

# Nico Pietroni

Computer Graphics, Geometry Processing and Art

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<http://www.nicopietroni.com>

## Personal Information

Name Nico Pietroni  
Title PhD in Computer Science  
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Nationality [REDACTED]

My primary research area is **Computer Graphics** and **Geometry Processing**, with a focus on developing concepts and practical algorithms for creating and manipulating digital shape representations. My work aims to advance industrial production pipelines by leveraging robust theoretical foundations in geometry processing. My research spans **mesh parametrization**, **reconstruction**, **surface abstraction**, and **global optimization**, with applications in the entertainment industry, digital fabrication, and architectural geometry. I have a strong track record of excellence, with over 50 international journal papers—more than 80% published in top-tier Q1 journals—and 20 papers presented at **SIGGRAPH / ACM Transactions on Graphics**, underscoring my significant contributions to the field. My expertise has earned me three appointments to the **International Program Committee of SIGGRAPH**. My work has been recognized with **three Symposium on Geometry Processing Awards** (2015, 2017, and 2021), celebrating my contributions to open-source tools such as MeshLab, LibLGL, and HexaLab, which integrate algorithms I developed. Beyond academia, my geometry algorithms have had a tangible impact in diverse domains. In architecture, they shaped an installation featured at the **2021 Venice Biennale**. In 2023, I developed a groundbreaking algorithm that powered an innovative artwork exhibited at the **Art Gallery of New South Wales**, earning recognition as a finalist for the prestigious **Wynne Prize**.

## Academic Positions

2023 – present Associate Professor *University of Technology Sydney*, Australia  
2020 – 2023 Tenured Senior Lecturer (equivalent to Associate Professor in EU) *University of Technology Sydney*, Australia  
2017 – 2020 Senior Lecturer (equivalent to Associate Professor in EU) *University of Technology Sydney*, Australia  
2013 – 2017 Researcher (Permanent) *Visual Computing Laboratory, ISTI - National Research Council (CNR)*, Italy  
2010 – 2012 Researcher (Temporary) *Visual Computing Laboratory, ISTI - National Research Council (CNR)*, Italy  
2009 – 2010 Post Doc at *Media Research Laboratory, New York University* New York City, NY, USA  
2006 – 2007 Visiting PhD Student at *Computer Graphics Lab, ETH Zurich*, Switzerland  
2004 – 2009 PhD Student, *University of Genova*, Italy

## Education

2009 **PhD, Computer Science**, University of Genova  
title: *A robust approach to interactive virtual cutting: geometry and color*  
supervisors: Enrico Puppo and Fabio Ganovelli  
2004 **Master Degree in Computer Science**, Dipartimento di informatica, University of Pisa  
Score: 110 / 110  
Title: *Algorithms and data structure for modelling cuts on deformable objects*  
supervisor: Fabio Ganovelli, Paolo Cignoni

## Italian Habilitation

2022 Habilitation as **Full professor**, Information Elaboration System (09/H1),  
Italian law n. 240/2010, art. 16, 02/02/2022 to 02/02/2033  
2022 Habilitation as **Full professor**, Computer Science (01/B1),  
Italian law n. 240/2010, art. 16, 31/01/2022 to 31/01/2033  
2017 Habilitation as **Associate professor**, Information Elaboration System (09/H1),  
Italian law n. 240/2010, art. 16  
2017 Habilitation as **Associate professor**, Computer Science (01/B1),  
Italian law n. 240/2010, art. 16

[AW5] 2021 **SYMPOSIUM ON GEOMETRY PROCESSING DATASET AWARD**

for *HEXALAB*, <http://awards.geometryprocessing.org>

Matteo Bracci, Marco Tarini, Marco Livesu, **Nico Pietroni**, Paolo Cignoni HexaLab is a WebGL application for real time visualization, exploration and assessment of hexahedral meshes. This tool use the technology of papers: [J30]

[AW4] 2019 **FIRST PRIZE**

for *FLEXMAP PAVILLON* at the Competition and Exhibition of innovative lightweight structures organized by the IASS Working Group 21 within the FORM and FORCE, joint international conference of IASS Symposium 2019 and Structural Membranes, see: <https://www.jjo33.com/iass-barcelona-2019>

Francesco Laccone, Luigi Malomo, Jesus Perez, **Nico Pietroni**, Federico Ponchio, Bernd Bickel, Paolo Cignoni using the technology of papers: [J45][J40][J33][J29]

[AW3] 2017 **SYMPOSIUM ON GEOMETRY PROCESSING AWARD**

for *MESHLAB*, see: <http://awards.geometryprocessing.org>

MeshLab (<http://www.meshlab.net/>) is an open source, portable, and extensible system for the processing and editing of unstructured 3D triangular meshes. It also supports processing of raw data produced with 3D digitization tools/devices, providing a set of tools for editing, cleaning, healing, inspecting, rendering, texturing and converting this kind of models. Paolo Cignoni, Guido Ranzuglia, Marco Callieri, Massimiliano Corsini, Matteo Dellepiane, Marco Di Benedetto, Fabio Ganovelli, Giorgio Marciás, Gianpaolo Palma, **Nico Pietroni**, Federico Ponchio, Luigi Malomo, Marco Tarini Roberto Scopigno using the technology of papers: [J5][J7]

[AW2] 2015 **SYMPOSIUM ON GEOMETRY PROCESSING AWARD**

for *LIBIGL*, *A simple C++ geometry processing library*.

**Symposium on Geometry Processing Software Award** 2015, see: <http://awards.geometryprocessing.org> Libigl is a C++ geometry processing library. It has a wide functionality including construction of sparse discrete differential geometry operators and finite-elements matrices such as the cotangent Laplacian and diagonalized mass matrix, simple facet and edge-based topology data structures, mesh-viewing utilities for OpenGL and GLSL, and many core functions for matrix manipulation. Alec Jacobson, Daniele Panozzo, Christian Schüller, Olga Diamanti, Qingnan Zhou, **Nico Pietroni**, Stefan Bruggerr, Kenshi Takayama, Wenzel Jakob, Nikolas De Giorgis, Luigi Rocca, Leonardo Sacht, Olga Sorkine-Hornung

[AW1] 2011 **ISTI - YOUNG RESEARCHER AWARD**

The ISTI Young Researcher Award (YRA) "Matteo Dellepiane" is an annual award that honors its staff of less than 35 years old for a distinct contribute to the Institute activity with their scientific production. National Research Council Of Italy

Google Scholar: H-index: 33 Citations: 3907,  
<https://scholar.google.it/citations?user=BXxHVPkAAAAJ&hl=en>

The three Top-Tier International Journals in the Computer Graphics fields are:

1st: *ACM Transaction on Graphics*

2nd: *IEEE Transaction on Visualization and Computer Graphics*

3rd: *Computer Graphics Forum*

font : [https://scholar.google.com/citations?view\\_op=top\\_venues&hl=en&uq=eng\\_computergraphics](https://scholar.google.com/citations?view_op=top_venues&hl=en&uq=eng_computergraphics)

Each publication reports also the SJR ( *SCImago Journal Rank (SJR)*) quartile. **Q1**: The top 25% of journals in a category (highest impact and quality).

2024

**Q1[J56]** *Digital Garment Alteration*

A Eggler, R Falque, M Liu, T Vidal-Calleja, O Sorkine-Hornung **N Pietroni**

**Computer Graphics Forum**, Volume 43, Issue 7 Pacific Graphics 2024, DOI: <https://doi.org/10.1111/cgf.15248>

**Q1[J55]** *Bending-Reinforced Grid Shells for Free-form Architectural Surfaces*

F Laccone, **N Pietroni**, P Cignoni, L Malomo

**Computer-Aided Design** 168, 103670

DOI: <https://doi.org/10.1016/j.cad.2023.103670>

**Q1[J54]** *Automated Shotcrete: A More Sustainable Construction Technology*

G Isaac, P Nicholas, G Paul, **N Pietroni**, T Vidal Calleja, M Xie, T Schork

**Sustainable Engineering: Concepts and Practices**, 331-345

- Q1[J53]** *Design and construction of catenary-ruled surfaces*  
Zhi Li, Ting-Uei Lee, **Nico Pietroni**, Roland Snooks, Yi Min Xie  
**Structures** 59, 105755  
DOI: <https://doi.org/10.1016/j.istruc.2023.105755>
- Q1[J52]** *Reducing the Number of Different Faces in Free-Form Surface Approximations Through Clustering and Optimization*  
Y Liu, TU Lee, AR Javan, **N Pietroni**, YM Xie  
**Computer-Aided Design**, Computer-Aided Design 166, 103633  
DOI: <https://doi.org/10.1016/j.cad.2023.103633>
- 2023**
- Q1[J51]** *Physically-based simulation of elastic-plastic fusion of 3D bioprinted spheroids*  
H Bahrami, F Sichetti, E Puppo, L Vettori, C Liu Chung Ming, S Perry, C Gentile, **N Pietroni**  
**Biofabrication**, Volume 15, N 4  
DOI: [10.1088/1758-5090/acf2cb](https://doi.org/10.1088/1758-5090/acf2cb)
- Q1[J50]** *HexBox: Interactive Box Modeling of Hexahedral Meshes*  
Zoccheddu Francesco, Gobetti Enrico, Livesu Marco, **Nico Pietroni**, Yi Min  
**Computers Graphics Forum** - SGP 2023 , Volume 42, N 5  
DOI: <https://doi.org/10.1111/cgf.14899>
- Q2[J49]** *Bending the light: Next generation anamorphic sculptures*  
Louis Pratt, Andrew Johnston, **Nico Pietroni**  
**Computers & Graphics** -Special Section on SMI 2023 ,  
DOI: <https://doi.org/10.1016/j.cag.2023.05.023>
- Q1[J48]** *Reducing the number of different nodes in space frame structures through clustering and optimization*  
Yuanpeng Liu, Ting-Uei Lee, Antiopi Koronaki, **Nico Pietroni**, Yi Min Xie  
**Engineering Structures**, Engineering Structures 284, 116016  
DOI:<https://doi.org/10.1016/j.engstruct.2023.116016>
- Q1[J47]** *Reflections on light: Developing new methods for producing anamorphic sculpture*  
Louis Pratt, Andrew Johnstone, **Nico Pietroni**,  
**MIT Leonardo**, 56 (6): 568–574  
DOI:[https://doi.org/10.1162/leon\\_a\\_02368](https://doi.org/10.1162/leon_a_02368)
- 2022**
- Q1[J46]** *SkinMixer: Blending 3D Animated Models*  
Stefano Nuvoli, **Nico Pietroni**, Riccardo Scateni, Paolo Cignoni, Marco Tarini  
**ACM Transactions on Graphics** 41 Issue 6 N 250, Siggraph Asia 2022  
DOI: <https://doi.org/10.1145/3550454.3555503>
- Q3[J45]** *Design And Construction Of a Bending-Active Plywood Structure: The Flexmaps Pavilion*  
Francesco Laccone, Luigi Malomo, Marco Callieri, Thomas Alderighi, Alessandro Muntoni, Federico Ponchio, **Nico Pietroni**, Paolo Cignoni  
**Journal of the International Association for Shell and Spatial Structures** Volume 63, Number 2  
DOI: <https://doi.org/10.20898/j.iass.2022.007>
- Q1[J44]** *Hex-Mesh Generation and Processing: a Survey*  
**Nico Pietroni**, Nico Pietroni, Marcel Campen, Alla Sheffer, Gianmarco Cherchi, David Bommes, Xifeng Gao, Riccardo Scateni, Franck Ledoux, Jean-Francois Remacle, Marco Livesu  
**ACM Transactions on Graphics** Volume 42, Issue 2, Article No.: 16, pp 1–44  
DOI: <https://doi.org/10.1145/3554920>
- Q1[J43]** *State of the art in computational mold design*  
Thomas Alderighi, Luigi Malomo, Thomas Auzinger, Bernd Bickel, Paolo Cignoni, Nico Pietroni  
**Computer Graphics Forum** Volume41, Issue 6, Pages 435-452  
DOI: <https://doi.org/10.1145/3554920>
- Q1[J42]** *Computational Pattern Making from 3D Garment Models*  
**Nico Pietroni**, Corentin Dumery, Raphael Guenot-Falque, Mark Liu, Teresa Vidal-Calleja, Olga Sorkine-Hornung  
**ACM Transactions on Graphics** - Volume 41 Issue 4 N 157 pp 1–14, Siggraph 2022  
DOI: <https://doi.org/10.1145/3528223.3530145>
- 2021**
- Q1[J41]** *Volume decomposition for two-pieces rigid casting*  
Thomas Alderighi , Luigi Malomo, Bernd Bickel, Paolo Cignoni, **Nico Pietroni**  
**ACM Transactions on Graphics** - Siggraph Asia 2021,(TOG) Volume 40 (6), 1-14  
DOI: <https://doi.org/10.1145/3478513.3480555>
- Q1[J40]** *Integrated computational framework for the design and fabrication of doubly-curved bending-active structures made from flat sheet material*  
Francesco Laccone , Luigi Malomo, **Nico Pietroni** , Paolo Cignoni, Tim Schork  
**Structures** - 2021 - Volume 34, 979-994  
DOI: <https://doi.org/10.1016/j.istruc.2021.08.004>

- Q1[J39]** *Reliable Feature-Line Driven Quad-Remeshing*  
**Nico Pietroni**, Stefano Nuvoli, Thomas Alderighi, Paolo Cignoni, Marco Tarini  
**ACM Transactions on Graphics** - Siggraph 2021, Volume 40 Issue 4  
 DOI: <https://doi.org/10.1145/3450626.3459941>
- Q1[J38]** *Automatic Surface Segmentation for Seamless Fabrication Using 4-axis Milling Machines*  
 Stefano Nuvoli, Alessandro Tola, Alessandro Muntoni, **N Pietroni**, Enrico Gobbetti, Riccardo Scateni  
**Computer Graphics Forum**, 40 (2), 191-203, Eurographics 2021  
 DOI : 0.1111/cgf.142625
- 2020**
- Q1[J37]** *LoopyCuts: Practical Feature-Preserving Block Decomposition*  
 Marco Livesu \*, **Nico Pietroni** \*, Enrico Puppo, Alla Sheffer, Paolo Cignoni ; \*Joint first authors  
**ACM Transactions on Graphics** - Siggraph 2020, Volume 39, Number 4 - July 2020  
 DOI: <https://doi.org/10.1145/3386569.3392472>
- Q1[J36]** *Reinforcement of General Shell Structures*  
 FT Gil Ureta, **N Pietroni**, D Zorin  
**ACM Transactions on Graphics**, June 2020 Article No.: 153  
 DOI : <https://doi.org/10.1145/3375677>
- Q1[J35]** *Skeleton-Based Conditionally Independent Gaussian Process Implicit Surfaces for Fusion in Sparse to Dense 3D Reconstruction*  
 L Wu, R Falque, V Perez-Puchalt, L Liu, **N Pietroni**, T Vidal-Calleja  
**IEEE Robotics and Automation Letters** 5 (2), 1532-1539  
 DOI: <https://doi.org/10.1109/LRA.2020.2969175>
- Q1[J34]** *Automatic Design of Cable-Tensioned Glass Shells*  
 Francesco Laccone, Luigi Malomo , Maurizio Froli , Paolo Cignoni, **Nico Pietroni**  
**Computer Graphics Forum** ,Volume 39 (1), 260-273  
 DOI: <https://doi.org/10.1111/cgf.13801>
- Q2[J33]** *A bending-active twisted-arch plywood structure: computational design and fabrication of the FlexMaps Pavilion*  
 Francesco Laccone, Luigi Malomo, Jesús Pérez, **Nico Pietroni**, Federico Ponchio, Bernd Bickel, Paolo Cignoni  
 SN Applied Sciences, Volume 2, August 2020  
 DOI: <https://doi.org/10.1007/s42452-020-03305-w>
- 2019**
- Q1[J32]** *QuadMixer: layout preserving blending of quadrilateral meshes*  
 Stefano Nuvoli, Alex Hernandez, Claudio Esperanca, Riccardo Scateni, Paolo Cignoni, **Nico Pietroni**  
**ACM Transactions on Graphics** , Volume 38, Issue 6, November 2019 - Siggraph Asia 2019  
 DOI: <https://doi.org/10.1145/3355089.3356542>
- Q1[J31]** *Volume-Aware Design of Composite Molds*  
 Thomas Alderighi, Luigi Malomo, Daniela Giorgi, Bernd Bickel, Paolo Cignoni, **Nico Pietroni**  
**ACM Transactions on Graphics** , Volume 38, Number 4 - ACM Siggraph 2019  
 DOI : <https://doi.org/10.1145/3306346.3322981>
- Q1[J30]** *HexaLab.net: an Online Viewer for Hexahedral Meshes*  
 Matteo Bracci, Marco Tarini, **Nico Pietroni**, Marco Livesu, Paolo Cignoni  
**Computer Aided Design** , Volume 110, May 2019, Pages 24-36  
 DOI: <https://doi.org/10.1016/j.cad.2018.12.003>
- 2018**
- Q1[J29]** *FlexMaps: Computational Design of Flat Flexible Shells for Shaping 3D Objects*  
 Luigi Malomo, Jesús Pérez Rodríguez, Emmanuel Iarussi, **Nico Pietroni**, Eder Miguel, Paolo Cignoni, Bernd Bickel  
**ACM Transactions on Graphics** , Volume 37 Issue 6, Article No. 241 - Siggraph Asia 2018  
 DOI: <https://doi.org/10.1145/3272127.3275076>
- Q1[J28]** *Metamolds: Computational Design of Silicone Molds*  
 Thomas Alderighi, Luigi Malomo, Daniela Giorgi, **Nico Pietroni**, Bernd Bickel, Paolo Cignoni  
**ACM Transactions on Graphics** , Volume 37 Issue 4, August 2018 Article No. 136 - ACM Siggraph 2018  
 DOI: <https://doi.org/10.1145/3197517.3201381>
- Q1[J27]** *State of the Art on Stylized Fabrication*  
 Bernd Bickel, Paolo Cignoni, Luigi Malomo **Nico Pietroni**  
**Computer Graphics Forum**, Volume 37, Issue 6 September 2018 ,pages 325-342.  
 DOI: <https://doi.org/10.1111/cgf.13327>,
- 2017**
- Q1[J26]** *Digital Fabrication Techniques for Cultural Heritage: A Survey*  
 Roberto Scopigno, Paolo Cignoni, **Nico Pietroni**, Marco Callieri, Matteo Dellepiane  
**Computer Graphics Forum** Volume 36, Issue 1, January 2017, Pages 6Ð21  
 DOI: <https://doi.org/10.1111/cgf.12781>

- Q1[J25]** *Position Based Tensegrity Design*  
**Nico Pietroni**, Marco Tarini, Amir Vaxman, Daniele Panozzo, Paolo Cignoni  
**ACM Transactions on Graphics**, Volume 36 Issue 6, November 2017 - ACM Siggraph Asia 2017  
 DOI: <https://doi.org/10.1145/3130800.3130809>  
 2016
- Q1[J24]** *FlexMolds: Automatic Design of Flexible Shells for Molding*  
 Luigi Malomo, **Nico Pietroni**, Bernd Bickel, Paolo Cignoni  
**ACM Transactions on Graphics**, Volume 35, Number 6 - ACM Siggraph Asia 2016  
 DOI: <https://doi.org/10.1145/2980179.2982397>
- Q1[J23]** *Tracing Field-Coherent Quad Layouts*  
**Nico Pietroni**, Enrico Puppo, Giorgio Marcias, Roberto Scopigno, Paolo Cignoni  
**Computer Graphics Forum**, Volume 35, Number 7 - Pacific Graphics 2016  
 DOI: <https://doi.org/10.1111/cgf.13045>
- Q1[J22]** *Stability of Statics Aware Voronoi Grid-Shells*  
 Davide Tonelli, **Nico Pietroni**, Enrico Puppo, Maurizio Froli, Paolo Cignoni, Gennaro Amendola, Roberto Scopigno  
**Engineering Structures**, Volume 116, Number 1, page 70-82 - June 2016  
 DOI : <https://doi.org/10.1016/j.engstruct.2016.02.049>
- Q4[J21]** *Conception and parametric design workflow for a timber large-spanned reversible grid shell to shelter the archaeological site of the Roman Shipwrecks in Pisa*  
 Elena Corio, Francesco Laccone, **Nico Pietroni**, Paolo Cignoni, Maurizio Froli  
**International Journal of Computational Methods and Experimental Measurements**, Volume 5 pp 551-661  
 DOI: <https://doi.org/10.2495/CMEM-V5-N4-551-561>  
 2015
- Q1[j20]** *Data-Driven Interactive Quadrangulation*  
 Giorgio Marcias, Kenshi Takayama , **Nico Pietroni**, Daniele Panozzo, Olga Sorkine-Hornung, Enrico Puppo, Paolo Cignoni  
**ACM Transactions on Graphics**, Volume 34, Number 65 - ACM Siggraph 2015  
 DOI: <https://doi.org/10.1145/2766964>
- Q1[J19]** *Elastic Textures for Additive Fabrication*  
 Julian Panetta, Qingnan Zhou, Luigi Malomo, **Nico Pietroni**, Paolo Cignoni, Denis Zorin  
**ACM Transactions on Graphics**, Volume 34, Number 4 - ACM Siggraph 2015  
 DOI: <https://doi.org/10.1145/2766937>
- Q1[J18]** *Statics Aware Grid Shells*  
**Nico Pietroni**, Davide Tonelli, Enrico Puppo, Maurizio Froli, Roberto Scopigno, Paolo Cignoni  
**Computer Graphics Forum**, Volume 34, Number 2, - Eurographics 2015  
 DOI : <https://doi.org/10.1111/cgf.12590>
- Q3[J17]** *Compression and Querying of Arbitrary Geodesic Distances*  
 Rosario Aiello, Francesco Banterle, **Nico Pietroni**, Luigi Malomo, Paolo Cignoni, Roberto Scopigno  
**Lecture Notes in Computer Science**, Volume 9279 pp 282-293  
 DOI: [https://doi.org/10.1007/978-3-319-23231-7\\_26](https://doi.org/10.1007/978-3-319-23231-7_26)  
 2014
- Q1[J16]** *Robust Field-aligned Global Parametrization*  
 Ashish Myles, **Nico Pietroni**, Denis Zorin  
**ACM Transactions on Graphics**, Volume 33, Number 4 - ACM Siggraph 2014  
 DOI: <https://doi.org/10.1145/2601097.2601154>
- Q1[J15]** *Field-Aligned Mesh Joinery*  
 Paolo Cignoni, **Nico Pietroni**, Luigi Malomo, Roberto Scopigno  
**ACM Transactions on Graphics**, Volume 3, Number 1 - ACM Siggraph Asia 2014  
 DOI: <https://doi.org/10.1145/2537852>  
 2013
- Q1[J14]** *Animation-Aware Quadrangulation*  
 Giorgio Marcias, **Nico Pietroni**, Daniele Panozzo, Enrico Puppo, Olga Sorkine  
**Computer Graphics Forum**, Volume 32, Issue 5 - Symposium on Geometry Processing 2013  
 DOI: <https://doi.org/10.1111/cgf.12183>
- Q1[J13]** *Quad-Mesh Generation and Processing: a survey*  
 David Bommes, Bruno Lévy, **Nico Pietroni**, Enrico Puppo, Claudio Silva, Marco Tarini, Denis Zorin  
**Computer Graphics Forum** Volume 32, Number 6 ,Eurographics 2012 State of the Art Report  
 DOI: <https://doi.org/10.1111/cgf.12014>  
 2011

- Q1[J12]** *An interactive local flattening operator to support digital investigations on artwork surfaces* **Nico Pietroni**, Massimiliano Corsini, Paolo Cignoni, Roberto Scopigno  
**IEEE Transactions on Visualization and Computer Graphics** - IEEE Visualization 2011  
 DOI: <https://doi.org/10.1109/TVCG.2011.165>
- Q1[J11]** *Simple Quad Domains for Field Aligned Mesh Parametrization* Marco Tarini, Enrico Puppo, Daniele Panozzo, **Nico Pietroni**, Paolo Cignoni  
**ACM Transactions on Graphics**, Volume 30, Number 6 - ACM SIGGRAPH Asia 2011  
 DOI: <https://doi.org/10.1145/2070781.2024176>
- Q1[J10]** *Global Parametrization of Range Image Sets*  
**Nico Pietroni**, Marco Tarini, Olga Sorkine, Denis Zorin  
**ACM Transactions on Graphics**, Volume 30, Number 6 - ACM SIGGRAPH Asia 2011  
 DOI: <https://doi.org/10.1145/2070781.2024183>
- Q1[J9]** *Automatic Construction of Adaptive Quad-Based Subdivision Surfaces Using Fitmaps*  
 Daniele Panozzo, Enrico Puppo, Marco Tarini, **Nico Pietroni**, Paolo Cignoni  
**IEEE Transactions on Visualization and Computer Graphics**, Volume 17, Number 10  
 DOI: <https://doi.org/10.1109/TVCG.2011.28>
- Q3[J8]** *New techniques for computer-based simulation in surgical training*  
 Giuseppe Turini, Nico Pietroni, Giuseppe Megali, Fabio Ganovelli, Andrea Pietrabissa, Franco Mosca  
 International Journal of Biomedical Engineering and Technology (IJET), Volume 5, Number 4  
 DOI: <https://doi.org/10.1504/IJBET.2011.039923>
- 2010**
- Q1[J7]** *Almost isometric mesh parameterization through abstract domains*  
**Nico Pietroni**, Marco Tarini, Paolo Cignoni  
**IEEE Transactions on Visualization and Computer Graphics**, Volume 16, Number 4  
 DOI: <https://doi.org/10.1109/TVCG.2009.96>
- Q1[J6]** *Feature-aligned T-meshes*  
 Ashish Myles, **Nico Pietroni**, Denis Kovacs, Denis Zorin  
**ACM Transactions on Graphics**, Volume 29, Number 4 - ACM Siggraph 2010  
 DOI: <https://doi.org/10.1145/1778765.1778854>
- Q1[J5]** *Practical quad mesh simplification*  
 Marco Tarini, **Nico Pietroni**, Paolo Cignoni, Daniele Panozzo, Enrico Puppo  
**Computer Graphics Forum**, Volume 29, Number 2 - EUROGRAPHICS 2010  
 DOI: <https://doi.org/10.1111/j.1467-8659.2009.01610.x>
- Q2[J4]** *Real-time Single Scattering Inside Inhomogeneous Materials*  
 Daniele Bernabei, Fabio Ganovelli, **Nico Pietroni**, Paolo Cignoni, Sumanta Pattanaik, Roberto Scopigno  
**The Visual Computer**, Volume 26, Number 6-9 - CGI 2010  
 DOI: <https://doi.org/10.1007/s00371-010-0449-7>
- Q2[J3]** *Solid-Texture Synthesis: A Survey*,  
**Nico Pietroni**, Paolo Cignoni, Miguel A. Otaduy, Roberto Scopigno  
**IEEE Computer Graphics and Applications**, Volume 30, Number 4  
 DOI: <https://doi.org/10.1109/MCG.2009.153>
- 2009**
- Q2[J2]** *Splitting Cubes: a fast and robust technique for virtual cutting.*  
**Nico Pietroni**, Fabio Ganovelli, Paolo Cignoni, Roberto Scopigno.  
**The Visual Computer**, Volume 25, Number 3  
 DOI: <https://doi.org/10.1007/s00371-008-0216-1>
- 2008**
- Q1[J1]** *Reconstructing head models from photographs for individualized 3D-audio processing*  
 Matteo Dellepiane, **Nico Pietroni**, Nicolas Tsingos, Manuel Asselot, Roberto Scopigno  
**Computer Graphics Forum**, Volume 27, Number 7  
 special issue of **Pacific Graphics 2008**  
 DOI: <https://doi.org/10.1111/j.1467-8659.2008.01316.x>
- 2007**
- Q1[J0]** *Texturing internal surfaces from a few cross sections.*  
**Nico Pietroni**, Miguel A. Otaduy, Bernd Bickel, Fabio Ganovelli, and Markus H. Gross.  
**Computer Graphics Forum**, Volume 26, Number 3 - Eurographics 2007  
 DOI: <https://doi.org/10.1111/j.1467-8659.2007.01087.x>

- [C14] *Statics and Stability of Bending-Optimized Double-Layer Grid Shell*  
F Laccone, **Nico Pietroni**, M Froli, P Cignoni, L Malomo  
Italian Workshop on Shell and Spatial Structures, 569-578
- [C13] *A Neural Network-based Low-cost Soft Sensor for Touch Recognition and Deformation Capture*  
Yifan Fan, **Nico Pietroni**, Sam Ferguson  
Proceedings of the 2023 ACM Designing Interactive Systems Conference 2023  
DOI: <https://doi.org/10.1145/3563657.3595963>
- 2020**
- [C12] *Automated Design and Analysis of Reinforced and Post-Tensioned Glass Shells*  
Francesco Laccone, Luigi Malomo, **Nico Pietroni**, Maurizio Froli, Paolo Cignoni  
Challenging Glass Conference Proceedings, Sep 2020  
DOI : 10.7480/cgc.7.4496
- [C11] *Suckers Emission Detection and Volume Estimation for the Precision Farming of Hazelnut Orchards*  
Ciro Potena; Renzo Fabrizio Carpio; **Nico Pietroni** ; Jacopo Maiolini; Giovanni Ulivi; Emanuele Garone; Andrea Gasparri  
I2020 IEEE Conference on Control Technology and Applications (CCTA)  
DOI:10.1109/CCTA41146.2020.9206335
- 2019**
- [C10] *FlexMaps Pavilion: a twisted arc made of mesostructured flat flexible panels*  
Francesco Laccone, Luigi Malomo, Jesus Perez, **Nico Pietroni**, Federico Ponchio, Bernd Bickel, Paolo Cignoni  
IASS 2019: FORM and FORCE
- [C9] *Concept and cable-tensioning optimization of post-tensioned shells made of structural glass*  
Francesco Laccone, Luigi Malomo, Maurizio Froli, Paolo Cignoni, **Nico Pietroni**  
IASS 2019: FORM and FORCE
- 2016**
- [C8] *Design and Fabrication of Grid-shells Mockups*  
Davide Tonelli, **Nico Pietroni**, Paolo Cignoni, Roberto Scopigno  
STAG: Smart Tools and Apps for Graphics - 2016  
DOI: 10.2312/stag.20161360
- [C7] *State Of The Art on Functional Fabrication*  
Asla Medeiros e Sá, Karina Rodriguez Echavarria, **Nico Pietroni**, Paolo Cignoni  
Eurographics Workshop on Graphics for Digital Fabrication (2016)  
DOI: 10.2312/gdf.20161073
- 2014**
- [C6] *Digital Fabrication Technologies for Cultural Heritage (STAR)*  
Roberto Scopigno, Paolo Cignoni, **Nico Pietroni**, Marco Callieri, Matteo Dellepiane  
Eurographics Workshops on Graphics and Cultural Heritage, EG GCH 2014  
DOI: 10.2312/gch.20141306
- [C5] *Interlocking pieces for printing tangible Cultural Heritage replicas*  
Giuseppe Alemanno, Paolo Cignoni, **Nico Pietroni**, Federico Ponchio, Roberto Scopigno  
Eurographics Workshops on Graphics and Cultural Heritage, EG GCH 2014, page 145-154  
DOI: 10.2312/gch.20141312
- 2013**
- [C4] *A computer-assisted constraint-based system for assembling fragmented objects*  
G. Palmas, **Nico Pietroni**, P. Cignoni and R. Scopigno  
Proc. of IEEE Digital Heritage 2013 International Congress  
DOI: 10.1109/DigitalHeritage.2013.6743793
- 2010**
- [C3] *Adaptive Quad Mesh Simplification*  
Agostino Bozzo, Daniele Panozzo, Enrico Puppo, **Nico Pietroni**, Luigi Rocca  
Proc. of IEurographics Italian Chapter Conference 2010  
DOI: 10.2312/LocalChapterEvents/ItalChap/ItalianChapConf2010/095-10
- 2007**
- [C2] *Techniques for Computer Assisted Surgery*  
Giuseppe Turini, **Nico Pietroni**, Fabio Ganovelli, Roberto Scopigno  
Proc. of IEurographics Italian Chapter Conference 2007  
DOI: 10.2312/LocalChapterEvents/ItalChap/ItalianChapConf2007/155-160
- [C1] *A robust method for real-time thread simulation*  
Blazej Kubiak, **Nico Pietroni**, Fabio Ganovelli, and Marco Fratarcangeli.  
ACM VRST 2007, Newport Beach, California, USA  
DOI: 10.1145/1315184.1315198

## 2005

- [C0] *Robust segmentation of anatomical structures with deformable surfaces and marching cubes*  
**Nico Pietroni**, Andrea Giachetti, Fabio Ganovelli  
 VRIPHYS 2005 Workshop On Virtual Reality Interaction and Physical Simulation  
 DOI: 10.1016/j.ics.2005.03.274

## Other Publications

- [Oth3] *Hex-Mesh Generation and Processing: a Survey*  
**Nico Pietroni**, Marcel Campen, Alla Sheffer, Gianmarco Cherchi, David Bommes, Xifeng Gao, Riccardo Scateni, Franck Ledoux, Jean-Francois Remacle, Marco Livesu  
 arXiv preprint arXiv:2202.12670, 2022
- [Oth2] *Computational Pattern Making from 3D Garment Models*  
**Nico Pietroni**, Corentin Dumery, Raphael Guenot-Falque, Mark Liu, Teresa Vidal-Calleja, Olga Sorkine-Hornung  
 arXiv preprint arXiv:2202.10272, 2022, 2022
- [Oth1] *Structurally optimized shells*  
 Francisca Gil Ureta, **Nico Pietroni**, Denis Zorin  
 arXiv preprint arXiv:1904.12240, 2019
- [Oth0] *Loopy Cuts: Surface-Field Aware Block Decomposition for Hex-Meshing*  
 M Livesu, **N Pietroni**, E Puppo, A Sheffer, P Cignoni  
 arXiv preprint arXiv:1903.10754, 2019

## Research

## Research Projects - 10 Australia

### 2023-2024

**Space Research Network** *Automating the fit process for spacesuit design & manufacturing*  
 Role : **Project Coordinator**  
 Funding (AUD): 30000, Papers [J56]

### 2022

**Cross collaborative scheme** *Games of Protein*  
 Role : **Project Coordinator** ,  
 Funding (AUD): 50000

**UTS Capex project** *New devices for Digital Fashion*  
 Role : **Chief Investigator**  
 Funding (AUD): 320000

### 2021

**CRC-P** *Shoulder Replacement Implant Design for Additive Manufacturing*  
 Role : **Chief Investigator**,  
 Funding (AUD): 600000

**Cross collaborative scheme** *Development of an Integrated Additive Manufacturing Framework for Robotic Shotcrete 3D Printing of Sustainable Free-Form Architecture*  
 Role : **Chief Investigator**  
 Funding (AUD): 20000

**Cross collaborative scheme** *Smart sculptures: renewable energy power generators as engaging public artworks*  
 Role : **Chief Investigator**  
 Funding (AUD): 15000

**Cross collaborative scheme** *Change Detection Visualisation for Real-time 3D scene evolution*  
 Role : **Chief Investigator**  
 Funding (AUD): 12500, papers [J37]

### 2019

**UTS Cross-Faculty collaborative scheme** *Towards an integrated Design-Robotic Architecture*  
 Role : **Chief Investigator**  
 Funding (AUD): 20000

### 2018

**Innovation Connection** *UI/UX Prototype Development (Stage 2) & Core Tech Industrialisation*  
 Role : **Chief Investigator**  
 Funding source(s): Tailors Mark & Innovation Connections Grant  
 Funding amount (\$): 154000



## Research Projects in Europe

- DSurf** *DSurf: Scalable Computational Methods for 3D Printing Surfaces 2016-2019*  
 Role : **Chief Investigator**  
 type : Research projects of national interest (PRIN) (Italian Ministry of Research)  
 Total Founds (€): 549.436  
 Partners: Cnr of Italy, Univ. degli Studi di ROMA "La Sapienza", Univ. degli Studi di GENOVA, Univ. degli Studi INSUBRIA Varese-Como, Univ. degli Studi di CAGLIARI, Univ. degli Studi di VERONA.  
 Papers: [J27][J28][J29][J30][J31][J32][J34][J37]
- Emotive** *Emotive Virtual cultural Experiences through personalized storytelling (2016-2019)*,  
[https://cordis.europa.eu/project/rcn/205688\\_en.html](https://cordis.europa.eu/project/rcn/205688_en.html) (<https://www.emotiveproject.eu>)  
 Role : **Participant Investigator**  
 Type: H2020-SC6-CULT-COOP-2016 Project ID: 727188  
 Total Founds (€): 2646447  
 Papers:[J27][J28][J29][J31]
- Harvest 4D** *Harvest4D - Harvesting Dynamic 3D Worlds from Commodity Sensor Clouds (2013-2016)*,  
<https://harvest4d.org>  
 Role : **Participant Investigator**  
 Type: EC 7FP - no: 323567  
 Total Founds (€): 2700000  
 Partners: TU Wien, University of Bonn, IMT Paris, Cnr of Italy, Delft University  
 Papers:[J18][J20]
- Ariadne** *ARIADNE: advanced research infrastructure for archeological dataset networking in Europe (2013-2016)*  
<http://www.ariadne-infrastructure.eu>  
 Role : **Participant Investigator**  
 Type: EC INFRA-2012 agreement 313193  
 Founds (€): 382103  
 Papers: [C4], [C5]
- V-MusT.net** *V-MUST.NET: How museums will look in the future (2011-2015)*  
 see: [https://cordis.europa.eu/project/rcn/101496\\_en.html](https://cordis.europa.eu/project/rcn/101496_en.html)  
 Role : **Participant Investigator**  
 Type: EC 7thFW NoE agreement 270404  
 Total Founds (€): 4 550 000  
 Papers: [J10][J11][J12][J13][J14]
- ST@rT** *Project START, Developing technologies for cultural heritage applications (2009-2011)*,  
 Role : **Participant Investigator**  
 Type: POR, Tuscany Region  
 Papers: [J4][J5]
- CROSSMOD** *CROSSMOD: Cross-Modal Perceptual Interaction and Rendering: a New Generation of Audiovisual Virtual Environments (2005-2008)*  
 see : [https://cordis.europa.eu/project/rcn/86392\\_en.html](https://cordis.europa.eu/project/rcn/86392_en.html)  
 Role : **Participant Investigator**  
 Type: European EU IST FET, contract number 014891.  
 Total Founds (€): 1555000  
 Papers:[J1]
- 3D-COFORM** *3DCOFORM: Tools and Expertise for 3D Collection Formation (2008-2012)*  
 see : [https://cordis.europa.eu/project/rcn/89256\\_en.html](https://cordis.europa.eu/project/rcn/89256_en.html) (<http://www.3d-coform.eu/>)  
 Role : **Participant Investigator**  
 Type: EU FP7 IST IP grant no. 231809  
 Total Founds (€): 8 449 994  
 Papers: [C4][J3][J4][J5][J6][J7]

## Teaching

### Recent Subjects that have been taught

- COMPUTER GRAPHICS** This subject equips students with essential problem-solving and communication skills within the realm of computer graphics, focusing on shape representation, manipulation, and visualization. It offers a balanced approach to theory and practice, both crucial for mastering the efficient development of computer graphics technologies. By completing this subject, students acquire valuable knowledge of the core graphical systems underlying game engines and 3D modelling software, along with hands-on skills in creating interactive 3D web applications.  
 University of Technology Sydney
- 3D ANIMATION** This subject lays the theoretical and technological foundations for 3D animation, with a particular emphasis on interactive animations for games. Students gain hands-on experience with a major commercial 3D game development platform, applying it to the creation of an interactive animation project or game. The subject adopts a project-based approach, allowing each student to design and develop a project of their choice, fostering creativity and practical skills.  
 University of Technology Sydney

## COMPUTER GRAPHICS

**COMPUTER GRAPHICS** University of Technology Sydney  
Computer Graphics is a mandatory subject in the Bachelor's program in Game Development and is offered as an elective in both the Bachelor's (undergraduate) and Master's (postgraduate) programs in IT. The subject spans **12 weeks**, with each student attending **1.5 hours of theory** and **1.5 hours of laboratory** (which is basically a programming lecture) sessions per week. There are a **total of 4–5 laboratory sessions**. I deliver the theory lectures and teach two of the lab sessions, while the remaining 2–3 lab sessions are conducted by a tutor under my coordination. Additionally, I am responsible for grading all assignments and the final project. The subject typically has an enrollment of 100 to 130 students. The subject is worth **6 CFU** (European Credit Transfer and Accumulation System credits).

**3D ANIMATION** University of Technology Sydney  
3D Animation is a mandatory subject in the Bachelor's program in Game Development and is offered as an elective in both the Bachelor's (undergraduate) and Master's (postgraduate) programs in IT. The subject spans **12 weeks**, with each student attending **1.5 hours of theory** and **1.5 hours of laboratory** (which is basically a programming lecture) sessions per week. There are a **total of 4 laboratory sessions**. I deliver the theory lectures and teach two of the lab sessions, while the remaining 2 lab sessions are conducted by a tutor under my coordination. Additionally, I am responsible for grading all assignments and the final project. The subject typically has an enrollment of 90 to 110 students. The subject is worth **6 CFU** (European Credit Transfer and Accumulation System credits).

**INTERACTIVE MEDIA** University of Technology Sydney  
Interactive Media is mandatory for students majoring in Interactive Media and is also available as an elective in the Bachelor's (undergraduate) and Master's (postgraduate) programs in IT. The subject spans **12 weeks**, with each student attending **1.5 hours of theory** and **1.5 hours of laboratory (which is basically a programming lecture)** sessions per week. There are a **total of 6 laboratory sessions**. I deliver the theory lectures and teach two of the lab sessions, while the remaining 4 lab sessions are conducted by a tutor under my coordination. Additionally, I am responsible for grading all assignments and the final project. The subject typically has an enrollment of 200 to 300 students. The subject is worth **6 CFU** (European Credit Transfer and Accumulation System credits).

**SOFTWARE DEVELOPMENT STUDIO** University of Technology Sydney  
Software Development Studio 1 and 2 were available until 2021 and a mandatory subjects in the Master's (postgraduate) programs in IT. The subject spans **12 weeks**, with each student attending **3 hours of laboratory** sessions per week. I typically supervise 2–3 student groups, each consisting of 5–10 members, working on software development projects aligned with real-world industry applications. The subject typically has an enrollment of 30 to 60 students. The subject is worth **6 CFU** (European Credit Transfer and Accumulation System credits).

## 1. Job History

Feb - June 2024	<b>Computer Graphics Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~120 students - 12 Weeks x 6h/Week (6 CFU)
Feb - June 2024	<b>3D Animation Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~110 students - 12 Weeks x 6h/Week (6 CFU)
Feb - June 2023	<b>Computer Graphics Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
Feb - June 2023	<b>3D Animation Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
Feb - June 2022	<b>Computer Graphics Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
Feb - June 2022	<b>3D Animation Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
March - June 2021	<b>Computer Graphics Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
March - June 2021	<b>3D Animation Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
March - June 2020	<b>Computer Graphics Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
March - June 2020	<b>3D Animation Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
March - June 2019	<b>Computer Graphics Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)
March - June 2019	<b>3D Animation Main lecturer and Course Coordinator</b> University of Technology Sydney, Australia ~60 students - 12 Weeks x 6h/Week (6 CFU)
August - October 2018	<b>Interactive Media Main Lecturer and coordinator</b> University of Technology Sydney, Australia ~250 students - 12 Weeks x 6h/Week (6 CFU)
March - June 2018	<b>Software Development Studio 1 and 2 Tutoring students</b> University of Technology Sydney, Australia ~30 students - 12 Weeks x 3h/Week (6 CFU)

March - June 2018 *Introduction to Computer Graphics* **Main lecturer**  
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

Nov 2023 *Introduction to Geometry Processing* **Main lecturer and Course Coordinator**  
University of Technology Sydney, Australia ~10 students, 6 hours. Subject for the PhD in Computer Science.

#### 2018 **3D Graphics for Web**

**Canon Information System Research**, Australia Sydney

Course on real time rendering and Three.js (~12 hours 2 days) ~10 students (Canon Senior Researchers)

Funding provided (Au \$): 20000

*In this course I provided an overview all the main techniques for real-time rendering on the web*

#### 2016 **3D Scanning and Geometry Processing**

**Canon Information System Research**, Australia Sydney

Course on 3D scanning, geometry processing and shape analysis (~84 hours 14 days) ~15 students (Canon Senior Researchers)

Funding (€): 20000

*In this course I provided an overview all the main techniques for geometry processing, remeshing and shape analysis with particular focus on applications such as fabrication and mesh reconstruction*

CNR Invoice 5791, Contract N 0001163 , 30/03/2016

#### 2015 **Geometry Processing**

**Canon Information System Research**, Australia Sydney

Course on geometry processing and exercise in C++ (~54 hours 9 days) ~20 students (Canon Senior Researchers)

Funding (€): 20000

*In this course I provided an overview all the main functionalities of the VCG library and Meshlab*

CNR Invoice 5874, Contract N 0001427 , 26/03/2016

#### [T3] *A Course on Hex-Mesh Generation and Processing*

speakers: **Nico Pietroni**, Marco Livesu

ACM **SIGGRAPH ASIA 2022** Courses - 2022, 6 hours

DOI <https://doi.org/10.1145/3550495.3558207>

#### [T2] *State of the Art on Stylized Fabrication*

speakers: **Nico Pietroni**, Paolo Cignoni

ACM **SIGGRAPH ASIA 2019** Courses - 2019, 6 hours

DOI <https://doi.org/10.1145/3355047.3359411>

#### [T1] *Digital Fabrication Technologies for Cultural Heritage (STAR)*

speakers: **Nico Pietroni**, Paolo Cignoni

Eurographics Workshops on Graphics and Cultural Heritage EG GCH 2014 , 4 hours

DOI <http://dx.doi.org/10.2312/gch.20141306>

See <https://dl.acm.org/doi/10.1145/3355047.3359411>

#### [T0] *Quad Meshing*

speakers: **Nico Pietroni**, Marco Tarini

**Eurographics 2012** Eurographics 2012 State of the Art report , 4 hours

DOI: 10.2312/conf/EG2012/stars/159-182

see [http://www.eurographics2012.it/program\\_st.html](http://www.eurographics2012.it/program_st.html)

2020-2024 Louis Pratt , FEIT, UTS Sydney, *Geometry Processing and Art*

2020-2024 Hassan Bahrami , FEIT, UTS Sydney, *Computational Design*

2017-2021 Stefano Nuvoli, University of Cagliari, *Retopology for the entertainment industry*

2013-2017 Luigi Malomo, Computer Science, University of Pisa, *Geometry Processing for Fabrication*

2013-2017 Giorgio Marcias, Computer Science, University of Pisa, *Modeling for Entertainment Industry*

2024-Ongoing Edward Su, UTS Sydney, *3D Geometry and Machine Learning*

2024-Ongoing Anna Egger, ETH Zurich, *Computational design*

2023-Ongoing Youanpeng Liu, RMIT Melbourne, *Architectural Geometry*

2023-Ongoing Sultan Aljabri, FEIT, UTS Sydney, *Architectural Geometry*  
 2019-Ongoing Ivan Fan, FEIT, UTS Sydney, *Physical Interfaces*  
 2018-Ongoing Herve Harvard, FEIT, UTS Sydney, *Geometry processing for Industry*

#### 2024 Master Thesis

Master Thesis Hassan Rehan, University Technology Sydney, *Video Game Console FPS Statistics Tracking using CV*  
 Master Thesis Tuan Kiet Phan, University Technology Sydney, *Metaverse in the Built Environment*  
 Master Thesis Zhiheng Gu, University Technology Sydney, *Automatic Aiming Technology for FPS Games*  
 Master Thesis Mirto Randellini, University of Milan and UTS Sydney, *Non-Rigid Alignment*  
 Master Thesis Samuel McKenzie-Sell, UTS Sydney, *Cutting Deformable Polyhedra*  
 Master Thesis Joy Dhar, UTS Sydney, *Pixel to Product*  
 Master Thesis James Davies-Fox, UTS Sydney, *Environmental light estimation for augmented reality (AR)*  
 Master Thesis Tuan Kiet Phan, UTS Sydney, *Metaverse in the Built Environment*

#### 2023

Master Thesis Anna Eggler, ETH Zurich and UTS Sydney, *Digital Fashion Design*  
 Master Thesis James Carlsson, UTS Sydney, *Implicit mesh sculpting*  
 Master Thesis Xueyan Yang *Educational game for children based on 3D graphics*  
 Master Thesis Hassan Rehan *Ease in Implementing Computer Vision Based Cheating in FPS Games*  
 Master Thesis James Kerr, UTS Sydney *Ball tracker in Unity*

#### 2022

Capstone Proj Marjan Savvati, UTS Sydney *3D Sound in Unity*  
 Capstone Proj Jack Coggins, UTS Sydney *NPR Rendering*

#### 2021

Capstone Proj Matthew Barrett, UTS Sydney, *Molecular Visualization system*  
 Capstone Proj Jacob Willis, UTS Sydney, *Bioprint Simulation*  
 Master Thesis Yuzhi Liu, UTS Sydney *Parafashion, 3D parametric fashion design*

#### 2016

Master Thesis Elena Corio, University of Pisa, Construction and Architectural Engineering  
*An innovative sail-shaped shelter for the Ancient Ships Archaeological Site of Pisa*

#### 2014

Master Thesis Rosario Aiello, University of Pisa, Computer Science,  
*Fast arbitrary geodesic computation on triangular meshes*

#### 2013

Master Thesis Giuseppe Alemanno, University of Pisa, Computer Science,  
*Decomposing 3D Shapes into modular Low Reliefs*

#### 2012

Master Thesis Gregorio Palmas, Computer Science, University of Pisa,  
*Computer-Assisted Assembling of Fragmented Objects*

#### 2007

Master Thesis Blazej Kubiak, Technical University of Łódź, Poland,  
*A robust method for real-time thread simulation*

#### Awards and Honors of My Supervised Students

2023 Anna Maria Eggler, ETH, visiting UTS, Gold Medal for best Masther Thesis ETH Zurich, paper [J56], see <https://inf.ethz.ch/news-and-events/spotlights/infk-news-channel/2023/09/eth-medals-and-willi-studer-prize-for-masters-graduates.html>  
 2022 Thomas Alderighi, University of Pisa, PhD Thesis Honorable Mention 2022, papers [J28][J31][J39][J43], Eurographics Association, see: <https://www.eg-italy.org/awards/>  
 2021 Stefano Nuvoli, University of Cagliari and UTS Sydney, best Italian PhD thesis in Graphics in 2021, , papers [J32][J38][J39][J46], Eurographics Association, see: <https://www.e32italy.org/awards/>

- 2018 Matteo Bracci, University of Pisa, Best BSc Thesis in graphics 2018, paper [J30], award[AW05] Eurographics Association, see: <https://www.eg-italy.org/awards/>
- 2017 Elena Corio, University of Pisa, best italian master thesis in graphics 2017, paper [J21], award[AW05] Eurographics Association, see: <https://www.eg-italy.org/awards/>

## Professional career

### Academic career

- 2022-Ongoing **Course Director of the Master of Information Technology**, University of Technology Sydney: As the coordinator of the Master of IT program, I engage in dialogue with students and make strategic decisions regarding the program's structure. Additionally, I collaborate with the administrative team to ensure the timely delivery of documents required by the government for the assessment and approval of the current structure.
- 2022-Ongoing **PhD Program (HDR) Coordinator**, University of Technology Sydney: *To date, I have chaired over 100 PhD Candidature Assessments. Since 2022, I have also been responsible for ranking PhD applicants annually. This ensures that applicants in our discipline are ranked appropriately, especially considering their often non-traditional backgrounds. In total, I have ranked about 60 applicants.*
- 2022-Ongoing **Member of School Teaching & Learning Committee**, University of Technology Sydney: *In this committee, we approve the structures of all the courses within the School of Computer Science, including the assessment and core program components.*
- 2022-2023 **Member of our Faculty Board**. The Faculty boards advise the Academic Board, the dean and other faculty senior staff on their respective academic activities. Faculty of Engineering and Information Technology, University of Technology Sydney
- 2020 **Committee member** Post Doc position at UTS. I have been part of the selection committee at UTS for one postdoc position on an ARC DP project led by AProf Teresa Vidal-Calleja in 2020.
- 2020-2022 **Member of the UTS FEIT Equity & Diversity Committee**, University of Technology Sydney: *I was working towards assembling a digital photo exhibition involving a famous photographer presenting personal stories of LGBTQI+ people.*
- 2019-Ongoing **Panellist** for BIT Cooperative I I interviewed numerous incoming students and ranked them to determine scholarship allocations at the University of Technology Sydney.
- 2015 **Committee member** research grant (assegno di ricerca) Num 21 Prot.4312 13/11/2015
- 2011 **Committee member** Temporary Researcher (Art 23) Num 1 Prot. 843 14/03/2011
- 2011 **Committee member** Temporary Researcher (Art 23) Num 2 Prot. 844 14/03/2011

### Invited talks / Visiting

- 2024 Martin Heistermann , University of Bern Switzerland
- 2024 Marzia Riso , University Sapienza, Roma, Italy
- 2023 Pietro Musoni , University of Verona, Italy
- 2023 Max Lyon , RWTH Aachen Germany
- 2020 Edoardo Carra, Computer Science, University Sapienza, Rome
- 2019 Gianmarco Cherchi, Computer Science, University of Cagliari
- 2016 Francesco Usai, Computer Science, University of Cagliari

### Peer Review

- 2023 INRIA (France) - Evaluation Research Teams  
part of the international committee for the evaluation of the Inria team MFX, led by Sylvain Lefebvre.
- 2022 European Research Council (ERC)  
part of the reviewer team for ERC Consolidator Grant Call
- 2021 Israel Science Foundation (ISF)  
part of the reviewer team for this fellowship similar to the ERCs.
- 2018 European Research Council (ERC)  
part of the reviewer team for ERC Starting Grant Call

## Engagement in the Academic Community

### Participation in international symposia

- 2017-ongoing Core member of *School of Computer Science*  
University of Technology Sydney

- 2022-ongoing Core member of *Visualization Institute, University of Technology Sydney*  
A cross-disciplinary research center focusing on visualisations and immersive experiences.  
see <https://www.uts.edu.au/visualisation-institute>
- 2005-2017 Core Member of *Visual Computing Laboraroty*, National Research Council of Italy  
see <http://vcg.isti.cnr.it>
- 2003-2007 Core member of *Endocas: Center of Excellence on Computed-Aided Surgery*  
see <http://www.endocas.org>  
Type: National Project MIUR
- 2017 Eurographics Workshop On Graphics For Digital Fabrication: Gradifab 2017
- 2025 Pacific Graphics 2025 Program Co-Chair
- 2023 SGP 2023 Graduate School  
see: <https://sgp2023.github.io/organization/>
- 2020 Shape Model International  
<https://smi2020.sciencesconf.org/resource/page/id/1>
- 2016 Eurographics Workshop On Graphics For Digital Fabrication: GradiFab 2016  
see <https://diglib.eg.org/handle/10.2312/gdf20162005>
- 2024 Pacific Graphics  
see: <http://pg2024.hsu.edu.cn>
- 2023-Ongoing **Department Editor** of IEEE Computer Graphics and Applications (ISSN 2571-9408)
- 2020-Ongoing **Editorial Board Member** of Heritage (ISSN 2571-9408) See <https://www.mdpi.com/journal/heritage>.
- Sep 2024 **University of Turin**  
*The fragile art of 3D meshing*, Remote
- Sep 2023 **University of Cagliari**  
*The fragile art of 3D meshing*, as part of my appointment as Visiting Professor
- Dec 2021 **3D Printech** 3D printing technology and research world forum, Frankfurt, Germany,  
*Engineering and imagination: Advanced computational design to manufacturing*
- June 2020 **Adobe Research** , Remote due to Covid  
*Introducing Quadmixer*
- March 2019 **Frames 2019** First Workshop on Frame-based hex meshing  
*HexaLab (online visualization) and Loopy Cuts: Surface-Field Aware Block Decomposition for Hex-Meshing*
- March 2019 **Sydney Design Festival**  
*Engineering the Imagination: advanced computational design to manufacturing*
- Oct 2018 **Computational Aspects of Fabrication**, Schloss Dagstuhl, Leibniz Center for Informatics ,Germany  
*Molding is the new Black*
- Nov 2018 **Visualisation Matters 2018**, Sydney ,Australia  
*Molding is the new Black*
- Feb 2013 **Universidade Federal do Rio**, Rio De Janeiro, Brasil , as part of my appointment as Visiting Professor  
*Quad Meshing* (~4 hours 1 day)
- Aug 2012 **University of Brighton**, UK  
*3D models for the Cultural Heritage: beyond plain visualization* (~2 hours 1 day)
- Aug 2010 **Disney Animation Studios**, Burbank, USA  
*Quad Mesh Processing* (~2 hours 1 day)
- 2024 Pacific Graphics All accepted paper published in Computer Graphics Forum (Q1)  
<http://pg2024.hsu.edu.cn/committee.html>
- 2024 SIGGRAPH All accepted paper published in ACM Transactions On Graphics (Q1).  
<https://s2024.siggraph.org/technical-papers-committee/>
- 2023 SIGGRAPH All accepted paper published in ACM Transactions On Graphics (Q1).  
<https://s2023.siggraph.org/technical-papers-committee/>

- 2022 SGP, Symposium of Geometry Processing , Awards Committee  
<https://sgp2022.github.io/organization/>
- 2021 SMI, Shape Model International, all accepted paper published in Computer & Graphics (Q2).  
<https://smi2021.github.io>
- 2021 SGP, Symposium of Geometry Processing , all accepted paper published in Computer Graphics Forum (Q1).  
<https://sgp2021.github.io/organization/>
- 2021 SIGGRAPH Asia, all accepted paper published in ACM Transactions On Graphics (Q1).  
<https://sa2021.siggraph.org/en/about-us/siggraph-asia-2021-committee/technical-papers-committee>
- 2021 EUROGRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
<https://conferences.eg.org/eg2021/organization/full-papers-ipc/>
- 2020 SIGGRAPH Asia, all accepted paper published in ACM Transactions On Graphics (Q1)
- 2020 EUROGRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
<https://conferences.eg.org/egev20/>
- 2019 PACIFIC GRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
<http://pg19.org>
- 2019 SGP, Symposium of Geometry Processing, all accepted paper published in Computer Graphics Forum (Q1)  
<https://sgp2019.di.unimi.it/committees.html>
- 2018 PACIFIC GRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
<http://sweb.cityu.edu.hk/pg2018/>
- 2018 SGP, Symposium of Geometry Processing, all accepted paper published in Computer Graphics Forum (Q1)  
<https://sgp2018.sciencesconf.org/resource/page/id/4>
- 2018 SMI, Shape Model International, all accepted paper published in Computer & Graphics (Q2)  
see: <http://smi2018.tecnico.ulisboa.pt/#event>
- 2017 PACIFIC GRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://www.siggraph.org.tw/pg2017/organizers.html>
- 2017 SMI, Shape Model International, all accepted paper published in Computer & Graphics (Q2)  
see: <https://s3pm.icsi.berkeley.edu/s3pm/smi.html>
- 2017 SGP, Symposium of Geometry Processing, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://geometry.cs.ucl.ac.uk/SGP2017/?p=committees>
- 2016 PACIFIC GRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
see: <https://indico.oist.jp/indico/event/0/page/2>
- 2016 SMI Shape Modeling International, all accepted paper published in Computer & Graphics (Q2)  
see : <http://igs2016.mi.fu-berlin.de/smi2016/pc.html>
- 2015 PACIFIC GRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://cg.cs.tsinghua.edu.cn/pg2015/>
- 2015 SGP, Symposium of Geometry Processing, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://www.geometrie.tugraz.at/sgp2015/contact.php>
- 2015 EUROGRAPHICS Short Paper 2015  
see: <http://www.eurographics2015.ch/short-papers-international-program-committee/>
- 2014 PACIFIC GRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://graphics.ewha.ac.kr/PG14/#organizers>
- 2014 SGP Symposium of Geometry Processing, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://www.cs.cf.ac.uk/sgp2014/organisation.html>
- 2013 PACIFIC GRAPHICS, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://www.comp.nus.edu.sg/pg2013/>
- 2013 SGP, Symposium of Geometry Processing, all accepted paper published in Computer Graphics Forum (Q1)  
see: <http://sgp.ge.imati.cnr.it/index.php/2012-11-28-16-40-34>
- 2012 GMP, Geometric Modeling and Processing  
see: <http://math.ustc.edu.cn/Conference/GMP2012/Committee.html>
- 2011 SMI, Shape Modeling International, all accepted paper published in Computer & Graphics (Q2)  
see: <http://www1.idc.ac.il/SMI2011/organization.html>

#### Recent Publications

- 2023 *Bending the light: Next generation anamorphic sculptures*[J49]  
**SMI - Shape Modelling International 2023** , Genova, Italy
- 2022 *A Course on Hex-Mesh Generation and Processing*[T3]  
**ACM SIGGRAPH Asia 2022**, Daegu, Korea
- 2021 *Reliable Feature-Line Driven Quad-Remeshing* [J39]  
**SIGGRAPH 2021** Online Due to Covid
- 2020 *LoopyCuts: Practical Feature-Preserving Block Decomposition* [J39]  
**SIGGRAPH 2020**, Online Due to Covid

- 2019 *State of the Art on Stylized Fabrication*[T2]  
**ACM SIGGRAPH Asia 2019**, Brisbane, Australia
- 2017 *Position Based Tensegrity Design* [J25]  
**ACM SIGGRAPH Asia 2017**, Bangkok, Thailand
- 2016 *Tracing Field-Coherent Quad Layouts* [J23]  
**Pacific Graphics 2016**, Okinawa, Japan
- 2014 *Digital Fabrication Technologies for Cultural Heritage (STAR)*[C6]  
**EG GCH 2014** Eurographics Workshops on Graphics and Cultural Heritage, Darmstadt, Germany
- 2014 *Interlocking pieces for printing tangible Cultural Heritage replicas*[C5]  
**EG GCH 2014** Eurographics Workshops on Graphics and Cultural Heritage, Darmstadt, Germany
- 2011 *An interactive local flattening operator to support digital investigations on artwork surfaces* [J12]  
**IEEE Visualization 2011**, Providence, USA
- 2011 *Global Parametrization of Range Image Sets*[J10]  
**ACM SIGGRAPH Asia 2017**, Hong Kong, China
- 2011 *Feature-aligned T-meshes*[J6]  
**ACM Siggraph 2010**, Los Angeles USA
- 2008 *Reconstructing head models from photographs for individualized 3D-audio processing*[J1]  
**Pacific Graphics 2008** Tokyo, Japan
- 2007 *Texturing internal surfaces from a few cross sections.* [J0]  
**Eurographics 2007**, Prague, Czech Rep.
- 2007 *A robust method for real-time thread simulation* [C1]  
**ACM VRST 2007**, Newport Beach, California, USA

## Publications

### Patents

- [P3] Paolo Cignoni, **Nico Pietroni**, Luigi Malomo, Bernd Bickel,  
**European Patent** EP3301597B1  
*Method for computationally designing a re-usable flexible mold*
- [P2] Thomas Alderighi, Paolo Cignoni, Luigi Malomo, Daniela Giorgi, Bernd Bickel, **Nico Pietroni**  
**US Patent** US11966666B2  
*Method for computationally designing a re-usable flexible mold for the reproduction of an object*
- [P1] Paolo Cignoni, **Nico Pietroni**, Luigi Malomo, Roberto Scopigno,  
*Mesh joinery: method for converting a 3D model into a set of planar shapes that can be interlocked to compose a self-supporting structure.*  
**Italian Patent** n. ITRM20130439A1. Registered in Rome on 2013.

### Industry Impact

- 2023-2024 Client: **Metakosmos inc.** <https://metakosmos.com.au>, A startup focusing in bioastronautics & spacesuit technology, focusing on the design and production of adaptable next generation spacesuits. Role : **Project Coordinator**, Funding (\$): 30000 Papers [J56]  
*I applied the digital garment design technology we developed to customize spacesuits for various 3D-scanned body shapes.*
- 2018-ongoing Client: **Ansys**. The leading finite element software company, Ansys, has reimplemented the method from my paper, Tracing Field-Coherent Quad Layouts [J23], integrating it as the primary quadrangular re-meshing tool in their software.
- 2022 Client: **Taylor Thomson Whitting** *Improve the tessellation of a complex surface of the Melbourne WestGate*  
Role : **Project Coordinator**, Funding (\$): 15000 Papers [J39]  
*I provided new technology to Taylor Thomson Whitting (Australia) to design the panels of a 50 mt tall curved shell made of aluminium that will be the entrance of a new big tunnel (for automobiles) in Melbourne. My contribution included optimizing the panels conforming to the architect's plan while reducing the overall construction cost. I achieved this objective by leveraging one of the 3D-remeshing tools I developed.*
- 2021 Client: **Hypercomp Inc.** *Hexahedral-dominant Auto-Mesh Generator*  
Role : **Project Coordinator**, Funding (\$): 38000  
*Hypercomp (USA) uses the algorithm I presented at SIGGRAPH 2020 to create the data for mechanical and aerodynamic simulations.*
- 2018 Client: **Canon Information System Research** *3D Graphics for Web*  
Role : **Project Coordinator**, Funding (Au \$): 20000  
Course on real time rendering and Three.js (~12 hours 2 days)  
*In this course I provided an overview all the main techniques for real-time rendering on the web*



- 2016 Client: **Canon Information System Research** *3D Scanning and Geometry Processing* Course on 3D scanning, geometry processing and shape analysis (~84 hours 14 days) Role : **Project Coordinator**, Funding (€): 20000  
*In this course I provided an overview all the main techniques for geometry processing, remeshing and shape analysis with particular focus on applications such as fabrication and mesh reconstruction*
- 2015 Client: **Canon Information System Research** , *Geometry Processing* Course on geometry processing and exercise in C++ (~54 hours 9 days)  
 Funding (€): 20000 Role : **Project Coordinator**,  
*In this course I provided an overview all the main functionalities of the VCG library and Meshlab*
- 2012-2015 Client: **Exxon Mobile** and **Modelo Inc**, San Francisco Bay Area  
 Funding (\$): 18000, Role : **Project Coordinator**,  
*C++ development of cutting-edge geometry processing techniques tailored to geosciences applications.*

### Open Source Projects

- MeshLab** MeshLab is an open source, portable, and extensible system for the processing and editing of unstructured 3D triangular meshes. Meshlab has become a de-facto standard in mesh processing with over 100000 active users, and **3 million downloads worldwide** and it is largely used by the 3D printing community. see [AW3]
- Libigl** A simple C++ geometry processing library currently used by key industry and academia players, such as **Pixar, Adobe Research, Epic Games, Google Research, Industrial Light and Magic and Microsoft Research**. see [AW2]
- VCG library** The Visualization and Computer Graphics Library (VCG for short) is a open source portable C++ templated library for manipulation, processing and displaying with OpenGL of triangle and tetrahedral meshes. VCG library is the backbone of Meshlab see [AW3]
- Hexalab** An online volumetric mesh visualizer integrating and shares the data of >30 different papers produced by multiple prestigious universities worldwide. It is becoming the standard tool in academia for volumetric mesh visualization

### Impact on Art and Architectural Design

*The main characteristic of my academic profile is my ability to think creatively across disciplinary boundaries impacting in the spheres of academia, arts, architecture and advanced manufacturing industry. In 2019 we used the Flexmap technology from my SIGGRAPH 2019 paper to design and fabricate a Pavillon that has been awarded First Prize at the Competition and Exhibition of innovative lightweight structures in Barcelona. A similar structure was installed in 2020 at UTS in collaboration with the DAB Advanced Fabrication Lab and exposed at the **Biennale of Architecture in Venice** (the top international event in architecture). In 2017 we realized a permanent art installation in Pisa (IT) that uses the tensegrity technology developed by my SIGGRAPH paper. In 2022, I designed, in collaboration with my PhD. student, an innovative reverse ray-tracing algorithm to produce a series of innovative sculptures. Such sculptures were selected as a finalist for the North Sydney Art Prize and are scheduled exhibited at the **Sydney Contemporary Art Fair** (leading art fair in Australia) and has been selected as finalist at the **Wynne Prize** and exhibited at the **Art Gallery of New South Wales** (the most important art museum in Sydney). Sydney Contemporary and Wynne Prize are usually attended by more than 10000 people. Below is a list of exhibitions and installations that utilize the technology I developed:*

- [E7] **Sydney Contemporary** 2024, *Most important Art Fair in Australia* with Lennox St Gallery, artwork realised using [J47,J49]
- [E6] Between life and death, Finalist of **North Sydney Art Prize** 2024, Sydney, artwork realised using [J47,J49]
- [E5] **Obscura**, **Lennox St Gallery**, Melbourne, artwork realised using [J47,J49]
- [E4] Finalist of **2023 Wynne Prize**, **ART Gallery of New South Wales** *Most important figure sculpture art prize in Australia*, Title: *A Very Dutch Ghost*, selected 40 out of ~ 800 submissions see <https://www.nicopietroni.com/bendingthelight>, artwork realised using [J47,J49]
- [E3] **Sydney Contemporary** 2022, *Most important Art Fair in Australia* with Nanda/Hobbs Gallery, artwork realised using [J47,J49]
- [E2] Finalist of **Fisher's Ghost Art Prize** 2022, Sydney , artwork realised using [J47,J49]
- [E1] Finalist of **North Sydney Art Prize** 2022, Sydney, artwork realised using [J47,J49]

- [I3] Francesco Laccone, Luigi Malomo, **Nico Pietroni**, Paolo Cignoni, Tim Schork *Flexmaps Pavillon 2* (Temporary installation using the technique of [J40,J33,J29,C12]) Apr - July 2019 UTS DAB Faculty



- Francesco Laccone, Luigi Malomo, Jésus Pérez, **Nico Pietroni**, Federico Ponchio, Bernd Bickel, Paolo Cignoni *Flexmaps Pavillon* (Temporary installation using the technique of [J40,J33,J29,C12])
- [I2] 22 May - 21 November 2021 **Venice Biennale of Architecture**  
18-20 October 2019 Maker Faire Rome  
7-11 October 2019 IASS Barcelona



- Nico Pietroni**, Marco Tarini, Amir Vaxman, Daniele Panozzo, Paolo Cignoni *Nerves of Steel, Permanent Sculpture at CNR of Italy, using the technique of [J25], 2017*
- [I1]



Website: <https://www.uts.edu.au/games/showcase>

2017-Ongoing **Co-Organizer of the UTS Games Showcase**, University of Technology Sydney: *An annual event that attracts over 100 participants from academia and industry, the UTS Games Showcase provides a platform for students to demonstrate their skills by presenting projects from my Computer Graphics and 3D Animation course. The event also features collaboration with several prominent industry partners, fostering valuable connections and showcasing innovative talent. see <https://showcase.gamesstudio.org/autumn-2024/>*

Sydney 12/01/2024

