Renata Correia

M.Sc Environmental Engineer

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Nationality: Brazilian with valid work permit in the NL

A motivated and curious person who seeks to explore innovative and effective methods to the upcoming engineering challenges through analytical and social skills. I am an active team player with leadership and organisational skills, able to balance multiple priorities and work independently. My great strength is to be resilient facing the adversities. I am a fast learner, trained to deal with pressure and ready to face new possibilities.

PROFESSIONAL EXPERIENCE

OCT 2014 – NOV 2018

Research Engineer – Project Engineer

Transportation and Infrastructure Institute of Technology/Federal University of Parana, Curitiba- Brazil

From Graduate intern to Research Engineer, I worked as a team player and as a leader in various projects with applied research for the higher education industry, the private sector and environmental agencies, addressing innovative methodologies and technological solutions related to infrastructure engineering.

Main achievements:

- Coordinated an Environmental Impact Assessment for a fluvial port in the Brazilian Pantanal, leading to additional environmental plans and partnerships to the Institute;
- Performed mathematical modelling for hydraulic and hydrodynamic studies in fluvial and coastal areas in Brazil, which led to subsequent studies of waterway designs and other projects related to water science (flood risk studies) and port engineering;
- Developed the Feasibility Studies of Paraguay River Waterway. The well executed project resulted in an international cooperation with the Brazilian Waterborne Agency (ANTAQ);
- Planning and participating of environmental surveys (sediment characterisation, ADCP measurements in large rivers, geodetic networks implementation, port infrastructure research);
- Developed a mathematical and econometric forecast method for cargo trading for the Waterborne Agency (ANTAQ) leading to subsequent partnership with private ports;
- Elaboration of technical and field reports, research proposals, publications and delivered various presentations for government agencies and national and international conferences.

MAR 2013 – OCT 2013

Intern

LACTEC Research and Development Institute, Curitiba – Brazil

As intern, three major achievements can be highlighted: 1. Performed the model setup and data assembly for the flooding system alert in Rio Grande watershed through a cooperation project between Deltares and CEMIG/LACTEC; 2. Technical reports revision, and state-of-art research within Monitoring Programmes of Small Power Plants.

AGO 2012 – FEB 2013

Visiting Student and Research Assistant

The University of Sheffield, Sheffield- United Kingdom

Exchange period where two main activities can be highlighted: 1. Development of studies of turbulence processes in incompressible flows over a backwards-facing step with quantitative analysis; 2. Application of Matlab tools for data analysis.

JUL 2011 – JUL 2012

Research Assistant

Brazilian Council for Scientific and Technological Development, Curitiba - Brazil

Research on sedimentation sludge processes in Sewage Treatment Plants (STP) for storage tank design. Performed field surveys, reports and scientific publishing.

FORMAL EDUCATION

MAR 2016 **M.Sc in Water Resources – Mathematical modelling applied to fluid mechanics and hydraulics**

Federal University of Parana (UFPR), Curitiba – Brazil

Thesis title: "Topo-bathymetric data for hydrodynamic modelling with GIS support- a case study of Paraguay River Waterway." Advisor: Dr Tobias Bleninger

OCT 2013 **B.Sc in Environmental Engineering**

Federal University of Parana (UFPR), Curitiba – Brazil

Thesis title: "Scale analysis of environmental data for mixing and transport processes in outfalls systems- a case study of Cartagena submarine outfall." Advisor: Dr Tobias Bleninger

SKILLS AND ACHIEVEMENTS

Technical Skills
- **CFD:** HEC-RAS (1D-2D-sediment-dam breach); DELFT 3D;
- **CAD/GIS:** ArcGIS; QGIS; HEC-GeoRAS, AutoCAD;
- **Programming:** Matlab; Python; LaTeX.

Fellowships / Awards
- (2014) Graduate Research Fellowship (CNPq) (Master level);
- (2012) International Undergraduate Research Fellowship (CNPq)–The University of Sheffield (UK)

Voluntary work
- (2010) Member of the Junior enterprise company of Environmental Engineering

Languages
- **English:** Advanced level proficiency
- **Portuguese**: Native
- **Spanish:** Working level proficiency
- **German:** Elementary level

PROFESSIONAL TRAINING

Sediment Transport Modelling held by U.S. Army Corps of Engineers (USACE)	2018 (40h)
Hydrodynamics of Environmental Systems (Delft 3D) held by Federal University of Parana (UFPR)	2017 (45h)
Fluvial Geomorphology held by U.S. Army Corps of Engineers (USACE)	2017 (40h)
Hydrodynamic Modelling (1D/2D) held by U.S. Army Corps of Engineers (USACE)	2016-2017 (80h)
Flow measurements with ADCP held by Federal University of Parana (UFPR)	2016 (45h)
Python Introduction held by Brazillian Research Institute LACTEC	2015 (40h)
SOBEK Suite held by Deltares partnership with Brazilian Research Institute LACTEC	2014 (40h)

INTERESTS

1. Hydraulic engineering (rivers, waterways and coastal studies); Climate adaptation; Morphodynamics; Waterway management; Port planning and sustainability;
2. Mathematical modelling; Environmental surveying; Statistics and probability; Programming.

SELECTED PUBLICATIONS *(more information on ResearchGate)*

1. Correia, R. Guarneri, H. Bleninger, T. **Improved bathymetry interpolation for hydraulic model development for the strongly meandering Paraguay River Waterway**. To be *submitted in the Brazilian Journal of Water Resources (in elaboration).*
2. Ratton, E.; Neto, D. N.; Waydzik, F.; Correia, R. **Methodology for environmental impact assessment of dredging services- case study of Paraguay River Waterway**. Brazilian Journal of Management and Sustainability (2018).
3. Correia, R.; Ratton, P.; Guarneri, H.; Ratton, E.; Queiroz, E. **Evaluation of Paraguay-Parana Waterway fluvial infrastructure**. 26º National Congress of Waterway Transportation, Naval and Offshore Construction (2016).
4. Correia, R.; Guarneri, H.; Bleninger, T. Tomas, G. P.; Ratton, P.; Ratton, E. **Hydrodynamic modelling for navigability assessment in a Brazilian stretch of Paraguay River**. 9 º SOBENA – Inland Navigation Development Seminar (2015).
5. Guarneri, H.; Correia, R.; Ratton, P.; Nadal, C. A.; Mouro, R.C.; Bleninger, T.; Ratton, E. **Digital elevation model determination for large rivers. Case study: brazilian stretch of Paraguay-Parana Waterway**. 9 º SOBENA – Inland Navigation Development Seminar (2015).

REFERENCES

Dr-Ing. Tobias Bleninger (English/German) (Curitiba, BRA)
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Dr Eduardo Ratton (English) (Curitiba, BRA)
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GRADUATION THESIS

Topo-bathymetric data for hydrodynamic modelling with GIS support – a case study of Paraguay River Waterway

Summary: Studies with hydrodynamic models are important allies in obtaining detailed information on hydraulic and hydrological parameters of a river system. The mathematical representation and simulation complement field data and provide reliable information to assist in the evaluation of navigability conditions in inland waterways, especially during extreme events, such as flooding and droughts.

In this context, the primary focus of this research is the development and application of hydrodynamic modelling with Geographic Information System (GIS) support to complement the scarce field data, identify the longitudinal variations of the flow regime, also to check the drought conditions and its relation to the navigability in a Paraguay River reach. The study area covered a stretch of 126 kilometres between the city of Ladário/MS and the district of Porto Esperança/MS, Brazil.

The research covered the development and evaluation of a Digital Elevation Model (DEM) through statistical analysis and interpolation techniques of topo-bathymetric data. In a GIS environment, information from field surveys such as thalweg, margins and cross sections provided the cartographic base to the hydrodynamic model. Boundary conditions and control points from surveys were used for calibration and verification (discharge, water level, cross-sectional area and velocity). The simulation is connected to the Reference Level (RL) in the Paraguay River, representing the low water level event.

The primary results included the representation of the riverbed surface of the study area, where from a statistical and geometric analysis, the Weighted Distance Inverse (IDW) interpolator presented the best results. The hydrodynamic model was able to reproduce and complement survey data, to identify the critical stretches for navigation and with the GIS support, estimate the dredging volumes to guarantee safety navigation. By regarding the simulated velocities, the hydrodynamic model could provide hydraulics variables to sediment transport and dunes movements. Further investigations on morphodynamics and 2D/3D numerical models can use this work database. Likewise, is a powerful device to increase the visibility of the inland waterways in the Brazilian transport matrix.

Keywords: Hydrodynamic model; bathymetric interpolation; Digital Elevation Model; Geographic Information Systems; Inland navigation; droughts.