

# EMMANUEL ANIOS FILS MOMPREMIER

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## EDUCATION

**KTH Royal Institute of Technology**, Stockholm, Sweden

Sep 2021 - Jul 2023

**Université de Lorraine**, Nancy, France

*Degree: Joint Master in Decentralized Smart Energy Systems*

Achievements & Awards: Erasmus Mundus Scholarship (2021 - 2023)

Master Thesis: A Methodology for End-to-End Digitalization of Battery Cell Production

**National Taiwan University**, Taipei, Taiwan

Sep 2017 - Jul 2021

*Degree: Bachelor of Science in Mechanical Engineering*

Achievements & Awards: MOFA Taiwan Scholarship (2017 - 2021), Presidential Award (top 5% of class, 2021)

## SKILLS

Programming:	Python (NumPy, Pandas, Matplotlib, Pyomo, Tkinter, Streamlit, scikit-learn, Keras, TensorFlow), SQL, MATLAB/Simulink, OpenModelica, HTML/CSS
Software Tools:	Git, Bitbucket/Github, Jupyter Notebook, Atlassian Suite (Confluence, Jira), Excel, Power BI, Tableau, Kafka, Grafana
Other Skills:	Mathematical Optimization, Data Analytics, OPC UA, Data Modelling, Machine Learning, Deep Learning, Technical Writing, Public Speaking
Certifications:	Deep Learning Specialization (Coursera), Student Leadership in Renewable Energy (IRENA), Design Thinking, Strategy & Innovation (ESADE)
Languages:	Haitian-Creole (native), French (native), English (fluent), Mandarin (advanced), Spanish (advanced), German (basic)

## WORK EXPERIENCE

**BMW Group**, Munich, Germany

Jan 2023 – Jul 2023

*Internet-of-Things and Data Analytics Intern*

- Collaborated with IT & process engineers using digital twin tech, PLCs and edge devices to commission battery cell manufacturing equipment and optimize data transfer efficiency
- Built machine-to-cloud data pipelines with OPC UA, Kafka and cloud services to store large timeseries data
- Designed real-time dashboards using Grafana and Power BI for monitoring battery cell production performance
- Created thorough project documentation using JIRA & Confluence to facilitate the onboarding of new team members

**Advanced Skills:** Data Engineering, Data Modelling, OPC-UA, Grafana, Kafka, JSON, Python, JIRA, Confluence

**Laboratoire Lorrain de Recherche en Informatique et ses Applications (LORIA)**, Nancy, France

Jul 2022 – Aug 2022

*Co-Simulation Summer Intern*

- Updated the model of an EV powered by fuel cells and supercapacitors, adding rigorous physical constraints and increasing the model's accuracy by 20%
- Wrote 500+ lines of code to integrate trajectory, physics of the engine and driver behavior into the EV simulation, resulting in an improvement in simulation speed
- Co-simulated the subsystems developed in Modelica using Python/FMUs to determine the time variation of the SCs' SOC

**Advanced Skills:** Software Engineering, Python, Modelica, Algorithms, FMI/FMU, Modeling of Electric Vehicle, Research

**First Code Academy**, Taipei, Taiwan

Jun 2021 – Aug 2021

*STEM and Coding Instructor*

- Led 30+ students aged 7-15 in online coding bootcamps, boosting their coding interest & achieving 95% satisfaction rate
- Guided students to create personal projects and provided their parents with prompt feedback on the learning progress
- Covered programming topics included Python, HTML, CSS, Roblox Studio (Lua), MIT App Inventor and Scratch

**Advanced Skills:** Programming, Teaching, Communication, Teamwork, Time Management, Adaptability

**Industrial Technology Research Institute (ITRI)**, Hsinchu, Taiwan

Jul 2019 – Aug 2019

*International Marketing & Communication Intern*

- Collaborated with technical experts to edit and review ITRI's annual report and research project updates
- Conducted user market research and wrote publications to improve international outreach and company recognition

**Advanced Skills:** Technical Writing & Presenting, Expert Interviews, Research, Team Collaboration

## PROJECTS

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### **EV Charging Station Controller** (Skills: Python, Pyomo, Mathematical Optimization, MILP)

- Developed a MILP optimization model with Python, Pyomo and CBC solver for efficient charging of an EV pool
- Implemented a controller with SOC and power flow constraints achieving 98.48% accuracy in charging predictions
- Used Python to design dashboards allowing to monitor the station performance

### **Energy+** (Skills: Python, Tkinter, NumPy, Pandas, Matplotlib, Data Analysis)

- Programmed an energy management app reducing residential energy consumption by 30% via behavior-based design
- Utilized Python, Tkinter, OpenWeatherMap APIs and third-party structured data to create the app
- Conducted data analysis using NumPy, Pandas and Matplotlib to evaluate energy savings

### **Propeller-Driven Autonomous Robot Car** (Skills: Programming, Automatic Control, CAD Design)

- Managed team of 5 to build a propeller-driven car with autonomous abilities for line tracing and obstacle avoidance
- Designed and implemented sensor-integrated control system using Arduino (C Programming) with a budget under €100
- Achieved target speeds and reduced robot car body weight by 10% lower than average during final relay

### **Point & Quantile PV Generation Forecasts** (Skills: Machine Learning, Data Modeling, Python, scikit-learn)

- Developed ML models to forecast PV generation from irradiance and temp. data, achieving test set errors <10%
- Fine-tuned hyperparameters of scikit-learn models (MLR, MLP, GBR) to optimize MAE, RMSE, and CRPS metrics
- Generated both point and quantile forecasts for accurate prediction of PV generation for the solar plant

### **Demand Management for Off-Grid Industrial Applications** (Skills: Data Analysis, Load Shedding, Python, MATLAB)

- Devised a load shedding strategy to minimize power outages and delays, resulting in preventing downtime up to 30 mn
- Engineered a MATLAB/Simulink-based controller that balances power demand and generation within 10 milliseconds
- Validated the controller's effectiveness by testing on datasets from a real industrial grid and measuring key performance indicators (KPIs) such as frequency deviation, voltage stability and active power delivered
- Implemented dashboards using Python & Streamlit to visualize controller's performance on the KPIs

### **Optimal Sizing of Microgrids** (Skills: Genetic Algorithm, Optimization, Renewable Energy Systems)

- Developed a microgrid system with PV and BESS for a football stadium to sell excess electricity to the main grid
- Optimized the size of the PV panels and battery cells using genetic algorithm resulting in 181 panels and 2589 cells with an initial SOC of 62%
- Achieved a total cost of €1.82 million, yearly revenue of €1.15 million, and payback period of approximately 19 months with the optimized system

## VOLUNTEERING & EXTRACURRICULAR ACTIVITIES

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### **National Taiwan University (NTU) – Office of International Affairs, Taipei, Taiwan**

Sep 2019 – Jul 2021

#### *Student Ambassador*

- Coordinated student-led events and welcomed foreign delegations, demonstrating effective communication and collaboration skills
- Led a team of 3 to create NTU's first International Freshmen Student Handbook, benefiting 1000+ students and improving their orientation week experience

**Advanced Skills:** Team Leadership, Project Management

### **International Companion for Learning (ICL), Taipei, Taiwan**

Sep 2017 – Jul 2021

#### *Instructor*

- Hosted weekly Skype sessions to instruct primary and middle school Taiwanese students in intercultural exchanges, showcasing effective teaching and communication skills
- Devoted 55 service hours per semester to teaching, training, school visits, and assessment, demonstrating strong work ethic and dedication to the success of the students

**Advanced Skills:** Communication, Collaboration, Digital Work Environment