PERSONAL INFORMATION

Silvio Barbarelli

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WORK EXPERIENCE

Jan 2015 – Present — Senior Postdoctoral Fellow

Department of Mechanical, Energy and Management Engineering - University of Calabria, Rende (Italy)

Research activities:

- Development of numerical models predicting the performance of marine turbines;
- Floating analysis of a self-balancing turbine prototype designed for the exploitation of tidal currents;
- Study of a hydraulic system converting energy from sea waves near the coast.
- Development of numerical models estimating the performances of centrifugal pumps running as turbines;
- Experimental activity at test rig for measuring centrifugal pumps both in direct way or in reverse way, i.e. running as turbines;
- Development of micro wind turbines with wooden blades: CFD simulations;
- Theoretical and experimental analysis of an innovative compressible flow, tangential admission micro turbine

Jan 2012 – May 2015 — Mathematics and physics teacher secondary school

Liceo Classico "Giovanni Colosimo", Corigliano Calabro (Italy)

Jan 2007 – Mar 2012 — Ph.D student (2nd PHD)

Department of Mechanical, Energy and Management Engineering - University of Calabria, Rende (Italy)

The research activity consisted of the theoretical and experimental characterization of a variable displacement oil pump prototype. In more detail, data were collected, dynamic analysis of the signals were obtained, and a zero dimensional model in Matlab/Simulink useful for the reconstruction of the pressure signal present in the vanes of the pump prototype was implemented.

Oct 2002 – Dec 2006 — Mathematics and physics teacher secondary school

Istituto Magistrale "Tommaso Campanella", Lamezia Terme (Italy)

Jan 2000 – Feb 2002 — Postdoctoral Fellow

Mechanical Engineering Department - University of Calabria, Rende (Italy)

Research activity carried out in the field of small compressible fluid turbines. Set up of the electronic instrumentation at the compressible flow turbines test rig. Realization of a data acquisition software in Labview@ Environment for the management of the measurements. Analysis and testing on an innovative tangential flow turbine having a rotating channel. Realization of a mathematical model for the performance prediction. Test rig measurements.

Ph. D student (1st PHD)

Mechanical Engineering Department - University of Calabria, Rende (Italy)

Theoretical-experimental research in the following fields
- small power turbines;
- centrifugal pumps;

Laboratory activities: installation of electronic instruments at the hydraulic machines test rig.

Curriculum vitae

Silvio Barbarelli

Realization of a data acquisition system in LabView @ Environment.
Development of a mathematical model predicting the performance of a centrifugal pump running as a turbine (PAT)

EDUCATION AND TRAINING

Jul 2018 – Present — **National Scientific Qualification for Associate Professorship** — EQF level 8

Ministry of Education (Italy)

Competition Sector: 09 / C1 (MACHINES AND SYSTEMS FOR ENERGY AND THE ENVIRONMENT)

01/01/2007–07/03/2012 — **2nd Ph. D in Mechanical Engineering** — EQF level 8

Department of Mechanical, Energy and Management Engineering - University of Calabria, Rende (Italy)

Title of the Ph.D thesis “Numerical Simulation of a Variable-Displacement Lubricating Vane Pump and Pressure Transducers Signal Analysis”.

01/01/1997–10/03/2000 — **1st Ph. D in Machines Engineering** — EQF level 8

Polytechnic of Bari and Department of Mechanical Engineering - University of Calabria, Rende (Italy)

Title of the Ph.D thesis “Numerical and Experimental Analysis of Centrifugal Pumps used As Turbines”

01/10/1988–26/07/1996 — **Degree in Mechanical Engineering** — EQF level 7

Faculty of Engineering - University of Calabria, Rende (Italy)

Title of the Thesis “Performances Analysis of a Low-Power Turbine Prototype" (**marks 110/110**)

TUTORING

1999 – Present — **Tutor in the following courses at the Faculty of Engineering of the University of Calabria:**

- math analysis;
- linear algebra and geometry;
- rational mechanics;
- machines;
- machines laboratory

REVIEWER ACTIVITY

2015 – Present — **Reviewer for the following Journals:**

- Applied Energy;
- Energy Conversion and Management;
- Energy;
- Journal of Ocean Engineering and Marine Energy;
- Engineering Applications of Computational Fluid Mechanics Sustainability;
- Energies;
- Journal of Cleaner Production;
- Journal of Marine Science and Application

EDITORIAL ACTIVITY

Topic Editor for the following Journal:
“Journal of Marine Science and Engineering” - MPDI open access Journals

PERSONAL SKILLS

Mother tongue: Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B1	B2	B2	B2	B2
	Cambridge certificate				
French	B1	B1	B1	B1	B1

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages - Self-assessment grid

Communication skills

Good communication skills acquired thanks to the experience of school teaching and to the participation in several scientific conferences in which the writer was the speaker

Organisational / managerial skills

Good organizational skills acquired thanks to the propensity to be leader in the research group, by coordinating the ideas of the colleagues and writing technical papers and research projects

Job-related skills

Ability to face and quickly solve engineering problems of any nature with a practical but open-minded perspective, and an aptitude for developing the most appropriate solution. Familiarity with the most advanced software in the field of design. Intuitiveness and familiarity with the legal-administrative aspects that accompany the entire design process.

Digital skills

Software expertise: Autocad, Matlab, Simulink, LabView, Office, Acrobat Operating System: Windows 10

PUBBLICATIONS

Journal Articles

J.1 Barbarelli S, Amelio M, Castiglione T, Florio G, Scornaienchi NM. Design and analysis of a new wave energy converter based on a point absorber and a hydraulic system harvesting energy from waves near the shore in calm seas. Int J Energy Res. 2020; 1–30. https://doi.org/10.1002/er.5799

J.2 Barbarelli, S., Amelio, M., Florio, G. Using a statistical-numerical procedure for the selection of pumps running as turbines to be applied in water pipelines: Study cases. Journal of Sustainable Development of Energy, Water and Environment Systems 6(2), pp. 323-340 (2018)

J.3 Barbarelli S, Florio G, Scornaienchi N M. Developing of a Small Power Turbine Recovering Energy from low Enthalpy Steams or Waste Gases: Design, Building and Experimental Measurements. Thermal Science and Engineering Progress, Volume 6, June 2018, Pages 346-354. ISSN: 2451-9049, doi: https://doi.org/10.1016/j.tsep.2017.12.007

J.4 S. Barbarelli, G. Florio, M. Amelio, N. M. Scornaienchi. Preliminary performance assessment of a novel on-shore system recovering energy from tidal currents. Applied energy, Volume 224, 15 August 2018, Pages 717-730, doi: https://doi.org/10.1016/j.apenergy.2018.05.029

J.5 Silvio Barbarelli, Gaetano Florio, Giacomo Lo Zupone, Nino Michele Scornaienchi. First techno-economic evaluation of array configuration of self-balancing tidal kinetic turbines. Renewable Energy, Volume 129, Part A, December 2018, Pages 183-200, doi: https://doi.org/10.1016/j.renene.2018.06.007

J.6 Barbarelli S, Amelio M, Florio G. (2017). Experimental activity at test rig validating correlations to select pumps running as turbines in microhydro plants. Energy Conversion and Management, vol. 149, p. 781-797, ISSN: 0196-8904,doi: https://doi.org/10.1016/j.enconman.2017.03.013

J.7 Amelio, Mario, Barbarelli, Silvio, Rovense, Francesco, Scornaienchi, Nino M. (2017). Possibility of employing a small power tangential flow turbine prototype in a micro solar concentration plant. International Journal of Heat and Technology, vol. 35, p. 785-792, ISSN: 0392-8764, doi: 10.18280/ijht.350413

J.8 Barbarelli S, Castiglione t, Florio G, Scornaienchi N M, Lo Zupone G (2017). Computational Fluid Dynamic Analysis of the External Rotor Supporting the Design of a Tidal Kinetic Turbine Prototype. Journal of Sustainable Development of Energy, Water and Environment Systems, vol. 5, p. 332-344, ISSN: 1848-9257, doi: http://dx.doi.org/10.13044/j.sdewes.d5.0150

J.9 Barbarelli S, Florio G, Scornaienchi N M. (2017). Theoretical and experimental analysis of a

new compressible flow small power turbine prototype. International Journal of Heat and Technology, vol. 35, p. S391-S398, ISSN: 0392-8764, doi: 10.18280/ijht.35Sp0153

J.10 S. Barbarelli, M. Amelio, G. Florio "Predictive model estimating the performances of centrifugal pumps used as turbines" Energy, Volume 107, 15 July 2016, Pages 103-121

J.11 Barbarelli S., Florio G., Amelio M., Scornaienchi NM., Cutrupi A., Lo Zupone G. Lcoe evaluation for a tidal kinetic self balancing turbine: Case study and comparison. Applied Energy (2016), doi:10.1016/j.apenergy.2016.01.015.

J.12 Barbarelli S. Amelio M. Florio G. Cutrupi A., Lo Zupone G. Transients Analysis of a Tidal Currents Self-Balancing Kinetic Turbine with Floating Stabilizer. Applied Energy, Volume 160, 15 December 2015, Pages 715-727

J.13 Barbarelli S., Amelio M., Florio G., Scornaienchi N. M., Lo Zupone G., Cutrupi A., "Design procedure of an innovative turbine with rotors rotating in opposite directions for the exploitation of the tidal currents". Energy, 2014, Vol. 77, pp. 254-264.

J.14 Barbarelli S., Amelio M., Castiglione T., Florio G., Scornaienchi N. M., Lo Zupone G., Cutrupi A., "Analysis of the equilibrium conditions of a double rotor turbine prototype designed for the exploitation of the tidal currents". Energy Conversion & Management, 2014, Vol. 87, pp. 1124-1133.

J.15 Barbarelli S, Florio G, Amelio M, Scornaienchi N M, Cutrupi A, Sanchez Blanco M, Lo Zupone G. (2014). Engineering Design Study on an Innovative Hydrokinetic Turbine with on Shore Foundation.Journal of Energy and Power Engineering, vol. 8, p. 476-486, ISSN: 1934-8975

J.16 Amelio M. , Barbarelli S. , Florio G. , Scornaienchi N. M. , Cutrupi A. , Minniti G. , Sanchez Blanco M. , " Innovative tidal turbine with central deflector for the exploitation of river and sea currents in on-shore installations". Applied Energy, 2012, Vol. 97, pp. 944-955.

J.17 Barbarelli S. , Florio G. , Scornaienchi N. M. , " Performance Analysis of a Low-Power Tangential Flow Turbine With Rotary Channel". Journal of Energy Resources Technology Transactions of the ASME, 2005, Vol. 127, pp. 272-279.

International Conferences

C.1 S. Barbarelli, E. Berardi, M. Amelio, N. M. Scornaienchi. An Externally Fired Micro Combined-Cycle, with Largely Adjustable Steam Turbine, in a CHP System. Procedia Manufacturing 42 (2020) 532–537. Proceedings of International Conference on Industry 4.0 and Smart Manufacturing - ISM 2019 – Rende, dal 20-11-2019 al 22-11-2019

C.2 Silvio Barbarelli, Mario Amelio, Francesco Iovino, Alfredo Meomartini, Nino Michele Scornaienchi. Study of the Shape of a Vertical Axis Micro Wind Turbine With Wooden Blades. Proceedings of 11th International Conference on Applied Energy (ICAE 2019 Västerås, Svezia) dal 12-08-2019 al 15-08-2019

C.3 Barbarelli, S., Amelio, M., Castiglione, T., Florio, G., Scornaienchi, N.M. Hydraulic on-shore system recovering energy from sea waves. Energy Procedia 159, pp. 72-77 (2019). Proceedings of Applied Energy Symposium and Forum Renewable Energy Integration with Mini/Microgrid, REM2018 – Rodi, dal 29-09-2018 al 30-09-2018

C.4 Barbarelli, S., Castiglione, T., Zupone, G.L., Bova, S., Yan, J. CFD Investigation of the Open Center on the Performance of a Tidal Current Turbine. Energy Procedia 159, pp. 28-33 (2019). Proceedings of Applied Energy Symposium and Forum Renewable Energy Integration with Mini/Microgrid, REM2018 – Rodi, dal 29-09-2018 al 30-09-2018

C.5 Perrone D., Castiglione, T., Morrone P., Barbarelli S., Amelio M. NOx emissions for oxy-mild combustion of pulverized coal in high temperature pre-heated oxygen. Energy Procedia 148, pp. 567-574 (2018). Atti del 73° Congresso Nazionale ATI (Pisa) dal 12-09-2018 al 14-09-2018

C.6 Barbarelli, S., Amelio, M., Florio, G., Scornaienchi, N.M. Study of a hydraulic system converting energy from sea waves near the coast MATEC Web of Conferences 240,01004 (2018). Proceedings of 11th International conference on computational heat, mass and momentum transfer ICCHMT 2018 – Cracovia, dal 21-05-2018 al 24-05-2018

C.7 Zupone G.L., Massaro S., Barbarelli S., Sulpizio R. Siting assessment for Kinetic Energy Turbines: An emplacement study for sea and river applications Energy Procedia Volume 143, 2017, Pages 713-720. Proceedings of World Engineers Summit – Applied Energy Symposium & Forum: Low Carbon Cities & Urban Energy Joint Conference, WES-CUE 2017, 19–21 Luglio 2017, Singapore

C.8 Zupone G.L., Massaro S., Barbarelli S., Sulpizio R. A multi-parametric criteria for Tidal Energy Converters siting in marine and fluvial environments. Energy Procedia Volume 142, 2017, Pages 328-336. Proceedings of 9th International Conference on Applied Energy, ICAE2017-Cardiff, dal 21-08-2017 al 24-08-2017

C.9 Barbarelli S., Amelio M., Florio G., Scornaienchi N.M. Innovative on-Shore System recovering Energy from Tidal Currents. Energy Procedia Volume 142, 2017, Pages 29-36. Proceedings of 9th International Conference on Applied Energy, ICAE2017-Cardiff, dal 21-08-2017 al 24-08-2017

C.10 Barbarelli S, Amelio M, Florio G, Scornaienchi N M. (2017). Procedure Selecting Pumps

Running as Turbines in Micro Hydro Plants. ENERGY PROCEDIA, vol. 126, p. 549-556, ISSN: 1876-6102, doi: https://doi.org/10.1016/j.egypro.2017.08.282. Atti del al 72° Congresso Nazionale ATI (Lecce) dal 06-09-2017 al 08-09-2017.

C.11 Barbarelli S, Castiglione T, Florio G, Scornaienchi N M, Lo Zupone G. (2016). Design and Numerical Analysis of a Double Rotor Turbine Prototype Operating in Tidal Currents. ENERGY PROCEDIA, vol. 101, p. 1199-1206, ISSN: 1876-6102, doi: https://doi.org/10.1016/j.egypro.2016.11.162. Proceedings of del 71st Conference of the Italian Thermal Machines Engineering Association, ATI2016, 14-16 September 2016, Turin, Italy

C.12 S. Barbarelli, G. Florio, M. Amelio. Waste Energy Recovering in Water Pipelines by Using Pumps Running as Turbines. Proceedings of the 11th Conference on Sustainable Development of Energy, Water and Environment Systems, SDEWES2016.81, 1-14 (2016)

C.13 S. Barbarelli, M. Amelio, G. Florio. Procedure for the Selection of Pumps Running as Turbines in Micro Hydro Plants. Proceedings of the 2nd South East European Conference on Sustainable Development of Energy, Water and Environment Systems, SDEWES.SEE2016.22, 1-13 (2016)

C.14 S. Barbarelli, G. Florio, N.M. Scornaienchi, G. Lo Zupone, First Evaluation of Array Configuration of Self-Balancing Tidal Kinetic Turbines. Proceedings of the 2nd South East European Conference on Sustainable Development of Energy, Water and Environment Systems, SDEWES.SEE2016.139, 1-11 (2016)

C.15 S. Barbarelli, T. Castiglione, G. Florio, G. Lo Zupone, N.M. Scornaienchi. CFD Analysis of the External Rotor of a Tidal Kinetic Turbine Prototype. Proceedings of the 10th Conference on Sustainable Development of Energy, Water and Environment Systems, SDEWES.2009.139, 1-11 (2015)

C.16 Barbarelli S., Florio G., Amelio M., Scornaienchi NM., Cutrupi A., Lo Zupone G. Levelized Cost of Energy: a first evaluation for a self balancing kinetic turbine. Energy Procedia 75 (2015) 283 – 293 . Proceedings of 7th International Conference on Applied Energy – ICAE2015 – Abu Dhabi

C.17 Silvio Barbarelli, Mario Amelio, Gaetano Florio, Nino Michele Scornaienchi, Antonino Cutrupi, Giacomo Lo Zupone Transients Analysis of a Tidal Currents Self-balancing Kinetic Turbine with on Shore Basement Energy Procedia, Volume 61, 2014, Pages 962-969. Proceedings of 6th International Conference on Applied Energy – ICAE2014 - (Taipei) dal 30-05-2014 al 02-06-2014

C.18 Barbarelli S., Amelio M., Castiglione T., Florio G., Scornaienchi N. M., Cutrupi A., Lo Zupone G. Analysis of the Equilibrium Conditions of a Double Rotor Turbine Prototype Designed for the Exploitation of the Tidal Currents. Proceedings of “SDEWES 2013”, Dubrovnik, Croazia, 22-27 Settembre, 2013

C.19 Barbarelli S., Florio G., Amelio M , Scornaienchi N. M., Cutrupi A., Lo Zupone G. Design procedure of an innovative turbine with rotors rotating in opposite directions for the exploitation of the tidal currents. Proceedings of “SEEP 2013 - 6th International Conference on Sustainable Energy and Environmental Protection”, Maribor - Slovenia, 20-23 august 2013

C.20 Amelio M. , Barbarelli S. , Florio G., Scornaienchi N. M., Cutrupi A., Sanchez Blanco M., Lo Zupone G. Engineering design study of an innovative hydrokinetic turbine with on shore foundation. Proceedings of OWEMES 2012 Offshore wind and Other Renewables Energies in Mediterranean and European Seas, Roma, 2012, pp. 245-259.

C.21 Amelio M. , Barbarelli S. , Florio G. , Scornaienchi N. M. , Cutrupi A. , Minniti G. , Sanchez Blanco M. Innovative Tidal Turbine with Central Deflector for the Exploitation of River and Sea Currents in On-Shore Installations. Atti del convegno ICAE 2011 (International Conference on Applied Energy), Perugia, 16-18 Maggio, 2011

C.22 Barbarelli S. , Bova S. , Piccione R. , " A Model Investigation on the Pressure Transducer Dynamics for Measurements in Lubricating Vane Pumps: Influence of Dissolved Air and of Transducer/Tubing Geometry". SAE technical paper, 2010. Proceedings of SAE 2010 Small Engine Technology Conference, Linz, Austria, 28-30 September, 2010

C.23 Barbarelli S. , Bova S. , Piccione R. , " Zero-dimensional Model and Pressure Data Analysis of a Variable-Displacement Lubricating Vane Pump". SAE technical paper 2009. Proceedings of SAE International Powertrains, Fuels and Lubricants Meeting, Florence, Italia

C.24 Amelio M., Barbarelli S. A one-dimensional numerical model for calculating the efficiency of Pumps As Turbines for implementation in micro-hydro power plants. Proceedings of 7th Biennial ASME Conference Engineering Systems Design and Analysis", Manchester, UK, July 19-22, 2004

C.25 Barbarelli S. , Florio G., Scornaienchi N. M. Set up of a New Test Rig, Design of a 5 Deflectors Turbine Prototype and First Experimental Results. Proceedings of 5th European Conference Proceedings on Turbomachinary Fluid Dynamic and Thermodynamics, Praha, 17 - 22 marzo, 2003, pp. 1133-1144.

C.26 Scornaienchi N. M. , Florio G. , Barbarelli S. Rilievi al Banco Prova delle Prestazioni di un Prototipo di turbina a 5 Deflettori per il Recupero di Cascami Energetici. Atti del convegno International Symposium Energy and Environment 2002, Capri, 6/8 Giugno, 2002, pp. 495-505.