

# Curriculum Vitae

## PERSONAL INFORMATION

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## EDUCATION BACKGROUD

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### Sun Yat-sen University (SYSU)

Aug. 2017-Jun. 2019

- Master of Hydraulic Engineering
- GPA: **87.4**/100

Guangzhou, China

### South China University of Technology (SCUT)

Sep. 2013-Jun. 2017

- Bachelor of Water Resources and Hydropower Engineering
- GPA: **3.68**/4.0 or **86.09**/100 Rank: **3<sup>th</sup>**/53

Guangzhou, China

## HONOR AND AWARD

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- Outstanding Students Awards of SCUT in 2014, 2017
- Undergraduate Fellowship of SCUT in 2014, 2016, 2017
- Postgraduate Fellowship of SYSU in 2018 (*Top 3 in a class of 30*)

## RESEARCH EXPERIENCE

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**Project 1:** *Dynamic prediction and regulation of water resources carrying capacity in the Pearl River Delta (2016YFC0401305), National Key Research and Development Program of China, 2016-2020*

**Experience:** Engage in modeling the response of river network to land use changes in the context of urbanization of Foshan city. (*Bachelor Thesis Theme*)

- The goal was to quantitatively analyze the spatial response of urban river reduction and its causes.
- Use stepwise regression analysis to get driving fators of river network changes, and then develop both spatial auto-regression and geographic weighted regression models to quantify contributions of driving fators.
- Results showed that the expansion of industrial land was the primary cause, while the impact of land use changes has obvious spatial differences.

**Project 2:** *Study of estuarine saltwater intrusion and salinity time series prediction (51879289), General Program of National Natural Science Foundation of China, 2019-2022*

**Experience:** Engage in developing data-driven prediction models for salinity time series to serve estuarine water resources management. (*Participate in the preparation of fund application; Master Thesis Theme*)

- The goal was to construct an effective daily-scale prediction scheme for the water quality of the estuary under the complex interaction of sea and land factors.
- Input variables selection, data transformation, uncertainty analysis and machine learning were involved and coupled to construct hybrid machine learning models.
- The nonlinearity and nonstationarity of salinity time series were handled by hybrid models, and the developed time-invariant wavelet-based model was practical for estuarine salinity prediction.

## PUBLICATION AND SOFTWARE

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### Research paper:

- **Hu, J.**, Liu, B. (2019). Analysis of River Network Changes Based on Spatial Auto-regression and Geographic Weighted Regression Model. *Hydrology*, 039(002), 7-13. (**Chinese Core Journal**)
- **Hu, J.**, Liu, B., & Peng, S. (2019). Forecasting salinity time series using RF and ELM approaches coupled with decomposition techniques. *Stochastic Environmental Research and Risk Assessment*, 33(4-6), 1117-1135. (<https://www.researchgate.net/profile/Jiayu-Hu-9>)
- Zhou, F., Liu, B., **Hu, J.**, et al. (2020). Study of Estuarine Salinity Prediction Based on Wavelet Artificial Neural Network. *Hydrology*, 240(06):57-64. (**Chinese Core Journal**)

### Software copyright:

- Liu, B., **Hu, J.**. Software for iterative predictors selection for hydrological and water environment prediction based on HP-OPELM model (V1.0), 2019SR0470866.

## SKILL AND EXPERTISE

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### Application of data-driven forecast/prediction models for water resources system

#### 1. *Machine Learning*

- Artificial neural network; Extreme learning machine; Random forests

#### 2. *Data Preprocessing and Feature Engineering*

- Data transformation: Time-invariant wavelet; Empirical mode decomposition
- Input determination: (Partial) mutual information; Forward iterative selection

#### 3. *Uncertainty Measurement*

- Sample with bootstrap technique; Sample with bayesian method and markov chain monte carlo

### Spatial econometric analysis

- Spatial autocorrelation analysis; Spatial regression analysis

### Tools for data analysis, statistical modeling and data visualization

- Python/ Matlab/ Arcgis (skilled); R/ SQL (average)

## WORK EXPERIENCE

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Guangdong Provincial Design Institute of Water Conservancy and Electric Power

Jul. 2019-

- *Assistant engineer*, engage in water resources and flood prevention planning

Guangzhou, China

### Relevant experience:

#### 1. *West Guangdong Water Diversion Optimization Based on Genetic Algorithm*

(<https://github.com/Napolepburn/Water-Diversion-Optimization-Based-on-Genetic-Algorithm>)

- Make a daily-scale water resources allocation system with Python (involving the joint dispatch of 4 reservoirs).
- The combinations of 57 decision variables (e.g., design diversion, reservoir operation) were optimized to reach Pareto-fronts for irrigation water supply guarantee rates of multiple reservoirs.

#### 2. *Monthly Probabilistic Streamflow Improvement for East River with Machine Learning Method*

(<https://github.com/Napolepburn/Probabilistic-Streamflow-Improvement-with-Machine-Learning-Method>)

- Wavelet transformation was used to improve runoff point and interval forecasts with a forecast period of one month.

#### 3. *Emergency Plan for Exceeding Standard Floods (1%) in Liuxi River, Guangzhou*

- Technical support for flood control consultation and decision-making (e.g., flood risk map making based on DEM).