Nico Pietroni

Computer Graphics, Geometry Processing and Art

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Personal Information

Name	Nico Pietroni
Title	PhD in Computer Science
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Telephone	+61 431587132
Email	nico.pietroni@uts.edu.au
Nationality	Italian, Australian

*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 Graphicds**, 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, LibIGL, 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

2025 – present	Full Professor *University of Technology Sydney*, Australia
2023 – 2925	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 Scence**, 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

Awards

[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 Marcias, 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

Publications

Google Scholar: H-index: 36 Citations: 4641,
`https://scholar.google.it/citations?user=BXxHVPkAAAAJ&hl=en`

Journal publications

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&vq=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).*

2025

Q1[J58] *Designing with Tension: Nearly-Developable Patch Layouts*
A Qi, Anna Eggler, **Nico Pietroni**, Pengbin Tang, Michal Piovarci, Bernd Bickel
Siggraph Asia 2025, in press

Q1[J58] *Free-form Surface Approximation Using Rotational Patches*
Yuanpeng Liu, Yi Min Xie, Ting-Uei Lee, Ziqi Wang, **Nico Pietroni**
ACM Transactions on Graphics, Volume 44, Issue 5, DOI: https://doi.org/10.1145/374470

Q1[J57] *Fabricable Discretized Ruled Surface*
A Baharami,M Piovarci, M Tarini, B Bickel, **N Pietroni**
ACM Transactions on Graphics, Volume 44, Issue 3 , Presented at Siggraph Asia 2025, DOI: https://doi.org/10.1145/3734519

Q1[J57] *Rags2Riches: Computational Garment Reuse*
A Qi, **N Pietroni**, M Korosteleva, O Sorkine-Hornung, **Siggraph 2025**, in press

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

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

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, Benrd 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 Rodriguez, 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 6Đ21
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

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
IIEEE 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, MarcoTarini, **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 (IJBET), 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

Peer-reviewed international conference publications

2023

[C14] *Statics and Stability of Bending-Optimized Double-Layer Grid Shell*
F Laccone, **N 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

Funding

Research Projects: In Australia

2025

ARC Discovery Project *DP260100687:Flow field perception for unleashing robots in the wild.*
Role : **Chief Investigator**
Funding (AUD): 686776

UTS Near Miss *Parafashion*
Role : **Project Coordinator**
Funding (AUD): 15000

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-Facoulty 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://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
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
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 (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

New Subjects I Developed

COMPUTER GRAPHICS University of Technology Sydney
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.

3D ANIMATION University of Technology Sydney
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.

Subject Descriptions

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 DEVELOP 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).

Teaching Subjects

Feb - June 2025 — *Computer Graphics* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~150 students - 12 Weeks x 6h/Week (6 CFU)

Feb - June 2025 — *3D Animation* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~140 students - 12 Weeks x 6h/Week (6 CFU)

Feb - June 2024 — *Computer Graphics* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~120 students - 12 Weeks x 6h/Week (6 CFU)

Feb - June 2024 — *3D Animation* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~110 students - 12 Weeks x 6h/Week (6 CFU)

Feb - June 2023 — *Computer Graphics* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

Feb - June 2023 — *3D Animation* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

Feb - June 2022 — *Computer Graphics* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

Feb - June 2022 — *3D Animation* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

March - June 2021 — *Computer Graphics* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

March - June 2021 — *3D Animation* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

March - June 2020 — *Computer Graphics* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

March - June 2020 — *3D Animation* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

March - June 2019 — *Computer Graphics* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~100 students - 12 Weeks x 6h/Week (6 CFU)

March - June 2019 — *3D Animation* **Main lecturer** and **Course Coordinator**
University of Technology Sydney, Australia ~60 students - 12 Weeks x 6h/Week (6 CFU)

August - October 2018 — *Interactive Media* **Main Lecturer and coordinator**
University of Technology Sydney, Australia ~250 students - 12 Weeks x 6h/Week (6 CFU)

March - June 2018 — *Software Development Studio 1 and 2* **Tutoring students**
University of Technology Sydney, Australia 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)

Subjects for PhD students

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.

Specialized Courses for the Industry

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

Courses at Prestigious International Conferences

[T3] *A Course on Hex-Mesh Generation and Processing*
speakers: **Nico Pietroni**, Marco Livesu
ACM **SIGGRAPH ASIA 2022** Courses - 2022, 6 hours ~100 students
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 ~50 students
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 ~50 students
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, 100 students , 4 hours ~100 students
DOI: 10.2312/conf/EG2012/stars/159-182
see http://www.eurographics2012.it/program_st.html

Menthoring

Completed Supervised PhDs

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*

Ongooing PhDs

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

2024-Ongoing Anna Eggler, 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, *Phisical Interfaces*

Supervised Master Thesis

2025

Master Thesis Yuxing Ren, University Technology Sydney, *3D City Visualization*

Master Thesis Hongyuan Wang, University Technology Sydney, *Visualization of chemical reaction*

2024

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, *Implicity mesh sculting*

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 Safvati, 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 activities

Academic Service

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

PhD Jury Member

2024 Martin Heistermann , University of Bern Switzerlsnd

2024 Marzia Riso , University Sapienza, Roma, Italy

2023 Pietro Musoni , University of Verona, Italy

2023 Max Lyon , RWTH Aachen Genmany

2020 Edoardo Carra, Computer Science, University Sapienza, Rome

2019 Gianmarco Cherchi, Computer Science, University of Cagliari

2016 Francesco Usai, Computer Science, University of Cagliari

Project Reviewer

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 fewllowship similar to the ERCs.

2018 European Research Council (ERC)
part of the reviewer team for ERC Starting Grant Call

Service to the Academic Community

Participation to Research Centres of Excellence

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

Conference Organizer

2017 Eurographics Workshop On Graphics For Digital Fabrication: Gradifab 2017

Program Chair

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

Paper Sorter

2026 ACM Siggraph Technical Papers COI Coordinato
see: https://s2026.siggraph.org/

2024 Pacific Graphics
see: http://pg2024.hsu.edu.cn

Editorial Board

2020-2026 **Editorial Board Member** of IEEE Transactions on Visualization and Computer Graphics (ISSN 1941-0506) See https://www.computer.org/csdl/journal/tg.

2023-Ongoing **Department Editor** of IEEE Computer Graphics and Applications (ISSN 2571-9408)

2020-2026 **Editorial Board Member** of Heritage (ISSN 2571-9408) See https://www.mdpi.com/journal/heritage.

Program Committee

2026 SGP, Symposium of Geometry Processing ,
https://sgp26.org/organization/

2026 Eurographics All accepted paper published in Computer Graphics Forum (Q1)
https://eg2026.github.io/organization/#ipc

2025 SIGGRAPH Asia Course Program)
https://asia.siggraph.org/2025/about-the-event/siggraph-asia-2025-committee/courses-committee/

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

Invited Talks

Aug 2025 **Centre Inria d'Université Côte d'Azur**
Patch-Based Decomposition of 3D Manifolds via Curvature Guidance

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)

International Conference Talks

2025 *Fabricable Discretized Ruled Surface*[J57]
SIggraph 2023 , Genova, Italy

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

Technology Transfer

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**. hrefhttps://metakosmos.com.auhttps://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.

2016-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:*

[E8] **Galleria Gagliardi** 2025, *A Very Dutch Ghost*,
artwork realised using [J47,J49]

[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 $\sim$ 800 submissions
see https://www.nicopietroni.com/bendingthelight,
artwork realised using [J47,J49]

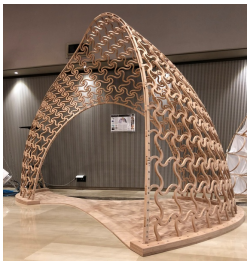
[E3] **Sydney Contemporary** 2022, *Most important Art Fair in Australia* with Nanda/Hobbs Gallery,
artwork realised using [J47,J49]

[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

[I2] 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])
- 22 May - 21 November 2021 **Venice Biennale of Architecture**
- 18-20 October 2019 Maker Faire Rome
- 7-11 October 2019 IASS Barcelona



[I1] **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*

University Event organization

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/*