

Curriculum Vitae of Johan Padding

Personal details

Name: Prof. Dr Ir Johannes Tiemen Padding
Gender: Male
Date/place of birth: 20th July 1975, Steenwijk (NL)
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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 University, 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. Wim 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*.
- 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*.
- 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*.
- 2016 – 2018 Associate Professor in the Process & Energy department at Delft University of Technology.
- 2018 – now Full Professor (chair) in *Complex Fluid Processing* in the 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.
13. Peter Jamar (TUD), Coherent effects in bubble generation during electrolysis.
14. Koen de Jongh (TUD), Multiscale CFD simulations of gas-solid fluidized beds.

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, Vlaardingen): butter crystallisation modelling.
4. Alessandro Lopez Perez (Shell Technology Center Amsterdam): classified project.
5. Amin Ahmadzadeh (Unilever, Vlaardingen): 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.
31. Onno Kramers (TUD), hydraulics of fluidized particles for water treatment processes
32. Max Döpke (TUD), molecular dynamics simulations of electrolyte properties near solid surfaces
33. Christos Tsekos (TUD), processing of biomass in fluidized bed reactors
34. Joseph Blake (TUD), modelling of transport in porous electrodes
35. Arvind Pari (TUD), modelling of bubble phenomena in porous electrodes
36. Esaar Naeem Butt (TUD), bridging scales in electrochemical reactor design
37. Nagaraj Nagalingam (TUD), modelling of non-photochemical laser-induced nucleation phenomena

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

Funding ID

Project title	Applicants	Funding agency	Date of grantin	Positions
Viscoelasticity of wormlike micellar solutions	<u>Padding</u>	EPSRC (UK)	02/2003	1
Microrheology of cell membranes and the cytoskeleton (VENI)	<u>Padding</u>	NWO (NL)	12/2005	1
Directed and Controlled Self-Assembly of nano-Colloids	6 universities / institutes	FP7 (EU)	02/2008	2 for UT
Dynamics of Architecturally Complex Polymers (Dynacop)	12 universities / companies	FP7 (EU)	11/2008	1 for UT
Nanomechanical Characterization of supramolecular protein structures using	Bennink / <u>Padding</u>	FOM-DPI (NL)	05/2009	2
Manufacturing techniques of organic solar cells (Energy Research grant – Long term)	ECN Petten / UT / Fujifilm	Agentschap NL	07/2010	1 for UT
ESMI: European Facilities for Soft Matter Technologies	12 universities / institutions	FP7 (EU)	01/2011	1 for UT
Viscoelastic flow simulations of polymer flooding	<u>Padding</u> / Peters	FOM-Shell(NL)	12/2012	1
Simulation of proppant transport for shale gas production	Peters / <u>Padding</u>	FOM-Shell(NL)	10/2013	1
Multiscale modelling of dense gas-fluidized flows of non-spherical particles (ERC-CoG)	<u>Padding</u>	ERC CoG (EU)	11/2013	8
Flow structure formation and evolution of GLS reactive flows	<u>Padding</u> / Kuipers / Lohse / Sun	NWO	11/2014	1
Influence of wall corrugation on mass transfer in catalytic reactors	<u>Padding</u> / Kuipers / Van Santen	NWO	11/2014	1
Hydrodynamics and interaction of self-assembly in droplet environment	Dijkstra / Filion / <u>Padding</u>	NWO	11/2014	1
Interfacial dynamics in multiphase flow through pores	Peters / <u>Padding</u>	FOM-Shell(NL)	12/2014	1
Toepassing pyrolyse olie in een gemodificeerde dieselmotor	3 companies and TU/e	EZ (TKI)	12/2015	1 for TU/e
Drying of multi-components dispersion droplets	TUD, WUR, 3 companies	TTW-OTP	03/2017	2 for TUD
Multicomponent transport in micro-structured reactors	Fan / <u>Padding</u>	CSC	05/2017	1
Electrons to Chemical Bonds (E2CB)	TUD, UT, TU/e, WUR, UG, UL	TTW Perspectief	11/2018	15 (10 for TUD)
LightX: Light induced seed generation for industrial crystallization	Eral / <u>Padding</u> / vd Heijden	TTW-OTP	01/2019	3
Pyrolysis in molten salt reactors	<u>Padding</u> / v Ommen / Westerweel	Shell	01/2019	1
Towards Large-scale electro-conversion systems (TOeLS)	Large team at TUD	Shell, TKI, TUD	03/2019	11 (1 for CFP)
Bubble dynamics in electrolysis	TU/e, TUD, UT, Shell, Nouryon	NWO	04/2019	4 (1 for CFP)

Total funding obtained through external grants (counting local positions in collaborative projects): 9.1 M€.

Research focus and recognition of scientific contributions

I have a long-time research focus on development of novel simulation models for complex flow and transport 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: 276 and 174 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 47 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: 390 and 161 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 68 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 46 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 105 times. (Hemelrijk, Reid)
7. Development of an efficient accurate Direct Simulation Monte Carlo algorithm for simulation of systems containing millions to billions of particles, droplets or bubbles. Paper have appeared from 2013 to now. (Pawar, Finotello, Kamath, 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. Papers have appeared in 2017, 2018 and 2019. (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 papers have appeared from 2016 to 2019.

Selection of invited presentations to conferences and international advanced schools

1. *DNS and force correlations for assemblies of non-spherical particles*, presentation at 13th International Conference on Computational Fluid Dynamics in the Minerals and Process Industries, Melbourne, Australia (2018).
2. *Elastic instabilities in pillared micro channels*, invited lecture at Annual European Rheology Conference, Copenhagen, Denmark (2017).
3. *Mesoscale particle-based modelling of flow & diffusion in colloidal suspensions*, invited lecture at JMBC course on dispersed multiphase flow, University of Twente (2017).
4. *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).
5. *Hydrodynamic interactions in non-equilibrium computer simulations of colloidal systems*, invited lecture at European Summer School on Electrochemical Engineering, Leeuwarden, The Netherlands (2015).
6. *Cross-validation of 3D particle tracking in granular flows down rotating chutes*, presentation at Physics@FOM, Veldhoven, The Netherlands (2015).
7. *Particle-based simulations: what do we learn and why should you care?*, invited keynote lecture at NPS conference, Utrecht, The Netherlands (2014).
8. *From atoms to galaxies*, presentation at Jülich Soft Matter Days special session, Bad Honnef, Germany (2014).
9. *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.*)
10. *Statistical Mechanics of Liquids*, invited lectures (5x2 hours) at Advanced School for Theoretical Chemistry and Spectroscopy, Han-sur-Lesse, Belgium (2010).
11. *Hydrodynamics of confined colloidal fluids in two dimensions*, invited lecture at the 144th Faraday Discussion, Groningen, The Netherlands (2009).
12. *Hydrodynamic interactions in polymer networks and embedded particles*, invited lecture at the Joint Soft Matter Conference, Forschungszentrum Jülich, Jülich, Germany (2009).
13. *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).
14. *Deposition of colloidal asphaltene in capillary flow: Experiments and mesoscopic simulations*, lecture at 8th International Conference on Petroleum Phase Behavior and Fouling, Pau, France (2008).
15. *Colloidal asphaltene deposition and aggregation in capillary flow: Experiments and mesoscopic simulation*, lecture at 15th International Congress on Rheology, Monterey, USA (2008).
16. *Simulations of the dynamics and rheology of wormlike micelles*, lecture at 15th International Congress on rheology, Monterey, USA (2008).
17. *Deposition of colloidal asphaltene in capillary flow: Experiments and mesoscopic simulation*, invited lecture at the International Soft Matter Days, Aachen, Germany (2007).
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).
- 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 coach and jury of “Physics with Industry” workshop (Lorenz Center Leiden, 2016, 2017).
- Invited reviewer for the Netherlands Organisation for Scientific Research (NWO) in 2011, 2012, 2014, 2018 and for the National Science Foundation (USA) 2006-2015.
- Invited reviewer for Physical Review (A,E,Lett), Europhysics Letters, European Physics J., J. Chemical Physics, Physical Chemistry Chemical Physics, Macromolecules, Biomacromolecules, Soft Matter, Colloid and Interface Science, Rheologica Acta, J. Fluid Mechanics, J. Non-Newtonian Fluid Mechanics, Microfluidics and Nanofluidics, Energy & Fluids, Chemical Engineering Science, AIChE J., and Nature.

Memberships and organisational activities

- Vice-director of the Delft Process Technology Institute (DPTI).
- Member of the educational committee of MCEC (Netherlands Center for Multiscale Catalytic Energy Conversion); organizer of MCEC PhD/Postdoc schools of 2015, 2016 and 2017.
- Former member of the educational committee of TU/e Chemical Engineering department (OC-ST).
- Member of the Master admission committee of 3mE, TUD.
- Jury member for NWO-TTW Perspectief proposals.
- Member of the program committee of Physics@Veldhoven 2019.
- 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.
- 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 Multiscale Institute workshop “Porous Media”, Eindhoven, The Netherlands (2013) (70 participants).
- Co-organiser of the kick-off of the Delft Institute for Computational Science and Engineering (DCSE) (May 2017) (180 participants)

Scientific Track Record (citation records retrieved from Scopus, February 2019)

Publications in refereed journals:	122	<p>Citations per year:</p> <table border="1"><thead><tr><th>Year</th><th>Citations</th></tr></thead><tbody><tr><td>2001</td><td>0</td></tr><tr><td>2002</td><td>10</td></tr><tr><td>2003</td><td>15</td></tr><tr><td>2004</td><td>25</td></tr><tr><td>2005</td><td>35</td></tr><tr><td>2006</td><td>55</td></tr><tr><td>2007</td><td>50</td></tr><tr><td>2008</td><td>70</td></tr><tr><td>2009</td><td>75</td></tr><tr><td>2010</td><td>85</td></tr><tr><td>2011</td><td>95</td></tr><tr><td>2012</td><td>110</td></tr><tr><td>2013</td><td>105</td></tr><tr><td>2014</td><td>105</td></tr><tr><td>2015</td><td>150</td></tr><tr><td>2016</td><td>175</td></tr><tr><td>2017</td><td>225</td></tr><tr><td>2018</td><td>200</td></tr><tr><td>2019</td><td>55</td></tr></tbody></table>	Year	Citations	2001	0	2002	10	2003	15	2004	25	2005	35	2006	55	2007	50	2008	70	2009	75	2010	85	2011	95	2012	110	2013	105	2014	105	2015	150	2016	175	2017	225	2018	200	2019	55
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h-index:	26																																									
Number of chapters in published books:	4																																									
Supervised PhD theses (18 finished, 15 ongoing):	33																																									
Number of papers reviewed:	~350																																									
Number of proposals reviewed: (7 for NSF, USA and 6 for NWO, NL)	13																																									

Publications in international (refereed) journals

2019

121. G. Finotello, **J.T. Padding**, K.A. Buist, A. Schijve, A. Jongsma, F. Innings, and J.A.M. Kuipers, Numerical investigation of droplet-droplet collisions in a water and milk spray with coupled heat and mass transfer, to appear in **Drying Technology** (2019).
120. L. Yang, **J.T. Padding**, and J.A.M. Kuipers, Two-fluid modelling of three-dimensional cylindrical fluidized beds using kinetic theory for rough spheres, to appear in **Particuology** (2019).
119. M.F. Döpke, J. Lützenkirchen, O.A. Moulton, B. Siboulet, J.-F. Dufrêche, **J.T. Padding**, and R. Hartkamp, Preferential Adsorption in Mixed Electrolytes Confined by Charged Amorphous Silica, **J. Phys. Chem. C** **123**, 16711 (2019).
118. V.V. Mahajan, J. Mehmood, Y.M.F. El Hasadi and **J.T. Padding**, Fluid medium effect on stresses in suspension of high-inertia rod-like particles, **Chem. Eng. Sci.** **X 3**, 100030 (2019).
117. B.W. Fitzgerald, A. Zarghami, V.V. Mahajan, S.K.P. Sanjeevi, I. Mema, V. Verma, Y.M.F. El Hasadi, and **J.T. Padding**, Multiscale simulation of elongated particles in fluidised bed reactors, **Chem. Eng. Sci.** **X 2**, 100019 (2019).
116. G. Finotello, **J.T. Padding**, K.A. Buist, A. Jongsma, F. Innings, and J.A.M. Kuipers, Droplet collisions of water and milk in a spray with Langevin turbulence dispersion, **Int. J. Multiphase Flow** **114**, 154 (2019).
115. R.V. Maitri, S. De, S.P. Koesen, H.M. Wyss, J. van der Schaaf, J.A.M. Kuipers, **J.T. Padding**, and E.A.J.F. Peters, Effect of microchannel structure and fluid properties on non-inertial particle migration, **Soft Matter** **15**, 2648 (2019).
114. A. Vila, S.K.P. Sanjeevi, **J.T. Padding**, and S. Pirker, Gas flow through static particle arrangements with a channel: Resolved simulations and analytic considerations, accepted for publication in **Chem. Eng. Sci.** **X 2**, **100015** (2019).
113. E.M. Moghaddam, E.A. Foumeny, A.I. Stankiewicz, and **J.T. Padding**, Fixed Bed Reactors of Non-Spherical Pellets; Importance of Heterogeneities and Inadequacy of Azimuthal Averaging, accepted for publication in **Chem. Eng. Sci.** **X 1**, 10006 (2019).
112. A. Sengar, J.A.M. Kuipers, R.A. van Santen, and **J.T. Padding**, Towards a particle based approach for multiscale modeling of heterogeneous catalytic reactors, **Chem. Eng. Sci.** **198**, 184 (2019).
111. G. Fiorucci, **J.T. Padding**, and M. Dijkstra, Small asymmetric Brownian objects self-align in nanofluidic channels, **Soft Matter** **15**, 321 (2019).
110. I. Mema, V.V. Mahajan, B.W. Fitzgerald, and **J.T. Padding**, Effect of lift force and hydrodynamic torque on fluidization of non-spherical particles, **Chem. Eng. Sci.** **195**, 642 (2019).
109. O. Kramer, P. de Moel, E. Baars, W. van Vugt, **J. Padding**, and J.P. van der Hoek, Improvement of the Richardson-Zaki liquid-solid fluidisation model on the basis of hydraulics, **Powder Technology** **343**, 465 (2019).
108. A. Zarghami, H.R. Ashorynejad, and **J.T. Padding**, Hydrodynamics Forces on a Circular Particle near a Sinusoidal Corrugated Wall, **Powder Technology** **342**, 789 (2019).

2018

107. B.W. Fitzgerald and **J.T. Padding**, Superhelden in de natuurkunde klas (Superheroes in the physics classroom), **Nederlands Tijdschrift voor de Natuurkunde** (Dutch Physics Journal), page 12-14, December 2018.

- 106.** E.M. Moghaddam, E.A. Foumeny, A.I. Stankiewicz, and **J.T. Padding**, A Rigid Body Dynamics Algorithm for Modeling Random Packing Structures of Non-Spherical and Non-Convex Pellets, **Ind. & Eng. Chem. Res.** **57**, 14988 (2018).
- 105.** R. Maitri, S. Das, J.A.M. Kuipers, **J.T. Padding**, and E.A.J.F. Peters, An improved ghost-cell sharp interface immersed boundary method with direct forcing for particle laden flows, **Computers and Fluids** **175**, 111 (2018).
- 104.** V.V. Mahajan, T.M. Nijssen, J.A.M. Kuipers, and **J.T. Padding**, Non-spherical particles in a pseudo-2D fluidised bed: Modelling study, **Chem. Eng. Sci.** **192**, 1105 (2018).
- 103.** A. Sengar, R.A. van Santen, E. Steur, J.A.M. Kuipers and **J.T. Padding**, Deactivation kinetics of solid acid catalyst with laterally interacting protons, **ACS Catalysis** **8**, 9016 (2018).
- 102.** S.K. Pacha Sanjeevi, J.A.M. Kuipers, and **J.T. Padding**, Drag, lift and torque correlations for non-spherical particles from Stokes limit to high Reynolds numbers, **Int. J. Multiphase Flow** **106**, 325 (2018).
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