

## Curriculum Vitae of Johan Padding

### Personal details

Name: Dr J.T. (Johan) Padding  
Gender: Male  
Date of birth: 20<sup>th</sup> July 1975  
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### Education

- 1993 – 1998 MSc Applied Physics at University of Twente, Netherlands. Graduated Summa Cum Laude in Sept. 1998, highest average grades since the foundation of Applied Physics at the UT in 1968.
- 1997 Four month internship at Ångström Laboratory, Uppsala Universitet, Sweden (quantum chemistry).
- 1998 – 2003 PhD research on *Viscoelasticity of polymer melts: coarse-grained simulations* in the Chemical Physics group at the University of Twente, Netherlands. PhD degree obtained Summa Cum Laude on January 24, 2003 (Promotor: Prof. W.J. Briels).

### Academic Career

- 2003 – 2006 Three year fellowship at University of Cambridge, United Kingdom, developing *hydrodynamic and multi-particle collision models for colloidal suspensions* (0.4 fte).
- 2003 – 2006 Consultant at Schlumberger Cambridge Research, United Kingdom, focussing on *viscoelasticity of wormlike micellar solutions and asphaltene aggregation / deposition* (0.6 fte).
- 2006 – 2010 Postdoc on a prestigious personal VENI grant at University of Twente, The Netherlands, focussing on *hydrodynamics of fiber networks and solid-fluid drag on rod-particles near walls* (1.0 fte).
- 2010 – 2011 Postdoc (EU FP7 collaborative project ‘Modify’) at Université de Louvain, Belgium, on *multiscale modelling & experiments of the flow behaviour of pressure sensitive adhesives* (1.0 fte).
- 2011 – 2016 Tenure-track Assistant (later Associate) Professor in Multiscale Modelling of Multiphase Flows at Eindhoven University of Technology, The Netherlands. Leading PhD projects on *gas-solid flows, direct simulation monte carlo of droplets in turbulent flows, models for triboelectrification, dissipative granular flows, kinetic theory of granular flow of frictional particles* (1.0 fte).
- 2016 – present Associate Professor in Process & Energy department at Delft University of Technology. Leading projects on *multiscale modelling of fluidization of non-spherical particles (application: biomass conversion), non-Newtonian fluid flows through porous media (application: enhanced oil recovery), multicomponent flows in micro-structured reactors (application: heterogeneous catalysis, electrolysis), packing, flow and heat-transfer in columns with non-spherical particles (application: packed bed reactors), and drying of multi-component dispersion droplets (application: spray drying)*.

## University teaching profile

### *Bachelor courses*

- Process Engineering & Thermodynamics (TUD Bachelor course, course coordinator and teacher)
- Physical Transport Phenomena (TU/e Bachelor course, responsible teacher)
- Introduction to Modelling (TU/e Bachelor course, developer, co-teacher)
- Introduction to Chemical Engineering and Chemistry (TU/e Bachelor course, tutorials)

### *Master courses*

- Thermodynamics and Statistical Physics (UT Master course, developer, responsible teacher)
- Soft Matter (UT Master course, developer, responsible teacher)
- Particle-based Simulations (TU/e Master course, developer, responsible teacher)
- Advanced Computational Fluid and Plasma Dynamics (TU/e Master course, co-teacher)

### *PhD/PdEng courses*

- Theory of Polymer Dynamics (PhD course, developer, responsible teacher)
- Statistical Mechanics of Liquids (PhD course, developer, responsible teacher)
- Particle-based Modelling Techniques (JMBC PhD course, developer, co-teacher)
- Numerical Methods for Chemical Engineers (OSPT PhD course, co-teacher)
- Multiphase Computational Fluid Dynamics (OSPT PhD course, co-teacher)

### **Guided MSc projects**

1. Leon van Heijkamp (UT), Molecular Dynamics simulations of the viscosity of n-alkanes.
2. Alex Wilber (U Cambridge), Sedimentation of aggregating solids in a fluid.
3. Ainsley Mayhew Seers (U Cambridge), Theoretical aspects of Stochastic Rotation Dynamics.
4. Merijn Buyst (TU/e), 3D-PTV of granular chute flow.
5. Niek Steendijk (TU/e), Theory for the effect of salinity on the rheology of polyelectrolyte solutions.
6. Geert Eikelboom (TU/e), GPU-optimized Stochastic Rotation Dynamics simulations.
7. Filip Henrikson (U Lund, visiting TU/e), High-speed camera expts. of particle-droplet collisions.
8. Pavithra Jayaprakash (TU/e), 3D-Magnetic Particle Tracking of non-spherical particle fluidization.
9. Leander Boersma (TU/e), Quasi-2D PIV/DIA of non-spherical particle fluidization.
10. Jan Willem Oortwijn (TU/e), Dynamics of a gas bubble in a viscoelastic fluid (expt. & theory).
11. Pradyumna Krishnan (TU/e), Viscoelastic flooding of oil from microfluidic pillared arrays.
12. Junaid Mehmood (TUD), Study of rheological behavior of suspension of rod-like particles via coupled CFD-DEM simulations.

### **Guided PDEng projects**

1. Maryam Shazad (Janssen Pharmaceutica, Beerse): crystallisation modelling and expts.
2. Iria Kaperoni (Shell Technology Center Amsterdam): classified project.
3. Yulyanna Carrasco Febres (Unilever, Vlaardingem): butter crystallisation modelling.
4. Alessandro Lopez Perez (Shell Technology Center Amsterdam): classified project.
5. Amin Ahmadzadeh (Unilever, Vlaardingem): granulation of food powder products.

## Guided PhD projects

1. Jimaan Sane (U Cambridge), Taylor dispersion of colloidal particles in microchannel flow.
2. Peter Kindt (UT), Coarse-grained simulations of entangled polymer melts.
3. Albert van der Noort (UT, Unilever), Coarse-grained simulations of core-shell particles.
4. Yuguo Tao (UT), Dynamics of rigid rod suspensions.
5. Amol Thakre (UT), Fluid-fluid phase separation and hydrodynamic instabilities
6. Igor Santos de Oliveira (UT), Flow-induced ordering of hard particles in viscoelastic fluids.
7. Li Liu (UT), Coarse-graining complex polymer architectures.
8. Daniel Reid (RU Groningen), Collective effects in high-Reynoldsnumber swimming organisms.
9. Kristina Milinkovic (U Utrecht), Hydrodynamics of sedimenting bidisperse mixtures of spheres.
10. Vikrant Verma (TU/e), Two-Fluid Model in cylindrical coordinates for fluidized gas-solid flows.
11. Sushil Shirsath (TU/e, Tata Steel), segregation of granular particles in rotating chute flows.
12. Sandip Pawar (TU/e, TetraPak), expts. & Direct Simulation Monte Carlo modelling of spray drying.
13. Yupeng Xu (TU/e), dynamics of large intruders impacting granular beds.
14. Martin Korevaar (TU/e), triboelectric charging of particles in long narrow ducts for dry separation.
15. Luuk Seelen (TU/e), dynamics of granular systems of non-spherical particles.
16. Lei Yang (TU/e), kinetic theory of granular flow for rough frictional spheres.
17. Shauvik De (TU/e, Shell), viscoelastic flow through porous media for enhanced oil recovery.
18. Rohit Maitri (TU/e, Shell), sedimentation and resuspension in solid-liquid flows.
19. Sathish Sanjeevi (TUD), hydrodynamic forces on non-spherical particles (Lattice Boltzmann).
20. Giulia Finotello (TU/e, TetraPak), modelling & expts. of droplet-droplet collisions for spray drying.
21. Maxim Masterov (TU/e), highly parallelizable CFD methods for dense bubbly flows.
22. Satish Kamath (TU/e), Direct Simulation Monte Carlo methods applied to dense bubbly flows.
23. Harshil Patel (TU/e, Shell), Lagrangian Voronoi-cell-based methods for CFD applications.
24. Vinay Mahajan (TUD), Wall effects on the orientation dynamics of non-spherical fluidized particles.
25. Ivan Mema (TUD), Effect of aspect ratio on the dynamics of non-spherical fluidized particles.
26. Aditya Sengar (TU/e), Advection-diffusion-reaction mechanisms near corrugated walls.
27. Giulia Fiorucci (U Utrecht), Effect of hydrodynamics on confined colloidal crystallization dynamics.
28. Elyas Moghaddam (TUD), Packing, flow and heat transfer in packed beds with non-spherical particles.
29. Rong Fan (TUD), Multicomponent transport in micro-structured reactors.
30. Stephan Snejders (TUD), drying of multicomponent dispersion droplets.

I am or have been co-promotor of all PhD students except 1, 4-9, and 27.

## Funding ID

Project title	Applicants	My role in this proposal	Funding agency	Date of granting	Positions
Viscoelasticity of wormlike micellar solutions	<u>Padding</u>	Written full proposal	EPSRC (UK)	02/2003	1
Microrheology of cell membranes and the cytoskeleton ( <b>VENI</b> )	<u>Padding</u>	Written full proposal, defended in interview	NWO (NL)	12/2005	1
Directed and Controlled Self-Assembly of nano-Colloids	6 universities / institutes	Written sections pertaining to UT	FP7 (EU)	02/2008	2 for UT
Dynamics of Architecturally Complex Polymers (Dynacop)	12 universities / companies	Written sections pertaining to UT, financial negotiations	FP7 (EU)	11/2008	1 for UT
Nanomechanical Characterization of supramolecular protein structures using AFM	Bennink / <u>Padding</u>	Written full proposal, defended in interview	FOM-DPI (NL)	05/2009	2
Manufacturing techniques of organic solar cells (Energy Research grant – Long term)	ECN Petten / UT / Fujifilm	Written sections pertaining to UT	Agentschap NL (NL)	07/2010	1 for UT
ESMI: European Facilities for Soft Matter Technologies	12 universities / institutions	Written sections pertaining to UT, financial negotiations	FP7 (EU)	01/2011	1 for UT
Viscoelastic flow simulations of polymer flooding	<u>Padding</u> / Peters	Written full proposal	FOM-Shell(NL)	12/2012	1
Simulation of proppant transport for shale gas production	Peters / <u>Padding</u>	Written full proposal	FOM-Shell(NL)	10/2013	1
Multiscale modelling of dense gas-fluidized flows of non-spherical particles ( <b>ERC-CoG</b> )	<u>Padding</u>	Written full proposal	ERC CoG (EU)	11/2013	8
Flow structure formation and evolution of GLS reactive flows	<u>Padding</u> / Kuipers / Lohse / Sun	Written full proposal	NWO	11/2014	1
Influence of wall corrugation on mass transfer in catalytic reactors	<u>Padding</u> / Kuipers / Van Santen	Written full proposal	NWO	11/2014	1
Hydrodynamics and interaction of self-assembly in droplet environment	Dijkstra / Filion / <u>Padding</u>	Written sections pertaining to TU/e	NWO	11/2014	1
Interfacial dynamics in multiphase flow through pores	Peters / <u>Padding</u>	Written full proposal	FOM-Shell(NL)	12/2014	1
Toepassing pyrolyse olie in een gemodificeerde dieselmotor	3 companies and TU/e	Written sections pertaining to TU/e	EZ (TKI)	12/2015	1 for TU/e
Drying of multi-components dispersion droplets	TUD, WUR, 3 companies	Written sections pertaining to TUD	TTW-OTP	03/2017	2 for TUD
Multicomponent transport in micro-structured reactors	Fan / <u>Padding</u>	Written full proposal	CSC	05/2017	1

Total funding obtained through external grants (counting local positions in collaborative projects): 6.5 M€.

## Research focus and recognition of scientific contributions

I have a long-time research focus on development of novel simulation models for complex flow problems, including validating experiments, with emphasis on non-Newtonian fluids and non-trivial particles (non-spherical, charged, attractive, viscoelastic).

My research is multiscale, ranging from molecular to granular, as well as interdisciplinary, connecting areas of physics, chemistry, and (process) engineering. The most important contributions include (acknowledging collaborators in parentheses):

1. Systematic coarse-graining of interactions in polymer melts and wormlike micelles. The innovative method and algorithm for topology (entanglement) conservation are well-cited: 179 and 120 times for the two main papers. The work has led to an invited review paper and invited presentations at the International Liquid Matter conference (The Netherlands and Sweden), International Soft Matter Days (Germany), and the International Congress on Rheology (USA). (Briels, Boek)
2. Reintroduction of memory effects (transient forces) in super-coarse-grained particles. Several papers appeared, one of which (2009) has been cited 33 times. In all cases the results are quantitatively validated against experimental results. Invited presentations at De Gennes Discussion Conference (France) and International Soft Matter Days (Germany). (Briels, Sprakel, Bailly)
3. Coarse-graining of hydrodynamic interactions in sedimenting and flowing suspensions of solid particles. I was the first to apply a stochastic multi-particle collision method to model hydrodynamic flow between solid particles. The main papers describing the methodology and results are well-cited: 220 and 111 times, respectively. Invited presentations at the Newton Institute (United Kingdom), Physics@FOM Conference (The Netherlands), Joint Soft Matter Conference (Germany) and Faraday Discussions (The Netherlands). (Louis, Moncho-Jordá, Dijkstra).
4. Aggregation and deposition of sticky asphaltene particles in capillary flow. I have performed both coarse-grained hydrodynamic simulations and micro-Particle Image Velocimetry experiments. Several papers appeared, one of which has been cited 44 times. Invited presentations at the International Soft Matter Days (Germany), International Congress on Rheology (USA) and International Conference on Petroleum Phase Behaviour and Fouling (France). (Boek)
5. Determination of drag forces and drag torques on solid particles near walls, with fully resolved fluid flow. Experimental validation of reduced diffusion of particles near confining walls. The main paper (2010) has been cited 25 times. Invited presentation at the Joint Soft Matter Conference (Germany). (Briels, Imperio)
6. Determination of high-Reynolds hydrodynamic flow and drag and lift forces on objects and swimmers. A paper on hydrodynamic interactions between fully deforming fish has appeared in 2015 and already cited 34 times. (Hemelrijk, Reid)
7. Development of an efficient accurate Direct Simulation Monte Carlo algorithm for simulation of systems containing millions to billions of particles and droplets. A full paper has appeared in 2013. (Pawar, Deen, Kuipers)
8. Experimental and simulation investigations into hydrodynamic instabilities appearing in low Reynoldsnumber flow of viscoelastic fluids through microchannels and porous media. A number of papers have appeared (2015-2017) and received considerable attention. (De, Peters)
9. A new kinetic theory of granular flow for rough frictional spheres. Papers on this theoretical tour-de-force have recently appeared (2016, 2017). (Yang, Kuipers)
10. A particle-based mesoscale model for multi-component mass transfer and heterogeneous catalytic reactions in structured reactors. A first paper on the methodology has appeared in 2017. (Sengar, Van Santen, Padding)
11. A new multiscale simulation methodology to model fluidized beds with non-spherical particles. This is my ERC Consolidator work, and the first papers have appeared in 2016, 2017. More are expected in 2018 and 2019.

## **Selection of invited presentations to conferences and international advanced schools**

1. *Elastic instabilities in pillared micro channels*, invited lecture at Annual European Rheology Conference, Copenhagen, Denmark (2017).
2. *Mesoscale particle-based modelling of flow & diffusion in colloidal suspensions*, invited lecture at JMBC course on dispersed multiphase flow, University of Twente (2017).
3. *Application of Direct Simulation Monte Carlo to particles and droplets in a spray drying device*, invited keynote lecture at Discrete Simulation of Fluid Dynamics Conference, Edinburgh, United Kingdom (2015).
4. *Hydrodynamic interactions in non-equilibrium computer simulations of colloidal systems*, invited lecture at European Summer School on Electrochemical Engineering, Leeuwarden, The Netherlands (2015).
5. *Cross-validation of 3D particle tracking in granular flows down rotating chutes*, presentation at Physics@FOM, Veldhoven, The Netherlands (2015).
6. *Particle-based simulations: what do we learn and why should you care?*, invited keynote lecture at NPS conference, Utrecht, The Netherlands (2014).
7. *From atoms to galaxies*, presentation at Jülich Soft Matter Days special session, Bad Honnef, Germany (2014).
8. *Modelling of granular flows through inclined rotating chutes using a discrete particle model*, presentation at Ninth International Conference on CFD in the Minerals and Process Industries, CSIRO, Melbourne, Australia (2012). (*Invited chairman for the session on particle collisions.*)
9. *Statistical Mechanics of Liquids*, invited lectures (5x2 hours) at Advanced School for Theoretical Chemistry and Spectroscopy, Han-sur-Lesse, Belgium (2010).
10. *Hydrodynamics of confined colloidal fluids in two dimensions*, invited lecture at the 144<sup>th</sup> Faraday Discussion, Groningen, The Netherlands (2009).
11. *Hydrodynamic interactions in polymer networks and embedded particles*, invited lecture at the Joint Soft Matter Conference, Forschungszentrum Jülich, Jülich, Germany (2009).
12. *Computer simulation of the rheology of concentrated star polymer suspensions*, lecture at De Gennes Discussion Conference “From Reptation to Glossy Materials – De Gennes Pioneering Work in Rheology and Recent Developments”, Chamonix, France (2009).
13. *Deposition of colloidal asphaltene in capillary flow: Experiments and mesoscopic simulations*, lecture at 8<sup>th</sup> International Conference on Petroleum Phase Behavior and Fouling, Pau, France (2008).
14. *Colloidal asphaltene deposition and aggregation in capillary flow: Experiments and mesoscopic simulation*, lecture at 15<sup>th</sup> International Congress on Rheology, Monterey, USA (2008).
15. *Simulations of the dynamics and rheology of wormlike micelles*, lecture at 15<sup>th</sup> International Congress on rheology, Monterey, USA (2008).
16. *Deposition of colloidal asphaltene in capillary flow: Experiments and mesoscopic simulation*, invited lecture at the International Soft Matter Days, Aachen, Germany (2007).
17. *Rheology of wormlike micellar fluids from Brownian and molecular dynamics simulations*, lecture at 6<sup>th</sup> Liquid Matter Conference, Utrecht, The Netherlands (2005).
18. *Brown vs Stokes: sedimentation of colloidal suspensions*, invited lecture at the Newton Institute, Cambridge, United Kingdom (2005).
19. *Theory of Polymer Dynamics*, invited lectures (4x2 hours) at Advanced School for Physical Chemistry, Han-sur-Lesse, Belgium (2005).

## Examples of other academic activities

- Invited lecturer at Advanced School for Physical Chemistry, Han-sur-Lesse, Belgium (2005), Advanced School for Theoretical Chemistry and Spectroscopy, Han-sur-Lesse, Belgium (2010), and J.M. Burgerscentrum Advanced Course in Particle-based Modeling Techniques, Eindhoven, NL (2013), and European Summer School on Electrochemical Engineering, Leeuwarden, NL (2015).
- Co-organiser of the CECAM workshop “Structure and rheology of self-assembling and aggregating colloidal suspensions: theory, simulation and experiment”, Lyon, France (2005) (40 participants).
- Co-organiser of the Eindhoven Multischale Institute workshop “Porous Media”, Eindhoven, The Netherlands (2013) (70 participants).
- Collaborator (by invitation) with academic groups in London (UK), Oxford (UK), Harvard (USA), Patras (Greece), Düsseldorf (Germany), San Sebastian (Spain), Groningen, Utrecht, Wageningen and Twente (Netherlands), Leuven and Louvain (Belgium), Zürich (Switzerland) and Melbourne (Australia).
- External opponent at PhD-defences of Dr. D.A.P. Reid (Rijksuniversiteit Groningen, 2011), Dr. B. O’Conchuir (University of Cambridge, 2015) and Dr. A. Soleimani (University of Linz, 2016).
- Invited reviewer for the Netherlands Organisation for Scientific Research (NWO) in 2011, 2012, 2014, and for the National Science Foundation (USA) 2006-2015.
- Member of the educational committee of OSPT (Research school on process technology).
- Member of the educational committee of MCEC (Netherlands Center for Multiscale Catalytic Energy Conversion).
- Member of the educational committee of TU/e Chemical Engineering department (OC-ST).
- Member of the Master admission committee of 3mE, TUD.
- Invited academic coach and invited jury member of “Physics with Industry” workshop (Lorenz Center Leiden, 2016, 2017).
- Young Executive Board member of the TU Delft e-Refinery initiative (responsible for coordinating research activities related to transport phenomena).
- Member of the core team guiding reorganization of the Process & Energy department, with the goal to improve collaboration between its members and definition of equal and shared responsibilities.
- Invited reviewer (>30 annually) for Physical Review (A, E, Letters), Europhysics Letters, European Physics Journal, Journal of Chemical Physics, Physical Chemistry Chemical Physics, Macromolecules, Biomacromolecules, Soft Matter, Colloid and Interface Science, Rheologica Acta, Journal of Fluid Mechanics, Journal of Non-Newtonian Fluid Mechanics, Microfluidics and Nanofluidics, Energy & Fluids, AIChE Journal, and Nature.

## Scientific Track Record (citation records retrieved from Scopus, December 2017)

Publications in refereed journals:	94	<b>Citations by year</b> 
Publications in refereed proceedings:	22	
Total number of citations:	1821	
<b>h-index:</b>	<b>24</b>	
Number of chapters in published books:	4	
Supervised PhD theses (17 finished, 13 ongoing):	30	
Number of papers reviewed:	~270	
Number of proposals reviewed:	10	
(7 for NSF, USA and 3 for NWO, NL)		

## Publications in international (refereed) journals

### 2018

94. S. De, J.A.M. Kuipers, E.A.J.F. Peters and **J.T. Padding**, Viscoelastic flow past mono- and bidisperse random arrays of cylinders: flow resistance, topology and normal stress distribution, accepted for publication in **Soft Matter** (2018).

93. S. De, M. Golombok, S.P. Koesen, R.V. Maitri, **J.T. Padding** and J.F.M. van Santvoort, Flow of viscoelastic surfactants through porous media, to appear in **AIChE Journal** (2018).

92. S. Kamath, **J.T. Padding**, K.A. Buist and J.A.M. Kuipers, Stochastic DSMC method for dense bubbly flows: Methodology, **Chem. Eng. Sci.** **176**, 454 (2018).

91. S. De, P. Krishnan, J. van der Schaaf, H. Kuipers, F. Peters and **J. Padding**, Viscoelastic effects on residual oil distribution in flows through pillared microchannels, **J. Colloid Interf. Sci.** **510**, 262 (2018).

### 2017

90. S. De, J. van der Schaaf, N.G. Deen, J.A.M. Kuipers, E.A.J.F. Peters and **J.T. Padding**, Lane change in flows through pillared microchannels, **Physics of Fluids** **29**, 113102 (2017). This paper was featured as a featured article on their Physics of Fluids website.

89. K.A. Buist, P. Jayaprakash, J.A.M. Kuipers, N.G. Deen and **J.T. Padding**, Magnetic particle tracking for nonspherical particles in a cylindrical fluidized bed, **AIChE Journal** **63**, 5335 (2017).

88. L. Yang, **J.T. Padding** and J.A.M. Kuipers, Three-dimensional fluidized beds with rough spheres: validation of a two fluid model by magnetic particle tracking and discrete particle simulations, **Chem. Eng. Sci.** **174**, 238 (2017).

87. A. Sengar, R.A. van Santen, J.A.M. Kuipers and **J.T. Padding**, Particle-based modeling of heterogeneous chemical kinetics including mass transfer, **Phys. Rev. E** **96**, 022115 (2017).

86. G. Finotello, **J.T. Padding**, N.G. Deen, A. Jongsma, F. Innings and J.A.M. Kuipers, Effect of viscosity on droplet-droplet collisional interaction, **Physics of Fluids** **29**, 067102 (2017).

85. S. De, E.A.J.F. Peters, J.A.M. Kuipers and **J.T. Padding**, Viscoelastic flow simulations in random porous media, **J. Non-Newtonian Fluid Mech.** **248**, 50 (2017).

84. Y. Xu, J. Musser, T. Li, **J.T. Padding** and W.A. Rogers, Particles climbing along a vertically vibrating tube: numerical simulation using the Discrete Element Method (DEM), **Powder Tech.** **320**, 304 (2017).

83. S. De, E.A.J.F. Peters, J.A.M. Kuipers and **J.T. Padding**, Viscoelastic flow simulations in model porous media, **Phys. Rev. Fluids** **2**, 053303 (2017).

82. S.K.P. Sanjeevi and **J.T. Padding**, On the orientational dependence of drag experienced by spheroids, **J. Fluid Mech.** **820**, R1 (2017). This paper featured as editor's pick of J. Fluid Mechanics.

81. L. Yang, **J.T. Padding** and J.A.M. Kuipers, Investigation of collisional parameters for rough spheres in fluidized beds, **Powder Technology** **316**, 256 (2017).

80. L. Yang, **J.T. Padding** and J.A.M. Kuipers, Partial slip boundary conditions for collisional granular flows at flat frictional walls, **AIChE J.** **63**, 1853 (2017).

79. H. Patel, S. Das, J.A.M. Kuipers, **J.T. Padding** and E.A.J.F. Peters, A coupled VOF-IBM method for simulating 3D multiphase flows with contact line dynamics, **Chem. Eng. Sci.** **166**, 28 (2017).

78. B.W. Fitzgerald, **J.T. Padding** and R. van Santen, Simple diffusion hopping model with convection, **Phys. Rev. E** **95**, 013307 (2017).



## 2016

77. L.J.H. Seelen, **J.T. Padding** and J.A.M. Kuipers, Improved quaternion based integration scheme for rigid body motion, **Acta Mechanica** **227**, 3381 (2016).

76. Kay Buist, Luuk Seelen, Niels Deen, **Johan Padding** and Hans Kuipers, On an efficient hybrid soft and hard sphere collision integration scheme for DEM, **Chem. Eng. Sci.** **153**, 363 (2016).

75. S.K. Pawar, F. Henrikson, G. Finotello, **J.T. Padding**, N.G. Deen, A. Jongsma, F. Innings and J.A.M. Kuipers, An experimental study of droplet-particle collisions, **Powder Technology** **300**, 157 (2016).

74. L. Yang, **J.T. Padding** and J.A.M. Kuipers, Modification of Kinetic Theory of Granular Flow for Frictional Spheres, Part II: Model validation, **Chem. Eng. Sci.** **152**, 783 (2016).

73. L. Yang, J.T. Padding and J.A.M. Kuipers, Modification of Kinetic Theory of Granular Flow for Frictional Spheres, Part I: Two-fluid model derivation and numerical implementation, **Chem. Eng. Sci.** **152**, 767 (2016).

72. S. De, S. Das, E.A.J.F. Peters, J.A.M. Kuipers and **J.T. Padding**, A coupled finite volume immersed boundary method for simulating 3D viscoelastic flows in complex geometries, **J. Non-Newtonian Fluid Mech.** **232**, 67 (2016).

## 2015

71. **J.T. Padding**, N.G. Deen, E.A.J.F. Peters and J.A.M. Kuipers, "Euler-Lagrange modelling of the hydrodynamics of dense multiphase flows", **Advances in Chemical Engineering** **46**, 137 (2015).

70. M.W. Korevaar, **J.T. Padding**, N.G. Deen, J. Wang, M. de Wit, M.A.I. Schutyser and J.A.M. Kuipers, "Hybrid PIV/PTV measurements of velocity and position distributions of gas-conveyed particles in small, narrow channels", **AIChE J.** **61**, 3616 (2015).

69. J. Sane, **J.T. Padding** and A.A. Louis, "Taylor dispersion of colloidal particles in narrow channels", **Mol. Phys.** **113**, 2538 (2015).

68. S.K. Pawar, **J.T. Padding**, N.G. Deen, A. Jongsma, F. Innings and J.A.M. Kuipers, "Numerical and Experimental Investigation of Induced Flow and Droplet-Droplet Interactions in a Liquid Spray", **Chem. Eng. Sci.** **138**, 17 (2015).

67. S.S. Shirsath, **J.T. Padding**, H.J.H. Clercx and J.A.M. Kuipers, "Simulation study of the effect of wall roughness on the dynamics of granular flows in rotating semi-cylindrical chutes", **AIChE J.** **61**, 2117 (2015).

66. S.S. Shirsath, **J.T. Padding**, H.J.H. Clercx and J.A.M. Kuipers, "Cross-validation of 3D particle tracking velocimetry for the study of granular flows down rotating chutes", **Chem. Eng. Sci.** **134**, 312 (2015).

65. S.S. Shirsath, **J.T. Padding**, H.J.H. Clercx and J.A.M. Kuipers, "Dynamics of granular flows down rotating semi-cylindrical chutes", **Procedia Engineering** **102**, 731 (2015).

64. V. Verma, **J.T. Padding**, N.G. Deen and J.A.M. Kuipers, "Effect of bed size on hydrodynamics in 3D gas-solid fluidized beds", **AIChE Journal** **61**, 1492 (2015).

63. C.K. Hemelrijk, D.A.P. Reid, H. Hildenbrandt, and **J.T. Padding**, "The increased efficiency of fish swimming in a school", **Fish and Fisheries** **16**, 511 (2015). This paper was added as a research highlight in Nature (13 February 2014).

62. V. Sutkar, N.G. Deen, **J.T. Padding**, V. Salikov, B. Crueger, S. Antonyuk, S. Heinrich and J.A.M. Kuipers, "A novel approach to determine wet restitution coefficients through a unified correlation and energy analysis", **AIChE Journal** **61**, 769 (2015).

## 2014

61. **J.T. Padding** and W.J. Briels, “Momentum conserving Brownian Dynamics propagator for complex soft matter fluids”, **J. Chem. Phys.** **141**, 244108 (2014).

60. Y. Xu, **J.T. Padding** and J.A.M. Kuipers, “Numerical investigation of the vertical plunging force of a spherical intruder into a prefluidized granular bed”, **Phys. Rev. E** **90**, 062203 (2014).

59. V. Verma, **J.T. Padding**, N.G. Deen and J.A.M. Kuipers, “Numerical Investigation on the Effect of Pressure on Fluidization in a 3-D Fluidized Bed”, **Industrial & Engineering Chemistry Research** **53**, 17487 (2014).

58. S.S. Shirsath, **J.T. Padding**, H.J.H. Clercx and J.A.M. Kuipers, “Numerical investigation of monodisperse granular flow through an inclined rotating chute”, **AIChE Journal** **60**, 3424 (2014).

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