Ruoshui Li

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Education

Master in Environmental Management　　　　　　　　　　　　　　　　　　**Expected 2021**
Duke University　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　*Durham, NC*

- **Concentration**: Energy and Environment
- **Course Work**: Electricity Markets, Energy Technologies and its Environmental Impacts, Modeling for Energy Systems, Time Series Analysis for Energy Data.

B.E. Environmental Science　　　　　　　　　　　　　　　　　　　　　　　**June 2019**
Hohai University　　　　　　　　　　　　　　　　　　　　　　　　　　　　　*Nanjing, China*

- **GPA**: 87.88/100; **Rank**: the 2nd place
- **Mathematics courses:** Advanced Calculus (92); Data and Analysis (96); Linear Algebra B (100).
- **Course Work:** Climate Change: Impacts, Perceptions, Adaptations (96); Atmosphere and the Water Cycle (95); Environmental Management (97); Geographical Information System (96).

Professional Experiences

Boston Scientific Corporation　　　　　　　　　　　　　　　　　　　　　**Shanghai, China**
Summer Intern in Quality Department (Full time)　　　　　　　　　　　　　*Jul. 2017 - Aug. 2017*

- Analyzed monthly import and export of the company's weekly medical devices using Pivot Table.
- Completed and submitted four weekly summary reports detailing the key sale figures of twenty medical devices, to help colleagues keep track of sales data and prepare for stocks in advance.

Research & Projects

Nicholas School of the Environment, Duke University　　　　　　　　　　　**Durham, NC**
Individual project　　　　　　　　　　　　　　　　　　　　　　　　　　*Feb. 2020 - May. 2020*

- **Project: Wind farm site evaluation in Western North Carolina**
  - Assess ten potential sites in Western North Carolina for different criteria to build a new wind farm using ArcGIS.
  - Eliminate unfeasible sites based on the Federal Aviation Administration flight path restrictions and avian species inhabitant considerations.
  - Estimate potential turbine generation of each site according to available site area and wind class. Calculate cost of each wind farm to connect to existing power grid using *Cost Distance* tool.
  - Evaluate each criteria to find the most prospective site which can host a wind farm that can deliver the most power, but can also be built under specified budget constraints.
- **Project: Analyze renewable alternatives to reduce carbon emission in ten years**
  - Use hypothetical generator capacity (including conventional, solar and wind) as well as load data in a 3-bus electric system to explore feasible ways for increasing proportion of green power resource in the system.
  - Create models using Python (Pulp package) to maximize CO_2 emission reduction in the system, while minimize total cost (including RE generator construction costs, Operation & Maintenance costs and fossil fuel costs from NG and coal-fired plants) of meeting system demand, under different renewable incorporation scenarios.
  - Introduce CCS retrofitting on existing plants, battery storage, demand response, and energy efficiency appliance into the model to examine flexibility of the electric system design to meeting resource adequacy target.
  - Finalized a report to present planning process and propose a practical capacity plan for the hypothetical electric system to achieve emission-cutting goal.
- **Project: Explore influence of Fukushima event on Japan's Oil and LNG imports pattern** (Group project of 2)
  - Collect crude oil and Liquid Natural Gas (LNG) imports data to Japan from January 1997 to March 2019. Show historic imports trend and seasonality pattern for both oil and LNG using R.
  - Fit (Seasonal) ARIMA model, Simple Moving Average model, Exponential Smoothing model and State Spacing model on imports data before Fukushima event in R, then evaluate each model's performance based on forecast value accuracy (Mean Squared Error) and fitting residuals pattern.
  - Deploy the model captures most information of raw data series to forecast amount of Oil and LNG should have been imported to Japan without massive nuclear generation loss in 2011. Compare forecasting results with real-world imports data in Japan from 2011 to 2019 to analyze changes in fossil fuel import pattern.
  - Finalized a report to show model evaluation process and justify time series model forecasting results.

Nicholas School of the Environment, Duke University **Durham, NC**

Project participant *Oct. 2019 - Dec. 2019*

- **Project: Economic analysis of different cooling systems: Chilled water V.S. Ice storage system**
  - Collected energy use and chilled water consumption data in a building at Duke university to estimate equivalent energy consumption volume and storage tank size of an ice storage system to fulfill cooling requirements.
  - Calculated cost of using an ice storage system including expenses incurred over the life of the system, and to determine the most cost-effective system designs by comparing to the cost of current chilled water system.
  - Conducted a sensitivity analysis to test robustness of calculation results by varying key parameters like discount rate and proportion of system replacement.
  - Finalized a poster to present calculation results and proposed recommendations to consider the installation of ice storage system in Duke University as it will result in higher economic savings and reduced environmental costs associated to carbon dioxide emissions.
- **Project: Explore influence factors of net utility-scale summer capacity of solar photovoltaic panels**
  - Established a linear ANCOVA model for summer solar PV capacity and 5 independent variables including tax rate, monthly sunshine hours, household income, political affiliation and status of RPS standard in each state using R.
  - Evaluated and selected full and reduced models using Akaike information criterion (AIC) and partial F-test.
  - Tested and modified selected model to meet assumptions of linear regression, including deleting outliers according to Cook's distance and Studentized Residual Rules, removing insignificant explanatory variables, excluding correlated variables with Variance Inflation Factor (VIF) and applying Shapiro-Wilk test to check residual normality.
  - Finalized a report to present model selection process and highlight coefficients interpretation of the final model. Used R to visualize the relationship between PV capacity and independent variables.

College of Environment, Hohai University **Nanjing, China**

Undergraduate Research Assistant advised by Prof. Xu Zhao *Oct. 2017 - Feb. 2020*

- **Project 1: Measure scarce water saving through international agricultural products trade**
  - Quantify global water saving embodied in crop trade from both virtual water and virtual scarce water perspectives using Python. Evaluate the relationship between domestic water stress and amount of virtual water imports. Highlight the role of international trade in alleviating water scarcity.
- **Project 2: Transition of thermal power plants in Beijing under resource and environmental constraints**
  - Utilized the Logarithmic Mean Divisia Index (LMDI) model to find and examine key driving factors or resistances of water and energy efficiency evolution in Beijing's thermal power plants. Found synergies between CO_2 emission and water use to bring water-carbon co-benefits.
- **Project 3: Research on the impact of water footprint for six megacities in China**
  - Applied a Multi-Region-Input-Output (MRIO) model to analyze the impact of virtual water import (including green water and blue water import) as well as pollution outsourcing based on the MRIO table using Matlab. Presented the virtual water trade between provinces using Circos.Proposed policy revisions to reduce the burden of water quality and quantity stress caused by six megacities.

Skills

Coding	C, Python, R, Sql, LaTeX, VBA
Data Analysis	Python (pandas, numpy, scipy, Pulp), R (dplyr, tidyr) , Excel modeling, IBM ILOG CPLEX Optimization
Data Visual	Python (matplotlib), R (ggplot), Echarts, ArcGIS pro, Circos
Misc.	Academic Research, MS Office, Adobe Photoshop & Premiere, Markdown
Language	Mandarin Chinese, English, Spanish

Awards & Achievements

Certificate of Data Analyst with SQL Server (#129,356), awarded by DataCamp	2020
Certification of Data Scientist with Python (#93,176), awarded by DataCamp	2019
Certificate of Quantitative Analysis Using R, awarded by DataCamp	2019
Hohai University Honored Student Scholarship	2016 – 2019
Department of Education in China National Scholarship (Ranking top 1)	2017
China Foundation for Poverty Alleviation Excellent Volunteer in Loving Parcel Project	2016