

## Curriculum Vitae

*"I accept nothing on authority. A hypothesis must be backed by reason, or else it is worthless" - Isaac Asimov*

### Personal information

Place and date of birth Italy, Monza (MB), December the 12th, 1988  
Pronouns he/his  
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Homepage My own page, ResearchGate

### Research Interests

Regularization of Inverse Problems, with focus on image processing  
Multigrid and Preconditioning  
Krylov subspace methods  
Optimization techniques

### Education

2013–2016 **Ph.D. in Computer Science and Computational Mathematics**, *University of Insubria, Como, Italy, Department of Science and high Technology.*  
2010–2012 **Master degree in Mathematics**, *University of Bicocca– Milano, Italy, Department of Matematica e Applicazioni, Final grade 110/110 cum laude.*  
2007–2010 **Bachelor in Mathematics**, *University of Bicocca– Milano, Italy, Department of Matematica e Applicazioni, Final grade 98/110.*

#### Ph.D. Thesis

Title *Tikhonov-type iterative regularization methods for ill-posed inverse problems: theoretical aspects and applications*  
Advisor Prof. Marco Donatelli

#### Master Thesis

Title *Bivariate subdivision scheme with non separable bases*  
Supervisor Prof. Mira Bozzini  
Coexaminer Dott. Milvia Rossini

#### Bachelor Thesis

Title *An adaptive method for the approximation of sparse data*  
Supervisor Prof. Mira Bozzini

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## Current Position

12/2024– Present Associate Professor at the University of Cagliari, Cagliari, Italy

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## Previous Positions

12/2021– 12/2024 Assistant Professor (Tenure-Track) at the University of Cagliari, Cagliari, Italy

08/2019– 12/2021 Assistant Professor (non Tenure-Track) at the University of Cagliari, Cagliari, Italy

04/2017– 07/2019 Postdoctoral Researcher at the Kent State University, Kent, OH, Supervisor: Prof. Lothar Reichel (reichel@math.kent.edu)

11/2013– 12/2016 PhD Student (fellowship), PhD in Computer Science and Computational Mathematics, Advisor: Prof. Marco Donatelli (marco.donatelli@uninsubria.it)

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## Publications

### Published

A. Azzarelli and A. Buccini, *A variational model for glyph extraction, theoretical aspects and implementation*, Electronic Transactions on Numerical Analysis, Accepted.

2026 A. Buccini and E. Crabu, A tool for the construction of synthetic petroglyphs, 2025 25th International Conference on Computational Science and Its Applications (ICCSA), (2026), pp. 417–429, [https://doi.org/10.1007/978-3-031-97638-4\\_26](https://doi.org/10.1007/978-3-031-97638-4_26).

2025 A. Buccini, F. Chen, O. De La Cruz Cabrera, and L. Reichel, *Fast Alternating Least-Squares Methods for Trigonometric Curve Fitting*, Applied Numerical Mathematics, vol. 208 (2025), pp. 104–134, <https://doi.org/10.1016/j.apnum.2024.01.001>.

2025 A. Buccini, F. Chen, M. Pasha, and L. Reichel, *Krylov subspace based FISTA-type methods for linear discrete ill-posed problems*, Numerical Linear Algebra with Applications, vol. 32 (2025), art. num. e2610, <https://doi.org/10.1002/nla.2610>.

2025 A. Buccini, M. Donatelli, and M. Ratto, *Multigrid methods for Computed Tomography*, Symmetry, vol 14 (2025), art. num. 470, <https://doi.org/10.3390/sym17030470>.

2025 A. Buccini, M. Donatelli, L. Onisk, and L. Reichel, *Flexible iterative methods for linear systems of equations with multiple right-hand sides*, Numerical Algorithms, vol. 100, pp. 1477–1505, <https://doi.org/10.1007/s11075-025-02007-x>.

2025 A. Buccini, S. Gazzola, L. Onisk, M. Pasha, and L. Reichel, *Projected iterated Tikhonov in general form with adaptive choice of the regularization parameter*, Numerical Algorithms, vol. 100, pp. 1617–1637, <https://doi.org/10.1007/s11075-025-02072-2>.

2024 S. Aleotti, A. Buccini, and M. Donatelli, *Fractional graph Laplacian for image reconstruction*, Applied Numerical Mathematics, vol. 200 (2024), pp. 43–57, <https://doi.org/10.1016/j.apnum.2023.05.007>.

2024 A. Buccini, P. Díaz de Alba, and F. Pes, *An Alternating Direction Multiplier Method for the Inversion of FDEM Data*, Journal of Scientific Computing, vol. 101 (2024), art. num. 14, <https://doi.org/10.1007/s10915-024-02652-9>.

2024 A. Buccini and L. Reichel, *Software for limited memory restarted  $\ell^p - \ell^q$  minimization methods using generalized Krylov subspaces*, Electronic Transactions on Numerical Analysis, vol. 61 (2024), pp. 66–91, [https://doi.org/10.1553/etna\\_vol61s66](https://doi.org/10.1553/etna_vol61s66).

- 2023 M. Alotaibi, A. Buccini, and L. Reichel, *Krylov Subspace Split Bregman Methods*, Applied Numerical Mathematics, vol. 184 (2023), pp. 371–390, <https://doi.org/10.1016/j.apnum.2022.10.009>.
- 2023 A. Buccini, O. De la Cruz Cabrera, C. Koukouvinos, M. Mitrouli, and L. Reichel, *Variable selection via  $\ell_p$ - $\ell_q$  minimization for high-dimensional data*, Communications in Statistics - Simulation and Computation, vol. 52 (2023), pp. 4326–4347, <https://doi.org/10.1080/03610918.2021.1961151>.
- 2023 A. Buccini, P. Díaz de Alba, F. Pes, and L. Reichel, *An Efficient Implementation of the Gauss-Newton Method Via Generalized Krylov Subspaces*, Journal of Scientific Computing, vol. 93 (2023), art. num. 44, <https://doi.org/10.1007/s10915-023-02360-w>.
- 2023 A. Buccini, M. Donatelli, and L. Reichel, *Theoretical and numerical aspects of a non-stationary preconditioned iterative method for linear discrete ill-posed problems*, Journal of Computational and Applied Mathematics, vol. 423 (2023), 114940, <https://doi.org/10.1016/j.cam.2022.114940>.
- 2023 A. Buccini, L. Onisk, and L. Reichel, *A preconditioned Arnoldi–Tikhonov method for the solution of linear discrete ill-posed problems*, Numerical Algorithms, vol. 92 (2023), pp. 223–245, <https://doi.org/10.1007/s11075-022-01407-7>.
- 2023 A. Buccini, L. Onisk, and L. Reichel, *Range restricted iterative methods for the solution of discrete linear ill-posed problems*, Electronic Transactions on Numerical Analysis, vol. 58, pp. 348–377, [https://doi.org/10.1553/etna\\_vol58s348](https://doi.org/10.1553/etna_vol58s348).
- 2023 A. Buccini and L. Reichel, *Limited memory restarted  $\ell^p$ – $\ell^q$  minimization methods using generalized Krylov subspaces*, Advances in Computational Mathematics, vol. 49, art. num. 26, <https://doi.org/10.1007/s10444-023-10020-8>.
- 2022 D. Bianchi, A. Buccini, M. Donatelli, and E. Randazzo, *Graph Laplacian for image deblurring*, Electronic Transactions on Numerical Analysis, vol. 55 (2022), pp. 169–186, [https://doi.org/10.1553/etna\\_vol55s169](https://doi.org/10.1553/etna_vol55s169).
- 2022 A. Buccini, *Fast Alternating Direction Multipliers Method by Generalized Krylov Subspaces*, Journal of Scientific Computing, vol 90, pp. 60, <https://doi.org/10.1007/s10915-021-01727-1>.
- 2022 A. Buccini and P. Díaz de Alba, *A variational non-linear constrained model for the inversion of FDEM data*, Inverse Problems, vol. 38 no. 1 (2022), pp. 014001, <https://doi.org/10.1088/1361-6420/ac3c54>.
- 2022 A. Buccini, M. Pragliola, L. Reichel, and F. Sgallari, *A comparison of parameter selection rules for  $\ell^p$  –  $\ell^q$  minimization*, Annali dell'Università di Ferrara, Vol. 68 (2022), pp.441–463, <https://doi.org/10.1007/s11565-022-00430-9>.
- 2021 M. Alotaibi, A. Buccini, and L. Reichel, *Restoration of blurred images corrupted by impulse noise via median filters and  $\ell^p$  –  $\ell^q$  minimization*, 2021 21st International Conference on Computational Science and Its Applications (ICCSA), (2021), pp. 112–122, <https://doi.org/10.1109/ICCSA54496.2021.00025>.
- 2021 X. Bai, A. Buccini, and L. Reichel, *Golub-Kahan vs. Monte Carlo: A comparison of bidiagonalization and randomized SVD methods for the solution of linear discrete ill-posed problems*, BIT Numerical Mathematics, vol. 64 no. 10. 4 (2021), pp. 1093–1114, <https://doi.org/10.1007/s10543-021-00857-0>.
- 2021 X. Bai, A. Buccini, and L. Reichel, *Solution of linear discrete ill-posed problems by discretized Chebyshev expansion*, 2021 21st International Conference on Computational Science and Its Applications (ICCSA), (2021), pp. 101–111, <https://doi.org/10.1109/ICCSA54496.2021.00024>.

- 2021 A. Buccini, *Generalized Cross Validation stopping rule for Iterated Tikhonov regularization*, 2021 21st International Conference on Computational Science and Its Applications (ICCSA), (2021), pp. 1–9, <https://doi.org/10.1109/ICCSA54496.2021.00012>.
- 2021 A. Buccini, and M. Donatelli, *Graph Laplacian in  $\ell^2 - \ell^q$  regularization for image reconstruction*, 2021 21st International Conference on Computational Science and Its Applications (ICCSA), (2021), pp. 29–38, <https://doi.org/10.1109/ICCSA54496.2021.00015>.
- 2021 A. Buccini, M. Donatelli, L. Reichel, and W. Zheng, *A new non-stationary preconditioned iterative method for linear discrete ill-posed problems*, Numerical Linear Algebra with Applications, vol. 28 no. 2 (2021), e2353, <https://doi.org/10.1002/nla.2353>.
- 2021 A. Buccini, G. Huang, L. Reichel, and F. Yin, *On the choice of regularization matrix for an  $\ell_2 - \ell_q$  minimization method for image restoration*, Applied Numerical Mathematics, vol 164 (2021), pp. 211–221, <https://doi.org/10.1016/j.apnum.2020.11.004>.
- 2021 A. Buccini, Y. Park, and L.Reichel, *Corrigendum to “Comparison of a-posteriori parameter choice rules for linear discrete ill-posed problems” [J. Comput. Appl. Math. 373 (2020) 112138]*, vol. 397 (2021), pp. 113571, <https://doi.org/10.1016/j.cam.2021.113571>.
- 2021 A. Buccini, M. Pasha, and L. Reichel, *Linearized Krylov subspace Bregman iteration with nonnegativity constraint*, Numerical Algorithms, vol 87 no. 3 (2021), pp. 1177–1200, <https://doi.org/10.1007/s11075-020-01004-6>.
- 2021 A. Buccini and L. Reichel, *Generalized Cross Validation for  $\ell^p - \ell^q$  minimization*, Numerical Algorithms, vol. 88 no. 4 (2021), pp. 1595–1616, <https://doi.org/10.1007/s11075-021-01087-9>.
- 2020 D. Bianchi and A. Buccini, *Generalized Structure Preserving Preconditioners for Frame-Based Image Deblurring*, Mathematics, vol. 8 no. 5 (2020), 486, <https://doi.org/10.3390/math8040468>.
- 2020 A. Buccini, O. De La Cruz Cabrera, M. Donatelli, A. Martinelli, and L. Reichel, *Large Scale Regression with Non-Convex Loss and Penalty*, Applied Numerical Mathematics, vol 157 (2020), pp. 590–601, <https://doi.org/10.1016/j.apnum.2020.07.006>.
- 2020 A. Buccini, P. Dell’Acqua, and M. Donatelli, *A general framework for the acceleration of ADMM*, Numerical Algorithms, vol 80 (2020), pp. 829–848, <https://doi.org/10.1007/s11075-019-00839-y>.
- 2020 A. Buccini and M. Donatelli, *A Multigrid frame based method for image deblurring*, Electronic Transactions in Numerical Analysis, vol. 53 (2020), pp. 283–312, [https://doi.org/10.1553/etna\\_vol53s283](https://doi.org/10.1553/etna_vol53s283).
- 2020 A. Buccini, Y. Park, and L. Reichel, *Comparison of A-Posteriori Parameter Choice Rules for Linear Discrete Ill-Posed Problems*, Journal of Computational and Applied Mathematics, vol. 373 (2020), 112138, <https://doi.org/10.1016/j.cam.2019.02.005>.
- 2020 A. Buccini, M. Pasha, and L. Reichel, *Generalized Singular Value Decomposition with Iterated Tikhonov Regularization*, Journal of Computational and Applied Mathematics, vol. 373 (2020), 112276, <https://doi.org/10.1016/j.cam.2019.05.024>.
- 2020 A. Buccini, M. Pasha, and L. Reichel, *Modulus-based iterative methods for constrained  $\ell_p - \ell_q$  minimization*, Inverse Problems, vol. 36 no. 8 (2020), pp. 084001, <https://doi.org/10.1088/1361-6420/ab9f86>.
- 2020 A. Buccini and L. Reichel, *An  $\ell^p - \ell^q$  minimization method with cross-validation for the restoration of impulse noise contaminated images*, Journal of Computational and Applied Mathematics, vol. 375 (2020), 112824, <https://doi.org/10.1016/j.cam.2020.112824>.

- 2019 D. Bianchi, A. Buccini, and M. Donatelli, *Structure preserving preconditioning for frame-based image deblurring*, in *Computational Methods for Inverse Problems in Imaging*, Springer, Cham (2019), pp. 33–49, [https://doi.org/10.1007/978-3-030-32882-5\\_2](https://doi.org/10.1007/978-3-030-32882-5_2).
- 2019 A. Buccini and L. Reichel, *An  $\ell^2 - \ell^q$  regularization method for large discrete ill-posed problems*, *Journal of Scientific Computing*, vol. 79 no. 3 (2019), pp. 1526–1549, <https://doi.org/10.1007/s10915-018-0816-5>.
- 2019 Y. Fan, A. Buccini, M. Donatelli, and T.-Z. Huang, *A non-convex regularization approach for compressive sensing*, *Advances in Computational Mathematics*, vol. 45 no. 2 (2019), pp. 563–588, <https://doi.org/10.1007/s10444-018-9627-3>.
- 2018 A. Buccini, M. Donatelli, and F. Ferri, *Weakly constrained Lucy-Richardson with application to inverse light scattering*, *Journal of Scientific Computing*, vol. 74 no. 2 (2018), pp. 786–804, <https://doi.org/10.1007/s10915-017-0461-4>.
- 2018 A. Buccini, M. Donatelli, and R. Ramlau, *A semi-blind regularization algorithm for inverse problems with application to image deblurring*, *SIAM Journal of Scientific Computing*, vol. 40 no. 1 (2018), pp. A452–A483, <https://doi.org/10.1137/16M1101830>.
- 2018 A. Buccini, Y. Park, and L. Reichel *Numerical aspects of the nonstationary modified linearized Bregman algorithm*, *Applied Mathematics and Computation*, vol. 337 no. 15 (2018), pp. 386–398, <https://doi.org/10.1016/j.amc.2018.05.044>.
- 2017 Z.Z. Bai, A. Buccini, K. Hayami, L.Reichel, J.F. Yin, and N. Zheng, *Modulus-Based Method for Constrained Tikhonov Regularization*, *Journal of Computational and Applied Mathematics*, vol. 319 (2017), pp. 1–13, <https://doi.org/10.1016/j.cam.2016.12.023>.
- 2017 A. Buccini, *Regularizing preconditioners by non-stationary iterated Tikhonov with general penalty term*, *Applied Numerical Mathematics*, vol. 116 (2017), pp. 64–81, <https://doi.org/10.1016/j.apnum.2016.07.009>.
- 2017 A. Buccini, M. Donatelli, and L. Reichel, *Iterated Tikhonov with general penalty term*, *Numerical Linear Algebra with Applications*, vol. 24 no. 4 (2017), e2089, <https://doi.org/10.1002/nla.2089>.
- 2015 D. Bianchi, A. Buccini, M. Donatelli, and S. Serra-Capizzano, *Iterated fractional Tikhonov regularization*, *Inverse Problems*, vol.31 no. 5 (2015), pp.055005, <https://doi.org/10.1088/0266-5611/31/5/055005>.

### Submitted

- A. Azzarelli, A. Buccini, A. El Hachimi, and L. Reichel, *Low-rank and sparse splitting for glyph extraction*
- A. Buccini, M. Donatelli, M. Ratto, and L. Reichel, *A preconditioned majorization-minimization method for  $\ell^p - \ell^q$  minimization*
- A. Buccini, M. Donatelli, M. Ratto, and L. Reichel, *An iterated  $\ell^2 - \ell^q$  regularization method*
- A. Buccini, M. Donatelli, M. Ratto, and L. Reichel, *An  $\ell^p - \ell^q$  minimization method using preconditioned generalized Krylov subspaces with generalized cross validation.*

### In progress

- A. Azzarelli and A. Buccini, *Blind regularization operator for  $\ell^2 - \ell^q$  minimization (working title)*
- A. Buccini, E. Crabu, and G. Rodriguez, *An  $\ell^p$  minimization for the treatment of non-Lambertian points in photometric stereo (working title)*
- A. Buccini, P. Díaz de Alba, F. Pes, and R. Sormani, *Solution of large-scale inverse problems via preconditioned and constrained  $\ell^2 - \ell^q$  with application to geophysics*

## Scientific Communications

### Invited Talks

- 2026 Solution of large-scale inverse problems via preconditioned and constrained  $\ell^2 - \ell^q$  with application to geophysics, A. Buccini, P. Díaz de Alba, F. Pes, R. L. Sormani; Numerical Analysis and Scientific Computation with Applications (NASCA), Kalamata, Greece, June 9–12, 2026
- 2025 Iterated  $\ell^2 - \ell^q$  regularization, A. Buccini, M. Donatelli, M. Ratto, and L. Reichel; European Conference on Numerical Mathematics and Advanced Applications (ENUMATH), Heidelberg, Germany, September 1–5, 2025
- 2024 Software for  $\ell^p - \ell^q$  minimization methods using generalized Krylov subspaces, A. Buccini and L. Reichel; International Conference “Mathematics & Decisions”, Rabat, Morocco, December 17–20, 2024
- 2024 Fast Alternating Direction Multipliers Method by Generalized Krylov Subspaces, A. Buccini; SIAM Conference on Imaging Science (SIAM IS24), Atlanta, GA, USA, May 28–31, 2024
- 2024 Limited memory restarted  $\ell^p - \ell^q$  minimization methods using generalized Krylov subspaces, A. Buccini and L. Reichel; SIAM Conference on Applied Linear Algebra (SIAM LA24), Paris, France, May 13–17, 2024
- 2024 Review of the project “Tecniche numeriche per lo studio dei problemi inversi e l’analisi delle reti complesse” including the talk “An efficient implementation of the Gauss-Newton Method via Generalized Krylov Subspaces”, A. Buccini, P. Díaz de Alba, F. Pes, and L. Reichel; GNCS-INdAM congress, Rimini, Italy, February 14–16, 2024
- 2023 Fast Alternating Direction Multipliers Method by Generalized Krylov Subspaces, A. Buccini; Unione Matematica Italiana (UMI), Pisa, Italy, September 4–9, 2023
- 2023 Limited memory restarted  $\ell^p - \ell^q$  minimization methods using generalized Krylov subspaces, A. Buccini and L. Reichel; Applied Inverse Problems (AIP), Göttingen, Germany, September 4–8, 2023
- 2023 Limited memory restarted  $\ell^p - \ell^q$  minimization methods using generalized Krylov subspaces, A. Buccini and L. Reichel; International Congress on Industrial and Applied Mathematics (ICIAM), Tokyo, Japan, August 20–25, 2023
- 2023 Fast Alternating Direction Multipliers Method by Generalized Krylov Subspaces, A. Buccini; Numerical Analysis and Scientific Computation with Applications (NASCA23), Athens, Greece, July 3–6, 2023
- 2023 A variational non-linear constrained model for the inversion of FDEM data, A. Buccini and P. Díaz de Alba; Challenges and Advances in Numerical Analysis (CANA), Cagliari, Italy, June 5–9, 2023
- 2022 Fast Alternating Direction Multipliers Method by Generalized Krylov Subspaces, A. Buccini; Functional Analysis, Approximation Theory and Numerical Analysis (FAATNA), Matera, Italy, July 5–8, 2022
- 2022 A variational non-linear constrained model for the inversion of FDEM data, A. Buccini and P. Díaz de Alba; Householder Symposium XXI, Selva di Fasano, Italy, June 13–17, 2022
- 2022 Fast Alternating Direction Multipliers Method by Generalized Krylov Subspaces, A. Buccini; Numerical Methods for Large Scale Problems (NMLSP), Belgrade, Serbia, June 6–10, 2022
- 2022 Regularizing Preconditioners for  $\ell^1$  Regularization, D. Bianchi, A. Buccini, and M. Donatelli; SIAM Conference on Imaging Science (SIAM IS22), Online, March 21–25, 2022

- 2021 Structure Preserving Preconditioning for Frame-Based Image Deblurring, D. Bianchi, A. Buccini, and M. Donatelli; SIAM Conference on Applied Linear Algebra (SIAM LA21), Online, May 17–21, 2021
- 2019 Variational Methods for Ill-posed inverse problems, A. Buccini; International Congress on Industrial and Applied Mathematics (ICIAM19), Valencia, Spain, 15–19 July, 2019
- 2018 An  $\ell^2$ - $\ell^q$  regularization method for large discrete ill-posed problems, A. Buccini and L. Reichel; SIAM Imaging Science (SIAM IS 2018), Bologna, Italy, June 5–8, 2018
- 2017 Non-stationary regularizing preconditioners for ill-posed problems, A. Buccini and M. Donatelli; Householder Symposium XX, Blacksburg (VA), USA, 18–23 June, 2017
- 2017 A Semi-blind regularization algorithm for inverse problems with application to image deblurring, A. Buccini, M. Donatelli, and R. Ramlau; Applied Inverse Problems (AIP 2017), Hangzhou, China, May 29 – June 2, 2017
- 2015 Multigrid regularization method for image deblurring with arbitrary boundary conditions, A. Buccini and M. Donatelli; The 8th International Congress on Industrial and Applied Mathematics (ICIAM 2015), Beijing, China, August 10–14, 2015
- 2014 Multigrid regularization method for image deblurring with arbitrary boundary conditions, A. Buccini and M. Donatelli; 18th European Conference on Mathematics for Industry (ECMI 2014), Taormina, Italy, June 9–19, 2014

#### Contributed Talks

- 2024 An Alternating Direction Multiplier Method for the inversion of FDEM data, A. Buccini, P. Diaz de Alba, and F. Pes; Advances in Applied Mathematics and Learning Approaches for Cultural Heritage and the Arts (AMALART), Cagliari, Italy, April 22–24, 2024
- 2019 Parameter selection rules for  $\ell^p - \ell^q$  regularization, A. Buccini and L. Reichel; Recent advances in scientific computation, Santa Margherita di Pula, Italy, 27–29 May, 2019
- 2018  $\ell^p - \ell^q$  minimization methods for image restoration, A. Buccini and L. Reichel; Workshop “Computational Methods for Inverse Problems in Imaging”, Como, Italy, 16–18 July, 2018
- 2018 An  $\ell^p - \ell^q$  minimization method with cross-validation for the restoration of impulse noise contaminated images, A. Buccini and L. Reichel; Numerical Analysis and Scientific Computation with Applications (NASCA 2018), Kalamata, Greece, 2–6 July, 2018
- 2017 A Semi-blind regularization algorithm for inverse problems with application to image deblurring, A. Buccini, M. Donatelli, and R. Ramlau; Summer School “Computational Methods for Inverse Problems in Imaging”, Como, Italy, May 21–25, 2017
- 2017 Non-stationary regularizing preconditioners for ill-posed problems, A. Buccini and M. Donatelli; Due Giorni Algebra Lineare, Como, Italy, 16–17 February, 2017
- 2016 Iterated Tikhonov with general penalty term, A. Buccini, M. Donatelli and L. Reichel; SIAM Imaging Science 2016, (SIAM IS 2016), Albuquerque, New Mexico (USA), May 23–26, 2016
- 2015 On nonstationary preconditioned iterative regularization methods for image deblurring, A. Buccini and M. Donatelli; New Trends in Numerical Analysis, (NETNA 2015), Falerna, Italy, June 18–21, 2015

#### Organization

- 2026 Organizer of the Minisymposium: “Numerical Linear Algebra for large-scale inverse problems” with A. Azzarelli at the International Conference “Numerical Analysis and Scientific Computation with Applications”, Kalamata, Greece, June 9–12, 2026

- 2024 Organizer of the Minisymposium: “Regularization of ill-posed inverse problems” with A. Azzarelli at the International Conference “Mathematics & Decisions”, Rabat, Morocco, December 17–20, 2024
- 2024 Organizer of the Minisymposium: “Numerical Linear Algebra Meets Inverse Problems in Imaging” with Prof. L. Reichel at the SIAM conference on Imaging Science (SIAM IS24), Atlanta, GA, USA, May 28 – 31, 2024
- 2024 Organizer of the Minisymposium: “Acceleration of Methods for the Solution of Large Scale Problems” with Prof. L. Reichel at the SIAM conference on Applied Linear Algebra (SIAM LA24), Paris, France, May 13 – 17, 2024
- 2023 Organizer of the Minisymposium: “Numerical linear algebra tools for the solution of ill-posed inverse problems” with Dr. L. Onisk at Numerical Analysis and Scientific Computation with Applications (NASCA23), Athens, Greece, July 3–6, 2023
- 2023 Member of the Organizing Committee at Challenges and Advances in Numerical Analysis (CANA23), Cagliari, Italy, June 5–9, 2023
- 2023 Member of the Program Committee at Scale Space and Variational Methods in Computer Vision (SSVM23), Cagliari, Italy, May 21–25, 2023
- 2022 Member of the Scientific Committee at NMLSP 2022, Belgrade, Serbia, June 6–10, 2022
- 2022 Member of the Organizing Committee at NMLSP 2022, Belgrade, Serbia, June 6–10, 2022
- 2022 Organizer of the Minisymposium: “Regularization of ill-posed inverse problems” with Prof. M. Donatelli at NMLSP 2022, Belgrade, Serbia, June 6–10, 2022
- 2022 Organizer of the Minisymposium: “Inverse Problems Meet Imaging Science: From (Noisy) Data to (Nice) Images” with Dr. C. Fenu at SIAM IS 2022, Online, March 21–25, 2022
- 2021 Organizer of the PRIMO Workshop, Bologna, Italy, with Dr. P. Cascarano, Dr. S. Crisci, Dr. G. Gurioli, Dr. M. Pragliola, and Dr. M. Viola, October 11–13, 2021
- 2021 Member of the Local Organizing Committee Chairs for the ICCSA conference, Cagliari, Italy, September 13–16, 2021
- 2021 Organizer of the Workshop: “Application of Numerical Analysis to Imaging Science” with Dr. Fenu at ICCSA, Cagliari, Italy, September 13–16, 2021
- 2021 Organizer of the Minisymposium: “Computational Methods for Inverse Problems” with Prof. Lothar Reichel and Giuseppe Rodriguez at SIAM LA 2021, Online, May 17–21, 2021
- 2020-2021 Organizer of the PRIMO talks (seminar series) with Dr. P. Cascarano, Dr. S. Crisci, Dr. G. Gurioli, Dr. M. Pragliola, and Dr. M. Viola, October 2020 – June 2021
- 2019 Organizer of the Minisymposium: “Computational Methods for Inverse Problems” with Prof. Lothar Reichel at ICIAM 2019, Valencia, Spain, July 15–19, 2019
- 2019 Organizer of the Minisymposium: “Regularization methods based on subspace selection” with Prof. Marco Donatelli at AIP 2019, Grenoble, France, July 8–12, 2019
- 2019 Organizer of the Minisymposium: “Iterative method for well-posed and ill-posed problems” with Dr. Kirk Soodhalter at the Recent Advances in Scientific Computation conference on the occasion of the 25th anniversary of the ETNA journal, Cagliari, Italy, May 27–29, 2019
- 2018 Member of the Local Committee of the INdAM intensive period *Computational Methods for Inverse Problems in Imaging*, Como, Italy, May 21 – July 20, 2018

## Posters

- 2025 Iterated  $\ell^2 - \ell^q$  regularization, A. Buccini, M. Donatelli, M. Ratto, and L. Reichel; AQuA25 - Approximation, Quadrature, and Applications, Santa Margherita di Pula, Italy, October 9–11, 2025
- 2025 Iterated  $\ell^2 - \ell^q$  regularization, A. Buccini, M. Donatelli, M. Ratto, and L. Reichel; Due Giorni di Algebra Lineare Numerica e Applicazioni (Two days of Numerical Linear Algebra and Applications), Pisa, Italy, January 20–21, 2025
- 2024 An Alternating Direction Multiplier Method for the inversion of FDEM data, A. Buccini, P. Diaz de Alba, and F. Pes; Numerical Linear Algebra, Luminy, France, September 16–20, 2024
- 2021 A variational non-linear constrained model for the inversion of FDEM data, A. Buccini and P. Diaz de Alba; Numerical Methods and Scientific Computing, Luminy, France, November 8–12, 2021
- 2018  $\ell^p$ - $\ell^q$  minimization methods for image restoration, A. Buccini and L. Reichel; Calcolo scientifico e modelli matematici: alla ricerca delle cose nascoste attraverso le cose manifeste 2.0 (Scientific computation and mathematical modeling: looking for hidden things through manifest things 2.0), Como, Italy, May 16–18, 2018
- 2017 Tikhonov-based regularization methods for ill-posed inverse problems, A. Buccini PCH 60, Copenhagen, Denmark, August 23–25, 2017
- 2016 On nonstationary preconditioned iterative regularization methods for image deblurring, A. Buccini; Mathematical Methods for Digital Image Analysis and Processing, Como, Italy, March 6–7, 2017
- 2016 On nonstationary preconditioned iterative regularization methods for image deblurring, A. Buccini; Optimization Techniques for Inverse Problems III, Modena, Italy, September 19–21, 2016
- 2016 On nonstationary preconditioned iterative regularization methods for image deblurring, A. Buccini; HD Tomo Days, Lyngby, Denmark, April 7–8, 2016
- 2016 On nonstationary preconditioned iterative regularization methods for image deblurring, A. Buccini; Workshop on Structured Matrix Computations with Applications, Sanya, China, March 14–18, 2016 (Invited poster)
- 2016 On nonstationary preconditioned iterative regularization methods for image deblurring, A. Buccini; Winter School on Advances in Mathematics of Signal Processing, Bonn, Germany, January 11–15, 2016

## Seminars

- 2021 Structure Preserving preconditioners for  $\ell^1$  regularization; Univeristy of Insubria, Como, Italy, January 9th, 2021
- 2019 Variational methods for inverse problems; Wichita State University (WSU), Wichita (KS), USA, March 18th, 2019
- 2018  $\ell^p$ - $\ell^q$  regularization methods for image restoration; Colloquium talk, Kent State University (KSU), Kent (OH), USA, September 6th, 2018
- 2017 An  $\ell^2$ - $\ell^q$  regularization method for large discrete ill-posed problems; Kent State University (KSU), Kent (OH), USA, September 29th, 2017
- 2017 Tikhonov-based regularization methods for ill-posed inverse problems; Kent State University (KSU), Kent (OH), USA, May 1st, 2017
- 2015 On nonstationary preconditioned iterative regularization methods for image deblurring, A. Buccini and M. Donatelli; Exploiting Hidden Structure in Matrix Computations. Algorithms and Applications, CIME-EMS Summer School in applied mathematics, Cetraro, Italy, June 22–26, 2015

- 2015 On nonstationary preconditioned iterative regularization methods for image deblurring, A.Buccini and M.Donatelli; Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz, Austria, July 7, 2015
- 2015 On nonstationary preconditioned iterative regularization methods for image deblurring, A.Buccini and M.Donatelli; Kent State University (KSU), Kent (OH), USA, November 6, 2015

## Funding and Projects

### Projects

- 2023 P.I. for the “A mathematical approach to inverse problems arising in cultural heritage preservation and dissemination ” Project, PRIN PNRR 2022 N. P2022PMEN2, national grant of Italian Ministry of Instruction, University and Research (224,996€)
- 2022 P.I. for the project “Regularization Methods and Models for large scale inverse ill-posed problems” of the GNCS group of INdAM (2,700€)
- 2022 Grant for inviting a Visiting Professor for 10 days at the University of Cagliari
- 2021 Co-P.I. for the funding for the organization of the “PRIMO Workshop” obtained from the Department of Mathematics of the University of Bologna (2,500€)

### Individual grants

- 2021 Full board fellowship for the participation to the “Numerical Methods and Scientific Computing” conference at the CIRM research center, Luminy, France, November 8–12, 2021
- 2019 Individual GNCS-INDAM grant for the project “Reconstruction of sparse data” as part of the “Young Researchers Project” (Progetto Giovani Ricercatori)
- 2018 Individual GNCS-INDAM grant for attendance at NASCA 2018
- 2016 Student travel award for the participation to the SIAM conference on Imaging Science 2016, Albuquerque, New Mexico (USA)
- 2016 Individual fellowship from the Hausdorff Institute of Mathematics (HIM) for the participation to the special trimester “Mathematics of Signal Processing”, HIM, Bonn, Germany
- 2014 Individual GNCS-INDAM grant for attendance at ECMI 2014

### Participant

- 2023-present IPIS (Inverse Problems in the Imaging Sciences) Project, PRIN 2022 N. 2022ANC8HL, national grant of Italian Ministry of Instruction, University and Research
- 2023 *Numerical techniques for the study of inverse problems and the analysis of complex networks*, INDAM (National Institute of High Mathematics) GNCS Project
- 2022-2024 Regione Autonoma della Sardegna research project “Computational Methods and Networks in Civil Engineering [COMANCHE]”
- 2021-2022 Participant to the creation and recording of the lectures for the “Numerical Analysis with Matlab” (NUMISMAT) European Digital UniverCity (EDUC) project co-founded by the Erasmus+ Program of the European Union
- 2020-2021 Regione Autonoma della Sardegna research project “Algorithms and Models for Imaging Science [AMIS]” (RASSR57257, intervento finanziato con risorse FSC 2014-2020 - Patto per lo Sviluppo della Regione Sardegna)
- 2017 *Non linear numerical methods for inverse problems and applications*, INDAM (National Institute of High Mathematics) GNCS Project

- 2015–2016 *New aspects of imaging regularization*, INDAM (National Institute of High Mathematics) GNCS Project
- 2014–2017 SMASIP (Structured Matrices in Signal and Image Processing) Project, PRIN 2012 N. 2012MTE38N, national grant of Italian Ministry of Instruction, University and Research

## Editorial Experiences

- 2022–Present Software Editor for *Electronic Transaction in Numerical Analysis*
- 2021 Editor for the IEEE proceedings of the Workshop: “Application of Numerical Analysis to Imaging Science” at the International Conference on Computer Science and its Applications 2021
- 2020–Present Editor for *Electronic Transaction in Numerical Analysis*
- 2017–Present Managing editor for *Electronic Transaction in Numerical Analysis*

## Teaching

### Graduate courses

- 2026–Present Instructor for the *Numerical Methods for Applied Sciences* bachelor course; University of Cagliari, Department of Mathematics and Computer Science
- 2025–Present Instructor for the *Laboratory Numerical Computing* master course; University of Cagliari, Department of Environmental Engineering
  - 2025 Instructor for the *Variational and Krylov methods for the solution of discrete inverse problems* course in the Summer School “Approximation and Quadrature for Applicative Integral Models”; CNR, Naples, Italy.
  - 2023 Instructor for the *Krylov methods for ill-posed inverse problems* course in the Winter School “Domain Decomposition and Krylov Subspace Methods for PDEs and Ill-Posed Problems”; UM6P, Benguerir, Morocco.
- 2022–present Instructor for the *Numerical Computing* master course; University of Cagliari, Department of Civil Engineering
- 2021–present Instructor for the *Applied Numerical Mathematics* master course; University of Cagliari, Department of Mathematics and Computer Science
  - 2020 Instructor for the *Regularization of ill-posed inverse problems* Ph.D. course; University of Cagliari, Department of Mathematics and Computer Science
  - 2019 Instructor for the *Regularization by filtering and variational methods: theoretical and numerical aspects* Ph.D. course; University of Insubria, Department of Science and High Technology
  - 2019 Instructor for the *Numerical Computing II* master and Ph.D. course; Kent State University, Department of Mathematical Sciences
  - 2018 Instructor for the *Numerical Computing I* master and Ph.D. course; Kent State University, Department of Mathematical Sciences

### Undergraduate courses

- 2019 – 2020 Instructor for the *Computations of Probability* bachelor course; University of Cagliari, Department of Mathematics and Computer Science
- 2018 Instructor for the *Calculus with Precalculus I* bachelor course; Kent State University, Department of Mathematical Sciences
- 2018 Instructor for the *Linear Algebra with Applications* bachelor course; Kent State University, Department of Mathematical Sciences

- 2017–2018 Instructor for the *Analytic Geometry and Calculus I* bachelor course; Kent State University, Department of Mathematical Sciences
- [Assistance and tutoring](#)
- 2016–2017 Teaching assistance for the *Computational Mathematics* course from the bachelor degree in Mathematics; University of Insubria Varese – Como, Department of Science and High Technology
- 2015–2016 Teaching assistance for the *Computational Mathematics* course from the bachelor degree in Mathematics; University of Insubria Varese – Como, Department of Science and High Technology
- 2014–2015 Teaching assistance for the *Computational Mathematics* course from the bachelor degree in Mathematics; University of Insubria Varese – Como, Department of Science and High Technology
- 2014–2015 Teaching assistance for the *Regularization of inverse problems* course from the master degree in Mathematics; University of Insubria Varese – Como, Department of Science and High Technology
- 2014–2015 Tutoring for the Calculus I and Algebra I course from the bachelor degree in Mathematics; University of Insubria Varese – Como, Department of Science and High Technology
- 2013–2014 Tutoring for the Algebra I course from the bachelor degree in Mathematics; University of Insubria Varese – Como, Department of Science and High Technology

### [Ph.D. Students](#)

- 2024–Present Andrea Azzarelli, Università di Cagliari, Cagliari, Italy (Co-advised with Prof. Giuseppe Rodriguez)
- 2023–Present Marco Ratto, Università dell’Insubria, Como, Italy (Co-advised with Prof. Marco Donatelli)
- 2020–2022 Lucas Onisk, Kent State University, Kent, Ohio, USA (Co-advised with Prof. Lothar Reichel)
- 2019–2021 Xianglan Bai, Kent State University, Kent, Ohio, USA (Co-advised with Prof. Lothar Reichel)
- 2017–2023 Fei Chen, Kent State University, Kent, Ohio, USA (Co-advised with Prof. Lothar Reichel)
- 2017–2020 Mirjeta Pasha, Kent State University, Kent, Ohio, USA (Co-advised with Prof. Lothar Reichel)
- 2017–2019 Yonggi Park, Kent State University, Kent, Ohio, USA (Co-advised with Prof. Lothar Reichel)

### [Postdocs and Research Associates supervision](#)

- 2025 Patricia Díaz de Alba, Research Associate (assegnista di ricerca), Università di Cagliari, Cagliari, Italy
- 2025 Rosita Luisa Sormani, Research Associate (assegnista di ricerca), Università di Cagliari, Cagliari, Italy
- 2024 Andrea Azzarelli, Research Associate (assegnista di ricerca), Università di Cagliari, Cagliari, Italy

### [Thesis](#)

- 2023 Co-advisor for the Ph.D. Thesis *Sparse Approximation, Curve Fitting, and Mathematical Methods for Exploring Living Liquid Crystals Transitions* (F. Chen)
- 2022 Co-advisor for the Ph.D. Thesis *Arnoldi-type methods for the solution of linear discrete ill-posed problems* (L. Onisk)
- 2021 Co-advisor for the Ph.D. Thesis *Non-Krylov Non-iterative Subspace Methods for Linear Discrete Ill-posed Problems* (X. Bai)
- 2020 Co-advisor for the Ph.D. Thesis *Krylov subspace type methods for the computation of non-negative or sparse solutions of ill-posed problems* (M. Pasha)
- 2019 Co-advisor for the Ph.D. Thesis *Parameter Selection Rules for Ill-Posed Problems* (Y. Park)
- 2017 Coexaminer for the Bachelor thesis *Cimmino’s method: generalizations ad applications* (the thesis has been written in italian under the title: “ Metodo di Cimmino: generalizzazioni ed applicazioni”)

- 2016 Coexaminer for the Master thesis *The alternating direction method of multipliers with application to image deblurring*

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## Institutional Roles

- 2024–Present Member of the Rule-book Committee (Comissione Regolamento) for the creation of an updated rule-book and of a vademecum for new hires for the Department of Mathematics and Computer Science at the University of Cagliari.
- 2024–Present Quality Assurance responsible (Referente per la qualità) for the Ph.D. program in Mathematics and Computer Science at the University of Cagliari.
- 2021 – 2024 Member of the technical working group on ethics and professional aspects for obtaining the European qualification in Human Resources Strategy for Researchers (HRS4R) for the University of Cagliari.

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## Visiting

### Research periods

- 2021 Visiting Prof. M. Donatelli at University of Insubria, Como, Italy, June 30st–July 9th
- 2018 Visiting Prof. M. Donatelli at University of Insubria, Como, Italy, May 21st–July 20th
- 2015 Visiting Prof. R. Ramlau at Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz, Austria, July 1st–9th, 2015
- 2015 Visiting Prof. L. Reichel at Kent State University, Kent OH, USA, October 10th–November 13th, 2015

### Special programs

- 2016 Participant to the special trimester "Mathematics of Signal Processing" at the Hausdorff Institute of Mathematics (HIM) in Bonn (8th January–8th February)

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## Awards

- 2024 Italian National Scientific Abilitation (Abilitazione Scientifica Nazionale) to the role of Full Professor.
- 2022 Italian National Scientific Abilitation (Abilitazione Scientifica Nazionale) to the role of Associate Professor.
- 2021 Invited by the Editorial Board of Inverse Problems to publish on the special issue "Emerging Talents 2021" of Inverse Problems (A. Buccini, P. Díaz De Alba, *A variational non-linear constrained model for the inversion of FDEM data*)
- 2021 Full board fellowship for the participation to the "Numerical Methods and Scientific Computing" conference at the CIRM research center, Luminy, France, 8th-12th November 2021
- 2021 Best Paper Award presented to the paper "A. Buccini, *Generalized Cross Validation stopping rule for Iterated Tikhonov regularization*" presented at the ICCSA 2021 conference
- 2018 Individual GNCS-INDAM grant for attendance at NASCA 2018
- 2016 Student travel award for the participation to the SIAM conference on Imaging Science 2016, Albuquerque, New Mexico (USA)
- 2016 Individual fellowship from the Hausdorff Institute of Mathematics (HIM) for the participation to the special trimester "Mathematics of Signal Processing", HIM, Bonn, Germany
- 2014 Individual GNCS-INDAM grant for attendance at ECMI 2014

## Membership

- 2020–Present Founding member of the PRIMO (Post-Graduate Researchers in Inverse Problems, Machine learning, and Optimization) group
- 2019–Present Research Group: Cagliari Numerical Analysis Group (CaNA). University of Cagliari
- 2014–Present Research Group: Matrix Structures In Analysis, Algorithms and Applications. the University of Insubria
- 2014–Present GNCS - Gruppo Nazionale Calcolo Scientifico (National Group of Scientific Computation)
- 2014–2024 SIAM - Society for Industrial and Applied Mathematics