

Curriculum Vitae



PERSONAL INFORMATION

First name / Surname **Battisti Lorenzo**

Address C.so 3 Novembre, 63, 38100 Trento, Italy

Telephone +39 0461 882515

Mobile: +39 345 1329004

+39 328 2998985

Fax +39 0461 882599

E-mail lorenzo.battisti@ing.unitn.it
info@lorenzobattisti.it

personal site: www.lorenzobattisti.it

Nationality Italian

Date of birth 25.10.1963

Gender Male

Married with Tiziana (+23), two childs, Sofia (21) and Federico (21)

OCCUPATIONAL FIELD **Mechanical Engineer, Professor, University**

WORK EXPERIENCE

Dates **2014 Full professor qualification**

Dates **2002 onwards**

Occupation or position held **Associate Professor**

Main activities and responsibilities Head of the Turbomachinery Laboratory

Name and address of employer DICAM - Department of Civil, Environment and Mechanics, Faculty of Engineering, University of Trento, Italy

Type of business or sector (For Italy alone) Area CAR 09 – Industrial and information Engineering ING-IND/08

Dates **1993 -2002**

Occupation or position held **Assistant Professor**

Main activities and responsibilities Responsible of the Turbomachinery Laboratory

Name and address of employer Department of Civil, Environment and Mechanical DICAM, Faculty of Engineering, University of Trento, Italy

Type of business or sector Turbomachinery, Energy conversion systems

Dates **1991-1993**

Occupation or position held **Contract Engineer**

Main activities and responsibilities Development of the Turbomachinery Laboratory
 Name and address of employer Department of Mechanical and Structural Engineering, Faculty of Engineering, University of Trento, Italy

Dates **1989-1991**
 Occupation or position held **Environment and industrial risk manager.**
 Name and address of employer MEMC Monsanto electronic materials, Sinigo (BZ), Italy
 Main activities and responsibilities Industrial hygiene assessment plan, executive protocol for waste treatment.
 Type of business or sector Management of tests

EDUCATION AND TRAINING

Dates **2010-2013**
 Title of qualification awarded **Ph.D**
 Name and type of organisation providing education and training University of Udine (Italy)
 Principal subjects/occupational skills covered **Wind turbine operations in cold climates and anti-icing design**

Dates **1995-1996**
 Title of qualification awarded **Postgraduate Diploma in Fluid-Dynamics, option Turbomachinery**
 Principal subjects/occupational skills covered Experimental testing of turbomachinery, Fluid-dynamics
 Name and type of organisation providing education and training von Karman Institute for Fluid-dynamics (Bruxelles – Belgium), an AGARD-NATO Institute

Dates **1982-1988**
 Title of qualification awarded **Mechanical Engineering**
 Principal subjects/occupational skills covered Disinfection of civil water by means of dioxide chloride: plant design and operation
 Name and type of organisation providing education and training University of Padova, Italy
 Level in national or international classification Master Degree

PERSONAL SKILLS AND COMPETENCES

Mother tongue **Italian**

Other language(s)

Self-assessment <i>European level (*)</i>	Understanding		Speaking		Writing	
	Listening	Reading	Spoken interaction	Spoken production		
English	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user
German	C1 Proficient user	C2 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user
French	B1 Independent user	B1 Independent user	A1 Basic user	A1 Basic user	A1 Basic user	A1 Basic user
Spanish	B1 Independent user	B1 Independent user	A1 Basic user	A1 Basic user	A1 Basic user	A1 Basic user

(*) [Common European Framework of Reference for Languages](#)

TECHNICAL SKILLS AND COMPETENCES Thermal and fluid-dynamic quantities measurements;
Data acquisition and measurements post-processing;
Fortran programming
Gas turbines design,
Water steam turbine design,
ORC plants design,
Design and testing of wind turbines
Wind measurements
Development of wind parks in not conventional sites
Hydrokinetic turbines design and testing
Wind turbine reconditioning and life extension assessment
Sustainability and energy transition

ORGANISATIONAL SKILLS AND COMPETENCES Coordination of a team of 4-7 people in the Turbomachinery Laboratory,
Volleyball Coach: Italian Federation (FIPAV) First Degree Qualification.

ARTISTIC SKILLS AND COMPETENCES Harpsichord and transverse flute player,
Harpsichord restoration and organology analysis of plucked instruments
Author of books of poetry

SYNTHETIC DESCRIPTION OF THE SCIENTIFIC ACTIVITY FIELDS

MAIN TOPICS **Gas and steam turbines, cycle analysis and blade/combustion chamber cooling;**
Hydrogen technology in gas/steam turbines;
Renewable energies: wind power and hydraulic power.
Anti-icing systems for wind turbines

Gas and steam turbines, cycle analysis and blade/combustion chamber cooling

This area of investigation deals with fluid machines fluid dynamics and heat transfer. The activity began during the permanence at von Karman Institute (1995-96) and 1999 and pointed on the analysis of heat exchange processes in gas turbines, with emphasis on stator/rotor cooling. This activity has led to original contributions in the field of effusive cooling and patents in the field. The latter earned engagement from the Ministry of National Defense and contact with leading companies in the field.

Hydrogen technology in gas/steam turbines;

This activity was driven from the enrollment in the international grant "Development cycles Zero Emission Hydrogen Combustion" Participating Bodies: ENEL, GE, University of Trento, Padua, Genoa, Florence. 2006-2009 Resolution MATT-Region Veneto 2405 of 09.08.2005, with aim of financing the construction of a hydrogen district at Porto Marghera).
Further activities have been in the field of hydrogen production by wind energy and water electrolysis.

Renewable energies: wind power and hydraulic power.

In the field of wind power, particular emphasis has been put on small wind energy systems. In 2007 a wind turbine test field has been established (www.eolicotrento.ing.unitn.it) to analyze two topics: wind energy exploitation in cold climates and technology and efficiency analysis of different concepts of small wind turbines, in particular solutions able to harvest more energy in low windy regions. The vertical axis wind turbine architecture has been deeply investigated in the years either from the experimental and numerical point of view gaining important advancements in the knowledge of fluid dynamic and structural behavior of small wind turbines.

The skills gained in the field of performance prediction, design, and testing of vertical axis wind turbines were determinant for engagement within the consortium of the FET European project on offshore floating VAWT (Deepwind) in 2010. He was also coordinator of the 2009 PRIN national project on Fluid dynamic analysis of vertical axis wind turbines. Besides these scientific activities, he is engaged in numerous design and testing activities of small wind turbines commissioned by leading wind turbine manufacturers. Recently his research group acquired a medium-size wind tunnel test to carry out more detailed tests on vertical wind turbine aerodynamics

Wind turbine life extension concerns with reconditioning of a plant that operated in a wind site for a certain number of years and that is dismantled to be re-installed on other sites. This practice has been in use for decades for every type of electrical production plant, diesel engines, turbogas, etc. and for some years now it has also been rapidly extending to the wind sector, also by the same manufacturers of new machines. In a recent specific conference on the subject (19th CIRP Conference on Life Cycle Engineering, Berkeley, USA, 2012) it is indicated as one of the "leveraging technology for a sustainable world". This activity envelopes different branches of knowledge and skills, as early detection of component damage, mechanical, electrical and aerodynamic improvement and technology update, repowering/derating, etc

The basic knowledge gained in the modelling of the aerodynamics of wind turbines has been now directed towards the development of the new research field of hydrokinetic turbine hydrodynamics, in particular to the field of hydropower exploitation in confined flows (canals and rivers). In the giant artificial canal, named Biffis, near Trento, the worldwide first experimental facility of real size turbines is in operation since November 2020.

To date applications of hydrokinetic turbines are almost exclusively intended to harvest energy from ocean/marine currents and tidal, but the implementation of this technology to artificial canals is not straightforward and needs a specific customization of the technology.

Anti-icing systems for wind turbines

The modeling results achieved in the field of cooling systems have been exported, with the extension to the two-phase fluid case, to the anti-icing/de-icing problems of wind turbines operating in cold climates, where the minimization of thermal power necessary for safe operation is essential. On the topic, a Ph.D. at the Graduate School of the University of Udine (2010-2013) was completed. Three additional patents have been granted on the topic. Such research activities have earned the endorsement of teaching and research periods at the Polytechnic University of Copenhagen continuously from 2004 to 2009 and the publication of two international books.

SUB- TOPICS

- Turbines
 - Heat transfer in turbomachinery
 - Transpiring and effusing systems for cooling of gas turbines
 - Innovative gas turbines for hydrogen cycles
 - Innovative concepts for small wind turbines
 - Innovative concepts for small hydraulic turbines
 - Operation of wind turbines in cold climates
 - Anti-icing systems for wind turbines

- Energy vectors
 - Safety Hydrogen handling;
 - Hydrogen production from renewable energies

- Renewable energies
 - Small wind turbines
 - Wind parks for not-conventional sites
 - Wind turbine life extension
 - Sustainability and energy transition

PATENTS

	GB 2 355 017 - Porous Element for the effusive cooling of Machine Component ; 23.09.1999
	GB 2 356 684 - Boundary Layer Control using Electroformed Micro-Porous Material ; 23.11.1999
	US 6,488,238 - Boundary Layer Control of aerodynamic airfoils ; 03.12.2002
	PCT/IB03/04551 - De-icing and anti-icing arrangement for wind energy converting systems ; 27.11.2005
	WO2007138452 (A2) Method For Implementing Wind Energy Converting Systems ; 02.03.2009

MX2010003358 (A) **System And Method Of Plating Metal Alloys By Using Galvanic Technology**; 23.06.2010.

WO2007138450 (a1) **method and system for detecting ice on aerodynamic surfaces**; 10.02.2012.

EP3807463 (A1) **Road pavement heating and temperature maintenance system** 13.06.2018

PCT/IB2021/053628, **Hydrokinetic energy recovery system**, 30.04.2021

PCT/IB2021/053627, **Rotor of hydrodynamic turbine**, 30.04.2021

OTHER TITLES

Award of best product of the research 2001-2003 of the Trento University for the area ICAR 09 Ingegneria industriale e dell'informazione, D.L. 205 del 5.6.98, art. 5: US 6,488,238 - Boundary Layer Control of Aerodynamic Airfoils.

Winner of a NATO-CNR Senior Fellowship Programme 1998. Title of the Research Project: "Transient Heat Transfer Measurement Technique on Hot Surface Models" carried out at the Von Karman Institute-Bruxelles.

Delegate of the Italian Government by the Technical Option Committee - Refrigeration, AC and Heat Pumps of United Nations Environmental Programme (UNEP) and co author of the 1998 Protocol.

IEA - XIX ANNEX "Wind Energy in Cold Climate" Italian delegate 2005-2007.

Member ETN European Turbine Network (2005-2008).

Member of the Panel of Experts of Italian Ministry of Economy for Renewable Energies (DM 7.4.06 – wind energy).

NATIONAL AND INTERNATIONAL GRANTS

OCEN-COVID19 (Osservatorio dei Consumi Energetici – Covid 19), Granted by University of Trento 2021-23 (65 k€).

Wind Resource Map & Pilot-Wind Power Development Program Of Uganda, granted by Uganda African Development Bank, 27/08/2018. DB REFERENCE N°:AfDB980-08/18 (800 k€)

Future Deep Sea Wind Turbine Technologies, ENERGY.2010-2014.10.2-1: Future Emerging Technologies for Energy Applications (FET), Coordinator Danmarks Tekniske Universitet Risø DTU (136 k€); - The Trento unit was responsible for numerical modeling of the model for experiments in Denmark in Roskilde Fjord, and the fluid-dynamic experimental test on the model in the Politecnico of Milano wind tunnel.

Fluid dynamic analysis of vertical axis wind turbines PRIN 2010- Funded in 2011, duration 24 months- National Coordinator Prof. Lorenzo Battisti. (475 k€);

Development of zero emission hydrogen propelled cycles – Development of a Hydrogen District in Porto Marghera (UE-MATT Projects) - 2006-2009.Coordinator ENEL Research PISA, (55 k€);

Rapporto sullo stato dell'arte delle energie rinnovabili e dei vettori energetici puliti Commissionato da Servizio Energia ed Assessorato all'urbanistica Provincia Autonoma di Trento. Giugno 2003, Responsabile scientifico Prof. Lorenzo Battisti (24 k€)

Linee guida per la valutazione dell'impiego dell'energia eolica sul territorio Commissionato da Servizio Energia Provincia Autonoma di Trento. Luglio 2004 Responsabile scientifico Prof. Lorenzo Battisti (61 k€)

MAIN CONTRACTS

Turbina idrocinetica per canali artificiali, Granted by HE-PowerGreen s.r.l. (with the contribution of L.P.6/99 PAT) Role; Scientific Director 2017-20, (1.199 k€).

Hydro technology for energy recovery of reverse osmosis system - water treatment plant, Project contractor Saipem (2015) (30 k€).

Progetto di una turbina eolica con pale in legno composito (design of an innovative wind turbine with wooden composite blades), Project contractor Defino&Giancaspro srl. (2015) (90 k€).

Analisi sperimentale delle prestazioni di una turbina eolica da 10 kW (experimental tests on a 10 kW wind turbine), Project contractor Pentawind srl. (2015) (43 k€)

Progettazione di un micro generatore eolico per l'ambiente urbano (design of a micro wind turbine for urban environments), Project contractor Fondital SpA (2014) (30 k€)

Analisi delle resa energetica di miniturbine eoliche (analysis of efficiency of small wind turbines), Experimental Test Field of Trento for Small wind turbines Trento, 2006-2010 – www.eolicotrento.ing.unitn.it (360 k€)

Concezione, progetto e prototipazione di turbine eoliche urbane ad alto contenuto di innovazione (Ideation, design and prototyping of urban wind turbines and small wind turbines with high innovation), Project L.P. 6/99, Contractor TOZZI-SUD, 2006-2010 (3,1 M€)

Sistema integrato di condizionamento ed antighiaccio per aerogeneratori eolici di concezione innovativa (analysis, development and optimization of the energy aspects of an anti-icing system, and technical-economic efficiency of an innovative wind turbine) Contractor Leitner S.p.A. 2002-2004 (204 k€)

More than 30 Wind Site analysis and assessments

More than 10 Wind Parks due diligences

TEACHING ACTIVITY

The teaching activity has been carried out continuously since 1993 at the University of Trento mainly within the course of industrial engineering degree, supplying the basic teaching of Fluid Machine, Machine Design, Mechanics, Industrial Plants

Currently, I teach the following courses for the Free University of Bozen Master's Degree in Energetic Engineering (Energy Engineering is a multi-university master program, jointly managed by the Faculty of Science and Technology of the Free University of Bozen-Bolzano):

- **Fluid Machines Engineering** (9 credits, in English)

The course masters the most important concepts about fluid machines dedicated to energy conversion systems and their integration in the energetic system, to give decision tools and criteria for design, cost analysis, and selection with emphasis to community and small scale plants.

The course aims to discuss the main power systems generation, either fossil and renewable fluids fuelled. The emphasis is put on the difference between utility and community scale, while main attention is drawn on design and selection criteria of the latter, since their application potential at territory scale. Innovative systems and technologies are presented and discussed, like variable speed hydro turbines, reversible pumps, use of wastewaters, and hydrogen-fuelled plants.

Stand-alone and grid-connected plants are examined from the machinery point of view, instead of from an electric connection to optimize selection criteria. Finally, energy accumulation systems are analyzed, to discuss scale, limits, and application both for utility and community size. This aspect is particularly important because of the development of intermittency of renewable sources also at micro-scale..

- **Wind Power Systems** (6 credits, in English)

The course provides the basic knowledge of wind energy systems analysis and design. Main technical, and economical aspects for the proper selection and design will be faced and discussed. In particular, small wind turbine application area will be developed through a dedicated project.

The course makes use of lectures, with an introduction and discussion of the general aspects of wind turbine design, and group meetings to review the progress of the projects assigned.

During the course, the state of progress of the project will be periodically evaluated and discussed. The exam consists of the presentation and discussion of the project and deliverables of the individual working groups, with the identification and evaluation of the contributions of individual participants.

Two visits to small wind plants and manufacturing companies are organized.

The following course is tough for the Degree Course in Environmental and Land Engineering, and Degree course in Civil Engineering:

- **Machine and Machine Elements** (6 credits, in Italian) since year 2015/16

- **Analysis of Energy Systems (Elementi di analisi dei sistemi energetici)** (2 credits, in Italian) since year 2020/21

ORGANIZATION OF HIGH FORMATION COURSES

University Master (II Level) in Energy Engineering, IDEE University of Trento: **Wind Energy (4 ETCS)**:

- First Edition. March-April 2005 Role: organization and main lecturer.
- Second Edition. May 2006 Role: organization and main lecturer.
- Third Edition. Sept. 2007. Role: organization and main lecturer.
- Fourth Edition. May-Sept 2008: Role: organization and main lecturer.
- Fifth Edition. Sept. 2009: Role: organization and main lecturer.

University Master (II Level) in Wind Energy, University of Milano and Genova, May 2004 (1 ETCS):
Role: lecturer.

Special course on **Ice Prevention on Wind Turbines**, (16-17-18. November 2004). Birk Innovation Center Birk Centerpark (Herning – Danmark)

PARTICIPATION TO PH. D SCHOOLS

- **Member of the Scientific Board of the Ph.D. School of University of Udine from 2001 to 2010**. During this period I was tutor of 7 Ph.D students
- **Member of the Scientific Board of the Ph.D. School of DICAM - University of Trento from 2015** . During this period he was tutor of 1 Ph.D student
- **Member of the Scientific Board of the Ph.D. Doctoral School of Social Science: "Sustainability: Economics, Environment, Management and Society" (Susteems)**; since 2018

PARTICIPATION TO SPECIAL COURSES

- **Introduction to Measurement Techniques**, Oct. 1994 - Von Karman Institute, Bruxelles;
- **La Fluidodinamica Numerica nello Studio delle Macchine** Nov. 1994 - by Cilea, Consorzio Interuniversitario Lombardo per L'elaborazione Automatica;
- **Measurement Techniques** Jan.1995 - Von Karman Institute, Bruxelles ;
- **Heat Transfer and Blade Cooling in Gas Turbines**, May 1995 -Von Karman Institute, Bruxelles;
- **Turbomachinery blade Design Systems**, Febr. 1999 -Von Karman Institute, Bruxelles;
- **Simulation Methods Used for the In-flight Icing Certification of Aircraft, Helicopters and Jet Engines**, Nov 6-9 2012 Lyon by Newmerical Technologies International;

INTERNATIONAL ENDORSEMENT

International Master Science in Wind Energy (Polytechnic of Copenhagen DTU -Danish Technical University)

June 2004 "**Wind Turbine Ice Prevention Systems Selection and Design**", (Special course 41326 – 6 ETCS).

June 2005 "**Wind Turbine Ice Prevention Systems Selection and Design**", (Special course 41326 – 6 ETCS)

June 2006 "**Wind Turbine Operation in Cold Climates**", (Special course 41326 – 6 ETCS).

June 2007 "**Wind Turbine Operation in Cold Climates**", (Special course 41326 – 6 ETCS)

June 2008 "**Wind Turbine Operation in Cold Climates**", (Special course 41326 – 6 ETCS).

June 2009 "**Wind Turbine Operation in Cold Climates**", (Special course 41326 – 6 ETCS).

Aim/objective of the course:

To give an exhaustive analysis of wind energy exploitation in hostile climates, with particular emphasis on the methodology for the design of ice prevention systems (IPSs).

- Wind energy exploitation in hostile climates: motivation, assessment of sites in cold climates, wind turbine operations in cold climates, influence on reliability and availability, safety, influence on loads and power production.
- Economics: economic break-even analysis for an IPS, estimation of costs, model for the estimation of the energy requirement in icing periods

- Analysis and evaluation of anti-ice heat fluxes requirement: modeling the physics of ice formation mechanism, basics of heat transfer, analysis of heat flux contributions, the influence of climatic and wind turbine variables (geometric and functional) on thermal power requirements, sensitivity analysis,
- Review of the technical solution in use for wind energy exploitation in cold climates: IPSs concepts comparison and discussion, technical solution comparison, energetic efficiency of an IPS. Influence of wind turbine typology, size, control strategy, and off condition operations on IPS selection, design, and performance. IPS and wind turbine optimum matching procedure.
- Detailed analysis of a thermal-based IPS: design and discussion.
- New frontiers: the regenerative option, the intermittent heating, emerging solutions for IPSs.

INVITED LECTURE -

- Lecture **Wind Energy and the Energy Market** at Venice International University VIU, Theme: Clean Energy and Climate Change, (Venezia Isola di san Servolo), years 2013, 2014, 2015
- Lecture Series **“WIND ENERGY – A state of Art**, (17-23 March 2007) by von Karman Institute for Fluid-Dynamics (Brussels – Belgium)
- **Wind Power**, Invited lecture, Porter School Of Environment, Telaviv, Israel, 18 Nov. 2009.
- **Opportunities of Small wind Technology**, Invited lecture, Eilat-Eilat Int. Conference, Eilat, Israel, 17-18 Feb. 2010.

INSTITUTIONAL DUTIES

- Delegate for Course Council of the Master in Energy Engineering (Trento-Bolzano) (2015-on)
- Member of the board of directors of the University of Trento (2004-2008)
- Representative of Researchers in the Faculty Council (1996-1998 and 1998-2000).
- Member of the ‘Edilizia Ponte’ Committee, Faculty of Engineering (2004-05)

PAPERS IN GAS TURBINE AND HEAT TRANSFER AREA

- L. BATTISTI, R. FEDRIZZI, **2D Numerical Simulation of a Wind Turbine De-Icing System Using Cycled Heating**”, Wind Engineering, VOLUME 31, NO. 1, 2007.
- L. BATTISTI, P. BAGGIO AND R. FEDRIZZI, **“Warm-Air Intermittent De-Icing System for Wind Turbines”**, Wind Engineering, VOLUME 30, NO. 5, 2006.
- G. CERRI, L. BATTISTI, R. FEDRIZZI, A. GIOVANNELLI **“Advances in Effusive Cooling Techniques of Gas Turbines**, Applied Thermal Engineering, 2006 Elsevier Limited
- L. BATTISTI, R. FEDRIZZI, G. CERRI **“Novel Technology for Gas Turbine Blade Effusion Cooling”** GT2006-90516, ASME Turbo Expo 2006: Power for Land, Sea and Air, May 8-11, 2006, Barcelona, Spain.
- G. CERRI, L. BATTISTI, G. SORAPERRA, **“Non-Conventional turbines for Hydrogen Fueled Power Plants”**. ASME GT2003-38324
- L. BATTISTI, P. BAGGIO **“Experimental Determination of average turbulent heat transfer and Friction Factor in Stator Internal Rib -Roughened Channels”** in Heat Transfer in Gas Turbine Systems, Annals of the New York Academy of Sciences Volume 934, Editor Richard J. Goldstein, 2001
- CERRI, L. BATTISTI, **“Valve Control for Optimum Performance in Compression Refrigeration Cycles”**, Heat Recovery System & CHP 1994 Vol.14, N.1 pp.61-66

**CONFERENCE PROCEEDINGS IN GAS
TURBINE AND HEAT TRANSFER AREA**

- L. BATTISTI, R. FEDRIZZI, S. DAL SAVIO, A. GIOVANNELLI, "**Influence of the and Size of Wind Turbines on Anti-icing Thermal Power Requirement**", Proceedings of EUROMECH 2005 Wind Energy Colloquium, 4-7 Oct. 2005, Oldenburg – Germany, Springer Verlag 2007
- L. BATTISTI, R. FEDRIZZI, M. RIALTI, S. DAL SAVIO, **A model for the design of hot-air based wind turbine ice prevention system** WREC05 22-27 May 2005 Aberdeen
- L. BATTISTI, P. BAGGIO, R. FEDRIZZI, **Numerical simulation of a wind turbine warm-air intermittent de-icing system** 4th International Conference on Computational Heat and Mass Transfer, Proceedings of 4th ICCHMT, May 17–20, 2005, Paris-Cachan, FRANCE ICCHMT'05 – 231.
- L. BATTISTI, R. FEDRIZZI, , G. SORAPERRA S, **Analysis of the finned stator thermal effectiveness of the Leitwind MW class wind turbine** PID46956 WREC05 22-27 May 2005 Aberdeen.
- L. BATTISTI, et al. "**Experimental analysis of the heat transfer coefficient of winged surfaces for turbomachinery applications**. (Previsione sperimentale dello scambio termico di superfici alettate per applicazioni nelle macchine a fluido)" MIS-MAC VIII 28 Firenze - Maggio 2004
- L. BATTISTI, et al. "**Experimental analysis of the thermo-fluid-dynamic field past the electric stator of a HAWT** (Indagine sperimentale del campo termo-fluidodinamico a valle del rotore di turbine eoliche ad asse orizzontale)" MIS-MAC VIII 28 Firenze – 05/ 2004
- L. BATTISTI, E. BERTOLAZZI, and F. TRIVELLATO, "**Numerical Processing of Temperature Data**", WIT press, ISBN: 1-85312-705-1, ISSN: 1369-7331, Advanced computational methods in Heat Transfer VII", 2004.
- L. BATTISTI, G. CERRI, G. SORAPERRA, S. BORGHETTI, "**Emerging solutions in hydrogen fuelled power plants**", HYPOTHESIS V, HYdrogen – POver Theoretical and Engineering Solutions International Symposium, 7-10 September 2003 PORTO CONTE – ITALY
- L.BATTISTI, J.M. CHARBONNIER "**Transient Radiant Heat Transfer Measurement Technique on Hot Surface Models**" Von Karman Institute Preprint, March 2000, pp. 44
- L.BATTISTI, P. BAGGIO, "**Experimental Determination of average turbulent heat transfer in a rib-roughened channel**", Atti del XVI Congresso Nazionale sulla Trasmissione del Calore, Siena 17-19 giugno 1998.
- G.CERRI, L.BATTISTI, C.SALVINI, "**Parametric Analysis of a Vapour Compression Refrigeration Plant Steady State Behavior**", Proceedings of IIR Conference on Emerging Trends in Refrigeration & Air-conditioning, March 1998 New Delhi India
- L.BATTISTI, AND T. SCHMEER, "**Experimental Study of the Surface Heat Transfer Enhancement in a Rib-Roughened Blade Cooling Channel By Means of Double Layer Thin Film**" 55 Eurotherm International Congress, 16-19 September 1997, Santorini, Grece.
- L.BATTISTI, T. ARTS, "**Wall Heat Transfer Measurements in Rib-Roughened Cooling Channels by Means of a Transient Technique**", Atti 51° Convegno ATI, Udine 16-20 Settembre 1996
- L.BATTISTI, "**Thermal Characteristics of Rib-Roughened Cooling Channels by Means of a Transient Technique**" Project Report 1996-01, Von Karman Institute for Fluid Dynamics, June 1996, pp.88.
- L.BATTISTI, "**Experimental evaluation of the heat transfer coefficients of fluidized beds operating at atmospheric pressure** (Valutazione dei Coefficienti di Scambio Termico in Letti Fluidizzati Funzionanti a Pressione Atmosferica)" Atti Cagliari MIS-MAC III Metodi di Sperimentazione nelle Macchine Ottobre 1994
- F. FERRARI, G. CERRI, L. BATTISTI, et al., "**Interventi su un motore diesel tricilindrico ad iniezione diretta per l'incremento delle prestazioni**", 1° Convegno Nazionale - Progetto Finalizzato Trasporti 2 - CNR, Roma, Atti pp. 1354-1383, 19-21 Ottobre 1993

PAPERS IN HYDRO ENERGY AREA

- L. CACCIALI; L. BATTISTI, S. DELL'ANNA **Free surface double actuator disc theory and double multiple streamtube model for In- Stream Darrieus hydrokinetic turbines**, Submitted for publication, Journal: Ocean Engineering, 2022
- L. CACCIALI; L. BATTISTI, S. DELL'ANNA, **Effect of the inflow variation on the hydrokinetic turbine performance in subcritical prismatic canals**, Submitted for publication, Journal: Ocean Engineering, 2022.
- L. CACCIALI; L. BATTISTI, S. DELL'ANNA, G. SORAPERRA, **Case study of a cross-flow hydrokinetic turbine in a narrow prismatic canal**, Accepted for publication, Ocean Engineering 2021.
- L. CACCIALI; L. BATTISTI, S. DELL'ANNA, G. SORAPERRA, **Investigation on inviscid models for the performance prediction of hydrokinetic turbines in confined subcritical flows**, Accepted for publication, Ocean Engineering 2021.
- F. BALDUZZI, P. MELANI, G. SORAPERRA, A. BRIGHENTI, L. BATTISTI, AND A. BIANCHINI, **Some design guidelines to adapt a Darrieus vertical axis turbine for use in hydrokinetic applications**, E3S Web Conf. Volume 312, 2021, 76th Italian National Congress ATI (ATI 2021)

PAPERS IN WIND ENERGY AREA

- BATTISTI, L., **Design Options to Improve the Dynamic Behavior and the Control of Small H-Darrieus VAWTs**. Appl. Sci. 2021, 11(19), 9222; <https://doi.org/10.3390/app11199222> - 03 Oct 2022
- BATTISTI, L., ZANNE, L., CASTELLI, M.R., BIANCHINI, A., BRIGHENTI, A., **A generalized method to extend airfoil polars over the full range of angles of attack**, 2020 Renewable Energy, 155, pp. 862-875
- BATTISTI, L., DELL'ANNA, S., RACITI CASTELLI, M., BRIGHENTI, A., **Effectiveness of Wind Turbines in Urban Environment**, Springer, 2019, Research Topics in Wind Energy 8, pp. 255-269
- BATTISTI, L., BENINI, E., BRIGHENTI, A., DELL'ANNA, S., RACITI CASTELLI, M., **Small wind turbine effectiveness in the urban environment**, 2018. RENEWABLE ENERGY - ISSN:0960-1481 pp.102-113, vol. 129.
- BATTISTI, L., PERSICO, G., DOSSENA, V., BRIGHENTI, A., BENINI, E., **Experimental benchmark data for H-shaped and troposkien VAWT architectures** pp.425-444. In RENEWABLE ENERGY - ISSN:0960-1481 vol. 125, 2018
- BATTISTI, L., BRIGHENTI, A., RACITI CASTELLI, M., PERSICO, G., DOSSENA, V., **Performance and midspan wake measurements on a H-Darrieus in controlled conditions**, 2018, JOURNAL OF PHYSICS. CONFERENCE SERIES - ISSN:1742-6588 vol. 1037
- BATTISTI, L., BENINI, E., BRIGHENTI, A., (...), PERSICO, G., PARADISO, B., **A review based on evaluation experiences with ten-years activity in VAWT experimental wind tunnel testing**, GREEN ENERGY AND TECHNOLOGY - ISSN:1865-3529, 2018
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- L.BATTISTI, **Wind Turbines in Cold Climates, Icing Impact and Mitigation Systems**, Ed. Springer, ISBN 978-3-319-05190-1, March. 2015

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- www.lorenzobattisti.it: web site of scientific and technical dissemination on wind energy technology
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- It has registered at the 31st of December 2015, after Google Analytics, 3.120 downloads
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<http://www.qualenergia.it/speciali/20120225-scelta-e-installazione-delle-miniturbine-eoliche>
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The main objective of the project was to create in Italy and Europe a landmark in the study of small wind systems. The experimental wind farm has specific equipment for the analysis and comparison of design characteristics, functional, and energy of mini and micro wind turbines. Since one of the purposes connected is to evaluate the possibility of widespread use of these sizes of wind turbines, in addition to the ability to operate in a technically and economically efficient, such a structure also aims to evaluate aspects of environmental impact, acoustic and logistical and requirements infrastructure for their installation and disposal.

Since its creation, CEST was visited by over 200 private companies and Research Institutes operating in the sector, representatives of Italian and foreign universities and colleges. Several dozens of guided visits by secondary and high schools.

Reports of 2007-2015 activity are available on the website. <http://www.eolicotrento.ing.unith.it/>

MEDIA

Several teaching movies and small films have been produced in the years on the wind energy topic. Here some links are listed:

- Documentario sul minieolico – Le ali del vento

https://www.youtube.com/watch?v=1xAS3L9T7qs&feature=em-share_video_user

- Documentario sulle prove sperimentali al Politecnico di Milano EU FET Deepwind project (in English)

https://www.youtube.com/watch?v=XD0uY3xl1Y4&feature=em-share_video_user

- Energia eolica a GEO&GEO RAI3

<http://www.rai.tv/dl/RaiTV/programmi/media/ContentItem-621c3002-5091-4165-9f2f-399168de73bf.html>

- Minieolico: è possibile la sua integrazione nella struttura urbana?

<https://www.youtube.com/watch?v=OXMekBrgXF8>

- Kyoto Club - edifici e minieolico

<https://www.youtube.com/watch?list=PL36CBB87FD420A270&v=5wMdul69jEQ> (PART 1/3)

<https://www.youtube.com/watch?v=VKa6s4ZXYbl> (PART 2/3)

https://www.youtube.com/watch?v=UCvqG1_Zf1Y (PART 3/3)