CHARLIE MYDLARZ

Acoustician/IoT architect who designs, develops, and deploys advanced devices and systems to improve our understanding of: acoustic environments, machinery health, and urban conditions.

@ cmydlarz@gmail.com +347 272 0864 Brooklyn, NY cmydlarz
cmydlarz.com charliemydlarz Publications

EXPERIENCE

Research Assistant Professor

Center for Urban Science and Progress (CUSP), New York University

August 2019 – Ongoing New York, NY

Developed, sourced, and deployed a network of domestically deployed noise sensors, employing design for manufacture (DFM) principles. This was in collaboration with LOFT LLC, a multidisciplinary product development studio. To monitor air/noise health impacts on at-risk communities in NYC, I extended this new system with a highly accurate air quality sensor with deployments in NYC Chinatowns. This period has seen $2M in successful grant funding including an exciting project called FloodNet that had me build a new team and develop an ultra-low-power, LoRaWAN based flood monitoring sensor network for urban street flooding. This system is actively used by city agencies and government weather services to monitor and analyze flood conditions in realtime for emergency alerting and flood model validation. I have since completed its design for manufacture (DFM) process to scale up production to 500 deployed devices.

Senior Research Scientist

Center for Urban Science and Progress (CUSP), New York University

September 2016 – August 2019 New York, NY

Continued the development and expansion of the SONYC sensor network, one of the worlds largest and longest operating urban noise monitoring networks. I built up a diverse team of scientists and engineers to implement dev-ops solutions to the network backend and sensor provisioning. My work with city agencies increased as I tailored and integrated our solutions into their operational procedures. This position also saw the award of $2.6M in grants, which had me leading a hardware/software team developing a multi-modal sensor system incorporating 15 channel MEMS microphone arrays, dual high res cameras and a GPU equipped compute core for edge intelligence creation. In addition, I co-founded a startup concept for acoustic condition monitoring of manufacturing machinery including intense customer discovery and business model development.

Postdoctoral Associate

Center for Urban Science and Progress (CUSP), New York University

October 2013 – September 2016 New York, NY

Brought on as one of the first postdocs to the Center for Urban Science and Progress (CUSP) to develop novel sensor systems for the monitoring of urban noise. I created a set of MEMS microphone based prototype urban noise sensors as part of the "Noise Project". This early project success led to a $4.6M National Science Foundation (NSF) award for the Sounds Of New York City or SONYC project. During this period, I was the sole hardware research and development engineer on the project, designing and implementing a deployed fleet of 75 sensors mounted at strategic acoustic locations across NYC. This included the implementation of a full stack client-server infrastructure for robust data collection and network analysis. For the sensor's custom MEMS microphone module, I designed, prototyped and liaised with fabrication houses in China to have 500 modules assembled to an exacting standard for high audio quality and module consistency.

CORE SKILLS

Problem solving · Acoustic IoT · Sensor networks · Acoustics · Embedded development · Audio system design · EE · Dev-ops · PCB design · DSP · MEMS microphones · Calibration techniques · Python · C, C++ · Javascript · Web dev · Linux

CODING

Python
Javascript
C, C++
Swift
Shell

EDUCATION

Ph.D. in Acoustics

University of Salford, UK

Feb 2013

CITIZENSHIP

UK

Citizenship

United States

Permanent Resident, Green Card holder

SELECTED RESEARCH PROJECTS

The Sounds Of New York City (SONYC) Project

wp.nyu.edu/sonyc

October 2013 – Today New York University

I designed, fabricated and deployed a network of over 200 low-cost acoustic sensors across NYC, many of which have been running for over five years, to provide continuous, real-time, and accurate monitoring of urban noise. I designed and supervised the building of the back and front end systems for a scalable and resilient solution. This has allowed me to carry out large-scale analysis of urban noise activity to reveal patterns across space and time. These platforms have been used to create a data-driven approach for city agencies tasked with noise mitigation by feeding relevant, actionable, and timely noise information.

DeepSense

Report

October 2017 – January 2020 New York University

I was co-founder of a startup concept that aimed to provide cutting edge ultra-wideband acoustic condition monitoring solutions to manufacturing machinery OEMs who rely on continuous mechanical operation and timely, actionable foresight of impending machinery faults. Early stage machinery malfunction can be indicated by abnormal acoustic emissions. Reactive, late-stage fault detection leading to machinery failure results in high parts/repair costs, and extensive losses due to longer periods of unscheduled downtime. Predictive and data-driven, early-stage fault detection allows for strategic planning of machinery repairs including more efficient use of scheduled downtime periods resulting in increased overall asset uptime. We made use of our experience in acoustic remote sensing, digital signal processing, and machine learning to enable us to extract insight from very noisy signals.

FloodSense

floodnet.nyc

March 2020 – Today New York University

A smart cities initiative focused on developing and deploying a sensor network for the monitoring, analysis and understanding of urban flooding. In New York City, sea level rise has led to a dramatic increase in flood risk, particularly in low-lying and coastal neighborhoods. Urban flood water can impede pedestrian and vehicle mobility, and also can contain a diverse array of contaminants, including fuels, raw sewage, and industrial/household chemicals. Our goals are to develop a longitudinally deployed fleet of connected flood sensors, as well as the implementation of the digital infrastructure necessary to log, process, and present flood profile data in combination with other publicly available information, such as rainfall levels, 311 flooding complaints, and social media feeds.

Reconfigurable Environmental Intelligence Platform (REIP)

wp.nyu.edu/reip

March 2019 – Today New York University

Building sensor networks is costly and time consuming. It is difficult to build upon other people's work and there are only a few open-source solutions for integrating different devices and sensing modalities. REIP is a platform for fast and reusable sensor network prototyping. REIP's first and most central tool, is an open-source software framework with a flexible modular API for synchronized data collection and analysis using multiple sensing modalities. It was developed with the aim of being user-friendly, device-agnostic, and easily extensible, allowing for fast prototyping of heterogeneous sensor networks. Our framework is implemented in Python to reduce the entrance barrier for future contributions. Using REIP we have built a multimodal dense sensor network for pedestrian and traffic monitoring.

RELEVANT PAPERS

The Life of a New York City Noise Sensor Network

Sensors Journal, Special Issue on Intelligent Sensors, 19 (6)

2019

The Implementation of Low-cost Urban Acoustic Monitoring Devices

Applied Acoustics, Special Issue on Acoustics of Smart Cities, 117 (B)

2017

Noise Monitoring and Enforcement in New York City Using a Remote Acoustic Sensor Network

Internoise, Hong Kong

2017

PATENTS

System, Method And Computer-accessible Medium For Machine Condition Monitoring

Patent pending, Appl. No.: 16/750378

2019

SOFT SKILLS

Teamwork
Effective Communication
Growth Mindset
Goal-focused
Agile
Leadership
Multitasking
Creativity
Mentorship
Networking
Diligence
Public Speaking
Detail-oriented

A DAY IN MY LIFE