A. CURRICULUM VITAE

1. **Name**: Prashant Valluri
2. **School**: School of Engineering
3. **College**: Science and Engineering
4. **Date of first appointment in The University of Edinburgh**: 10/2009
5. **Date(s) of promotion in The University of Edinburgh**: 08/2020
6. **Career since graduation**

2020 – Current	Personal Chair in Fluid Dynamics, School of Engineering
2019 – Current	Head of Graduate School, School of Engineering
2020 (*External Appointment*)	*Extraordinary Professor, Department of Mechanical and Aeronautical Engineering, University of Pretoria, South Africa*
2019 (*External Appointment*)	*Honorary Advisor (Mentor), Chemical Engineering Department, Vishwakarma Institute of Technology, University of Pune, India*
2018 (*External Appointment*)	*Invited JSPS (Japan Society for the Promotion of Science) Fellow, Department of Mechanical Engineering, Kyushu University, Japan*
2014 – 2018	Deputy Head of Graduate School, School of Engineering
08/2015 – Current	Senior Lecturer, Chemical Engineering, School of Engineering
10/2009 – 07/2015	Lecturer, Chemical Engineering, School of Engineering
03/2005 – 09/2009	Post-Doctoral Research Associate (TMF3 and ZEAL Projects) *Department of Chemical Engineering, Imperial College London, London, UK*
03/2004 – 02/2005	Consultant (TMF3 Project) *Department of Chemical Engineering, Imperial College London, London, UK*
11/1998 – 11/2000	Research Officer *Unilever Research India (Hindustan Lever Research Centre), Mumbai, India*

7. **University education:** Undergraduate and PhD (see below)

11/2000 – 10/2004	PhD in Chemical Engineering, *Imperial College London, London, UK* Field: *Fluid Mechanics* Topic: *Multiphase Fluid Dynamics in Structured Packings*
06/1994 – 06/1998	Bachelor of Technology in Chemical Engineering *Dr. B. A. Technological University, Lonere, India* Grade: *First Class with Distinction, Ranked 2 amongst 70*

8. **Teaching experience**

Nominated for EUSA Award *every year since 2010. Total nominations: 11*

4th Year Chemical Engineering Coordinator*: Contribute towards curriculum development in our 4th year courses*

Course	Year		Contact hours/Sem	No. of students
Chemical Engineering 1 (Labs)	1	01/10 – 01/18 Laboratory Organiser	24 (All labs)	60-120
Process Calculations 2	2	01/12 – 07/16 Course Organiser (CO)	47 (11 h Lectures + 36 h Tutorials)	50-120
Chemical Engineering in Practice 3 / MATLAB design exercise	3	01/11 – 07/16 Course Developer	12 (All labs)	60-120
Chemical Engineering Design Project 4	4	01/10 – 01/12 11/18 – Current	36 (All discussions)	8-10
Fluid Mechanics (Chemical) 4	4	09/11 – Current CO	60 (22 h Lectures + 33 h Workshops + 5 h Feedback sessions)	50-120
Supervision of study (4th year), research and industrial (both 5th year) projects	4 & 5	09/10 – Current	Individual projects (~ 4-6 study, ~ 2 research, and ~ 3 industrial)	~9-12
Computational Fluid Dynamics 5	5	09/11 – 09/12 CO	30 (10 h Lectures + 20 h Labs)	50-70
Chemical Engineering Industrial Projects 5	5	07/18 – Current CO	40 (Course organisation)	40-60

Innovations

- ***Fluid Mechanics (Chemical) 4:*** *Rewrote and updated the entire course*. Rejuvenated lecture delivery by introducing new audio-visual material. Introduced highly interactive workshop sessions by using teaching studios. Examples include live demonstrations of problem solving, highlighting typical mistakes and four full sessions dedicated to comprehensive formative feedback. Innovated lecture capture to include simultaneous recording of black boardwork along with the slides. *This has been taken as an example for best practice by Learning and Technology Services*. Developed a new methodology in 2019 to introduce augmented/virtual reality towards studying large-scale or complex flows and their impact on engineering design of equipment. Very positive feedback from students (*see course feedback reports*). CEQ scores 4.8/4.9 (2018-19), 4.8/4.9 (2017-18).
- ***Process Calculations 2:*** Rewrote parts of the course by introducing new lecture material and tutorial exercises. Introduced anonymous peer-to-peer assessment and feedback, designed to help students realise each other's solutions and errors. This type of cross-peer assessment and moderation provides a comprehensive combination of summative feedback (through peer-assessment) and formative feedback (through moderation), whilst at the same time significantly reducing marking-loads (by atleast 80%) and accelerating feedback through a combination of instant and post-mortem feedback. Also, introduced formative feedback tutorial sessions based on assessment exercises to aid

problem-solving, decision-making towards the choice of method and detailed analysis.

- ***Chemical Engineering 1*:** Introduced on-the-spot marking and feedback for short lab reports – to enable students to complete experiments, proforma hand-ins, marking and feedback on the same day. This is helpful in two specific ways – i) enabling the students to receive verbal and written feedback instantaneously (along with marks) and ii) reducing marking loads and waiting times by 50%.*This has been adopted as an example for best practice* in other courses too, most notably in Chemical Engineering Laboratory 3 (for third year chemical engineers). Introduced formative feedback for long lab reports. Reemphasised the importance of error-analysis and safety.
- ***Computational Fluid Dynamics 5:*** Introduced new lecture and tutorial content on turbulence and multiphase flows. Introduced problems to enhance analytical and intuitive grasp towards numerical formulation of flow phenomena.
- ***Chemical Engineering in Practice 3 (MATLAB Design):*** Developed MATLAB reactor design examples linking MATLAB programming to real-world engineering design.
- ***Chemical Engineering Industrial/ Overseas Research Projects 5:*** Refurbished and updated guidance relevant for students, academic supervisors and external industrial supervisors – to improve clarity on the essential requirements of the course and to avoid delays in marking. The guidance has also helped clarify and emphasise aspects of non-disclosure agreements and/or IP agreements. Introduced SharePoint towards sharing of important course documents between both industrial and academic supervisors. Introduced online marking for posters – which has been adopted in other courses.

9. Number of postgraduate taught students* supervised and the dates of the period of supervision

**Note: PhD students in section 12*

Anthony Buchoux	MSc Biomechanics Thesis	01/12 – 07/12
Yunning Meng	MSc Advanced Chemical Engineering Thesis – with INEOS Plc (UK)	09/16 – 08/17 (awarded the highest mark)
Haochen Yan	MSc Advanced Chemical Engineering Thesis – with Howden Group (UK)	09/17 – 08/18

10. Major research interests

My principal research interests lie in the field of fluid mechanics, specifically in:

- Multiphase (& single phase) Fluid Dynamics and Transport Phenomena
- Stability Theory and Turbulence
- Development of bespoke flow solvers

Using bespoke mathematical models, my research tackles complex multiphase flow problems relevant to the following industrial sectors

- *Energy* (oil-gas pipeline flows and microelectronic cooling),
- *Environment* (process cleaning and carbon capture)
- *Healthcare* (brain cooling devices and pulmonary function during scoliosis)

Why is this important? These are major global challenges. For example, better understanding of temperature distribution in the brain will enable us to design better scalp cooling devices that are essential to prolong and improve quality of life of

patients suffering severe cerebral trauma. Also understanding how multiple fluids flow simultaneously, also called multiphase flow, is crucial in many processes. For instance, a better understanding of flows in pipelines can help economise transcontinental transport of crude oil and natural gas. Understanding how phase-change alters flows, can help prolong the life of high-speed processors and at the same time save energy by helping design better electronic cooling methods. These applications pose significant technical challenges given the complex interaction between the underlying multiphase flow, and accompanying energy or heat transfer, material or mass transfer, phase-change and chemical reactions. The current state-of-the-art in addressing these problems has mainly been empirical with deliberate assumptions to ignore accompanying phenomena and hence prone to severe error.
Methodology used. I use advanced mathematical methods such as *stability analyses* and computational tools called *direct numerical simulations* (DNS) to understand multiphase flows. My methods have a major advantage given the DNS strategy avoids assumptions thereby accounting for the full physical description of the problem in 3D. This is done by powerful number-crunchers such as ARCHER, the UK's National Supercomputer, and Eddie (Edinburgh Compute and Data Facility) mini-supercomputer based at Edinburgh. Furthermore, I use *stability analyses* to identify important controllable parameters that can help regulate flow. This helps not only to allow the quantitative prediction of flow parameters necessary for design, but also to provide a detailed picture of the flow fields that is inaccessible to current experimental methods. The tools that my team has developed are called Solvers and are available under Opensource licenses, clocking several downloads globally (Section 14a)
Links. Industrial and interdisciplinary collaborations are integral to my research. All my projects are with industry and/or physicists, mathematicians, clinicians or engineers from other disciplines. These collaborations provide invaluable means of knowledge exchange that helps check my modelling strategies either via experiment or plant data and helps me capture complete physical phenomena. Reflective of the interdisciplinary nature of my research, I collaborate both formally and informally with researchers having a wide variety of expertise both nationally and internationally:

Multiphase Flow Experimental Experts	• Prof. T. Karayiannis, Brunel University London, UK • Prof. Y. Takata, Kyushu University, Japan • Prof. P. Cheng, Shanghai Jiaotong University, China • Prof. J. Kim, University of Maryland, USA • Prof. K. Goodson, Stanford University, USA • Prof. J. Meyer, University of Pretoria, South Africa • Prof. A. Tomiyama, Kobe University, Japan • Prof. A. Amirfazli, York University Toronto, Canada
Multiphase Flow and Fluid Mechanics Theoretical Experts	• Prof. O. K. Matar, Imperial College London, • Dr. L. Ó Náraigh, University College Dublin • Prof. R. Govindarajan, Tata Institute for Fundamental Research, India • Dr. P. Theodorakis, Institute of Physics – Polish Academy of Sciences • Prof. Y. Yan, University of Nottingham, UK • Prof. R. Bennacer, École Normale Supérieure Paris – Saclay

Multiphase Flow Direct Numerical Simulations	• Prof. P. D. M. Spelt, Universite de Lyon, CNRS, France • Prof. S. Popinet, Université Pierre et Marie Curie, CNRS, France • Prof. H. Ding University of Science and Technology of China, China • Prof. A. Tomiyama, Kobe University, Japan
Code development and Solver design	• Edinburgh Parallel Computing Centre, UK
Clinical/ Healthcare Understanding	• Prof. I. Marshall, Centre for Clinical Brain Sciences and Edinburgh Imaging, The University of Edinburgh, UK • Prof. P. Andrews, Department of Anaesthesia, Critical Care and Pain Medicine, Centre for Clinical Brain Sciences, The University of Edinburgh, UK • Prof. E. Garrido, Spine Surgeon, The Royal Hospital for Sick Children, Edinburgh and NHS Consultant, Department of Orthopaedics and Trauma, The University of Edinburgh

I also collaborate extensively with Industry (see Section 11 and 14). My collaborations are reflected in my publications, demonstrating the impact such interactions bring to both design and implementation.

Research Leadership: I am continuosly demonstrating my leadership in the field internationally and nationally. I am one of the pioneers in simultaneously applying direct numerical simulations and stability theory to multiphase flow problems. My publications listed in Part B illustrate how computer simulations can be employed in the design of equipment from small (micro) to large (macro) scales and is of great interest to the wider engineering community. All my publications are in the top fluid mechanics journals with the highest impact factors in the field. My work on brain cooling has also generated press interest (for e.g. https://www.sciencedaily.com/releases/2018/05/180518102739.htm). My research receives ever-growing international recognition which is demonstrated, for example, by being invited to speak at around 40 international (Section 21f) and national (Section 21g) events. I have also organised 4 conferences at international and national levels (Section 15) and organised 2 large training schools for early career researchers. I am a regular contributor to the American Physical Society Division of Fluid Dynamics Meetings, which is the largest and the most influential congregation of fluid dynamicists globally, with over 62 talks since 2006. I have been regularly invited to examine PhD students as an external examiner (Section 17).

Internationally, as a Coordinator and the PI of the cross-continental EU MSCA-RISE ThermaSMART Project (comprising 18 academic and industrial partners from 12 countries spanning 5 continents, Section 11), as an Invited JSPS (Japan Society for the Promotion of Science) Fellow at Kyushu University and hold honorary positions in India and South Africa. I am the co-coordinator of the European Space Agency's ISS (International Space Station) Drop Evaporation Science Team – bringing a modelling perspective towards experiments to be designed for the International Space Station (Section 21).

Nationally, as the Chair of the UK Fluids Network Special Interest Group (SIG) in Multiphase Flows and Transport Phenomena, funded by the EPSRC UK Fluids Network. I have brought together approx. 200 researchers from across both the UK industry and academia, at all levels of experience. The group comprises members

from over 40 Universities in the UK and about 20 industries, with the aim to strengthen, sustain, unify and foster an internationally-leading UK Multiphase Flow community. The group enables sustained interaction to develop strategical alliances towards objectives including funding calls, policy alignment and increase industrial participation. The core objectives of the SIG are to exchange knowledge, drive innovation, train ECRs (early career researchers), accelerate industrial uptake and promote the area to wider public. To achieve this, we have organised several UK wide events (Section 15).

11. Principal research grants

As PI and Coordinator				
EC 778104 — ThermaSMART – H2020-MSCA-RISE-2017 *(Score 96.8% First RISE award to UoE)*	Smart thermal management of high-power microprocessors using phase-change *17 Partners: Nottingham, UC Dublin, Warsaw, Paris-Saclay, York Toronto, Maryland, Stanford, Rio de Janeiro, Pretoria, Tianjin UC, Dalian, TIFR Bangalore, Kyushu, Kobe, Elvesys, Flow Capture, Cherry Biotech*	(*UoE*) £544,784	(*Total*) €1.7 M (£1.5 M)	(*Duration)* 12/17 – 12/21
Industry: K2M Inc R83420	Computational fluid dynamics simulation of airflow in the right and left lung in subjects with airway narrowing due to scoliosis *Partners: Sick Kids Hospital (Edinburgh) and K2M Inc.*	£50,000		09/15 – 11/19
EPSRC – UK Fluids Network EP/N032861/1 (*Chair*, *Devolved to Special Interest Group*)	Special Interest Group on Multiphase Flows and Transport Phenomena *Partners: 200 members across the UK*	£12,000		01/17 – 03/20
EPSRC IAA - Sulzer PII016	Accelerating impact by deploying advanced modelling techniques in	£54,096		03/16 – 12/16

	multiphase flow to the chemical process industry *Partners: Sulzer and UC Dublin*			
ETP – Sulzer	TRANSPACC: TRANSient operation of PAckings for Carbon Capture – Modelling and Direct Numerical Simulations *Partners: University College Dublin, Heriot-Watt University and Sulzer Inc*	£75,000		01/11 – 05/15
As PI for National Computational Resources (ARCHER)				
EPSRC – ARCHER for EP/S019588/1	Enhanced Multiscale Boiling Surfaces (EMBOSS): From Fundamentals to Design *8 Partners: Imperial College, Brunel University, Alfa Laval, Oxford NanoSystems, CAL Gavin, Intrinsiq Materials, Thermacore Europe, TMD Technologies*	£141,609 (ARCHER)		08/19 – 07/22
EPSRC – ARCHER eCSE08-04	TPLS: 3D Decomposition and Gas/Liquid Flows *Partners: EPCC and UC Dublin*	£79,750		08/16 – 10/17
EPSRC – ARCHER	TopUP Application to support simulations for EP/K00963X/1	£73,180		04/15 – 03/18
EPSRC-ARCHER eCSE01-008	TPLS: Optimised Parallel I/O and Visualisation *Partners: EPCC and University College Dublin*	£57,933		04/14 – 12/14

EPSRC-HECToR and Software Sustainability Institute e174 RAP Phase 1b & dCSE	Project: Towards a complete description of turbulence in two-phase stratified flows Partners: EPCC, Université de Lyon and University College Dublin	£164,950		11/11 – 09/14
EPSRC – HECToR/ ARCHER for EP/K00963X	Boiling in microchannels: integrated design of closed-loop cooling system for devices operating at high heat fluxes *Partners: Brunel, Selex Galileo, Thermacore Europe, Rainford Precision and Sustainable Energy Systems*	£137,963		04/13 – 03/16
EPSRC-HECToR e174 (Phase 2a)	Three dimensional instabilities in twolayer flows at high Reynolds numbers	£5,000		07/10 – 06/11
As Co-I (Lead investigator for modelling)				
EPSRC EP/S019588/1	Enhanced Multiscale Boiling Surfaces (EMBOSS): From Fundamentals to Design (*8 Partners*)	(*UoE*) £638,708	(*Total*) £1.5 M	(*Duration*) 08/19 – 07/22
RSE-NSFC *(Just announced)*	A combined numerical modelling and machine learning approach for non-invasive estimation of fractional flow reserve from coronary computed tomography	£12000	£24000	08/19 – 07/21
ESA 14293/00/NL/SH CC No:5	Convection and Interfacial Mass Exchange (Evaporation)	£15200		10/16 – 09/19
EPSRC EP/M001482/1	SELECT: Selective Exhaust Gas Recirculation for Carbon Capture with Gas Turbines:	£506,923	£1.4 M	10/14 – 09/17

	Integration, Intensification, Scale-up and Optimisation *Partners: Leeds, Cardiff, Sulzer Inc, Costain, Doosan Babcock, Howden*			
UKCCSRC Call 2	Towards more flexible power generation with ccs: pilot plant test campaigns for best practice guidelines for post-combustion capture *Partners: Leeds*	£69,252		2014 – 2016
EPSRC EP/K00963X	Boiling in microchannels: integrated design of closed-loop cooling system for devices operating at high heat fluxes *5 Partners*	£578,199	£1.1 M	04/13 – 03/16
EU PIRSES-GA-2011-294905	Thermal Management of High Power Microsystems Using Multiphase Flows *Partners: EPFL Lausanne, Maryland, Shanghai Jiaotong University and Nottingham*	£350,800		04/12 – 03/16
DECC-Costain	ReCAP: Reduced Elevation CO_2 Absorber Programme *Partner: Costain Ltd*	£113,287		01/13 – 08/14
EPSRC EP/J020788/1	Gas-FACTS: Gas - Future Advanced Capture Technology Options *Partners: Cranfield, Imperial, Leeds and Sheffield*	£693,182	£3 M	04/12 – 03/15
Overall Grant Income				

		£1,391,265 PI	**£7 M** incl. partners	
		£3,052,551 CoI		

12. Research supervision experience

First Supervisor (PhD)		
Katie Thomson	Simultaneous phase-change of multiple sessile droplets	To join 11/19
To be interviewed	EMBOSS Project	To join 12/19
Luke Fulford	Mapping brain temperatures after large and or small vascular occlusion	09/18 – Ongoing
Davide Masiello	Bubble dynamics under low frequency sound waves: Shouting at Bubbles	08/16 – Ongoing (Joint)
James Farrell	The Effect of Rib Cage Deformity in Primary Thoracic Idiopathic Scoliosis on Pulmonary Function, Airway Morphology and Lung Volumes	09/15 – Ongoing ***Submitted Sept 2019 Viva in Jan 2020***
Erich Essmann	Complex dynamics of solid-fluid systems	09/15 – 09/19 ***Passed (minor corrections)***
Dr. Robson K Nazareth	Multiphase Dynamics in Liquid Mixtures: Thermocapillary Propulsion of Bubbles and Instabilities in Evaporating Layers	09/14 – 09/18 ***Graduated***
Dr. Adam G L Williams	Evaporation of Binary Liquids: Planar Layers and Sessile Drops	09/14 – 09/18 ***Graduated***
Dr. Stephen J Blowers	Modelling Brain Temperatures in Healthy Patients and Those With Induced Hypothermia	09/13 – 09/17 ***Graduated***
Dr. Patrick Schmidt	Interfacial Dynamics in Counter-current Gas-Liquid Flows	06/12 – 07/16 ***Graduated***
Dr. Pei Shui	A Novel Immersed Boundary Method for Direct Numerical Simulations of Solid-Fluid Flows	11/10 – 10/14 ***Graduated***
Dr. Pedro J Sáenz	Evaporation of Liquid layers and drops	05/10 – 04/14 ***Graduated***
Assistant Supervisor (PhD)		
Khaloud M M Al Balushi	Fundamentals of dropwise evaporation phase change on structured surfaces	05/19 – Ongoing
Miguel G Vazquez	New Approaches for Methane Emission Control	09/18 – Ongoing
Xiaoqiang Jin	Study on three phase flow in confined space based on the colloid and interfacial nature of the fluids and pore structure	09/17 – Ongoing
Hongyu Zhao	Complex wetting dynamics of droplets	09/17 – Ongoing
Yuhong Chen	Capillary origami	09/17 – Ongoing

Veronika Kubyshkina		10/17 – Ongoing
Muhammad Sofwan Bin Mohamad	On passive and active drag reduction of free-falling bodies in quiescent viscous fluid	12/15 – Ongoing ***Submitted***
Anthony Buchoux	Additive manufacturing technologies for microfluidic: development of complex 3-dimensional modular microfluidic devices	10/13 – Ongoing ***Examined, Corrections awaited***
Dr. Rohan Vernekar	Numerical study of Microfluidic effects and red blood cell dynamics in 'Deterministic Lateral Displacement' Geometries	09/14 – 09/18 ***Graduated***
Dr. Tamás I Jósza	Drag Reduction by Passive in-Plane Wall Motions in turbulent Wall-Bounded Flows	10/14 - 2018 ***Graduated***
Dr. Paul Tait	Pilot-scale testing of dynamic operation and measurement of interfacial wave dynamics in post-combustion carbon dioxide capture	01/12 – 12/17 ***Graduated***
Dr. Florian Chaumeil	Using DEM-CFD at colloidal scale	04/09 – 03/13 ***Graduated***
Dr. Georgios Machtsiras	Utilising flow characteristics to increase performance in swimming	10/06 – 05/13 ***Graduated***
PDRA Supervision		
Dr. Santhosh Seshadri	ReCAP Project	08/13 – 08/14
Dr. Gianluca Lavalle	SELECT and Sulzer IAA Projects	03/15 – 12/16

13. Contribution to Knowledge Exchange and Impact

Opensource Flow Solvers

a) Two Phase Level Set (TPLS) Solver is an ultra-high resolution, highly parallelisable, 3D Direct Numerical Simulation (DNS) flow solver to simulate single/ multi-phase flows at unprecedented detail, speed and accuracy

- TPLS v3 released in Dec 2017 (v2 in May 2015, v1 in June 2013)
- Available as Open Source at https://sourceforge.net/projects/tpls/
- 1515 downloads since June 2013 (globally by both academia and industry like Shell plc., Sulzer – see below, from at least 59 countries)
- Already tested in Sulzer through EPSRC IAA (G5)
- Optimised for supercomputing clusters such as ARCHER

b) Vascular Porous (VaPor) Model for Simulating Biological Temperatures is an open source software designed to simulate biological mass flows and heat transfer simultaneously.

- First version released in May 2018
- Available as Open Source at https://github.com/sblowers/VaPor
- Fully tested and validated on mice and neo-natal brain vasculature
- Accounts for both arterial and venous vasculature and porous tissue
- Simple MATLAB based interface

c) Gerris Immersed Solid Solver (GISS) is a versatile 3D Direct Numerical Simulation (DNS) flow solver to simulate solid-fluid multiphase flows**.**

- Full release in Dec 2019
- Restricted Beta version released in Feb 2015
- 6 degree of freedom motion of multiple solids of arbitrary shape
- Seamless coupling with Gerris Navier-Stokes Solver

Industrial collaborations

- Sulzer Inc, Switzerland – mass transfer equipment (Cash: £150k; In-Kind for EPSRC projects: ~ £100k)
- K2M Inc, USA (Now under Stryker Corporation) – Medical (Cash: £50k)
- Thermacore Europe, UK – thermal management systems (In-kind: ~ £20k)
- Selex Gaileo, UK – defence electronics (In-kind: ~ £10k)
- Costain, UK – engineering and construction (In-kind: ~ £10k)
- Elvesys, France – microfluidics (In-kind: ~ £10k)
- Cherry Biotech, France – microfluidic devices (In-kind: ~ £10k)
- Flow Capture AS, Norway – X-Ray Tomography (In-kind: ~ £10k)
- Alfa Laval, Sweden – heat exchange equipment (Direct + In-kind: £33k)
- Intrisiq Materials, UK – nanostructured surfaces (Direct + In-kind: £30k)
- Oxford NanoSystems, UK – nanostructured coatings (Direct + In-kind: £25k)
- TMD Technologies, UK – radar and RF cooling (In-kind: £15k)
- Calgavin, UK – heat transfer solutions (In-kind: £20k)

14. Academic Leadership, Management and Citizenship

a) Chair, Multiphase Flow and Transport Phenomena SIG, UK Fluids Network

- 200 participants across UK academia and industry
- Chair steering committee comprising 6 champions across the UK
- Exchanging knowledge, drive innovation and train ECRs, identify research challenges, accelerate industrial uptake and promote the area to wider public
- Deliverables / Actions

May 2017 (Edinburgh)	Focus Groups and Strategy – First Multiphase SIG Meeting
Dec 2017 (UCL)	Early Career Researchers Poster Pitch and Industry Interaction – Second SIG Meeting
Jul 2018 (Nottingham)	Barry Azzopardi Summer School in Experimental Methods and Data Analysis – Third SIG Meeting
Dec 2018 (Merck, Southampton)	Industry Day at Merck – Fourth SIG Meeting
May 2019 (Strathclyde)	Hewitt-Reese Spring School for Modelling Multiphase Flows – Fifth SIG Meeting
Sept 2019 (Durham)	Special Symposium on Emulsions and Multiphase Flows at Droplets 2019 – Sixth SIG Meeting

b) Conference and Workshop Organisation

Upcoming	*Maryland (June 2020), Toronto (Dec 2020), Pretoria (June 2021), Edinburgh (Nov 2021), International Boiling Conference (2020)*
Dec 2019 (Kyushu, Japan)	Second ThermaSMART Progress 100 workshop, supported by Kyushu University and Japanese academia and industry. (~ 60 delegates expected)

Sept 2019 (Durham)	Chair, Multiphase Flows/ Emulsions Session, Droplets 2019
Jun 2019 (Dublin)	Mid-Term Meeting at Dublin with the International Union of Theoretical and Applied Mechanics (IUTAM) Symposium on Computational Modelling of Instabilities and Turbulence in Separated Two-Phase Flows. (~100 delegates)
Dec 2018 (Tianjin, China)	The First ThermaSMART workshop at Tianjin, (~70 delegates including Chinese industry and academia).
June 2018 (Glasgow)	ECCM-ECFD 2018. (~ 1930 participants of which 625 PhD students)
Sept 2015 (Edinburgh)	The 14th UK Heat Transfer Conference (~ 200 participants from UK and International Academia and Industry)
Sept 2015 (Edinburgh)	Second ThermaPOWER Workshop. (~ 55 participants, ThermaPOWER consortium)
Aug 2014 (Shanghai)	First ThermaPOWER Workshop (Aug 2014) (~ 50 participants, ThermaPOWER consortium)

c) Citizenship

- Convenor of seminars at IMP from 2011-17 (organised around 85 seminars): Introduced Academic Keynotes (given by academic colleagues of high esteem), Industry Keynotes (Industry Leaders and Research centres), Envisage Seminars (Chancellors Fellows and New UoE Academics) and IMP Seminars (local IMP students, visitors and staff).
- I have stepped in as Acting Head of Research Institute, Acting Head (and Deputy Head) of Graduate School and represented the School in many College committees.
- I have been able to support academic staff and students (also for whom I am not a direct PT or a supervisor) undergoing serious mental-health and physical health crises. It's indeed a privilege to see that my colleagues and students view me as trustworthy and supportive. I am the School of Engineering nominee for the Charlie Waller Trust Training for Mental Health and Wellbeing.

d) Management

<u>*Graduate School Management*</u>

- *09/18-Current, Head of Graduate School*: Lead governance and development of the Graduate School. Provide strategic leadership in postgraduate (PGR) student recruitment, progression and training, including development of necessary strategy. Support the full spectrum of School's research agenda, strategy and plan. I chair the two School postgraduate committees: School Postgraduate Experience Committee (SPEC) and School Postgraduate Progression Committee (SPPC).
    - ≫ Lead a team of seven PG Advisors from each Institute forming the SPPC.
    - ≫ Streamlined fair allocation of UK and International PhD Studentships in line with the School's research strategy.
    - ≫ Work closely with the Director of Research to advise on applications for funding CDTs and to other sponsors for equivalent PGR schemes.
    - ≫ Implemented reforms in extensions and interruptions by improving communication of milestones and rules leading to considerable reduction of applications.

- Introduced improved surveillance and introduction of compulsory milestones for the annual review process. ***Our completion rates have risen from 63% in 2017 to 75% in 2018.***
- Streamlining PhD degrees - development and introduction of a single Engineering PhD course, rather than institute based PhD courses.
- Engage with University IAD and ensure that IAD Devolved Funding is deployed optimally to support PGR training courses.
- Introduced innovations such as demonstrations in School Research Conference and PGR Open Days improving student dissemination experience to a wider audience
- Resolve issues concerned with PGR matters - ranging from very serious mental health circumstances to difficult PhD examinations and difficult supervisor-student conflicts
- Successfully contributed to the 2017 School Postgrad Programme Review, that commended our practices - and now ensuring implementation of recommendations
- Represent the School and contribute in committees responsible for PGR strategy and training at the College (Section 15).

- *03/17-08/18, PG Advisor for IMT*: Deal with all PGR related matters at IMT and advise/work with the HoRI on PGR matters. Resolve difficult PGR matters alongside HoRI, DDoPS and HoGS.
- *12/15-08/18, Deputy Head of Graduate School and SPPC Member*: Responsible for overall PGR student experience. Worked with HoGS and DDoPS. Cover for HoGS (during periods of absence) to ensure prompt and efficient decision making and discharge of duties. Represent the School on various College committees (Section 16).
- *01/15-12/15, Acting Deputy Head of Graduate School and SPPC Member*: Responsibilities same as above
- *2011-17, PG Adviser for IMP and Member of School Postgrad Progression Committee (SPPC)*: Same as duties for PG Adviser for IMT (see above).

Teaching

- *2011-Current, Personal tutor*

15. Membership of committees, both University and external, where relevant

- School Postgraduate Progression Committee (2011 – Current)
- School Postgraduate Experience Committee (2011 – Current)
- School Impact Task Force (2017 – Current)
- College Researcher Training Committee (2016 – Current)
- College Researcher Experience Committee (2016 – Current)
- College PG Appeals Committee (2016 – Current)
- Edinburgh Parallel Computing Centre Scientific User Support Panel (2015 – Current)
- EPSRC Grant Prioritisation Panel (April 2019 onwards)

16. Appointments as external examiners (give university, dates and degrees)

- TU Darmstadt, 02/2020, PhD
- Imperial College London, 12/2019, PhD
- University of Nottingham, 10/2019, PhD
- Brunel University London, 06/2018, PhD

- Indian Institute of Technology Bombay, 2017, PhD
- University of Southampton, 12/2015, PhD

17. **Editorships**: Guest Editor for special issue of Fluid Dynamics and Material Processing incorporating outcomes from the *IUTAM Symposium on Computational Modelling of Instabilities and Turbulence in Separated Two-Phase Flows*
18. **Consultancies**
    Steer Energy, Schlumberger Doll (USA), Deacons (Hong Kong), SVT (UK), Air Liquide (France), ConocoPhillips (USA), HydroVenturi (UK)
19. **Membership of societies where academic distinction is the criterion of membership**
    IChemE, American Physical Society, American Chemical Society, American Association for Advancement of Science, Indian Society of Surface Science Technologies and EPSRC Peer Review College
20. **Items of esteem at symposia and congresses, chairmanships, invited talks at overseas university** and government/industry research groups and laboratories. Please present in date order indicating the year, title of presentation, meeting and city/institution.

    a) Invited JSPS Fellowship at Kyushu University (Jan 2018 – Mar 2018)
    - Conducted research on phase-change at Kyushu University on three specific topics: a) counter-current thermocapillary propulsion of bubbles in self-rewetting fluids, b) evaporation of colloidal droplets on flexible substrates and c) stability of evaporating binary mixture layers and absorption dynamics of hygroscopic sessile droplets.
    - Initiated new collaborations: Kobe University (Prof. Akio Tomiyama, Mechanical Engineering), Kyoto University (Prof. Tomoaki Kunugi, Nuclear Engineering) and Tokyo University of Science (Prof. Ichiro Ueno, Mechanical Engineering)

    b) Chair, Multiphase Flows and Transport Phenomena Special Interest Group (SIG), UK Fluids Network (Section 15a)

    c) Co-coordinator, European Space Agency's ISS Drop Evaporation Science Team
    - I bring modelling perspective in the design of experiments aboard ISS.
    - Work closely with the Coordinator, Prof D. Brutin (Aix Marseille University, France – Experimental expert) and the international science and measurement team.

    d) Mentor (Honorary Adviser) for curriculum development, Department of Chemical Engineering, Vishwakarma Institute of Technology (VIT), University of Pune, India

    e) Extraordinary Professor at the Department of Mechanical and Aeronautical Engineering, University of Pretoria, South Africa.

    f) International Invitations and Keynote Lectures
    1. "Secretive Behaviour of Binary Mixtures: Layers, Drops and Particles", Invited Talk at Tata Institute for Fundamental Research, Hyderabad, Aug 2019.
    2. "Secretive Behaviour of Binary Mixtures: Layers, Drops and Particles", Invited Talk at Indian Institute of Technology Hyderabad, Chemical/ Mechanical Engineering, Hyderabad, Aug 2019

3. “Secretive Behaviour of Binary Mixtures: Layers, Drops and Particles”, Invited Talk at Indian Institute of Technology Madras, Mechanical Engineering, Aug 2019
4. “Secretive Behaviour of Binary Mixtures: Layers, Drops and Particles”, Invited Talk at Indian Institute of Technology Mumbai, Mechanical/ Chemical Engineering, Jul 2019
5. “Secretive hydrodynamics during phase-change”, Keynote Speaker at HEFAT Meeting, Wicklow, Jul 2019
6. “Confessions and Secrets During Evaporation: Pools, Drops and Particles”, Keynote Speaker at International Conference on Energy and Environment, VIT Pune, Jan 2019.
7. “Secretive Hydrodynamics During Phase Change: Pools, Drops and Particles”, Keynote Speaker at First ThermaSMART Workshop, Tianjin, Dec 2018.
8. “Unravelling Some Secrets of Evaporating Binary Fluid Mixtures: Pools and Drops”, Keynote Speaker at Symposium on Patterns and Dynamics in Multiphase and Interface Flows, University of Florida, Nov 2018.
9. “Confessions of an evaporating binary mixture drop”, International Centre for Theoretical Sciences – Tata Institute for Fundamental Research, Bangalore, Apr 2018.
10. “Two-phase flows: Stability Analyses and Ultra-high Resolution DNS”, Department of Mechanical Engineering, Tokyo University of Science, Tokyo, Mar 2018
11. “Evaporation of Droplets formed of Binary Mixtures”, Department of Nuclear Engineering, Kyoto University, Kyoto, Mar 2018.
12. “Multiphase Flows @ Ultra-high Resolutions: Instabilities and a World of Unparalleled Scientific Beauty”, Department of Mechanical Engineering, Kobe University, Kobe, Mar 2018.
13. “Watching Sessile Droplets Evaporate: Beautiful (and never boring) phenomena!” Keynote Speaker at I2CNER and Hydrogenius Workshop, Fukuoka, Feb 2018.
14. “Beautiful Multiphase Flows @ Ultra-High Resolution & Superfast Speeds: Phase-change applications and Stratified Flows”, Keynote Speaker at EKC 2017, Stockholm, July 2017.
15. “Sessile Droplet Evaporation: Ultra-high Resolution DNS, Geometry Control and Curvature driven Phase Segregation of Species”, Droplets 2017, Los Angeles, July 2017.
16. “Sessile Droplet Evaporation: Ultra-high Resolution DNS, Geometry Control and Curvature driven Phase Segregation of Species”, Keynote Speaker at the 1st Asian Conference of Thermal Sciences, Jeju, South Korea, Mar 2017.
17. “Watching droplets evaporate ... is certainly NOT boring!”, Mechanical Engineering, Indian Institute of Technology Bombay, India, Jan 2017.
18. “Sessile droplet evaporation - Geometry-control and curvature-driven phase segregation in binary mixtures”, Tata Institute for Fundamental Research, Hyderabad, India, Dec 2016.
19. “Spatiotemporal Instabilities in Stratified Co-current and Counter-Current Gas-Liquid Flows: Ultrahigh Resolution DNS”, Keynote GDR Films (No: 3373) Workshop, CNRS Aussois, France, March 2015.

20. “Thermocapillary Instabilities in Evaporating Pools and Sessile Droplets: Ultrahigh Resolution DNS”, Keynote GDR Films (No: 3373) Workshop, CNRS Aussois, France, March 2015.
21. “Three Dimensional Direct Numerical Simulations of Non-isothermal Pools and Sessile Droplets with Phase Change: Hydrothermal Waves and Convective Rolls”, 9th International Conference on Two-Phase Systems for Ground and Space Applications, Baltimore, Maryland USA, Sept 2014.
22. “Thermocapillary Instabilities and Hydrothermal Waves during the Evaporation of Liquid Pools and Drops”, Keynote Speaker, Workshop on Fluid Patterns in Science and Technology, University of Florida, Gainesville, USA, April 2014.
23. “Unravelling Complex Multiphase Flows by Means of Ultra-High Resolution DNS”, Department of Mechanical Engineering, University of Maryland, Maryland, USA, December 2013.
24. “Unravelling Complex Multiphase Flows by Means of Ultra-High Resolution DNS”, Tata Institute for Fundamental Research, Hyderabad, India, September 2013.
25. “Direct Numerical Simulations Revealing the Nature of Complex Multiphase Flows”, Department of Modern Mechanics, University of Science and Technology of China, China, August 2013.
26. “Direct Numerical Simulations Unravelling Complex Multiphase Flows”, School of Mechanical Engineering, Shanghai Jiao Tong University, China, August 2013.
27. “Direct Numerical Simulations - Predicting Complex Multiphase Flows”, School of Mathematical Sciences, University College Dublin, April 2013.
28. “Spatiotemporal instabilities in two-phase flow”, Institut Jean le Rond d’Alembert, Université Pierre et Marie Curie, Paris, April 2011.
29. “Spatiotemporal instabilities in two-phase flow”, Department of Chemical Engineering, Indian Institute of Technology, Mumbai, India, January 2010.
30. “Computational fluid dynamics: From understanding to implementation”, Department of Chemical Engineering at Indian Institute of Technology, Hyderabad, India, January 2010.
31. “Computational fluid dynamics: From understanding to implementation”, Department of Chemical Engineering, Dr. Babasaheb Ambedkar Technological University, Lonere, India, December 2009.
32. “Modelling complex flows using CFD”, Invited Talk at Fakultat fur Ingenieurwissenschaften, Universitat Duisburg-Essen, Duisburg, Germany, February 2007.

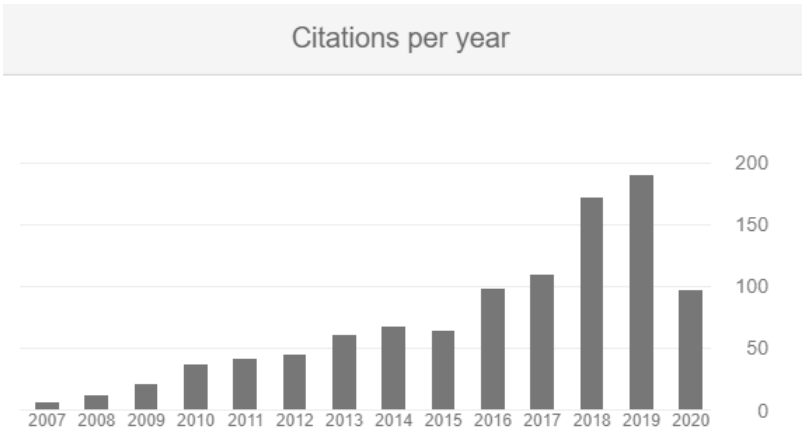
g) National invitations

1. “Confessions of an Evaporating Binary Mixture Drop”, Complex Heterogeneous Systems Workshop, School of Mathematics and Computer Sciences, Heriot-Watt University, Edinburgh, UK, Jun 2018.
2. “Watching Sessile Droplets Evaporate: Beautiful (and never boring) phenomena!”, School of Science and Technology, Nottingham Trent University, Nottingham, UK, Jan 2018.
3. “Watching Sessile Droplets Evaporate: Beautiful (and never boring) phenomena!”, Continuum Mechanics and Industrial Mathematics, Department of Mathematics and Statistics, University of Strathclyde, Glasgow, UK, Nov 2017.

4. “World of Multiphase Flows @ Ultra-High Resolution: Phase-change applications and Stratified Flows”, Keynote Speaker at IMechE Multiphase Flows CFD Modelling Special Meeting, May 2016.
5. “Models of heat loss from the brain - advantages and problems”, International Hypothermia Symposium, Edinburgh, UK, Sept 2014.
6. “Three dimensional direct numerical simulations of non-isothermal pools and sessile droplets with phase change: hydrothermal waves and convective rolls”, The Geoff Hewitt Celebration Conference on Multiphase Flows, Imperial College London, UK, July 2014
7. “Unravelling Complex Multiphase Flows by Means of Ultra-High Resolution DNS”, Department of Chemical Engineering, University of Strathclyde, Glasgow, UK, March 2014.
8. “Direct Numerical Simulations - Predicting Complex Multiphase Flows”, The First Chemical Engineering UK Day, Department of Chemical Engineering, Imperial College London, March 2013

21. Any other relevant information:

- *Article Referee service*: Journal of Fluid Mechanics, Physics of Fluids, Physical Review Fluids, International Journal of Multiphase Flow, Nature Communications, Nature Scientific Reports, Chemical Engineering Science, International Journal of Heat and Mass Transfer,
- *Proposal Referee service:* EPSRC, British Council Young Scientists Award, Leverhulme Fellowships, Carnegie Trust
- *Public engagement:* Science and Engineering Ambassador (EPSRC-NOISE scheme), RCUK Case studies, Judge at Big Bang Scotland (2012)
- *Important Fluid Dynamics Community Contributions:* Around 66 contributions in the American Physical Society Division of Fluid Dynamics Meetings (the largest and the most influential global congregations of fluid dynamicists)
- *Google Scholar Data*:



	All	***Since 2015***
Citations	1042	732
h-index	20	18
i10-index	22	20

B. LIST of PUBLICATIONS

1. Joint articles published

Publication Strategy: To publish high impact papers in top quality journals in the field of fluid mechanics.

The top journals in my field are Journal of Fluid Mechanics (IF=2.893), Physical Review Letters (9.227), Physical Review Fluids, Physical Review X (12.211), Physics of Fluids (2.627), Nature Communications (11.88), Nature Scientific Reports (4.011) and International Journal of Multiphase Flow (2.509). *In my field of work, publications through these top journals is quite rigorous and usually takes at least one year to publish.*

1) M. Vermaak, J. Potgieter, J. Dirker, M. A. Moghimi, **P. Valluri**, K. Sefiane, J. P. Meyer, “Experimental and numerical investigation of micro/mini channel flow-boiling heat transfer with non-uniform circumferential heat fluxes at different rotational orientations”, accepted in International Journal of Heat and Mass Transfer (2020).
2) H. Zhao, C. Mackenzie-Dover, D. Orejon, **P. Valluri**, M. E. R. Shanahan and K. Sefiane, “Fast Droplet Motion on Contrasting Striated Surfaces”, accepted in Applied Physics Letters (2020)
3) D. Masiello, I. Tudela, R. Govindarajan, R. Nityananda and **P. Valluri**, “Single-bubble collapse at high amplitude audible frequencies”, submitted to Physical Review X (2019).
4) Z. Wang, G. Karapetsas, A. Williams, K. Sefiane, Y. Takata and **P. Valluri**, “Dynamics of hygroscopic aqueous salt solution droplets along with water evaporation”, submitted to Journal of Fluid Mechanics (2019).
5) R. K. Nazareth, G. Karapetsas, K. Sefiane, O. K. Matar, and **P. Valluri**, “The stability of evaporating binary liquid film heated from below”, submitted to Physical Review Fluids (2019).
6) E. Essmann, P. Shui, S. Popinet, S. Zaleski, **P. Valluri** and R. Govindarajan, “Chaotic orbits of tumbling ellipsoids”, submitted to Journal of Fluid Mechanics (2019)
7) A. G. L. Williams, G. Karapetsas, D. Mamalis, K. Sefiane, O. K. Matar and **P. Valluri**, “Spreading of volatile drops comprising binary mixtures during phase-change”, submitted to Journal of Fluid Mechanics (2019)
8) Y. Chen, A. Askounis, K. Sefiane, V. Koutsos, **P. Valluri**, Y. Takata, and S. K. Wilson, “On the effect of the substrate viscoelasticity on the evaporation kinetics and deposition patterns of nano-suspension drops”, Langmuir, 36, 204 (2020).
9) S. Blowers, I. Marshall, M. Thrippleton, P. Andrews, B. Harris, I. Bethune and **P. Valluri**, “How does blood regulate cerebral temperatures during hypothermia?”, Scientific Reports, 8, 7877 (2018).
10) G. Lavalle, M. Lucquiaud, M. Wehrli and **P. Valluri**, “Cross-flow structured packing for the process intensification of post-combustion carbon dioxide capture”, Chemical Engineering Science, 178, 284, (2018).
11) P. J. Sáenz, A. Wray, Z. Che, O. K. Matar, **P. Valluri**, J. Kim and K. Sefiane “Dynamics and universal scaling law in geometrically-controlled sessile drop evaporation”, Nature Communications, 8, 14783, (2017).

12) G. Lavalle, J. P. Vila, M. Lucquiaud, and **P. Valluri**, “Ultra-efficient reduced model for counter-current two-layer flows", Physical Review Fluids, 2, 014001, (2017).
13) P. Schmidt, L. Ó Náraigh, M. Lucquiaud and **P. Valluri**, “Linear and nonlinear instability in vertical counter-current laminar gas-liquid flows”, Physics of Fluids, 28, 042102, (2016). ***Editor’s Choice.***
14) J. Fannon, J-C. Loiseau, **P. Valluri**, I. Bethune and L. Ó Náraigh, “Simplified TPLS as a learning tool for high-performance computational fluid dynamics”, European Journal of Physics, 37, 045001, (2016).
15) P. Tait, W. Buschle, I. Ausner, W. Wehrli, **P. Valluri** and M. Lucquiaud, “A pilot-scale study of dynamic response scenarios for the flexible operation of post-combustion CO2 capture” International Journal of Greenhouse Gas Control, 48, 216-233 (2016).
16) P. J. Sáenz, K. Sefiane, J. Kim, O. K. Matar and **P. Valluri**, “Evaporation of sessile drops: a three dimensional approach", Journal of Fluid Mechanics, 772, 705-739, (2015).
17) T. Robinson, **P. Valluri**, G. Kennedy, A. Sardini, C. Dunsby, M. A. A. Neil, G. S. Baldwin, P. M. W. French and A. J. de Mello, “Analysis of DNA binding and nucleotide flipping kinetics using two-colour two-photon fluorescence lifetime imaging microscopy”, *Analytical Chemistry*, **86**, 10732-10740, (2014).
18) L. Ó Náraigh, **P. Valluri**, D. Scott, I. Bethune and P. D. M. Spelt, “Linear instability, nonlinear instability, and ligament dynamics in three-dimensional laminar two-layer liquid/liquid flows", *Journal of Fluid Mechanics*, **750**, 464-506, (2014).
19) P. Sáenz, **P. Valluri**, K. Sefiane, G. Karapetsas and O. K. Matar, “On phase change in Marangoni-driven flows and its effects on the hydrothermal-wave instabilities", *Physics of Fluids*, **26**, Art. 024114, (2014).
20) P. Sáenz, **P. Valluri**, K. Sefiane, G. Karapetsas and O. K. Matar, “Linear and non-linear stability of hydrothermal waves in planar liquid layers driven by thermocapillarity", *Physics of Fluids*, **25**, Art. 094101, (2013).
21) G. Karapetsas, O. K. Matar, **P. Valluri** and K. Sefiane, “Convective and hydrothermal waves in evaporating sessile drops", *Langmuir*, **28**, 11433-11439, (2012).
22) **P. Valluri**, H. Ding, L. Ó Náraigh and P. D. M. Spelt, “Linear and nonlinear spatio-temporal instability in laminar two layer flows", *Journal of Fluid Mechanics*, **656**, 458-480, (2010).
23) K. C. Sahu, H. Ding, **P. Valluri** and O. K. Matar, “Pressure-driven miscible two-fluid channel flow with density gradients", *Physics of Fluids*, **21**, Art. 043603, (2009).
24) K. C. Sahu, H. Ding, **P. Valluri** and O. K. Matar, “Linear stability analysis and numerical simulation of miscible two-layer channel flow", *Physics of Fluids*, **21**, Art. 042104, (2009).
25) T. Robinson, **P. Valluri**, H. B. Manning, D. M. Owen, I. Munro, C. B. Talbot, C. Dunsby, J. F. Eccleston, G.S. Baldwin, M. A. A. Neil, A. J. de Mello and P. M. W. French, “Three-dimensional molecular mapping in a microfluidic mixing device using fluorescence lifetime imaging", *Optics Letters*, **33**, 1887-1889, (2008).

26) **P. Valluri**, P. D. M. Spelt, C. J. Lawrence and G. F. Hewitt, “Numerical simulation of the onset of slug initiation in laminar horizontal channel flow", *International Journal of Multiphase Flow*, **34**, 206-225, (2008).
27) K. C. Sahu, **P. Valluri**, P. D. M. Spelt and O. K. Matar, “Linear instability of pressure-driven channel flow of a Newtonian and a Herschel-Bulkley fluid", *Physics of Fluids*, **19**, Art. 122101, (2007).
28) **P. Valluri**, O. K. Matar, G. F. Hewitt and M. A. Mendes, “Thin film flow over structured packings at moderate Reynolds numbers", *Chemical Engineering. Science*, **60**, 1965-1975, (2005).
29) **P. Valluri**, O. K. Matar, M. A. Mendes and G. F. Hewitt, “Modelling hydrodynamics and mass transfer in structured packings - A Review", *Multiphase Science and Technology*, **14**, 303-348, (2002).

2. Book Chapters

1) L. Ó Naraigh and **P. Valluri**, “Stability Analysis and Direct Numerical Simulation for Two-Phase Flows and Heat Transfer: A Complementary Approach”, In The Encyclopedia for Two-Phase Heat Transfer and Flow IV, J. R. Thome (Ed.), 239-291, (2018).
2) I. Bethune, A.B.K. Collis, L. Ó. Náraigh, D. Scott and **P. Valluri**, “Developing a scalable and flexible high-resolution DNS code for two-phase flows”, In Parallel Computing: On the road to Exascale, Vol 27, Book Series: Advances in Parallel Computing, G. R. Joubert et al. (Eds), 459-468, (2016).

3. Important notes

1) D. M. Scott, L. Ó Náraigh, I. Bethune and **P. Valluri**, “TPLS: 3D Decomposition and Gas/Liquid Flows”, ARCHER-eCSE Technical Report (2017).
2) I. Bethune, A.B.K. Collis, L. Ó. Náraigh, D. Scott and **P. Valluri**, “TPLS: Optimised Parallel I/O and Visualisation”, ARCHER-eCSE Technical Report, http://www.archer.ac.uk/community/eCSE/eCSE01-008/eCSE01-008.php (2016)
3) D. M. Scott, L. Ó Náraigh, I. Bethune, **P. Valluri** and P. D. M. Spelt “Performance Enhancement and Optimization of the TPLS and DIM Two-Phase Flow Solvers”, HECToR-dCSE Technical Report, http://www.hector.ac.uk/cse/distributedcse/reports/tpls-dim/ EPSRC-HECToR (2013).
4) L. Ó Náraigh and **P. Valluri**, “Towards a complete description of two-phase interfacial dynamics in turbulent stratified flow”, HPC-Europa2 Technical Report, European Commission (2011).

4. Patents:

1) *Solid detergent for e.g. kitchen surfaces consists of surfactants, alkalolamines, amide and solid abrasive, in bar form*. **Held by Unilever plc**. (Last Published in 2007) Derwent Primary Accession Number: 2001-329373 [70], Patent numbers: BR200004050-A; IN9900634-I3; IN204208-B
2) *Non liquid abrasive cleaning composition consists of a particulate and surfactant blend incorporating alkanolamines*. **Held by Unilever plc.** (Last Published in 2004) Derwent Primary Accession Number: 2001-235449 [71], Patent Numbers: BR200003116-A; MX2000007215-A1; IN193938-B.
3) *Non liquid abrasive cleaning composition consists of a particulate and surfactant blend incorporating alkanolammonium contra ions*. **Held by**

Unilever plc. (Last Published in 2005) Derwent Primary Accession Number: 2001-235448 [78], Patent Numbers: BR200003115-A; MX2000007216-A1; IN195369-B.

5. Refereed Conference Proceedings

1) A. G. L. Williams, P. J. Sáenz, G. Karapetsas, K. Sefiane, O. K. Matar and P. Valluri, “Evaporation of binary mixtures: Pools and Droplets”, In International Heat Transfer Conference, Beijing (Aug 2018),
2) P. Shui, P. Valluri, S. Popinet and R. Govindarajan, “Direct numerical simulation study of hydrodynamic interactions between immersed solids and wall during flow”, Proceedings, IUTAM Symposium on Multiphase flows with phase change: challenges and opportunities (Dec 2014)
3) P. J. Sáenz, P. Valluri, K. Sefiane and O. K. Matar, “Stability and two-phase dynamics of evaporating Marangoni driven flows in laterally-heated liquid layers and sessile droplets”, Proceedings, IUTAM Symposium on Multiphase flows with phase change: challenges and opportunities (Dec 2014)
4) P. Valluri, K. C. Sahu, P. D. M. Spelt, O. K. Matar and C. J. Lawrence, “Removal of non-Newtonian soils using Newtonian fluids: A numerical study”, In the International Conference on Multiphase Flow, Leipzig, Germany, July 9-13, 2007.
5) P. Valluri, O. K. Matar, M. A. Mendes-tatsis and G. F. Hewitt, “Modelling multiphase hydrodynamics in structured packings.”, In International Symposium on Process Systems Engineering and Control, special technical session on “CFD productivity enhancement”, IIT Bombay, India, Jan 1-4, 2003.