OTHMANE ECHCHABI

+86 188 622 50911 | oe23@duke.edu | othmaneechc.com

EDUCATION

Duke Kunshan University — Jiangsu, China
Duke University — Durham, North Carolina
Bachelor of Science in Data Science (Dual Degree) — Aug 2020 - May 2025

Universidad Carlos III — Madrid, Spain
Semester Abroad — Jan 2022 – May 2022
Relevant Coursework: Statistical Machine Learning, Computer Vision, Deep Learning, Speech Recognition

GRANTS AND AWARDS

DKU Student Experiential Learning Fellowship, 2024
DKU Signature Work Research Grant, 2023 | Awarded $1,500 for research on wetland degradation.
DKU iNNOVATION iNCUBATOR, 2023 | Awarded $3,000 for developing a dialectal Arabic NLP model.
Dean's List, 2021

RESEARCH EXPERIENCE

Tracking Progress Towards SDG6 — **Jun 2024 – Present**
Supervised by Prof. Ka Leung Lam, Duke Kunshan University — Suzhou, China

- Assessed piped water and sewage access in Africa using satellite imagery and vision transformers with 97% accuracy; Developed a large dataset for piped water and sewage access in 50/54 African countries .

Echchabi, O., Talty, N., Manto, J., Lahlou, A., Lam, K. L. "Tracking Progress Towards Sustainable Development Goal 6 Using Satellite Imagery." *Environmental Science & Technology*. **(Under review)**. *arXiv preprint* arXiv:2411.19093.

Carbon Footprint Reduction and Trip Mode and Purpose Prediction — **Jun 2024 – Present**
Supervised by Prof. Charles Chang, Duke Kunshan University — Suzhou, China

- Developed a self-supervised learning model for large sequence data to predict individual modalities; achieved 92% accuracy in mode identification on the GeoLife dataset with our pre-trained transformer-based model; as well as 95% accuracy on the MOBIS dataset using the same model.
- Designed and implemented CarbonClever, a social media application for individual carbon footprint reduction.

Echchabi, O., Zhang, Y., Feng, T., Zhang, W., Liao, H.-K., Lu, Z., Chang, C. "Individual Modality Prediction Using Sporadic Social Media Geolocations and Pre-trained Transformer Models." *International Journal of Geographical Information Science.* **(Work in progress)**. [code]

Monitoring Spartina Alterniflora Using Self-Supervised Learning — **Jun 2024 – Aug 2024**
Supervised by Prof. Wenhong Li and Prof. Ding Ma, Duke University — Durham, NC

- Identified evasive coastal wetland species using satellite imagery and ViTs for wetland monitoring.

"Monitoring *Spartina alterniflora* Using Self-Supervised Learning." Climate+ Symposium, Rhodes Information Initiative at Duke, Durham, NC, 2024. [project page] [poster]

Animal Tracking and Wildlife Monitoring with Computer Vision — **May 2023 – Apr 2024**
Supervised by Prof. Sze Chai Kwok, Duke Kunshan University — Suzhou, China

- Built a pipeline using Segment Anything Meta (SAM), significantly accelerating the annotation of a very large dataset (30GB) of primate images; model training is currently underway.

Assessing Climate Change Risk of Rural Coastal Plains — **Jun 2023 – Aug 2023**
Supervised by Prof. Emily Bernhardt, Duke University — Durham, NC

- Developed a comprehensive geospatial database for saltwater intrusion and sea level rise research within the North American Coastal Plain using ArcGIS. [Interactive map]
- Applied NLP models such as BERT to analyze and map insights from over 1,000 scholarly articles.

"Assessing Climate Change Risk of Rural Coastal Plain Communities." Climate+ Symposium, Rhodes Information Initiative at Duke, Durham, NC, 2023. [project page] [poster]

PROFESSIONAL EXPERIENCE

***Data Analyst Intern*, Atos Morocco** **Rabat, Morocco | Oct 2022 – Nov 2022**

- Created dashboards to provide real-time insights into HR metrics, facilitating leadership decision-making.
- Rolled out the solution in the Morocco branch, later expanding to all company branches in Africa.

***Data Analyst Intern*, XPerlean** **Saint-Quentin, France | Jul 2022 – Aug 2022**

- Collaborated with Morocco's leading ceramics manufacturer, using Faster R-CNN and YOLO models to detect defects in ceramics, increasing defect detection accuracy from 70% to 85%.
- Improved quality control, sped up production by 10%, and decreased operational costs.

***Data Analyst Intern*, Al Jazeera Media Institute** **Doha, Qatar | Oct 2021 – Dec 2021**

- Scraped large-scale CSV data files using social media APIs, processing over 200,000 data records, to analyze user behavior and interaction data.

PROJECTS

Spatiotemporal Patterns of the Yancheng Coastal Wetlands Degradation. **Aug 2023 - Present**

Senior Year Thesis Suzhou, China

- Conducted a 25-year spatiotemporal analysis of Yancheng coastal wetlands degradation using satellite imagery and NDVI, highlighting ecological shifts and advocating for targeted conservation strategies. [poster]
- Developed a wetland segmentation model achieving state-of-the-art performance.

Football AI Tracker **Oct 2024 - Dec 2024**

Final Project for STATS402: Interdisciplinary Data Science Suzhou, China

- Achieved accurate tracking of players, referees, and the ball under suboptimal video conditions, providing a cost-effective alternative to high-end tracking systems, democratizing football analytics. [manuscript]

ACTIVITIES AND VOLUNTEER WORK

Duke Kunshan University

Resident Assistant Aug 2024 – Present
Student Athlete – Co-Captain of the soccer team Aug 2023 – Present
DKU CS Club Software Team Lead [website] Aug 2023 – Present
Math and Computer Science TA Jan 2022 – May 2024

FADI Academy **Aug 2023 – Present**

Partner and Math Tutor Remote/Casablanca, Morocco

Co-founded the academy and designed the math curriculum that helped students get near-perfect SAT scores.

FIFA World Cup 2022 Volunteer **Nov 2022 – Dec 2022**

Spectator Services Volunteer – Team Leader Doha, Qatar

Led team of volunteers and assisted spectators in two venues with a capacity of 45,000 seats each.

TECHNICAL SKILLS

Python, JavaScript, SQL, TensorFlow, PyTorch, Django, React, Rasterio, Geopandas, Dask, shapely,