CURRICULUM VITAE

Date: 08/11/2024
Abramo Agosti
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Current Position

– Since March 2021:
Assistant professor (RTDA), Università degli studi di Pavia.
Department of Mathematics.
Academic disciplines for italian University research and teaching:
MAT/05 - Mathematical analysis.

Previous Positions

– February 2020 - January 2021:
Scientific Collaborator, IRCCS Mondino Foundation.
Advanced Imaging and Radiomics center, Neuroradiology department
Subject: Development of Deep Learning alghorithms and computational models for the processing of Neuro Images and for Personalized Medicine.

– April 2018 - January 2020:
Scientific Collaborator, MOX Laboratory, Department of Mathematics, Politecnico di Milano.
Funded by AIRC grant MFAG 17412.
Supervisor: Prof. P. Ciarletta. *Subject*: Mathematical Analysis and Numerical implementation of optimization algorithms for personalized oncology.

– April 2016 - March 2018:
Post Doctoral Researcher, MOX Laboratory, Department of Mathematics, Politecnico di Milano.
Funded by AIRC grant MFAG 17412.
Supervisor: Prof. P. Ciarletta. *Subject*: Mathematical modeling of cancer development.

– April 2014 - March 2016:
Post Doctoral Researcher, Department of Mathematics, Politecnico di Milano.
Funded by FARB grant.
Supervisor: Prof. M. Grasselli. *Subject*: Mathematical Analysis and Numerics of Diffuse Interface models.

– April 2013 - March 2014:
Post Doctoral Researcher, MOX Laboratory, Department of Mathematics,

Politecnico di Milano.
Funded by ENI.
Supervisor: Prof. L. Formaggia. *Subject*: Mathematical Analysis and Numerical implementation of reactive flows in porous media.

- May 2012 - March 2013:
  Research Fellow, Department of Mathematics and Physics, Università Cattolica del Sacro Cuore di Brescia.
  Supervisor: Prof. F. Borgonovi. *Subject*: Mathematical modeling of Turbulence for particles remixing in urban areas.

Research fields

Analysis of PDE's; Numerical Analysis; Mathematical Physics; Optimization problems for Personalized Medicine; Deep Learning and Artificial Intelligence.

Education

- Phd in Physics, Astrophysics and Applied Physics. Università degli studi di Milano. February 2013, Ciclo XXIV.
  Thesis: Models of turbulence. Applications to particulate mixing induced by traffic flow in urban areas.
  Advisor: Prof. F. Borgonovi.

- Master degree in Physics, 110/110 Summa cum laude. Università Cattolica del Sacro Cuore di Brescia. July 2007.
  Thesis: Tachion condensation in cubic String Field Theory.
  Advisor: Prof. G. Nardelli.

- Bachelor's degree in Physics, 110/110 Summa cum laude. Università Cattolica del Sacro Cuore di Brescia. December 2004.

Awards

- 2007: XLVIII Agostino Gemelli Prize as best graduate at Faculty of Scienze Matematiche, Fisiche e Naturali.

Projects and Professional Qualifications

- 2018: Progetto Giovani GNFM Indam.
  Role: participant.
  Subject: Mathematical model for the GlioBlastoma growth.
  PI: Chiara Giverso (Politecnico di Torino).
  Funding: 4000 euro.

- 2021: MIUR-PRIN Grant 2020F3NCPX.
  Role: participant in the unit at Università di Pavia.
  Subject: Mathematics for industry 4.0 (Math4I4).
  PI: prof. Pasquale Ciarletta (Politecnico di Milano).
  Unit leader: prof. Elisabetta Rocca (Università di Pavia).

– 2023: MIUR-PRIN Grant P2022Z7ZAJ.
Role: participant in the unit at Università di Pavia.
Subject: A Unitary Mathematical Framework for Modelling Muscular Dystrophies.
PI: prof. Mattia Zanella (Università di Pavia).

– 2024: Progetto GNAMPA CUP E53C23001670001.
Role: Coordinator.
Subject: Analisi di modelli di campo di fase con applicazioni alla Biomedicina.
Funding: 4000 euro.

– Italian National Scientific Habilitation to Associate Professor, Mathematical Physics (compartment 01/A4), granted January 2022.

– Italian National Scientific Habilitation to Associate Professor, Mathematical Analysis (compartment 01/A3), granted November 2024.

Invited talks to international conferences

C1 ECCOMAS Congress 2024 - 9th European Congress on Computational Methods in Applied Sciences and Engineering. Lisboa, Portugal, 3-7 June 2024.
MS035B - Computational Models and Methods for Predicting Cancer Progression and Treatment Response.
Organizers: Guillermo Lorenzo.

C2 XVII International Conference on Computational Plasticity. Fundamentals and Applications. Barcellona, Spain, 5-7 September 2023.
WEa-1702b - IS1702b - Phase-Field Modeling and Engineering Applications in Solid Mechanics.
Organizers: Hector Gomez , Thomas J. R. Hughes, Laura De Lorenzis, Guillermo Lorenzo, Ernst Rank, Alessandro Reali.

C3 The 8th European Congress on Computational Methods in Applied Sciences and Engineering ECCOMAS Congress 2022. Oslo, Norway, 5-9 June 2022.
MS16: Image-Informed computational models and methods for prediction of cancer growth and treatment response.
Organizers: Guillermo Lorenzo, David A. Hormuth II, Chengyue Wu, Ernesto A.B.F. Lima, Michael R. A. Abdelmalik, Alessandro Reali, Thomas J.R. Hughes and Thomas E. Yankeelov.

C4 SIMAI-UMI-PTM joint meeting. Mathematical Modelling for Complex Systems: Seeking New Frontiers. Wroclaw, Poland, 17-20 September, 2018.
Organizers: Unione Matematica Italiana, Società Italiana di Matematica Applicata e Industriale, Polish Mathematical Society.

C5 SMACS2018. Special materials and complex systems. Gargnano, Italy, 18-22 June, 2018.

Organizers: E. Bonetti, C. Cavaterra (University of Milan), E. Rocca (University of Pavia), R. Rossi (University of Brescia).

C6 Numerical Methods for PDES. ME2 conference: Advanced numerical methods: recent developments, analysis and applications. Institut Henri Poincaré, Paris, Fr., 3-7 October 2016.
Organizers: D. Di Pietro (University of Montpellier), A. Ern (Ecole Polytechique of Paris), L. Formaggia (Politecnico di Milano).

C7 The XIII biannual congeress of SIMAI. MS.60 - Small-scale Solid and Fluid Mechanics in Biology, Part I. Milano, Italy, 13-16 September 2016.
Organizers: D. Ambrosi, P. Zunino (Politecnico di Milano).

C8 ACOMEN. 6th International Conference on Advanced Computational Methods in Engineering. Ghent, Belgium, 23-28 June 2014.
Organizers: M. Slodicka (University of Ghent).

Other invited talks to national and international workshops and seminars

T1 Analysis of a multi-species Cahn–Hilliard–Keller–Segel tumor growth model with chemotaxis and angiogenesis. Indam Workshop: Cahn–Hilliard and Allen–Cahn Equations in Bio-medicine. Politecnico di Milano, 22 February 2024.
Organizers: C. Cavaterra, M. Fornoni, A. Giorgini, E. Rocca, A. Signori.

T2 Analysis and numerical implementation of a phase field model coupled to viscoelasticity with large deformations. XI Giornata di Studio Politecnico di Milano - Università di Pavia. Equazioni Differenziali e Calcolo delle Variazioni. Milano, 26 October 2023.
Organizers: M. Conti, A. Giorgini, F. Tomarelli, E. Rocca, G. Schimperna.

T3 A Cahn–Hilliard phase field model coupled to viscoelasticity at large strains. Langenbach Seminar, Weierstrass Institute for Applied Analysis and Stochastics. Berlin, Germany. 24 May 2023.
Organizers: A. Glitzky, A. Mielke, M. Thomas, B. Zwicknagl.

T4 PHAse field MEthods in applied sciences. Roma, Italy. 23-27 May 2022.
Organizers: E. Rocca (University of Pavia).

T5 Radiomics Toolbox. Workflow and quality management. Neural networks for automatic segmentation. Pavia, Italy, 8-9-10 September 2021.
Organizers: A. Pichiecchio, L. Preda and A. Filippi (University of Pavia).

T6 Workshop: The Mechanics of Cell Aggregates. Experiments and Models. Politecnico di Torino, Italy. September 3-6, 2019.
Organizers: P. Recho (LiPhy- CNRS Grenoble), D. Ambrosi, A. Grillo, C. Giverso and L. Preziosi (Politecnico di Torino).

T7 Workshop PHASE2019. Recent advances in Phase-Field modeling: from Engineering to Biology. Pavia, Italy, 8-10 May 2019.
Organizers: E. Rocca and A. Reali (University of Pavia).

T8 Oberwolfach Workshop. Surface, Bulk, and Geometric Partial Differential Equations: Interfacial, stochastic, non-local and discrete structures. Oberwolfach, Germany, 20-26 January 2019.
Organizers: C.M. Elliott (University of Warwick), H. Garcke (University of Regensburg), R. Kornhuber (University of Berlin).

T9 Seminario di Matematica Applicata at IMATI-CNR and Dipartimento di Matematica di Pavia, Pavia, Italy, 17 April 2018.
Organizers: E. Rocca (University of Pavia).

T10 Oberwolfach Workshop. The Mathematics of Mechanobiology and Cell Signaling. Oberwolfach, Germany, February 25-March 03, 2018.
Organizers: D. Ambrosi (Politecnico di Milano), C. Liu (University Park), M. Roger (University of Dortmund), A. Stevens (University of Munster).

T11 International Workshop on Modelling of Nonlinear Continua. Castro Urdiales, Cantabria, Spain, 26-30 June 2017.
Organizers: J. Merodio (Universidad Politecnica de Madrid) and R. Ogden (University of Glasgow).

Organization of international conferences and workshops

O1 Lions–Magenes days 2024 - Pavia, 21-22 May 2024.
Organizers: Abramo Agosti, Carlo Marcati, Massimiliano Martinelli.

Invited visiting period abroad

V1 May 22 – 26, 2023. Weierstrass Institute for Applied Analysis and Stochastics. Berlin, Germany. Collaboration with Dr. R. Lasarzik.

V2 January 27 – February 02, 2019. Laboratoire Jacques-Louis Lions, Université Sorbonne, Paris. Collaboration with Prof. B. Perthame and Prof. L. Almeida.

V3 October 07 – 11, 2018. University of Regensburg. Collaboration with Prof. H. Garcke nd Prof. Michael Hinze.

Pubblications list

- **Articles in peer-reviewed international journals and book chapters**

– **Submitted**

S1 A. Agosti, P. Colli and M. Frémond: "Large deformations in terms of stretch and rotation and global solution to the quasi-stationary problem" (2023)
arXiv preprint arXiv:2307.02992.

S2 F. Santini, J.Wasserthal, A. Agosti et al.: "Deep Anatomical Federated Network (Dafne): an open client/server framework for the continuous collaborative improvement of deep-learning-based medical image segmentation" (2023).
arXiv preprint arXiv:2302.06352.

S3 A. Agosti, E. Beretta, C. Cavaterra, M. Fornoni and E. Rocca: "Identifying early tumour states in a Cahn-Hilliard-reaction-diffusion model" (2024)
arXiv preprint arXiv:2409.15925.

– **Printed**

1 A. Agosti, R. Lasarzik, E. Rocca: "Energy-variational solutions for viscoelastic fluid models" (2024).
Accepted for pubblication in Advances in Nonlinear Analysis.

2 A. Agosti and M. Frémond: "Local in time solution to an integro-differential system for motion with large deformations and defects".
Nonlinear Analysis: Real World Applications, 82, 104231, 2025.
DOI: 10.1016/j.nonrwa.2024.104231.

3 A. Agosti, A. Signori: "Analysis of a multi-species Cahn-Hilliard-Keller-Segel tumor growth model with chemotaxis and angiogenesis".
Journal of Differential Equations, 403, pp. 308–367, 2024.
DOI: 10.1016/j.jde.2024.05.025.

4 A. Agosti, R. Bardin, P. Ciarletta, M. Grasselli: "A diffuse interface model of tumour evolution under a finite elastic confinement".
Interfaces and Free Boundaries, 2024.
DOI: 10.4171/IFB/520

5 S. Luzzi, A. Agosti: "Radiomics Multifactorial In-Silico Model for Spatial Prediction of Glioblastoma Progression and Recurrence: A Proof-of-Concept".
World Neurosurgery, 183, pp. e677–e686, 2024.
DOI: 10.1016/j.wneu.2024.01.002

6 A. Agosti, E. Rocca and L. Scarpa: "Strict separation and numerical approximation for a non-local Cahn-Hilliard equation with single-well potential".
Discrete and Continuous Dynamical Systems Series S 17(1), pp. 462–511, 2024.
DOI: 10.3934/dcdss.2023213

7 A. Agosti, P. Colli, H. Garcke, E. Rocca: "A Cahn-Hilliard phase field model coupled to an Allen-Cahn model of viscoelasticity at large strains".

Nonlinearity 36(12), pp. 6589–6638, 2023.
DOI: 10.1088/1361-6544/ad0211

8 A. Agosti, P. Colli, H. Garcke, E. Rocca: "A Cahn–Hilliard model coupled to viscoelasticity with large deformations".
Communications in Mathematical Sciences 21(8), pp. 2083–2130, 2023.
DOI: 10.4310/CMS.2023.v21.n8.a2

9 A. Agosti, A. G. Lucifero, S. Luzzi: "An image informed Cahn–Hilliard Keller–Segel multiphase field model for tumor growth with angiogenesis".
Applied Mathematics and Computation 445, 127834, 2023.
DOI: 10.1016/j.amc.2023.127834

10 G. Lucci, A. Agosti, P. Ciarletta, C. Giverso: "Coupling solid and fluid stresses with brain tumour growth and white matter tract deformations in a neuroimaging-informed model".
Biomechanics and Modeling in Mechanobiology (1602), 2022.
DOI: 10.1007/s10237-022-01602-4

11 S. Sampaoli, A. Agosti, G. Pozzi, P. Ciarletta: "A toy model of misfolded protein aggregation and neural damage propagation in neurodegenerative diseases".
International Journal of Nonlinear Mechanics, 144, 104083, 2022.
DOI: 10.1016/j.ijnonlinmec.2022.104083

12 A. Agosti, E. Shaqiri, M. Paoletti et al.: "Deep Learning for Automatic Segmentation of thigh and leg muscles".
Magnetic Resonance Materials in Physics, Biology and Medicine 35, pp. 467–483, 2022.
DOI: 10.1007/s10334-021-00967-4

13 F. Lizzi, A. Agosti, F. Brero et al.: "Quantification of pulmonary involvement in COVID-19 pneumonia by means of a cascade of two U-nets: training and assessment on multiple datasets using different annotation criteria".
International Journal of Computer Assisted Radiology and Surgery 17, pp. 229–237, 2022.
DOI: 10.1007/s11548-021-02501-2

14 J. Falco, A. Agosti, I. G. Vetrano et al.: "In Silico Mathematical Modelling for Glioblastoma: a Critical Review and a Patient-Specific Case".
Journal of Clinical Medicine, 10(10), 2169, 2021.
DOI: 10.3390/jcm10102169

15 A. Perrillat-Mercerot, A. Miranville, A. Agosti, E. Rocca, P. Ciarletta, R. Guillevin: "Partial differential model of lactate neuro-energetics: analytic results and numerical simulations".
Mathematical Medicine and Biology: A Journal of the IMA 38(2), pp. 178–201, 2021.
DOI: 10.1093/imammb/dqaa016

16 F. Acerbi, A. Agosti, J. Falco et al.: "Mechano-Biological Features in a Patient-Specific Computational Model of Glioblastoma". In: Seano G. (eds) Brain Tumors. Neuromethods, vol 158. Springer, New York, NY, 2021.
DOI: 10.1007/978-1-0716-0856-2_12.

17 A. Agosti, P. Ciarletta, H. Garcke, M. Hinze: "Learning patient-specific parameters for a diffuse interface glioblastoma model from neuroimaging data".
Mathematical Methods in the Applied Sciences 43 (15), pp. 8945–8979, 2020.
DOI: 10.1002/mma.6588.

18 A. Agosti, S. Marchesi, G. Scita, P. Ciarletta: "Modelling cancer cell budding in-vitro as a self-organised, non-equilibrium growth process".
Journal of Theoretical Biology 492, 110203, 2020.
DOI: 10.1016/j.jtbi.2020.110203.

19 A. Agosti: "Discontinuous Galerkin Finite Element discretization of a degenerate Cahn-Hilliard equation with a single-well potential".
Calcolo 56(14), pp. 1–47, 2019.
DOI: 10.1007/s10092-019-0310-y.

20 D. Riccobelli, A. Agosti, P. Ciarletta: "On the existence of elastic minimizers for initially stressed materials".
Philosophical Transactions of the Royal Society A, 377(2144), 20180074, 2019.
DOI: 10.1098/rsta.2018.0074.

21 A. Agosti, C. Giverso, E. Faggiano, A. Stamm, P. Ciarletta: "A personalized mathematical tool for neuro-oncology: a clinical case study".
International Journal of Nonlinear Mechanics, 107, pp. 170–181, 2018.
DOI: 10.1016/j.ijnonlinmec.2018.06.004

22 A. Agosti, D. Ambrosi, S. Turzi: "Strain energy storage and dissipation rate in active cell mechanics".
Physical Review E, 97(5), pp. 052410, 2018.
DOI: 10.1103/PhysRevE.97.052410.

23 A. Agosti, C. Cattaneo, C. Giverso, D. Ambrosi, P. Ciarletta: "A computational framework for the personalized clinical treatment of glioblastoma multiforme".
ZAMM-Journal of Applied Mathematics and Mechanics/Zeitschrift für Angewandte Mathematik und Mechanik, 98(12), pp. 2307–2327, 2018.
DOI: 10.1002/zamm.201700294.

24 A. Agosti: "Error analysis of a finite element approximation of a degenerate Cahn-Hilliard equation".

ESAIM Mathematical Modelling and Numerical Analysis, 52(3), pp. 827–867, 2018.
DOI: 10.1051/m2an/2018018.

25 A. Agosti, A. L. Gower, P. Ciarletta: "The constitutive relations of initially stressed incompressible Mooney-Rivlin materials".
Mechanics Research Communications 93, pp. 4–10, 2017.
DOI: 10.1016/j.mechrescom.2017.11.002.

26 A. Agosti, P. F. Antonietti, P. Ciarletta, M. Grasselli, M. Verani:"A Cahn-Hilliard type equation with application to tumor growth dynamics".
Mathematical Methods in the Applied Sciences, 40(18), pp. 7598–7626, 2017.
DOI: 10.1002/mma.4548.

27 A. Agosti, B. Giovanardi, L. Formaggia, A. Scotti: "A numerical procedure for geochemical compaction in the presence of discontinuous reactions".
Advances in Water Resources, 94, pp. 332–344, 2016.
DOI: 10.1016/j.advwatres.2016.06.001.

28 A. Agosti, L. Formaggia, A. Scotti: "Analysis of a model for precipitation and dissolution coupled with a Darcy flux".
Journal of Mathematical Analysis and Applications, 431(2), pp. 752–781, 2015.
DOI: 10.1016/j.jmaa.2015.06.003.

29 A. Agosti: "Models of Turbulence. Applications to Particulate Mixing induced by traffic flow in Urban Areas". Phd Thesis. http://hdl.handle.net/2434/217169.
DOI: 10.13130/agosti-abramo_phd2013-02-13.

- **Articles in international conference proceedings**

P1 A. Agosti: "A diffuse interface model for the patient specific evolution of Glioblastoma Multiforme". Mathematisches Forschungsinstitut Oberwolfach, Report No. 3/2019, Surface, Bulk, and Geometric Partial Differential Equations: Interfacial, stochastic, non-local and discrete structures.
DOI: 10.4171/OWR/2019/3

P2 A. Agosti, L. Formaggia, B. Giovanardi, A. Scotti. "Numerical simulation of geochemical compaction with discontinuous reactions". Coupled Problems 2015 - Proceedings of the 6th International Conference on Coupled Problems in Science and Engineering, pp. 300–311, 2015.

Software production

S1 A. Agosti: "Dnn muscle segmentation: Release 1.0.1 (version v1.0.1)". Zenodo (2021).
DOI: http://doi.org/10.5281/zenodo.4479168

S2 F. Santini, J. Wasserthal, A. Agosti: "DAFNE. Deep Anatomic Federated NEtwork".2021.
https://www.dafne.network/

Teaching activities

I served as a teaching professor for the following course at Università degli studi di Pavia:

- 2020–2021: Analisi 2, Civil–Environmental Engineering and Construction–Architecture Engineering (60 hours per year).
- 2021–2022: Analisi 2, Civil–Environmental Engineering and Construction–Architecture Engineering (60 hours per year).
- 2022–2023: Analisi 2, Civil–Environmental Engineering and Construction–Architecture Engineering (60 hours per year).
- 2023–2024: Analisi 2, Civil–Environmental Engineering and Construction–Architecture Engineering (60 hours per year).

I served as a teaching assistant for the following courses at Politecnico di Milano:

- 2014–2019: Meccanica dei Continui II, Mathematical Engineering, held by prof. M. Vianello and D. Ambrosi (20 hours per year).
- 2015–2019: Biomathematical Modeling, Mathematical Engineering, held by prof. A. Marzocchi and D. Ambrosi (30 hours per year).
- 2016–2019: Geometria Differenziale, Mathematical Engineering, held by prof. E. Schlesinger (20 hours per year).
- 2018–2019: Meccanica Razionale, Material Engineering, held by prof. P. Ciarletta (20 hours per year).

Supervision activities

I served as a co-supervisor for the Master Theses of four students of Politecnico di Milano (in the academic years 2014-2015, 2016-2017, 2018-2019), of a student of University Milano Bicocca (in the academic year 2017-2018), of a student of Politecnico di Torino (in the academic year 2018-2019) and for the Bachelor's Theses of two students of University of Pavia (in the academic years 2021-2022 and 2022-2023).

Service activities

I served as a reviewer for the following international journals:

- Mathematical Models and Methods in the Applied Sciences
- Mathematical Methods in the Applied Sciences

- Computers and Mathematics with Applications.
- International Journal of Non Linear Mechanics.
- Journal of Theoretical Biology.
- ESAIM: Mathematical Modelling and Numerical Analysis .
- Nonlinear Analysis.
- Discrete and Continuous Dynamical Systems-S
- Journal of Nonlinear Mathematical Physics
- Artificial Intelligence in Medicine
- Mathematical Reviews/MathSciNet

Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base all'art. 13 del D. Lgs. 196/2003 e all'art. 13 GDPR 679/16.