Jenifer Gomez Pastora

Contact information:
Address: 219 Livermore Center, Texas Tech University, Lubbock, TX 79409 (United States)
☎: +1 614-292-1284
✉: Jenifer.Gomez@ttu.edu

Research Expertise

Magnetic materials, application and separation: Numerical modeling and process design – Synthesis, Bioseparation, Water treatment, Detoxification, Blood and cancer cell magnetic characterization and separation, Ferrofluids, Microfluidics, Microfabrication, Computational Fluid Dynamics (CFD), Hydrodynamics, Mass Transfer at the microscale, Magnetic field and force analysis, Magnetophoresis, Multiphase Analysis, Cell culture, Biosensing.

Education

2014 – 2018 **PhD in Chemical Engineering, Energy and Processes**
Department of Chemical and Biomolecular Engineering, University of Cantabria (Spain).
Dissertation: On the design of lab-on-a-chip devices for magnetophoretic separations.
Advised by: Dr. Eugenio Bringas and Prof. Inmaculada Ortiz.

2014 – 2019 **Diploma in Criminology** (equivalent to BSc)
International University of La Rioja (Spain).
Thesis: Sociodemographic characteristics of the sexual offender in Spain and social perception of this delinquency.
Advised by: Dr. Francisco Javier Hernández Suárez-Llanos.

2013 – 2014 **MSc in Chemical Engineering: Sustainable Production and Consumption**
Department of Chemical and Biomolecular Engineering, University of Cantabria (Spain).
Thesis: Recent progress and future challenges on the use of high performance magnetic nanoadsorbents in environmental applications.
Advised by: Dr. Eugenio Bringas and Prof. Inmaculada Ortiz.

2011 – 2014 **Diploma in Industrial Engineering – Specialty in Industrial Chemistry** (equivalent to BSc)
Department of Chemical and Biomolecular Engineering, University of Cantabria (Spain).
Thesis: Introduction to the Computational Fluid Dynamics technique and its potential application to Chemical Engineering.
Advised by: Dr. Eugenio Bringas.

2007 – 2013 **Diploma in Chemical Engineering** (equivalent to BSc and MSc)
Department of Chemical and Biomolecular Engineering, University of Cantabria (Spain).
Thesis: Equilibrium and kinetics of arsenic removal onto functionalized magnetic nanoadsorbents.
Advised by: Dr. Juan Saiz and Dr. Eugenio Bringas.

Professional Experience

2022-Present **Assistant Professor – Texas Tech University**
Department of Chemical Engineering.
- Instructor of the "Chemical Process Design and Simulation" course, Spring 2022.
- Advisor of the AIChE Student Chapter at Texas Tech University.
- Performed research in the following areas:
  1. Blood cell magnetic characterization, fractionation and separation

2. Magnetic bead technologies for extracorporeal detoxification systems
3. Design and numerical modeling of high gradient magnetic separators
4. Characterization and separation of sickle red blood cells
5. Magnetic-based sensors for COVID-19 surveillance

2018-2021 **Postdoctoral scholar – The Ohio State University**
William G. Lowrie Department of Chemical and Biomolecular Engineering.
- Co-instructor of the "Process Design and Development" course, Spring 2021.
- Performed research in the following areas:
  1. Red and white blood cell magnetic characterization
  2. Human cell magnetic fractionation in quadrupole magnetic sorters
  3. Single cell magnetophoresis to analyze and separate glioma cancer stem cells
  4. Magnetic and density separation of blood cells from sickle cell disease patients
  5. Iron oxide nanoparticle magnetophoresis for advanced diagnostics

2014 – 2018 **Graduate research assistant – University of Cantabria**
Department of Chemical and Biomolecular Engineering.
- Guest-lecturer for the "Emerging Technologies in Chemical Engineering" course, Spring 2015 and 2016.
- Performed research in the following areas:
  1. CFD model development for particle magnetophoresis with permanent magnets
  2. Extracorporeal magnetic detoxification systems for treating septic patients
  3. Synthesis of drug delivery capsules using ferrofluid droplets
  4. Reactive separation of metals at the microscale

2012 – 2014 **Undergraduate research assistant – University of Cantabria**
Department of Chemical and Biomolecular Engineering.
- Student lecturer for the "Chemical Reaction Engineering" course, Summer 2013.
- Performed research in the following areas:
  1. Design and synthesis of magnetic nanomaterials for environmental remediation
  2. Arsenic removal from groundwater with functionalized iron oxide nanoparticles

2012 **Internship - Solvay Química, S.L.**
Carbonate Production Unit of the Torrelavega (Spain) plant.
Participated in a project aiming at increasing the production, quality and grain size of sodium bicarbonate, which resulted in the implementation of two new measures at the site.

Academic Experience

Research projects

2018 – Present William G. Lowrie Department of Chemical and Biomolecular Engineering, The Ohio State University. Research projects:
1. Development of single cell magnetophoresis to analyze and isolate glioma cancer stem cells. Principal Investigators (PI): J.J. Chalmers and M. Venere. Funding entity: National Institutes of Health (NIH). Researcher and key contributor of the grant proposal.
2. Fractionation of aged RBCs based on hemoglobin content. PI: JJ. Chalmers. Funding entity: NIH. Participating as researcher.

2012 – 2018 Department of Chemical and Biomolecular Engineering, University of Cantabria. Research projects:
1. Advanced separation applications. Mathematical modeling and proof of concept. PI: I. Ortiz. Funding entity: Economy and Competitiveness Ministry of Spain (Mineco). Researcher and key contributor of the grant proposal.
2. Magnetic separator of bacterial endotoxins (LPS) for sepsis treatment. PI: I. Ortiz. Funding entity: Mineco. Researcher and key contributor of the grant proposal.
3. Design and characterization of magnetic nanomaterials as separation agents. PI: I. Ortiz. Funding entity: Vicerectorate of Research of the University of Cantabria; SODERCAN, S.A. Researcher and key contributor of the grant proposal.

4. Novel rate-controlled separation processes based on functionalized materials. PI: I. Ortiz. Funding entity: Mineco. Participated as researcher.
5. Research and development of reactive separations. Contribution to the sustainable technological development. PI: I. Ortiz. Funding entity: Education and Science Ministry of Spain. Participated as researcher.

Teaching experience

2022-Present **Instructor – Texas Tech University**
Course: Chemical Process Design and Simulation – Spring 2022
Responsible for the course design, lectures, assignments and exam evaluation.

2020-2021 **Instructor – The Ohio State University**
Course: Process Design and Development – Spring 2021
Responsible for the course design, lectures, and exam evaluation.

Teaching assistant – University of Cantabria

2013 1. Student tutor of the "Chemical Reaction Engineering" course (Summer 2013). Duties: Responsible for the course design, lectures, and student homework evaluation.

2015-2016 2. Guest-lecturer for the "Emerging Technologies in Chemical Engineering" course (Spring 2015 and 2016). Duties: Responsible for preparing and teaching classes and designing problems for homework and exams.

Mentorship

2015 - Present **Graduate student advisor**

1. Sowrav Barua, "Intrinsic magnetic susceptibility of blood cells and their potential separation", PhD in Chemical Engineering, Texas Tech University.
2. Xian Wu, "*Magnetophoretic capture of 5 nm sized superparamagnetic iron oxide nanoparticles under different gradient field conditions*", MSc in Chemical Engineering, The Ohio State University.
3. Venoos Amiri, "*CFD analysis of the generation and manipulation of ferrofluid droplets*", MSc in Chemical Engineering, University at Buffalo, State University of New York.
4. Cristina González Fernández, "*Separation of magnetic particles from flowing blood in multiphase microfluidic devices*", MSc in Chemical Engineering, University of Cantabria.

Undergraduate student advisor

5. Cristina González Fernández, "*Contribution to the design of microfluidic systems for the separation of magnetic particles*", BSc in Chemical Engineering, University of Cantabria.

Academic merits

2021-Present **Journal editor**
Guest editor of the Special Issue "Particle and Cell Separation Processes in Microfluidics" (Journal Processes).

2017-Present **Journal referee**
Lab on a Chip, PlosONE, Scientific Reports, Sensors, Clinica Chimica Acta, Applied Sciences, Journal of Mechanical Engineering Science, Critical Reviews in Biotechnology, Journal of Chemical Technology & Biotechnology, Mathematics, Journal of Magnetism and Magnetic Materials, Micromachines, Journal of Industrial and Engineering Chemistry, Reviews in Chemical Engineering, Soft Matter, Chemosphere, Microfluidics and Nanofluidics, Acta Biomaterialia, Magnetochemistry.

Conference organizing committee

2020 Conference: Nanotech 2020 Conference & Expo.
Duties: Abstract evaluation, session organization and session co-chair (postponed to 2021).

Guest seminar speaker

2021 Seminar: Magnetically driven lab-on-a-chip devices for biomedical applications. Institution: Texas Tech University.

2019 Seminar: Magnetic behavior of human blood constituents and their separation. Institution: University of Cantabria.

PhD dissertation committee

2019 Claudia Solá Gutiérrez, "Traceability of PCDD/Fs formation in the advanced oxidation of triclosan in aqueous samples", PhD in Chemical Engineering, Energy and Processes, University of Cantabria.

Awards and Honors

Scholarships

2007 – 2014 **Spanish Ministry of Education scholarship for 6 academic years**
Merit-scholarship awarded based upon academic merit and financial need.

Research fellowships

2014 – 2018 **FPI grant from the Economy and Competitiveness Ministry of Spain**
48-month grant awarded by the Spanish Government to complete my PhD, associated to the research project "Novel rate-controlled separation processes based on functionalized materials".

2012 – 2013 **Research initiation grant from the Ministry of Education, Culture and Sport of Spain**
1-year grant awarded by the Spanish Government to perform research projects while completing my undergraduate studies.

Fellowships to perform research stays abroad

2016-2017 **Mobility fellowship for graduate students**
Awarded twice with a fellowship offered to PhD students to perform research stays abroad. The fellowships are awarded by the Spanish Government based upon academic and research achievements.

Awards

2021 **Outstanding Doctorate Award**
Award for the best PhD dissertation among dissertations presented in 2018 in Engineering and Arquitecture at the University of Cantabria.

2020 **Outstanding Postdoc Award**
Recipient of the "Outstanding Postdoc Award" from the William G. Lowrie Department of Chemical and Biomolecular Engineering at The Ohio State University.

2020 **Research Award – Consejo Social Juan María Parés 2019**
Award for the best PhD dissertation in Engineering and Technology at the University of Cantabria.

2019 **Travel Award**
Recipient of a travel award to attend conferences sponsored by The Ohio State University Postdoctoral Association.

2019 **Selected to attend the 2019 Dow's BEST Symposium**
Symposium sponsored by Dow Chemical Company and offered to the top 20 chemical engineering graduate students and postdocs in the United States.

2019 **Best Poster Award**
Best poster in the 3rd ANQUE-ICCE International Congress of Chemical Engineering. Poster title: Optimized design of novel magnetophoretic-microfluidic devices for biofluids detoxification.

2018 **Best Poster Award**
First place in the national poster competition for PhD students celebrated during the VI Doctorate Days and Scientific Dissemination of Group 9 of Universities (G-9) (Spain). Poster title: Innovative microdevice for extracorporeal sepsis treatment.

2017 **Best Poster Award**
First place in the international poster competition for undergraduate and master degree students celebrated during the 10th World Congress of Chemical Engineering. Poster title: Development of microfluidic-magnetophoretic devices for gram-negative sepsis treatment. Student: Cristina González-Fernández. Advisor: Jenifer Gómez-Pastora.

2017 **Best Presentation Award**
Best presentation award in the 17th FLOW-3D European Users Conference. Presentation title: Optimization of magnetic blood cleansing microdevices.

2014 **Best Thesis Award**
Best final degree thesis in the School of Engineering of the University of Cantabria. Thesis title: Equilibrium and kinetics of arsenic removal onto functionalized magnetic nanoadsorbents.

2013 **Best Poster Award**
Second place in the national poster competition organized by the Spanish Federation of Chemical Engineers. Poster title: Equilibrium and kinetics of arsenic removal onto functionalized magnetic nanoadsorbents.

Publications

Articles

In preparation/submitted

2022 **J. Gómez-Pastora**, M. Weigand, M. Zborowski, J.J. Chalmers, "Blood separations with magnetic techniques: A review", Critical Reviews in Biotechnology (*To be submitted*).

2022 I. H. Karampelas, **J. Gómez-Pastora,** "Novel approaches on the numerical modeling of particle and cell separations in microfluidics", Processes (*To be submitted*).

2022 M. Weigand, **J. Gómez-Pastora,** M. Zborowski, A.F. Palmer, J.J. Chalmers, "Magnetic fractionation of red blood cells: Experiments and Simulations", Processes (*To be submitted*).

2022 M. Weigand, **J. Gómez-Pastora**, J. Strayer, X. Wu, H. Choe, S. Lu, E. Plencner, K. Landes, A.F. Palmer, M. Zborowski, P.C. Desai, J.J. Chalmers, "The unique magnetic signature of sickle red blood cells: A comparison between the red blood cells of transfused and non-transfused sickle cell disease patients and healthy donors", IEEE Transactions on Biomedical Engineering (*Minor revision*).

Published

2022 **J. Gómez-Pastora**, J. Kim, M. Weigand, A.F. Palmer, M. Yazer, P.C. Desai, M. Zborowski, J.J. Chalmers, "Potential of Cell Tracking Velocimetry as an Economical and Portable Hematology Analyzer", Scientific Reports (Accepted).

2022 X. Wu, **J. Gómez-Pastora**, M. Zborowski, J.J. Chalmers, "SPIONs self-assembly and magnetic sedimentation in quadrupole magnets: Gaining insight into the separation mechanisms", Separation and Purification Technology 280 (2022) 119786.

2021 C. González-Fernández, **J. Gómez-Pastora**, E. Bringas, M. Zborowski, J.J. Chalmers, I. Ortiz, "Recovery of Magnetic Catalysts: Advanced Design for Process Intensification", Industrial & Engineering Chemistry Research 60 (2021) 16780-16790.

2021 M.R.H. Weigand, **J. Gómez-Pastora**, J. Kim, M.T. Kurek, R.J. Hickey, D.C. Irwin, P.W. Buehler, M. Zborowski, A.F. Palmer, J.J. Chalmers, "Magnetophoretic and spectral characterization of oxyhemoglobin and deoxyhemoglobin: Chemical versus enzymatic processes", PLoS ONE 16 (2021) e0257061.

2021 **J. Gómez-Pastora**, J. Kim, V. Multanen, M. Weigand, N.A. Walters, E. Reátegui, A.F. Palmer, M. Yazer, M. Zborowski, J.J. Chalmers, "Intrinsically magnetic susceptibility in human blood and its potential impact on cell separation: Non-classical and intermediate monocytes have the strongest magnetic behavior in fresh human blood", Experimental Hematology 99 (2021) 21-31.

2020 V.A. Roodan, **J. Gómez-Pastora**, I.H. Karampelas, C. González-Fernández, E. Bringas, I. Ortiz, J.J. Chalmers, E.P. Furlani, M.T. Swihart, "Formation and manipulation of ferrofluid droplets with magnetic fields in a microdevice: A numerical parametric study", Soft Matter 16 (2020) 9506-9518.

2020 **J. Gómez-Pastora**, M. Weigand, J. Kim, X. Wu, J. Strayer, A.F. Palmer, M. Zborowski, M.Yazer, J.J. Chalmers, "Hyperferritinemia in critically ill COVID-19 patients – Is ferritin the product of inflammation or a pathogenic mediator?", Clinica Chimica Acta 509 (2020) 249-251.

2020 C. González-Fernández, **J. Gómez-Pastora**, A. Basauri, M. Fallanza, E. Bringas, J.J. Chalmers, I. Ortiz, "Continuous-Flow Separation of Magnetic Particles from Biofluids: How Does the Microdevice Geometry Determine the Separation Performance?", Sensors 20(11) (2020) 3030.

2020 **J. Gómez-Pastora**, X. Wu, N. Sundar, J. Alwawi, G. Nabar, J.O. Winter, M. Zborowski, J.J. Chalmers, "Self-Assembly and sedimentation of 5 nm SPIONs using horizontal, high magnetic fields and gradients", Separation and Purification Technology 248 (2020) 117012.

2020 J. Kim, **J. Gómez-Pastora**, M. Weigand, C. Gilbert, N.A. Walters, E. Reátegui, A.F. Palmer, M. Yazer, M. Zborowski, J.J. Chalmers, "Quantification of the mean and distribution of hemoglobin content in normal human blood using cell tracking velocimetry", Analytical Chemistry 92 (2020) 1956-1962.

2019 J. Kim, **J. Gómez-Pastora**, M. Weigand, M. Potgieter, N.A. Walters, E. Reátegui, A.F. Palmer, M. Yazer, M. Zborowski, J.J. Chalmers, "A subpopulation of monocytes in normal human blood has significant magnetic susceptibility: Quantification and potential implications", Cytometry Part A 95A (2019) 478–487.

2019 **J. Gómez-Pastora**, V.A. Roodan, I.H. Karampelas, A.Q. Al-Orabi, M.D. Tarn, A. Iles, V.N. Paunov, E. Bringas, N. Pamme, E.P. Furlani, I. Ortiz, "Two-step numerical approach to predict ferrofluid droplet generation and manipulation inside multilaminar flow chambers", Journal of Physical Chemistry C 123 (2019) 10065-10080.

2019 **J. Gómez-Pastora**, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, "Numerical analysis of bead magnetophoresis from flowing blood in a continuous-flow microchannel: Implications to the bead-fluid interactions", Scientific Reports 9 (2019) 7265.

2019 A. Basauri, **J. Gómez-Pastora**, M. Fallanza, E. Bringas, I. Ortiz, "Predictive model for the design of reactive micro-separations", Separation and Purification Technology 209 (2019) 900-907.

2018 **J. Gómez-Pastora**, C. González-Fernández, E. Real, A. Iles, E. Bringas, E.P. Furlani, I. Ortiz, "Computational modeling and fluorescence microscopy characterization of a two-phase magnetophoretic microsystem for continuous-flow blood detoxification", Lab on a Chip 18 (2018) 1593-1606.

2018 **J. Gómez-Pastora**, C. González-Fernández, M. Fallanza, E. Bringas, I. Ortiz, "Flow patterns and mass transfer performance of miscible liquid-liquid flows in various microchannels: Numerical and experimental studies", Chemical Engineering Journal 344 (2018) 487-497.

*2017** A.Q. Al-Orabi, M.D. Tarn, **J. Gómez-Pastora**, E. Bringas, I. Ortiz, V.N. Paunov, N. Pamme, "Polyelectrolyte coating onto magnetic droplets – Towards continuous flow assembly of drug delivery capsules", Lab on a Chip 17 (2017) 3785-3795. **Selected by the handling Editor as one of the top 10% of papers published in Lab on a Chip.*

*2017** **J. Gómez-Pastora**, S. Dominguez, E. Bringas, M.J. Rivero, I. Ortiz, D.D. Dionysiou, "Review and Perspectives on the Use of Magnetic Nanophotocatalysts (MNPCs) in Water Treatment", Chemical Engineering Journal 310 (2017) 407-427. **Highly cited paper (top 1% according to Essential Science Indicators).*

2017 **J. Gómez-Pastora**, X. Xue, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, "Analysis of separators for magnetic beads recovery: From large systems to multifunctional microdevices", Separation and Purification Technology 172 (2017) 16-31.

2017 **J. Gómez-Pastora**, I.H. Karampelas, X. Xue, E. Bringas, E.P. Furlani, I. Ortiz, "Magnetic bead separation from flowing blood in a two-phase continuous-flow magnetophoretic microdevice: Theoretical analysis through CFD simulation", Journal of Physical Chemistry C 121 (2017) 7466-7477.

2016 **J. Gómez-Pastora**, E. Bringas, I. Ortiz, "Design of novel adsorption processes for the removal of arsenic from polluted groundwater employing functionalized magnetic nanoparticles", Chemical Engineering Transactions 47 (2016) 241-246.

*2014** **J. Gómez-Pastora**, E. Bringas, I. Ortiz, "Recent progress and future challenges on the use of high performance magnetic nano-adsorbents in environmental applications", Chemical Engineering Journal 256 (2014) 187-204. **Highly cited paper (top 1% according to Essential Science Indicators).*

Book Chapters

2021 **J. Gómez-Pastora**, L.R. Moore, J.J. Chalmers, M. Zborowski, "Magnetic separations", In: Particle separation techniques - Fundamentals, instrumentation and selected applications, Elsevier (Accepted).

2021 **J. Gómez-Pastora**, X. Wu, J.J. Chalmers, "Magnetic separation of micro- and nanoparticles for water treatment processes", In: Solid-Liquid Separation Technologies and Applications for Produced Water, Taylor & Francis (Accepted).

2017 **J. Gómez-Pastora**, E. Bringas, M. Lázaro-Díez, J. Ramos-Vivas, I. Ortiz, "The reverse of controlled release: Controlled sequestration of species and biotoxins into nanoparticles (NPs)", In: From Materials to Medical Devices: Drug Delivery Systems, World Scientific, 2017.

Conference Proceedings

2019 **J. Gómez-Pastora**, J. Kim, M. Weigand, M. Potgieter, N.A. Walters, E. Reátegui, A.F. Palmer, M. Yazer, M. Zborowski, J.J. Chalmers, "Human monocytes from fresh blood present strong magnetic characteristics; CTV analysis and magnetic susceptibility quantification", TechConnect Briefs 2019, 302-305.

2019 C. González-Fernández, **J. Gómez-Pastora**, I.H. Karampelas, E. Bringas, I. Ortiz, "Optimization of continuous-flow magnetic bioseparators through CFD numerical models", TechConnect Briefs 2019, 290-293.

2019 V. Amiri, **J. Gómez-Pastora**, C. González-Fernández, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, "CFD Analysis of the Generation and Manipulation of Ferrofluid Droplets", TechConnect Briefs 2019, 298-301.

2019 **J. Gómez-Pastora**, "Computational Fluid Dynamics Models for the Rational Design of Magnetic Microseparators – In Memory of Dr. Ed Furlani", TechConnect Briefs 2019, 314-317.

2018 **J. Gómez-Pastora**, C. González-Fernández, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, "Design of Magnetic Blood Cleansing Microdevices through Experimentally Validated CFD Modeling", TechConnect Briefs 2018, Vol. 3 Biotech, Biomaterials and Biomedical, 170-173.

2018 **J. Gómez-Pastora**, I.H. Karampelas, A.Q. Alorabi, M.D. Tarn, E. Bringas, A. Iles, V.N. Paunov, N. Pamme, E.P. Furlani, I. Ortiz, "CFD analysis and experimental validation of magnetic droplet generation and deflection across multilaminar flow streams", TechConnect Briefs 2018, Vol. 3 Biotech, Biomaterials and Biomedical, 182-185.

2017 **J. Gómez-Pastora**, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, "CFD Analysis of Particle Magnetophoresis in Multiphase Continuous-flow Bioseparators", TechConnect Briefs 2017, Vol. 3 Biotech, Biomaterials and Biomedical, 170-173.

2017 I.H. Karampelas, **J. Gómez-Pastora**, M.J. Cowan, E. Bringas, I. Ortiz, E.P. Furlani, "Numerical Analysis of Acoustophoretic Discrete Particle Focusing in Microchannels", TechConnect Briefs 2017, Vol. 3 Biotech, Biomaterials and Biomedical, 174-177.

2017 A. Basauri, **J. Gómez-Pastora**, M. Fallanza, E. Bringas, and I. Ortiz, "Computational analysis of facilitated transport in a microfluidic device", Computer Aided Chemical Engineering, Vol. 40, 1189-1194.

2017 **J. Gómez-Pastora**, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, " Computational analysis of a two-phase continuous-flow magnetophoretic microsystem for particle separation from biological fluids", Computer Aided Chemical Engineering, Vol. 40, 1183-1188.

2017 **J. Gómez-Pastora**, A.Q. Al-Orabi, M.D. Tarn, E. Bringas, I. Ortiz, V.N. Paunov, N. Pamme, "Continuous generation of stable polyelectrolyte multilayer capsules inside a snakes-and-ladders chip", Proceedings of the 21st International Conference on Miniaturized Systems for Chemistry and Life Sciences – MicroTAS 2017, 724-725.

Conference Presentations

2021 X. Wu, **J. Gómez-Pastora**, J.J. Chalmers, "Self-Assembly and Sedimentation of Superparamagnetic Iron Oxide Nanoparticles Using Enhanced Quadrupole Magnetic Sorters". 2021 AIChE Annual Meeting, Boston (USA), November 7-11, 2021 (Oral Presentation).

2021 **J. Gómez-Pastora**, M. Weigand, J. Kim, J.J. Chalmers, "Continuous-flow Magnetic Fractionation of Red Blood Cells Based on Hemoglobin Content – Clinical Blood Supply Implications and Sickle Cell Anemia Treatment". Nanotech 2021 Conference & Expo, Washington DC (USA), October 18-20, 2021 (Oral presentation).

2021 C. González-Fernández, **J. Gómez-Pastora**, A. Basauri, M. Fallanza, E. Bringas, I. Ortiz, "Intensified microfluidic separations under magnetic field". 11th International Symposium on Catalysis and Multiphase Reactors (CAMURE), Milan (Italy), March 21-24, 2021 (Oral Presentation).

2019 **J. Gómez-Pastora**, X. Wu, J. Kim, M. Weigand, M. Zborowski, J.J. Chalmers, "Magnetophoretic capture of 5 nm sized superparamagnetic iron oxide nanoparticles under different gradient field conditions". 2019 AIChE Annual Meeting, Orlando (USA), November 10-15, 2019 (Oral Presentation).

2019 J. Kim, **J. Gómez-Pastora**, M. Weigand, J.J. Chalmers, "Cell Tracking Velocimetry: A Femtogram Resolution Fluorescence Cytometric Magnetometer". 2019 AIChE Annual Meeting, Orlando (USA), November 10-15, 2019 (Oral Presentation).

2019 M. Weigand, **J. Gómez-Pastora**, J. Kim, J.J. Chalmers, "High Magnetic Energy Gradient Quadrupole Magnet to Fractionate Low Iron Label-Less RBCs from Aged Blood Donations". 2019 AIChE Annual Meeting, Orlando (USA), November 10-15, 2019 (Poster Presentation).

2019 J. Kim, **J. Gómez-Pastora**, C. Gilbert, M. Weigand, N.A. Walters, E. Reátegui, A.F. Palmer, J.J. Chalmers, "Separation of Healthy Red Blood Cells for better blood transfusion practices". 2019 AIChE Annual Meeting, Orlando (USA), November 10-15, 2019 (Poster Presentation).

2019 M. Weigand, **J. Gómez-Pastora**, J. Kim, M. Kurek, R. Hickey, J.J. Chalmers, "Magnetophoresis and spectral characterization of deoxyhemoglobin by conversion with oxyrase and sodium lactate", 8th Annual Graduate Research Symposium of the Chemical and Biomolecular Engineering Department of The Ohio State University, Columbus (USA), September 25, 2019 (Poster Presentation).

2019 J. Kim, **J. Gómez-Pastora**, C. Gilbert, M. Weigand, N.A. Walters, E. Reátegui, A.F. Palmer, J.J. Chalmers, "Quantification of the mean and distribution of hemoglobin content in normal human blood using cell tracking velocimetry", 8th Annual Graduate Research Symposium of the Chemical and Biomolecular Engineering Department of The Ohio State University, Columbus (USA), September 25, 2019 (Poster Presentation).

2019 C. González-Fernández, **J. Gómez-Pastora**, E. Bringas, I. Ortiz, "Novel design of magnetophoretic microdevices for extracorporeal sepsis treatment". 12th European Congress of Chemical Engineering and 5th European Congress of Applied Biotechnology (ECCE12 & ECAB5), Florence (Italy), September 15-19, 2019 (Oral Presentation).

2019 **J. Gómez-Pastora**, J. Kim, M. Weigand, C. Gillbert, A. Palmer, M. Yazer, L. Moore, M. Zborowski, J.J. Chalmers, "The intrinsic magnetic susceptibility of some normal human blood constituents and the potential to separate these entities". Frontiers in Biomagnetic Particles, Telluride (USA), August 5-7, 2019 (Poster presentation).

2019 **J. Gómez-Pastora**, "Magnetic behavior of human blood constituents and their separation". Dow´s BEST Symposium, Midland (USA), July 30-August 1, 2019 (Oral presentation).

2019 J.J. Chalmers, J. Kim, **J. Gómez-Pastora**, M. Weigand, "The separation of red blood cells based solely on intrinsic magnetization: Clinical and commercial implications". Biochemical and Molecular Engineering XXI, Quebec (Canada), July 14-18, 2019 (Oral presentation).

2019 C. González-Fernández, **J. Gómez-Pastora**, E. Bringas, I. Ortiz, "Optimized design of novel magnetophoretic-microfluidic devices for biofluids detoxification". 3rd International Congress of Chemical Engineering (ANQUE-ICCE-CIBIQ 2019), Santander (Spain), June 19-21, 2019 (Poster presentation).

2019 **J. Gómez-Pastora**, J. Kim, M. Weigand, M. Potgieter, N.A. Walters, E. Reátegui, A.F. Palmer, M. Yazer, M. Zborowski, J.J. Chalmers, "Human monocytes from fresh blood present strong magnetic characteristics; CTV analysis and magnetic susceptibility quantification". Nanotech 2019 Conference & Expo, Boston (USA), June 17-19, 2019 (Oral presentation).

2019 C. González-Fernández, **J. Gómez-Pastora**, I.H. Karampelas, E. Bringas, I. Ortiz, "Optimization of continuous-flow magnetic bioseparators through CFD numerical models". Nanotech 2019 Conference & Expo, Boston (USA), June 17-19, 2019 (Oral presentation).

2019 V. Amiri, **J. Gómez-Pastora**, C. González-Fernández, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, "CFD Analysis of the Generation and Manipulation of Ferrofluid Droplets". Nanotech 2019 Conference & Expo, Boston (USA), June 17-19, 2019 (Oral presentation).

2019 **J. Gómez-Pastora**, "Computational Fluid Dynamics Models for the Rational Design of Magnetic Microseparators – In Memory of Dr. Ed Furlani". Nanotech 2019 Conference & Expo, Boston (USA), June 17-19, 2019 (Oral presentation).

2018 V.A. Roodan, **J. Gómez-Pastora**, A. Verma, E. Bringas, I. Ortiz, E.P. Furlani, "Computational analysis of magnetic droplet generation and manipulation in microfluidic devices". 5th International Conference on Fluid Flow, Heat and Mass Transfer (FFHMT'18), Niagara Falls (Canada), June 7-9, 2018 (Oral presentation).

2018 **J. Gómez-Pastora**, C. González-Fernández, I.H. Karampelas, E. Bringas, E.P. Furlani, I.Ortiz, "Design of magnetic blood cleansing microdevices through experimentally validated CFD modeling", Nanotech 2018 Conference & Expo, Anaheim (USA), May 13-16, 2018 (Oral presentation).

2018 **J. Gómez-Pastora**, I.H. Karampelas, A.Q. Alorabi, M.D. Tarn, E. Bringas, A. Iles, V.N. Paunov, N. Pamme, E.P. Furlani, I. Ortiz, "CFD analysis and experimental validation of magnetic droplet generation and deflection across multilaminar flow streams", Nanotech 2018 Conference & Expo, Anaheim (USA), May 13-16, 2018 (Oral presentation).

2018 **J. Gómez-Pastora**, C. González, J. Ramos-Vivas, E.P. Furlani, E. Bringas, I. Ortiz, "Innovative microdevice for extracorporeal sepsis treatment". VI Doctorate Days and Scientific Dissemination of Group 9 of Universities (G-9), Santander (Spain), April 11-13, 2018 (Poster presentation).

2018 A. Basauri, **J. Gómez-Pastora**, M. Fallanza, E. Bringas, I. Ortiz, "Mass transfer performance under different flow-pattern systems in micro-extractors". 5th European Conference on Microfluidics - μFlu18, Strasbourg (France), February 28-March 1, 2018 (Oral presentation).

2017 **J. Gómez-Pastora**, A.Q. Al-Orabi, M.D. Tarn, E. Bringas, I. Ortiz, V.N. Paunov, N. Pamme, "Continuous generation of stable polyelectrolyte multilayer capsules inside a snakes-and-ladders chip", The 21st International Conference on Miniaturized Systems for Chemistry and Life Sciences – MicroTAS 2017, Savannah (USA), October 22-26, 2017 (Poster presentation).

2017 **J. Gómez-Pastora**, I.H. Karampelas, E. Bringas, E.P. Furlani and I. Ortiz, "Computational analysis of a two-phase continuous-flow magnetophoretic microsystem for particle separation from biological fluids". 27th European Symposium on Computer-Aided Process Engineering – ESCAPE 27, Barcelona (Spain), October 1-5, 2017 (Oral presentation).

2017 **J. Gómez-Pastora**, C. González-Fernández, A. Basauri, M. Fallanza, E. Bringas and I. Ortiz, "Contribution to the design of magnetic blood cleansing microdevices". 10th World Congress of Chemical Engineering, Barcelona (Spain), October 1-5, 2017 (Oral presentation).

2017 C. González-Fernández, **J. Gómez-Pastora**, E. Bringas and I. Ortiz, "Development of microfluidic-magnetophoretic devices for gram-negative sepsis treatment". 10th World Congress of Chemical Engineering, Barcelona (Spain), October 1-5, 2017 (Poster presentation).

2017 A. Basauri, **J. Gómez-Pastora**, M. Fallanza, E. Bringas, and I. Ortiz, "Computational and experimental techniques to describe a micro-extraction process with selective solvents". 10th World Congress of Chemical Engineering, Barcelona (Spain), October 1-5, 2017 (Oral presentation).

2017 A. Basauri, **J. Gómez-Pastora**, M. Fallanza, E. Bringas, and I. Ortiz, "Computational analysis of facilitated transport in a microfluidic device". 27th European Symposium on Computer-Aided Process Engineering – ESCAPE 27, Barcelona (Spain), October 1-5, 2017 (Poster presentation).

2017 A. Basauri, **J. Gómez-Pastora**, M. Fallanza, E. Bringas, I. Ortiz, "Computational analysis of a micro-solvent extraction process". VII International Conference on Coupled Problems in Science and Engineering, Rhodes Island (Greece), June 12-14, 2017 (Oral presentation).

2017 **J. Gómez-Pastora**, C. González-Fernández, A. Basauri, M. Fallanza, E. Bringas and I. Ortiz, "Design and optimization of a multiphase microfluidic device for magnetic bead separation from biofluids". VII International Conference on Coupled Problems in Science and Engineering, Rhodes Island (Greece), June 12-14, 2017 (Oral presentation).

2017 **J. Gómez-Pastora**, E. Bringas, I. Ortiz, E.P. Furlani, "Optimization of magnetic blood cleansing microdevices with Flow-3D". 17th FLOW-3D European Users Conference, Barcelona (Spain), June 6-7, 2017 (Oral presentation).

2017 A. Basauri, **J. Gómez-Pastora**, M. Fallanza, E. Bringas, I. Ortiz, "CFD analysis of facilitated transport in microextraction processes". Nanotech 2017 Conference & Expo, Washington DC (USA), May 14-17, 2017 (Poster presentation).

2017 I.H. Karampelas, **J. Gómez-Pastora**, M.J. Cowan, E. Bringas, I. Ortiz, E.P. Furlani, "Numerical analysis of acoustophoretic discrete particle focusing in microchannels". Nanotech 2017 Conference & Expo, Washington DC (USA), 14-17 May, 2017 (Oral presentation).

2017 **J. Gómez-Pastora**, I.H. Karampelas, E. Bringas, E.P. Furlani, I. Ortiz, "CFD analysis of particle magnetophoresis in multiphase continuous-flow bioseparators". Nanotech 2017 Conference & Expo, Washington DC (USA), May 14-17, 2017 (Oral presentation).

2016 **J. Gómez-Pastora**, I. Ortiz, I.H. Karampelas, X. Xue, E. Bringas, E.P. Furlani, "Analysis of magnetic bead separation in continuous-flow magnetophoretic microsystems for biomedical applications". 2016 AIChE Annual Meeting, San Francisco (USA), November 13-18, 2016 (Oral presentation).

2015 **J. Gómez-Pastora**, C. González, E. Bringas, I. Ortiz, "Nuevo sistema para el tratamiento de sepsis empleando nanopartículas magnéticas". II Jornadas de Jóvenes Investigadores de Cantabria, Santander (Spain), November 5-6, 2015 (Poster presentation).

2015 **J. Gómez-Pastora**, X. Xue, E. Bringas, E.P. Furlani, I. Ortiz, "Novel adsorption processes incorporating magnetic nanoparticle recovery in continuous microfluidic systems". 10th European Congress of Chemical Engineering, Niza (France), September 27- October 1, 2015 (Poster presentation).

2014 **J. Gómez-Pastora**, E. Bringas, G.A. Esteban, J.M. Blanco, I. Ortiz, "Simulation of separation processes incorporating magnetic nanoparticle recovery in continuous microfluidic systems". 6th European Conference on Computational Fluid Dynamics (ECFD VI), Barcelona (Spain), July 20-25, 2014 (Poster presentation).

2014 R. Sanz, **J. Gómez-Pastora**, E. Bringas, R. Ibañez, I. Ortiz, "Forward osmosis processes incorporating microfluidic separation stages for magnetic draw solutions recovery". IX Ibero-American Congress on Membrane Science and Technology, Santander (Spain), May 25-28, 2014 (Poster presentation).

2013 **J. Gómez**, J. Saiz, E. Bringas, I. Ortiz, "Functionalized silicon-based porous nanomaterials and their application onto arsenic adsorption". I Workshop de la Federación Española de Ingenieros Químicos, Ciudad Real (Spain), November 7-8, 2013 (Poster presentation).

2013 R. Sanz, **J. Gomez**, E. Bringas, R. Ibañez, I. Ortiz, "Forward osmosis with magnetic particulate nanomaterials". XXXIV Reunión Bienal de la Real Sociedad Española de Química, Santander (Spain), September 15-18, 2013 (Poster presentation).

Skills and Abilities

Leadership

2022-Present Vice Chair of the Fluid-Particle Separation Division (Area 2f) at AIChE.
2022-Present Advisor of the AIChE Student Chapter at Texas Tech University.

2022-Present Advisor of the Latina Student Association at Texas Tech University.
2018-2020 Member of the executive board of The Ohio State University Postdoctoral Association.
2013 – 2017 Member of the executive board of AQUICÁN (Association of Chemistry and Chemical Engineering of Cantabria).

Analytical Techniques

XRD, DLS, ICP-OES, UV-Vis, Optical/Fluorescence microscopy, Flow cytometry.

Software Skills

CFD Modeling Software: FLOW-3D, ANSYS Fluent, ANSYS CFX, OpenFOAM.
Chemical Engineering Software: Aspen, ChemCAD, SuperPro Designer.
CAD software: AutoCAD.
Cell analysis software: FlowJo, Image J.
General purpose: MatLab, Gams, Microsoft Office, SigmaPlot.
Additional experience in HPC environments, Validation and verification of numerical models.

Languages

Mother tongue: Spanish.
Professional level: English.
Basic level: German.

Volunteering in scientific activities

2016-2017 Organizer and participant in the activities carried out at the University of Cantabria to celebrate the "International Day of Women and Girls in Science".
2016-2017 Organizer and participant in the IV and V edition of the European Researchers' Night.
2015-2017 Organizer and participant in the Science Week held at the University of Cantabria.
2014 Volunteer in the organization of the IX Ibero-American Congress on Membrane Science and Technology.
2013 Volunteer in the organization of the conference "XXXIV Reunión Bienal de la Real Sociedad Española de Química".

International Research Stays

2017 **University of Hull (UK)**
Duration: 3 months (March-May 2017).
Supervisor: Prof. Nicole Pamme.

2016 **State University of New York at Buffalo (USA)**
Duration: 3 months (April-June 2016).
Supervisor: Prof. Edward P. Furlani.

2015 **State University of New York at Buffalo (USA)**
Duration: 2 months (February-March 2015).
Supervisor: Prof. Edward P. Furlani.