



## **SEBASTIAN CHIALVO, PH.D.**

### **SENIOR CONSULTANT**

[schialvo@engsys.com](mailto:schialvo@engsys.com)

Dr. Sebastian Chialvo has a Ph.D. in chemical engineering and specializes in modeling fluid flow, heat transfer, and reacting systems. He is an expert in computational fluid dynamics (CFD) and, more specifically, in developing and utilizing CFD models to solve complex flow problems rapidly and accurately. He has used these approaches to understand and quantify loss of containment, atmospheric dispersion, wind loads, fluid mixing, erosion and corrosion, noise and vibration, thermal fatigue, equipment fouling, reactor runaway, and reactor product quality issues.

Prior to joining ESi, Dr. Chialvo worked for eight years at ExxonMobil Research and Engineering where he supported numerous projects for oil production, refining, and chemicals production. He also served as group lead for its fluid dynamics group and held technical quality oversight responsibilities for others' work in fluid dynamics and CFD modeling. His experience includes investigating root causes of safety and environmental incidents (as well as preventing them before they happen), identifying chemical process and equipment improvements to enhance throughput and reliability, and research into novel chemical and petrochemical process technologies. His work spanned a diverse range of application areas including catalytic and thermal cracking, polymerization, catalyst manufacturing, drying, multiphase separations, spray systems, heat exchangers, flares, and pipelines.

### **Areas of Specialization**

Computational Fluid Dynamics (CFD)  
Multiphase Flow  
Heat and Mass Transfer  
Chemical Reactor Engineering  
Chemical Process Scale-Up  
Multiscale Modeling  
Chemical & Petrochemical  
Refineries  
Drilling Operations  
Design Analysis  
Risk Analysis  
Safety  
Fire Science & Modeling  
Origin and Cause

### **Education**

B.S., Chemical Engineering, University of Florida, 2008  
Ph.D., Chemical Engineering, Princeton University, 2014

February 2022

## Professional Affiliations/Honors

### **American Institute for Chemical Engineers (AIChE),**

National Member since 2005

### **Peer Recognition Award, ExxonMobil Process Technology Department**

for driving increased research collaboration across organizations, 11/2020

### **Peer Recognition Award, ExxonMobil Process Technology Department**

for mentoring and driving technical quality in the group, 06/2019

### **Peer Recognition Award, ExxonMobil Refining & Supply**

for rapid evaluation of safety risk on refinery process, 02/2019

### **Peer Recognition Award, ExxonMobil Fuels Process & Optimization**

for technical leadership on capital project support for oil sands, 03/2018

### **Spot Award, ExxonMobil Process Technology Department**

for novel polymer process design support, 06/2017

### **Peer Recognition Award, ExxonMobil Specialized Engineering Division**

for rapid modeling support of chemical plant environmental issue, 09/2016

### **Peer Recognition Award, ExxonMobil Process Technology Department**

for innovation in oil sands process R&D, 06/2016

## Positions Held

### **ExxonMobil Research & Engineering, Spring, Texas**

Engineering Associate, Fluid Dynamics/CFD Group, 2021 - 2022

Group Lead, Fluid Dynamics/CFD Group, 2018 - 2021

Senior Engineer, Fluid Dynamics/CFD Group, 2015 - 2018

Advanced Engineer, Fluid Dynamics/CFD Group, 2013 - 2015

## Continued Education

Enterprise Leadership Program, UNC Kenan-Flagler Business School - 05/2018

ExxonMobil Process Scale-Up Course - 11/2017

ExxonMobil Process Development Course - 07/2016

ExxonMobil Mixing Fundamentals Course - 05/2016

Fundamentals of Oil Sands Extraction, Prof. Jacob Masliyah, U. of Alberta - 02/2016

PSRI Fluidization Workshop - 09/2015

OpenFOAM Training (Beginner and Advanced), OpenFOAM Foundation - 05/2015

ANSYS Fluent Training - 11/2013

## Patents

CA3100024A1. **S Chialvo**, JC Bondos, J Hernandez. Outlet nozzle for a fluid-solid processing unit. Patent pending.

- US10427088B2. RF Tammera, BT Kelley, **S Chialvo**, AK Nagavarapu, W Barnes, TA Fowler. Apparatus and System for Swing Adsorption Processes Related Thereto. 01 October 2019.
- CA3011234C. **S Chialvo**, BD Albert, O Gervais, KA Abel. Feedwell system for a separation vessel. 06 August 2019.
- US10322365B2. TA Fowler, S Ramkumar, JW Frederick, AK Nagavarapu, **S Chialvo**, RF Tammera, JW Fulton. Apparatus and system for swing adsorption processes related thereto. 18 June 2019.
- US10040022B2. TA Fowler, S Ramkumar, JW Frederick, AK Nagavarapu, **S Chialvo**, RF Tammera, JW Fulton. Apparatus and system for swing adsorption processes related thereto. 07 August 2018.

## Publications

- S Chialvo**. Constitutive model development for flows of granular materials. Ph.D. Dissertation, Princeton University, September 2014.
- Y Gu, **S Chialvo**, S Sundaresan. "Rheology of cohesive granular materials across multiple dense-flow regimes." *Physical Review E* 90(3), 032206 (2014).
- S Chialvo**, S Sundaresan. "A modified kinetic theory for frictional granular flows in dense and dilute regimes." *Physics of Fluids* 25, 070603 (2013).
- S Chialvo**, J Sun, S Sundaresan. "Bridging the rheology of dense granular flows in three regimes." *Physical Review E* 85(2), 021305 (2012).
- S Chialvo**, J Sun, S Sundaresan. "A comprehensive rheological model for granular flows: from quasi-static to rapid regimes." Unpublished proceeding. Symposium on Recent and Emerging Advances in Chemical Engineering (REACH). IIT-Madras, Chennai, India. 2 December 2010.

## Conference Presentations

- JA Federici, **S Chialvo**, B Du, SE Feicht, SP Haynie, DJ Sandell. "Scaling down a purge bin: a multiscale model-centric focus on process fundamentals." Southwest Process Technology Conference. Galveston, TX, 9 October 2018.
- S Chialvo**, S Sundaresan. "A modified kinetic theory for frictional granular flows in dense and Dilute regimes." APS Division of Fluid Dynamics Annual Meeting. San Diego, CA, 19 November 2012.
- S Chialvo**, S Sundaresan. "A modified kinetic-theory model bridging dense and dilute regimes of frictional granular flow". AIChE Annual Meeting. Pittsburgh, PA, 30 October 2012.
- S Chialvo**, J Sun, S Sundaresan. "Bridging the rheology of granular flows in three regimes." APS Division of Fluid Dynamics Annual Meeting. Baltimore, MD, 21 November 2011.
- S Chialvo**, J Sun, S Sundaresan. "Rheology of simple shear flows of dense granular assemblies in different regimes." APS Division of Fluid Dynamics Annual Meeting. Long Beach, CA, 23 November 2010.