Zhichuan MA

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EDUCATION

École Polytechnique – Paris, France **2022 – 2024**
Studying for Energy environment: Science technology and management master

- *GPA: 3.77/4.0*
- Coursework: Thermodynamics, Machine learning, Optimization, Modelling
- Scholarships: Swiss Mobility (2023), EDF (2023), Erasmus+ (2024)

Zhejiang University – Hangzhou, China **2019 – 2023**
Bachelor of Engineering in Energy & Environment Systems Engineering, Certificate of Chu Kochen Honors program

- *GPA: 3.72/4.0*
- Coursework: Engineering Fluid Mechanics (92/100), Partial Differential Equations (92/100), Complex function and integral transformation (92/100), Numerical calculation method (89/100), Theory and Practice of Big Data Analysis of Energy System (88/100)
- Scholarships: Qingshan international scholarship (2023-2024)

WORK EXPERIENCE

Multi-criteria analysis based on Life-cycle assessment of a positive energy district accounting for a country context – application to real case study – Louvain-la-Neuve, Belgium **04.2024 – 10.2024**
Energy Systems Optimization & Modeling Intern at IMMC, UCLouvain *(6 months)*

- **Integration:** Integrated the LCA framework of the energy system optimization model Energyscope into the REHO energy system model.
- **LCA Database Creation:** Gathered and organized data for the LCA database of REHO, based on the Ecoinvent database combined with World IMPACT+. Ensured data accuracy by removing double counting for precise LCA outcomes.
- **Innovation:**
  - **Comprehensive LCA:** Modified constraints and objective functions in REHO to align with the new methodology from Energyscope, optimizing REHO using Dantzig-Wolfe decomposition.
  - **Generalization and normalization of LCA indicators:** Applied a consistent methodology to compare results from two different energy system models. Normalized 27 environmental impact indicators and integrated them into the model for multi-objective optimization.
- **Internship Reports:** ongoing

Carbon footprints and cost evolution of green technologies – Sion, Switzerland **03.2023 – 09.2023**
Life Cycle Assessment Intern at IPESE, EPFL *(6 months)*

- **Research:** Conducted Life Cycle Assessment of green hydrogen electrolysis production
- **Cost and Environmental Impacts Analysis:** Life cycle assessment and cost methodologies were merged to create a model evaluating the cost and carbon footprint of PEMEC and SOEC manufacturing.
- **Innovation:**
  - **Model Development:** Created a novel, bottom-up model that concurrently assesses and compares the economic and environmental impacts of electrolysis cell manufacturing processes.
  - **Scaling Effect Exploration:** Provided an insight into the scalability of PEMEC and SOEC technologies by analyzing their cost and carbon footprint dynamics at varied manufacturing capacities.
- **Internship Reports**: Estimating Future Costs and Carbon Footprints of PEMEC and SOEC Manufacturing
- **Publications:** ongoing

Experimental Research on Low-temperature Thermal Conversion of Polystyrene Waste Plastics in Two-step Process for Hydrogen Production – Hangzhou, China **09.2021 – 05.2022**
Undergraduate Research Assistant at Zhejiang University, instructed by Prof. Shurong Wang *(8 months)*

- **Hydrogen Production Methodology:** Utilized a two-step method for hydrogen production through the hydrothermal directional depolymerization (<250°C) and liquid phase reforming (<260°C) of polystyrene

- **Catalyst Preparation:** Initiated the preparation of hydrothermal oxidation catalysts to enhance the selectivity of small molecule acids, such as acetic and formic acid, in the liquid phase product during liquid-phase reforming hydrogen production
- **Extension:** Undertook preliminary efforts to extrapolate the established methodology to other oxygenated olefins, notably lignin, to explore its applicability and efficiency across diverse materials

New-type electrode material intensified electro-fermentation system methane production device – Hangzhou, China **03. 2021 – 08. 2021**
National University Student Social Practice and Science Contest on Energy Saving and Emission Reduction *(6 months)*

- **Design and Material Innovation:** Engaged in designing electrode nano-arrays, integrating novel materials, specifically using ZIF67 nanosheets.
- **Utilization of Methanogens:** Employed methanogens with the novel electrode design to facilitate and optimize methane production processes
- **Enhanced Methane Production:** Achieved an approximately 35% increase in methane production compared to traditional methane production methodologies
- **Patents:** Turbulent flow type reaction kettle and method for producing methane; Biogas preparation device and method

SKILLS, ACTIVITIES & INTERESTS

Languages: Mandarin (Native), Wu Chinese (Native), English (Fluent), French (Basic)

Programming languages: Python, AMPL, C or C++, Matlab, R

Societies: Secretary of the Youth League Committee of Zhejiang University (Organized and led student study sessions in linear algebra, enriching learning through invited senior expertise)
Volunteer Committee at Chu Kochen Honors college (upkeeping relationships with social volunteer groups and organizing off-campus events)

Volunteering: Rural Agricultural Support Volunteer in China (2021), Census Data Collection Volunteer (2020)