 37: Theoretical Issues in Mathematics Education at the 12th International Congress on Mathematical Education (ICME-12), Seoul, 8-15 July 2012.
- Member of the International Scientific Committee of 11th International Conference for Technology in Mathematics Teaching (ICTMT11), held in Bari, July 8-12, 2013.
- Board member of ERME (European Society for Mathematics Education), from February 2013.
- Local Organizer for CIEAEM65 Conference, Torino 22-26 July 2013.
- Member of CIEAEM (Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques), from July 2013, and Secretary from July 2017.
- International Program Member for CIEAEM66 Conference, Lyon 23-27 July 2014.
- Scientific and Local Organizer for the VII and VIII Convegno Di.Fi.Ma., Torino, 2015 and 2017.
- Member of the International Program Committee for CERME10, Dublin 1-5 February 2017.
- Since June 2017 member of the Executive Committee of Associazione Subalpina Mathesis and since 29/11/2018 President of the same association, aimed at scientific dissemination and teacher training in the Piedmont region (Italy).
- Since July 2017 Secretary of CIEAEM (Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques), an ICMI affiliated association.
- From January 2019 to March 2022 member of the Executive Committee of AIRDM (Italian Association for Research in Didactics of Mathematics).
- Member of the International Program Commission for ICTMT 14, Essen 22-25 July 2019.
- Member of the GEV (Groups of Experts for Evaluation) for the research quality assessment (VQR) 2015-2019 for Area 1 - Mathematical and Informatics Sciences (draw of 17 September 2020) on behalf of the Italian National Agency for the Evaluation of the University System and Research (ANVUR).
- Chair for the Topic Study Group 23 – Visualization in the Teaching and Learning of Mathematics, at ICME-14 (14th International Congress on Mathematics Education), Shanghai and online, 11-18 July 2021.
- Since October 2021 member of the CIIM (Italian Commission for the Teaching of Mathematics), an organ of the UMI (Italian Mathematical Union).
- Since 14 September 2022 member of the Executive Committee of the Italian Mathesis Federation and since 30 November 2022 Vice-President of the same association, aimed at the coordination of Mathesis Associations on the national territory (scientific dissemination and teacher training).
- Member of the International Program Committee per ICME-15 (15th International Congress on Mathematics Education), Sydney 7-14 July 2024.
- Elected for the ICMI (International Commission on Mathematical Instruction) Executive Committee in July 2024.

PRINCIPAL INVESTIGATOR IN INTERNATIONAL PROJECTS

January 2014 – December 2016. Principal Investigator of the European Project FaSMEd - Formative Assessment in Science and Mathematics Education (FP7, project number 612337).

MEMBER IN SCIENTIFIC NATIONAL AND INTERNATIONAL RESEARCH PROJECTS

- *PRIN03 – Concepts and proofs in mathematics: meanings, models, theories* (n. 2003011072). Funded by Italian MIUR. University of Torino.
- *PRIN05 – Meanings, conjectures, proofs: from embodied cognition research to curricular implications* (n. 2005019721). Funded by Italian MIUR. University of Torino.
- *PRIN07 - Instruments and representations in teaching-learning mathematics: theory and practice* (n. 2007B2M4EK). Funded by Italian MIUR. University of Torino.
- *European Project ReMath ‘Representing Mathematics with Digital Media’* (n. IST4-26751). 2007-2009 University of Siena, Dep. Mathematics and Computer Science.
- *Artefact-Mediated Kinaesthetic Actions, Semiotic Activity, and Algebraic Thinking*. Funded by the Conseil de Recherche en Sciences Humaines du Canada CRSH / Social Sciences and Humanities Research Council of Canada SSHRC. (Subvention ordinaire de recherche). 2004 – 2007 Laurentian University, Sudbury (CA).
- *Eye tracking Project: MIUR–Inter-University Cooperation with Sweden (INTERLINK Project); Torino-Lund* (A.F. 2006-CAP. 1712). 2007 - 2009 University of Torino.
- 1/1/2018 – today Scientific consultant for the project *Teaching-Learning Mathematics of Change in an Environment that Stimulates Scientific Inquiry Using Augmented Reality Technology*, Ben Gurion University, Research Grant Application no. 1089/18 (scientific responsibility by prof. Osama Swidan and Prof. Michael Fried).
- 1/3/2020 – today Scientific consultant for the project *Reasoning and proving in primary education*, funded by the Research council of Norway (project number 301402), Norwegian University of Science and Technology, Trondheim, NO.
- 1/1/2023 – 31/12/2025 Team Member for the EU Horizon project *TransEET - Transforming Education with Emerging Technologies* (Project ID 101078875), University of Torino.

EDITORIAL BOARDS AND REVIEWS

- From January 2024 Associate Editor of the Journal *Educational Studies in Mathematics*.
- From October 2016 to December 2023 member of the Editorial Board of the Journal *Educational Studies in Mathematics*.
- From November 2020 member of the Editorial Board of the Journal *Recherches en Didactique des Mathématiques*.
- From October 2020 member of the Editorial Board of the Journal *RdM-Didattica della matematica. Dalla ricerca alle pratiche d’aula*.
- Reviewer for the following journals:
 - *International Conference PME - Psychology of Mathematics Education* (from 2007)
 - *Journal for Research in Mathematics Education* (from October 2008)
 - *International Journal of Science and Mathematics Education* (from February 2013)
 - *Gesture* (from November 2016).

CONTRIBUTION TO INTERNATIONAL CONFERENCES

I contributed with one or more paper presentations to the following Conferences (all with peer-review process):

- CERME (Conference of the European Society for Research in Mathematics Education): 2005, 2007, 2009, 2011, 2013, 2017, 2021.
- CIEAEM conference (Commission Internationale pour l'Etude et l'Amélioration de l'Enseignement des Mathématiques): 2003, 2012, 2013, 2014, 2015, 2016, 2018.

- CME conference (Children’s Mathematical Education): 2010.
- ICME (International Congress on Mathematical Education): 2004, 2008, 2012, 2016 (Invited Lecture), 2021, 2024.
- ICMI Study 19 conference: Proof and Proving in Mathematics Education, May 10-15, 2009, Taipei (Taiwan).
- ICTMT (International Conference on Technology in Mathematics Teaching): 2013, 2017.
- *Interacting Bodies conference* (2nd Conference of the International Society for Gesture Studies (ISGS)): 2005.
- MAVI Conference (Mathematical Views): 2009, 2010, 2015.
- PME (Annual Conference of the International Group for the Psychology of Mathematics Education): 2004, 2005, 2009, 2010, 2011, 2013, 2014, 2015, 2016, 2018, 2022.

PUBLICATIONS

I am author and co-author of several scientific publication of international relevance (with referee). In the official University ranking I have been ranked “A level” (namely best class).

The current list of my *peer-reviewed publications* (from the most recent ones) is the following:

- Casi, R., & Sabena, C. (2024). Mathematics in Art and History Museums: An Informal Mathematics Education Case for Teachers’ In-service Training. *Education Sciences*, 14(5) 489. <https://doi.org/10.3390/educsci14050489>.
- Sabena, C. & Schäfer, M. (2023). Visualizazion and Semiotics. A Case for Gestures. In M. Schäfer, (Ed.), *Visualization and Epistemological Access to Mathematics Education in Southern Africa*, Routledge.
- Casi, R., Sabena, S., Borsero, M., Pizzarelli, C. (2023). Circonferenze e spirali in un percorso di educazione matematica informale tra scuola e museo. *Didattica della matematica. Dalla ricerca alle pratiche d'aula*, 14, 30-58. <http://dx.doi.org/10.33683/ddm.23.14.2>.
- Soldano, C. & Sabena, C. (2023). “Ti sfido in altezza”: da un gioco-indagine in ambiente di geometria dinamica alla discussione di attributi critici delle figure. *DDM-Didattica della Matematica*,13, 57-69, <https://doi.org/10.33683/ddm.23.13.3>.
- Albano, G., Pierri, A. & Sabena, C. (2022). Grasping criteria for success: engaging undergraduate students in formative feedback by means of digital peer workshops. *Teaching Mathematics and its Applications: An International Journal of the IMA*, 1-20, hrac012, <https://doi.org/10.1093/teamat/hrac012>. Online ISSN 1471-6976, Print ISSN 0268-3679.
- Robutti, O., Sabena, C., Krause, C., Soldano, C., Arzarello, F. (2022). Gestures in Mathematics Thinking and Learning. In M. Danesi (ed.). *Handbook of Cognitive Mathematics* (pp. 1-42). Springer, Cham. https://doi.org/10.1007/978-3-030-44982-7_8-1.
- Soldano, C., Sabena, C. (2022). Enhancing reflection on the critical attributes of the figures: the height challenge game. In C. Fernández, S. Llinares, A. Gutiérrez, & N. Planas (Eds.), *Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, pp. 11-18). PME.
- Chan, M.C., Sabena, C. & Wagner, D. (2021). Mathematics education in a time of crisis—a viral pandemic. *Educational Studies in Mathematics*, Volume 108, issue 1-2, pp. 1-13. Open access
- Ferri, F., Martignone, F., Robotti, E. & Sabena, C. (2020). Educare ad argomentare in matematica: problemi aritmetici nella scuola primaria. *Archimede*, 4/2020, 245–251. Le Monnier. ISBN: 9788800881319.
- Swidan, O., Sabena, C. & Arzarello, F. (2020). Disclosure of mathematical relationships with a digital tool: a three layer-model of meaning. *Educational Studies in Mathematics*, 103, 83–101. <https://doi.org/10.1007/s10649-019-09926-2>.

- Maffia, A., & Sabena, C. (2020). On the mathematics teacher's use of gestures as pivot signs in semiotic chains. *For the Learning of Mathematics*, 40(1), 15-21.
- Albano, G. & Sabena, C. (2020). E-learning for fostering the growth of students responsible for their own learning: didactic organization and theoretical reflections. *Quaderni di Ricerca in Didattica, Numero speciale n. 8 - "E-learning e matematica nella formazione universitaria e post-universitaria: da buone pratiche a linee di ricerca"*, 9-20. ISSN 1592-5137.
- Carotenuto, G., Mellone, M., Sabena, C. & Lattaro, P. (2020). Un progetto di educazione matematica informale per prevenire la dispersione scolastica. *Matematica, Cultura e Società – Rivista dell'Unione Matematica Italiana*, Serie 1, Vol. 5, N° 2, agosto 2020, 157-172. ISSN 2499-751X.
- Ferri, F., Martignone, E., Robotti, E. & Sabena, C. (2020). Interpretare dati, discutere e riflettere insieme: esperienze didattiche in IV e V primaria. *Didattica della matematica. Dalla ricerca alle pratiche d'aula*. Online www.rivistadm.ch, 2020 (8), 82 - 108, DOI: <https://doi.org/10.33683/ddm.19.6.4> ISSN 2504-3210.
- Sabena, C., Albano, G., Pierri, A. (2020). Formative assessment workshops as a tool to support pre-service teacher education on argumentation. *Proceedings of CIEAEM 71, Braga 22-26 July 2019, Quaderni di Ricerca in Didattica (Mathematics)*, special issue 7, 2020, pp. 205-216. ISSN: 1592-4424. http://math.unipa.it/%7Egrim/quaderno_2020_numspecc7.htm.
- Swidan, O., Schacht, F., Sabena, C., Fried, M., El-Sana, J. & Arzarello, F. (2020). Engaging students in covariational reasoning within an augmented reality environment. In T. Prodromou (ed.), *Augmented Reality in Educational Settings* (pp. 147-167). Leiden/Boston: Brill|Sense Education. <https://brill.com/view/title/55719?lang=en> ISBN 978-90-04-40882-1 (paperback); ISBN 978-90-04-40883-8 (hardback); ISBN 978-90-04-40884-5 (e-book).
- De Simone, M. & Sabena, C. (2020). Making choices and explaining them: an experiment with strategy games in kindergarten. In M. Carlsen, I. Erfjord, P.S. Hundeland, (Eds.), *A Mathematics Education in the Early Years. Results from the POEM4 Conference*, (pp. 143-159). Springer Nature: Cham, Switzerland. 2018 Kristiansand, Norway 29-30 May 2018. ISBN 978-3-030-34776-5. 10.1007/978-3-030-34776-5.
- Albano, G., Pierri, A. & Sabena, C. (2020). Enhancing formative assessment practices in undergraduate courses by means of online workshops. In B. Barzel, R. Bebernik, L. Göbel, M. Pohl, H. Ruchniewicz, F. Schacht, D. Thurm (eds.), *Proceedings of the 14th International Conference on Technology in Mathematics Teaching - ICTMT 14* (p. 155-162). Essen, Germany, 22nd to 25th of July 2019.
- Cusi, A., Sabena, C. (2020). The role of the teacher in fostering students' evolution across different layers of generalization by means of argumentation. *RECME-Revista Colombiana de Matemática Educativa*, 5 (2), pp. 93-105. ISSN 2500-5251, <http://funes.uniandes.edu.co/22718>. open
- Soldano, C., Sabena, C. (2019). Fostering critical thinking in primary school within dynamic geometry environments. In: B. Di Paola, Y. Aberkane, F. Cerquetti (Eds.), *Mathematics and living together: social process and didactic principle*, Proceedings of CIEAEM 70, Mostaganem 15-19 July 2018, Quaderni di Ricerca in Didattica, special issue 3, 73-79. ISSN 1592-4424. http://math.unipa.it/%7Egrim/quaderno_2019_numspecc3.htm.
- Soldano, C., Sabena, C. (2019). Exploring non-prototypical configurations of equivalent areas through inquiring-game activities within DGE. In: U. T. Jankvist, M. van den Heuvel-Panhuizen, & M. Veldhuis (Eds.), *Proceedings of CERME 11-Eleventh Congress of the European Society for Research in Mathematics Education* (pp. 2949-2956). Utrecht, the Netherlands: Freudenthal Group & Freudenthal Institute, Utrecht University and ERME. 6-10 febbraio 2019.
- Cusi A., Morselli F., Sabena C. (2019) The Use of Polls to Enhance Formative Assessment Processes in Mathematics Classroom Discussions. In: G. Aldon & J. Trgalová (eds.) *Technology in Mathematics Teaching. Mathematics Education in the Digital Era*, vol 13 (pp. 7-30). Springer, Cham. ISBN 978-3-030-19740-7.

- Sabena, C. (2018). Multimodality and the semiotic bundle lens: a constructive resonance with the theory of objectification. *PNA. Revista de Investigación en Didáctica de la Matemática*, vol 12, n° 4, pp. 185-208. ISSN: 1887-3987.
- Sabena, C. (2018). Exploring the contribution of gestures to mathematical argumentation processes from a semiotic perspective. In G. Kaiser, H. Forgasz, M. Graven, A. Kuznia, E. Simmt & B. Xu (Eds.), *Invited Lectures from the 13th International Congress on Mathematics Education* (pp. 541-559). Springer Open.
- Cusi, A., Morselli, F. and Sabena, C. (2018). The use of digital technologies to enhance formative assessment processes. In D.R. Thompson, M. Burton, A. Cusi, D. Wright (Eds.), *Classroom assessment in mathematics. Perspectives from around the globe* (pp. 77-92). ICME-13 Monographs. Springer.
- Sabena, C. (2017). Early child spatial development: a teaching experiment with programmable robots. In G. Aldon, F. Hitt, L. Bazzini & U. Gellert (eds.), *Mathematics and technology: a C.I.E.A.E.M. source book* (pp. 13-30). Springer Series 'Advances in Mathematics Education'.
- Cusi, A., Morselli, F., and Sabena, C. (2017). Promoting formative assessment in a connected classroom environment: design and implementation of digital resources. *ZDM Mathematics Education*, 49:755–767.
- Radford, L., Arzarello, F., Edwards, L., and Sabena, C. (2017). The Multimodal Material Mind: Embodiment in Mathematics Education. In J. Cai (Ed.), *Compendium for Research in Mathematics Education* (pp. 700-721). Reston, VA: National Council of Teachers of Mathematics.
- Cusi, A., Morselli, F., and Sabena, C. (2017). Promuovere strategie di valutazione formativa in Matematica con le nuove tecnologie: l'esperienza del progetto FaSMEd. *Annali online della Didattica e della Formazione Docente, Vol 9, N° 14, Strategie e metodologie didattiche in Matematica e nelle Scienze*, pp. 91-107.
- Cusi, A., Morselli, F. & Sabena, C. (2017). "Every time I fell down (made a mistake), I could get up (correct)": affective factors in formative assessment practices with classroom connected technologies. In C. Andrà, D. Brunetto, E. Levenson & P. Liljedahl, (Eds.), *Teaching and Learning in Maths Classrooms: Emerging Themes in Affect-related Research: Teachers' Beliefs, Students' Engagement and Social Interaction (Research in Mathematics Education)* (pp. 265-275). Dordrecht, Heidelberg, New York, London: Springer.
- Aldon, G., Cusi, A., Morselli, F., Panero, M & Sabena, C. (2017). Formative assessment and technology: reflections developed through the collaboration between teachers and researchers In G. Aldon, F. Hitt, L. Bazzini & U. Gellert (eds.), *Mathematics and technology: a CIEAEM source book* (pp. 551-578). Springer Series 'Advances in Mathematics Education'. Radford, L., Arzarello, F., Edwards, L., and Sabena, C. (2017). The Multimodal Material Mind: Embodiment in Mathematics Education. In J. Cai (Ed.), *Compendium for Research in Mathematics Education* (pp. 700-721). Reston, VA: National Council of Teachers of Mathematics.
- Panero, M., Arzarello, F. & Sabena, C. (2016). The mathematical work with the derivative of a function: teachers' practices with the idea of "generic". In I. M. Gómez-Chacón, L. Vivier (Eds.) *Mathematical work: the role of teacher, knowledge and interactions. Boletim de Educação Matemática (BOLEMA)*, 30(54), 265-286. DOI: <http://dx.doi.org/10.1590/1980-4415v30n54a13>.
- Maffia, A., & Sabena C. (2016). Teacher gestures as pivot signs in semiotic chains. In C. Csikos, A. Rausch, & J. Sztányi (Eds.), *Proceedings of the 40th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 3, pp. 235-242). Szeged, Hungary: PME.
- Sabena, C., Krause, C. & Maffia, A. (2016). L'analisi semiotica in ottica multimodale: dalla costruzione di un quadro teorico al networking con altre teorie. *Relazione al XXXIII Seminario Nazionale di ricerca in didattica della matematica Giovanni Prodi, Rimini 28-30 Gennaio 2016*. http://www.airdm.org/sem_naz_2016_25.html.

- Sabena, C. (2015). La concettualizzazione spaziale nel bambino: una sperimentazione con un robottino programmabile. *L'insegnamento della matematica e delle scienze integrate*, vol. 38 A-B, n°3 (maggio-giugno 2015), pp. 213-234.
- Aldon, G. & Sabena, C. (2015). Formative assessment in the FaSMEd project: reflections from classroom experiences. In C. Sabena, B. Di Paola (eds.), *Teaching and learning mathematics: resources and obstacles, Proceedings of CIEAEM 67, Quaderni di ricerca didattica*, 25-2 (pp. 83-86). Aosta, July 20-24, 2015. http://math.unipa.it/~grim/CIEAEM%2067_Pproceedings_QRDM_Issue%2025_Suppl.2.pdf
- Maffia, A. & Sabena, C. (2015). Networking of theories as resource for classroom activities analysis: the emergence of multimodal semiotic chains. In C. Sabena, B. Di Paola (eds.), *Teaching and learning mathematics: resources and obstacles, Proceedings of CIEAEM 67, Quaderni di ricerca didattica*, 25-2 (pp. 405-417). Aosta, July 20-24, 2015. http://math.unipa.it/~grim/CIEAEM%2067_Pproceedings_QRDM_Issue%2025_Suppl.2.pdf
- Aldon, G., Cusi, A., Morselli, F., Panero, M., & Sabena, C. (2015). Which support technology can give to mathematics formative assessment? The FaSMEd project in Italy and France. In C. Sabena, B. Di Paola (eds.), *Teaching and learning mathematics: resources and obstacles, Proceedings of CIEAEM 67, Quaderni di ricerca didattica*, 25-2 (pp. 631-641). Aosta, July 20-24, 2015. http://math.unipa.it/~grim/CIEAEM%2067_Pproceedings_QRDM_Issue%2025_Suppl.2.pdf.
- Bazzini, L. & Sabena, C. (2015). Participation in mathematical problem-solving through gestures and narration. In U. Gellert, J. Giménez, C. Hahn, S. Kafoussi (Eds.), *Educational Paths to Mathematics: A C.I.E.A.E.M Sourcebook*. Cham: Springer.
- Radford, L. & Sabena, C. (2015) The Question of Method in a Vygotskian Semiotic Approach. In A. Bikner-Ahsbabs, C. Knipping & N. Presmeg (Eds.), *Approaches to Qualitative Research in Mathematics Education. Examples of Methodology and Methods* (pp. 157-182). Springer: Dordrecht, Heidelberg, New York, London.
- Morselli, F. & Sabena, C. (2015). "Let's play! Let's try with numbers!": Pre-service teachers' affective pathways in problem solving. In K. Krainer & N. Vondrova (Eds.), *Proceedings of CERME9* (pp. 1231-1237). Prague: Charles University in Prague, Faculty of Education and ERME. <https://hal.archives-ouvertes.fr/CERME9>.
- Panero, M., Arzarello, F. & Sabena, C. (2015). Practices of Italian teachers with the derivative concept: a problematic meeting between Algebra and Analysis in secondary school.. pp. 605-617. In *Mathematical Working Space, Proceedings Fourth ETM Symposium*.
- Coppola, C., Di Martino, P., Pacelli, T & Sabena, C. (2015). Crucial events in pre-service primary teachers' mathematical experience. In K. Beswick, T. Muir, J. Wells. (Eds.), *Proceedings of PME39, Vol 2* (pp. 193-200). Hobart, Australia: PME.
- Andrà, C., Lindström, P., Arzarello, F., Holmqvist, K., Robutti, O., Sabena, C. (2015). Reading mathematics representations: an eye-tracking study. *International Journal of Science and Mathematics Education*, Volume 13, Issue 2, pp 237-259.
- Sabena, C. (2014). Early childhood spatial development through a programmable robot. In G. Aldon, B. Di Paola, C. Fazio (2015). *Mathematics and reality, Proceedings of CIEAEM 66, Quaderni di Ricerca in didattica*, 24(1), pp. 265-278. http://math.unipa.it/~grim/quaderno24_suppl_1.htm.
- Sabena, C. (2014). La concettualizzazione spaziale nella scuola dell'infanzia. In G. Cerrato, C. Sabena, E. Scalenghe (Eds.), *L'apprendimento nella scuola dell'infanzia. Riflessioni teoriche ed esperienze didattiche* (pp. 109-126). Roma: Aracne Editrice.
- Sabena, C. (2014). Description of the data: Introducing the session of Carlo, Giovanni and the exponential function. In A. Bikner-Ahsbabs & S. Prediger (Eds.), *Networking of Theories as a Research Practice in Mathematics Education*. ZDM-Series Advances in Mathematics Education (pp. 13-28). New York: Springer.

- Arzarello, F. & Sabena, C. (2014). Analytic-Structural Functions of Gestures in Mathematical Argumentation Processes. In L.D. Edwards, F. Ferrara & D. Moore-Russo (Eds.), *Emerging perspectives on gesture and embodiment* (pp. 75-103). Charlotte, NC (US): Information Age Publishing, Inc.
- Arzarello, F. & Sabena, C. (2014). Introduction to the approach of Action, Production and Communication (APC). In A. Bikner-Ahsbahs & S. Prediger (Eds.), *Networking of Theories as a Research Practice in Mathematics Education* (pp. 31-45). ZDM-Series Advances in Mathematics Education. New York: Springer.
- Martignone, F. & Sabena, C. (2014). Analysis of argumentation processes in strategic interaction problems. In P. Liljedahl, C. Nicol, S. Oesterle, & D. Allan (Eds.). *Proceedings of the Joint Meeting of PME 38 and PME-NA 36*, Vol. 1, pp. 218-223. Vancouver, Canada: PME.
- Morselli, F. & Sabena, C. (2014). Emozioni e risoluzioni di problemi di matematica. Un'indagine sui futuri insegnanti della scuola dell'infanzia e primaria. *Pedagogia e Vita*, 72(2014), pp. 183-200.
- Dreyfus, T., Sabena, C., Kidron, I., & Arzarello, F. (2014). The Epistemic Role of Gestures – A case study on networking of APC and AiC. In A. Bikner-Ahsbahs & S. Prediger (Eds.), *Networking of Theories as a Research Practice in Mathematics Education* (pp. 127-151). ZDM-Series Advances in Mathematics Education. New York: Springer
- Sabena, C., Arzarello, F., Bikner-Ahsbahs, A., & Schäfer, I. (2014). The epistemological gap - A case study on networking of APC and IDS. In A. Bikner-Ahsbahs & S. Prediger (Eds.), *Networking of Theories as a Research Practice in Mathematics Education. ZDM-Series Advances in Mathematics Education* (pp. 179-200). New York: Springer.
- Bikner-Ahsbahs, A., Sabena, C., Arzarello, F., Krause, C. (2014). Semiotic and theoretic control within and across conceptual frames. In P. Liljedahl, C. Nicol, S. Oesterle, & D. Allan (Eds.). *Proceedings of the Joint Meeting of PME 38 and PME-NA 36*, Vol. 2, pp. 153-160. Vancouver, Canada: PME. <http://www.pme38.com/>.
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- Multimodality and semiotics in mathematics classroom processes;
- Mathematics education from early grades to primary school, with special attention to the development of theoretical thinking through argumentation;
- Formative assessment and argumentation in the mathematics classroom;
- The mediation of technology in mathematics learning and proposals for teaching sequences;

ACADEMIC TEACHING

- Tenureship of several courses of Mathematics Education at Faculties of Education of the University of Torino and the University of Valle d'Aosta, from 2006.
- Lecturer at several Undergraduate, Master and PhD courses and at the Department of Mathematics of the University of Torino.
- Professor at the Doctorate School in Science and Technology of the University of Torino.
- Supervision or Co-supervision of 3 PhD thesis in Mathematics Education.

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