Marco Livesu

Born
August 11th, 1983, Cagliari (Italy)

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CNR - IMATI
Consiglio Nazionale delle Ricerche
Istituto di Matematica Applicata e Tecnologie Informatiche
Via de Marini, 6
16149, Genoa, Italy

CURRENT POSITIONS

Senior Researcher (Primo Ricercatore) (since Jan 2023)
Institute for Applied Mathematics and Information Technologies (IMATI)
National Research Council of Italy (CNR)

Adjunct Professor (Professore a Contratto) (since Sep 2020)
University of Cagliari, Italy

PREVIOUS POSITIONS

Researcher (Nov 2016 - Dec 2022)
Institute for Applied Mathematics and Information Technologies (IMATI)
National Research Council of Italy (CNR)

Post-Doctoral Fellow, with Dott. Michela Spagnuolo (Oct 2015 - Oct 2016)
Institute for Applied Mathematics and Information Technologies (IMATI)
National Research Council of Italy (CNR)

Post-Doctoral Fellow, with Prof. Riccardo Scateni (Mar 2015 - Sep 2015)
University of Cagliari, Italy

Post-Doctoral Fellow, with Prof. Alla Sheffer (Jun 2014 - Jan 2015)
University of British Columbia, Vancouver, Canada

VISITING

Visiting Academic at University of Cagliari, Italy (since Mar 2020)

Visiting Academic at New York University, USA (Feb 2019 - Mar 2019)
Host: Prof. Daniele Panozzo

Visiting Academic at University of Genoa, Italy (Feb 2015 - Sep 2015)
Host: Prof. Enrico Puppo

Visiting Phd Student at University of British Columbia, Canada (Sep 2012 - Apr 2013)
Host: Prof. Alla Sheffer

ITALIAN HABILITATIONS

Scientific habilitations awarded by the Italian Ministry of University and Research (MIUR):
— Habilitation as **Full Professor** in Information Elaboration Systems (09/H1) (since 2023)
— Habilitation as **Associate Professor** in Information Elaboration Systems (09/H1) (since 2020)
— Habilitation as **Associate Professor** in Computer Science (01/B1) (since 2020)

EDUCATION

PhD in Mathematics and Computer Science at University of Cagliari, Italy (Jan 2010 - May 2014)
Grade: Excellent
Thesis: Understanding the Structure of 3D Shapes: PolyCubes and Curve-Skeletons
Advisor: Prof. Riccardo Scateni
Reviewers: Prof. Konrad Polthier, Prof. Leila De Floriani

Master of Computer Science at University of Cagliari, Italy (Oct 2008 - Sep 2010)
Grade: 110/110 cum laude

Thesis: Automatic 3D Skeletonization Using Multiple Views (see IJ1)
Advisor: Prof. Riccardo Scateni

Bachelor of Computer Science at University of Cagliari, Italy   (Oct 2005 - Jul 2008)
Grade: 110/110 cum laude
Thesis: Digital Terrain Models Construction Using Delaunay Triangulations
Advisor: Prof. Riccardo Scateni

LANGUAGES

Italian (mother tongue), English (proficient)

AWARDS and HONORS

1. SGP Software Award 2024 for Cinolib
   http://awards.geometryprocessing.org

2. Co-advisor (with R. Scateni and E. Gobbetti) of the PhD thesis
   Adaptive Grid-based Hexmeshing: Exploring Wider Solution Spaces,
   authored by L. Pitzalis and awarded as Best PhD Thesis in Computer Graphics
   at the Eurographics Italian Chapter conference (STAG2023)

3. Listed as world's top 2% scientist for the single year impact (2022)
   https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/6

4. Best Paper Award for the article *Topological Initialization of Injective Integer Grid Maps* ([IP10]),
   presented at STAG 2022

5. SGP Dataset Award 2021 for the HexaLab project (IJ14)
   http://awards.geometryprocessing.org

6. Honorable mention for the article *A Mesh Generation Perspective on Robust Mappings* (IP9),
   presented at STAG 2020

7. Co-advisor (with R. Scateni) of the PhD thesis
   Real-time Deformation with Coupled Cages and Skeletons,
   authored by F. Corda that reveiced a honorable mention for Best PhD Thesis in Computer Graphics
   at the Eurographics Italian Chapter conference (STAG2020)

8. Winner of the CNR Short Term Mobility Grant (2018)
   spent visiting Prof. Daniele Panozzo at New York University from Feb 10, 2019 to Mar 03, 2019

9. Top conference paper, for article *Gradient Field Estimation on Simplicial Meshes* (IP7),
   presented at STAG 2018 and shortlisted for journal extended version (IJ16)

10. Top conference paper, for article *slice2mesh: meshing sliced data for the simulation of AM Processes* (IP6),
    presented at STAG 2018 and shortlisted for journal extended version(IJ15)

11. Elsevier Reviewer of Distinction (2018)
    Awarded by The Editors of Computers & Graphics Journal

12. Co-author of Matteo Bracci for the article Hexalab, based on his thesis work
    at the University of Pisa, and awarded as Best Bachelor Thesis in Computer Graphics
    at the Eurographics Italian Chapter conference (STAG2018)

13. Special mention at the IEEE TVCG Best Reviewer Award (2017)

14. Elsevier Outstanding Contribution in Reviewing (2017)
    Awarded by The Editors of Computers & Graphics Journal

15. Top conference paper, for article *Heat Flow Based Relaxation of n Dimensional Discrete Hyper Surf.* (IP4),
    presented at STAG 2017 and shortlisted for journal extended version(IJ11)

16. Co-advisor (with Prof. Riccardo Scateni) of the thesis *Polycubes Optimization*,
    authored by Gianmarco Cherchi and awarded as Best Master Thesis in Computer Graphics
    at the Eurographics Italian Chapter conference (STAG2016)

17. Winner of an Alain Bensoussan 12 months PostDoctoral Fellowship (2015/2016), funded by
    European Research Consortium for Informatics and Mathematics (ERCIM)
    refused due to another offer

18. Front cover of ACM Transactions on Graphics (Volume 35, No 1)

19. Three years PhD scolarship, funded by
    P.O.R. Sardegna F.S.E. Operational Programme of the Autonomous Region of Sardinia
    European Social Fund 2007-2013 - Axis IV Human Resources, Objective I.3, Line of Activity I.3.1

OPEN SOURCE PROJECTS (selected)

1. *CinoLib* – A generic programming header only C++ library for processing polygonal and polyhedral meshes
   `https://github.com/mlivesu/cinolib` (953★, 101 forks)

2. *HexaLab* – An Online Viewer for Hexahedral Meshes
   `www.hexalab.net` (120★, 32 forks)

3. *Interactive And Robust Mesh Booleans*
   `https://github.com/gcherchi/InteractiveAndRobustMeshBooleans` (199★, 34 forks)

4. *Fast and Robust Mesh Arrangements using Floating-point Arithmetic*
   `https://github.com/gcherchi/FastAndRobustMeshArrangements` (152★, 25 forks)

5. *LoopyCuts* – Practical Feature-Preserving Block Decomposition for Strongly Hex-Dominant Meshing
   `https://github.com/mlivesu/LoopyCuts` (64★, 12 forks)

6. *HexBox* – Interactive Box Modeling of Hexahedral Meshes
   `https://github.com/cg3hci/HexBox` (58★, 10 forks)

7. *CageLab* – An Interactive Tool for Cage-Based Deformations
   `https://github.com/cordafab/Cagelab2018` (33★, 8 forks)

8. *Slice2Mesh* – A Direct Meshing Tool for the Simulation of Additive Manufacturing Processes
   `https://github.com/mlivesu/slice2mesh` (32★, 4 forks)

TALKS

1. *Stripe Embedding: Efficient Maps with Exact Numeric Computation*
   paper presented at SIGGRAPH Asia
   3 December, 2024 - Tokyo, Japan
   (presenting [IJ37])

2. *Stripe Embedding: Efficient Maps with Exact Numeric Computation*
   invited talk at University of Bern
   19 November, 2024 - Bern, Switzerland
   Host: David Bommes
   (presenting [IJ37])

3. *Geometric Techniques for Digital Fabrication*
   PhD School at SGP 2024
   23 June, 2024 - MIT, Boston, USA
   In collaboration with Marco Attene (CNR IMATI)

4. *Advancing Front Surface Mapping*
   paper presented at Eurographics (EG)
   24 April, 2024 - Limassol, Cyprus
   (presenting [IJ36])

5. *Fabrication-Aware Shape Decomposition*
   invited talk at University of Cagliari (MaIn Colloquium)
   7 November, 2023 - Cagliari, Italy
   `https://web.unica.it/unica/it/main_colloquium.page`

6. *VOLMAP: a Large Scale Benchmark for Volume Mappings to Simple Base Domains*
   paper presented at Symposium on Geometry Processing (SGP)
   5 July, 2023 - Genoa, Italy
   (presenting [IJ34])

7. *A course on Hex-Mesh Generation and Processing*
   PhD School at SGP 2023
   1 July, 2023 - Genoa, Italy
   In collaboration with Gianmarco Cherchi (University of Cagliari)

8. *A course on Hex-Mesh Generation and Processing*
   Course at SIGGRAPH Asia 2022
   8 December, 2022 - Daegu, South Korea
   In collaboration with Nico Pietroni (UTS)

9. *Robust and Interactive Mesh Booleans*
   invited talk at INRIA
   28 November, 2022 - Sophia-Antipolis, France
   Host: Adrien Bousseau

10. *Topological Initialization of Injective Integer Grid Maps*
    paper presented at Smart Tools and Applications in Graphics (STAG)
    18 November, 2022 - Cagliari, Italy
    (presenting [IP10])

11. *Computational Assemblies: Analysis, Design, and Fabrication*
    Tutorial at Eurographics 2022
    25 April, 2022 - Reims, France
    In collaboration with Peng Song (SUTD) and Ziqi Wang (ETH)

12. *Fabrication-Aware Shape Decomposition*
    invited talk at the Computational Fabrication Seminar
    https://computational-fabrication.org
    31 March, 2022
    Host: Peng Song (SUTD)

13. *Recent Advancements on Grid-Based Hexahedral Meshing*
    invited talk at the FRAMES Workshop
    6 December, 2021
    (given remotely due to COVID)

14. *A Mesh Generation Perspective on Robust Mappings*
    paper presented at Smart Tools and Applications in Graphics (STAG)
    13 November, 2020 - Florence, Italy
    (given remotely due to COVID)
    (presenting [IP9])

15. *LoopyCuts: Practical Feature-Preserving Block Decomposition for Strongly Hex-Dominant Meshing*
    invited talk at MIT Graphics Seminars
    9 September, 2020 - Boston, USA
    (given remotely due to COVID)
    Host: Justin Solomon, Paul Zhang (MIT)

16. *Generation, Visualization and Assessment of Hexahedral Meshes*
    invited talk at INRIA
    26 September, 2019 - Sophia-Antipolis, France
    Host: Evelyne Hubert

17. *From 3D Models to 3D Prints: an Overview of the Processing Pipeline*
    invited talk at University of Verona
    16 November, 2018 - Verona, Italy
    Host: Prof. Andrea Giachetti

18. *slice2mesh : meshing sliced data for the simulation of AM Processes*
    paper presented at Smart Tools and Applications in Graphics (STAG)
    18 October, 2018 - Brescia, Italy
    (presenting [IP6])

19. *slice2mesh : meshing sliced data for the simulation of AM Processes*
    invited talk at EGIT PhD School on Graphics and Geometry Processing for AM
    17 October, 2018 - Brescia Italy

20. *From 3D Models to 3D Prints: an Overview of the Processing Pipeline*
    invited talk at EGIT PhD School on Graphics and Geometry Processing for AM
    17 October, 2018 - Brescia Italy
    with Jonas Martìnez (INRIA)

21. *Fabrication-Aware Shape Decomposition*
    invited talk at EGIT PhD School on Graphics and Geometry Processing for AM
    17 October, 2018 - Brescia Italy

22. *Fabrication-Aware Shape Decomposition*
    ng - Curves and Surfaces (C&S)
    28 June, 2018 - Arcachon, France
    Host: Georg Muntingh

23. *Cinolib – A generic programming header only C++ library for processing polygonal and polyhedral meshes*
    invited talk at University of Cagliari
    February, 2018 - Cagliari, Italy
    Host: Prof. Riccardo Scateni

24. *Research and Challenges in Polygonal/Polyhedral Mesh Generation*
    talk at ERC CHANGE Workshop
    30 January, 2018 - Leysin, Switzerland
    Host: Prof. Annalisa Buffa

25. *CAxMan: Computer Aided Technologies for Additive Manufacturing*
    paper presented at Smart Tools and Applications in Graphics (STAG)
    12 September, 2017 - Catania, Italy

26. *Heat Flow Based Relaxation of n Dimensional Discrete Hyper Surfaces*
    paper presented at Smart Tools and Applications in Graphics (STAG)
    11 September, 2017 - Catania, Italy
    (presenting [IP4])

27. *Explicit Cylindrical Maps for General Tubular Shapes*
    paper presented at Solid and Physical Modeling (SPM)
    2 June, 2017 - Berkeley, USA
    (presenting [IJ10])

28. *From 3D Models to 3D Prints: an Overview of the Processing Pipeline*
    paper presented at Eurographics 2017
    25 April, 2017 - Lyon, France
    (presenting [IJ9])

29. *European Projects at CNR IMATI*
    talk at Eurographics 2016
    12 May, 2016 - Lisbon, Portugal

30. *Practical Medial Axis Filterig for Occlusion-Aware Contours*
    paper presented at Smart Tools and Applications in Graphics
    16 October, 2015 - Verona, Italy
    (presenting [IP3])

31. *Practical Hex-Mesh Optimization via Edge-Cone Rectification*
    paper presented at ACM SIGGRAPH
    13 August, 2015 - Los Angeles, USA
    (presenting [IJ6])

32. *Coarse Layouts for Structured Surface and Volumetric Meshing*
    invited talk at INRIA
    22 June, 2015 - Sophia-Antipolis, France
    Host: Pierre Alliez

33. *Automatic Generation of Hexahedral Meshes of Articulated Objects*
    invited talk at CNR-IMATI
    12 May, 2015 - Genoa, Italy
    Hosts: Michela Spagnuolo, Marco Attene

34. *PolyCut: Monotone Graph-Cuts for PolyCube Base-Complex Construction*
    paper presented at ACM SIGGRAPH Asia
    20 November, 2013 - Hong Kong
    (presenting [IJ4])

35. *Extracting curve-skeletons from digital shapes using occluding contours*
    paper presented at Computer Graphics International (CGI)
    11 June, 2013 - Hannover, Germany
    (presenting [IJ3])

36. *Rigid registration of different poses of animated shapes*
    paper presented at Winter School of Computer Graphics (WSCG)
    June, 2013 - Plzen, Czech Republic
    (presenting [IJ2])

37. *Reconstructing the Curve-Skeleton of 3D Shapes Using the Visual Hull*
    invited paper presented at Eurographics Symposium on Parallel Graphics and Visualization (EGPGV)
    5 May, 2013 - Girona, Spain
    (presenting [IJ1])

PROFESSIONAL ACTIVITIES

Editor for International Scientific Journals:
— Guest Editor, Computers & Graphics (Special Issue on STAG 2018)   2019
— Academic Editor, PLOS One   since 2018
— Guest Academic Editor, PLOS One   2017

Chair:
— Program Chair, Smart Tools and Apps in Computer Graphics (STAG)   2018
— Awards Chair, Smart Tools and Apps in Computer Graphics (STAG)   2020,2019
— Student Volunteer Chair, Eurographics (EG)   2019
— Session Chair, Eurographics (EG)   2020
— Session Chair, Smart Tools and Apps in Computer Graphics (STAG)   2020, 2019, 2018
— Session Chair, Shape Modeling International (SMI)   2017

Committees:
— Program Committee, SIGGRAPH   2024, 2023
— Program Committee, Symposium on Geometry Processing (SGP)   2025, 2024, 2023, 2022,2021
— Program Committee, Symposium on Solid and Physical Modeling (SPM)   2025, 2024
— Program Committee, Eurographics, full papers (EG)   2025
— Program Committee, Eurographics, STAR papers (EG)   2023
— Program Committee, Eurographics, short papers (EG)   2021, 2020
— Program Committee, Replicability Stamp   since 2020
— Program Committee, SIBGRAPI   2017
— Program Committee, Int. Conference on Computer Graphics Theory and Applications (GRAPP)   since 2017
— Program Committee, Smart Tools and Apps in Computer Graphics (STAG)   since 2016
— Best Paper Award Committee, Symposium on Geometry Processing (SGP)   2022,2024
— Best Thesis Award Committee, Smart Tools and Apps in Computer Graphics (STAG)   2018, 2017, 2016
— Local Organizing Committee, Eurographics (EG)   2019
— Steering Committee of the PhD School of Mathematics and Computer Science (University of Cagliari, Italy) 2025
— Doctoral Committee for the PhD School of Mathematics and Computer Science (University of Cagliari, Italy) 2025

PhD Thesis Referee/Committee member:
— Valentin Zénon Nigolian (advised by Prof. D. Bommes, University of Bern, Switzerland)   2024
— Felix Hähnlein (advised by Prof. A. Bousseau, INRIA, Université Cote D'Azur, France)   2022
— Alvaro Fuentes Suarez (advised by Prof. E. Hubert, INRIA, Université Cote D'Azur, France) 2019

Evaluator for Competitive Funding:
— Technical evaluator for the Israel Science Foundation (ISF), Personal Research Grants   2021
— Technical evaluator for the Italian Ministry of Economic Growth (MISE, FCS projects)   2020,2019

Evaluator for Book Proposals:
— Technical evaluator for Elsevier, Book Proposals on mechanics of materials and mechanical engineering   2022

Reviewer:
— SIGGRAPH   2024, 2023, 2022, 2021, 2020, 2019, 2018, 2016
— SIGGRAPH Asia   2024, 2023, 2022, 2021, 2020, 2017, 2016
— ACM Transactions on Graphics (TOG)   2022, 2018, 2017, 2016, 2015
— IEEE Transactions on Visualization and Computer graphics (TVCG)   2024,2022, 2021, 2020, 2018, 2017, 2016
— Computer-Aided Design (CAD)   2024, 2023, 2022, 2020, 2015, 2014
— EuroGraphics (EG)   2023, 2022, 2021, 2020, 2019, 2017, 2016
— IEEE Access   2020, 2019
— Computer Graphics Forum (CGF)   2024,2022, 2020, 2019, 2017, 2016
— Symposium on Geometry Processing (SGP)   2024,2023,2022, 2021, 2016, 2015
— Computer Aided Geometric Design (CAGD)   2022
— Pacific Graphics (PG)   2019, 2018, 2017, 2016
— Engineering with Computers   2023
— CAD Conference   2019, 2018
— T&F, Computer Methods in Biomechanics and Biomedical Engineering   2016, 2015
— Advances in Engineering Software   2024
— Robotics and Computer Integrated Manufacturing   2017
— PLOS One   2017
— Numerical Algorithms   2017, 2016
— Computers & Graphics (C&G)   2024, 2023,2022, 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2013
— Shape Modeling International (SMI)   2016
— Intern. Conf. on Geometric Modeling and Processing (GMP)   2016
— The Visual Computer   2022, 2021, 2020, 2016
— Graphical Models   2015
— Computer-Aided Design and Applications   2018
— Intern. Conf. on Comp. Graphics Theory and Appl. (GRAPP)   2017, 2016, 2015
— WSCG   2015

EDUCATIONAL ACTIVITIES

Teaching:
— Lecturer, Geometric Techniques for Digital Fabrication, *SGP PhD School*   2024
— Lecturer, A course on Hex-Mesh Generation and Processing, *SGP PhD School*   2023
— Lecturer, A course on Hex-Mesh Generation and Processing, *SIGGRAPH Asia Course*   2022
— Lecturer, Computational Assemblies: Analysis, Design, and Fabrication, *Eurographics Tutorial*   2022
— Lecturer, Video Game Design (VGD), *University of Cagliari, Italy*   since 2020
— Lecturer, Geometry Processing for Digital Manufacturing, *EGIT PhD School*   2018
— Teaching assistant, Advanced Data Structures, *University of Cagliari, Italy*   2015, 2013, 2011, 2010
— Teaching assistant, Computer Architectures, *University of Cagliari, Italy*   2011, 2010

Visiting Students (1):
— Francois Protais (INRIA, France)   Nov-Dec 2021

PhD Students (6):

- F. Meloni - *ongoing*
  University of Cagliari, 2023 (co-supervised with G.Cherchi)

- L. Pitzalis - *Adaptive Grid-based Hexmeshing: Exploring wider solution spaces*
  University of Cagliari, 2022 (co-supervised with R. Scateni and E. Gobbetti)
  - **awarded as Best PhD Thesis in Computer Graphics at STAG 2023**

- F. Corda - *Real-time Deformation with Coupled Cages and Skeletons*
  University of Cagliari, 2020 (co-supervised with R. Scateni)
  - **honorable mention as Best PhD Thesis in Computer Graphics at STAG 2020**

- G. Cherchi - *Polycube Optimization and Applications: From the Digital World to Manufacturing*
  University of Cagliari, 2019 (co-supervised with R. Scateni)
  - **awarded as Best PhD Thesis in Computer Graphics at STAG 2019**

- S. Casti - *Cages and Skeletons in Digital Animation: A Novel Skeleton-based Approach for Cage Generation*
  University of Cagliari, 2019 (co-supervised with R. Scateni)

- A. Muntoni - *Geometry Processing for Subtractive Fabrication*
  University of Cagliari, 2018 (co-supervised with R. Scateni)

Master Students (12):

- M. Faedda - *Mesh Diff: Visualization of Differences between Meshes Through Boolean Operators*
  University of Cagliari, 2024 (co-supervised with G. Cherchi)

- F. Meloni - *Advancing Volumes - A Tetrahedral Mesh Generation Method*
  University of Cagliari, 2023 (co-supervised with G. Cherchi)

- F. Zoccheddu - *Modellazione di mesh volumetriche di esaedri mediante box modeling*
  University of Cagliari, 2023 (co-supervised with R. Scateni)
  - **full paper published at Symposium on Geometry Processing 2023 [IJ35]**

- E. Pau - *HoloSculpt: un Tool per Modellazione 3D di Mesh Fabbricabili*
  University of Cagliari, 2019 (co-supervised with D. Spano)

- S. Staglianò - *Temporal Integration Analysis in Geodesic Distances Comput. through Heat Eq.*
  University of Genoa, 2017 (co-supervised with E. Puppo)

- G. Cherchi - *PolyCubes Optimization*
  University of Cagliari, 2015 (co-supervised with R. Scateni)
  - **full paper published at Symposium on Geometry Processing 2016 [IJ8]**
  - **awarded as Best Master Thesis in Computer Graphics at STAG 2016**

- F. Winkelmolen - *Hexahedral Meshes from Curve-Skeletons*
  University of Genoa, 2015 (co-supervised with E. Puppo)
  - **full paper published at Pacific Graphics 2016 [IJ7]**

- S. Casti and F. Corda - *CageLab: Interactive Tool for Cage-based Animation*
  University of Cagliari, 2015 (co-supervised with R. Scateni)
  - **full paper published at STAG 2018 [IP5]**

- S. Volpe - *Building Anisotropic Cages for Digital Character animation*
  University of Genoa, 2015 (co-supervised with E. Puppo)

- A. Muntoni - *Simplifying the Shape of Triangle Meshes for Unfolding, Milling and Fabrication*
  University of Cagliari, 2014 (co-supervised with R. Scateni)

- F. Usai - *A novel Technique for Shape Matching Based on Skeletal Feature Points*
  University of Cagliari,. 2011 (co-supervised with R. Scateni)

- D. Cabiddu and G. Marcias- *Detecting Shape Features from Meshes Using JMAPT*
  University of Cagliari,2012 (co-supervised with R. Scateni and A. Giachetti)

Bachelor Students (9):

- V. Scema - *Comparazione Algoritmi di Ricerca del Path Minimo su Mesh Triangolari*
  University of Cagliari, 2022

- F. Piscitelli - *Sviluppo di un Algoritmo di Ambient Occlusion per l'Analisi di Mesh Tridimensionali*
  University of Cagliari, 2022

- D. De Luca - *Study and Implementation of As-Rigid-As-Possible Surface Deformations*
  University of Cagliari, 2022

- F. Pitzalis - *Mesh Simplification, Struttura e Analisi con Quadric Error Metrics*
  University of Cagliari, 2021

- D.G. Podda - *AABB Tree: Implementazione e Testing di una BVH in un ambiente 3D*
  University of Cagliari, 2021

- S. Podda, *Semplificazione Concorrente di Mesh Poligonali con Connettivita' Fissa*
  University of Cagliari, 2012 (co-supervised with R. Scateni)

- G. Broccia - *Riconoscimento di Gesti Umani per la Guida di Robot*
  University of Cagliari, 2011 (co-supervised with R. Scateni)
  - **full paper published at Eurographics Italian Chapter 2011 [IP2]**

- T. Puggioni - *Studio ed Implementazione dello Smoothing Basato sul Mean Curvature Flow*
University of Cagliari, 2011 (co-supervised with R. Scateni)

- E. Alimonda - *CGView: un Agile Visualizzatore di Mesh*
University of Cagliari, 2010 (co-supervised with R. Scateni)

FUNDING

- **National Group for Scientific Computing (GNCS)** (4.7K€) (Feb 2024 - Jan 2025)
Algebra lineare numerica per problemi di grandi dimensioni: aspetti teorici e applicazioni
GNCS 2024 - CUP E53C23001670001
Participant

- **RAISE** (109M€) (Jan 2024)
Robotics and AI for Socio-economic Empowerment
SPOKE 2: Smart Devices and Technologies for Personal and Remote Healthcare
Milestone 7.1, 7.2, 7.3 PNRR (ECS00000035)
Participant

- **DIGITbrain PROMed** (100K€) (Oct 2021 - Sep 2022)
Production Optimization for Additive Manufacturing of Medical Devices
EU H2020 Research and Innovation Programme under GA No 952071
Task Leader

- **Hex and hex-dominant meshing for the US Navy** (10K$) (Oct 2020 - Sep 2021)
Research Contract between CNR IMATI and HyperComp, Inc.
Principal Investigator (with Prof. N.Pietroni from UST Sydney)

- **CNR Short Mobility Grant** (3.8K€) (Feb 2019)
Fabrication-Aware Implicit Surfaces
Principal investigator

- **CHANGE** (2.2M€) (Oct 2016 - Sep 2022)
New CHallenges for PDE solvers: the interplay of ANalysis and GEometry.
ERC Advanced Grant
Participant

- **CaxMan** (7.1M€) (Oct 2015 - Sep 2018)
Computer Aided Technologies for Additive Manufacturing.
Horizon 2020 - Research and Innovation action - Grant Agreement N° 680448
Participant

- **Automated Hexahedral Meshing** (124K$) (Jun 2014 - Jan 2015)
NSERC Idea to Innovation (I2I)
Participant

- **Virtuoso** (300K€) (Mar 2015 - Sep 2015)
Un osservatore sanitario virtuale per la prevenzione di malattie
cardio-metaboliche nella pratica di attivitá fitness & wellness nei centri turistici.
Funded by Sardinia Regional Government (CUP F78C13000530002)
Participant

PUBLICATIONS and PATENTS

Legend:

B	Book
P	Patent
IJ	Peer-reviewed International journal
IP	Proceedings of a peer-reviewed international conference
PD	Project Deliverable
TR	Technical Report

Books (1):

[B1] Design, Representations and Processing for Additive Manufacturing
M. Attene, M. Livesu, S. Lefebvre, T. Funkhouser, S. Rusinkiewicz, S. Ellero, J. Martìnez, A. H. Bermano
Morgan & Claypool Publishers - Synthesis Lectures on Visual Computing, 2018

Patents (2):

[P2] *Methods and Systems for Hex-mesh Optimization via Edge-cone rectification*
M. Livesu, A. Sheffer, N. Vining
US Patent *US20170024931 A1*

[P1] *Methods and Systems for Generating PolyCube Segmentations from Input Meshes of Objects*
M. Livesu, A. Sheffer, N. Vining, J. Gregson
US Patent *US20160240001 A1*

Peer-reviewed International Journals (37):

[IJ37] Stripe Embedding: Efficient Maps with Exact Numeric Computation
M. Livesu
ACM Transactions on Graphics, 2024 (SIGGRAPH Asia, Tokyo, Japan)

[IJ36] Advancing Front Surface Mapping
M. Livesu
Computers Graphics Forum, 2024 (Eurographics, Limassol, Cyprus)

[IJ35] HexBox: Interactive Box Modeling of Hexahedral Meshes
F. Zoccheddu, E. Gobbetti, M. Livesu, N. Pietroni, G. Cherchi
Computers Graphics Forum, 2023 (Symposium on Geometry Processing, Genoa, Italy)

[IJ34] VOLMAP: a Large Scale Benchmark for Volume Mappings to Simple Base Domains
G. Cherchi, M. Livesu
Computers Graphics Forum, 2023 (Symposium on Geometry Processing, Genoa, Italy)

[IJ33] Exploration of 3D Motorcycle Complexes from Hexahedral Meshes
E. Gunpinar, M. Livesu, M. Attene
Computers & Graphics, 2023 (Shape Modeling International, Genoa, Italy)

[IJ32] Towards a Robust and Portable Pipeline for Quad Meshing:
Topological Initialization of Injective Integer Grid Maps
M. Livesu
Computers & Graphics, 2023

[IJ31] Interactive and Robust Mesh Booleans
G. Cherchi, F. Pellacini, M. Attene, M. Livesu
ACM Transactions on Graphics, 2022 (SIGGRAPH Asia, Daegu, South Korea)

[IJ30] Hex-Mesh Generation and Processing: a Survey
N. Pietroni, M. Campen, A. Sheffer, G. Cherchi, D. Bommes,
X. Gao, R. Scateni, F. Ledoux, JF. Remacle, M. Livesu
ACM Transactions on Graphics, 2022

[IJ29] Optimal Dual Schemes for Adaptive Grid Based Hexmeshing
M. Livesu, L. Pitzalis, G. Cherchi
ACM Transactions on Graphics, 2021 (presented at SIGGRAPH 2022, Vancouver, Canada)

[IJ28] Benchmarking the Geometrical Robustness of a Virtual Element Poisson Solver
M. Attene, S. Biasotti, S. Bertoluzza, D. Cabiddu,M. Livesu,
G. Patanè, M. Pennacchio, D. Prada, M. Spagnuolo
Mathematics and Computers in Simulation, 2021

[IJ27] Generalized Adaptive Refinement for Grid-based Hexahedral Meshing
L. Pitzalis, M. Livesu, G. Cherchi, E. Gobbetti, R. Scateni
ACM Transactions on Graphics, 2021 (SIGGRAPH Asia)

[IJ26] Practical Computation of the Cut Locus on Discrete Surfaces
C. Mancinelli, M. Livesu, E. Puppo
Computer Graphics Forum, 2021 (Symposium on Geometry Processing, Toronto, Canada)

[IJ25] Deterministic Linear Time Constrained Triangulation using Simplified Earcut
M. Livesu, G. Cherchi, R. Scateni, M. Attene
IEEE Transactions on Visualization and Computer Graphics, 2021

[IJ24] Fast and Robust Mesh Arrangements Using Floating-point Arithmetic
G. Cherchi, M. Livesu, R. Scateni, M. Attene
ACM Transactions on Graphics, 2020 (SIGGRAPH Asia)

[IJ23] Scalable Mesh Refinement for Canonical Polygonal Schemas of Extremely High Genus Shapes
M. Livesu
IEEE Transactions on Visualization and Computer Graphics, 2020

[IJ22] LoopyCuts: Practical Feature-Preserving Block Decomposition for Strongly Hex-Dominant Meshing
M. Livesu, N. Pietroni, E. Puppo, A. Sheffer, P. Cignoni
ACM Transactions on Graphics, 2020 (SIGGRAPH)

[IJ21] Real-time Deformation with Coupled Cages and Skeletons
F. Corda, J.M. Thiery, M. Livesu, E. Puppo, T. Boubekeur, R. Scateni
Computer Graphics Forum, 2020

[IJ20] Parametric Shape Optimization for Combined Additive-Subtractive Manufacturing
L. Tamellini, M. Chiumenti, C. Altenhofen, M. Attene, O. J. D. Barrowclough,
M. Livesu, F. Marini, M. Martinelli, V. Skytt,
JOM - The Journal of The Minerals, Metals & Materials Society, 2020

[IJ19] CinoLib: a generic programming header only C++ library for processing polygonal and polyhedral meshes
M. Livesu
Lecture Notes in Computer Science. Transactions on Computational Science XXXIV, 2019

[IJ18] Surface2Volume: Surface Segmentation Conforming Assemblable Volumetric Partition
C. Araujo, D. Cabiddu, M. Attene, M. Livesu, N. Vining, A. Sheffer
ACM Transactions on Graphics, 2019 (SIGGRAPH, Los Angeles, USA)

[IJ17] Skeleton Based Cage Generation Guided by Harmonic Fields
S. Casti, M. Livesu, N. Mellado, N. Abu Rumman, R. Scateni, L. Barthe, E. Puppo
Computers & Graphics, 2019

[IJ16] A Comparison of Methods for Gradient Field Estimation on Simplicial Meshes
C. Mancinelli, M. Livesu, E. Puppo
Computers & Graphics 80, 2019 (extended version of [IP7])

[IJ15] slice2mesh: a Meshing Tool for the Simulation of Additive Manufacturing Processes
M. Livesu, D. Cabiddu, M. Attene
Computers & Graphics 80, 2019 (extended version of [IP6])

[IJ14] Hexalab.net: an Online Viewer for Hexahedral Meshes
M. Bracci, M. Tarini, N. Pietroni, M. Livesu, P. Cignoni
Computer Aided Design 110, 2019

[IJ13] Topology-Driven Shape Chartification
T. Sorgente, S. Biasotti, M. Livesu, M. Spagnuolo
Computer Aided Geometric Design 65, 2018

[IJ12] Axis-Aligned Height-Field Block Decomposition of 3D Shapes
A. Muntoni, M. Livesu, R. Scateni, A. Sheffer, D. Panozzo
ACM Transactions on Graphics 37(5), 2018 (presented at SIGGRAPH Asia, Tokyo, Japan)

[IJ11] A Heat Flow Based Relaxation Scheme for n Dimensional Discrete Hyper Surfaces
M. Livesu
Computers & Graphics 71, 2018 (extended version of [IP4])

[IJ10] Explicit Cylindrical Maps for General Tubular Shapes
M. Livesu, M. Attene, G. Patanè, M. Spagnuolo
Computer Aided Design 90, 2017 (Solid and Physical Modeling, Berkeley, USA)

[IJ9] From 3D Models to 3D Prints: an Overview of the Processing Pipeline
M. Livesu, S. Ellero, J. Martìnez, S. Lefebvre, M. Attene
Computer Graphics Forum 36(2), 2017 (Eurographics STAR, Lyon, France)

[IJ8] Polycube Simplification for Coarse Layouts of Surfaces and Volumes
G. Cherchi, M. Livesu, R. Scateni
Computer Graphics Forum 35(5), 2016 (Symposium on Geometry Processing, Berlin, Germany)

[IJ7] Skeleton-driven Adaptive Hexahedral Meshing of Tubular Shapes
M. Livesu, A. Muntoni, E. Puppo, R. Scateni
Computer Graphics Forum 35(7), 2016 (Pacific Graphics, Okinawa, Japan)

[IJ6] Practical Hex-Mesh Optimization via Edge-Cone Rectification
M. Livesu, A. Sheffer, N. Vining, M. Tarini
ACM Transactions on Graphics 34(4), 2015 (SIGGRAPH, Los Angeles, USA)

[IJ5] Extraction of the Quad Layout of a Triangle Mesh Guided by its Curve-Skeleton
F. Usai, M. Livesu, E. Puppo, M. Tarini, R. Scateni
ACM Transactions on Graphics 35(1), 2015 (presented at SIGGRAPH Asia, Kobe, Japan)

[IJ4] PolyCut: Monotone Graph-Cuts for PolyCube Base-Complex Construction
M. Livesu, N. Vining, A. Sheffer, J. Gregson, R. Scateni
ACM Transactions on Graphics 32(6), 2013 (SIGGRAPH Asia, Hong Kong)

[IJ3] Extracting curve-skeletons from digital shapes using occluding contours
M. Livesu, R. Scateni
The Visual Computer 29(9), 2013 (Computer Graphics International, Hannover, Germany)

[IJ2] Rigid registration of different poses of animated shapes
M. Livesu, R. Scateni
Journal of WSCG 21(1), 2013 (WSCG, Plzen, Czech Republic)

[IJ1] Reconstructing the Curve-Skeleton of 3D Shapes Using the Visual Hull
M. Livesu, F. Guggeri, R. Scateni
IEEE Transactions on Visualization and Computer Graphics 18(11), 2012

Peer-reviewed International Conferences (12):

[IP12] To What Extent Are Existing Volume Mapping Algorithms Practically Useful?
F. Meloni, G. Cherchi, R. Scateni, M. Livesu
Smart Tools and Applications in Graphics, 2024 (Verona, Italy)

[IP11] ProMED: Production Optimization for Additive Manufacturing of Medical Devices
M. Attene, T. Berti, D. Cabiddu, A. Garosi, M. Livesu, Z. Pásztor, D. Petrovszki, A. Ranieri
Smart Tools and Applications in Graphics, 2022, Poster (Cagliari, Italy)

[IP10] Topological Initialization of Injective Integer Grid Maps
M. Livesu
Smart Tools and Applications in Graphics, 2022 (Cagliari, Italy)
- **best paper award (shortlisted for journal extension)**

[IP9] A Mesh Generation Perspective on Robust Mappings
M. Livesu
Smart Tools and Applications in Graphics, 2020 (Florence, Italy)
- **honorable mention**

[IP8] FETI-DP preconditioners for the Virtual Element Method on general 2D meshes
D. Prada, S. Bertoluzza, M. Pennacchio, M. Livesu
Lecture Notes in Computational Science and Engineering, 2019
Numerical Mathematics and Advanced Applications - ENUMATH 2017

[IP7] Gradient Field Estimation on Simplicial Meshes
C. Mancinelli, M. Livesu, E. Puppo
Smart Tools and Applications in Graphics, 2018 (Brescia, Italy)
- **top conference paper (shortlisted for journal extension [IJ16])**

[IP6] slice2mesh : meshing sliced data for the simulation of AM Processes
M. Livesu, D. Cabiddu, M. Attene
Smart Tools and Applications in Graphics, 2018 (Brescia, Italy)
- **top conference paper (shortlisted for journal extension [IJ15])**

[IP5] CageLab: An Interactive Tool for Cage-based deformations
S. Casti, F. Corda, M. Livesu, R. Scateni
Smart Tools and Applications in Graphics, 2018 (Brescia, Italy)

[IP4] Heat Flow Based Relaxation of n Dimensional Discrete Hyper Surfaces
M. Livesu
Smart Tools and Applications in Graphics, 2017 (Catania, Italy)
- **top conference paper (shortlisted for journal extension [IJ11]**)

[IP3] Practical Medial Axis Filterig for Occlusion-Aware Contours
M. Livesu, R. Scateni
Smart Tools and Applications in Graphics, 2015 (Verona, Italy)

[IP2] Gestural Interaction for Robot Motion Control
G. Broccia, M. Livesu, R. Scateni
Proceedings of the 9th Eurographics Italian Chapter, 2011 (Salerno, Italy)

[IP1] Tools and Applications for Teaching and Research in Computer Graphics
F. Guggeri, M. Livesu, R. Scateni
Proceedings of the 8th Eurographics Italian Chapter, 2010 (Genoa, Italy)

Project Deliverables (8):

[PD8] Deliverable n. D4.2.2 — Hardware implementation; software platform development and population
C. E. Catalano, G. Arnulfo, F. Pisanello, A. Randazzo, A. Rossi, M. De Vittorio, B. Spagnolo, L. Collard, G. Patané, M. Paccini, S. Cammarasana, M. Livesu, M. Attene, C. Pizzi, R. Albertoni, L. Roccatagliata, D. Arnaldi
RAISE (Project 4.2: Image-driven predictive tools for neurological disorders)

[PD7] Deliverable n. D3.4 — AM Process Plan Assessment
J. C. Morel, M. Attene, M. Livesu, T. Ventura
CAxMan (H2020-FoF-2015-680448)

[PD6] Deliverable n. D2.6 — Analysis Based Optimization Tools
L. Tamellini, M.Attene, M. Martinelli, M. Chiumenti, F. Marini, M. Livesu,
P. Pietra, M. Pennacchio, S. Bertoluzza, V. Skytt, O. Barrowclough, C. Altenhofen
CAxMan (H2020-FoF-2015-680448)

[PD5] Deliverable n. D1.6 — Cloud Infrastructure Version 3
S. Bergweiler, J. Hjelmervik, C. Altenhofen, F. Loosmann, M. Livesu,
D. Cabiddu, M. Martinelli, E. Neiva, J. Cauchois, M. North, N. Arcontara, A. Mata
CAxMan (H2020-FoF-2015-680448)

[PD4] Deliverable n. D2.5 — Analysis Tools for AM, Non-Linear Setting
L. Tamellini, R. Vazquez, M. Martinelli, F. Marini, P. Pietra, M. Pennacchio,
S. Bertoluzza, M. Attene, M. Livesu, V. Skytt, O. Barrowclough, M. Chiumenti
CAxMan (H2020-FoF-2015-680448)

[PD3] Deliverable n. D3.3 — First Implementation of Process Planning Workflows
M. Attene, O. Barrowclough, D. Cabiddu, J. Cauchois, S.Ellero,
J. Haenisch, M. Livesu, J.C. Morel, T.Ventura
CAxMan (H2020-FoF-2015-680448)

[PD2] Deliverable n. D3.2 — AM Process Planning Workflows
M. Attene, D. Cabiddu, J. Cauchois, S.Ellero, M. Livesu, J.C. Morel
CAxMan (H2020-FoF-2015-680448)

[PD1] Deliverable n. D3.1 — Requirement: Process Planning for AM
S. Ellero, T. Zerbi, M. Attene, M. Livesu, M. Spagnuolo, O. Barrowclough,
T. Dokken, J.C. Morel, B. Ellingsen, D. Sørlie, S. Canard
CAxMan (H2020-FoF-2015-680448)

Technical Reports (4):

[TR4] A Survey of Algorithms for Geodesic Paths and Distances
K. Crane, M. Livesu, E. Puppo, Y. Qin
arXiv:2007.10430

[TR3] Benchmark of Polygon Quality Metrics for Polytopal Element Methods
M. Attene, S. Biasotti, S. Bertoluzza, D. Cabiddu,M. Livesu,
G. Patanè, M. Pennacchio, D. Prada, M. Spagnuolo
arXiv:1906.01627

[TR2] TopChart: from Functions to Quadrangulations
T. Sorgente, S. Biasotti, M. Livesu, M. Spagnuolo
CNR IMATI Technical Report 18-05

[TR1] A Study of the State of the Art of Process Planning for Additive Manufacturing
M. Livesu, M. Attene, M. Spagnuolo, B. Falcidieno
CNR IMATI Technical Report 39