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# NOUR ABDELMONEIM

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**GitHub:** NourAbdelmoneim

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## MACHINE LEARNING RESEARCH

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### Full-time Research Assistant

August 2022 — Present

### Undergraduate Research Assistant

January 2022 — July 2022

*Mars Research Group, Center for Space Science, NYUAD*

- Led a project employing an interpretable variable selection network to model relative humidity on Mars using MSL REMS data
- Analyzed Mars climate patterns, including surface temperature, dust, and ice measured by the Emirates Mars Mission (EMM) and compared results to in-situ measurements from NASA's Curiosity and Perseverance rovers
- Implemented LSTM and transformer models for Mars time-series climate forecasting of surface temperature and humidity
- Analyzed infrared spectra to detect signs of biosignature gases on Mars using the Emirates Mars Infrared Spectrometer
- Evaluated observational data against general circulation climate models to identify anomalies and investigate explanations
- Mentored 4 students by guiding them through the workflow and providing continuous feedback and support
- Conducted in-depth research on explainable AI techniques and shared detailed insights to support team's research.

### Capstone Research and Post-Graduate Practical Training

September 2021 — July 2022

*Data Science and AI Lab, Computer Science Department, NYUAD*

- Researched privacy-invading AI algorithms with a team of 4, focusing on identifying methods for preserving individual privacy.
- Developed and assessed adversarial attacks including the FGSM and one-pixel attack, targeting privacy invading ML models
- Successfully replicated, trained, and tested relevant machine learning models from research papers

### Machine Learning Research Intern

May 2021 — August 2021

*Space Program, Group 42, Abu Dhabi, UAE*

- Led a project to develop visual-to-audio conversion using audio processing and object detection models for conveying semantic information from images through sound using TensorFlow
- Created a user-friendly demo for the visual-to-audio conversion product using JavaScript, HTML, and CSS
- Implemented statistical change detection methods (IRMAD) from scratch using canonical correlation analysis
- Trained and tested machine learning change detection algorithms on satellite imagery using PyTorch

### Machine Learning and Computational Analysis Research Assistant

January 2020 — April 2021

*Music and Sound Cultures Research Group, NYU Abu Dhabi, UAE*

- Developed music information retrieval and machine learning scripts for the computational analysis of music from the South Indian region to cluster, classify, and predict beat patterns
- Developed generative models for Carnatic music incorporating constraints derived from computational analyses of improvisation samples

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## PUBLICATIONS & SUBMISSIONS

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### Expanding Mars Climate Modeling:

*Under Review*

### Interpretable Machine Learning for Modeling MSL Relative Humidity

*Nour Abdelmoneim, Dattaraj B. Dhuri, Dimitra Atri, Germán Martínez*

### Diurnal variation of the surface temperature of Mars with the Emirates Mars Mission:

*MNRAS: Letters*

### A comparison with Curiosity and Perseverance rover measurements

*Dimitra Atri, Nour Abdelmoneim, Dattaraj B. Dhuri, Mathilde Simoni*

### Surface temperature of Mars: Exploring diurnal and seasonal variations with the Emirates Mars Mission

*EGU2023*

*Dimitra Atri, Nour Abdelmoneim, Dattaraj B. Dhuri, Mathilde Simoni*

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## EDUCATION

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### New York University Abu Dhabi

August 2018 — May 2022

Bachelor of Science in Computer Science with Honors, GPA: 3.92, Founder's Day Award recipient

**Minor:** Sound and Music Computing

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## INSTRUCTIONAL ROLES

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### Volunteer Piano Instructor

June 2019 — Present

*Alexandria, Egypt*

- Volunteered during biannual visits to my home city to teach kids in the community aged 5 to 14 beginner Piano
- Curated individual plans to engage different kids by varying teaching style and activities
- Guided students from complete beginner levels to independent sheet music readers with a passion for music

### Ice Skating Coach

September 2016 — March 2020

*Emirates Skating Club, Abu Dhabi, UAE*

- Coached intermediate and beginner level skaters from the ages of 4 to 18
- Adapted coaching style based on varying age groups and individual needs
- Successfully helped skaters of all ages pass internationally recognized ice skating exams

### Computer Programming Teaching Assistant

September 2019 — December 2019

*Engineering Department, New York University Abu Dhabi, UAE*

- Guided 20 first-year university students through lab sessions with projects utilizing C++ and MATLAB
- Utilized different recourses to help students on a one-on-one basis during weekly office hours

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## EXTRACURRICULARS

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### Quantum Computing Hackathon for Social Good in the Arab World

March 2022

- Collaborated with a team of 7 from 5 institutions in Algeria, USA, Palestine, and the UAE to build a project that uses quantum computing to address a social issue in the Arab world
- Tackled the issue of rising mortality rates of delivery drivers in the UAE due to the pressure of prompt delivery by developing an application to optimize delivery time and order using quantum computing

### Piano Student

June 2016 — Present

- Completed Trinity College London's Classical Piano exams up to the highest grade (Grade 8), passing with Honors
- Minored in Sound and Music Computing to deepen my music knowledge by taking a range of classes from music theory to algorithmic and AI composition
- Explored my interest in western classical piano with the intersection of culture by researching orientalist themes in popular classical music

### Dragon Boating Team Member

September 2019 — December 2020

- Joined NYUAD's dragon boating team and participated in weekly practice sessions
- Participated in 2 national level competitions with our team earning first place in one

### Figure Skating

June 2014 — March 2020

- Passed internationally recognized exams through the International Ice Skating Institute Asia (ISIAsia)
- Participated in 18 events in 6 national level competitions earning several first-place medals
- Performed in 4 ice skating shows with my team at our local ice rink, earning two first-place team awards
- Obtained my ice skating coaching certification through ISIAsia by completing a coaching training program

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## SKILLS

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**Languages:** English (Native Fluency), Arabic (Native Fluency), French (Advanced - B2 level)

**Programming Languages/Libraries:** Python, NumPy, Pandas, SciPy, Matplotlib, C++

**Machine Learning:** TensorFlow, Keras, scikit-learn, openCV, PyTorch

**Web Design and Development:** HTML, CSS, MySQL, JavaScript/jQuery, Flask