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Present Address: *Permanent Address:*
Av. Tejada 109, Dpto. 602   Calle Las Flores 410 Dpto. 302
Miraflores, Lima, Peru   Lima, Lima27, Perú

EDUCATION:

The University of Iowa   Iowa City, IA
PhD. In Civil Engineering   November, 2017
Designation in Hydraulics, Hydrology and Water Resources

Stanford University   Stanford, CA
Master of Science in Civil Engineering   June, 2012
Designation in Environmental Fluid Mechanics and Hydrology

The University of Kansas   Lawrence, KS
Bachelor of Science in Civil Engineering   May, 2011
Graduated with distinction (GPA 3.95)

INTERNATIONAL RESEARCH EXPERIENCE

University of Notre Dame   Notre Dame, IN
Visiting researcher   January – February, 2019
Department of Civil and Environmental Engineering and Earth Sciences

National University of Cordoba   Cordoba, Argentina
Visiting research professor   July - August, 2019
Department of Exact, Physical and Natural Sciences

Fluid Dynamics of Sustainability and the Environment Summer School   Cambridge, England
University of Cambridge   September, 2014
Department of Applied Mathematics and Theoretical Physics

WORK EXPERIENCE:

Universidad de Ingenieria y Tecnologia (UTEC)   Lima, Peru
Department Chair – Department of Sciences, September 2019 - Ongoing
Assistant Professor – Department of Environmental Engineering, January, 2018 – Ongoing
- PI: On the breathability of a city: a numerical study (UTEC Seed Fund: S/. 10 000)
- Co-PI: PEGASUS Producing Energy and Preventing Hazards from surface water storages in Perú (Newton-Paulett fund for S/. 1 500 000)
- Co-PI: ePIURA Understanding flooding and urban planning in Piura, Perú (FONDECYT fund for S/. 350 000)
- PI: Hydralic study of the network of pre-hispanic channels and ponds located in the Sanctuary of Pachacamac (UTEC Seed Fund for S/.20 000)
- Co-PI: Numerical study of the influence of Westerly Wind Bursts (WWBs) on the hydroclimatological conditions in the Peruvian coast before and during EL Niño Events using the WRF model (UTEC-Harvard Seed Fund for $15 000)
- Development of new undergraduate courses for the Environmental Engineering Department: Introduction to Environmental Engineering, Environmental Physics and Chemistry, Fluid Mechanics, Free-surface hydraulics)
- Faculty Advisor for the IAHR UTEC branch Young Professional Network
- Core researcher for the Water Research Center (CITA):
  - Numerical study of the potential for erosion of a river dock for the city of Pucalla, Peru.
  - Numerical investigation of the influence of semi-permeable river groynes on the river hydrodynamics in La Pastora river bend, Madre de Dios, Peru.

IIHR-Hydroscience and Engineering   Iowa City, IA
Research Assistant, August 2012 – Ongoing
- Development and validation of a 3D non-hydrostatic unsteady RANS (URANS) 2-phase flow model using the Volume-of-Fluid method for real flood simulation in STAR-CCM+
- Estimation of errors in 2D depth-averaged codes in predicting riverine flooding extent and flow profiles, and effect of flood protection structures on flood propagation and extent
- Estimation of potential for erosion during the passage of a floodwave including possible pressure scour effects during bridge deck submergence
- Simulation of extreme flood event caused by hypothetical structural failure of flood control structures (e.g. flood protection dams and/or levees) and development of a methodology to better calibrate 2D depth-averaged codes to capture more accurately dam/levee break flood extent and propagation.
- Development of a 3D non-hydrostatic 2-phase flow research code using the Level Set Method in structured general curvilinear coordinates in finite difference representation
- Large Eddy Simulations (LES) and Direct Numerical Simulations (DNS) of stratified mixing caused by oscillatory shear stress boundary condition
- Detached Eddy Simulations (DES) of the development of shallow mixing layer in a curved channel between two incoming parallel streams with a velocity ratio close to 2.2
- Aided in the mentoring of a visiting graduate student, which included bi-weekly meetings with the student to check on the progress, set up plan-of-action for research as well as corresponding timeline.

Insideo S.A.C.
Environmental Consultant-Hydrology, July – August 2012   Lima, Peru
- Duties included updating the meteorological data, calculate precipitations with different return periods (including the probable maximum precipitation), obtain and analyze results from field measurements and run simulations for watershed response to different events and conditions for the Constancia Mining Project (HudBay Minerals).
- Provided assistance in creating bids for new Environmental Impact assessments projects.

Entry Level Environmental Consultant, July – September 2011
- Duties included checking compliance of the Conga Mining Project with IFC guidelines and Equator Principles.
- In addition, assisted in the Cumulative Impact Assessment of the Conga Mining Project.

Constructores Ark S.A.   Lima, Peru
Field Engineer, May – July 2010
- Duties included supervising all the work done in the construction site and supervising and controlling personnel who worked in the construction site.
- Set up meetings with both clients and subcontractors to make sure objectives are being made in a timely fashion while making sure that it is what the client wants.
- In addition, supervising the use of necessary equipment for construction and controlling the quality and quantity of materials being used.

PUBLICATIONS IN INTERNATIONAL JOURNALS:
Munoz, D. H., Constantinescu, G., Rhoads, B., Lewis, Q., & Sukhodolov, A. (2020). Density effects at a concordant bed natural river confluence. Water Resources Research, 56, e2019WR026217. https://doi.org/10.1029/2019WR026217Horna

Munoz, D., Constantinescu, G. (2019). Predicting dam break flows in natural environments using a fully 3-D model. Advances in Water Resources, 137, 103510

Ulloa, H., Constantinescu, G., Chang, K., Horna Munoz, D., Sepulveda Steiner, O., Bouffard, D., Wüest, A. (2019). Horizontal transport under wind-induced resonance in stratified waterbodies. Physical Review Fluids, 5, 054503

Horna Munoz, D., Constantinescu, G. (2018). A fully 3D numerical model to predict flood wave propagation and assess efficiency of flood protection measures. Advances in Water Resources, 122, pg 148-165

Ulloa, H., Constantinescu, G., Chang, K., Horna Munoz, D., Sepulveda Steiner, O., Bouffard, D., Wüest, A. (2018). Hydrodynamics of a periodically wind-forced small and narrow stratified basin: a large-eddy simulation experiment. Environmental Fluid Mechanics. https://doi.org/10.1007/s10652-018-9645-1

Wu. P, Horna Munoz, D., Constantinescu, G., Qian, Z. (2019). Two-phase flow DES and URANS simulation of pump-intake bay vortices. Journal of Hydraulic Research. https://doi.org/10.1080/00221686.2018.1555552

CONFERENCE PROCEEDINGS:

Horna Munoz, D., Gutierrez Collave, C., Timana Mendoza, C., Curi Yauri, J., Rivera Verde, M., Valverde Azaña, H., Guerrero Asmad, L., Angeles Falcon, R., & Oshiro Rivero, J. (2019) Ancient Hydraulic Structures: initial findinds on the engineering behind the network of channels and ponds in the incan sanctuary of Pachacamac in Peru. Proceedings of the 38th IAHR World Congress, September 1-6, Panama City, Panama. Doi:10.3850/38WC092019-0871

Horna Munoz, D., Constantinescu, G. (2018). Application of a 3-D CFD model to investigate flood-related engineering problems. Proceedings of 9th International Conference on Fluvial Hydraulics, River Flow 2018, Lyon, France. https://doi.org/10.1051/e3sconf/20184006004

Horna Munoz, D., Constantinescu G. (2016) A critical assessment of the performance of standard 2D flood models based on results of 3D URANS simulations. Proceedings of the 8th International Conference on Fluvial Hydraulics, River Flow 2016, Saint Louis, Missouri, USA.

Horna Munoz, D., Constantinescu, G. (2015) Development and validation of a 3D numerical model to simulate floods in natural channels. XXXVI International Association of Hydroenvironmet Research World Congress, The Hague, Netherlands.

Horna Munoz, D., Constantinescu, G. (2018) Investigación Numérica de potencial de erosión causado por socavación por presión (Numerical investigation of potential for erosion caused by pressure scour effects). XXVIII Congreso Latinoamericano de Hidraulica, Buenos Aires, Argentina

Melendez, M., Valverde, H., Abad, J., Cabreba, J., Guerrero, L., Horna, D. (2018) Evaluación hidrodinámica del meandro Pastora con espigones (Hidrodynamic study of Pastora bend with breakwaters). XXVIII Congreso Latinoamericano de Hidraulica, Buenos Aires, Argentina.

AWARDS:

- National Academy of Science and Technology — March, 2019
- Best Young Peruvian Researcher – Water — July, 2019
- Post-Comprehensive Research Award — Spring 2017
- First place in KU math Competition Junior Level. — Spring 2008
- First place in Kansas Math Competition — Spring 2008
- Dean's Honor Roll — Fall 2007 - Spring 2010

SEMINARS/WORKSHOPS:

- Using Rubrics to Grade Fairly and Efficiently — April 27th, 2017
- Universal Design for Learning (UDL) Principles in the College Classroom — March 30th, 2017
- Self-Care: Your Students' and Yours — February 23rd, 2017
- Facilitating Effective Conversations — February 7th, 2017
- Business etiquette and personal image — June 2009 – July 2009
- Le Cordon Bleu Culinary School in Peru — January 2007 - March 2007
- The great religions of the world — January 2006 - March 2006
- Chinese culture and history — January 2006 - March 2006

ACTIVITIES:

- SIIHR (Student of IIHR) — January 2015 – January 2016
  - Position held: President
- Tau Beta Pi Honors Engineering Society member.
- Chi Epsilon Civil Engineering Honor Society
  - Position held: Secretary — Fall 2010 – Spring 2011

LANGUAGE SKILLS:

Spanish (Native language), English (Second language), and Basic German.

SOFTWARE SKILLS:

AutoCAD, Arc-GIS, HEC-HMS, Matlab, FORTRAN, HEC-SSP, HEC-RAS, EPANET, MODFLOW, MIKE 11, MIKE 21, OpenFOAM, STAR-CCM+, Telemac-2D, FLUENT, Tecplot, Pointwise.

REFERENCES:

References upon request.