

**Name:**

Costantino Manes

**Date and place of birth:**

14/06/1977, Senigallia (AN), Italy.

**Nationality:**

Italian

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**Current address:** DIATI -Dipartimento di Ingegneria dell'Ambiente, del Territorio e delle Infrastrutture, Politecnico di Torino, Corso Duca degli Abruzzi, 24, 10129, Torino, Italy.

**Academic career**

*Since Nov 2015:* Associate Professor at DIATI -Dipartimento di Ingegneria dell'Ambiente, del Territorio e delle Infrastrutture, Politecnico di Torino, Torino, Italy.

*Oct 2011-Nov 2015:* Lecturer at the Faculty of Engineering and the Environment, University of Southampton, Southampton, UK,

*Oct 2008-Oct 2011:* Research Assistant at the Department of Hydraulics, Transports and Civil Infrastructures, Politecnico di Torino, Torino, Italy.

*Oct 2006-Oct 2008:* Post doc at the Federal Institute for Snow and Avalanche Research WSL/SLF, Flüelastr. Davos Switzerland.

*Oct 2002-June 2006:* PhD in Engineering at the Department of Engineering, University of Aberdeen, Aberdeen, Scotland, UK.

*March 2002:* Laurea (5 years programme) in Environmental Engineering, University of Ancona, Italy.

**Main research interests**

Turbulence in open channel flows, wave-turbulence interaction, local scouring, fish response to hydrodynamic stimuli, fish swimming efficiency in turbulent flows, water-disinfection through hydrodynamic cavitation, bubble dynamics, multiphase flows in coalescing filters, flow-induced encrustations in ureteral stents.

**Awards and grants**

Sep 2002 Member of the Italian Association ("Albo") of Civil Engineers.

2002-2005 EPSRC postgraduate scholarship.

Jan 2010 Visiting Scientist at the University of Aberdeen, Scotland, UK. In collaboration with Dr. D. Pokrajac, (£ 2,990, Royal Society, travel grant, co-applicant).

Feb 2013 Network Rail (£ 24,000, Research Project Leader). The funding comes from a research framework agreement between the University of Southampton and Network rail, PI: Prof William Powrie. In collaboration with Dr. S Clubley and Prof. D. Richards.

Nov 2013 Network Rail (budget holder and Research leader, £250,000). The funding comes from a research framework agreement between the University of Southampton and Network rail, PI: Prof William Powrie). In collaboration with Dr. S Clubley and Prof. D. Richards.

- July 2014 Visiting scientist at the Università Politecnica delle Marche. In collaboration with Prof. M. Brocchini (Campus World, € 2,000).
- Mar 2015 Fellow of the Higher Education Academy (UK).
- Nov 2015 Visiting fellow at the Faculty of Engineering and the Environment, University of Southampton, UK (3 years appointment).
- June 2016 Bill Curtin Medal for best paper in Civil Engineering 2015, awarded by the Institute of Civil Engineering, ICE publishing, UK.
- Aug 2016 Principal investigator in the Project “Attrarre docenti di alta qualità tramite Starting Grant” (€ 93,500, San Paolo Foundation).
- July 2017 Principal investigator in the Project “Metti in rete la tua ricerca” (€150,000, Principal Investigator, San Paolo Foundation).
- April 2019 Principal investigator in a research contract in collaboration with TREELIUM about hydrodynamic cavitation (€ 25,000).
- Sept 2019 Principal investigator in a research contract in collaboration with FILTERS s.p.a. about the design and optimization of coalescing filters for oil mists (€ 100,000).
- Jan 2020 Co-investigator in the ITN MSCA project “RIBES” (budget PoliTO: € 700,000)

### Teaching experience

- Currently: Coordinator of the Courses “Fluid Mechanics” and “Environmental Fluid Mechanics” as well as lecturer for the course “Hydraulics II” at Politecnico di Torino.
- 2011-2015 Lecturer and module coordinator for the following courses at the University of Southampton:
- Hydraulics (year 2, Beng/Meng in Civil and Environmental Engineering)
  - Applied Hydraulics (year 3, Beng/Meng in Civil and Environmental Engineering)
  - Hydraulic Engineering and Sediment Transport (year 4, Meng in Civil and Environmental Engineering)

Extensive experience in supervising undergraduate and master students for their final year project, in Italy, UK and Switzerland. Currently supervising 2 PhD students and 3 post-docs.

### PhDs lead to completion

Dr. Jim Kerr	University of Southampton, UK.
Dr. Sonia Taddei	University of Southampton, UK.
Dr. Ali Mosayyebi	University of Southampton, UK.
Dr. Ashley Rogers	University of Southampton, UK.
Dr. Francesco Coscarella	Università della Calabria, Italy.
Dr. Domenico Ferraro	Università della Calabria, Italy.

### Referee for

- Journal of Fluid Mechanics, Cambridge University Press, UK.
- Physics of Fluids, American Institute of Physics, US.
- Geophysical Research Letters, AGU, US.
- Acta Geophysica, Springer, Germany.
- Transport in Porous Media, Springer, Germany.
- Water Resources Research, AGU, US.
- Journal of Geophysical Research-Earth, AGU, US.
- Advances in Water Resources, Elsevier, Netherlands.
- Journal of Geophysical Research-Atmosphere, AGU, US.

- Journal of Hydrologic Engineering, ASCE, US.
- Journal of Hydraulic Engineering, ASCE, US.
- Journal of Hydraulic Research, IAHR.
- Experimental Thermal and Fluid Science, Elsevier, Netherlands.
- Engineering applications of Computational Fluid Mechanics.
- International Journal of Sediment Research, Elsevier, Netherlands.

### External Responsibilities

- Associate Editor, *Advances in Water Resources*, Elsevier, Netherlands.
- PhD committee: EPFL (Switzerland).
- PhD committee: University of Melbourne (Australia).

### Administrative roles

- Former member of the Faculty Ethics Committee, University of Southampton
- Former admission tutor, University of Southampton (responsible for the admission of undergraduate students in the Civil and Environmental Engineering programme).
- Head of the communication and public engagement team at DIATI, Politecnico di Torino

### Invited talks and seminars

- June 2011 *IUGG Meeting*, Melbourne, Australia, invited talk.
- Dec 2013 *AGU fall meeting*, San Francisco, honorary poster presentation.
- Sept 2014 *River Flow*, Lausanne, Switzerland, Chairman and oral presentation.
- Aug 2017 Summer School, *Transport Phenomena and the Limits of Life in the Biosphere*, KIT/IMK-IFU, Garmisch-Partenkirchen (Germany). Invited Lecturer.

### Languages

Fluent in English, Italian (mother tongue) and Portuguese.

### Patents

- 1) New International (PCT) Patent | Application No. PCT/GB2018/052522 | Claiming priority from UK application no. 1714337.1 | Filed 6th September 2018 | Patent Title: **Stent with streamlined side holes** | University of Southampton (inventors: **C. Manes**, D. Carugo, A. Mosayyebi).

### Publications

#### Journal papers (ISI)

- 1) Campbell, L.j., McEwan, I.K., Nikora, V.I., Pokrajac, D., Gallagher, M., **Manes C.** (2005). "Bed-Load effects on hydrodynamics of rough-bed open-channel flows." *Journal of Hydraulic Engineering*, ASCE, 131(7).
- 2) **Manes, C.**, Pokrajac D., McEwan I.K., Nikora V.I., Campbell, L.J. (2006). A new application of UVP: velocity measurements within porous media. *Journal of Hydraulic Engineering*, ASCE Volume 132, Issue 9, pp. 983-986.
- 3) Pokrajac, D., Campbell, L.J., Nikora, V.I., **Manes, C.**, McEwan I.K. (2007). Quadrant analysis of persistent spatial velocity perturbations over square-bar roughness. Vol, 42, No 3, pp 413-423. *Experiments in Fluids*.
- 4) **Manes, C.**, Pokrajac D., McEwan I.K. (2007). Double averaged open channel flows with small relative submergence. *Journal of Hydraulic Engineering*, ASCE Volume 133, Issue 8, pp. 896-904.
- 5) Pokrajac D., **Manes, C.**, McEwan I.K. (2007). Peculiar mean velocity profiles within a porous bed of an open channel, *Physics of Fluids*, **19**, 098109.

- 6) Clifton, A., **Manes, C.**, Ruedi, J.D., Guala, M., Lehning, M. (2008). On shear driven ventilation of snow, *Boundary Layer Meteorology*, Volume 126 (2), 249-261.
- 7) Loewe, H., Egli, L., Bartlett, S.J., Guala, M., **Manes, C.** (2008). On the evolution of snow roughness during snow fall, *Geophysical Research Letters*, 34 (21): Art. No. L21507.
- 8) Pokrajac, D. and **Manes, C.** (2008). The interface between turbulent flows above rough porous walls, *Acta Geophysica*, 56, (3), 824-844.
- 9) **Manes, C.**, Pokrajac D., Coceal, O., McEwan I.K. (2008). On the significance of form induced stress in rough wall turbulent boundary layers, *Acta Geophysica*, 56, (3), 845-861.
- 10) **Manes, C.**, Guala, M., Bartlett, S., Loewe, H., Lehning, M., Egli, L. (2008). Statistical properties of fresh snow roughness, *Water Resources Research*, 44(11), W11407.
- 11) Guala, M., **Manes, C.**, Clifton, A., Lehning, M. (2008). On the saltation of fresh snow in a wind tunnel: profile characterization and single particle statistics, *Journal of Geophysical Research*, 113, F03024, doi:10.1029/2007JF000975.
- 12) Pokrajac, D. and **Manes, C.** (2009). Velocity measurements of a free-surface turbulent flow penetrating a porous medium composed of uniform-size spheres, *Transport in Porous Media*, 78 (3), pp 367-383.
- 13) **Manes, C.**, Pokrajac, D., McEwan, I., Nikora, V. (2009). Turbulence structure of open channel flows over permeable and impermeable beds: a comparative study, *Physics of Fluids*, (21), 125109.
- 14) Stoessel, F, Guala, M., Fierz, C. **Manes, C.** and Lehning, M. (2010). Micrometeorological and morphological observations of surface hoar dynamics on a mountain snow cover. *Water Resources Research*, 46, 4.
- 15) Boano F., **Manes, C.**, Poggi, D., Revelli, R., Ridolfi, L. (2010). Comment on “Porewater flow due to near-bed turbulence and associated solute transfer in a stream or lake sediment bed”, by M. Higashino et al., *Water Resources Research*, 46, W10801.
- 16) **Manes, C.**, Poggi, D., Pokrajac, D., Nikora, V., Ridolfi, L. (2011). Turbulent friction in flows over permeable walls, *Geophysical Research Letters*, 38, L03402.
- 17) Gromke, C., **Manes, C.**, Walter B., Lehning, M., Guala, M. (2011). The aerodynamic roughness length of fresh snow, *Boundary Layer Meteorology*, 141(1), pp 21-34.
- 18) **Manes, C.**, Poggi, D., Ridolfi L. (2011). Turbulent boundary layers over permeable walls: scaling and near wall structure, *Journal of Fluid Mechanics*, 687, 141-170.
- 19) Mott, R., Egli, L., Grünewald, T., Dawes, N., **Manes, C.**, Bavay M., Lehning, M. (2011). Micrometeorological processes driving snow ablation in an Alpine catchment, *The Cryosphere*, 5, 2159–2196.
- 20) Walter, B., Gromke, C., Leonard, K., **Manes, C.**, Lehning, M. (2012). Spatio-temporal surface shear stress variations in live plant canopies and cube arrays of different density, *Boundary Layer Meteorology*, 143, 337-356.
- 21) **Manes, C.**, Ridolfi, L., Katul, G. (2012). A phenomenological model to describe turbulent friction in permeable-wall flows, *Geophysical Research Letters*, 39, 14.
- 22) Fontan, S., Katul, G.G., Poggi, D., **Manes, C.**, Ridolfi, L. (2013). Flume experiments on turbulent flows across gaps of permeable and impermeable boundaries, *Boundary Layer Meteorology*, 147(1), 21-39.
- 23) Camporeale, C., Mantelli, E., **Manes C.**, (2013). Interplay among unstable modes in films over permeable walls, *Journal of Fluid Mechanics*, Vol. 719, pp. 527\_550.

- 24) Maggiolo, D., **Manes, C.**, Marion, A., (2013), Momentum transport and laminar friction in rough-wall duct flows, *Physics of Fluids*, 25, 093603.
- 25) Katul, G.G., Porporato, A., **Manes, C.** and Meneveau C., (2013). Co-spectrum and mean velocity in turbulent boundary layers. *Physics of Fluids*, 25, 091702.
- 26) Katul, G.G. and **Manes, C.** (2014). A co-spectral budget of turbulence explains the bulk properties of smooth pipe flow, *Physical Review E*, 90, (6), 063008.
- 27) Clubley, Simon K., **Manes, C.** and Richards, D.J. (2014). Bridge scour measurement using high resolution sonars. *ICE Proceedings Civil Engineering*. ICE Proceedings Civil Engineering, 168, (CE1) (doi:10.1680/cien.14.00033).
- 27) **Manes, C.** and Brocchini, M. (2015). Local scour around structures and the phenomenology of turbulence. *Journal of Fluid Mechanics*, Vol. 779, pp 309-324.
- 28) Piper, A., **Manes, C.**, Siniscalchi, F., Marion, Wright, R.M., Kemp, P.S. (2015). Response of seaward migrating European eel (*Anguilla Anguilla*) to manipulated flow fields. *Proceedings of the Royal Society B*, B282 (1811), 20151098.
- 29) Katul, G.G., **Manes, C.** Porporato, A., Bou-Zeid, E., Chamecki, M. (2015). Bottlenecks in turbulent kinetic energy spectra predicted from the Von Karman Howarth Equation, *Physical Review E*, 92(3), 033009.
- 30) Taddei, S., **Manes, C.** and Ganapathisubramani, B. (2016). Characterisation of drag and wake properties of canopy patches immersed in turbulent boundary layers, *Journal of Fluid Mechanics*, Vol. 798, pp 27-29.
- 31) Kerr, J.R., **Manes, C.**, Kemp, J.S. (2016). Assessing hydrodynamic space use of brown trout, *Salmo trutta*, in a complex flow environment: A return to first principles, *Journal of Experimental Biology*, 1-27, doi: 10.1242/jeb.134775.
- 32) Bonetti, S., Manoli, G., **Manes, C.**, Porporato, A., Katul, G.G. (2017). Manning's formula explained by a co-spectral budget for the turbulent stress in the roughness sublayer, *Journal of Fluid Mechanics*, vol. 812, pp. 1189-1212.
- 33) Mosayyebi A, Vijayakumar A, Yue Qi Y, Bres-Niewada E, **Manes C**, Carugo, D., Bhaskar K. Somani (2017). Engineering solutions to ureteral stents: Material, Coating and Design. *Central European Journal of Urology* 2017; doi: 10.5173/ceju.2017.1520.
- 34) Tubaldi, E., Macorini L., Iuzzudin B., **Manes, C.** and Laio, F. (2017). Probabilistic assessment of scour risk for bridge piers, *Structural Safety*, 69, 11-22.
- 35) A Mosayyebi, BK Somani, X Zhang, **C Manes**, D Carugo (2017). Accumulation of stent encrustations depends on Fluid Dynamics: in-vitro study on a stent-on-a-chip model, *European Urology Supplements* 16 (7), e2520.
- 36) Mosayyebi A., **Manes C.**, Carugo D., Bhaskar K Somani (2018). Advances in Ureteral Stent Design and Materials, *Current Urology Reports*, 19 (5) 35.
- 37) Mosayyebi A., Yue QY., Somani BK., Zhang X., **C Manes**, Carugo D. (2018). Particle accumulation in ureteric stents is governed by fluid dynamics: in-vitro study using a 'stent-on chip' model. *Journal of Endourology*, 32 (7).
- 38) Matakchiera F., **Manes C.**, Beaven RP., Rees-White TC., Boano F., Mønster J., Scheutz C. (2019). AERMOD as a Gaussian dispersion model for planning tracer gas dispersion tests for landfill methane emission quantification, *Waste Management*, 87, pages 924-936.
- 39) Katul, G.G., Li, D. & **Manes C.** (2019) A primer on turbulence in hydrology and hydraulics: the power of dimensional analysis, *WIRES Water*, 6(2).

- 40) Mosayyebi A., Lange D., Yue QY, Somani BK, Zhang, X., **Manes C.**, Carugo, D. (2019). Reducing deposition of encrustation in ureteric stents by changing the stent architecture: a microfluidic-based investigation, *Biomicrofluidics*, 13, 1.
- 41) Rogers, A., **Manes, C.** & Tsuzaki, T (2019). Measuring the geometry of a developing scour hole in clear-water conditions using underwater sonar scanning, *International Journal of Sediment Research*, 35 (1).
- 42) Burzio, E. Vesipa, R., Caridi, G. Bersani F., Ridolfi, L. and **Manes C.** (2020). Water disinfection by orifice-induced hydrodynamic cavitation 60, *Ultrasonics-Sonochemistry*.
- 43) Coscarella, F., Gaudio R. and **Manes C.** (2020). Near-bed eddy scales and clear-water local scouring around vertical cylinders, *Journal of Hydraulic Research*, in press.
- 44) Nicolai, C., Taddei, S., **Manes, C.** & Ganapathisubramani, B. (2020). Wakes of wall-bounded turbulent flows past patches of circular cylinders, *Journal of Fluid Mechanics*, vol 892.
- 45) Peruzzi, C., Poggi, D., Ridolfi, L. and **Manes C.** (2020). Large scale turbulence structures in smooth-bed open channel flows, *Journal of Fluid Mechanics*, vol 889.
- 46) De Bie J., **Manes, C.**, Kemp, P. (2020). Collective behaviour of fish in the presence and absence of flow, *Animal Behaviour*, in press.
- 47) Veza P., Libardoni F., **Manes C.**, Tsuzaki T., Bertoldi W., Kemp P.S. Influence of near-bottom velocity and water temperature on the glass eel swimming performance, *Scientific Reports (in revision)*.
- 48) Camporeale, C., Canuto, C., **Manes, C.** Stability analysis of open channel flows with secondary currents (*submitted*).
- 49) Cantero-Chinchilla F.N., De Almeida G.A.M. & **Manes C.** Temporal evolution of local scour at bridge piers with flow-dependent debris accumulations (*submitted*).
- 50) Starnoni, M & **Manes, C.** A multiphase multicomponent flow and transport model for liquid aerosol filtration in coalescing filters (*submitted*).

### **In preparation**

- Coscarella, F., Gaudio, R., Katul, GG & **Manes, C.** Refining the link between spectra and flow resistance scaling laws via a co-spectral approach.
- Vesipa, R., Paissoni, E., **Manes, C.** and Ridolfi, L. bubbles' dynamics in a stochastic pressure field.
- Caridi, G., Vesipa, R., Ridolfi, L. and **Manes, C.** Effects of hydrodynamic cavitation on the flow field downstream of thick orifice plates.
- Peruzzi, C. Vettori, D., Poggi, D., Ridolfi, L. & **Manes C.** Turbulence scaling and structure in shallow currents perturbed by collinear waves.

## Conference proceedings

- Pokrajac, D., Campbell, L.J., **Manes, C.**, Nikora, V.I. and McEwan, I.K., (2003). Spatially averaged flow over ribbed roughness: a new application of quadrant analysis. *XXX IHAR congress, Greece 2003*.
- Pokrajac D., Finnigan, J.J., **Manes, C.**, McEwan I.K., Nikora V.I., (2006). “On the definition of shear velocity in rough bed open channel flows”. *River flow congress, Lisbon 2006*.
- Manes, C.**, Pokrajac, D., (2008). Influence of bed permeability on the resistance of rough turbulent open channel flows”. *River Flow Congress, Ankara 2008*.
- Gromke C., Guala, M., **Manes, C.**, Walter, B., Lehning, M., (2009). Aerodynamic and surface characteristic length scales of snow covered flat planes”. *ISSW Europe 2009: International Snow Science Workshop Proceedings*.
- Pokrajac, D. and **Manes C.**, (2010). “Components of the spatially-averaged turbulent stress in open channel flows over rough beds”, *River Flow Congress, Braunschweig 2010*.
- Manes, C.** (2014). Clear water scouring and the phenomenological theory of turbulence, *River Flow Congress, Lausanne 2014*.
- Coscarella, F., **Manes C.**, Gaudio, R. (2018). Local scour around long vertical wall abutment and the phenomenology of turbulence. *IAHR conference, Trento, 2018*.
- Manes. C.** Quaranta E., Revelli, R., Kemp, P. and Comoglio, C. (2018). On the drag coefficient of vegetation patches, *Convegno Nazionale di Idraulica e Costruzioni Idrauliche, Ancona, 2018*.
- Manes, C.**, Coscarella, F., Rogers, A., Gaudio R., (2018). Viscosity effects on local scour around vertical structures in clear-water conditions. *River Flow Congress, Lyon, 2018*.

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