CHARLES GAN

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STRENGTHS

- Wastewater RNA extraction and PCR analysis
- Laboratory management for routine monitoring
- Optimization of Digital Droplet PCR (Bio-Rad and Stilla systems)
- Coordination between multiple stakeholders

- Scientific writing and presentation (Native English)
- Assay design for viral targets using ddPCR (RT-PCR)
- MATLAB & R studio & Prism for plots
- Python (data frame manipulation, graphs)

CORE EXPERIENCE

WASTEWATER-BASED EPIDEMIOLOGY (WBE) LAB MANAGER, EAWAG   JUL 2021 - CURRENT

Detecting viral targets in municipal wastewater as an early alarm system for protecting public health

- Performing daily viral RNA extraction and digital droplet PCR analysis (RT-PCR)
- Designing and implementing a nationwide ring trial to evaluate sources of variability between commercial/cantonal labs
- Nanopore sequencing using MinION technology – sample and library prep
- Developing new assays and validating new digital droplet PCR instruments
- Coordinating shipping logistics for on-time delivery of 75 samples from 15 regions of Switzerland
- Contributing to data management and dashboard to inform public health decisions: wise.ethz.ch
- Managing a team of four to provide timely data to the Federal Office of Public Health: https://www.idd.bag.admin.ch/
- Trained over 10 people (range of academic backgrounds and lab knowledge) over the course of 2 years

MASTER THESIS STUDENT, EAWAG – SWISS FEDERAL AQUATIC RESEARCH INSTITUTE   FEB 2021 – JULY 2021

Evaluated the effect of operation mode (sequence batch reactor vs. continuous stirred tank reactor) and nutrient limitation on the production of bioplastic from municipal wastewater

- Design and implementation of a flat ultra-filtration membrane
- Understanding of complex wastewater treatment scheme to convert fatty acids to PHA
- In lab analysis of wastewater indicators (TN, TP, COD, sCOD, TCOD, pCOD, NH_4, PO_4, TSS, TS, VSS, VS)
- In lab analysis with gas and ion chromatography to identify fatty acids and PHA species
- Troubleshooting of wastewater systems based on indicators

PROCESS ENGINEERING INTERN, EAWAG – SWISS FEDERAL AQUATIC RESEARCH INSTITUTE   JUL 2020 – SEPT 2020

Characterized rotating drum and filterband microsieve performance for primary WW treatment

- Assessed coagulation and flocculation products using jar testing methodology
- Evaluated cost/benefit of chemically enhanced primary treatment (CEPT) + low footprint primary treatment on resource recovery for high value production of PHA and bioplastics

STORMWATER INTERN, JACOBS ENGINEERING – ENVIRONMENTAL CONSULTING   JUN 2019 – SEPT 2019

Understanding and implementing stormwater city municipal code to improve regulation workflow

- Created an As-Built Hydrology Report checklist for the City of Peachtree Corners, GA using municipal code as guidance
- Utilized ArcGIS to populate a stormwater database with new systems installed
- Organized and gathered documentation for Community Rating System (CRS) application as part of FEMA's National Flood Insurance Program

ENVIRONMENTAL HEALTH SAFETY INTERN, SI GROUP – CHEMICAL MANUFACTURING   MAY 2018 – AUG 2018

Tracking/evaluating hazardous substances and setting best practices for mitigating env. impact

- Analyzed organic components within a biological wastewater treatment system and established concentration limits to ensure compliance with permit limits and treatment efficiency
- Communicated with and audited external businesses to coordinate HDPE recycling and due diligence
- Developed and collaborated to create an in-depth guide for onsite wastewater treatment training
- Initiated and investigated solutions to mitigate ammonia output by working with a chartered engineering team

MICROBIOLOGY RESEARCH INTERN, EPFL – ENVIRONMENTAL CHEMISTRY LAB   FEB 2017 – JUN 2017

Experimentally identifying the effect of microorganisms on the inactivation of enteroviruses

- Performed lab analysis: DBT/BGMK cell culture, gel electrophoresis, PCR, 16s DNA sequencing, viral/protozoa culture, most probable number viral counts, bacteriophage isolation
- Performed detailed experiments on a timely basis to model and analyze protozoa behavior
- Worked in a team setting and summarized my work in a 1-hour lecture (Writing samples on Linkedin)
- Produced data that is published in an internationally peer-reviewed journal: doi:10.1128/AEM.01992-19

EDUCATION (WRITING SAMPLES ON LINKEDIN)

SWISS FEDERAL INSTITUTE OF TECHNOLOGY LAUSANNE (EPFL) - SWITZERLAND   SEPT 2019 – SEPT 2021

- Master of Science in Environmental Engineering | **GPA: 5.05/6.0**
- Excellence Scholarship Recipient (covering all expenses)

GEORGIA INSTITUTE OF TECHNOLOGY - USA   AUG 2014 – MAY 2019

- Bachelor of Science in Environmental Engineering | **GPA: 3.81/4.0 (Highest Honors)**

SOFTWARE/PROGRAMMING/SOFT SKILLS

- Microsoft Office Suite
- MATLAB programming language (proficient)
- Overleaf/LaTex
- ArcGIS/QGIS + Geoda
- Team Leading
- Schedule Management

- PostgreSQL
- Python (minimal, for dataframe manipulation, plotting)
- R studio (minimal, for plotting)
- Bio-Rad and Stilla Analysis Software
- Communication between stakeholders

CERTIFICATIONS/PERSONAL DETAILS

- Fundamentals of Engineering certificate: link
- **Resident Status:** US Citizen/ Authorization Permit B (Switzerland)
- **Hobbies:** Long distance running, bread making, sunrise/sunset hiking, ultimate frisbee, piano

- Biosafety Level 2 env. exposure (enteric/respiratory pathogens)
- **Languages:** French (A2 spoken, B1 reading/writing), English (native)
- **Awards:** EPFL Excellence Fellowship

Research/Industry Interests: Lab Management, Developmental Engineering, Public Health, Environmental Protection, Field Investigation, Environmental/Wastewater R&D, Sustainable Community Architecture, Policy for Equitable Resource Access, Analytical Lab Work