

## **JOHAN AUGUSTO BOCANEGRA CIFUENTES**

*Ph.D. Mechanical, Energy, and Management Engineering*

*Mg. Teaching Exact and Natural Sciences*

*Physicist*

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### **PROFESSIONAL PROFILE**

I'm a researcher on applied physics. My projects have included both experiments and computational simulations of physical systems. I have experience using advanced laboratory techniques, such as the acoustic camera, Kundt's tube, and multipurpose data acquisition systems for thermo-hydraulic measurements. I have held teaching and management positions in education, performing planning and control tasks and implementing the ISO 9001 Quality Management System in educational contexts.

### **PERSONAL SKILLS**

**Language skills:** Italian (B2/UGAI)  
English (C1/ TOEFL)  
Spanish (Native).

**Digital skills:** COMSOL, Ansys Fluent, Elmer multiphysics, Z88, Lattice Boltzmann PALABOS, I-SIMPA, AGROS2D, Freecad, Matlab, Mathematica, C++, Python, VB, Arduino, LabVIEW, Audacity, Zotero.

### **EDUCATION AND TRAINING**

- 2021** Ph.D. in Mechanical, Energy, and Management Engineering,  
Curriculum Technical Physics  
Università degli Studi di Genova, DIME, (Italy)  
*Thesis titled: Lattice Boltzmann Method: applications to thermal fluid dynamics and energy systems*
- 2013** Magister in Teaching Exact and Natural Sciences  
Universidad Nacional de Colombia, (Colombia)  
*Thesis titled: Mechanical wave laboratory supported with free access information and communication technologies, a didactic proposal for teaching basic acoustics based on free access Technologies.*
- 2006** Physics  
Universidad Nacional de Colombia, (Colombia)  
*Thesis entitled: Numerical implementation of a mammalian inner ear model.*

## Complementary Studies

**Course:** Corso sicurezza lavoratori: parte generale +specifica (rischio alto). Held in Videoconference from 30/05/2023 to 31/05/2023, 16 H.

**Course:** PhD-Summer Course- Machine Learning: A Computational Intelligence Approach MLCI 2022 (10th edition). Università degli Studi di Genova. 30/05/2022-3/06/2022.

**Course:** LabVIEW core 2. National Instruments. 26/01/2021– 28/01/2021.

**Workshop/ School:** Palabos Summer School 2020, UniGe (University of Geneva, Switzerland) and Hepia (University of Applied Sciences of Western Switzerland). 8/7/2020 -10/7/2020.

**Course:** Advanced programming in MATLAB and Simulink. Prof. Matteo Lodi. Università degli Studi di Genova. 17/07/2020.

**Course:** Spectral analysis in practice. Prof. Ing. Giovanni Battista Rossi. Università degli Studi di Genova. 20/02/2020.

**Seminar:** Tomorrow's professor. Walid Kamali Ph.D. City University, Engineering & IT Maritime Studies/ Università degli Studi di Genova. 17/12/2019.

**Seminar:** Geological and geotechnical insights related to borehole heat exchanger design and realization for geothermal heat pump applications. Dr. Giorgia Dalla Santa Ph.D. Università degli Studi di Genova. 25/11/2019.

**Course:** Numerical Thermal Fluid Dynamics/Termo-fluidodinamica numerica (master course). Prof. Francesco Devia, Università degli Studi di Genova. 2019.

**Course:** Heat Transfer/ Trasmissione del calore (master course). Prof. Giovanni Tanda, Università degli Studi di Genova. 2019.

**Course:** Acoustic design for buildings (master course). Prof. Davide Borelli & Prof Corrado Schenone, Università degli Studi di Genova. 2019.

**Workshop/ School:** Modelling, manufacturing and application of porous sound packages in today's industry, MATELYS – Research Lab, ENTPE. Lyon (France). 23/04/2019 24/04/2019.

**Workshop/ School:** Scuola Estiva di Fisica Tecnica XI edizione: nuove frontiere in tema di trasmissione del calore, Università degli Studi del Sannio, Massa Lubrense - Sorrento. 8/7/2019 - 12/7/2019.

**Seminar:** Heat Storage Technologies, Prof. Aldo Giovannini, MCI Innsbruck, Università degli Studi di Genova/ MCI University Innsbruck. 29/05/2019.

**Seminar:** Worldwide energy situation: from waste exploitation to thalasso energy frontiers, Prof. Hervé Boileau, USMB, Università degli Studi di Genova/ Université Savoie Mont Blanc. 17/04/2019.

**Seminar:** Monitoraggio, simulazione e previsione del vento, DICCA, Università di Genova. 28/02/2019.

**Online Course:** Simulation and modeling of natural processes, Prof. Bastien Chopard, Prof. Jean-Luc Falcone, Prof. Jonas Latt, and Prof. Orestis Malaspinas, University of Geneva. 12/14/2018.

**Online Course:** Introduction to solar cells, Morten Vesterager Madsen, Technical University of Denmark (DTU). 11/28/2018

**Other courses:** Micro architecture and interior design, Universidad Nacional de Colombia. Active Learning in Optics and Photonics, ALOP-UNESCO, Universidad Nacional de Colombia. New Tools for Creation in the Visual Arts Modules I and II, Universidad Nacional de Colombia.

## WORKING EXPERIENCE

- 2022-2023** Università degli Studi di Genova  
Research fellow at Department of Mechanical, Energy, Management and Transport Engineering *“Modelling and experiments on a room temperature magnetic refrigerator prototype”*
- 2022-2023** Università degli Studi di Genova  
Teaching *“Acoustic Design for Buildings”*
- 2022-2023** Università degli Studi di Genova  
Didactics support for official teaching of *“Applied physics (Fisica Tecnica)”*
- 2022-2023** Università degli Studi di Genova  
Didactics support for official teaching of *“Applied thermodynamics”*
- 2021-2022** Università degli Studi di Genova  
Teaching *“Acoustic Design for Buildings”*
- 2021-2022** Università degli Studi di Genova  
Didactics support for official teaching of *“Fisica Tecnica (Applied thermodynamics)”*
- 2021-2022** Università degli Studi di Genova  
Didactics support for official teaching of *“Fire Design and modelling”*
- 2021-2022** Polo Universitario Guglielmo Marconi Promostudi La Spezia, Università degli Studi di Genova  
*Didactics support for official teaching of “Fisica Tecnica (Applied thermodynamics), laurea Triennale in Ingegneria Nautica”.*
- 2020-2021** Università degli Studi di Genova  
*Didactics support for official teaching of “Acoustic Design for Buildings”.*
- 2020-2021** Polo Universitario Guglielmo Marconi Promostudi La Spezia, Università degli Studi di Genova  
*Didactics support for official teaching of “Fisica Tecnica (Applied thermodynamics), laurea Triennale in Ingegneria Nautica”*
- 2019-2020** Università degli Studi di Genova  
*Didactics support for official teaching of “Acoustic Design for Buildings”*
- 2019-2020** Polo Universitario Guglielmo Marconi Promostudi La Spezia, Università degli Studi di Genova  
*Didactics support for official teaching of “Fisica Tecnica (Applied thermodynamics), laurea Triennale in Ingegneria Nautica”*
- 2014-2015** Universidad la Gran Colombia  
Professor at Civil Engineering Department, *“Solid Mechanics, Fluid Mechanics, Numerical Methods, Mathematics, and Experimental Physics”*

## RECENT RESEARCH ACHIEVEMENTS

**H-index:** 5 (SCOPUS)

### Journal Papers:

**Bocanegra, J.A.**, Scarpa, F.\*, Bianco, V., Tagliafico, L. The effect of dead volumes on the performance of magnetic refrigerators (2022). International Journal of Refrigeration (Elsevier).

DOCUMENT TYPE: Article; PUBLICATION STAGE: Final

Misale, M, **Bocanegra, J.A.\*** Experiments and qualitative analysis by Artificial Neural Network approach on pool boiling of FC-72 on finned surfaces confined by an unheated horizontal wall (2022). International Journal of Thermal Sciences (Elsevier).

DOCUMENT TYPE: Article; PUBLICATION STAGE: Final

Misale, M, **Bocanegra, J.A.\***, Marchitto, A. Long-term experimental study on gravitational sedimentation of water aluminum oxide nanofluid at different volumetric concentrations (2022). International Journal of Sediment Research (Elsevier). DOI: 10.1016/j.ijsrc.2023.01.002

DOCUMENT TYPE: Article; PUBLICATION STAGE: Final

**Bocanegra, J.A.\***, Marchitto, A., Misale, M. Thermal performance investigation of a mini natural circulation loop for solar PV panel or electronic cooling simulated by lattice Boltzmann method (2022) International Journal of Energy Production and Management, 7 (1), pp. 1-12. DOI: 10.2495/EQ-V7-N1-1-12

DOCUMENT TYPE: Article; PUBLICATION STAGE: Final

**Bocanegra, J.A.**, Borelli, D.\*, Gaggero, T., Rizzuto, E., Schenone, C. A novel approach to port noise characterization using an acoustic camera (2022) Science of the Total Environment, 808, art. no. 151903. DOI: 10.1016/j.scitotenv.2021.151903

DOCUMENT TYPE: Article; PUBLICATION STAGE: Final

Misale, M., **Bocanegra, J.A.\***, Marchitto, A. Thermo-hydraulic performance of connected single-phase natural circulation loops characterized by two different inner diameters (2021) International Communications in Heat and Mass Transfer, 125, art. no. 105309. DOI: 10.1016/j.icheatmasstransfer.2021.105309

DOCUMENT TYPE: Article; PUBLICATION STAGE: Final

Misale, M., **Bocanegra, J.A.\***, Borelli, D., Marchitto, A. Experimental analysis of four parallel single-phase natural circulation loops with small inner diameter (2020) Applied Thermal Engineering, 180, art. no. 115739. DOI: 10.1016/j.applthermaleng.2020.115739

DOCUMENT TYPE: Article; PUBLICATION STAGE: Final

**Bocanegra Cifuentes, J.A.\***, Borelli, D., Cammi, A., Lomonaco, G., Misale, M. Lattice Boltzmann method applied to nuclear reactors-A systematic literature review (2020) Sustainability (Switzerland), 12 (18), art. no. 7835. DOI: 10.3390/su12187835

DOCUMENT TYPE: Review; PUBLICATION STAGE: Final

## Papers Presented In International Conferences:

(\*presenting author)

**Bocanegra, J.A.\***, Misale, M., (2022) Lattice Boltzmann model of a square natural circulation loop with small inner diameter: working fluid effects. 39th Heat Transfer Conference (UIT 2022) Journal of Physics: Conference Series (IOP).

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

**Bocanegra, J.\***, Borelli, D., (2022) Propagation of pressure pulses in rectangular enclosures using the lattice Boltzmann method. Proceedings of the 28th International Congress on Sound and Vibration, ICSV 2022.

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

**Bocanegra, J.**, Borelli, D.\*, Gaggero, T., Rizzuto, E., Schenone, C. (2022). Modal response of cabins at low frequencies in a Ro-pax vessel. Proceedings of the 28th International Congress on Sound and Vibration, ICSV 2022.

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

**Bocanegra, J.**, Borelli, D., Gaggero, T., Schenone, C.\* (2022). Acoustic camera ship noise measurements during docking operations: a case study in Genoa. Proceedings of the 28th International Congress on Sound and Vibration, ICSV 2022.

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

**Bocanegra, J.A.**, Borelli, D.\* Experimental characterization of the steel tongue drum (2021). "Advances in Acoustics, Noise and Vibration - 2021" Proceedings of the 27th International Congress on Sound and Vibration, ICSV 2021.

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

**Bocanegra, J.\***, Misale, M., Schenone, C., Borelli, D. (2020). Geometric correction factor for elliptic holes in perforated plates and its role in sound absorption coefficient. *Forum Acusticum* 2020. DOI: 10.48465/fa.2020.0971.

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

**Bocanegra, J.\***, Borelli, D., Gaggero, T., Rizzuto, E., Schenone, C. (2020). Analysis of literature data on shipboard noise. *Forum Acusticum* 2020. DOI: 10.48465/fa.2020.0967.

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

**Bocanegra, J.**, Borelli, D.\* Review of acoustic hysteresis in flute-like instruments (2019) Proceedings of the 26th International Congress on Sound and Vibration, ICSV 2019.

DOCUMENT TYPE: Conference Paper PUBLICATION STAGE: Final

## Participation in International Conferences:

**8th AIGE/IIETA International Conference and 18th AIGE 2023 Conference on "Energy Conversion, Management, Recovery, Saving, Storage and Renewable Systems" June 14–15 2023, Turin, Italy.**

The Multiphysics Approach for a New Rotary Magnetic Refrigerator prototype

**European Conference RACHP, 8<sup>th</sup>-9<sup>th</sup> June 2023, Milan, Italy.** Sustainability in domestic refrigeration: the feasibility of rotary magnetic refrigerators

**39th Heat Transfer Conference (UIT 2022), Gaeta, Italy.** Lattice Boltzmann model of a square natural circulation loop with small inner diameter: working fluid effects

**28th International Congress on Sound and Vibration, ICSV 2022, Sinagapur.**

Propagation of pressure pulses in rectangular enclosures using the lattice Boltzmann method.

Modal response of cabins at low frequencies in a Ro-pax vessel.

Acoustic camera ship noise measurements during docking operations: a case study in Genoa.

**Energy and Sustainability 2021, 9th International conference on Energy and Sustainability, 6 - 8 October 2021.** Thermal performance investigation of a mini natural circulation loop for solar PV panel or electronic cooling simulated by lattice Boltzmann method

**30th International Conference on Discrete Simulation of Fluid Dynamics, 2021.** Lattice Boltzmann applications to acoustics.

**27th International Congress on Sound and Vibration, ICSV 2021.** Experimental characterization of the steel tongue drum (2021).

**Forum Acusticum 2020.** Geometric correction factor for elliptic holes in perforated plates and its role in sound absorption coefficient. DOI: 10.48465/fa.2020.0971.

**Forum Acusticum 2020.** Analysis of literature data on shipboard noise. DOI: 10.48465/fa.2020.0967.

**26th International Congress on Sound and Vibration ICSV 2019.**, "Review of acoustic hysteresis in flute-like instruments"

## Invited chairman:

- **28th International Congress on Sound and Vibration, ICSV 2022** Regular Sessions T12 RS01 - Underwater sound – measurement and modelling.
- **29th International Congress on Sound and Vibration, ICSV 2023** Regular Sessions T12 RS01 - Underwater sound – measurement and modelling.

## Reviewer for international journals:

Ocean Engineering, Progress in Nuclear Energy, Energies, Processes, Sustainability, Journal of Nuclear Engineering, Mathematics, International Journal of Environmental Research and Public Health.

*Johan Augusto Bocanegra Cifuentes*

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Pisa, Italy, 20/06/2023