David Fernández Rivas CV -

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Last updated: April 3, 2017.

Graduate Education

Ph.D. October, 26^{th} 2012.
Supervisor (Promotor): Prof. Dr. J.G.E. Gardeniers. University of Twente, Enschede, The Netherlands. *Dissertation:* Taming Cavitation Bubbles.

Master of Science, October 2006.
Early Turbulence Transition by Polymer Addition. Ingeniería Nuclear, Inst. Superior Ciencias y Tecnologías Aplicadas. InSTEC, Cuba.
Prof. Dr. M.E. Montesinos, with research visit to the International Centre for Theoretical Physics Abdus Salam, ICTP, Italy. Prof. Dr. K.R. Sreenivasan, Dir. of Advanced Fluidics, Prof. Dr. S. Raghu.

Nuclear Engineering Diploma, *Suma cum laude*, July 2004
Modelación del flujo de aire en un termosifón aplicando técnicas de dinámica de fluidos computacional. InSTEC, Cuba.
Prof. Dr. M. Piedra, and visit to the Technische Universität Dortmund, Germany: Prof Turek.
Score: **5.19** / 5. First student graduating in 4 years -normally 5 years program.

Employment

Assistant Professor (Tenure Track) at the Mesoscale Chemical Systems group. MCS
August 2014 – Present; in the projects:

BuBleJet: Microfluidics for transdermal needle-free delivery based on thermocavitation.

BuBbleGun: Controlled ultrasonic cavitation for surface modification.

BuBbleServer: Cavitation in novel systems for challenging chemical reactions.

BuBleManagement: Novel electrodes for Solar2Fuel devices (hydrogen evolution).

Research fellow (Post-Doc) August 2012 – August 2014; in the projects:

Solar-2-fuel cells. Project leader: Prof. J. Huskens. Molecular Nanofabrication Group (MNF) and Mesoscale Chemical Systems Group, Faculty of Science and Technology, University of Twente, The Netherlands.

Microneedles. Project leader: Prof. R. Luttge. Mesoscale Chemical Systems Group, Faculty of Science and Technology, University of Twente, The Netherlands.

PhD in the MCS group, Mesa+ Institute for Nanotechnology, University of Twente,
Supervisor: Prof. Dr. J.G.E. Gardeniers. August 2007 - August 2012. PhD Mesoscale Chemical Systems; 80% appointment, led to an extra year for Dutch standards.

Instituto Superior de Ciencias y Tecnologia Aplicadas, InSTEC. 2004-2007

Docent Instructor category at InSTEC. 2006.

Radiological Protection Safeguard Responsible, InSTEC, Cuba. Coordinator of International Atomic Energy Agency (IAEA) delegations for Nuclear Material Control.
November 2004-November 2007.

Valorisation and Spin-off experiences

BuBclean, spin-off (co-founder), The Netherlands. Patented and commercialised a product: BubbleBags, more than 10,000 units sold.

InkBeams spin-off from the University of Twente. In development; based on applications of needle-free injection technology to deliver fluids through the skin.

Selected 6 publications (IF: impact factor).

1. Modestino, M.A., Fernández Rivas, D., Hashemi, S.M.H., Gardeniers, J.G.E., Psaltis, D., The potential for microfluidics in electrochemical energy systems. Energy Environ. Sci. **9** 3381-3391, (2016) IF-25.47

   This is my highest impact factor publication, but I consider it important also from the fact that is an overlooked topic that will accelerate the search for solutions to problems faced in the renewable and conventional energy systems, based on electrochemistry (solar-to-fuel, electrolysers, membranes, etc).

2. Fernández Rivas, D., A. Prosperetti, A.G. Zijlstra, D. Lohse, J. G. E. Gardeniers Efficient Sonochemistry through Microbubbles Generated with Micromachined Surfaces, Angewandte Chemie International Edition, 49: 9699 - 9701. (2010). IF-11.26
   A higher efficiency of ultrasound reactors was reported for the first time with microfabrication of artificial crevices. Corner-stone of my acoustic cavitation research.

3. 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). IF-3.36

   First demonstration of the possibility to inject liquid with portable and cheaper (continuous wave) lasers. Needles are the main drug delivery system nowadays, but there are risks, such as spread of disease and waste contamination. Here we studied liquid microjet production on a continuous wave laser-based microfluidic device. I am currently developping a needle-free portable injector.

4. Verhaagen, B., Fernandez Rivas, D. Measuring cavitation and its cleaning effect. Ultrasonic Sonochemistry, 29, Pages 619 – 628 (2016). IF-4.56

   Featured in a Special issue I co-edited, a review addressing issues of cleaning with bubbles, its partial understanding and challenges in cleaning quantification and adhesion.

5. Fernandez Rivas, D., Cintas, P., Gardeniers, J.G.E., Merging microfluidics and sonochemistry: towards greener and more efficient micro-sono-reactors. Chemical Communications. 48 (89), 10935 - 10947 (2012). IF-6.83
   In this review paper, we discussed emerging trends such as green chemistry, potential uses of combined sonication and microfluidic systems.

6. Gomes, F., Thakkarb, H., Lähde, A., Verhaagen, B., Pandit, A.B., Fernandez Rivas, D., Is Reproducibility Inside the Bag?. Ultrasonic Sonochemistry (**in press**), (2017). IF-4.56

   This is the 'cherry on the ice' of the BuBlebag, and BuBclean. We address reproducibility challenges with a scaled-up version of the microfluidic reactor published in Angew. Chemie (#2 above). Now we demonstrate that bubbles in a bag have many practical uses, such as exfoliation of nanomaterials with improved reproducibility.

Published patent

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

Research monographs

Cleaning with bubbles: on the contribution of radicals, shockwaves and jets.. Co-Editors Verhaagen, B. and Fernandez Rivas, D., for Elsevier Ultrasonics Sonochemistry; fourth special issue since 1994. Editorial team: Prof. Mason, Prof. Leveque, X. Li, Y. Ermers, T. Boopathy; ISSN 1350-4177 (2015).

Fernandez Rivas, D. and Verhaagen, B. Preface to the Special Issue: Cleaning with bubbles, Ultrasonics Sonochemistry, 29, 517-518, (2016).

Books and book chapters

Sonochemistry series Topics in Current Chemistry Collections, 978-3-319-54270-6. Chapter "Synergy of Microfluidics and Ultrasound: Process Intensification Challenges and Opportunities"; authors: Fernandez Rivas, D. and Kuhn, S.

PhD Thesis: Taming acoustic cavitation (2012). ISBN 978-90-365-3419-2

Tracer experimental techniques for CFD model verification and validation in sugar crystallizer. Integration of tracing with computational fluid dynamics for industrial process investigation. Final report of a co-ordinated research project 2001-2003. *IAEA*, Vienna, 2004. IAEA - TECDOC-1412, ISBN 92-0-114504-7, ISSN 1011-4289

Peer-reviewed publications

Scopus: Author ID 36068876400, ISI Web of Knowledge ID: B-6687-2008. Impact Factor (IF), Last updated: April 3, 2017.

1. Bolaños-Jiménez, R; Rossi, M.; Fernandez Rivas, D.; Kaehler, C.; Marin, A. Streaming flow by oscillating bubbles: Quantification via particle tracking velocimetry. Journal of Fluid Mechanics (accepted March 28th, 2017). IF 2.38
2. Gomes, F., Thakkarb, H., Lähde, A., Verhaagen, B., Pandit, A.B., Fernandez Rivas, D., Is Reproducibility Inside the Bag?. Ultrasonic Sonochemistry (**Acepted**), (2017). IF-4.56
3. van Zwieten, R., Verhaagen, B., Schroën, K, Fernandez Rivas, D., Emulsification in novel ultrasonic cavitation intensifying bag reactors. Ultrasonic Sonochemistry (**36**), Issue 1, 446-453 (2017). IF-4.56
4. Modestino, M.A., Fernández Rivas, D., Hashemi, S.M.H., Gardeniers, J.G.E., Psaltis, D., The potential for microfluidics in electrochemical energy systems. Energy Environ. Sci. **9** 3381-3391, (2016) IF-25.47
5. Fernandez Rivas, D. and Kuhn, S. Synergy of Microfluidics and Ultrasound: Process Intensification Challenges and Opportunities. Top Curr Chem (Z) 374: 70. (2016). IF-4.01
6. P.J. Bruggeman, et al. Plasma-Liquid Interactions: A Review and Roadmap, Plasma Sources Science and Technology 25 (5), 053002 (2016). IF-3.59
7. Verhaagen, B, Liu, Y., Galdames-Perez, A., Castro-Hernández, E., Fernandez Rivas, D. Scaled-up sonochemical microreactor with improved efficiency and reproducibility, ChemistrySelect **1**, 2, 136–139, (2016). IF New Journal

8. Castro-Hernández, E., Kok, M.P., Versluis, M., Fernandez Rivas, D. Study of the geometry in a 3D flow-focusing device, Microfluidics and Nanofluidics. 20 (40). 40 (2016). IF 2.53
9. 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). IF-3.35
10. Narezo Guzman, D., Yanbo, X., Songyue, C., Fernandez Rivas, D., Chao, S., Lohse, D., Guenter, A. Heat-flux enhancement by vapour-bubble nucleation in Rayleigh-Bérnard turbulence. Journal of Fluid Mechanics, 787, pp. 331-366., (2016) IF 2.38
11. Fernandez Rivas, D., Verhaagen, B., Galdamez Perez, A., Castro-Hernandez, E., van Zwieten, R., Schroen, K. A novel ultrasonic cavitation enhancer, Journal of Physics: Conference series, 656 (**1**). ISSN 1742-6588 (2015). IF 0.45
12. Verhaagen, B., Zanderink, T., Fernandez Rivas, D. Ultrasonic cleaning of 3D printed objects and Cleaning challenge devices. Applied Acoustics, 103, Part B, 172-181 (2016). IF-1.270
13. Verhaagen, B., Fernandez Rivas, D. Measuring cavitation and its cleaning effect. Ultrasonic Sonochemistry, **29**, Pages 619–628 (2016). IF-4.56
14. Zijlstra, A.G., Fernandez Rivas, D., Gardeniers. J.G.E, Versluis, M. and Lohse, D. Enhancing acoustic cavitation using artificial crevice bubbles, Ultrasonics, **56**, 512-523 (2015). IF-1.805
15. Macedo, R., Verhaagen, B., Fernandez Rivas, D., Versluis, M., Wesselink, P., van der Sluis, L. Cavitation measurement during sonic and ultrasonic activated irrigation, Journal of Endodontics, **40**, 4, 580-583 (2014). IF-2.929
16. Stricker, L., Dollet, B., Fernandez Rivas, D., and Lohse, D. Interacting bubble clouds and their sonochemical production, J. Acoust. Soc. Am., 134, 1854 (2013). IF-1.650
17. Macedo, R.G., Verhaagen, B., Fernandez Rivas, D., Gardeniers, J.G.E., van der Sluis, L., Wesselink, P. and Versluis, M., Sonochemical and visual characterization of cavitation generated by ultrasound in root canal models. Ultrasonic Sonochemistry (**21**), Issue 1, 324-335 (2014). IF-4.56
18. Fernandez Rivas, D., Betjes, J. Verhaagen, B., Lohse, D. and Gardeniers, J.G.E., Erosion evolution in mono-crystalline silicon surfaces caused by acoustic cavitation bubbles. J. Appl. Physics. 113 (**6**) (2013). IF-2.210
19. Fernandez Rivas, D., Cintas, P., Gardeniers, J.G.E., Merging microfluidics and sonochemistry: towards greener and more efficient micro-sono-reactors. Chemical Communications. 48 (89), 10935 - 10947 (2012). IF-6.378
20. Fernandez Rivas, D., Verhaagen, B., Seddon, J., Jiang, L.M., Zijlstra, A. G., van der Sluis, L., Versluis, M., Prosperetti, A., Lohse, D. and Gardeniers, J.G.E. Localized removal of deposited layers by cavitation microbubbles. Biomicrofluidics, (**6**), 034114 (2012). IF-3.385
21. Fernandez Rivas, D., Stricker, L., Zijlstra, A. G., Gardeniers, J.G.E., Lohse, D. and Prosperetti, A. Ultrasound nucleated bubbles and their sonochemical radical production. Ultrasonic Sonochemistry. (**20**) 510-524. (2013). IF-3.516
22. Fernández Rivas, D., Ashokkumar, M., Leong, T., Yasui, K., Tuziuti, T., Kentish, S., Lohse, D. and Gardeniers, H.J.G.E. Sonoluminescence and sonochemiluminescence from a microreactor Ultrasonic Sonochemistry. (**19**) 1252-1259. (2012). IF-3.516
23. Rooze, J., Matthieu André, Gert-Jan S. van der Gulik, David Fernández Rivas, Johannes G. E. Gardeniers, Evgeny V. Rebrov, Jaap C. Schouten and Jos T. F. Keurentjes Hydrodynamic cavitation in micro channels with channel sizes of 100 and 750 micrometers. Microfluidics and Nanofluidics, (**12**), Issue 1-4, pp 499-508, (2012). IF-3.218

24. Fernández Rivas, D., A. Prosperetti, A.G. Zijlstra, D. Lohse, J. G. E. Gardeniers Efficient Sonochemistry through Microbubbles Generated with Micromachined Surfaces, Angewandte Chemie International Edition, 49: 9699 - 9701. (2010). IF-11.26
25. Fernández Rivas, D., Microfluidos: Nuevas fronteras, Revista Cubana de Física, Vol. 28, No. 1. (2011).
26. Fernández Rivas, D., Microfluidos: ¿Cuánto hay de nuevo?, Revista Cubana de Física, Vol. 25, No. 2B. p 142-149. (2008).
27. Kashid, M., D. Fernández Rivas, D. W. Agar and S. Turek, On the hydrodynamics of liquid-liquid slug flow capillary microreactors, Asia-Pacific Journal of Chemical Engineering, 3: 151-160 (2008). IF-0.789
28. Fernández, D. and Gardeniers, J.G.E., On the resilience of PDMS microchannels after violent optical breakdown microbubble cavitation, 6th International Conference on Nanochannels, Microchannels, and Minichannels, ICNMM2008; Darmstadt Germany. (2008).
29. Fernández Rivas, D., M. Kashid, D. W. Agar and S. Turek, Slug flow capillary microreactor hydrodynamic study, The African Review of Physics, Vol 1. (2007).
30. Fernández Rivas, D., Piedra Díaz, M., La dinámica de fluidos computacional, su aplicación al estudio de las características de un intercambiador de tubos térmicos, Ingeniería Mecánica, Vol 8. (3), p.1-10 (2005).

Other Publications

1. Efficient cleaning of a microfluidic chip, blog Chips & Tips, a regularly updated forum for scientists in the miniaturisation field from Lab on a Chip; a place where ideas and solutions can be exchanged on common practical problems encountered in the lab, which are seldom reported in the literature.
2. Fernandez Rivas, D.; Verhaagen, B.; Walsh, S., Complementary technologies required for 21^{st} century additive manufacturing product insertion Commercial Micro Manufacturing International, Volume: 8 Issue: 6 Pages: 30-33, 2015
3. Master thesis: Early Turbulence Transition by Polymer Addition. InSTEC. 2006

   Tutors: Prof. Dr. M.E. Montesinos, InSTEC. Prof. Dr. K.R. Sreenivasan, International Centre for Theoretical Physics Abdus Salam, ICTP, Prof. Dr. S. Raghu.
4. Diploma thesis: Modelación del flujo de aire en un termosifón aplicando técnicas de dinámica de fluidos computacional. InSTEC. 2004. Supervisor: Prof. Dr. M. Piedra.

Media coverage

1. De ongekende kracht van belletjes. Colleague prof. Michel Versluis, demonstrates the us of BuBble bags (made by BuBclean), March 2017.
2. Cuba and back again. MIRA, Biomedical Technology and Technical Medicine; (1) 2017.
3. PIHC overview of Pioneers in Healthcare winners; MIRA, 2016.
4. Winner of the StartUpLaunch weekend. October 18^{th}, 2016.
5. InkBeams is winnaar van The StartupLaunch. Radio Interview TVEnschedeFM. October 17^{th}, 2016.
6. InkBeams wins the first edition of The StartupLaunch, October 17^{th}, 2016.
7. Technisch Weekblad Medicijninjectie met 100 m/s article, June 3^{rd} 2016.

8. Naaldloos Prikken, June 2016.
9. Interview about event on Solar Hydrogen, Internal MCEC Newsletter 2016/1. In it you can read about how the event Pathways to Solar Hydrogen Technologies was shaped.
10. NRC Next article on MESA+ cleanroom and BuBclean, September 2^{nd}, 2015. weekly appendix precision technology in the MESA+ NanoLab.
11. Boom's lab catalog presenting the BuBble Bags. January 7^{th}, 2016.
12. Start-up opent nieuwe perspectieven voor ultrasoon reinigen. December, 2015.
13. Article in CMM magazine on Twente Spin-offs. August 14^{th} 2015. Story on how BuBclean started and on our activities in ultrasonic cleaning for precision technology.
14. Arago Focus article: BuBclean, ultrasoon reinigen met microbelletjes. February, 2015.
15. Holland Alumni testimonial My experiences as entrepreneur and immigrant., December 2014.
16. Mikroniek "Removing additive contaminants", December 2014.
17. Technisch Weekblad "Technostarter": article: Ultrasoon reinigen kan beter, December 2014.
18. UT Nieuws "Bubbles, de schoonmakers van de toekomst".
19. TV program "De Kennis van Nu" over de kracht van bellen.
20. MESA+ Annual report 2013, Valorisation Grant phase 1.
21. Tubantia Ondernemer
22. Tubantia
23. The public defence of my PhD was covered in the website of the University of Twente.

Conference, Workshops, Poster and Seminar Presentations

1. **Invited** Improving nanomaterials exfoliation in a bag BINA Annual Conference, Israel, March 2017.
2. **Invited** A non-native view on entrepeneurship in the Netherlands, Physics@Veldhoven, 2017.
3. **Invited** The Space of Microscale and Ultrasound for Process Intensification, Process intensification network PIN-NL, Autumn meeting, 19^{th} October, 2016, Woerden, The Netherlands.
4. **Invited** More than cleaning with ultrasound, NanoBio Surfaces and Interfaces in Healthcare and Science, 27^{th} September, 2016, Enschede, The Netherlands.
5. **Plenary** Green Sonochemistry: current status and Prospects, (co-author P. Cintas); 15^{th} Meeting European Society of Sonochemistry-ESS15, Istanbul, Turkey on June 27^{th}-July 1^{st}, 2016.
6. **Keynote** Is reproducibility inside the bag?, 15^{th} Meeting of the European Society of Sonochemistry -ESS15, Istanbul, Turkey on June 27^{th}-July 1^{st}, 2016.
7. **Invited** Intensifying with ultrasound and microfluidics, 24^{th} Process intensification network meeting, 21^{st} June, 2016, Newcastle University, 2016.
8. **Invited keynote** Usefulness of Bursting Bubbles, 4^{th} Cavitation Workshop, Chania, Crete, Greece, May 30^{th}-June 1^{st}, 2016.
9. Two **invited** Usefulness of Bursting Bubbles, UC3M and CSIC - video, Madrid, Spain, May, 2016.
10. **Keynote invited** Anglo-French Physical Acoustic conference, London, UK, Jan. 13^{th}-15^{th}, 2016.
11. **Invited** departament PDRA Forum on innovation and entrepreneurship: Bursting Bubble and its Utilisation, UCL, London, UK, January 12^{th}, 2016.
12. 9^{th} International Symposium on Cavitation CAV 2015, December 6^{th}-10^{th}, 2015, Lausanne, Switzerland. Oral presentation *A novel ultrasonic cavitation enhancer*.
13. **Invited** Micro Plasma & Microstructures, 2^{nd} International Workshop on Applied Science and Entrepreneurship, Ghent, Belgium, November 26^{th}-27^{th}, 2015.

14. **Invited** A tale of unaware intensification research Leuven, Belgium, October 16th, 2015.
15. Flowing Matter: Application, Dissemination and Outreach, 27th-28th April 2015, Sofia, Bulgaria. COST MP1305 Workshop. Oral presentation *Artificial modification of surfaces for cavitation research and practical applications*. Chairing Engineering and environmental applications session.
16. **Invited** departamental: Investigación y valorización alrededor de la modificación de superficies en los Paśes Bajos. May 10th, 2015. Universidad de Sevilla.
17. **Invited** 1st International conference on ultrasonic-based applications: from analysis to synthesis. Artificially created crevices for cavitation enhancement. 15-17 September, 2014, Caparica, Portugal. Co-author, Bram Verhaagen, Michel Versluis, Han Gardeniers.
18. **Invited** 6th International Workshop Novel Developments & Applications in Sensor & Actuator Technology.: Enhancing acoustic cavitation, streaming w/ artificial crevices. Co-author, B. Verhaagen.
19. Gas/Plasma-Liquid Interface: Transport, Chemistry and Fundamental Data . Leiden, The Netherlands. From 4 - 8 Aug 2014.
20. American Physical Societey, 65th Annual Fall Division of Fluid Dynamics Meeting, San Diego, USA, 18-20 November, 2012. Oral presentation.

    Enhancing cavitation with micromachined surfaces. Co-authors: L. Stricker, A. Zijlstra, J.G.E. Gardeniers, D. Lohse and A. Prosperetti.
21. American Physical Societey, 65th Annual Fall Division of Fluid Dynamics Meeting, San Diego, USA, 18-20 November, 2012. Gallery of Fluid Motion.

    Taming acoustic cavitation. Co-authors: B. Verhaagen, O. R. Enriquez, M. Versluis, A. Prosperetti, J.G.E. Gardeniers and D. Lohse.
22. Microneedles 2012, Cork, Ireland, 13-15 May, 2012. Poster.

    Micromolded nanoporous ceramic microneedle arrays. Co-authors: J. de Groot, M. Verhoeven,T.D. de Gruijl, R.J. Scheper and R. Luttge.
23. Acoustic Waves for the Control of Microfluidics Flows, Lorentz Center, Leiden, The Netherlands. April 23-27, 2012.

    Ultrasound nucleated bubbles in a microreactor: radical production, sonoluminescence, sonochemiluminescence and cleaning control. Various authors.
24. 20th Annual Meeting of the Japan Society of Sonochemistry (JSS) and The International Workshop on Advanced Sonochemistry, Nagoya, Japan, November 2-4, 2011.

    Sonoluminescence and sonochemiluminescence in microreactors. Co-authors: T. Leong, M. Ashokkumar, D. Lohse, J.G.E. Gardeniers.
25. XV Convención Científica de Ingeniería y Arquitectura. CUJAE Havana, Cuba. November 29th December 2010. Two Oral presentations.

    Chemical processing and analysis using microfluidic systems. Co-author: J.G.E. Gardeniers.

    Microfluidic Hydrodynamic Cavitation. Co-authors: J. Rooze, M. Andre and J.G.E. Gardeniers.
26. The 14th International Conference on Miniaturized Systems for Chemistry and Life Sciences. 3 - 7 October 2010. Oral presentation. Sonochemical microreactor with microbubbles created on micromachined surfaces. Co-authors: A.G. Zijlstra, D. Lohse, A. Prosperetti and J.G.E. Gardeniers
27. 20th International Congress on Acoustics, ICA 2010, Sydney, Australia.23-27 August 2010. Oral. Sonochemistry with micromachined pits. Co-authors: A.G. Zijlstra, D. Lohse, A. Prosperetti and J.G.E. Gardeniers.
28. 2do Seminario internacional de Nanociencias y Nanotecnologías. Havana, Cuba. November 2008.
29. Sixth International ASME Conference on Nanochannels, Microchannels and Minichannels. Darmstadt, Germany. 23-25 June 2008. Poster. On the resilience of PDMS microchannels after violent optical breakdown microbubble cavitation. Co-author: J.G.E. Gardeniers.
30. Physics of Micro- and Nanofluids. Leiden, The Netherlands. From 9 - 20 Jun 2008.
31. 11th Conference of the European Sonochemistry Society in La Grande Motte, France June 1-5, 2008.
32. VII Taller Internacional sobre enseńanza de la Física en Ingeniería y III Taller internacional de Física Aplicada (EFING 2006), 13 Convención Científica de Ingeniería y Arquitectura, Havana, Cuba Nov. 29 - December 1, 2006. Oral presentation. Propuesta de tres núcleos temáticos investigativos para la enseńanza de la ingeniería. Co-authors: M.E. Montesinos y M. Piedra. ISBN 959-261-248

33. International Conference on Micro and Nanotechnologies, Tizi-Ouzu, Argelia. 19-26 November 2006. Oral presentation. Slug flow capillary microreactor hydrodynamic study. Co-authors: M. N. Kashid, D. W. Agar and S. Turek.
34. College on Physics of Nano-devices. 10-21 July 2006. Poster. Multiphase Fluid Modelling at the Microscale: Liquid-Liquid Slug Flow Hydrodynamic. M. N. Kashid, D. W. Agar and S. Turek.
35. International Conference on Nanosciences, ICON 2006. Choroni, Venezuela. May 7-11, 2006. Poster. Multiphase Fluid Modelling at the Microscale: Liquid-Liquid Slug Flow Hydrodynamic. M. N. Kashid, D. W. Agar and S. Turek.
36. Fourth International Meeting on Photodynamics, Havana, Cuba February 6-10, 2006. G. Rojas y D. Fernández en, Simulation of Molecular Dynamics of Hg (3P) Relaxation in N2 matrices.
37. 17^{th} IMACS World Congress, Scientific Computation, Applied Mathematics and Simulation. Paris, France July 11-15, 2005
38. 12 Convención Científica de Ingeniería y Arquitectura, Congreso Ingeniería Mecánica, 2004. La Dinámica de Fluidos Computacional, su aplicación al estudio de un intercambiador de tubos térmicos, Co-author:M. Piedra. ISBN 959-261-169-6. Oral presentation.

Honors & Awards

1. The StartupLaunch 2016: Grand prize of €1.000 offered by Kennispark Twente and six months free office space offered by BTC-Twente. The jury saw in InkBeams a team that developed a promising concept for a needle-free injection mechanism.
2. Pieter Langerhuizen Lambertuszoon Fonds: 15 000 Euro (8 % success rate). The Koninklijke Hollandsche Maatschappij der Wetenschappen was established in 1752 in Haarlem. It is the oldest learned society in The Netherlands, with the goals of promoting science in its broader definition.
3. Lane of innovation tree. As one of the 75 innovative companies that symbolically received a tree at the Lane of Innovation in Enschede, The Netherlands. November 2013.
4. COMS2013 Young Technology Award Finalist competitor. This is a competition for companies younger than 10 years in the micro- and nano-sector, 2013.
5. Young Business Award, for the pitch on a business idea for a spin-off named BubCLEAN, in collaboration with Bram Verhaagen; (5000 Euro) given at MESA+ Day, Enschede, The Netherlands, September 2012.
6. Young Sonochemist Award. Japan Society of Sonochemistry (JSS) has been established in 1992 as a non-profit organisation. This recognition was given during its 20^{th} Annual Meeting and the International Workshop on Advanced Sonochemistry held at Nagoya University on November 2^{nd}-4^{th} 2011.
7. Best poster award. MESA+ Day, (1000 Euro) 2010.
8. Rector's prize to the Radiological protection activities 2004-2006, InSTEC.
9. Sello Forjadores del Futuro (Smithers of the Future) 2006, given by UJC (Cuban Communist Youth Organization).
10. Suma cum Laude graduated. Total score 5.19 over 5. 2004
11. Sello InSTEC. To the first student graduating in four years, 2004.
12. Graduado más Destacado en Cultura del InSTEC en 2004
13. Distinguished Scientific-Technical Result AENTA 2004, Técnica experimental para la verificación del modelo DFC en un Cristalizador Azucarero. Various authors.
14. Premio Edison greatest technical-economical contribution Student's Scientific Forum 2003-2004
15. Second Student's Scientific Forum prize in the Engineering comission 2003-2004.
16. Special Mention to the highest number of works presented on the Student's Scientific Forum 2002-2003
17. 80 Aniversario de la FEU (University Student Federation), 2002
18. Second prize Student's Scientific Forum, Radiochemistry Comission 2000-2001.
19. Prize InSTEC *Ab initio* 2000, revelation freshman students (shared with Alejandro Amor Coarasa).

Professional Activities

Event organization

Main Organizer, Pathways to Solar Hydrogen Technologies, June 13^{th}-17^{th} by Lorentz Center. Budget: 17 k€ for 55 Participants; Co-organizers: Prof. S. Ardo (UCI, USA), Dr. M. Modestino (EPFL, Switzerland), Dr. V.C. Stimberg (UT, The Netherlands).

Co-organizer of a full-day Seminar: Technical aspects and monitoring of cleaning and sterilization processes. First collaboration of BuBclean and gke.

Teaching

University of Twente

Certified teacher basic qualifications in education (UTQ/BKO), September 2016.

Process Intensification Principles: Course Designer. MSc Chem. Eng. 5 ECTS, 2015 and 2016.

Surface Phenomena and Microfluidics course. MSc Chem. Eng. 5 ECTS, 2014.

Invited lectures as part of other existing courses

Avances (...) Ultrasonidos), MSc. en Nutrición y Seguridad Alimentaria. Murcia, Spain; 2017.

(Ultrasound as processing technique), Food Engineering, MSc. RMIT, Melbourne, Australia, 2015.

Designs & Systems Practice, Nano-applications and Society, BSc, Saxion (2014, 2015).

Fundamentals of Nanotechnology and its Applications FONA.

InSTEC

Designed and taught the course *GNU/Linux for beginners*. January 2005. Graduate.

Designed and taught the course *Introduction to Microfluidics*. November 2008. Graduate.

Thermo-hydraulics models (Assistant). January-June 2005, 2006 and 2008. Undergrad level.

Technical drawing for Physicists. September-February 2005. Undergrad level.

Computation II for Meteorologists. January-May 2006. Undergrad level.

Technical Drawing I & II, Engineers. September 2006-June 2007 and 2008. Undergrad level.

Ordinary Differential Equations (Practical lessons). January-June 2005. Undergrad level.

Laboratory practicum: Perfiles en Fluidos y Método de Elementos Finitos. 2003

Laboratory practicum: Integración Óptica-análisis Elementos Finitos de Materiales 2003.

Laboratory practicum: Modelación de termosifón aplicando técnicas de DFC. 2004

Institutional responsibilities

Erasmus students exchange liaison for the University Nova of Lisbon, Portugal, since 2015.

Reviewer for

Angewandte Chemie International Edition,
Ultrasonics sonochemistry,
Advanced Functional Materials,
Journal of Materials Science,
Industrial & Engineering Chemistry Research.
Oil & Gas Science and Technology,
Food Control.

Fellowships and membership

DesignLab Fellow, University of Twente, March 2017.

Member, Process Intensification Network, Pin-NL, 2015–Present.

Member, Association for Microsystems and Nanotechnology, MinacNed, 2015–Present.

Member, European Sonochemical Society 2008–Present.

COST TD1208 Electrical Discharges with Liquids for Future Applications.

COST MP1305 Flowing matter, at the crossroads between industrial processes, fundamental physics and engineering.

Member, Japanese Sonochemical Society 2011–Present.

Member, American Physical Society, 2011–Present.

Member, Sociedad Cubana de Física. 2006–Present.

Skills

Experimental research: Fluid Dynamics (microfluidics, turbulence, multiphasic fluids), Computational Fluid Dynamics; Image and data processing (Matlab, Excel).

Clean-room working experience in microfabrication.

Science dissemination (scientific writing, presentations).

Languages

Spanish - native.

English - advanced (Canadian Assessment in English Language, CAEL).

Dutch - Inburgering (double-nationality): reading&listening- good, spoken&written-intermediate

Italian - intermediate