Maria Palmese

PERSONAL DATA

Maria Palmese

EDUCATION

February 2002 – January 2005
Ph.D. Course in Electronic Engineering and Computer Science in the Department of Biophysical and Electronic Engineering (DIBE), University of Genoa.
Title of the dissertation: '*Underwater Acoustic Imaging: Signal Simulation, Real-Time Beamforming, 3-D Image Analysis*.'
Tutor: Prof. Ing. Andrea Trucco.

May 2001
Engineer qualification granted by the Engineers Association of Genoa, May 2001.
Grade: 201/240.

March 2001
"Laurea" (M.S.) degree in Electronic Engineering with full marks and "summa cum laude" from the University of Genoa in March 2001.
Title of thesis work: "*Development and integration of methods to generate and process seafloor sonar images*."
Supervisor: Prof. Ing. Andrea Trucco.
Cosupervisor: Dr. Alessandro Pescetto.

July 1994
General Certificate of Education from the "Liceo Scientifico L. Da Vinci" of Genoa (five years of high-school studies).
Grade: 60/60.

INTERNATIONAL RELATIONS ACTIVITY

Good skills and knowledge in managing procedures and tools for the selection and enrolment of international students at Italian Higher Education Institutions, starting from the configuration of the

online student application portal to analysing credentials and assessing their academic equivalence. In particular:
- Knowledge of the admission criteria and curricular requirements of all the Master's courses taught in English at the University of Genoa;
- Configuration and setup of the portal Dream Apply for the admission of non-EU students to Master's courses taught in English;
- Support to central offices and Master's courses in Credential Evaluation activities: verification of curricular requirements, through an in-depth examination of the student's study career; assignment of scores reflecting the assessment of the regularity of the studies carried out by the candidate, the grades obtained during previous studies and the quality of the university that awarded the qualification;
- Updating and maintenance of the admission portal Dream Apply;
- Knowledge of the procedures for validating the pre-enrolment applications of non-EU students on the Universitaly portal and forwarding them to the embassies (or consulates) indicated by the students.

Attendance to the events:
- *'Mobilità e riconoscimento: la prospettiva italiana'*, organized by CIMEA, Iuav, Santa Croce 191, Venezia, November 2019.
- '*Impact of covid-19 on higher education and recognition*, webinar organized by CIMEA, May 2020.
- '*Effetti del COVID-19 nel settore della formazione superiore: DIGITALIZZAZIONE e RICONOSCIMENTO*', webinar organized by CIMEA, May 2020.
- *'Riconoscimento dei titoli dei rifugiati: buone pratiche e strumenti utili'*, webinar organized by CIMEA, June 2020.
- '*Recognition and information provision in the time of COVID-19: the role of Higher Education Institutions*', online seminar organized in the context of the Bologna Process, June 2020.

PROFESSIONAL EXPERIENCE

January 2022 – June 2022
Collaboration (contratto di lavoro autonomo) with International Service, University of Genoa.
Topic: '*Support to central offices and master courses for the selection of international students'.*

February 2021 – October 2021
Collaboration (contratto di lavoro autonomo) with International Service, University of Genoa.
Topic: '*Support to central offices and master courses in Credential Evaluation activities and updating and maintenance of the Admission portal'.*

May 2020 – January 2021
Collaboration (contratto di lavoro autonomo) with International Service, University of Genoa.
Topic: '*Support to central offices and master courses in Credential Evaluation activities in the implementation phase of the new Admission portal'.*

December 2018 – May 2020
Research grant (borsa di ricerca post-lauream) in the Dept. of Electrical, Electronic, Telecommunications Engineering, and Naval Architecture (DITEN), University of Genoa.

Research topic: '*Methods and computational solutions for underwater acoustic imaging, with possible application to naval inspection*'.

August 2018 – December 2018
Collaboration with LINEAR - Apparecchi Acustici.
Topic: '*Estimation of HRTFs using physical features*'.

July 2015 – November 2018
Post-doc research associate in the Dept. of Electrical, Electronic, Telecommunications Engineering, and Naval Architecture (DITEN), University of Genoa.
Research topic: '*CZT digital beamforming for medical ultrasound tridimensional imaging*'.

February 2013 – June 2015
Post-doc research associate in the Dept. of Electrical, Electronic, Telecommunications Engineering, and Naval Architecture (DITEN), University of Genoa.
Research Topic: '*Design of person-centered ultrasound hearing aids*'.

March 2012 – January 2013
Post-doc research associate in the Dept. of Electrical, Electronic, Telecommunications Engineering, and Naval Architecture (DITEN), University of Genoa.
Research Topic: '*Signal modulation methods for sound perception through the emission of ultrasound*'.

March 2011 – September 2011
Fixed-term contract with FINCANTIERI – Naval Vessels.
Function: Planning of the weapons, sensors and antennas on the ship's topside to optimize the performance and minimize the radar cross section of the ship.

April 2010 – March 2011
Post-doc research associate in the Bioengineering and Robotics Research Center "E. Piaggio", University of Pisa.
Research Topic: '*Study of spread spectrum modulation techniques for acoustic communication in shallow water channel.*'

April 2009 – March 2010
Post-doc research associate in the Department of Biophysical and Electronic Engineering (DIBE), University of Genoa.
Research Topic: '*Development of techniques for underwater acoustic digital communication*'.

April 2007 – March 2009
Post-doc research associate in the Department of Biophysical and Electronic Engineering (DIBE), University of Genoa.
Research Topic: '*Design of underwater acoustics systems and signal analysis*'.

February 2005 – January 2007
Post-doc research associate in the Department of Biophysical and Electronic Engineering (DIBE), University of Genoa.
Research Topic: '*Processing of underwater acoustic signals in new-generation sonar systems*.'

June 2001 – July 2004

Scientific collaborations with:
- Department of Biophysical and Electronic Engineering (DIBE), University of Genoa;
- Interuniversity Center of Integrated Systems for Marine Environment (ISME), University of Genoa;
- Department of Computer Science, University of Verona.

Topics: array signal processing; sonar systems and underwater signal processing for 3-D imaging; acoustic image analysis and classification.

RESEARCH EXPERIENCE AND PROJECT ACTIVITY

My research activity has been concentrated on the study and development of signal processing methods for acoustics applications. In particular, I have acquired a strong mathematical background in algorithms related to the following topics:

- simulation of ultrasound signals;
- synthesis of optimized planar arrays;
- development of efficient 3-D real-time beamforming algorithms;
- time-frequency analysis;
- development of communication techniques;
- image analysis;
- study of ultrasound modulation techniques;
- filter design;
- principal component analysis;

I have developed the above methodologies in the context of the following application domains:
- ultrasound medical imaging;
- sonar imaging systems;
- underwater acoustics;
- hearing aids.

Moreover, I have carried out the described research activities within the framework of the following funded projects, in a multicultural context, acting also as coordinator of the research work.

Projects:

2016 –2018
Study and development of a system for hearing aids individualized fitting, based on anthropometric data – **POR - FESR Liguria 2014-2020.**

2014 –2016
CARPUS – Cloud-based platform for trusted big data management in medical diagnosis and therapeutic treatment follow-up - **PAR FAS Regione Liguria 2007-2013**.

2008-2011
UAN – Underwater Acoustic Network, **European Commission**, VII FP, Theme Information and Communication Technologies.

2006-2008
Techniques for covert underwater acoustic communication – **FINCANTIERI**.

2005-2006
Development of acoustic tomography methodologies for monitoring the variability of ocean processes in Antarctica – **PNRA** (Programma Nazionale di Ricerche in Antartide) Italian Antarctic Program.

2002-2005
SITAR – Seafloor Imaging and Toxicity: Assessment of Risks Caused by Buried Waste, **European Commission**, V FP, Environment Programme.

2001-2002
Development of a system for acoustic imaging in the air and for the location of walls to be applied to the automatic guidance of blind people, **CNR Programma Agenzia** 2000.

2001
Development and supply of software tools for the analysis of acoustic data, **ENEA**, Ente per le nuove tecnologie, l'energia e l'ambiente.

TEACHING ACTIVITY

May – June 2009
<u>**Teacher for the course:**</u>
- <u>**Signal theory**</u>

for the II level MASTER in Photonics and Optoelectronics organized by Faculty of Engineering, University of Genoa, and the FF. AA. School of Telecommunications, Chiavari, Italy.

July 2008
<u>**Teacher for the course:**</u>
- <u>**Underwater Acoustic Communications and Networks**</u>

for the II level academic MASTER in Advanced Technologies for Integrated Intelligent Systems organized by Faculty of Engineering, University of Genoa.

March – June 2008
<u>**Teacher for the courses:**</u>
- <u>**General Optics**</u>
- <u>**Optic Communications**</u>

for the II level MASTER in Photonics and Optoelectronics organized by Faculty of Engineering, University of Genoa, and the FF. AA. School of Telecommunications, Chiavari, Italy.

2001-2019
Thesis assistant supervisor of students for Bachelor and Master Degree in Telecommunications, Electronic and Computer Science Engineering.

2002-2008
Assistance and support activity for 'Electrical Communications 1', a course attended by students for the "laurea" degree in Computer Science Engineering at the University of Genoa.

2007
Assistance and support activity for 'Multidimensional Signal Processing 1', a course attended by students for the "laurea" degree in Telecommunications Engineering at the University of Genoa.

2007
Assistance and support activity for 'Complements of Electrical Communications 1', a course attended by students for the "laurea" degree in Telecommunications Engineering at the University of Genoa.

EDITORIAL SERVICE

Reviewer for the **journals**:
- *IEEE Journal of Oceanic Engineering*;
- *IEEE Transactions on Instrumentation and Measurement*;
- *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*;
- *IEEE Sensors Journal*;
- *Elsevier - Pattern Recognition Letters*;
- *JASA Express Letters*;
- *Journal of Zhejiang University-SCIENCE A*

and the **conferences**:
- *European Signal Processing Conference* (*Eusipco Conference*);
- *IEEE International Workshop on Imaging Systems and Technique*;
- *IEEE International Conference on Advanced Video and Signal based Surveillance*;
- *MTS/IEEE Oceans Conference.*

CHAIRMAN ACTIVITY

IEEE International Workshop on Imaging Systems and Technique, Cracovia, Poland, May 2007.

MTS/IEEE Oceans'15 Conference, Genoa, Italy, May 2015.

LANGUAGES

Italian (native language)
English (fluently spoken and written)

GENERAL COMPUTER SKILLS

Operating systems: Windows**,** Unix, Linux.
Programming: C, C++, Pascal, Matlab.
Microsoft Office Suite
Software graphics tools.
Software setup and configuration.

AWARDS

Winner of the second prize of the Student Poster Competition organized by the International Conference MTS/IEEE Oceans 2005, Washington, D.C, USA.

Winner of the third prize of the Student Poster Competition organized by the International Conference MTS/IEEE/TECHNO-OCEAN 2004, Kobe, Japan.

Finalist for the Student Poster Competition organized by the International Conference MTS/IEEE Oceans 2002, Biloxi, Mississippi, USA.

SCIENTIFIC PUBLICATIONS

<u>**International Journals:**</u>

[P1] M. Palmese, A. Bozzo, S. Jesus, J. Onofre, P. Picco, A. Trucco, "Observation of Acoustical Signal Fluctuations by Time-Frequency Analysis Methods", *Acta Acustica United With Acustica*, vol. 88, No. 5, pp. 653-657, September/October 2002.

[P2] A. Trucco, M. Palmese, S. Repetto, "Mosaicking Data in Seafloor Front-Scan Imaging", *Acta Acustica United With Acustica*, vol. 88, No. 5, pp. 767-770, September/October 2002.

[P3] A. Trucco, M. Palmese, S. Repetto, "Image Projection and Composition With a Front-Scan Sonar System: Methods and Experimental Results*", IEEE Journal of Oceanic Engineering*, vol. 28, No. 4, pp. 687-698, October 2003.

[P4] A. Caiti, M. Palmese, A. Trucco, "Risk assessment of seafloor waste: acoustical imaging of buried dumpings", *Journal of Computational Acoustics*, vol. 13, No. 2, pp. 385-401, June 2005.

[P5] M. Palmese, A. Trucco, "Acoustic Imaging of Underwater Embedded Objects: Signal Simulation for 3-D Sonar Instrumentation", *IEEE Transactions on Instrumentation and Measurement*, vol. 55, no. 4, pp. 1339-1347, August 2006.

[P6] A. Caiti, R. Minciardi, M. Palmese, M. Robba, R. Sacile, A. Trucco, "GIS tools application for risk assessment of toxic waste buried in seafloor sediments", *Chemistry and Ecology*, *International Journal of Taylor & Francis Publishing Group*, vol. 22, sup. 1, pp. S145 - S161, August 2006.

[P7] S. Curletto, M. Palmese, A. Trucco, "On the Optimization of the Transmitted Beam in Contrast-Enhanced Ultrasound Medical Imaging," *IEEE Trans. Instrument. and Measurement*, vol. 56, no. 4, pp. 1239-1248, August 2007.

[P8] M. Palmese, A. Trucco, "Chirp Zeta Transform Beamforming for Three-Dimensional Acoustic Imaging", *Journal of Acoustical Society of America*, vol. 122, no. 5, pp. EL191-EL195, November 2007.

[P9] M. Palmese, A. Trucco, "From 3-D sonar images to augmented reality models for objects buried on the seafloor", *IEEE Transactions on Instrumentation and Measurement*, vol. 57, no. 4, pp. 820-828, April 2008.

[P10] A. Trucco, M. Palmese, S. Repetto "Devising an Affordable Sonar System for Underwater 3-D Vision", *IEEE Transactions on Instrumentation and Measurement*, vol. 57, no. 10, pp. 2348 – 2354, October 2008.

[P11] M. Palmese, A. Trucco, "Three-Dimensional Acoustic Imaging by Chirp Zeta Transform Digital Beamforming", *IEEE Transactions on Instrumentation and Measurement*, vol. 58, no. 7, pp. 2080-2086, July 2009.

[P12] M. Crocco, M. Palmese, C. Sciallero, A. Trucco, "A Comparative Analysis of Multi-Pulse Techniques in Contrast-Enhanced Ultrasound Medical Imaging", *Ultrasonics*, vol. 49, no. 1, pp. 120-125, January 2009.

[P13] A. Trucco, S. Curletto, M. Palmese, "Interpolation of medical ultrasound images from coherent and non-coherent signals," *IEEE Trans. Instrument. and Measurement*, vol. 58, no. 7, pp. 2048-2060, July 2009.

[P14] M. Palmese and A. Trucco, "An efficient digital CZT beamforming design for near-field 3-D sonar imaging", *IEEE Journal of Oceanic Engineering*, vol. 35, no. 3, pp. 584-594, July 2010.

[P15] M. Palmese, A. Trucco, "Pruned Chirp Zeta Transform Beamforming for 3-D Imaging With Sparse Planar Arrays," *IEEE Journal of Oceanic Engineering*, vol. 39, pp. 206-211, April 2014.

Online Open-Access Journals:

[P16] M. Palmese, G. Bertolotto, A. Pescetto, A. Trucco, "Experimental validation of a chirp-based underwater acoustic communication method", *Proceedings of Meetings on Acoustics, Acoustical Society of America*, vol. 4, 6 pages, 2008.

[P17] M. Palmese, A. Trucco, "Experimental assessment of a direct sequence spread spectrum underwater acoustic communication method", *Proceedings of Meetings on Acoustics*, Acoustical Society of America, vol. 17, 9 pages, 2012.

Theses:

[P18] Laurea Degree Thesis: Maria Palmese and Stefania Repetto, "*Development and integration of methods to generate and process seafloor sonar images*", March 2001.
Supervisor: Prof. Ing. Andrea Trucco.
Co-supervisor: Dott. Ing. Alessandro Pescetto.

[P19] Ph.D. Thesis: Maria Palmese, 'Underwater Acoustic Imaging: Signal Simulation, Real-Time Beamforming, 3-D Image Analysis', April 2005.
Tutor: Prof. Ing. Andrea Trucco.

Book Chapters:

[P20] A. Trucco, M. Palmese, A. Fusiello, and V. Murino, "Three-dimensional underwater acoustical imaging and processing," In *Underwater Acoustic Digital Signal Processing and Communication Systems*, R.S.H. Istepanian and M. Stojanovic, Eds. Boston: Kluwer Academic Publishers, pp. 247-274, 2002.

[P21] V. Murino, M. Palmese and A. Trucco, "Processing tools for acoustic 3D images," In *Buried Waste in the Seabed – Acoustic Imaging and Bio-toxicity*, P. Blondel and A. Caiti, Eds. Springer-Praxis, Chichester, UK, pp. 39-64, 2007.

[P22] A. Caiti, V. Murino, M. Palmese, A. Trucco and M. Zakharia, "3D acoustical image analysis and feature extraction," In *Buried Waste in the Seabed – Acoustic Imaging and Bio-toxicity*, P. Blondel and A. Caiti, Eds. Springer-Praxis, Chichester, UK, pp. 143-164, 2007.

Conference Proceedings:

[P23] M. Palmese, A. Bozzo, S. Jesus, J. Onofre, P. Picco, A. Trucco, "Observation of Acoustical Signal Fluctuations by Time-Frequency Analysis Methods", *Sixth European Conference on Underwater Acoustics*, Gdansk, Poland, pp. 755-760, June 2002.

[P24] A. Trucco, M. Palmese, S. Repetto, "On Ray-Tracing and Interpolation in Seafloor Front-Scan Imaging*", Sixth European Conference on Underwater Acoustics*, Gdansk, Poland, pp. 535-540, June 2002.

[P25] S. Repetto, M. Palmese, A. Trucco, "Projection and Mosaicking of Real Data Gathered with a Front-Scan Sonar System", *MTS/IEEE Oceans 2002*, Biloxi, Mississippi, pp. 2466-2471, October 2002.

[P26] A. Caiti, V. Murino, M. Palmese, and A. Trucco "Object Reconstruction and Feature Extraction from 3-D Underwater Acoustic Scattering Measurements", *Tenth International Congress on Sound and Vibration*, Stockholm, Sweden, pp. 2449-2456, July 2003.

[P27] P. Picco, A. Trucco, M. Palmese, and R. Meloni, "Sound speed variability and oceanographic processes in the Ross Sea (Antarctica)", *CD-ROM Proceedings of the Seventh European Conference on Underwater Acoustics*, Delft, The Netherlands, paper no. 235, July 2004.

[P28] M. Palmese, A. Caiti, V. Murino, and A. Trucco, "A Volume Growing Approach to Analyse Buried Objects in 3-D Acoustic Images", *Seventh European Conference on Underwater Acoustics*, Delft, The Netherlands, pp. 819-826, July 2004.

[P29] M. Palmese and A. Trucco, "A Flexible Method to Simulate 3-D Underwater Sub-Bottom Images", *MTS/IEEE/Techno-Oceans 2004*, Kobe, Japan, pp. 2346-2353, November 2004.

[P30] M. Palmese, A. Caiti, and A. Trucco, "On The Analysis Of Buried Objects By Processing 3-D Acoustic Images"**,** *Oceans'05 Europe IEEE*, Brest, France, 6 pages, June 2005.

[P31] S. Repetto, M. Palmese, and A. Trucco, "High-Resolution 3-D Imaging by a Sparse Array: Array Optimization and Image Simulation", *Oceans'05 Europe IEEE*, Brest, France, 6 pages, June 2005.

[P32] M. Palmese and A. Trucco, "A Simulation Method for the Design of a 3-D Acoustical Imaging System for Sub-Bottom Investigation", *2005 IEEE Instrumentation and Measurement Technology Conference*, Ottawa, Canada, pp. 1240-1245, May 2005.

[P33] M. Palmese and A. Trucco, "Analysis of Buried Objects in 3D Underwater Acoustic Images by a Volumetric Segmentation Algorithm", *MTS/IEEE Oceans'05*, Washington, D.C., 7 pages, September 2005.

[P34] M. Palmese and A. Trucco, "Characterizing the Objects Embedded in the Sea-Bottom by Processing 3-D Acoustic Images", *2006 IEEE Instrumentation and Measurement Technology Conference*, Sorrento, Italy, pp. 168-173, April 2006.

[P35] S. Repetto, M. Palmese, and A. Trucco, "Design and Assessment of a Low-Cost 3-D Sonar Imaging System Based on a Sparse Array", *2006 IEEE Instrumentation and Measurement Technology Conference*, Sorrento, Italy, pp. 410-415, April 2006.

[P36] M. Palmese, G. De Toni and A. Trucco, "3-D Underwater Acoustic Imaging by an Efficient Frequency Domain Beamforming", *IEEE International Workshop on Imaging Systems and Techniques*, Minori, Italy, pp. 86-90, April 2006.

[P37] M. Palmese, G. De Toni, and A. Trucco, "Chirp Zeta Transform Beamforming for the Generation of 3-D Acoustical Images", *Proceedings of the Eighth European Conference on Underwater Acoustics*, Carvoeiro, Portugal, pp. 793-798, June 2006.

[P38] P. Picco, R. Meloni, A. Trucco and M. Palmese, "An Analysis of Sound Speed Variability in Terra Nova Bay (Ross Sea, Antarctica)", *Proceedings of the Eighth European Conference on Underwater Acoustics*, Carvoeiro, Portugal, pp. 421-426, June 2006.

[P39] M. Granara, M. Palmese, and A. Trucco, "Evaluation of Object Specular Reflection in Acoustical Imaging, with Special Emphasis on Synthetic Aperture Systems", *Int. Conf. on Synthetic Aperture Sonar and Synthetic Aperture Radar*, Lerici, Italy, pp. 299-305, September 2006.

[P40] M. Palmese and A. Trucco, "Digital Near Field Beamforming for Efficient 3-D Underwater Acoustic Image Generation", *IEEE International Workshop on Imaging Systems and Techniques*, Krakow, Poland, 5 pages, May 2007.

[P41] M. Palmese, G. Bertolotto, A. Pescetto, and A. Trucco, "Spread spectrum modulation for acoustic communication in shallow water channel", *IEEE Int. Conf. Oceans 07 Europe,* Aberdeen, UK, 4 pages, June 2007.

[P42]   M. Palmese, G. Bertolotto, S. Curletto, A. Pescetto, and A. Trucco, "Preliminary Results of a Chirp-Based Acoustic Communication System", *Undersea Defence Technology Conference and Exhibition UDT EUROPE 2007*, Naples, Italy, 5 pages, June 2007.

[P43]   A. Caiti, M. Palmese, P. Picco, F. Traverso and A. Trucco, "Monitoring Antarctic water circulation by ocean acoustic tomography: a sensitivity study", *8th International Conference on Theoretical and Computational Acoustics*, Heraklion, Crete, pp. 39-46, July 2007.

[P44]   M. Palmese, G. Bertolotto, A. Pescetto, and A. Trucco, "Experimental Validation of a Chirp-Based Underwater Acoustic Communication Method", *Proceedings of Acoustics'08*, Paris, France, pp.147-152, July 2008.

[P45]   M. Palmese, A. Trucco, "Designing a 3-D sonar system using a sparse array and CZT beamforming", *ICA2010: 20th International Congress on Acoustics*, Sydney, Australia, 8 pages, 23-27 August 2010.

Genoa, June 21st, 2022