
Ecology. Electronics. Cities

I work on end-to-end systems to support healthy, biodiverse, and sustainable cities. With an interdisciplinary background in electronics, ecology, city science and human health, I am passionate about creating interfaces that reimagine how humans and nature interrelate. Hungry to keep learning and with a keen eye for detail, I thrive at the intersection of disciplines.

I am committed to contributing to groundbreaking research that addresses pressing environmental and societal challenges.

Skills

Programming	Python, C/C++, SQL, Arduino, Git/GitHub, Linux, Bash, Raspberry Pi, Arduino, STM32
Prototyping	Oscilloscope, Soldering, Laser Cutting, Eagle, KitCad, Electronics Wiring and Assembly
Wet Lab	Cell Isolation and Culture, Microscopy, qPCR
Language	French (Mother-tongue), English, German/Swiss German (Full Proficiency), Italian (Basic)

Experience

The Bartlett, UCL

Connected Environments Lab
Sept. 2021 - present

Post-Graduate Teaching Assistant

- *Make, Design, Build Connected Sensor Systems (CASA0016)* - Assist students in building end-to-end microcontroller-based environmental sensing systems, including sensors selection, wiring, programming, schematic design, and enclosure fabrication.
- *Deep Learning for Sensor Networks (CASA0018)* - Support students in developing and implementing deep learning models on Arduino Nano 33 BLE, covering data collection, model architecture, training, quantization, implementation and evaluation using TFLite, Google Colab, Edge Impulse.
- *Foundations of Spatial Data Science (CASA0013)* - Deliver practical sessions on Python programming for spatial data science.

Vertical Future

London, United Kingdom
Jun. 2020 - Jun. 2021

Engineer

- Designed, prototyped, built, and implement hardware and software systems for automated plant growth, including irrigation, lighting, and airflow control.
- Worked with plant scientists to understand their specific needs and requirements. Provided technical support and trained them to use the farm software. Assist with the configuration of "growing recipes" to research requirements of various seeds.
- Managed procurement of electronics components. Verified and clarified technical specifications with suppliers. Built and maintained relationships with third-party suppliers, ranging from small-scale UK to large international businesses. Assessed and selected vendors based on costs, delivery time, and quality.

ETH Zurich

Exercise and Health Lab
Sept. 2016 - Feb. 2017

Molecular Lab Research

- Conducted research on skeletal muscle angiogenesis as part of my BSc. thesis entitled '*Protocol to study the effects of exercise and high-sugar, high-fat diets on blood vessel formation in muscle tissue.*'
- Performed laboratory work including the preparation of growing media, isolation of endothelial cells from mice legs muscles, cell culture, specimen preparation for microscopy (sectioning and staining), and qPCR analysis.

Education

The Bartlett, UCL

Connected Environments Lab
Sept. 2021 - present

The Bartlett, UCL

Centre for Advanced Spatial Analysis
Sept. 2018 - Sept. 2018

ETH Zurich

Dept. Health Sciences & Technology
Sept. 2013 - Feb. 2017

PhD Candidate

- EPSRC PhD Scholarship at the Connected Environments and People & Nature Labs.
- Full-stack engineer developing hardware and software systems, including Internet of Things (IoT) and embedded AI, for real-time and remote monitoring of ecosystems.
- Create python package to streamline implementation of bioacoustics machine learning algorithms on embedded devices such as Raspberry Pi.
- Develop an IoT-based monitoring system to collect and analyse audio, environmental, and visual data to learn about the dynamics and activities of social wasp colonies.

MSc. Smart Cities & Urban Analytics

- Practical and theoretical courseworks in urban simulation, quantitative methods, GIS, urban systems theory, spatial data visualisation.
- Dissertation in collaboration with Movement Strategies; analysis and visualisation of 16 million GPS records to model crowd behaviour at sporting events.

BSc. Food Science

- Theoretical and practical experience of food, agricultural and human health systems.
- Coursework in systems analysis, process engineering, microbiology, biotechnology, anatomy and physiology, immunology, chemistry, botany, algae and fungi.

Selected Research

Publication
In Preparation

acoupi: An Open-Source Python Package for Deploying Bioacoustics Deep Learning Models on Edge Devices. Vuillioemet A., Balvanera Martinez S., Wilson D., Jones K.,

Publication
In Preparation

IoT systems and edge AI applications for biodiversity monitoring, towards Nature 4.0 - A Literature Review. Vuillioemet A., Jones K., and Wilson D.,

Publication

Urban Nature: Does Green Infrastructure Relate to the Cultural and Creative Vitality of European Cities? Kumar V. and Vuillioemet A., (2021) Sustainability, 13(14), 8052.

Blogpost

Gardens of Things - Connecting Nature to the Cloud.
Vuillioemet A., (2023), Connected Environments Lab.

Interview

Improving Cities through Technology. By Metka Novak for CityChangers.org, (2022).

Awards & Leadership

London National Park City

Summer 2022

Electronics in Nature - Forest School Collaboration

- Designed, planned, and delivered environmental sensing workshops to 10y children.

Open Hardware Makers

May 2022 - Jun. 2022

Participant

- Learned, shared and worked on best practices for open hardware science projects.

Urban AI

Apr. 2022 - Sept. 2022

Emerging Leaders Program

- Debated and reimagined the ethics and sustainability of urban AI systems.

The Alan Turing Institute

Apr. 2022 - Sept. 2022

Data Study Group (DSG), Participant & Group Facilitator

- Implemented ML NLP techniques for the SpendNetwork and National Archives DSGs.

ETH Student Union - VSETH

Sept. 2015 - Sept. 2016

Board Member - Communication & University Policy

- Represented students at Teaching Commission, ETH Board. Organised sponsorships and welcoming events. Managed bi-weekly newsletters and social media.