

Gustavo A. Montoya Z.



Personal Information	<p>Place of birth and date: Caracas, December 02 of 1985. Nationality: Venezuelan. Marital Status: Single. Address: 160 Cambridgepark Drive, 02140 Cambridge, MA, USA. Contact Numbers: 001-617-8033800. E-mail: gmontoya@mit.edu Website: www.gustavo-montoya.com</p>
Education	<ul style="list-style-type: none">- PhD Degree – Graduated with Honors: Cum Laude. Thesis entitled: “Development and Validation of Advance Theoretical Modeling for Churn-Turbulent Flows and Subsequent Transitions”. Technische Universität Berlin (TU Berlin) in Berlin, Germany. Helmholtz-Zentrum Dresden-Rossendorf (HZDR) in Dresden, Germany. (2012 - 2015).- Visiting Graduate Student (PhD) at the Nuclear Science and Engineering (NSE) Department of the Massachusetts Institute of Technology (MIT). Massachusetts Institute of Technology (MIT) in Cambridge, MA, USA. (2013 - 2014).- Chemical Engineering. Simon Bolivar University (USB) in Caracas, Venezuela (2005 - 2010).- Science Major in Secondary Education – High School Claret School in Caracas, Venezuela (1998 - 2003).- English Studies Centro Venezolano Americano (CVA) in Caracas, Venezuela (1992 - 1996). English First (EF) Seattle in Seattle, USA. (2003). English First (EF) Boston in Boston, USA. (2003 - 2004).- French Studies French Alliance (Alliance Française) in Caracas, Venezuela (2005 - 2007).- German Studies Kaestner Kolleg (Kästner Kolleg) in Dresden, Germany (2010 - 2011). Helmholtz-Zentrum Dresden-Rossendorf in Dresden, Germany (2012). Technische Universität Dresden Institute of Advance Studies (2013).
Languages	<ul style="list-style-type: none">- Spanish: Mother Language.- English: Expert Level in speaking, reading, and writing. (TOEFL Test Grade: 112/120)

	<p>- German: Advance Level in speaking, reading, and writing (B1).</p> <p>- French: Intermediate Level in speaking, reading, and writing.</p>
<p><i>Publications and Presentations</i></p>	<p>- "Validation of a CFD-PBM model for the simulation of boiling flows ". Authors: Antonio Buffo; Marco Vanni; Daniele Marchisio; Gustavo Montoya; Emilio Baglietto. 14th International Conference Multiphase Flow in Industrial Plant. AIDIC and Universita' Degli Studi di Brescia Dipartimento di Ingegneria Meccanica e Industriale. Desenzano del Garda, BS, Italy. September 2017. Paper Accepted to be present as Lecture. http://animp.it/MFIP2017/</p> <p>- "Towards a CFD model for Boiling Flows: Validation of QMOM Predictions with TOPFLOW Experiments ". Authors: Antonio Buffo; Marco Vanni; Daniele Marchisio; Gustavo Montoya; Emilio Baglietto. 12th International Conference on Computational Fluid Dynamics in the Oil and Gas, Metallurgical and Process Industries. Trondheim, Norway. June 2017. Paper Accepted to be present as Lecture. https://www.sintef.no/projectweb/cfd-2017/</p> <p>- "A multi-scale approach simulating boiling in a heated pipe including flow pattern transition ". Authors: Thomas Hoehne; Eckhard Krepper; Gustavo Montoya; Dirk Lucas. 17th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-17). Xi'an, Shaanxi, September 2017. Paper Accepted to be present as Lecture. http://www.nureth17.com/</p> <p>- "Analysis, Application, and Validation of a Two-Fluid Multi-Field Hydrodynamic Model for High Void Fraction Regimes" (UNDER REVIEW) Authors: Gustavo Montoya; Dirk Lucas; Eckhard Krepper; Emilio Baglietto. Journal of Nuclear Engineering and Design (2017). https://www.journals.elsevier.com/nuclear-engineering-and-design</p> <p>- "Analysis, Application, and Validation of a Generalized Multi-Field Two-Fluid Approach for Treatment of Multi-Scale Interfacial Structures in High Void-Fraction Regimes" (UNDER REVIEW) Authors: Gustavo Montoya; Dirk Lucas; Emilio Baglietto; Thomas Höhne. Annals of Nuclear Energy (2017). http://www.journals.elsevier.com/annals-of-nuclear-energy</p> <p>- "Development, Analysis, and Validation of a Surface Tension and Wall Adhesion Model for a Generalized Two-Phase Flow Approach" (UNDER REVIEW) Authors: Gustavo Montoya; Emilio Baglietto; Dirk Lucas; Friederike Gauss. Chemical Engineering and Science (2017). http://ees.elsevier.com/ces/</p> <p>- "Resolved Interface Taylor Bubble Simulations to Support Eulerian Multiphase Closures Derivation". Authors: Gustavo Montoya; Emilio Baglietto. Computational Fluid Dynamics for Nuclear Reactor Safety Applications – CFD4NRS-6.</p>

Boston, USA. September 2016.
Paper Accepted and presented as Lecture.
<http://cfd.r.mit.edu/>

- **"Towards a Better Computational Fluid Dynamics Modeling of Multiphase Flow Systems with Direct Applicability to Light Water Reactors".**

Authors: Gustavo Montoya; Ben Magolan; Etienne Demarly; Giulia Agostinelli; Nazar Lubchenko; Ravikishore Kommajosyula; Rosie Sugrue; Emilio Baglietto.
MIT Energy Night 2016.
Cambridge, Massachusetts, USA. October 2016.
<https://energy.mit.edu/event/mit-energy-night/>

- **"A review on mechanisms and models for the churn-turbulent flow regime".**

Authors: Gustavo Montoya; Dirk Lucas; Emilio Baglietto; Yixiang Liao.
Chemical Engineering and Science (2015).
<http://ees.elsevier.com/ces/>

- **"Implementation and Validation of a Surface Tension Model for the Multi-Scale Approach GENTOP".**

Authors: Gustavo Montoya; Emilio Baglietto; Dirk Lucas.
16th International Topical Meeting on nuclear Reactor Thermalhydraulics - NURETH-16.
Chicago, USA. September 2015.
Paper Accepted and presented as Lecture.
<http://nureth16.anl.gov/>

- **"Comparative Analysis of High Void Fraction Regimes using an Averaging Euler-Euler Multi-Fluid Approach and a Generalized Two-Phase Flow (GENTOP) Concept".**

Authors: Gustavo Montoya; Emilio Baglietto; Dirk Lucas; Eckhard Krepper; Thomas Hoehne.
22nd International Conference on Nuclear Engineering (ICONE 22).
Prague, Czech Republic. July 2014.
Paper Accepted and Presented as Lecture and Poster.
"Best Poster Award" received.
<http://www.asmeconferences.org/icone22/>

- **"CFD-Modelle für Zweiphasenströmungen im Rahmen des Mehr-Fluid-Konzepts".**

Authors: Dirk Lucas; Roland Rzehak; Eckhard Krepper; Thomas Hoehne; Yixiang Liao; Gustavo Montoya; Susan Hänsch.
Institutsseminar des Instituts für Kern- und Energietechnik (IKET) am Karlsruher Institut für Technologie (KIT).
Invited Lecture
Karlsruhe, Germany. July 2014.

- **"GENTOP – a multi-field 2-fluid model".**

Authors: Dirk Lucas; Susan Hänsch; Eckhard Krepper; Thomas Hoehne; Gustavo Montoya.
Joint Hungarian-Korean Laboratory (JHKL) Workshop.
Invited Lecture
Budapest, Hungary. June 2014.

- **"Analysis and Applications of a Generalized Multi-Field Two-Fluid Approach for Treatment of Multi-Scale Interfacial Structures in High Void Fraction Regimes".**

Authors: Gustavo Montoya; Dirk Lucas; Eckhard Krepper; Susan Hänsch; Emilio Baglietto.
2014 International Congress on Advances in Nuclear Power Plants (ICAPP 2014).

Charlotte, North Carolina, USA. April 2014.
Paper Accepted and Presented as Lecture and Poster.
"Travel Student Fellowship" received.
<http://www.asmeconferences.org/icone22/>

- **"A Generalized Multi-Field Two-Fluid Approach for Treatment of Multi-Scale Interfacial Structures in High Void Fraction Regimes"**.

Authors: Gustavo Montoya; Emilio Baglietto; Dirk Lucas; Eckhard Krepper.
MIT Energy Night 2013.
Cambridge, Massachusetts, USA. October 2013.
<https://energy.mit.edu/event/mit-energy-night/>

- **"Analysis and Applications of a Two-Fluid Multi-Field Hydrodynamic Model for Churn-Turbulent Flows"**.

Authors: Gustavo Montoya; Yixiang Liao; Dirk Lucas; Eckhard Krepper.
21st International Conference on Nuclear Engineering (ICONE 21).
Chengdu, China. July 2013
Paper Accepted and Presented as Lecture and Poster.
"Best Paper Award" received.
<http://www.icone21.org/info.php?InfoID=1001>

- **"Multiphase CFD @ HZDR – Strategy and research topics of the CFD department"**.

Authors: Dirk Lucas, Gustavo Montoya (Presenter).
21st International Conference on Nuclear Engineering (ICONE 21).
Chengdu, China. July 2013
Invited lecture to the CFD Workshop.
<http://www.icone21.org/info.php?InfoID=1001>

- **"Application of a Multi-Field Concept to the Dambreak Case with an Obstacle"**.

Authors: S. Hänsch, D. Lucas, T. Höhne, E. Krepper, G. Montoya.
The 15th International Topical Meeting on Nuclear Reactor Thermalhydraulics (NURETH-15).
Pisa, Italy. May 2013
Paper Accepted and Presented.
<http://www.nureth15.org/>

- **"Comparative Simulations of Free Surface Flow using VOF-Methods and a New Approach for Multi-Scale Interfacial Structures"**.

Authors: S. Hänsch, D. Lucas, T. Höhne, E. Krepper, G. Montoya.
ASME 2013 Fluids Engineering Summer Meeting - FEDSM2013.
Nevada, USA. July 2013
Paper Accepted and Presented.
<http://www.asmeconferences.org/fedsm2013/>

- **"Modeling of Churn-Turbulent Flow"**.

Authors: G. Montoya; Y. Liao; D. Lucas.
Kompetenzzentrum Ost für Kerntechnik – East Centre of Excellence in Nuclear Engineering (KOMPOST - 2012).
Seminar for PhD students and young researchers.
Dresden, Germany. December 2012.
Invited for poster presentation.
http://tu-dresden.de/die_tu_dresden/fakultaeten/fakultaet_maschinenwesen/iet/wket/termine/KOMPOST_Prog_12.pdf

- **"CFD-Simulation siedender Strömungen in Komponenten mit großer vertikaler Ausdehnung"**.

Authors: G. Montoya; Y. Liao; D. Lucas.
E.ON Kernkraft Doktorandenkolloquium.
Hannover, Germany. November 2012.
Invited for presentation.

- "Modeling of Churn-Turbulent Flow".

Authors: G. Montoya; Y. Liao; D. Lucas.
Helmholtz-Zentrum Dresden-Rossendorf (HZDR) 7th PhD Seminar.
Schönebeck, Germany. October 2012.
Invited for poster presentation.

- "Image-Processing-Based Study of the Interfacial Behavior of the Countercurrent Gas-Liquid Two-Phase Flow in a Hot Leg of a PWR".

Authors: Gustavo A. Montoya Z.; Deendarlianto; Dirk Lucas; Thomas Höhne; Christophe Vallée.

Journal of Science and Technology in Nuclear Installation.

Published in Science and Technology of Nuclear Installations Volume 2012 (2012), Article ID 209542 (Special Issue named: Countercurrent Flow Limitations in a Pressurized Water Reactor).

<http://www.hindawi.com/journals/stni/2012/209542/abs/>

- "CFD studies on the phenomena around counter-current flow limitations of gas/liquid two-phase flow in a model of a PWR hot leg".

Authors: Deendarlianto; Thomas Höhne; Dirk Lucas; Christophe Vallée; Gustavo Adolfo Montoya Zabala.

Journal of Nuclear Engineering and Design.

Published in Nuclear Engineering and Design Volume 241, Issue 12, December 2011, Pages 5138–5148.

<http://www.sciencedirect.com/science/article/pii/S0029549311007060>

- "Determination and study of hold up and flow patterns in two-phase flow liquid-liquid systems for horizontal and inclined pipes using image processing techniques".

Authors: Montoya, G.; Valecillos, M.; García, J.; Romero, C. & González, D.

International Conference on Multiphase Flow 2010 (ICMF-2010).

Tampa, USA. June 2010.

Paper accepted for full publication and presented as poster (P1.52).

<http://ufdc.ufl.edu/UF00102023/00455>

- "Determination of hydrodynamic parameters on two-phase flow gas-liquid in pipes with different inclination's angles using image processing algorithm".

Authors: Montoya, G.; Valecillos, M.; Romero, C. & González, D.

International Conference on Multiphase Flow 2010 (ICMF-2010).

Tampa, USA. June 2010.

Paper accepted for full publication and presented as poster (P1.53).

<http://conferences.dce.ufl.edu/Docs/ICMF2010/PosterPresentations.pdf>

- "Determinación de altura de fase y hold up para flujo bifásico líquido-líquido en tuberías horizontales por medio de procesamiento de imágenes".

Authors: Montoya, G.; García, K.; Valecillos, M.; García, J.; Romero, C. & González, D.

American Society of Mechanical Engineers (ASME) Congress "Ideas Practicas...Soluciones Eficientes".

University Simon Bolivar (USB), Caracas-Venezuela. November 2009.

Paper accepted and presented.

ISBN 978-980-7062-17-6

	<p>- “Determination of Hydrodynamic Parameters on Two-Phase Flow Gas - Liquid in Pipes with Different Inclination Angles Using Image Processing Algorithm”. Authors: Gustavo Montoya; María Valecillos; Carlos Romero, Dosinda González. 62 Annual Meeting of the American Physical Society’s Division of Fluid Dynamics (DFD). Minneapolis, Minnesota. November 2009.</p>
<p>Awards</p>	<p>- Best Paper Award at the 21st International Conference on Nuclear Engineering (ICONE21) – August 2013 "Analysis and Applications of a Two-Fluid Multi-Field Hydrodynamic Model for Churn-Turbulent Flows" Published and presented in the 21st International Conference on Nuclear Engineering (ICONE21). Awarded by the American Society of Mechanical Engineers (ASME), the Japanese Society of Mechanical Engineers (JSME), and the Chinese Nuclear Society (CNS).</p> <p>- ICAPP 2014 Travel Fellowship at the 2014 International Congress on Advances in Nuclear Power Plants (ICAPP2014) – April 2014 "Analysis and Applications of a Generalized Multi-Field Two-Fluid Approach for Treatment of Multi-Scale Interfacial Structures in High Void Fraction Regimes" Published and presented at the International Congress on Advances in Nuclear Power Plants (ICAPP2014). Awarded by the American Nuclear Society (ANS).</p> <p>- Best Poster Award at the 22st International Conference on Nuclear Engineering (ICONE22) – July 2014 "Comparative Analysis of High Void Fraction Regimes using an Averaging Euler-Euler Multi-Fluid Approach and a Generalized Two-Phase Flow (GENTOP) Concept" Published and presented in the 22st International Conference on Nuclear Engineering (ICONE22). Awarded by the American Society of Mechanical Engineers (ASME), the Japanese Society of Mechanical Engineers (JSME), and the Chinese Nuclear Society (CNS).</p>
<p>Attended Courses</p>	<p>- Kaufman Teaching Certificate Program (KTCP). Massachusetts Institute of Technology (MIT), Cambridge, MA, USA. (2016)</p> <p>- International DYN3D Users and Developers Meeting. Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany. (2013)</p> <p>- Numerische Berechnung turbulenter Strömungen in Forschung und Praxis (Numerical calculations of turbulent flows in research and industry). Institute für Strömungsmechanik, Technischen Universität Dresden, Germany. (2012)</p> <p>- Kompetenzzentrum Ost für Kerntechnik – East Centre of Excellence in Nuclear Engineering (KOMPOST - 2012). Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany. (2012)</p> <p>- Workshop on Tomography, data processing and image reconstruction for medicine and engineering. Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany. (2012)</p> <p>- 10th Joint HZDR & ANSYS Germany Multiphase Flow Conference & Short Course (Simulation, Experimental, and Application). Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany. (2012)</p>

	<ul style="list-style-type: none"> - Introduction to Bioengineering. Simon Bolivar University. Caracas, Venezuela. (2010) - Process Simulation course (PROII/PROVISION, HEXTRAN, and INPLANT). Simon Bolivar University. Caracas, Venezuela. (2010) - Evaluation and management of chemical projects course. Simon Bolivar University. Caracas, Venezuela. (2010) - Strategic management and project planning course. Simon Bolivar University. Caracas, Venezuela. (2010) - 2010 IEEE International Conference on Robotics and Automation (ICRA 2010) Alaska, USA. (2010) - American Society of Mechanical Engineers (ASME) Congress. University Simon Bolivar. Caracas, Venezuela. (2007) University Simon Bolivar. Caracas, Venezuela. (2008) - Electronics and Telecommunication Congress University Simon Bolivar. Caracas, Venezuela. (2006)
<p>Research and Professional Experience</p>	<ul style="list-style-type: none"> - Postdoctoral Associate at the Nuclear Science and Engineering (NSE) Department of the Massachusetts Institute of Technology (MIT). USA. Postdoctoral Associate at the Nuclear Science and Engineering Department (NSE) of the Massachusetts Institute of Technology (MIT). (2015 - Present). - Visiting Graduate Student (PhD) at the Nuclear Science and Engineering (NSE) Department of the Massachusetts Institute of Technology (MIT). USA. Twelve months visiting graduate student position (PhD) at the Nuclear Science and Engineering Department (NSE) of the Massachusetts Institute of Technology (MIT). Research about the CFD modeling of high void fraction regimes with boiling applications for nuclear safety research towards my PhD degree. (2013 - 2014). - Support Staff Employee at the Nuclear Science and Engineering (NSE) Department of the Massachusetts Institute of Technology (MIT). USA. Research about the CFD modeling of high void fraction regimes with boiling applications for nuclear safety research using ANSYS CFX and STAR-CCM+. Supported by the DOE Sponsored Consortium for Advance Simulation of Light Water Reactors (CASL). (2014). - Scientific Employee with the possibility of preparing for a Doctorate at the Helmholtz-Zentrum Dresden-Rossendorf. Dresden, Germany. Research as a Chemical / Mechanical Engineer and Scientist in the Computational Fluid Dynamics (CFD) Department from the Institute of Fluid Dynamics of the Helmholtz-Zentrum Dresden-Rossendorf modeling churn-turbulent flow regime and the transition to slug flow in boiling systems. Dresden, Germany. (2012 - 2015). - Investigations in image analysis techniques for the study of CCFL and void fraction during counter-current two-phase flow in a model of Pressurized Water Reactor (PWR). Helmholtz-Zentrum Dresden-Rossendorf. Germany. Remunerated Internship (4 months) for my major in Chemical Engineering thesis about Image analysis techniques for the study of CCFL and void fraction during counter-current two-phase flow in a model of Pressurized Water Reactor (PWR). Helmholtz-Zentrum Dresden-Rossendorf. Germany. (2010)

	<p>- Investigations in the area of transport phenomena about pressure fall and hold up for multiphase flow liquid-liquid and gas-liquid. Simon Bolivar University, Venezuela. – Present owner and main researcher of the full project. Studies since 2008 with several publications (2008-Present).</p> <p>- Professor’s Assistantship at the Simon Bolivar University. Professor’s assistant in the Pure and Applied Mathematics Department, and the Thermodynamics and Transport Phenomena Department from the Simon Bolivar University, teaching Mathematics III, and Principles of Chemical Engineering. (2007 - 2008).</p>
<p><i>Groups and Associations</i></p>	<p>- Member of The American Nuclear Society (ANS). Member ID: 1384116379 www.ans.org</p> <p>- Member of The American Institute of Chemical Engineers (AIChE). Member ID: 003300051537 www.aiche.org</p> <p>- Member of The American Society of Mechanical Engineers (ASME). Membership number: 100354104 www.asme.org</p> <p>- Former Helmholtz-Junior Representative. One of the two representatives for the Helmholtz-Zentrum Dresden-Rossendorf in front of the Helmholtz-Association. http://www.helmholtz.de/jobs_talente/doktoranden/helmholtz_juniors/</p> <p>- DocTeam Helmholtz-Zentrum Dresden-Rossendorf. Scientific group in charge of the organization of an annual multidisciplinary PhD Seminar and other PhD activities inside the Helmholtz-Zentrum Dresden-Rossendorf.</p> <p>- GID-10 Research Group Student Collaborator and Lead Researcher in various Projects in the Transport Phenomena Area for the GID-10 Research Group of the University Simon Bolivar.</p>
<p><i>Peer Reviews</i></p>	<p>- Scientific article submitted to the Journal of Combustion Theory and Modelling (2016).</p> <p>- Two scientific articles submitted to the Computational Fluid Dynamics for Nuclear Reactor Safety Applications (CFD4NRS-6) conference. Cambridge, MA, USA (2016).</p> <p>- Multiphase flow book first revision published by Elsevier (2017) – In progress.</p>
<p><i>Skills and Abilities</i></p>	<p>- Advance knowledge working with MATLAB, SIMULINK, PROII with PROVISION, HEXTRAN, INPLANT, Polymath, Mathcad, Autodesk 3ds Max, C++, ANSYS ICEM CFD, ANSYS CFX, ANSYS Fluent, ANSYS Design Modeler, ANSYS Mesh, OpenFOAM, and STARCCM+.</p> <p>- Moderate knowledge of AutoCAD 3D Plant, AutoCAD P&ID, COMSOL Multiphysics, and Autodesk Simulation Multiphysics 2012.</p>