

## Adriana Angelotti – Curriculum Vitae

### Education:

- Degree in Physics in 2000 at Università degli Studi di Milano;
- Doctoral Degree in Energy Sciences in 2004 at Politecnico di Milano

### Scientific and teaching profile:

Since April 2005 Assistant Professor in Building Physics at Politecnico di Milano, initially at the Building and Environment Science and Technology (BEST) Department and since 2012 at the Energy Department.

Her research activity is focused on the building energy efficiency topic, both from the climatisation systems (ground-source heating and cooling systems) and the passive and building envelope technologies (thermal inertia, ventilated facades, breathing walls, night ventilation, textile architecture) point of view. She is involved in several national and international research projects and in research contracts. She serves as referee for many international journals of the sector.

She is a member of the Management Committee of the TexHUB Inter-dipartimental Laboratory of Politecnico. She has been a member of the Italian Technical Board (CTI) for ground source heat pumps standardization.

She is in charge of the course of Building Physics at the Architecture and Construction Engineering School and a member of the faculty of the Master Ridef Energia.

### National and international research projects:

- **PRIN 2015** "Riquilificazione del parco edilizio esistente in ottica nZEB (nearly Zero Energy Buildings): costruzione di un network nazionale per la ricerca" (2017-19), participant
- **S.IN.E.RG.I.E ATTI.V.E.** - Sistema INtegrato sostenibile Energeticamente aTTivo per il rinnoVo degli edifici industriali attraverso coperture composite - BANDO DI INVITO A PRESENTARE PROGETTI DI RICERCA INDUSTRIALE E SVILUPPO SPERIMENTALE NEI SETTORI STRATEGICI DI REGIONE LOMBARDIA E DEL MIUR DI CUI AL DECRETO N. 7128 DEL 29 LUGLIO 2011 (2012-14), participant;
- **EcoZoo** (Tecnologie Innovative per il miglioramento dell'impatto ambientale, del benessere e salute animale negli allevamenti intensivi Lombardi di bovini e suini) - BANDO DI INVITO A PRESENTARE PROGETTI DI RICERCA INDUSTRIALE E SVILUPPO SPERIMENTALE NEI SETTORI STRATEGICI DI REGIONE LOMBARDIA E DEL MIUR DI CUI AL DECRETO N. 7128 DEL 29 LUGLIO 2011 (2012-14), participant;
- **EU COST Action C24** "Analysis and Design of Innovative Systems for Low-EXergy in the Built Environment: COSTeXergy" (2007-10), Management Committee Member;
- **International Energy Agency ECBCS Annex 49** "Low-exergy systems for high-performance built environment" (2007-09), participant;

- **PRIN 2007** "RES2 - Responsive by Renewables. Una nuova frontiera per il miglioramento dell'efficienza energetica e della qualità globale dell'ambiente interno tramite componenti edilizi adattativi integrati con fonti rinnovabili", scientific responsible;
- **PRIN 2005** "Studio termofluidodinamico di componenti di facciata adattativi per il comfort ed il risparmio energetico", participant.

### Contract researches:

- "Sistemi tessili pressostatici e pneumatici: studio delle prestazioni energetiche di diverse soluzioni tecnico-costruttive" (2012), **committed by Canobbio s.p.a.**, responsible prof. A. Zanelli;
- "Energy performance assessment of exhibition buildings in Europe", **committed by EMECA (European Major Exhibition Centers Association)** (2010-11), responsible prof. C. Talamo;
- "Studio di alternative tecnologiche per il miglioramento delle prestazioni degli involucri edilizi di edifici esistenti del Polo Fieristico di Rho-Però", **committed by Fiera Milano s.p.a.** (2009-11), responsible prof. C. Talamo;
- "Progetto di ricerca per la valutazione delle trasformazioni necessarie a ridurre il consumo dei combustibili fossili e le emissioni di CO<sub>2</sub> ed incrementare l'utilizzo delle fonti rinnovabili applicate ad un unità amministrativa territoriale in ambito montano (Albosaggia, SO)", **committed by IREALP (Istituto di Ricerca per l'Ecologia e l'Economia Applicate alle Aree Alpine)** (2009-10), responsible prof. R. Cecchi, scientific responsible prof. G. Scudo;
- "Comportamento termico e ambientale di soluzioni di involucro in laterizio per l'efficienza energetica dell'edificio", **committed by ANDIL (Associazione Nazionale Industriali Laterizio)** (2006-07), responsible prof. A. Campioli.

### Publications

#### Peer-review international journal papers:

- 1) ALBERTI, L., ANTELMINI, M., ANGELOTTI, A., FORMENTIN, G. (2017). Geothermal heat pumps for sustainable farm climatization and field irrigation. *AGRICULTURAL WATER MANAGEMENT*, vol. 195, p. 187-200, ISSN: 0378-3774, doi: 10.1016/j.agwat.2017.10.009
- 2) ALBERTI, LUCA, ANGELOTTI, ADRIANA, ANTELMINI, MATTEO, LA LICATA, IVANA (2017). A Numerical Study on the Impact of Grouting Material on Borehole Heat Exchangers Performance in Aquifers. *ENERGIES*, vol. 10, p. 1-15, ISSN: 1996-1073, doi: 10.3390/en10050703
- 3) Alongi A., Angelotti A, Mazzarella L. (2017). Experimental investigation of the steady state behaviour of Breathing Walls by means of a novel laboratory apparatus. *BUILDING AND ENVIRONMENT*, vol. 123, p. 415-426, ISSN: 0360-1323, doi: 10.1016/j.buildenv.2017.07.013
- 4) PAGANIN G., ANGELOTTI A., DUCOLI, C., LAVAGNA, M., TALAMO, C., Luccietto, S. (2017). Energy performance of an exhibition hall in a life cycle perspective: embodied energy, operational energy and retrofit strategies. *ENERGY EFFICIENCY*, vol. 10, p. 1343-1364, ISSN: 1570-646X, doi:10.1007/s12053-017-9521-8

- 5) SUO H., ANGELOTTI A., ZANELLI A. (2015), Thermal-physical behaviour and energy performance of air-supported membranes for sports halls: a comparison among traditional and advanced building envelopes, *ENERGY AND BUILDINGS*, 109, 35-46.
- 6) Ramponi, R., Gaetani, I., Angelotti, A. (2014), Influence of the urban environment on the effectiveness of natural night-ventilation of an office building, *ENERGY AND BUILDINGS* 78, 24-34.
- 7) RAMPONI R., ANGELOTTI A., BLOCKEN B. (2014), Energy saving potential of night ventilation: sensitivity to pressure coefficients for different European climates, *APPLIED ENERGY* 123, 185-195.
- 8) ANGELOTTI A., ALBERTI L., LA LICATA I., ANTELMI M. (2014), Energy performance and thermal impact of a Borehole Heat Exchanger in a sandy aquifer: Influence of the groundwater velocity, *ENERGY CONVERSION AND MANAGEMENT* 77, 700–708.
- 9) ANGELOTTI A., CAPUTO P., SOLAINI G. (2012), Steady versus dynamic exergy analysis of climatisation systems: the case of an air source heat pump, *INTERNATIONAL JOURNAL OF EXERGY* 11 (4), 460-472.
- 10) ALBERTI L., ANGELOTTI A., ANTELMI M., LALICATA I., LEGRENZI C. (2012), Low temperature geothermal energy: heat exchange simulation in aquifer through Modflow/MT3DMS codes, *AQUA MUNDI, Journal of Water Sciences* 3 (1), 39-51.
- 11) TORIO H, ANGELOTTI A., SCHMIDT D. (2009), Exergy analysis of renewable energy-based climatisation systems for buildings: a critical view, *ENERGY AND BUILDING*, 41 (3), 248-271.
- 12) ASTE N., ANGELOTTI A., BUZZETTI M. (2009), The influence of the external walls thermal inertia on the energy performance of well insulated buildings, *ENERGY AND BUILDING*, 41 (11), 1181-1187.

### **Book chapters:**

- 13) ANGELOTTI A., JANSEN S., SHUKUYA M., TORIO H. (2011), Methods and models for exergy analysis, in: *Low Exergy Systems for High-Performance Buildings and Communities: Annex 49 Summary Report*, edited by Torio H. and Schmidt D., 11-22, ISBN: 978-3-8396-0239-3, Fraunhofer Verlag, Stuttgart (Germany).
- 14) ANGELOTTI A. (2010), Energia geotermica, 176-179, in aa.vv. *EcoSphera*, a cura di: Niles Eldredge, Telmo Pievani, ISBN: 978-88-02-08384-1, UTET (ITALY).
- 15) ANGELOTTI A., MORELLO E. (2009), Il ruolo della massa: analisi e valutazione delle caratteristiche dinamiche di chiusure verticali opache, in: *Raccomandazioni per la progettazione di edifici energeticamente efficienti*, a cura di: Andrea Campioli e Monica Lavagna, 35-42, ISBN: 978-88-8138-125-8, Edizioni Laterservice, Roma (ITALY).
- 16) ANGELOTTI A. (2007), Il modello COMFA+, in: DESSI' V., *Progettare il comfort urbano*, 223-246, ISBN: 978-88-513-0473-7, Esselibri, Napoli (ITALY).

### **International conferences proceedings:**

- 17) Alongi, Andrea, Angelotti, Adriana, Mazzarella, Livio (2017). Analytical modelling of Breathing Walls:

experimental verification by means of the Dual Air Vented Thermal Box lab facility. ENERGY PROCEDIA, vol. 140, p. 36-47, ISSN: 1876-6102, doi: 10.1016/j.egypro.2017.11.121

- 18) Angelotti, A., Alberti, L., Antelmi, M., Legrenzi, C., Formentin, G. (2016), Zoo-technical application of Ground Source Heat Pumps: a pilot case study, Proceedings 12<sup>th</sup> REHVA Congress CLIMA 2016, Aalborg, Denmark.
- 19) STAITI M., ANGELOTTI A. (2015). Design of borehole heat exchangers for ground source heat pumps: a comparison between two methods, ENERGY PROCEDIA 78, 1147-1152.
- 20) Dama A., Angelotti A., Penso D. (2015). Integrated design and dynamic simulation for a new zero energy building, Proceedings Building Simulation Applications BSA 2015. p. 223-230, Bolzano, Italy
- 21) D. Sterpi, A. Angelotti, D. Corti, M. Ramus (2014). Numerical analysis of heat transfer in thermo-active diaphragm walls. In: Proc. 8th Europ. Conf. Numerical Methods in Geotechnical Engineering, NUMGE 2014. p. 1043-1048, London: Taylor & Francis Group, ISBN: 9781138001466, Delft, The Netherlands, 18-20 June 2014.
- 22) STERPI D., ANGELOTTI A. (2013). Performance and effects on the subsoil temperature of a thermo-active diaphragm wall. Proc. Int. Workshop on Geomechanics & Energy "The ground as energy source and storage", EAGE (European Association of Geoscientists and Engineers), Lausanne, Switzerland, 26-28 November 2013, ISBN: 978-90-73834-61-3 (5 pp).
- 23) RAMPONI R., BLOCKEN B.J.E., ANGELOTTI A. (2013). Computational modeling of outdoor wind flow and indoor airflow in a cross-ventilated office building. In C. Baker, J. Owen, D. Hargreaves & M. Sterling (Eds.), Proceedings paper : 6th European-African Conference on Wind Engineering (EACWE), July 7-11, 2013, Cambridge, UK, (pp. 1-8).
- 24) SUO H., ANGELOTTI A., ZANELLI A., RESCIA R. (2013). Energy performance of different pneumatic and air-supported membranes for sports halls, Proceedings of Tensinet Symposium 2013, 8-10 May 2013, Istanbul, Turkey, 379-390, ISBN: 9789072325068.
- 25) RAMPONI R., COSTOLA D., ANGELOTTI A., BLOCKEN B., HENSEN J.L.M. (2011). Evaluation of wind-driven ventilation in building energy simulation: sensitivity to pressure coefficients, Proceedings of CISBAT 2011, 14-16/09/2011, Lausanne, Switzerland, 949-954, ISBN cd-version: 978-2-8399-0906-8.
- 26) ANGELOTTI A., DAMA A., MAZZARELLA L. (2010). Modeling naturally ventilated double skin facades, Proceedings of CLIMA 2010 10th REHVA World Congress, 9-12/05/2010, Antalya, Turkey.
- 27) ANGELOTTI A., CAPUTO P., COSTA G. (2010). Potential improvements of energy systems; evaluation of the energy and exergy performances of an Italian neighborhood, Proceedings of CLIMA 2010 10th REHVA World Congress, 9-12/05/2010, Antalya, Turkey.
- 28) ANGELOTTI A., (2010). Subjective versus objective assessment of thermal comfort: preliminary considerations on an experimental campaign in university classrooms, Proceedings of CLIMA 2010 10th REHVA WORLD Congress "Sustainable Energy Use in Buildings", 9-12/05/2010, Antalya, Turkey.
- 29) ANGELOTTI A., CAPUTO P., SOLAINI G. (2009). Dynamic exergy analysis of an air source heat pump, Proceedings of 1<sup>st</sup> ELCAS, Nisyros, Greece, 4-6 June 2009, ISBN: 978-960-243-663-9.

- 30) ANGELOTTI A., CAPUTO P. (2007). The exergy approach for the evaluation of heating and cooling technologies; first results comparing steady state and dynamic simulations, Proceedings of Palenc 2007, Crete, Greece, 27-29 Sept. 2007, 1, 59-64.
- 31) ANGELOTTI A., CAPUTO P. (2007). Energy and exergy analysis of heating and cooling systems in the Italian context, Proceedings of Climamed 2007, Genova, Italy, 5-7 Sept. 2007, 843-854, ISBN: 978-889-562-0022.
- 32) ANGELOTTI A., DESSI' V., SCUDO G. (2007), The evaluation of thermal comfort conditions in simplified urban spaces: the COMFA+ model, Proceedings of Palenc 2007, Crete, Greece, 27-29 Sept. 2007, 1, 65-69.
- 33) ANGELOTTI A., SOLAINI G. (2006), Design guidelines for direct ground cooling systems in different climates, Proceedings of PLEA 2006, Geneve, Switzerland, 6-8 Sept. 2006, 2, 363-368, ISBN: 2-940156-31-X.
- 34) ANGELOTTI A., SOLAINI G. (2006), Direct ground cooling: influence of ground properties on the ground heat exchanger size, Proceedings of EPIC 2006 AIVC, Lyon, France, 20-22 Nov. 2006, 1, 69-74, ISBN: 2-86834-122-5.
- 35) ANGELOTTI A., PAGLIANO L., SOLAINI G. (2004), Summer cooling by earth-to-water heat exchangers: experimental results and optimisation by dynamic simulation, Proceedings of EuroSun 2004, 20-23 June 2004, Freiburg, Germany, 2, 678-686, ISBN: 3-980-9656-2-7.

### **National conference proceedings:**

- 36) ANGELOTTI A., ALBERTI L., LA LICATA I., ANTELMI M. (2014), Borehole Heat Exchangers: heat transfer simulation in the presence of a groundwater flow, Journal of Physics: Conference Series 501.
- 37) ANGELOTTI A., DUCOLI C., LUCCIETTO S., PAGANIN G., TALAMO C. (2011). Energy retrofit strategies: the case of Milan Trade Fair, Atti del 66° Congresso Nazionale ATI, Rende (Cosenza), Italy, 5-9 Sept. 2011, ISBN: 978-88-95267-11-1.
- 38) ANGELOTTI A., DAMA A., PERINO M., MAZZARELLA L. (2007), Validazione sperimentale di un modello per facciate a "doppia pelle" in ventilazione meccanica, Atti del 62° Congresso Nazionale ATI, Salerno, Italy, 11-14 Sept. 2007, 1, 306-311, ISBN: 978-88-87998-77-1.
- 39) BALOCCO C., GAGLIARDI A., GRAZZINI G., ANGELOTTI A., SOLAINI G. (2004), Ground thermal storage using vertical pipes, Atti del 22° Congresso Nazionale sulla Trasmissione del Calore, Genova, Italy, ISBN: 88-7741-1303-7.
- 40) ANGELOTTI A., SOLAINI G. (2003), Raffrescamento estivo di un edificio tramite accoppiamento termico indiretto con il terreno, atti del 58° Congresso ATI, 9-12 Sept. 2003, Padova-S. Martino di Castrozza, Italy, 3, 1667-1674, ISBN: 88-86281-83-8.