LAUREN M BUTLER

EDUCATION

Columbia University | New York, NY 2016
M.S.E. Earth and Environmental Engineering

- Notable classes: Environmental Data Analysis and Modeling, Global Assessment with Remote Sensing, Development and Management of Water Systems
- Notable Projects: Statistical analysis of contamination plume trends at Bingham Canyon Mine, impacts of abandoned mine disasters and liability, wastewater treatment optimization for Rio de Janeiro, measurement and trend analysis of gas fluxes from urban bioretentions

University of Minnesota | Minneapolis, MN 2012
Bachelor of Arts in Dance
Bachelor of Mechanical Engineering

- Notable Projects: Optical technology to count surgical instruments, knee biomechanics measurement for injury prevention, measurement of airborne viruses and bacteria, residential solar thermal design

EXPERIENCE

Staff Research Associate | Columbia University | New York | Part time Feb 2017-Present
Columbia Water Center, Earth Institute

- Analysis of temporal and spatial trends in water quality data, in Peru and the U.S.
- Compared sources for water quality and mining production data and compiled database
- Developed a decision-making framework for field measurement options in developing regions
- Managed purchasing of in-situ test equipment for comparison with remotely sensed observations
- Trained environmental monitoring committee in Peru on water quality testing options
- Researched areas at risk of future contamination from mining, prioritized basins for analysis
- Studying interaction between long-term environmental monitoring and short-term climate risks

Education Consultant | EcoMoves | New York | Part time Sept 2017-Present

- Taught middle school students about the environment using dance and creative movement
- Developed "The Nature Games" in which students embody ecosystem connections and jointly problem solve to confront climate and other environmental threats

Artistic Director | Resonant Dance | New York | Part time Dec 2016-Present

- Founded and directed a dance company that does science and environmental collaborations
- Choreographed seven dance pieces related to water resources
- Partnered with NGOs, community stakeholder groups to present public dance presentations

Graduate Research Assistant | Columbia University | New York | Part time May-Dec 2016
Columbia Water Center, Earth Institute

- Obtained multi-source historical data on water quality via literature, trips to Peru, and databases
- Compiled a catchment-level database of water quality, quantity, and mining production data
- Analyzed trends in concentrations of heavy metals, spatial and temporal variation
- Compared to environmental quality standards to identify violation trends, explored attributions
- Statistical modeling of metal concentrations, with flow and mine production as predictors

Project Coordinador | Fundación Ingenieros en Acción | Bolivia | Full time Sep 2012-Jun 2015

- Coordinated field work for 3 research projects and 5 water resource development projects
- Tested pilot in-situ, scalable water quality measurement methods compared to existing tech
- Developed field test method for coliform and E. coli and calibrated to lab results
- Built, calibrated apparatus from local materials for deep well characterization and diagnosis
- Calculated increase in potable water use due to transition from decentralized to centralized sanitation
- Contributed to NSF-PIRE grant proposal with a La Paz university, U. of Michigan and others
- Developed plans for visiting student researchers, mentored on cultural norms and safety
- Evaluated rural locations to monitor wind pump performance and use for small-scale irrigation

Consultant | University Opera Theater | Minneapolis MN | Part time Feb-July 2012

- Received grant to design, build, and program a wearable Internet of Things sensor system and integrate into live performance

Principle Investigator | Engineers Without Borders | Part time Mar-May 2010, Aug 2010-Apr 2012
Undergraduate Research Opportunities Program Grant. Faculty advisors: Julian Marshall, Tim LaPara

- Designed household surveys to assess effectiveness and perception of water supply and treatment
- Directed statistical analysis of surveys to identify correlations, means, and uncertainties
- Conducted baseline study before irrigation improvement project
- Travelled to Guatemala five times with Engineers Without Borders teams
- Analyzed water pump designs and installed pump with sensors and automatic control

Intern | Foundation for Ecological Security | Udaipur, India | Full time Jun-Aug 2010

- Conducted ethnographic surveys in rural village
- Assessed priorities for environmental conservation and development
- Applied participatory development methodology for pilot environmental education program
- Reported frequency of endangered bird species nest landings and other biodiversity indicators

R&D Mechanical Engineering Intern | Ecolab, Inc. | Eagan, MN | Full time Jun-Aug 2009

- Contributed to Intellectual Property by testing and modifying laboratory sensing techniques
- Designed and conducted statistical experiment for prototypes of fluid flow control mechanisms
- Designed, created 3D model, and prototyped new part for hospital sanitation technology

Energy efficiency student liaison | Rebuilding Together Twin Cities | Part time Jan-Jun 2009

- Conducted energy audit with infrared thermography on low-income housing
- Researched energy efficiency improvement technologies and conducted cost benefit analysis
- Calculated interactions of energy-saving alternatives with air quality and HVAC systems

Undergraduate Research Assistant | Human/Machine Design Lab | Part time Mar 2008-Apr 2009
Undergraduate Research Opportunities Program Grant. Faculty advisor: William Durfee

- Designed lab bench test for prototype of stored-energy orthosis for gait restoration
- Repaired electrical connections on prototype and researched design alternatives
- Received IRB approval to test on human subjects with paraplegia using functional electrical stimulation with the orthosis

Engineering Intern | Motorola Mobile Devices | Libertyville, IL | Full time Jun-Aug 2007

- Analyzed source of software defects on next-generation smart phones

PUBLICATIONS AND PRESENTATIONS

Knowledge was power, now data is: case studies of water resource development in Latin America, 2017 International Sustainable Development Conference | Poster presentation

Butler, L. 2018. Dance and Mixed-Media Performance for Building Scientific Understanding and Environmental Respect. Consilience Journal of Sustainable Development, Vol. 19, Iss. pp183–195

Analysis of Water Contamination from Mining in Peru, 2017
Earth Institute Student Research Showcase | Poster presentation

Fundación Ingenieros en Acción: Strategic Governmental-NGO Planning for Water and Sanitation, 2014
Bolivian Ministry of Water and Environment | Invited Presenter

Asset-Based Methodologies for Water Infrastructure and Technology, 2013
International WaTER Center Conference, University of Oklahoma | Oral Presenter

Ethical Challenges in Uganda: When to Leave a Successful Project, 2011
Engineers Without Borders-USA International Conference | Panelist

Mazzola, G., Walsh, D., **Butler, L**., Polukeyev, A. **2013**. Visualization Technologies for Music, Dance, and Staging in Operas. Leonardo Journal, Vol 19 Issue 3

LaPara, T.M., **Butler, L.M,** Frieseke, J.H., Wilkinson, K.H. **2011.** Engineers Without Borders: UMN Chapter and Recent Projects. Proc. of the University of Minnesota Geotechnical Engineering Conference, St. Paul MN.

PROFESSIONAL SERVICE

Board of Directors, Engineers In Action, Tulsa, OK	2016-present
Professional Mentor, Engineers Without Borders, Columbia University	2017-present
Directed international dance/theater series on water-related risk	2014-2017
Mentored water-focused student group Aquanauts, Columbia University	2015-2016
Planned panel "Water: Tipping the Scale from Conflict to Cooperation", Columbia University	2016
Nepal Sanitation Ideation Lab mentor, Archimedes Project at Columbia University	2016
Wrote for blog "Engineering partnership in Bolivia for community development"	2012-2015
Directed film "Agua es Vida" about water crises in rural Bolivia	2014

PROFESSIONAL MEMBERSHIP

Engineers Without Borders-USA	2007-Present
American Society of Mechanical Engineers	2009-Present
American Society of Civil Engineers	2016-Present
American Society of Heating and Air-Conditioning Engineers	2011-2012
Society of Women Engineers	2008-2010

HONORS AND AWARDS

Urban Water Design Challenge - Brazil, team awarded funding and travel, Columbia U.	2016
SEAS Graduate Student council professional development Scholarship	2016
Global Water and Sanitation Roundtable invited participant, United Methodist Committee on Relief	2015
Water and Sanitation Summit invited facilitator, Bolivian Ministry of Water and Environment	2014
WaTER Center Conference International Travel Grant, University of Oklahoma	2013

SKILLS

Rstudio | ArcMAP | ENVI | EPANET | AutoCAD | SolidWorks | Pro/ENGINEER | LabVIEW | Minitab | HTML C/C++ | Max 6 multimedia | Arduino | Project Management | Lean Six Sigma | Wilderness Medicine | Toastmasters public speaking | Spanish Fluency