Alessandro Zulli

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EDUCATION

Doctor of Philosophy, Chemical and Environmental Engineering

Yale University • New Haven • 2023

• "Environmental Surveillance of Viral Pathogens for Identifying Infectious Disease Outbreaks", Advisor: Jordan Peccia

Master of Science, Chemical and Environmental Engineering

Yale University • New Haven, CT • 2020

Bachelor of Science, Physics

Minor in Environmental Engineering • University of California, Los Angeles • Los Angeles • 2018

EXPERIENCE

Postdoctoral Researcher

Stanford University   September 2023 - Present, Palo Alto, CA

• Analyzed RSV data spanning 189 locations across the last 2 years and compared to clinical case data to determine seasonality and onset.
• Familiarized with front-end and back-end of wastewater SCAN project, creating new visualizations and analyses.
• Aggregated and cleaned clinical data from various state and federal sources.
• Leading novel monitoring efforts for arboviruses and the application of semi-quantitative genomic monitoring.
• Leading a study on shedding of infectious viruses in human samples.

Research Assistant

Yale University   August 2019 -September 2023, New Haven, CT

• Designed, led, and implemented the wastewater SARS-CoV-2 initiative in Connecticut, covering 7 cities and over 1.3 million persons.
• Created sample-to-analysis protocols for measuring wastewater concentrations of 23 different targets, including nucleic acid extraction, PCR primer design, and public health modeling.
• Collaborated with local, state, and federal public health agencies to inform public responses to respiratory outbreaks in 7 Connecticut cities.
• Built and maintained a website with over 30,000 monthly views that provided timely and accurate public health data.
• Managed teams of 2-5 undergraduate and graduate students to accomplish both public health and research goals.
• Published 6 papers in peer-reviewed journals.

Teacher

Academics ETC   July 2018 - July 2019, Palos Verdes, CA

• Created and implemented tailored curricula for individual students and small classes of 5-20 for mathematics and physics.
• Taught a wide variety of subjects ranging from late high-school level physics to multi-variable calculus and linear algebra.
• Implemented a shared online calendar system for student-teacher scheduling.
• Updated company website leading to 55% increased view-counts.

Teacher

Elite Prep Torrance   July 2018 - July 2019, Torrance, CA

• Prepared three lessons a week in linear algebra, differential calculus, and classical mechanics for classes of 6-12 students.
• Worked 1 on 1 with students in preparation for American mathematics competition.
• Tutored groups of 2-3 college students in classical mechanics, statics, and elementary fluid mechanics.

Research Assistant

University of California, Los Angeles   September 2017 - July 2018, Los Angeles, CA

• Designed bio-remediation experiments to develop technologies for the degradation of chlorinated compounds and 1,4-dioxane.
• Learned lab techniques and instruments including culturing, qPCR, GC-FID, and GC-MS.
• Implemented bio-remediation technologies at several Department of Defense locations for in-situ bio-remediation.
• Published 1 peer reviewed paper and submitted 1 patent.

PUBLICATIONS

Observations of respiratory syncytial virus (RSV) nucleic-acids in wastewater solids across the United States in the 2022-2023 season: Relationships with RSV infection positivity and hospitalization rates

• Alessandro Zulli, Meri R.J. Varkila, Julie Parsonnet, Marlene K. Wolfe, Alexandria B. Boehm medRxiv 2023.11.16.23298599; doi: https://doi.org/10.1101/2023.11.16.23298599

Wastewater detection of emerging arbovirus infections: Case study of Dengue in the United States

• Marlene K. Wolfe, Abigail Harvey Paulos, Alessandro Zulli, Dorothea Duong, Bridgette Shelden, Bradley J. White, Alexandria B. Boehm medRxiv 2023.10.27.23297694; doi: https://doi.org/10.1101/2023.10.27.23297694

Tunable mesoscopic collagen island architectures modulate stem cell behavior

• Nguyen, R. Y., Cabral, A. T., Rosello-Martinez, A., Zulli, A., Gong, X., Zhang, Q., Yan, J., Mak, M., Tunable Mesoscopic Collagen Island Architectures Modulate Stem Cell Behavior. Adv. Mater. 2023, 35, 2207882. https://doi.org/10.1002/adma.202207882

Lineage abundance estimation for SARS-CoV-2 in wastewater using transcriptome quantification techniques
• Baaijens, J.A., Zulli, A., Ott, I.M. et al. Lineage abundance estimation for SARS-CoV-2 in wastewater using transcriptome quantification techniques. Genome Biol 23, 236 (2022). https://doi.org/10.1186/s13059-022-02805-9

Scaling SARS-CoV-2 wastewater concentrations to population estimates of infection
• Kaplan, E.H., Zulli, A., Sanchez, M. et al. Scaling SARS-CoV-2 wastewater concentrations to population estimates of infection. Sci Rep 12, 3487 (2022). https://doi.org/10.1038/s41598-022-07523-7

Aligning SARS-CoV-2 indicators via an epidemic model: application to hospital admissions and RNA detection in sewage sludge
• Kaplan, E.H., Wang, D., Wang, M. et al. Aligning SARS-CoV-2 indicators via an epidemic model: application to hospital admissions and RNA detection in sewage sludge. Health Care Manag Sci 24, 320–329 (2021). https://doi.org/10.1007/s10729-020-09525-1

Occurrence of respiratory viruses on school desks
• Alessandro Zulli, Alexa Bakker, Ratanachat Racharaks, Marina Nieto-Caballero, Mark Hernandez, Richard Shaughnessy, Ulla Haverinen-Shaughnessy, M. Khalid Ijaz, Joseph Rubino, Jordan Peccia, Occurrence of respiratory viruses on school desks, American Journal of Infection Control, Volume 49, Issue 4, 2021, Pages 464-468, ISSN 0196-6553, https://doi.org/10.1016/j.ajic.2020.12.006.

Predicting daily COVID-19 case rates from SARS-CoV-2 RNA concentrations across a diversity of wastewater catchments
• Alessandro Zulli, Annabelle Pan, Stephen M Bart, Forrest W Crawford, Edward H Kaplan, Matthew Cartter, Albert I Ko, Marcela Sanchez, Cade Brown, Duncan Cozens, Doug E Brackney, Jordan Peccia, Predicting daily COVID-19 case rates from SARS-CoV-2 RNA concentrations across a diversity of wastewater catchments, FEMS Microbes, Volume 2, 2021, xtab022, https://doi.org/10.1093/femsmc/xtab022

Measurement of SARS-CoV-2 RNA in wastewater tracks community infection dynamics
• Peccia, J., Zulli, A., Brackney, D.E. et al. Measurement of SARS-CoV-2 RNA in wastewater tracks community infection dynamics. Nat Biotechnol 38, 1164–1167 (2020). https://doi.org/10.1038/s41587-020-0684-z

A mixed microbial community for the biodegradation of chlorinated ethenes and 1,4-dioxane
• Alexandra LaPat Polasko, Alessandro Zulli, Phillip B. Gedalanga, Peerapong Pornwongthong, and Shaily Mahendra Environmental Science & Technology Letters 2019 6 (1), 49-54 DOI: 10.1021/acs.estlett.8b00591

PRESENTATIONS AND AWARDS

Multi-epidemic wastewater monitoring: Clinical and epidemiological predictions
AEESP 2023 • 2023
• Poster.

Quantitative comparison of wastewater virus concentrations to EPIC data for Norovirus, RSV, and Influenza A outbreaks
NSF RCN Webinar #23 • 2023
• Invited speaker.

Advances in estimating COVID-19 total infections and tracking variant prevalence from wastewater surveillance
Gordon Research Conference: Microbiology of the Built Environment • 2022
• Invited speaker.

Public Service Award as a Public Scholar
Yale University • 2022
• In recognition for my work in epidemiology and collaboration with local and national public health officials.

Estimating variant abundance of SARS-CoV-II in domestic wastewater
NSF RCN Webinar #17 • 2021
• Invited speaker.

Dean's Prize for Excellence in Research and Creativity
University of California, Los Angeles • 2018
• In recognition for my undergraduate research work in the development and implementation of bioremediation techniques.

UCLA Green Gala Sustainability Program of The Year
University of California, Los Angeles • 2017
• In recognition for the facilities commission's efforts to implement sustainable practices at UCLA, including solar power installations and zero waste awareness campaigns.

Library Prize for Undergraduate Research
University of California, Los Angeles • 2017

PROJECTS

Yale COVID Wastewater Tracking

Yale University • https://yalecovidwastewater.com/ • July 2020 -September 2023

• Built and managed a website tracking SARS-CoV-2 concentrations in 7 Connecticut cities.
• Managed several site migrations and maintained the underlying databases.
• Designed and implemented 3 separate pipelines for data generation to web update.

Six Americas Survey ESG Implementation

Yale Planetary Solutions Generator • January 2022 - June 2022

• Designed pilot implementations of clustering algorithms based on the Six Americas Survey.
• Provided guidance for project managers on how to interpret the resulting clusters and what trainings to seek out to promote environmental, social and governance principles at a company in a ground-up approach.
• Implemented locally with 30 TSAI City staff members.

The Green Initiative Fund

University of California, Los Angeles • August 2016 - August 2017

• Managed a $250,000 fund dedicated to funding green initiatives on campus at UCLA.
• Led the installation of solar water heaters on the rooftops of 3 engineering buildings.
• Designed and implemented a pilot project of solar charging stations in high traffic areas on campus.
• Funded and organized E-Coachella (now Coastalong), a bike-powered sustainability themed concert aimed at raising awareness and increasing student engagement.

INVOLVEMENT

SERIO

Stanford University • Organizer • September 2023 - Present
• Organized Stanford Engineering Research Introductions to provide opportunities for 20-30 underrepresented minority students interested in research each year.
• Organized lodging and transportation for students to arrive at Stanford's campus.
• Coordinated lab tours and keynote speeches for a 2-day event where students met professors and graduate students.
• Recruited participants from a variety of institutions ranging from community colleges to Ivy leagues.

Graduate Engineering Community Organization

Yale University • Treasurer and Event Organizer • January 2020 -September 2023
• Organized monthly social events for 200 graduate engineering students.
• Funded and obtained additional external funding for Society of Women Engineers events.
• Expanded a mentorship program which paired incoming students with later stage graduate students from 12 students to 48 students.

Engineers without Borders

University of California, Los Angeles • Advisor • September 2016 -September 2023
• Volunteered in different capacities at both the UCLA and Yale chapter of Engineers without Borders.
• Participated in an initial assessment of San Sebastian, Nicaragua and began design of a schoolhouse and small sanitation projects.
• Served as an advisor for the creation of a retaining pond in Naitolia, Tanzania, helping students with design calculations.

Equity in the Job Search Symposium

Yale University • Finance Chair • October 2022 - June 2023
• Raised $7000 from a variety of internal and external funding sources to fund symposium events and speakers.
• Organized a workshop focusing on job search self-advocacy to promote inclusion and equity in the workplace.

Project Literacy

University of California, Los Angeles • Literacy Tutor • September 2017 - June 2018
• Tutored adult learners to improve literacy rates in Los Angeles county.

SKILLS

R, Python, Epidemiological modeling, Primer/probe design, Metagenomic data analysis, Supervised learning models