

Curriculum Vitae

Prof. Alessandro Sacchetti

PERSONAL DATA

Name: Alessandro Sacchetti
Date of Birth: 09/01/1972
Place of Birth: Novara, Italy
Citizenship: Italian
Mother language: Italian
Other languages: English

Work Address: Department of Chemistry, Materials, and Chemical Engineering "G. Natta"
Politecnico di Milano
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EDUCATION

1998 **Laurea in Chemistry**
Department of Organic Chemistry
University of Milan, Italy
Evaluation: 106/110

1998-1999 **Fellowship** funded by the company Indena S.p.A. for research on the synthesis of compounds with pharmacological activity (betulin derivatives)
Department of Organic Chemistry
University of Milan
Supervisor: Prof. Bruno Danieli

1999-2002 **Ph.D. in Chemical Sciences**
Department of Organic Chemistry
University of Milan, Italy
Advisor: Prof. Giordano Lesma
Ph.D. title: Solid-phase synthesis of nitrogen-based molecules for biological and chemical applications.

2002 **Visiting PhD student at the University of Barcelona**
Department of Chemistry
Advisor: Prof. M.A. Pericàs
Synthesis of ligand for asymmetric catalysis.

2003 **Fellowship** funded by COMBIGEN consortium on the "Synthesis of chemical libraries and their use in the selection of antibacterial and antiproliferative compounds: library of 1,2,3,4-tetrahydro- β -carboline derived from 5-hydroxy-tryptophan"
Department of Organic Chemistry
University of Milan
Supervisor: Prof. Bruno Danieli

2004-2006 **Fellowship** funded by MIUR on the "Synthesis of new chiral diazotate ligands and their application in homogeneous and heterogeneous asymmetric catalysis"
Department of Organic Chemistry
University of Milan
Supervisor: Prof. Bruno Danieli

2006	Fellowship funded by the company Sanofi S.p.A. for research on the synthesis of compounds with pharmacological activity. Department of Organic Chemistry University of Milan Supervisor: Prof. Giordano Lesma
2007-2008	Fellowship funded by the company Indena S.p.A. for research on the synthesis of compounds with pharmacological activity Department of Organic Chemistry University of Milan Supervisor: Prof. Bruno Danieli
2008-2015	Resarcher – Assistant professor Department of Chemistry, Materials and Chemical engineering Polytechnic of Milan
2015-today	Associate professor Department of Chemistry, Materials and Chemical engineering Polytechnic of Milan

RESEARCH ACTIVITY

The research activity is in the field of organic chemistry, in particular in the application of organic synthesis in different field.

- Synthesis of natural products and potentially bio-active molecules In this field different natural compounds belonging to the family of alkaloids has been prepared with different synthetic strategies. In all cases a key feature was the realization of the stereo or enantioselective synthesis, mainly by means of biocatalytic tools for the dissymmetrization of prochiral molecules. An important part of these studies has been devoted to the design and synthesis of peptidomimetics, with the aid of computational tools. Taking inspiration from this experience, the design and synthesis of new molecules with antimicrobial activity has been realized. Further, the synthesis of structurally complex heterocycles has been realized with the use of multicomponent reactions or solid phase techniques.
- Synthesis of ligand for metal coordination. In this field the application of the bispidine scaffold has been investigated. Different bispidine derivatives, both chiral and achiral has been realized and investigated for the coordination of different metals. These structures have been mainly used as catalyst for organic transformations.
- Chemical modification of materials for biomedical applications. In this field, the activity was related to the chemical modification of organic polymers to obtain functionalized materials as hydrogel or nanogels for medical applications. In particular, these modifications were aimed to obtain a controlled release or a selective uptake within the cells.
- Chemical modification of materials for the chemical catalysis. In this case, amino-based polymers as PEI have been engineered to produce new materials for catalytic organic transformations. PEI has been cross-linked with different agents or formulated with other polymer as nanocellulose to obtain the final materials. The loading of different metals on these hybrid materials has also been successfully realized to produce very effective metal based heterogeneous catalysts.

Dissemination.

Co-author of 115 original peer-reviewed papers ($H_{index} = 27$, April 2023), which have collected more than 2100 citations (source Scopus, <https://orcid.org/0000-0002-4830-0825>).

3 invited lectures and several other oral and poster communications at national and international meetings.

Member of AICInG Association and founding member of the Division "Chemistry for Technologies" of Italian Chemical Society (SCI). Moreover, he is an active affiliate to INSTM, the National Interuniversity Consortium of Materials Science and Technology.

Collaboration and coordination of research activities with institution other than Polytechnic of Milan

Corresponding author of 17 publications (2011 – 2020) with 10 different institution (3 as single corresponding author, 10 with another corresponding author e 4 with two other corresponding authors)

TEACHING

Academic Years 2029/2010:

Course of “Foundations of Chemistry” for Computer Engineering at the School of Industrial Engineering of Politecnico di Milano

Academic Years 2010/2017:

Course of “Homogeneous catalysis in organic chemistry” for Chemical Engineering at the School of Industrial Engineering of Politecnico di Milano

Academic Years 2010/2017:

Course of “Foundations of Chemistry” for Building Engineering at the School of Architecture of Politecnico di Milano

Academic Years 2016/2017:

Course of “Foundations of Chemistry” for Energy, Mechanical and Space Engineering at the School of Industrial Engineering of Politecnico di Milano

Academic Years 2017/2023:

Course of “Organic Chemistry” for Chemical Engineering at the School of Industrial Engineering of Politecnico di Milano

Academic Years 2019/2023:

Course of “Pharmaceutical Chemistry Technology” for Chemical Engineering at the School of Industrial Engineering of Politecnico di Milano

Collaboration to the translation of Educational Books in Chemistry for Italian editions

2020: Organic Chemistry 6th Ed., by Brown/Iverson/Anslyn/Foote. Brooks Cole Edition. Italian Edition: Chimica Organica (Edises).

Supervisor of post-doctoral research associates

Dr. Arianna Rossetti (2018-2020)

Dr. Greta Dugoni (2021-2022)

Supervisor of Ph.D. students in Industrial Chemistry and Chemical Engineering

Dr. Arianna Rossetti (2015-2018)

Dr. Laura Riva (2018-2021 – co-supervisor)

Dr. Gloria Nicastro (2021-2024 - co-supervisor)

Supervisor of Master students

Chemical Engineering Master Degree

2013 Mauri Emanuele

2014	Toson Federico, Rodigari Cesare, Romano Isabella, Folloni Marco Luciano, Pesa Roberto
2016	Nascimbene Niccolò, Barbagli Michele, Azzolini Giulia
2018	Naso Davide, Villa Annalisa, Viganò Matteo, Urra Mancilla Carolina
2019	Malcagni Valeria
2020	Lotito Davide
2021	Andrea Magri, Saadati Marjan
2021	Maddalena Ponti, Andrea Forloni
<i>Chemical and Pharmaceutical Technology Master Degree (University of Milan)</i>	
2014	Marcella Moretti
2015	Arianna Rossetti
2016	Stefano Landoni, Marta Gatti
2017	Marta Bonfanti, Erika Minervini, Anna Morandini
2018	Edoardo Fumagalli

PROFESSIONAL ACTIVITIES

Duties at Politecnico di Milano

- 2017-today: Member of the Advisory Board of the Chemical Engineering course council
- 2019-today: Manager of the student's internship and stage service for the Chemical Engineering course
- 2019-today: Manager of the student's tutorship service for the Chemical Engineering course
- 2020-2022: Elected Member of the Advisory Board of Chemistry CMIC Department of Polytechnic of Milan

Commissioner appointed for PhD final defences in other universities

- 2018: Università degli Studi di Milano – PhD in Chemical Science.
- 2023: Università degli Studi di Brescia – PhD in Mechanical and Industrial Engineering

Organization of National and International Conferences and Meetings

1. Member of the Organizing Committee of the XXVII Meeting of the Italian Chemical Society (online version, 2021)
2. Member of the Organizing Committee of the XIII Congresso Nazionale AICInG - II Congresso Nazionale della Divisione di Chimica per le Tecnologie della SCI (Politecnico di Milano, 2023).

Projects and Funding

1. Local Unit Coordinator in the PRIN project 20227XZKBY "Superoxide responsive redox-active systems and nano smart materials to target ferroptosis – FEROX"
2. Participant in the project Powertan - funded by MISE (2023).
3. Coordinator in the project WORLD MSCA-RISE-2019 funded by EU H2020
4. Participant in the project Foodtech - funded by Regione Lombardia POR-FESR program (2017 – 2021).
5. Participant in the project Vipcat - funded by Regione Lombardia POR-FESR program (2017 – 2021).
6. Participant in the project Intenant (ID 214129), funded by the EU - FP7 program (2008-2011).

7. Research Co-Supervisor (PI) of a research contract financed by BOSSONG SPA Study of new formulations of adhesives for construction, € 33.000 (2020)
8. Research Co-Supervisor (PI) of a research contract financed by CHIMET SPA Research on production and stability of silver microparticles € 18.000 (2020)
9. Research Co-Supervisor (PI) of a research contract financed by TEC AR FLOR SRL Optimization of customer material and enhancement of processing waste, € 9.000 (2020)
10. Research Co-Supervisor (PI) of a research contract financed by FONDAZIONE POLITECNICO DI MILANO Unconventional processes for wood dyeing, € 92.400 (2021)
11. Research Co-Supervisor (PI) of a research contract financed by GARBO SRL Use of ionic liquids for the recovery of certain by-products of the chemical recycling process of waste based on Polyethylene Terephthalate in Bis-2-Hydroxyethyl Terephthalate ("BHET") € 10.000 (2021)
12. Research Co-Supervisor (PI) of a research contract financed by MARE SpA New functionalizations of cellulose derivatives for the formulation of new additives, € 60.000 (2022)
13. Research Co-Supervisor (PI) of a research contract financed by CHIMET SPA Research on production and stability of silver microparticles, € 35.000 (2022)
14. Research Co-Supervisor (PI) of a research contract financed by AKZONOBEL Development of new reversible cross-linking/insolubilization agents for cellulose ethers € 10.000 (2018)
15. Research Co-Supervisor (PI) of a research contract financed by BOSSONG SPA Study of new formulations of adhesives for construction € 50.000, (2018)
16. Research Co-Supervisor (PI) of a research contract financed by RENATO CORTI SpA Feasibility study for the optimization of adhesives applied to leather goods € 18.000 (2018)
17. Research Co-Supervisor (PI) of a research contract financed by GOLDEN LADY Screening of antibacterial and antifungal activity of PET-based fabrics € 40.000 (2017)
18. Research Co-Supervisor (PI) of a research contract financed by MACDERMID-ENTHONE SPA Study on contaminants in recycled PET € 35.000 (2013-2019)

Journal Reviewing

Organic Letters, Journal of Organic Chemistry, European Journal of Organic Chemistry, Tetrahedron Letters, , Organic & Biomolecular Chemistry, ChemCatChem, Chemical Review, Molecules, ACS Journal of medicinal Chemistry.

Editorial board membership

Member of the Editorial board of the international journal "The Scientific Journal" - Hindawy, section Organic chemistry

Member of the Editorial board of the international journal Molecules, MDPI editor.

PUBLICATIONS

[1] F. Pinelli, M. Saadati, E.N. Zare, P. Makvandi, M. Masi, A. Sacchetti, F. Rossi, A perspective on the applications of functionalized nanogels: promises and challenges, Int. Mater. Rev. 68 (2023) 1–25. <https://doi.org/10.1080/09506608.2022.2026864>.

- [2] F. Pinelli, M. Saadati, A. Rossetti, F. Rossi, A. Sacchetti, On the influence of polyethyleneimine modification in nanogel-driven drug delivery, *Colloids Surfaces A Physicochem. Eng. Asp.* 658 (2023). <https://doi.org/10.1016/j.colsurfa.2022.130623>.
- [3] A. Mannu, M.E. Di Pietro, G.L. Petretto, Z. Taleb, A. Serouri, S. Taleb, A. Sacchetti, A. Mele, Recycling of used vegetable oils by powder adsorption, *Waste Manag. Res.* (2022). <https://doi.org/10.1177/0734242X221135336>.
- [4] L. Riva, A.D. Lotito, C. Punta, A. Sacchetti, Zinc-and Copper-Loaded Nanosponges from Cellulose Nanofibers Hydrogels: New Heterogeneous Catalysts for the Synthesis of Aromatic Acetals, *Gels.* 8 (2022). <https://doi.org/10.3390/gels8010054>.
- [5] A. Schirato, L. Moretti, A. Mazzanti, A. Rossetti, L. Polito, F. Pizzetti, A. Sacchetti, G. Cerullo, F. Rossi, G.D. Valle, G.D. Valle, M. Maiuri, Controlling photothermal dynamics in gold nanoparticle-loaded agarose gel for plasmon-enhanced drug release, in: *Opt. InfoBase Conf. Pap.*, 2022.
- [6] A.M. Caramiello, M.C. Bellucci, G. Cristina, C. Castellano, F. Meneghetti, M. Mori, F. Secundo, F. Viani, A. Sacchetti, A. Volonterio, Synthesis and Conformational Analysis of Hydantoin-Based Universal Peptidomimetics, *J. Org. Chem.* (2022). <https://doi.org/10.1021/acs.joc.2c01903>.
- [7] J. Martí-Rujas, S. Elli, A. Sacchetti, F. Castiglione, Mechanochemical synthesis of mechanical bonds in $M_{12}L_8$ -poly-[*n*]-catenanes, *Dalt. Trans.* 51 (2022) 53–58. <https://doi.org/10.1039/d1dt03158a>.
- [8] M. Mori, E. Fumagalli, C. Castellano, A. Tresoldi, A. Sacchetti, F. Meneghetti, Synthesis and characterization of a tetradentate bispidine-based ligand and its zinc(II) complex, *Inorganica Chim. Acta.* 538 (2022). <https://doi.org/10.1016/j.ica.2022.120968>.
- [9] F. Moncalvo, E. Lacroce, G. Franzoni, A. Altomare, E. Fasoli, G. Aldini, A. Sacchetti, F. Cellési, Selective Protein Conjugation of Poly(glycerol monomethacrylate) and Poly(polyethylene glycol methacrylate) with Tunable Topology via Reductive Amination with Multifunctional ATRP Initiators for Activity Preservation, *Macromolecules.* 55 (2022) 7454–7468. <https://doi.org/10.1021/acs.macromol.2c00783>.
- [10] G. Colombo Dugoni, M. Mori, V. Dichiarante, A. Sacchetti, F. Meneghetti, Synthesis and characterization of a novel lanthanum (III) complex with a di(2-picoyl)amine-based ligand endowed with fluorescent properties, *J. Mol. Struct.* 1265 (2022). <https://doi.org/10.1016/j.molstruc.2022.133398>.
- [11] A. Sacchetti, C. Urrea Mancilla, G. Colombo Dugoni, Synthesis of DPA-triazole structures and their application as ligand for metal catalyzed organic reactions, *Tetrahedron.* 104 (2022). <https://doi.org/10.1016/j.tet.2021.132581>.
- [12] F. Moncalvo, E. Lacroce, G. Franzoni, A. Altomare, E. Fasoli, G. Aldini, A. Sacchetti, F. Cellési, Protein-friendly atom transfer radical polymerisation of glycerol(monomethacrylate) in buffer solution for the synthesis of a new class of polymer bioconjugates, *React. Funct. Polym.* 175 (2022). <https://doi.org/10.1016/j.reactfunctpolym.2022.105264>.
- [13] L. Riva, G. Nicastro, M. Liu, C. Battocchio, C. Punta, A. Sacchetti, Pd-Loaded Cellulose NanoSponge as a Heterogeneous Catalyst for Suzuki–Miyaura Coupling Reactions, *Gels.* 8 (2022). <https://doi.org/10.3390/gels8120789>.
- [14] R. Bernasconi, E. Mauri, A. Rossetti, S. Rimondo, R. Suriano, M. Levi, A. Sacchetti, S. Pané, L. Magagnin, F. Rossi, 3D integration of pH-cleavable drug-hydrogel conjugates on magnetically driven smart microtransporters, *Mater. Des.* 197 (2021). <https://doi.org/10.1016/j.matdes.2020.109212>.

- [15] A. Rossetti, F. Pizzetti, F. Rossi, E. Mauri, E. Borghi, E. Ottaviano, A. Sacchetti, Synthesis and characterization of carbomer-based hydrogels for drug delivery applications, *Int. J. Polym. Mater. Polym. Biomater.* 70 (2021) 743–753. <https://doi.org/10.1080/00914037.2020.1760275>.
- [16] F. Pinelli, F. Pizzetti, A. Rossetti, Z. Posel, M. Masi, A. Sacchetti, P. Posocco, F. Rossi, Effect of surface decoration on properties and drug release ability of nanogels, *Colloids Surfaces A Physicochem. Eng. Asp.* 614 (2021). <https://doi.org/10.1016/j.colsurfa.2021.126164>.
- [17] A. Mannu, M.E. Di Pietro, E. Priola, S. Baldino, A. Sacchetti, A. Mele, Unconventional reactivity of epichlorohydrin in the presence of triphenylphosphine: isolation of ((1,4-dioxane-2,5-diyl)-bis-(methylene))-bis-(triphenylphosphonium) chloride, *Res. Chem. Intermed.* 47 (2021) 1663–1674. <https://doi.org/10.1007/s11164-020-04364-9>.
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- [20] G. Colombo Dugoni, E. Mossini, E. Macerata, A. Sacchetti, A. Mele, M. Mariani, Deep Eutectic Solvents: Promising Co-solvents to Improve the Extraction Kinetics of CyMe₄-BTBP, *ACS Omega*. 6 (2021) 3602–3611. <https://doi.org/10.1021/acsomega.0c05109>.
- [21] A. Morandini, A. Rossetti, A. Sacchetti, Lipase-catalyzed kinetic resolution of alcohols as intermediates for the synthesis of heart rate reducing agent ivabradine, *Catalysts*. 11 (2021) 1–10. <https://doi.org/10.3390/catal11010053>.
- [22] A. Sacchetti, A. Rossetti, Synthesis of Natural Compounds Based on the [3,7]-Diazabicyclo[3.3.1]nonane (Bispidine) Core, *European J. Org. Chem.* 2021 (2021) 1491–1507. <https://doi.org/10.1002/ejoc.202001439>.
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- [24] L. Moretti, A. Mazzanti, A. Rossetti, A. Schirato, L. Polito, F. Pizzetti, A. Sacchetti, G. Cerullo, G.D. Valle, F. Rossi, F. Rossi, M. Maiuri, Plasmonic control of drug release efficiency in agarose gel loaded with gold nanoparticle assemblies, 2021. <https://doi.org/10.1515/9783110710687-022>.
- [25] F. Pizzetti, A. Rossetti, A. Marchetti, F. Castiglione, V. Vanoli, E. Coste, V. Veneruso, P. Veglianesse, A. Sacchetti, A. Cingolani, A. Cingolani, F. Rossi, Biphasic Porous Structures formed by Monomer/Water Interface Stabilization with Colloidal Nanoparticles, *Adv. Mater. Interfaces*. 8 (2021). <https://doi.org/10.1002/admi.202100991>.
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- [32] G. Colombo Dugoni, A. Sacchetti, A. Mele, Deep eutectic solvent as solvent and catalyst: One-pot synthesis of 1,3-dinitropropanes: Via tandem Henry reaction/Michael addition, *Org. Biomol. Chem.* 18 (2020) 8395–8401. <https://doi.org/10.1039/d0ob01516d>.
- [33] F. Pinelli, F. Pizzetti, Ó.F. Ortolà, A. Marchetti, A. Rossetti, A. Sacchetti, F. Rossi, Influence of the core formulation on features and drug delivery ability of carbamate-based nanogels, *Int. J. Mol. Sci.* 21 (2020) 1–15. <https://doi.org/10.3390/ijms21186621>.
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- [36] L. Riva, C. Punta, A. Sacchetti, Co-Polymeric Nanosponges from Cellulose Biomass as Heterogeneous Catalysts for amine-catalyzed Organic Reactions, *ChemCatChem.* 12 (2020) 6214–6222. <https://doi.org/10.1002/cctc.202001157>.
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- [40] A. Rossetti, N. Bono, G. Candiani, F. Meneghetti, G. Roda, A. Sacchetti, Synthesis and Antimicrobial Evaluation of Novel Chiral 2-Amino-4,5,6,7-tetrahydrothieno[2,3-c]pyridine Derivatives, *Chem. Biodivers.* 16 (2019). <https://doi.org/10.1002/cbdv.201900097>.
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- [43] E. Mauri, A. Sacchetti, N. Vicario, L. Peruzzotti-Jametti, F. Rossi, S. Pluchino, Evaluation of RGD functionalization in hybrid hydrogels as 3D neural stem cell culture systems, *Biomater. Sci.* 6 (2018) 501–510. <https://doi.org/10.1039/c7bm01056g>.
- [44] A. Rossetti, S. Landoni, F. Meneghetti, C. Castellano, M. Mori, G. Colombo Dugoni, A. Sacchetti, Application of chiral bi- and tetra-dentate bispidine-derived ligands in the copper(ii)-catalyzed asymmetric Henry reaction, *New J. Chem.* 42 (2018) 12072–12081. <https://doi.org/10.1039/c8nj01930d>.
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Applications for Patents

- “Sistema composito comprendente idrogelo e nano-particella/e per il contenimento, la veicolazione e il rilascio multiplo di farmaco/i e cellula/e”, Perale G., Rossi F., Masi M., Moscatelli D., Sacchetti A., Veglianesi P., priority application No. 102019000011352 IT – 10.7.2019

- "PRODOTTO DA FUMO O DA AEROSOL" Autore/i Punta, C.; Sacchetti, A.; Lippi, M.; Eusepi, I.; Di Lallo, V.; Quarelli Di Lesegno, F., Nr. brevetto 102023000013224

Invited keynote Lecture

2023: 5th Advanced Material Science - 2023 (Barcelona, Spain). *Polyethylenimine-based materials: novel heterogeneous catalysts for sustainable organic transformations*

Invited Speaker

2023: 4th Catalysis and Chemical engineering Summit - 2023 (Rome, Italy). *Polyethylenimine-based materials: novel heterogeneous catalysts for sustainable organic transformations*

2nd Annual Conference on Global Nanotechnology (#NanoSeries2023), Instituto de Ciencia de Materiales de Madrid (ICMM-CSIC) (Madrid, Spain)

Design and synthesis of nanogels as promising tools for drug delivery in spinal cord injury

Regular Oral Contributions

2002: XXVII Corso Estivo 'A. CORBELLA' - Seminari in Chimica Organica, Gargnano. *Sintesi di leganti chirali a scheletro bispidinico e loro applicazione come catalizzatori in soluzione e supportati su matrice polimerica"*

2003: NAT6, VI convegno Nazionale, Giornate di Chimica delle Sostanze Naturali, Vietri sul Mare (SA) *L'alcaloide (-)-sparteina come modello per la sintesi di leganti diamminici enantiopuri*

2004: Primo simposio "Giovani Chimici Organici della città di Milano", Milano. *L'alcaloide (-)-sparteina come modello per la sintesi di nuovi leganti diamminici enantiopuri*

2006 XXII Congresso Nazionale della Società Chimica Italiana (SCI). Firenze *Sintesi di sistemi eterociclici benzocondensati quali potenziali β -turn-mimetic*

2010 Convegno Nazionale della Divisione di Chimica Organica, San Benedetto del Tronto, Italy *Use of Baker's yeast in the enantioselective reduction of activated olefins for the synthesis of interesting API precursors*

2012 Convegno Nazionale della Divisione di Chimica Organica, Pavia, Italy *Use of Ugi MCR for the synthesis of 4-amino-1,2,3,4-tetrahydroisoquinoline-1,3-dione-based peptidomimetics*

2018 AICInG 2018 - XI Congresso Nazionale, Bologna. *Nuovi materiali costituiti da polimeri di coordinazione monodimensionali basati su ligandi bispidinici*

2022 Congresso INSTM, Bressanone. *Materiali a base di polietileneimina: nuovi catalizzatori eterogenei sostenibili per trasformazioni organiche*

Milano, 08/05/2023

Alessandro Sacchetti