
Prof. Valentina De Simone

Curriculum Vitae

October, 2021

EDUCATION

1999: PhD in Applied Mathematics and Computer Science, University of Naples "Federico II".

1993: MS Degree cum laude in Mathematics, University of Naples "Federico II".

HABILITATION

March 2017: Italian National Scientific Habilitation to Associate Professorship in Numerical Analysis.

POSITIONS

Sept. 2019-present: Associate Professor of Numerical Analysis, Department of Mathematics and Physics, University of Campania "Luigi Vanvitelli"

Nov. 2002-Aug. 2019: Assistant Professor of Numerical Analysis, Department of Mathematics and Physics, University of Campania "Luigi Vanvitelli".

PROFESSIONAL EXPERIENCE

2000-2002: Postdoc fellowship, Department of Mathematics and its Applications, University of Naples "Federico II".

1993-1994: CNR Fellow, Department of Mathematics and its Applications, University of Naples "Federico II".

RESEARCH TOPICS

The research activity is devoted to the development and analysis of numerical methods, algorithms and software for High-Performance Scientific Computing. The main research topics are:

- large-scale quadratic programming, with emphasis on interior point methods and iterative solution of related KKT systems;
- preconditioning of large and sparse saddle-point linear systems arising in nonlinear optimization and PDEs;
- nonsmooth optimization with applications in Image analysis and Portfolio Selection.

PARTICIPATION IN SCIENTIFIC PROJECTS (last 10 years)

2020: "Ottimizzazione Numerica in Image Restoration and Reconstruction", INdAM-GNCS Project.

2019: "Metodi avanzati di ottimizzazione non lineare per l'elaborazione di immagini", INdAM-GNCS Project.

2015-2018: "EoCoE - Energy oriented Centre of Excellence for computing applications", EU Horizon 2020 Project, Call H2020-EINFRA-2015-1.

2018: "Metodi numerici per equazioni lineari, non lineari e matriciali con applicazioni", INdAM-GNCS Project.

2017: "Metodi numerici per problemi di ottimizzazione vincolata di grandi dimensioni e applicazioni", INdAM-GNCS Project.

2016: "Nuove frontiere dell'ottimizzazione non differenziabile nei problemi inversi", INdAM-GNCS Project.

2015: Numerical Methods for Nonconvex/Nonsmooth Optimization and Applications, INdAM-GNCS Project (**Scientific Coordinator**)

2014: "First Order Optimization Methods for Image Restoration and Analysis", INdAM-GNCS Project.

2013: "Numerical Methods and Software for Large-Scale Optimization with Applications to Image Processing", INdAM-GNCS Project.

2012: "Advanced Numerical Methods for Preconditioning Linear Systems Arising from PDE and Optimization Problems", INdAM-GNCS Project.

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PARTECIPATION IN PhD BOARDS

From A.Y. 2018-19 to A.Y. 2021-22: PhD Program in Mathematics, Physics and Applications for Engineering, University of Campania "Luigi Vanvitelli".

EDITORIAL AND REVIEW ACTIVITY

2021: member of the Editorial Board of Frontiers in Applied Mathematics and Statistics, Frontier Media S.A., ISSN 2297-4687, <https://www.frontiersin.org/journals/applied-mathematics-and-statistics#editorial-board>

2020-to present: member of topics Board of Algorithms, MDPI, ISSN 1999-4893, https://www.mdpi.com/journal/algorithms/topical_advisory_panel

Referee for scientific journals in the areas of Numerical Analysis, Optimization and Scientific Computing, e.g., Applied Mathematics and Computation, Computational Optimization and Applications, SIAM Journal on Imaging Sciences.

TEACHING ACTIVITY

Since A.Y. 2002-2003 Valentina De Simone has been teaching courses of Scientific Computing, Numerical Computing and Numerical Optimization (including applications to image processing), for undergraduate and graduate programs in Mathematics and in Mathematics and Computer Science at the University Campania "Luigi Vanvitelli" (formerly Second University of Naples).

SOFTWARE DEVELOPMENT

1. SBSA_QP - Split Bregman method with Subspace Acceleration for Quadratic Problems modeling sparse data recovery with fused lasso regularization, MATLAB, https://github.com/diserafi/SBSA_QP, co-authors: Daniela di Serafino and Marco Viola (University of Campania "Luigi Vanvitelli", Caserta, Italy).
2. PRQP - Potential Reduction solver for Quadratic Programming, Fortran 90, co-authors: S. Cafieri (École Nationale de l'Aviation Civile, Toulouse), D. di Serafino (University of Campania Luigi Vanvitelli), G. Toraldo (University of Naples Federico II), M. D'Apuzzo, F. Riccio (formerly at the Second University of Naples)

AWARDS

COAP 2010 best paper award for the paper entitled "On mutual impact of numerical linear algebra and large-scale optimization with focus on interior point methods" published in Computational Optimization and Applications, Springer, Vol. 25, no. 2, pp. 283-310, 2010 (with Marco D'Apuzzo and Daniela di Serafino)

SELECTED PUBLICATIONS (last 10 years):

1. S. Corsaro, V. De Simone, Z. Marino, Fused Lasso approach in portfolio selection, Annals of Operations Research, 2021, 299(1-2), pp. 47–59, ISSN: 0254-5330 (doi: 10.1007/s10479-019-03289-w).
2. S. Corsaro, V. De Simone, Z. Marino, Split Bregman iteration for multi-period mean variance portfolio optimization, Applied Mathematics and Computation, Volume 392, Article number 125715, 2021, ISSN: 0096-3003 (doi: 10.1016/j.amc.2020.125715).
3. L. Antonelli, V. De Simone, D. di Serafino, Spatially Adaptive Regularization in Image Segmentation, Algorithms, 13(9), 226, 2020, ISSN: 1999-4893 (doi:10.3390/a13090226).
4. V. De Simone, D. di Serafino, M. Viola, A subspace-accelerated split Bregman method for sparse data recovery with joint l1-type regularizers, Electronic Transactions on Numerical Analysis, 53, pp. 406–42, 2020, ISSN: E1068–9613 (doi: 10.1553/etna_vol53s406).
5. S. Corsaro, V. De Simone, Adaptive l1-regularization for short-selling control in portfolio selection, Computational Optimization and Applications, 72(2), pp. 457-478, 2019, ISSN: 0926-6003 (doi: 10.1007/s10589-018-0049-4).
6. L. Bergamaschi, V. De Simone, D. di Serafino, A. Martínez, BFGS-like updates of constraint preconditioners for sequences of KKT linear systems in quadratic programming, Numerical Linear Algebra with Applications, 2018 (online), ISSN: 1099-1506 (doi: 10.1002/nla.2144).
7. L. Antonelli, V. De Simone, D. di Serafino, On the application of the spectral projected gradient method in image segmentation, Journal of Mathematical Imaging and Vision, 54 (1), 2016, pp. 106-116, ISSN: 0924-9907, published online in 2015 (doi: 10.1007/s10851-015-0591-y).
8. S. Bellavia, V. De Simone, D. di Serafino, B. Morini, Updating constraint preconditioners for KKT systems in quadratic programming via low-rank corrections, SIAM Journal on Optimization, 25 (3), 2015, pp. 1787-1808, ISSN: 1052-6234 (doi: 10.1137/130947155).

9. S. Bellavia, V. De Simone, D. di Serafino, B. Morini, A preconditioning framework for sequences of diagonally modified linear systems arising in optimization, *SIAM Journal on Numerical Analysis*, 50 (6), 2012, pp. 3280-3302, ISSN: 0036-1429 (doi: 10.1137/110860707).
10. S. Bellavia, V. De Simone, D. di Serafino, B. Morini, Efficient Preconditioner Updates for Shifted Linear Systems, *SIAM Journal on Scientific Computing*, 33 (4), 2011, pp. 1785-1809, ISSN: 1064-8275 (doi: 10.1137/100803419).