

Resume: Bendiks Jan Boersma May 2005

Personal details

Title(s), initial(s), first name, surname	dr.ir. B.J., Bendiks Boersma,
Male/female:	male
Date and place of birth	21 january 1969, IJlst, The Netherlands
Nationality :	Dutch

Master's

University/College of Higher Education:	University of Twente, Enschede, The Netherlands
Date:	21 May, 1993.
Main Subject:	Hydrodynamics instability

Doctorate

University/College of Higher Education:	Delft University of Technology
Date:	19-december -1997
Supervisor:	Prof.dr. ir. F.T.M. Nieuwstadt & Prof. dr. F.C. Schüller
Title of Thesis :	Electromagnetic effects in turbulent pipe flow

Work experience since graduating

01-08-95 – 01-09-95	Visiting researcher, ICASE, NASA Langley VA, USA.
01-09-97 – 20-09-99	Post-doc Center for Turbulence Research, Stanford University, Stanford CA, USA. Subject: Direct and Large Eddy simulation of complex turbulent flows.
01-01-99 – 31-12-03	KNAW Fellow, Laboratory for Aero and Hydrodynamics, Delft University of Technology, Computational Aero Acoustics , The Netherlands
01-09-03–present	Associate professor, Fluid mechanics, Delft University of Technology, The Netherlands
01-07-00 – 01-08-00	Visiting scientist, CTR/NASA-Ames Research center, Moffett Field CA, USA
01-08-02 – 01-09-02	Visiting scientist, NASA-Ames Research center, Moffett Field CA, USA
01-08-04 – 01-09-04	Visiting scientist, Flow Physics and Computation division, Stanford CA, USA

Brief summary of research over the years

After my Phd I have been working on the numerical simulation of turbulent flows at the Center for Turbulence Research of the Stanford University and in Delft. I have been involved in combustion research: the development of low Mach number models for combustion. Numerical investigations of the mixing properties in turbulent jets and aeroacoustics.

In 1998 a "KNAW akademieonderzoeker" scholarship was awarded to me. This gave me the opportunity to go back to Delft. In 2000 I have applied for a grant from the NWO-EW Computational Science program. This project with title: *Computation of multiphase flows by a Finite difference/Front tracking method* was granted and now three Phd students are working on this project. In this project we simulate a mixture of two different fluids by tracking the interfaces between the fluids. As first applicant I am strongly involved in this research project.

In 2003 a VIDI grant was awarded to me. The title of the proposal is: Measurement and computation of sound generated by turbulent flows. Currently two Phd students are working on this project.

In 2003 I also got funds from the the FOM turbulence program to construct a pressure vessel for turbulence measurements at a large range of Reynolds numbers. The project title is: A low/high pressure vessel for turbulence measurements at a large range of Reynolds numbers.

Apart from the specific projects given above, I am also involved in other projects in the field of combustion and turbulent drag reduction.

International activities

I was editor of the September 2003 issue of the Ercoftac (European Turbulence Community) newsletter which is devoted to computational aeroacoustics, and I am the leader of the Ercoftac Special Interest group on Aeroacoustics.

Other academic activities

I have been a member of the Phd committee of: dr.ir. T.C. Treurniet (2003) and dr.ir. A.J. Vrieling (2003).

I have been "toegevoegd promotor" for: dr.ir. I. Gavarini (2004) and dr.ir. W.P. Breugem (2005) both Phd's *Cum Laude*

I am a member of the program committee of Computational Science program of NWO/EW.

Teaching activities

Since January 2001 I am teaching Computational Fluid Dynamics (a fourth year course in the mechanical engineering faculty).

Since January 2005 I am teaching the Turbulence course at TU-Delft (a fourth year course in the mechanical engineering faculty).

Scholarships and prizes

- 1998, KNAW-akademieonderzoeker, research funding for 5 years
- 2003, NWO/STW-VIDI: Measurement and computation of sound generated by turbulent flows (650 kEuro)

Publications

Thesis

Boersma, B.J., 1997, Electromagnetic effects in cylindrical pipe flow, *Phd Thesis*, Delft University of Technology, The Netherlands.

Refereed and published journal papers

- R. Miesen, & B.J. Boersma, 1995, The hydrodynamic stability of a sheared liquid film, *J. Fluid Mech.*, **301**, 175-202.
- B.J.Boersma, & F.T.M. Nieuwstadt, 1996, Large eddy simulation of turbulent flow in a curved pipe. *J. Fluids Eng.*, **118**, 248-254.
- P. Boomkamp, B.J.Boersma, R. Miesen & G. Beijnon, 1997, A Chebyshev collocation Method for Solving Two-Phase Flow Stability Problems, *J. of Comp. Phys.*, **132**, 191-200.
- B.J. Boersma, M.N. Kooper, F.T.M. Nieuwstadt, & P. Wesseling, 1997, Local Grid Refinement in Large Eddy Simulations *J. Eng. Math.* **32**, 161-175.
- B.J. Boersma, G. Brethouwer, & F.T.M. Nieuwstadt, 1998, A numerical investigation on the effect of the inflow conditions on the self-similar region of a round jet, *Phys of Fluids*, **10**, 899-909.
- B. van Haarlem, B.J. Boersma, & F.T.M. Nieuwstadt, 1998, Direct Numerical Simulation of particle deposition onto a free-slip and no-slip surface, *Phys. of Fluids*, , **10**, 2608-2620.
- G. Brethouwer, B.J. Boersma, M.J.B.M. Pourquié & F.T.M. Nieuwstadt, 1999, Direct numerical simulation of turbulent mixing, *Eur. J. of Mech: B/Fluids*, **18**, 739-756.
- B.J. Boersma, & F.T.M. Nieuwstadt, 1999, On the electric potential induced by a magnetic field in a pipe flow, *Flow, Turbulence and Combustion*, **62**, 29-51.
- B.J. Boersma, 1999, Entrainment Boundary conditions for Free Shear Flows, *Int. J. Comp. Fluid Dyn*, **13**, 375-383.
- C.L. Lubbers, G. Brethouwer, & B.J. Boersma, 1999, Simulation of the mixing of a passive scalar in a free round turbulent jet. *Fluid dyn. Res.*, **28**, 189-208.
- C. Wall, B.J. Boersma & P. Moin, 1999, An evaluation of the assumed beta PDF subgrid scale model for LES of non-premixed, turbulent combustion with heat release, *Phys of Fluids*, **12**, 2522-2529.
- P. Wilders, B.J. Boersma, J.J. Derksen, A.W. Heemink, B. Niceno, M. Pourquie & C. Vuik, 2001, Parallel computational fluid dynamics at Delft University of Technology: some examples, *Flow Turb. & Comb.* **50**, 40-47.
- I. Danaila, & B.J. Boersma, 2000, Direct numerical simulation of bifurcating jets, *Phys of Fluids*, **12** 1255-1257.
- A. Hilgers, & B.J. Boersma, 2001, Optimization of jet mixing, *Fluid Dyn. Res.*, **29**, 345-368.
- B.J. Boersma, 2001, Large Eddy Simulation of compressible turbulent jets, In: Modern Simulation Strategies for Turbulent flow, ed B.J. Geurts, Edwards Inc., USA.
- P. Patsinski, B.J. Boersma, B.H.A. van den Brule, J.C.R. Hunt & F.T.M. Nieuwstadt, 2003, Turbulent channel flow near maximum drag reduction simulations, experiments and mechanisms, *J. of Fluid Mech.*, **490**, 251-291.
- A. Agrawal, B.J. Boersma & A. Prasad, 2004, Effect of strong off-source acceleration on a turbulent axisymmetric jet, *Flow Turb. & Comb.* **73**, 277-305.
- B.J. Boersma, 2004, Large Eddy Simulation of the sound field of a round turbulent jet *Theoretical and Computational Fluid Mechanics* (online).
- B.J. Boersma, 2004, Numerical simulation of the noise generated by a low Mach number, low Reynolds number jet, *Fluid dynamics research*, **35**, 425-447.
- C. Moulinec, B.J. Boersma, M.J.B.M. Pourquie, T. Buchal, & F.T.M. Nieuwstadt, 2004, Direct numerical simulation on a cartesian mesh of the flow through a tube bundle, *Int. J. of Comp.*

Fluid Dyn., **18** 1-14.

W.P. Breugem, B.J. Boersma & R. Uittenbogaard, 2005, The laminar boundary layer over a permeable wall, *Trans. Porous Med.*, **59**, 267-300.

T. Treurniet, F.T.M. Nieuwstadt & B.J. Boersma, 2005 Direct Numerical Simulation of Premixed Combustion in Homogeneous Turbulence at low Mach number, *accepted for publication in J. of Fluid Mech.*

W.P. Breugem & B.J. Boersma, 2005, Direct Numerical Simulation of turbulent flow over a permeable wall using a direct and a continuum approach, *Phys. of Fluids*, **17**, 2005.

B.J. Boersma, 2005, A staggered compact finite difference approach for the Compressible Navier-Stokes equations, Accepted in : *J. of Comp. Phys* (already online).

Papers in conference proceedings

B.J. Boersma, J.G.M. Eggels, M.J.B.M. Pourquié & F.T.M. Nieuwstadt, 1994, Large-Eddy simulation applied to an electromagnetic flowmeter, *In proceedings of the first Ercoftac workshop on DNS and LES simulation*, Kluwer, Dordrecht.

B.J. Boersma, & F.T.M. Nieuwstadt, 1995, Direct numerical simulation of turbulent flow in an axially rotating pipe, *Book of Abstracts 336th Euromech Colloquium on Flows Dominated by Centrifugal and Coriolis Forces*, Trondheim, Norway.

B.J. Boersma, & F.T.M. Nieuwstadt, 1995, *Large Eddy Simulation of Turbulent flow in a curved pipe* Paper presented at: *The 10th symposium on Turbulent Shear Flows*, Pennsylvania, USA.

B.J. Boersma, L.J.P. Timmermans, & F.T.M. Nieuwstadt, 1995, Large-eddy simulation past a square cylinder, *Proceedings of: Workshop on Large-Eddy Simulation past bluff bodies*, Tegnsee, Germany.

B.J. Boersma, & F.T.M. Nieuwstadt, 1996, Direct Numerical Simulation of the flow in a curved pipe, *Proceedings of the 3rd International Symposium on Engineering Turbulence Modelling and Measurements*, Elsevier, Amsterdam.

B.J. Boersma, & F.T.M. Nieuwstadt 1996, Non-unique solutions in turbulent curved pipe flow, *Proceedings of the second Ercoftac workshop on DNS and LES simulation*, Kluwer, Dordrecht.

B.J. Boersma, & F.T.M. Nieuwstadt, 1997, Direct numerical simulation of a round turbulent jet, *Presented at: Workshop on DNS and LES of Complex flow*, University of Twente.

P. Moin, B.J.Boersma, J.B. Freund., A.G. Kravchenko & C.D. Pierce, 1998, Turbulence Simulations on parallel computers, *International Symposium on parallel CFD*, Taiwan.

I. Danaila, & B.J. Boersma, 1998, Mode interaction in a forced homogeneous jet at low Reynolds numbers, *Proceedings of the 7th CTR summer program*, Stanford CA.

B.J. Boersma, 1998, Direct Simulation of a jet diffusion flame, *CTR Annual research briefs*, Stanford CA.

B.J.Boersma,2000, Particle distributions in the flow over a wavy wall, *Proceedings of the CTR Summerprogram*.

Boersma, B.J. & S.K. Lele, 1999, Large Eddy Simulation of a Mach 0.9 turbulent jet , *AIAA paper* 99-1874.

B.J. Boersma, 2001, Direct Numerical Simulation of jet noise, *DNS/LES Progress and Challenges*, 589-596, Greydon Press, USA.

Vrieling, A.J., B.J. Boersma & F.T.M. Nieuwstadt, 2001, Numerical simulation of turbulent re-

- acting flow, In: Proceedings of the 4th workshop on Direct and Large Eddy Simulation, Kluwer.
- Moulinec, C., M.B.J.M. Pourquie, B.J. Boersma & F.T.M. Nieuwstadt, 2001, Diagonal Cartesian methods on staggered grids for a DNS in a tube bundle, In: Proceedings of the 4th workshop on Direct and Large Eddy Simulation, Kluwer.
- Treurniet, T.C., B.J. Boersma & F.T.M. Nieuwstadt, 2001, A numerical simulation of the influence of turbulence on premixed combustion, In: Proceedings of the 4th workshop on Direct and Large Eddy Simulation, Kluwer.
- B.J. Boersma, 2002, DNS of the acoustic field of a circular heated turbulent jet, *ETMM* 5, 709-718, Elsevier, Amsterdam.
- Coyajee, E. & B.J. Boersma, 2004, DNS of the flow around a cylinder using an immersed boundary method, Proc. 5th Int. Workshop DNS/LES, 573-580, Kluwer.
- B.J. Boersma, 2004, Direct numerical simulation of the acoustic field of a turbulent offset jet, Proc. 5th Int. Workshop DNS/LES, 439-448, Kluwer.
- W.P. Breugem & B.J. Boersma, 2004, Turbulent channel flow over a permeable wall, Proc. 5th Int. Workshop DNS/LES, 501-508, Kluwer.
- W.P. Breugem, B.J. Boersma, & R.E. Uittenbogaard, 2004, DNS of turbulent channel flow over a 3D cartesian grid of cubes, In: *10th European Turbulence Conference*, 285-288, CIMNE, Spain E.
- Stalio, W.P. Breugem, & B.J. Boersma, 2004, Numerical study of turbulent heat transfer above a porous wall, In: Applications of porous media, In Reis, AH & Miguel, AF (Ed.), Applications of porous media. (pp. 191-198). vora: vora Geophysics Center.
- W.P. Breugem, B.J. Boersma & R.E. Uittenbogaard, 2004, Direct numerical simulations of plane channel flow over a 3D Cartesian grid of cubes. In Reis, AH & Miguel, AF (Ed.), Applications of porous media. (pp. 27-35). vora: vora Geophysics Center.