

25 August, 2014

List of Publications – Antti Hellsten

A. Peer reviewed scientific articles

1. Chaudhari, A., Hellsten, A., Agafonova, O. and Hämäläinen, J.: Large eddy simulation of boundary-layer flows over two-dimensional hills, In Fontes, M., Günther, M. and Marheineke, N., eds., *Progress in Industrial Mathematics at ECMI 2012*, pp. 211-218, 2014, ISBN 978-3-319-05364-6, DOI 10.1007/978-3-319-05365-3_29.
2. Hellsten, A. and Zilitinkevich, S. Role of convective structures and background turbulence in the dry convective boundary layer. *Boundary-Layer Meteorology* 149(3):323-353, DOI 10.1007/s10546-013-9854-6.
3. Tack, A. Koskinen, J., Hellsten, A., Sievinen, P., Esau, I., Praks, J., Kukkonen, J. and Hallikainen, M. Morphological database of Paris for atmospheric modeling purposes. *Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 5(6):1803-1810, 2012, DOI: [10.1109/JSTARS.2012.2201134](https://doi.org/10.1109/JSTARS.2012.2201134).
4. Hellsten, A. and Zilitinkevich, S. Large eddy simulation studies on convective atmospheric boundary layer. In: J. Freund and R. Kouhia, Eds., *Proceedings of the 24th Nordic Seminar on Computational Mechanics*. Aalto University, 2011, (invited plenary lecture).
5. Saloranta, J. and Hellsten, A. Evaluation of a general CFD-solver for a micro-scale urban flow. *International Journal of Environment and Pollution*, 44(1/2/3/4):368-375, 2011.
6. Franke, J., Hellsten, A., Schlünzen, K.H. and Carissimo, B. The COST 732 best practice guideline for CFD simulation of flows in the urban environment – A summary. *International Journal of Environment and Pollution*, 44(1/2/3/4):419-427, 2011.
7. S. Di Sabatino, R. Buccolieri, H. Olesen, M. Ketznel, R. Berkowicz, J. Franke, M. Schatzmann, H. Schlünzen, B. Leitl, R. Britter, C. Borrego, A.M. Costa, S. Trini Castelli, T. Reisin, A. Hellsten, J. Saloranta, N. Moussiopoulos, F. Barmpas, K. Brzozowski, I. Goricsan, M. Balczò, J. Bartzis, G. Efthimiou, J.L. Santiago, A. Martilli, M. Piringer, M. Hirtl, A. Baklanov, R. Nuterman and A. Starchenko. COST 732 in practice: the MUST model evaluation exercise. *International Journal of Environment and Pollution*, 44(1/2/3/4):403 - 418, 2011.
8. Hellsten, A. Case study on code verification using the method of manufactured solutions: 6th order finite difference method for homogeneous turbulence. In *The fifth International Symposium on Computational Wind Engineering*, Chapel Hill, North Carolina, USA, May 23-27, 2010.
9. Sievinen P., Praks J., Hallikainen M., Koskinen J., Hellsten, A. and Kukkonen J. Urban morphology retrieval by means of remote sensing for the modelling of atmospheric dispersion and micro-meteorology, Digest IEEE International Symposium on Geoscience and Remote Sensing (IGARSS'09), Cape Town, South Africa, 4 pp., 2009.
10. A. Hellsten and S. Wallin. Explicit algebraic Reynolds stress and nonlinear eddy-viscosity models, (review article). *International Journal of Computational Fluid Dynamics* 23(4):349-361, 2009.
11. A. Hellsten and H. Bézard. Behaviour of nonlinear two-equation turbulence models at the free-stream edges of turbulent flows. In W. Rodi and M. Mulas, eds., *Engineering Turbulence Modelling and Experiments* 6, pp. 147-156. Elsevier, Villasimius, Italy, May 2005.
12. A. Hellsten. New advanced *k-w* turbulence model for high-lift aerodynamics. *AIAA Journal*,

- 43(9):1857-1869, 2005.
13. A. Hellsten. Curvature corrections for algebraic Reynolds stress modeling: a discussion. *AIAA Journal*, 40(9):1909-1911, 2002.
 14. A. Hellsten and S. Laine. Extension of the k - w shear-stress transport turbulence model for rough-wall flows. *AIAA Journal*, 36(9):1728-1729, 1998.
 15. P. Kaurinkoski and A. Hellsten. Numerical simulation of a supersonic base bleed projectile with improved turbulence modelling. *Journal of Spacecraft and Rockets*, 35(5):606-611, 1998.
 16. J. Hoffren and A. Hellsten. Turbulence model tests in subsonic airfoil flows. In W. Haase, E. Chaput, E. Elsholz, M.A. Leschziner, U.R. Müller, eds., *Notes on Numerical Fluid Mechanics*, vol. 58, 1997.

B. Scientific papers not entirely peer-reviewed

1. Baumann-Stanzer K., Leidl B., Trini Castelli S., Milliez C.M., Berbekar E., Rakai A., Fuka V., Hellsten A., Petrov A., Efthimiou G., Andronopoulos S., Tinarelli G., Tavares R., Armand P., Gariazzo C. Evaluation of local-scale models for accidental releases in built environments – results of the “Michelstadt exercise” in *COST Action ES1006*. In *16th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*, 8-11 September 2014, Varna, Bulgaria.
2. Chaudhari, A., Ghaderi Masouleh, M., Janiga, G., Hämäläinen, J. and Hellsten, A. Large eddy simulation of atmospheric flows over the Bolund hill. In *The sixth International Symposium on Computational Wind Engineering*, Hamburg, Germany, June 9-12, 2014.
3. Milliez, M. and Hellsten, A. Evaluation of dispersion models for improvement and guidance for the use of local-scale emergency response tools; the “Michelstadt’ modelling exercise - COST action ES1006. In *The sixth International Symposium on Computational Wind Engineering*, Hamburg, Germany, June 9-12, 2014.
4. Barmpas, F., Trini Castelli, S., Franke, J., Leidl, B., Harms, F., Andronopoulos, S., Balczo, M. and Hellsten, A. Model evaluation protocol for cases of emergency response in urban areas. In *The sixth International Symposium on Computational Wind Engineering*, Hamburg, Germany, June 9-12, 2014.
5. Chaudhari, A., Agafonova, O., Hämäläinen, J., Hellsten, A. Large eddy simulation of atmospheric boundary-layer flows over complex terrains with applications in wind energy. In *Proceedings of the 11th World Congress on Computational Mechanics*, (WCCM XI), Barcelona, Spain, 2014.
6. Hellsten, A. and Zilitinkevich S. Role of convective structures and background turbulence in dry convective boundary layers. In 13th EMS Annual Meeting, Reading, UK, 9-13 September 2013.
7. Zilitinkevich S., Kleorin, N., Rogachevskii, I., Hellsten, A., Tyuryakov, S., Troitskaya, Y.I., Mareev, E.A., Kadantsev, E. Organised structures, non-local transports and turbulence closure for atmospheric convective boundary layer (CBL). In 13th EMS Annual Meeting, Reading, UK, 9-13 September 2013.
8. Tu, M.-K., Nordbo, A., Hellsten, A., Rinne, J., Vesala, T. Large eddy simulations for forest canopy. In Proceedings of FCoE in 'Physics, Chemistry, Biology and Meteorology of Atmospheric Composition and Climate Change' Annual Meeting 2013, Kulmala, M., Lappalainen H.-K., Brus, M., Kontkanen, J. Eds. Report Series in Aerosol Science (ISSN 0784-3496), ISBN 978-952-5822-75-5 (electronic publication), 2013.
9. Tu, M.-K., Nordbo, A., Hellsten, A., Markkanen, T. Rinne, J., Vesala, T. Surface heterogeneity and flux measurement height in large eddy simulations. In Japan Geoscience Union Meeting, Chiba, Japan, 19-24 May 2013.

10. Vesala, T., Tu, S., Steinfeld, G., Zhang, J., Raasch, S., Markkanen, T., Kanani, F., Hellsten, A., Mammarella, I., Järvi, L., Nordbo, A., Rannik, Ü. Flux Footprint Estimation for Complex Surfaces. In 9th International Carbon Dioxide Conference, Beijing, China, 3.-7. June 2013.
11. Tack, A., Praks, J., Sievinen, P. Hellsten, A. SAR interferometry for atmospheric modeling and risk assessment in urban environment. In Synthetic Aperture Radar, 2012. EUSAR. 9th European Conference, 2012.
12. Tu, S.M., Kanani, F., Hellsten, A., Markkanen, T., Raasch, S. and Vesala, T. Flux Footprint over Idealized Urban Surface Using Large Eddy Simulation model. In European Meteorological Society Annual Meeting EMS2012, 2012.
13. Chaudhari, A., Hellsten, A., Agafonova, O. and Hämäläinen, J.: Large eddy simulation of boundary-layer flows over two-dimensional hills, In the 17th European Conference on Mathematics for Industry (ECMI 2012), Lund, Sweden, July 23-27, 2012.
14. Tu, S.M., Kanani, F., Hellsten, A., Markkanen, T., Raasch, S., Järvi, L., Nordbo, A. and T.Vesala, T. Evaluation of flux footprint over idealized urban surface by large eddy simulation model. In Proceedings of Finnish Center of Excellence in 'Physics, Chemistry, Biology and Meteorology of Atmospheric Composition and Climate Change', and Nordic Center of Excellence in 'Cryosphere-Atmosphere Interactions in a Changing Arctic Climate' Annual Meetings 2012 , Kulmala, M, Lappalainen H.-K., Boy, M., Brus, M., Nieminen, T. Eds.Report N:o 134 in Report Series in Aerosol Science (ISSN 0784-3496), ISBN 978-952-5822-61-8 (electronic publication) , 2012.
16. Martilli, A., Santiago, J.L., Reisin, T. G., Baklanov, A., Bartzis, J., Buccolieri, R., Costa, A. M., Di Sabatino, S., Efthimiou, G., Franke, J., Hellsten, A., Nuterman, R. and Tavares, R. How to choose the best simulation for a specific purpose? In *14th Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*, Kos, Greece, 2-6 October 2011. Environmental Technology Laboratory, Department of Mechanical Engineering, University of West Macedonia, Greece.
17. Franke, J., Hellsten, A., Schlünzen, H. and Carissimo, B. The Best Practice Guideline for the CFD simulation of flows in the urban environment: an outcome of COST 732. In *The fifth International Symposium on Computational Wind Engineering*, Chapel Hill, North Carolina, USA, May 23-27, 2010.
18. H. R. Olesen, A. Baklanov, J. Bartzis, F. Barmpas, R. Berkowicz, K. Brzozowski, R. Buccolieri, B. Carissimo, A. Costa, S. Di Sabatino, G. Efthimiou, J. Franke, I. Goricsan, A. Hellsten, M. Ketzel, B. Leidl, R. Nuterman, E. Polreich, J. Santiago, R. Tavares. The MUST model evaluation exercise: patterns in model performance. In *12th Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*, Cavtat, Croatia, 6-10 October 2008. Croatian meteorological society.
19. J. Franke, J. Bartzis, F. Barmpas, R. Berkowicz, K. Brzozowski, R. Buccolieri, B. Carissimo, A. Costa, S. Di Sabatino, G. Efthimiou, I. Goricsan, A. Hellsten, M. Ketzel, B. Leidl, R. Nuterman, H. Olesen, E. Polreich, J. Santiago, R. Tavares. The MUST model evaluation exercise: statistical analysis of modelling results. In *12th Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*, Cavtat, Croatia, 6-10 October 2008. Croatian meteorological society.
20. T. Brandt, A. Hellsten, J. Fröhlich, and D. von Terzi. Assesment of a hybrid LES-RANS concept based on eddy-viscosity reduction using resolved Reynolds stresses. In: B. Schrefler and U. Perego, eds., *8th World Congress on Computational Mechanics (WCCM8) & 5th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008)*, Venice, Italy, 2008.
21. J. Franke, A. Hellsten, K.H. Schlünzen, and B. Carissimo. Best practice guideline for the CFD simulation of flows in the urban environment - a summary. In *11th Conference on*

- Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*, Cambridge, UK, July 2007. Cambridge Environmental Research Consultants.
22. J. Saloranta and A. Hellsten. Evaluation of a general CFD-solver for a micro-scale urban flow. In *11th Conference on Reviewed papers*
 23. *Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*, Cambridge, UK, July 2007. Cambridge Environmental Research Consultants.
 24. J. Saloranta and A. Hellsten. Numerical error of symmetric interpolations produced by grid non-uniformity in finite-volume method. In *ICFD Conference on Numerical Methods for Fluid Dynamics*. The Institute for Computational Fluid Dynamics at the Universities of Oxford and Reading, March 2007.
 25. A. Karvinen, H. Ahlstedt, J. Ala-Juusela, A. Hellsten, and R. Huhtanen. Effects of grid density and turbulence models on a jet in crossflow. In A. Reis, J. Ward, and W. Leuckel, eds., *7th European Conference on Industrial Furnaces and Boilers*, Porto, Portugal, April 2006. Cenertec-Centro de Energia a Tecnologia.
 26. A. Hellsten. Effect of parallel system rotation on heat transfer in laminar pipe flow. In *9th Finnish Mechanics Days*. Lappeenranta University of Technology, 2006.
 27. J. Saloranta and A. Hellsten. Verification of a Reynolds-averaged Navier-Stokes solver for direct numerical simulation of turbulent flow. In *9th Finnish Mechanics Days*. Lappeenranta University of Technology, 2006.
 28. A. Hellsten. New advanced k - ω turbulence model for high-lift aerodynamics. In *42nd AIAA Aerospace Sciences Meeting*. AIAA paper 2004-1120, Reno, NV, USA, January 2004.
 29. S. Wallin, A. Hellsten, M. Schatz, T. Rung, D. Peshkin, and A.V. Johansson. Streamline curvature corrected algebraic Reynolds stress turbulence modelling. In *3rd International Symposium on Turbulence and Shear Flow Phenomena*, vol. 1, pp. 45-50, Sendai, Japan, June 2003.
 30. A. Hellsten. Behaviour of linear and nonlinear two-equation turbulence models near interfaces of turbulent and laminar flow. In *8th Finnish Mechanics Days*. Helsinki University of Technology, 2003.
 31. K. Salo and A. Hellsten. A simple Reynolds stress turbulence model to validate its algebraic truncations. In *8th Finnish Mechanics Days*. Helsinki University of Technology, 2003.
 32. A. Hellsten, S. Wallin, and S. Laine. Scrutinizing curvature corrections for algebraic Reynolds stress models. In *32nd AIAA Fluid Dynamics Conference*. AIAA paper 2002-2963, St. Louis, MO, USA, June 2002.
 33. A. Hellsten and S. Laine. Explicit algebraic Reynolds-stress modelling in decelerating and separating flows. In *AIAA Fluids 2000*. AIAA paper 2000-2313, Denver, CO, USA, June 2000.
 34. P. Rautaeimo, A. Hellsten, S. Laine, and T. Siikonen. The importance of advanced turbulence modelling - examples of practical flows. In *ECCOMAS 2000*, Barcelona, Spain, Sep 2000.
 35. A. Hellsten. Some improvements in Menter's k - ω SST turbulence model. In *29th AIAA Fluid Dynamics Conference*, AIAA paper 98-2554, Albuquerque, NM, USA, June 1998.
 36. A. Hellsten and S. Laine. Extension of the k - ω SST turbulence model for flows over rough surfaces. In *AIAA Atmospheric Flight Mechanics Conference*, pp. 252-260, AIAA paper 97-3577, New Orleans, LA, USA, August 1997.
 37. P. Kaurinkoski and A. Hellsten. Numerical Simulation of A Supersonic Base Bleed Projectile with Improved Turbulence Modelling, In *AIAA Atmospheric Flight Mechanics Conference*, AIAA-paper 97-3495, New Orleans, LA, USA, August 1997.
 38. S. Laine and A. Hellsten. Navier-Stokes Calculations for a Hybrid Laminar Aerofoil Section with and without Suction, In *2nd European Forum on Laminar Flow Technology*, Bordeaux, 1996. Paris: AAAF.
 39. P. Rautaeimo, T. Siikonen, and A. Hellsten. Diagonalization of the Reynolds-averaged Navier-

Stokes equations with the Reynolds-stress turbulence model. In *Proceedings of the IMACS-COST Conference on Computational Dynamics*, pp. 240-247, Lausanne, Switzerland, Sept. 1995.

C. Scientific books

1. J. Franke, A. Hellsten, K.H. Schlünzen and B. Carissimo. Best practice guideline for the CFD simulation of flows in the urban environment. Technical report, COST Office, Avenue Louise 149, 1050 Brussels, Belgium, May 2007.
2. A. Hellsten. New Two-Equation Turbulence Model for Aerodynamics Applications. PhD thesis, Helsinki University of Technology, Espoo, Finland, February 2004. ISBN 951-22-6933-3 (print), 951-22-6934-1 (pdf, available at <http://lib.hut.fi/Diss/>).
3. A. Hellsten and P. Rautahaimo, eds. 8th ERCOFTAC/IAHR/COST workshop on refined turbulence modelling, Laboratory of Applied Thermodynamics, Report 127, Espoo, Finland, 1999.

D. Publications aimed at professional community (Technical reports)

1. J. Saloranta and A. Hellsten. Semi-nonmatching block interface scheme for a structured-grid based flow solver. Technical Report B-57, Helsinki University of Technology, Laboratory of Aerodynamics, 2007.
2. J. Schweighofer and A. Hellsten. Computations of Viscous Flow around the HSVA-1 Tanker Using two Versions of the k - w Turbulence Model. Technical report, Helsinki University of Technology, Laboratory of Aerodynamics, Report B-51, 1999.
3. P. Kaurinkoski, P. Heino, and A. Hellsten. Implementation of a time-accurate time-integration scheme to the FINFLO flow solver. Report A-18, Helsinki University of Technology, 1999. ISBN 951-22-4550-7.
4. P. Kaurinkoski and A. Hellsten. FINFLO: the parallel multi-block flow solver. Report A-17, Helsinki University of Technology, Laboratory of Aerodynamics, Espoo, Finland, 1998. ISBN 951-22-3940-X.
5. A. Hellsten. On the solid-wall boundary condition of w in the k - w type turbulence models. Report B-50, Helsinki University of Technology, Laboratory of Aerodynamics, Espoo, Finland, 1998. ISBN 951-22-4005-X.
6. A. Hellsten. Implementation of a one-equation turbulence model in the FINFLO flow solver. Report B-49, Helsinki University of Technology, Laboratory of Aerodynamics, 1996. ISBN 951-22-3219-7.

G. Theses

1. A. Hellsten. New Two-Equation Turbulence Model for Aerodynamics Applications. PhD thesis, Helsinki University of Technology, Espoo, Finland, February 2004. ISBN 951-22-6933-3 (print), 951-22-6934-1 (pdf, available at <http://lib.hut.fi/Diss/>).
2. A. Hellsten. Reynoldsin jännitys -malli laskennallisessa aerodynamiikassa. M.Sc. Thesis, (in Finnish), Helsinki University of Technology, 1995.

H. Patents and announcements of invention

1. A. Hellsten. Acceleration of the deposition of ethylene-glycol clouds emerging from aircraft de-

- icing using wind-vortex generators. Announcement of invention, 2014.
2. A. Hellsten and P. Majander. Preventing formation of turbulent flow and hence voice quality deterioration in loudspeaker front cavities of mobile terminal devices. Announcement of invention, 2007. Reserved for possible later use by Nokia Oyj.

I. Audiovisual material

1. A. Hellsten. Turbulenssia. Radio interview, Yle Radiaattori, February 2006.