


## Curriculum vitae

### Personal details

Titles	Assistant professor, dr. ir.	
Name & surname	David Fernandez Rivas	
Male/female	Male	
Nationality	Cuban	
Date of birth	August 15 <sup>th</sup> 1981	
Researcher ID	ORCID: 0000-0003-4329-3248	
Website	www.david-fernandez-rivas.com	

### Master's degree ('Doctoraal')

2000-2004	Engineering Diploma Summa cum laude (top 2% of students receives it), entitled Modelación del flujo (...) dinámica de fluidos computacional, Instituto Superior de Ciencias y Tecnologías Aplicadas, Cuba, InSTEC, supervised by Prof. M. Piedra. First to finish 1 year earlier, with score 5.19, even larger than the nominal maximum 5, due to excellence and extracurricular research activities.
2003	Research internship Prof. S. Turek, UT Dortmund, Germany, 2003. CFD modelling of a sugar cane crystalliser, contributed to my BSc thesis, and one IAEA publication.
2004-2006	MSc. from InSTEC, Cuba, entitled Early turbulence transition by polymer addition supervised by Prof. M. Montesinos.
2005	DAAD fellow visitor, Prof. D. Agar, Prof. S. Turek UT Dortmund, Germany, Slug flow microreactor Computational Fluid Dynamics (CFD); one publication.
2005	Research internship arranged personally with Prof. K.R. Sreenivasan, ICTP, Italy. Polymer drag reduction experiments, contributed to my MSc thesis.

### Doctorate

2007-2012	Ph.D. Taming Cavitation Bubbles. Mesoscale Chemical Systems, MCS. University of Twente UT, The Netherlands, supervised by Prof. J.G.E. Gardeniers. Defense date: October 26 <sup>th</sup> 2012 Based on my results, <b>a patent was filed and I co-founded a spin-off.</b>
2010	Research internship Prof. M. Ashokkumar, University of Melbourne, Australia. Learning about sonochemistry; one publication as a result.
2011	Research internship Dr. K. Yasui, AIST Nagoya, Japan. Conducted sonoluminescence experiments; one publication as a result.

### Work experience since completing PhD

Position	Period (date-date)	FTE	Type of position (fixed term/ permanent/ tenure track/ other)	Institution
Assistant professor UD	October 2017 - present	1.0	permanent	Mesoscale Chemical Systems, MCS University of Twente
Research affiliate	August 2017- present	0.05	fixed	Massachusetts Institute of Technology, MIT - Mechanical Engineering Department
Visiting	May-August	1.0	fixed	MIT - Mechanical

staff	2017			Engineering Department
Assistant professor	August 2014-September 2017	1.0	fixed	MCS University of Twente
Post-doctoral fellow	August 2012-August 2014	0.5	fixed	Molecular Nanofabrication, MNF, University of Twente. Supervisor Jurriaan Huskens
Post-doctoral fellow	August 2012-August 2014	0.5	fixed	MCS, University of Twente Supervisor Regina Lutge, spin-off embedding (Mylife technologies).
Co-founder	September 2012-September 2014	0.1	Fixed	BuBclean VOF, The Netherlands. Spin-off from the University of Twente

### **Selected Conference and Seminar presentations** –invited and keynote

1. **Speaker** at *Inspirerende Ingenieurs*, The Hague, The Netherlands, October 6<sup>th</sup>, 2019
2. **Speaker** Bubbles and hydrogen, Mini-symposium over Hydrogen organised by KIVI, Dutch Engineering Society, February 7<sup>th</sup> 2019.
3. Opening **plenary speaker** 1st International Congress on NanoBioEngineering, Monterrey, Mexico, Nov. 2018.
4. **Speaker** at EmTech Europe, Toulouse, France, October 2018. See video here.
5. **Speaker** HealthValley event, Nijmegen, The Netherlands, March 2018.
6. **Keynote** Improving nanomaterials exfoliation in a bag. BINA-Day, Israel, March 2017.
7. **Speaker** A non-native view on entrepreneurship in the Netherlands, Veldhoven, 2017.
8. **Keynote** Is reproducibility inside the bag?, 15th Meeting of the European Society of Sonochemistry ESS15, Istanbul, Turkey on June 27<sup>th</sup>-July 1<sup>st</sup>, 2016.

### **Other academic activities**

#### Organisation of Scientific Meetings

Year	Role, title, budget
2019	<b>Main organiser</b> Educating on Process Intensification, Lorentz Center, June 3-7 <sup>th</sup> , 32 ke.
2019	<b>Main organiser</b> The Future under our Skin, Design Lab, April 18 <sup>th</sup> NWA funded, 13 ke.
2019	<b>Member International Scientific Committee</b> , 2nd International Process Intensification Conference, Leuven, May 27-29 <sup>th</sup> Belgium
2019	<b>Member International Scientific Committee</b> , Additive Manufacturing Meets Medicine (AMMM 2019), Lübeck, Germany, September 12-13 <sup>th</sup>
2016	<b>Main organiser</b> , Pathways to Solar Hydrogen Technologies, Lorentz Center, June 13- 17 <sup>th</sup> , budget: 42 ke; Resulted in publication Energy Environ. Sci., 2018 and Journal Cover October 2018
2014	<b>Co-organizer</b> Technical aspects and monitoring of cleaning and sterilization processes, November 20 <sup>th</sup> .

Teaching since 2014 (before I also taught other courses in Cuba)

Year	Role	Course
2019	Course designer, teacher	Innovating Reactor Systems, MSc Chem. Eng. 2.5 ECTS.
2015	Course designer, teacher	Process Intensification Principles. MSc Chem. Eng. 5 ECTS, taught for 3 years.
2016	Certified teacher basic qualifications in education (UTQ/BKO)	
2014	Teacher	Surface Phenomena and Microfluidics course. MSc Chem. Eng. 5 ECTS.

### Scholarships, grants and prizes (selected)

Scholarship/Grant/ Prize Formal applicant	Amount in euros	*	Year of award
ERC Starting Grant: BuBble GUN	1.5 M		2019
Sensor development for real-time inline measurement of fluid-mechanical parameters in industry. University of Twente	100 k		2018
Rapid microsensor to diagnose bacterial infection in COPD exacerbations. Pioneers in Healthcare	50 k		2017
Pieter Langerhuizen Fonds. Koninklijke Hollandsche Maatschappij der Wetenschappen est. in 1752, oldest Dutch learned society	15 k		2016
Ultrasound Cavitation in Soft Materials, UCOM, H2020-MSCA-ITN	4.2 M	800 k	2018
Continuous sensing and flow with bubbles, Netherlands Center for Multiscale Catalytic Energy Conversion, MCEC	13.6 M	274.2 k	2018

### Output indicators

The publications from my research are read by scientific communities covering interdisciplinary areas within physics, chemistry, engineering, medicine, materials science, and others. Trained as nuclear engineer, I work in close collaboration with experts, specially theorists and fundamental scientists. *As a result, over 30 % of my publications since 2008 report joint experimental and theoretical work in various topics.* In my field, independence and leadership are demonstrated as last-author in original papers, or



Publications  
Scopus: 42  
Google Scholar: 75



H-Index  
Scopus: 15  
Google Scholar: 17



Grants  
# 13  
€ 1.6 M



Invited presentations  
12



Fellowships & Awards  
7



PD : 1 + 1  
PHD: 3 + 1  
MSc: 17  
BSc: 16



Start Ups  
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first, second or corresponding author in opinions and reviews. The valorisation of my work can be seen in two patents (one published, one filed) and two spin-off companies; however, standardised parameters for this output do not exist.

### Top 5 publications

(† leading PI) (IF Impact factor) (# citations).

1. † Oyarte, L., Brio, M., Fernandez Rivas, D. High speed imaging of solid needle and liquid micro-jet injections *Journal of Applied Physics*, 125, 14, 2019. IF-2.17

First comparison of jet injection with conventional tattoo machines.

2. † Berrospe Rodriguez, C., Visser, C.W., Schlautmann, S., Ramos Garcia, R., Fernandez Rivas, D., Continuous -wave laser generated jets for needle free applications. *Biomicrofluidics*, 10, 014104 (2016). #8 – IF-3.4

My group's first demonstration of jetting with continuous wave lasers to reduce needle usage as main drug delivery system, which poses severe risks such as spread of disease and waste contamination.

3. † Berrospe Rodriguez, C., Visser, C.W., Schlautmann, S., Fernandez Rivas, D., Ramos Garcia, R., Towards jet injection by continuous-wave laser cavitation. *Journal of Biomedical Optics*, 22(10), [105003] (2017). #5 – IF-2.9

Demonstrated in my lab, injection into agarose gels with microfluidic design published earlier (#2 above).

4. † van der Linde, P., Moreno Soto, A., Peñas-Lopez, P., Rodriguez-Rodriguez, J., Lohse, D., Gardeniers\*, H., van der Meer, D., Fernandez Rivas, D. Electrolysis-driven and pressure-controlled diffusive growth of successive bubbles on micro-structured surfaces. *Langmuir*, 33(45), 12873-12886 (2017). #6 – IF-3.8

First paper of my PhD student shows micromachined pits to control cavitation (as hydrogen gas bubbles) on silicon electrodes. Recommended by *Langmuir* Executive Editor R.M. Crooks.

5. † Gomes, F., Thakkarb, H., L'ahde, A., Verhaagen, B., Pandit, A.B., Fernandez Rivas, D., Is Reproducibility Inside the Bag? *Ultrason. Sonochem.* 40, 163-174, (2017). #6 – IF-4.2 CA

Addressing reproducibility with a scaled-up version of the microfluidic reactor published in *Angew. Chemie* Bubbles in a bag have many practical uses, such as exfoliation of nanomaterials with improved reproducibility and I have supervised its valorisation.

### Patents

1. Micropits for ultrasonic treatment. WO2015144918 A1, Verhaagen, B., Fernandez Rivas, D., Gardeniers, J.G.E., Versluis, A.M.; (2015).

This is an example of what drives me and makes me proud: converting a research idea from my PhD project into a useful document for its valorisation. With this patent, we initiated the commercialisation of the BuBble bags.

2. European Patent Application number 19161647.3, Energy efficient jet ejection by confined bubble expansion for injection of liquids. Fernandez Rivas, D. and Oyarte, L., 2019.

### Other Activities

*Valorisation and spin-off experiences*

1. BuBclean, spin-off co-founder, The Netherlands. Patented, and commercialised product: BubbleBags, with more than 10,000 units sold.
2. InkBeams is a spin-off idea supported by the University of Twente, based on applications of needle-free injection technology to deliver fluids through the skin.