

RESUMÉ

Name: Dr Zheng-Tong Xie

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Employment:

Lecturer/ Associate Prof: Dec.2007— Feb.2014/Mar. 2014—, University of Southampton

Research : * Large eddy simulation (LES) for flow, dispersion and heat transfer in urban environments; new approaches (e.g. inflow boundary condition, wall model) for LES; coupling between meso-scale flows and micro-scale flows; modelling interaction of fluid and slender structures; modelling wind turbine flows. Supervising 3 PhD students, 1 PostDoc. PI of 1 EPSRC project, 1 NCAS (NERC) project, and 1 ESRC/Arup CASE project.

Teaching: * Applications of CFD (MSc & MEng), Aerodynamics (UG), CFD Surgeries (UG & PG).

Senior Research Fellow: Apr. 2004-Dec.2007, University of Southampton, UK

Research: * LES for flow, scalar dispersion and heat transfer over a group of obstacles (e.g. urban environments).

Research fellow: May 2000—Apr 2004, University of Surrey, UK

Research: * LES, extreme value theory and wind tunnel experiment for atmospheric dispersion.

Associate Prof: Apr. 1998—May 2000, Institute of Mechanics (IMECH)
Chinese Academy of Sciences (CAS), Beijing.

Research: * LES for atmosphere boundary layer over non-homogeneous surface. LES for RT instability and mixing.

Post-Doc: Dec. 1995—Mar. 1998, IMECH, CAS, Beijing.

Research: * LES for atmospheric boundary layer flows, canopy turbulent flows.

Education:

Ph.D Sept.1992—Nov.1995, Sch. Naval Architecture, Ocean and Civil Eng., Shanghai Jiao-Tong University (SJTU), Shanghai.

Major: Free surface hydrodynamics.

* Numerical simulations and water tunnel experiments for modelling hydrodynamic characteristics of cavitating axisymmetric bodies at small angles of attack.

* Awarded the Shao-Ling Wu Scholarship twice in 1994 and 1995.

M.E. Sept.1990-Aug.1992, SJTU, China

Major: Computational fluid mechanics (BEM, FEM, FDM).

*Awarded as an excellent M.E. student of SJTU.

B.E. Sept.1986-July 1990, SJTU, China

Major: Solid mechanics, fluid mechanics, structural mechanics.

Major Honours and Distinctions

Date	Honour/Distinction
2005	The paper 'Li JC, Xie ZT(1999) A large-eddy simulation for canopy turbulent flow, <i>Acta Mechanica Sinica</i> , 31(4), 406-414' was awarded as an outstanding paper by China Association for Science & Technology.
1997	Awarded Fellowship of China Postdoctoral Science Foundation (as PI).
1995,1994	Awarded Wu Shao-Ling / Bao Yu-Gang Prize for outstanding Ph.D student at SJTU, twice.
1992	Award as an excellent MS student of SJTU.

Research grants and contracts

Dates	Award Holder(s)	Funding Body	Title	Value
2014-2017	Xie ZT (PI), Thomas TG, Castro IP	EPSRC	DIPLOS	£225k
2011-2015	Xie ZT (PI)	EPSRC and Arup	EPSRC CASE Studentship	£93k
2010 -2011	Xie ZT (PI)	Concawe	CFD modelling of dispersion from floating roof tanks	£6k
2008 -2014	Xie ZT (PI) & Castro IP	National Centre for Atmospheric Science (NCAS, NERC)	CFD for the Urban Environment	£520k

Publications

a. Selected referenced journal papers.

- Boppana B, Xie ZT (2014) Thermal stratification effects on flow over a generic urban canopy, *Bound.-Layer Meteorol.*, 153 (1), 141-162.
Castro I.P.
- Daniels SJ, Castro IP, Xie ZT (2013) Peak loading and surface pressure fluctuations of a tall model building. *Journal of Wind Engineering and Industrial Aerodynamics*, 120, 19-28.
- Xie ZT, Hayden P, Wood CR (2013) Large-Eddy Simulation of Stratification Effects on Dispersion in Urban Environments, *Atmos. Environ.*, 71, 64-74..
- Kim Y, Castro IP, Xie ZT (2013) Divergence-free turbulence inflow conditions for large-eddy simulations with incompressible flow solvers *Computers and Fluids. Computers and Fluids*, 84, 56-68.
- Boppana B, Xie ZT (2013) Large-eddy simulation of heat transfer from a single cube mounted on a very rough wall, *Bound.-Layer Meteorol.*, 147, (3).
- Boppana B, Xie ZT (2012) Large-Eddy Simulation of Dispersion from Line Sources in a Turbulent Channel Flow, *Flow, Turbul. Combust.*, 88(3), 311-342.
- Castro IP
- Xie ZT (2011) Modelling street-scale flow and dispersion in realistic winds – towards coupling with mesoscale meteorological models, *Bound.-Layer Meteorol.*, 141(1), 53-75.
- Xie ZT (2010) Large-eddy simulation of stratification effects on dispersion in urban environments, *J Hydrodyn. Ser. B*, 22, (5), 956 -961.
- Boppana B, Xie ZT, Castro IP (2010) Large Eddy Simulation of dispersion over an array of obstacles *Bound.-Layer Meteorol.*, 135(3), 433-454.
- Xie ZT, Castro IP (2009) Large-eddy simulation for flow and dispersion in urban streets, *Atmos. Environ.*, 43 (13), 2174-2185.
- Xie ZT, Coceal O & Castro IP (2008) Large-eddy simulation of flows over random urban-like obstacles, *Bound.-Layer Meteorol.*, 129, 1-23.
- Xie ZT, Castro IP (2008) Efficient generation of inflow conditions for large-eddy simulation of street-scale flows, *Flow, Turbul. Combust.*, 81(3),449-470.
- Xie Z.T., Hayden P. (2007) Modelling extreme concentration from a source in a turbulent flow over rough wall, *Atmos. Environ.*, 41(16),3395-3406.
- Voke PR & Robins AG
- Xie ZT, Castro IP (2006) LES and RANS for turbulent flow over arrays of wall-mounted obstacles, *Flow, Turbul. Combust.*, 76(3), 291-312.
- Xie ZT, Li JC (2005) A numerical study for turbulent flow and thermal influence over inhomogenous canopy of roughness elements, *Environ. Fluid Mech.*, 5, 577-597.
- Xie ZT, Voke PR, Hayden P & Robins AG (2004) Large-eddy simulation of turbulent flow over a rough surface, *Bound.-Layer Meteorol.*, 111, 417-440.
- Xie ZT, Hayden P, Voke PR & Robins AG (2004) Large-eddy simulation of dispersion: comparison between elevated source and ground level source. *J. Turbul.*, 5(31) 1-16.
- Wang LL, Li JC, Xie ZT (2002) Large-eddy-simulation of 3-dimensional Rayleigh-Taylor instability in incompressible fluids, *Science in China, Ser. A*, 45(1), 95-106.
- Xie ZT, He YS et al (2001) An experimental study of the cavitating flow of submerged bodies, *J. Hydrodynamics*, 16(3), in Chinese.
- Li JC, Xie ZT (1999) A large-eddy simulation for canopy turbulent flow, *Acta Mech. Sinica*, 31(4), 406-414, in Chinese.
- Xie ZT, Li JC (1999) An SGS model and its application, *Communication in nonlinear science & numerical simulation*, 4 (2) 87-90 .
- Xie ZT, He YS (1999) Water tunnel investigation of ventilated cavities on slender axisymmetric bodies, *Experimental Mechanics*, 14(3), 280-287, in Chinese.

- Xie ZT, Li JC et al (1998) Water and heat transfer in plant topsoil and the lower atmosphere, *Acta Mech. Sinica*, **30**(3), 267-276, in Chinese.
- Xie ZT, Yao D.L. et al (1997) A land-atmosphere interaction model and observation in Huang-Huai-Hai Plain, *Progress in Geography*, **16**, 39-47, in Chinese.
- Xie ZT, He YS (1997) An approach in modelling cavitaton flows with gravity effect, *Communication in nonlinear science & numerical simulation*, **2** (2), 100-104.
- Xie ZT, He YS, et al (1996) A numerical study on hydrodynamic forces and moments on cavitation slender axisymmetric bodies at small angles of attack, *J. Hydrodynamics*, **11**(6), 681-689, in Chinese.
- Xie ZT, Zhou W.B. (1996) A numerical method of the wing-tail combination's unsteady response to a gust, *Acta Aerodynamica Sinica*, **14**(3), in Chinese.
- Xie ZT, Yang H.X. (1994) An analysis of a common problem in the use of "moment of momentum theorem", *Mech. Practice*, **16**(4), in Chinese.

b. Selected conference papers and invited seminars.

- Xie ZT, Kim Y (2014) Modelling the effect of freestream turbulence on dynamic stall of a pitching airfoil. In *Proceedings of 6th European Conference on Computational Fluid Dynamics (ECFD VI)*, Barcelona, Spain, 07/2014.
- Xie ZT (2014) Numerical Environmental Wind Tunnel Of Newtonian fluid (NEWTON). In *6th International Symposium on Computational Wind Engineering*, Meteorological Institute, CEN, University of Hamburg, 06/2014.
- Boppa B, Xie ZT (2014) Thermal Stratification and Wind Direction Effects on Urban Flows, In *Proceedings of 6th International Symposium on Computational Wind Engineering*, Meteorological Institute, CEN, University of Hamburg, 06/2014
- Castro I.P. (2014) A novel partitioned approach to the fluid-structure coupling of bridge section models. In *Proceedings of 6th International Symposium on Computational Wind Engineering*, Meteorological Institute, CEN, University of Hamburg, 06/2014
- Daniels S, Castro IP (2014) Teaching Star-CCM+ in the University of Southampton (Invited talk). *The STAR Global Conference 2014*, Vienna, Austria. 03/2014.
- Xie ZT (2014) Teaching Star-CCM+ in the University of Southampton (Invited talk). *The STAR Global Conference 2014*, Vienna, Austria. 03/2014.
- Xie ZT (2013) Modelling Turbulent Flow and Dispersion in Urban Environments, *invited seminar*, Institute of Mechanics, CAS, Beijing. 06/2013.
- Kim Y, Castro IP, Xie ZT (2013) Large-eddy simulations for wind turbine blade: Rotational augmentation and dynamic stall". In *Direct and large-eddy simulation 9*, Dresden, Germany, 04/2013.
- Daniels S, Castro IP, Xie ZT (2013) Correlations between aerodynamic forces and surface pressure fluctuations for a tall model building. In, *the sixth European and African Conference on Wind Engineering*, Cambridge, 07/2013.
- Xie ZT (2013) Designing a Numerical Environmental Wind Tunnel (NEWT), in *International Workshop on PHYSICAL MODELLING OF FLOW AND DISPERSION PHENOMENA*, Guildford, 09/2013.
- Bercin K, Lloyd T (2013) Efficient method for analysing fluid-structure interaction of horizontal axis tidal turbine blades, In, *The European Wave and Tidal Energy Conference*, Aalborg, Demark, 09/2013.
- Xie ZT & Turnock SR (2013) Efficient method for analysing fluid-structure interaction of horizontal axis tidal turbine blades, In, *The European Wave and Tidal Energy Conference*, Aalborg, Demark, 09/2013.
- Daniels S, Castro IP, Xie ZT (2012) Large-eddy simulations for peak loading of tall buildings - The Application of the Forward-Stepwise Inlet Condition on the CAARC standard tall building model. In, *Proc. 10th UK Conf. Wind Eng.* Sept, Southampton.
- Kim Y, Castro IP, Xie ZT (2012) Divergence-free turbulence inflow conditions for Large-Eddy simulations of flows around an airfoil. In, *Proc. 10th UK Conf. Wind Eng.* Sept, Southampton.
- Xie ZT et al (2012) Flow and dispersion from an oil storage tank, In, *Proc. 10th UK Conf. Wind Eng.* Sept, Southampton.

- Xie ZT (2012) Modelling extreme events in urban environments. *Invited seminar, RMS (one), London, 13th/Nov.*
- Xie Z.T (2012) An efficient inflow generation for large-eddy simulation. *Invited seminar, University of Exeter. Mar, 2012.*
- Xie Z.T (2011) CFD for Wind Engineering. *Evening Technical Meeting. In, Wind Engineering Society and Institution of Civil Engineers. Sept 14, 2011.*
- Kim Y, Xie ZT & Castro IP (2011) Numerical study of 3-D effects on dynamic stall of a wind turbine blade. In, *Proc. 13th Int. Conf. Wind Eng. Jul 10-15, the Netherlands.*
- Kim Y, Xie ZT & Castro IP (2011) A forward stepwise method of inflow generation for LES. *Session chair. In: Recent Progresses in Fluid Dynamics Research: Proc. 6th Int. Conf. Fluid Mech. CSTAM and AIP, 137-139.*
- Xie Z.T (2010) Large-Eddy Simulation of Stratification Effects on Dispersion in Urban Environments, *Invited speaker, 9th Int. Confence Hydrodynamics Oct. 11-15, 2010 Shanghai.*
- Xie ZT, Castro IP (2010) Coupled modelling of flow and dispersion in urban environments, *5th Int. Sym. Comput. Wind Eng. (CWE2010), Chapel Hill, North Carolina, May 23-27, 2010*
- Claus JM, Xie ZT, Castro IP (2010) Wind direction effects on urban-like roughness, *5th Int. Sym. Comput. Wind Eng. (CWE2010), Chapel Hill, North Carolina, May 23-27, 2010*
- Boppa B, Xie ZT, Castro IP (2009) Large Eddy Simulation of dispersion over an array of obstacles in *Heat and Mass Transfer 6*, Eds Hanjalic K et al, Begell House Inc., New York.
- Xie ZT (2009) Modelling dispersion in full scale urban environments, *Atmos. Dispersion Forum, Sept 28, Chilton, UK.*
- Xie ZT (2009) Urban LES, *EPSRC Symposium Workshop on Computational Fluid Dynamics, Sept 1-3, Coventry, UK.*
- Xie ZT (2009) Modelling Full Scale Urban Environments, *NCAS Urban Meteorology Workshop, Mar 30-31, Reading, UK.*
- Boppa VBL, Xie ZT, Castro IP (2009) LES of dispersion of passive scalar from an area source, *NCAS Urban Meteorology Workshop, Mar 30-31, Reading, UK.*
- Castro IP, Xie ZT (2008) LES for modeling the urban environment, *ERCOFTAC Bulletin, 78, 4-10.*
- Xie ZT, Castro IP, (2008) Large-eddy simulation for flow and dispersion in urban streets, *7th EUROMECH Fluid Mechanics Conference, Sept 14-18, Manchester, UK.*
- Castro IP, Xie ZT (2008) Wind flows in non-uniform building arrays, *8th UK Conference on Wind Engineering, Jul, 2008, Guildford, UK.*
- Clause JM, Xie ZT, Castro IP (2008) Wind direction effects in urban environments: an LES study, *8th UK Conference on Wind Engineering, Jul, 2008, Guildford, UK.*
- Xie ZT, Castro IP (2007) LES for street-scale environment and its prospects, "Quality and Reliability of Large-Eddy Simulations", Springer, ERCOFTAC Series, 12, 271-282.
- Xie ZT, Castro IP (2007) Large-eddy simulation of flow and dispersion around London's Marylebone Rd region, *RMetS Conference, Sept.*
- Xie Z.T. (2007) Coupling weather scale flow with street scale computations ---large-eddy simulation of turbulence and scalar dispersion, *invited seminar, Imperial College, May.*
- Xie Z.T. (2007) Coupling weather scale flow with street scale computations ---large-eddy simulation of turbulence and scalar dispersion, *seminar, AFM group, Univ. Southampton, Mar.*
- Xie ZT, Castro IP (2006) Large-eddy simulation for combined oscillatory through-flow and steady current over roughness elements. *Invited talk. In: Workshop of Turbulence and Scalar Transport in Roughness Sublayers, NCAR, Boulder, Colorado, Sept.*
- Xie ZT, Castro IP (2006) LES for flows over an array of buildings, *UK Wind Engineering Conference, Glasgow, Sept.*
- Xie ZT, Castro IP (2006) Large-eddy simulation for urban micro-meteorology. *J. Hydrodynamics, 18(3, Supplement 1), 2006. 259-264.*

- Xie ZT (2006) Coupling weather scale flow with street scale computations, Institute of Atmospheric Physics, Chinese Academy of Science, Beijing, *invited seminar*, Aug.
- Xie ZT (2006) Coupling large-scale geophysical flow with turbulence over an array of bluff bodies, Institute of Mechanics, Chinese Academy of Science, Beijing, *invited seminar*, Jul.
- Xie ZT, Castro IP (2006) Coupling weather-scale flow with street scale computations, *Euromech Fluid Mechanics Conference – 6*, Stockholm, June.
- Xie ZT, Castro IP (2006) What can CFD approaches give us?--large eddy simulations for urban flows, *invited talk*. In 'Very High Resolution Environmental Modelling' Exploratory Workshop, Stuttgart, Sept.
- Xie ZT (2006) Urban CFD, *invited seminar*, UK Meteorological Office, Exeter, May.
- Xie ZT, Castro IP (2005) Urban boundary layer: inherent unsteadiness, inlet boundary condition and randomness of obstacles, *RMetS/UWERN Conference*, Exeter, Sept.
- Xie ZT (2005) LES for Flow over urban-like surfaces, *EUROMECH Colloquium 469*, Dresden, Germany, Oct.
- Xie ZT (2005) An efficient inlet condition generation and LES of flow over random obstacles, BL group, University of Reading, *invited seminar*. Nov.
- Xie ZT, Voke PR, Hayden P and Robins AG (2004) LES and extreme value theory: modelling the upper tail of the PDF of concentration in turbulent dispersion, *Direct and Large-Eddy Simulation-V*, Friedrich R., Geurts B.J. and Metais O. (eds), Kluwer, 323-332.
- Xie ZT (2004) Large-eddy simulation and extreme value theory--modelling concentration in turbulent dispersion, Institute of Mechanics, Chinese Academy of Science, Beijing, *invited seminar*, Jul.
- Xie ZT, Voke PR. (2004) Connectivity of concentration clouds in turbulent flows, *Recent Advances in Fluid Mechanics*, Zhuang F.G. and Li J.C. (eds), Tsinghua University Press and Springer.
- Voke PR, Xie ZT (2002) Dispersion from point sources over a rough wall: large-eddy simulation and extreme value theory predictions. In: *Advances in Turbulence*, 9, Castro I.P., Hancock P.E. and Thomas T.G.(Eds.), CIMNE, Barcelona, 609-612.
- Xie ZT, Voke PR (2002) Prediction of extreme events using large eddy simulation and extreme value theory, *invited talk*, *Workshop on High Resolution Flow Modelling*, University of Reading, Sept.
- Xie ZT, Li JC (1999) A large eddy simulation of turbulent flows over inhomogeneous underlying surface. In: *Proceedings of the 8th. Asian Congress of Fluid Mechanics*, Shenzhen, China, Dec., 846-849.
- Li JC, Xie ZT (1998) Subgrid scale models in large eddy simulation, In: *the 3rd. International Conference of Nonlinear Mechanics(ICNM-III)*, *invited lecture*, Shanghai, Aug., 75-79.
- Xie ZT, Li JC (1998) A large-eddy simulation for canopy turbulent flow, *IUTAM/IUGG Symposium on Developments in Geophysical Turbulence*, Boulder, USA, June.
- Xie ZT, Li JC (1998) Large-eddy simulation for the turbulent fluxes of atmospheric boundary-layer turbulence, In: *Proceedings of the 3rd. International Conference of Fluid Mechanics*, Beijing, BIT Press, Jul., 577-582.
- Xie ZT, Li JC et al (1997) A model of the land atmosphere interaction with canopy influence. In: *Proceedings of the 7th. Asian Congress of Fluid Mechanics*, Madras, Dec., 99-102.
- He YS, Xie ZT et al (1994) Free surface problem for a source moving in stratified Fluids. In: *Proceedings of the 1st International Conference on Flow Interaction*, Ko N.W.M. et al (eds), HongKong, Sept., 176-179.

Academic and Professional Activities , Membership of Professional Societies

Co-organised the UK Wind Engineering Conference 2012. Executive Committee member of UK Wind Engineering Society; FRMetS; member of the International Association for Urban Climate; member of Scientific Committee of the sixth European and African Conference on Wind Engineering, 2013; convener of wind in local environments session in Computational Wind Engineering Conference, Hamburg, 2014.

Research impact

Adequate provision of inlet boundary conditions for both direct numerical and large-eddy simulations (DNS and LES) of turbulent flows is both crucial and a significant challenge. Our recently developed inflow-generation approach, which is much more efficient than other alternatives, has been used by both industry and government – for example, by Arup, Buro Happold, the US Naval Research Laboratory, Ingenieurbüro Lohmeyer GmbH & Co. KG (Germany). In particular, this novel approach has now been installed and validated in CD-adapco's software as a plugin in 2011 and can thus be accessed in their current major code release, Star-CD v4.16, by any of CD-adapco's very extensive range of clients. It has also been implemented in other CFD softwares, e.g. Fluent, OpenFOAM.

Besides having been widely used by colleagues in the University of Southampton, this method has also been used by academics in many universities all over the world, e.g. Nottingham University, Imperial College and ETH Zürich.

Date: 10/2014