

SAVERIO SALZO

Curriculum Vitae

(ai fini della pubblicazione)

Part I – General Information

Full Name	Saverio Salzo
Address	
E-mail	
Citizenship	Italian
Spoken Languages	Italian, English

Part II – Education and habilitations

Title of qualification	Year	Institution.	Description
Laurea (MSc equivalent) in Pure Mathematics	2001	Università di Bari	110/110 cum Laude. Thesis' title: Spazi Adattati di Funzioni e Teoremi di tipo Korovkin.
Master degree in Application of Mathematics in Industry and Services (MAMI)	2002	Università di Milano-Bicocca	Thesis's title: Wavelet Transform and Lossless Image Compression.
PhD in Computer Science	2012	Università di Genova	Thesis's title: Variational Regularization for Image Registration: Theory and Algorithms
Abilitazione II fascia ASN - 01/A6 (MAT/09)	2021	MIUR	session 2018-2020, VI quadrimester

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
01.05.2007	30.12.2007	Università di Bologna, ARCES	Assegnista di Ricerca
03.01.2011	02.01.2013	Università degli Studi di Genova, DISI.	Assegnista di Ricerca
03.01.2013	02.01.2014	Università degli Studi di Genova, DIBRIS.	Assegnista di Ricerca
03.01.2014	02.01.2015	Università degli Studi di Genova, DIMA.	Assegnista di Ricerca
05.01.2015	04.01.2016	Università degli Studi di Genova, DIBRIS.	Assegnista di Ricerca
18.01.2016	18.02.2016	KU Leuven, ESAT-STADIUS, Belgio	Visiting Scholar

01.0.32016	31.12.2017	Istituto Italiano di Tecnologia, Laboratory for Computational and Statistical Learning.	Post-Doc
01.01.2018	Present	Istituto Italiano di Tecnologia, Laboratory for Computational Statistics and Machine Learning	Researcher
01.10.2020	Present	University College London, Computer Science Department	Honorary Lecturer

IIIB – Other Appointments

Start	End	Institution	Position
01.01.2003	30.04.2007	Advanced Computer System A.C.S Via della Bufalotta 238 – Rome, R&D Division Via della Tecnica 1, Matera	Software Engineering (permanent, full time). Involved in the following projects: <ul style="list-style-type: none"> - Gravity field and steady-state Ocean Circulation Explorer (GOCE), European Space Agency (ESA). Calibration and Monitoring Facility (CMF) group. - Diagnostic Technologies and Intelligent systems for archeological sites in south of Italy. (TECSIS), ENEA. Developing algorithms for multimodal image registration - COSMO Skymed Constellation, Italian Space Agency (ASI). Payload Data Segment (PDF) group. - ASIA, Italian Space Agency (ASI) and MIUR. Study of Lossless Hyperspectral Image Compression Algorithms.

Part IV – Teaching experience

Year	Institution	Role
2014–2015	Università di Genova	Teaching Assistant for <i>Mathematical Analysis 1 & 2</i> (60 hours). Architectural Science BSc. Prof. M. L. Bennati.
2017–2018	Università di Genova, DIBRIS	Teaching Assistant for the course <i>Information and Inference Theory</i> (60 hours). Data Science BSc. University of Genoa. Prof. L. Rosasco and Prof. Alessandro Verri
2017	Università di Genova, DIBRIS	Instructor for the course <i>Introduction to Convex Optimization</i> (22 hours). PhD program in Computer Science and Systems Engineering.
2018	Università di Genova, DIBRIS	Instructor for the course <i>Introduction to Convex Optimization</i> (22 hours). PhD program in Computer Science and Systems Engineering.
2019	Università di Genova, DIBRIS	Instructor for the course <i>Introduction to Convex Optimization</i> (22 hours). PhD program in Computer Science and Systems Engineering.
2020	Università di Genova, DIBRIS	Instructor for the course <i>Introduction to Convex Optimization</i> (22 hours). PhD program in Computer Science and Systems Engineering.

2021	UCL, Computer Science Department	Instructor for the course <i>Advanced Topics in Machine Learning: Introduction to Convex Optimization</i> (15 hours). MSc Machine Learning.
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Part V – Advisory Activity

Period	Student
2021-present	Cheik Traoré, PhD in Mathematics, Department of Mathematics, University of Genoa, Italy. Co-supervision with Prof. Silvia Villa
2021-present	Daniela Parletta, PhD in Mathematics, Department of Mathematics, University of Genoa, Italy. Co-supervision with Massimiliano Pontil.
2019-present	Riccardo Grazi, PhD in Computer Science, Department of Computer Science, University College London, UK. Co-supervision with Prof. Massimiliano Pontil.
2019	Feliks Hibrá, <i>Efficient Tensor Kernel methods for sparse regression</i> , MSc thesis in Computer Science, Department of Computer Science, University of Venice, Italy. Co-supervision with Prof. Marcello Pelillo.
2017-2018	Manuel Orlandi, <i>Tensor kernel methods for feature selection</i> , MSc thesis in Computer Engineering, DIBRIS, University of Genoa, Italy. Co-supervision with Prof. Lorenzo Rosasco.

Part VI - Society memberships

Year	Title
2014	Member of GNAMPA - Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni. http://www.altamatematica.it/gnampa/
2015	Member of GNAMPA - Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni. http://www.altamatematica.it/gnampa/

Part VII – Research Activities

Keywords	Brief Description
Nonsmooth optimization, operator splitting methods, convex analysis, fixed point algorithms.	I worked mainly on proximal gradient methods under different type of assumptions in infinite dimensional spaces, providing convergence analysis with particular emphasis on the study of rate of convergence. Among others I studied randomized coordinate-wise versions, acceleration techniques under the presence of computational errors and line search implementations in variable metrics.
Machine learning	I studied support vector machine in Banach spaces and their statistical consistency, tensor kernel methods promoting sparsity in the feature space, algorithms for variable selection.
Optimization methods for optimal transport	I studied first order optimization methods on probability spaces for the computation of the barycenter of probability measures and Bregman projection methods for problems in optimal transport.
Hyperparameter optimization	I studied hyperparameter optimization in group lasso and multi-task learning problems via bilevel optimization.

Part VIII – Publications

VIIIA — Journal Articles

	Year	Authors	Title	Journal
1	2021	S. Salzo , S. Villa	Parallel random block-coordinate forward-backward algorithm: A unified convergence analysis.	<i>Mathematical Programming</i> , Series A, doi: 10.1007/s10107-020-01602-1
2	2020	S. Salzo, J.K.A. Suykens.	Generalized support vector regression: duality and tensor-kernel representation.	<i>Analysis and Applications</i> , 18(1):149–183. doi: 10.1142/S0219530519410069
3	2018	P.L. Combettes, S. Salzo , S. Villa.	Consistent learning by composite proximal thresholding.	<i>Mathematical Programming</i> , Series B, 167:99–127. doi: 10.1007/s10107-017-1133-8
4	2018	P.L. Combettes, S. Salzo , S. Villa.	Regularized learning schemes in feature Banach spaces.	<i>Analysis and Applications</i> , 16(1):1–54. doi: 10.1142/S0219530516500202
5	2017	S. Salzo	The variable metric forward-backward splitting algorithm under mild differentiability assumptions.	<i>SIAM Journal on Optimization</i> 27(4):2153–2181. doi: 10.1137/16M1073741
6	2014	S. Salzo , S. Masecchia, A. Verri, A. Barla	Alternating proximal regularized dictionary learning.	<i>Neural Computation</i> , 26(12):2855–2895. doi: 10.1162/NECO_a_00672
7	2013	S. Villa, S. Salzo , L. Baldassarre, A. Verri.	Accelerated and inexact forward-backward algorithms.	<i>SIAM Journal on Optimization</i> , 23(3): 1607–1633. ISSN (print) 1052-6234
8	2012	S. Salzo , S. Villa.	Inexact and accelerated proximal point algorithms.	<i>Journal of Convex Analysis</i> , 19(4): 1167–1192. ISSN (print) 0944-6532
9	2012	S. Salzo , S. Villa.	Convergence analysis of a proximal Gauss-Newton method.	<i>Journal of Computational Optimization and Applications</i> , 53(2): 557–589. ISSN (print): 0926-6003

VIIIB — Conference Proceedings (with referees)

	Year	Authors	Title	Conference
1	2021	R. Grazzi, M. Pontil, S. Salzo .	Convergence properties of stochastic hypergradients.	Proceedings of the <i>24th International Conference on Artificial Intelligence and Statistics (AISTATS 2021)</i> .
2	2021	J.Frecon, S. Salzo , M. Pontil.	Unveiling groups of related tasks in multi-task learning.	<i>25th International Conference on Pattern Recognition (ICPR)</i> , pages 7134– 7141.
3	2020	R. Grazzi, L. Franceschi, M. Pontil, S Salzo .	On the iteration complexity of hypergradient computation.	In Proceedings of the <i>37th International Conference on Machine Learning (ICML 2020)</i> .

4	2019	G. Luise, S. Salzo , M. Pontil, C. Ciliberto	Sinkhorn barycenters with free support via Frank-Wolfe algorithm.	<i>Advances in Neural Information Processing Systems 32</i> (NeurIPS 2019).
5	2018	J. Frecon, S. Salzo , M. Pontil.	Bilevel learning of the group Lasso structure.	<i>Advances in Neural Information Processing Systems 31</i> (NIPS 2018).
6	2018	L. Franceschi, P. Frasconi, S. Salzo , R. Grazi, M. Pontil.	Bilevel programming for hyperparameter optimization and meta-learning.	<i>Proceedings of the 35th International Conference on Machine Learning</i> (ICML 2018)
7	2018	S. Salzo , J.K.A. Suykens, L. Rosasco.	Solving lp-norm regularization with tensor kernels.	<i>Proceedings of the 21st International Conference on Artificial Intelligence and Statistics</i> (AISTATS 2018)
8	2018	F. Tomasi, V. Tozzo, A. Verri, S. Salzo .	Forward-backward splitting for time-varying graphical models.	<i>Proceedings of the 9th International Conference on Probabilistic Graphical Models</i> .
9	2018	F. Tomasi, V. Tozzo, S. Salzo , A. Verri.	Latent variable time-varying network inference.	<i>Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining</i> (KDD 2018)
10	2013	S. Masecchia, A. Barla, S. Salzo , A. Verri.	Dictionary learning improves subtyping of breast cancer aCGH data.	<i>In Engineering in Medicine and Biology Society</i> (EMBC), 2013 35th Annual International Conference of the IEEE, pages 604–607. doi: 10.1109/EMBC.2013.6609572
11	2013	S. Masecchia, A. Barla, S. Salzo , A. Verri.	A dictionary learning based method for aCGH segmentation.	In ESANN 2013 proceedings, <i>European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning</i> , pages 461–466. ISBN 978-2-87419-081-0
12	2007	J.A González A. Canales J.R. Acarreta E. López-Hazas D. De Candia S. Salzo R. Floberghagen	The GOCE Calibration and Monitoring Facility (CMF)	European Space Agency, (Special Publication) ESA SP, 2007, (SP-627), pp. 127–134
13	2004	L. Galli, S. Salzo .	Lossless hyperspectral compression using KLT	<i>International Geoscience and Remote Sensing Symposium</i> (IGARSS 2004), 1, pp.313-316

VIIIC — Book chapters

	Year	Authors	Title	Book
1	2021	S. Salzo , S. Villa	Proximal gradient methods for machine learning and imaging (to appear).	In De Mari F. and E. De Vito, editors, <i>Harmonic and Applied Analysis: From Radon Transforms to Machine Learning</i> , Applied and Numerical Harmonic Analysis. Birkhäuser, 2021. ISBN 978-3-030-86663-1

2	2014	A Barla, S. Salzo , A Verri.	Regularized dictionary learning.	In <i>Regularization, Optimization, Kernels, and Support Vector Machines</i> , Chapman & Hall/CRC Machine Learning & Pattern Recognition. CRC Press. ISBN 9781482241396
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VIID – Articles submitted

	Year	Authors	Title
1	2021	V.R. Kostic S. Salzo	The method of randomized Bregman projections for stochastic feasibility problems.

VIII E – Working papers

	Year	Authors	Title
1	2021	V.R. Kostic S. Salzo	Batch Greenkhorn for fast regularized multimarginal optimal transport.
2	2014	C. Traoré, S. Salzo , S. Villa.	Convergence of an asynchronous block-coordinate forward-backward algorithm for convex composite optimization.

Part IX – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Journal articles	9	Scopus	2012	2021
Conference papers	10	Scopus + WOS	2012	2021

Index	Value	Start	End
Total Citations	281	2012	2021
Average Citations per Product	$281/19 = 14.78$	2012	2021
Hirsch (H) index	8	2012	2021
Total Impact factor*	19.2 (based on the 9 papers having IF)	2012	2021
Average Impact factor per publication	$19.2/9 = 2.13$	2012	2021

* The total IF is computed by summing the IF's of the products listed in Section VIIIA.

Products missing on Data Bases

Product type	Number	Data Base	Start	End
Book chapters	2		2012	2021
Conference papers	1		2012	2021

Part X – Professional activities

XA – Oral Presentations with invitation

Year	Title and Venue
2011	Convergence of accelerated proximal methods in the presence of computational errors. <i>13-th Workshop on Well-posedness of Optimization Problems and Related Topics</i> , Borovets, Bulgaria, September 12-16, 2011.
2013	Consistency of General Variational Learning Schemes in Banach spaces. <i>59th Workshop Nonlinear Optimization: a Bridge from Theory to Applications</i> , Erice, Italy, June 10-17, 2013.
2013	Proximal Gauss-Newton method. ICCOPT 2013. <i>The Forth International Conference on Continuous Optimization</i> , Lisbon, Portugal, July 29 - August 1, 2013.
2013	Consistency of General Variational Learning Schemes in Banach spaces, invited, <i>Workshop on Algorithms and Dynamics for Games and Optimization</i> , Playa Blanca, Tongoy, Chile, October 14-18, 2013.
2015	Consistent Learning by Composite Proximal Thresholding, <i>Mini-workshop Image reconstruction and Learning</i> , University of Innsbruck, Austria, September 10-11, 2015
2015	Consistent Learning by Composite Proximal Thresholding, <i>Workshop on Optimization in Machine learning, vision and image processing</i> , Toulouse, France, October 6-7, 2015.
2016	The variable metric forward-backward algorithm under mild differentiability assumptions, <i>28th European Conference on Operational Research</i> , Poznan, Poland, July 3-6, 2016.
2016	The variable metric forward-backward algorithm under mild differentiability assumptions, <i>Optimization Techniques for Inverse Problems III</i> , Modena, Italy, September 19-21, 2016.
2017	The variable metric forward-backward algorithm under mild differentiability assumptions, <i>SIAM Conference on Optimization (OP 17)</i> , Vancouver, British Columbia, Canada, May 22-25, 2017.
2018	The forward-backward splitting algorithm without cocoercivity?, <i>Workshop on Operator Splitting Methods in Data Analysis</i> . The Statistical and Applied Mathematical Sciences Institute (SAMSI), Raleigh NC. USA. March 21-23, 2018.
2018	Solving lp-norm regularization with tensor kernels, <i>International Symposium on Mathematical Programming (ISMP 18)</i> , Bordeaux, France, July 1-6, 2018.
2019	Bilevel Learning of Group Lasso Structure, <i>Symposium on Machine Learning and Dynamical Systems</i> , London, UK, February 11-13, 2019 https://sites.google.com/site/boumedienehamzi/symposium-on-machine-learning-for-dynamical-systems_2019
2019	Improving the random block-coordinate forward-backward method, <i>2nd Workshop on Operator Splitting Methods in Data Analysis</i> . Flatiron Institute, Center for computational mathematics, New York, NY. USA. March 20-22, 2019. https://indico.flatironinstitute.org/event/68/contributions/
2019	Parallel Random Block-Coordinate Forward-Backward Algorithm: A Unified Convergence Analysis, <i>International Conference on Continuous Optimization (ICCOPT 19)</i> , Berlin, Germany, August 5-8, 2019.
2021	Sinkhorn Barycenters with Free Support via Frank-Wolfe Algorithm, <i>Conference on System Modeling and Optimization (IFIP TC7 21)</i> , Quito, Ecuador, August 30– September 3, 2021.

XB – Organization of conferences

Year	Title and Venue
2014	<i>Optimization and dynamical processes in statistical learning and inverse problems. Italian-French workshop</i> (with P.L Combettes, L. Rosasco, and S. Villa). Sestri Levante, Italy, September 8-12, 2014. https://www.ljll.math.upmc.fr/~plc/sestri

2016	<i>Large scale structured optimization I and II. Sessions at EURO 2016 in the stream Convex Optimization (with S. Villa). Poznan, Poland, July 3-6, 2016.</i>
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XC – Seminars (invited)

Year	Title and venue
2012	<i>Regularization by Proximal Methods in Array-Comparative Genomic Hybridization Data Analysis, Séminaire on Méthodes Mathématiques du Traitement d'Images, Université Pierre et Marie Curie & C.N.R.S. Laboratoire Jacques-Louis Lions, Paris, December 18 2012.</i>
2015	Learning by Iterative Proximal Thresholding. University of Graz, Austria, 12 Febbraio 2015.
2015	<i>Learning in Banach spaces. KU Leuven, Belgium, December 1, 2015.</i>
2021	The iterative Bregman projection method and applications to Optimal Transport, NCSU Differential Equations/Nonlinear Analysis Seminar 2021, North Carolina State University, 15 Settembre 2021.

XD – Participation to summer schools

Year	Title and venue
2013	<i>Summer Course on Sparse Optimization and Applications to Information Processing. Universidade Nova de Lisboa, Lisbon, Portugal, July 28, 2013.</i>
2013	<i>Workshop on Applied Harmonic Analysis. Three mini courses on applied harmonic analysis. DIMA University of Genoa, September 2-6, 2013.</i>
2015	<i>Spring School on Variational Analysis and its Applications. Paseky, Czech Republic, April 19-25, 2015.</i>

XE – Short visit abroad for scientific collaborations.

Period		Department/University	Visiting
20.11.2013	22.11.2013	Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, Paris.	Prof. P. L. Combettes
27.08.2014	31.08.2014	Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, Paris.	Prof. P. L. Combettes
29.11.2015	05.12.2015	ESAT-STADIUS, KU Leuven, Belgio	Prof. A.K.L. Suykens
24.03.2018	26.03.2018	Department of Mathematics, North Carolina State University Raleigh, NC. USA.	Prof. P. L. Combettes
14.03.2019	16.03.2019	Department of Electrical and Electronic Engineering, Imperial College London, UK.	Prof. C. Ciliberto
25.02.2020	29.02.2020	Department of Electrical and Electronic Engineering, Imperial College London, UK.	Prof. C. Ciliberto

XF – Refereeing activity.

I normally serve as a referee for the following journals:

Mathematical Programming Series A and B

SIAM Journal on Optimization
SIAM Journal on Imaging Science
Journal of Optimization and Applications
Numerical Algorithms
IMA Journal of Numerical Analysis
Optimization Methods and Software
Journal of Nonsmooth Analysis and Optimization
Journal of Machine Learning Research

I am also part of the Editorial board reviewers of Journal of Machine Learning Research (<https://jmlr.org/editorial-board-reviewers.html>). In the past I served as a referee for the machine learning conference NIPS 2013 e COLT 2014.

Part X– Selected Publications

1	S. Salzo and S. Villa. Proximal gradient methods for machine learning and imaging (to appear). In De Mari F. and E. De Vito, editors, <i>Harmonic and Applied Analysis: From Radon Transforms to Machine Learning</i> , Applied and Numerical Harmonic Analysis. Birkhäuser, 2021 . ISBN 978-3-030-86663-1
2	S. Salzo and S. Villa. Parallel random block-coordinate forward-backward algorithm: A unified convergence analysis. <i>Mathematical Programming, Series A</i> , 2021 . doi: 10.1007/s10107-020-01602-1. Cit. 1 (Scopus) , IF: 3.995 (JCR)
3	R. Grazzi, M. Pontil, and S. Salzo. Convergence properties of stochastic hypergradients. In <i>Proceedings of the 24th International Conference on Artificial Intelligence and Statistics (AISTATS)</i> , 2021 . Cit. 0 (WOS)
4	S. Salzo and J.K.A. Suykens. Generalized support vector regression: duality and tensor-kernel representation. <i>Analysis and Applications</i> , 18(1):149–183, 2020 . doi: 10.1142/S0219530519410069 Cit. 3 (Scopus) , IF: 1.790 (JCR)
5	G. Luise, S. Salzo, M. Pontil, and Ciliberto C. Sinkhorn barycenters with free support via Frank-Wolfe algorithm. In <i>Advances in Neural Information Processing Systems 32 (NeurIPS)</i> , 2019 Cit. 11 (Scopus)
6	P.L. Combettes, S. Salzo, and S. Villa. Consistent learning by composite proximal thresholding. <i>Mathematical Programming, Series B</i> , 167:99–127, 2018 . doi: 10.1007/s10107-017-1133-8 Cit. 9 (Scopus) , IF: 3.785 (JCR)
7	P.L. Combettes, S. Salzo, and S. Villa. Regularized learning schemes in feature Banach spaces. <i>Analysis and Applications</i> , 16(1):1–54, 2018 . doi: 10.1142/S0219530516500202 Cit. 8 (Scopus) , IF: 1.231 (JCR)

8	J. Frecon, S. Salzo, and M. Pontil. Bilevel learning of the group Lasso structure. In <i>Advances in Neural Information Processing Systems 31 (NIPS)</i> , 2018 Cit. 12 (Scopus)
9	L. Franceschi, P. Frasconi, S. Salzo, R. Grazzi, and M. Pontil. Bilevel programming for hyperparameter optimization and meta-learning. In <i>Proceedings of the 35th International Conference on Machine Learning (ICML)</i> , 2018 Cit. 51 (Scopus)
10	S. Salzo, J.K.A. Suykens, and L. Rosasco. Solving lp-norm regularization with tensor kernels. In <i>Proceedings of the 21st International Conference on Artificial Intelligence and Statistics (AISTATS)</i> , April 2018 . Cit. 2 (Scopus)
11	S. Salzo. The variable metric forward-backward splitting algorithm under mild differentiability assumptions. <i>SIAM Journal on Optimization</i> , 27(4):2153–2181, 2017 . doi: 10.1137/16M1073741 Cit. 24 (Scopus) , IF: 2.183 (JCR)
12	S. Salzo, S. Masecchia, A. Verri, and Barla A. Alternating proximal regularized dictionary learning. <i>Neural Computation</i> , 26(12):2855–2895, 2014 . doi: 10.1162/NECO_a_00672 Cit. 3 (Scopus) IF:2.207 (JCR)
13	S. Villa, S. Salzo, L. Baldassarre, and A. Verri. Accelerated and inexact forward-backward algorithms. <i>SIAM Journal on Optimization</i> , 23(3):1607–1633, 2013 . ISSN (print) 1052-6234 Cit. 88 (Scopus) , IF: 2.106 (JCR)
14	S. Salzo and S. Villa. Inexact and accelerated proximal point algorithms. <i>Journal of Convex Analysis</i> , 19(4):1167–1192, 2012 . ISSN (print) 0944-6532 Cit. 40 (Scopus) , IF:0.625 (JCR)
15	S. Salzo and S. Villa. Convergence analysis of a proximal Gauss-Newton method. <i>Journal of Computational Optimization and Applications</i> , 53(2):557–589, 2012 . ISSN (print): 0926-6003 Cit. 20 (Scopus) , IF:1.278 (JCR)

Date 30.09.2021

Signature