CAL DUNHAM BUELO

Aquatic ecosystems, algal blooms, data science

EDUCATION

2021 | 2016 — **University of Virginia, Dept. of Environmental Sciences**
Ph.D., Advisor: Dr. Michael Pace — Charlottesville, VA

2014 | 2010 — **University of Wisconsin**
B.S. in Biology, Mathematics — Madison, WI

EMPLOYMENT

Present | 2022 — **Physical Scientist, Great Lakes National Program Office**
US Environmental Protection Agency — Chicago, IL

2022 | 2021 — **Research Associate, Dugan and Hanson Labs**
University of Wisconsin, Center for Limnology — Madison, WI

2016 | 2014 — **Research Technician, Pace Lab**
University of Virginia, Dept. of Environmental Sciences
Charlottesville, VA

2014 | 2011 — **Undergraduate Researcher, Cascade Research Group**
University of Wisconsin, Center for Limnology
Land O' Lakes, WI and Madison, WI

PUBLICATIONS

In Prep — **Quantifying disturbance and recovery in estuaries: tropical cyclones and high frequency measures of oxygen and salinity**
Target Journal: *Estuaries and Coasts* (draft available on request)

In Prep — **Anticipating blooms: exploring the accuracy of algal bloom initiation forecasts**
Target Journal: *Water Resources Research* (draft available on request)

2022 — **Increasing heatwave frequency in streams and rivers of the United States**
Limnology & Oceanography Letters
SJ Tassone, AF Besterman, **CD Buelo**, DT Ha, JA Walter, ML Pace

Evaluating the performance of temporal and spatial early warning statistics of algal blooms
Ecological Applications
CD Buelo, ML Pace, SR Carpenter, EH Stanley, DA Ortiz, DT Ha

CONTACT INFO

cbuelo10@gmail.com
+1 608-576-8741
calbuelo.com
github.com/cbuelo
Google Scholar
ORCID

TECHNICAL SKILLS

R (base, tidyverse, Shiny, package development)

Python, SQL, Git, Linux, Bash

Installation and maintenance of automated water quality sensor systems

*This resume was made with the R package **pagedown**.*

Last updated on 2022-10-08.

An algorithm for detecting and quantifying disturbance and recovery in high-frequency time series
Limnology and Oceanography: Methods
JA Walter, **CD Buelo**, AF Besterman, SJ Tassone, JW Atkins, ML Pace

Co-occurrence of aquatic heatwaves with atmospheric heatwaves, low dissolved oxygen, and low pH events in estuarine ecosystems
Estuaries and Coasts
SJ Tassone, AF Besterman, **CD Buelo**, JA Walter, ML Pace

No evidence of widespread algal bloom intensification in hundreds of lakes
Frontiers in Ecology and the Environment
GM Wilkinson, JA Walter, **CD Buelo**, ML Pace

2021 **Phytoplankton biomass, dissolved organic matter and temperature drive respiration in whole lake nutrient additions**
Limnology and Oceanography
ML Pace, **CD Buelo**, SR Carpenter

2020 **Air-water gas exchange in lakes and reservoirs measured from a moving platform by underwater eddy covariance**
Limnology and Oceanography: Methods
P Berg, ML Pace, **CD Buelo**

2018 **A synthesis of modern organic carbon accumulation rates in coastal and aquatic inland systems**
Scientific Reports
GM Wilkinson, A Besterman, **CD Buelo**, J Gephart, ML Pace

Filial cannibalism by largemouth bass (Micropterus salmoides): a three-decade natural history record from a small northern temperate lake
Journal of Freshwater Ecology
CJ Dassow, A Collier, JYS Hodgson, **CD Buelo**, JR Hodgson

A modeling analysis of spatial statistical indicators of thresholds for algal blooms
Limnology & Oceanography Letters
CD Buelo, SR Carpenter, ML Pace

Early warning signals precede cyanobacterial blooms in multiple whole-lake experiments
Ecological Monographs
GM Wilkinson, SR Carpenter, JJ Cole, ML Pace, RD Batt, **CD Buelo**, JT Kurtzweil

2017 **Reversal of a cyanobacteria bloom in response to early warnings**
Proceedings of the National Academy of Sciences USA
ML Pace, RD Batt, **CD Buelo**, SR Carpenter, JJ Cole, JT Kurtzweil, GM Wilkinson

2016 **Exogenously produced CO2 more than doubles the flux of greenhouse gases from three north temperate lakes**
Geophysical Research Letters
GM Wilkinson, **CD Buelo**, JJ Cole, ML Pace

SELECTED PRESENTATIONS

2022 **Variability in phenology among north temperate lakes**
CD Buelo, R Ladwig, KL Reinl, HA Dugan, PC Hanson. *Joint Aquatic Sciences Meeting*

Quantifying disturbance and recovery in estuaries: tropical cyclones and high frequency measurements of oxygen and salinity
CD Buelo, ML Pace, AF Besterman, JA Walter, DT Ha, SJ Tassone. *ASLO Ocean Sciences Meeting*

2021 **Quantifying resilience in aquatic ecosystems**
CD Buelo. *UW-Madison Center for Limnology Weekly Seminar*

Quantifying disturbance and recovery in estuaries: tropical cyclones and high frequency measurements of oxygen and salinity
CD Buelo, ML Pace, AF Besterman, JA Walter, DT Ha, SJ Tassone. *Hurricane Ecosystem Response Synthesis Network Monthly Webinar* **(invited speaker)**

Change in aquatic ecosystems: advancing resilience concepts towards practical applications
CD Buelo. *UVA Environmental Sciences Dissertation Defense*

Evaluating temporal and spatial early warning statistics of algal blooms
CD Buelo, ML Pace, SR Carpenter, EH Stanley, DA Ortiz, DT Ha. *ASLO Aquatic Sciences Meeting*

Predicting algal blooms in lakes using early warning statistics and near-term forecasting
CD Buelo. *UVA Environmental Sciences Department Seminar*

2020 **Forecasting Algal Blooms**
CD Buelo, N Nazemi. *UVA School of Data Science Presidential Fellowship Presentation*

2019 **Algal blooms and ecosystem metabolism in a managed drinking water reservoir**
CD Buelo, ML Pace. *UVA Global Water Initiative Graduate Water Symposium Presentation*

- **Time vs. space: comparing statistical indicators of algal blooms**
  CD Buelo, ML Pace, SR Carpenter. *ASLO Aquatic Sciences Meeting*

2018
- **Lake experiments to test early warnings of resilience loss**
  CD Buelo, ML Pace. *UW Trout Lake Station Weekly Seminar*
- **Spatial indicators of algal blooms using remote sensing**
  CD Buelo. *Virginia Space Grant Consortium Research Conference*
- **Algal blooms and ecosystem metabolism in a drinking water reservoir**
  CD Buelo, ML Pace. *EnviroDay: UVA Envi. Sci. Graduate Student Symposium*

2017
- **Storms, algal blooms, and CuSO4 treatment in a drinking water reservoir**
  CD Buelo, CS Hanley, GM Wilkinson, ML Pace. *Virginia Water Monitoring Council Conference* **(invited speaker & panelist)**
- **Spatial resilience indicators of algal blooms**
  CD Buelo, ML Pace, SR Carpenter. *ASLO Aquatic Sciences Meeting*

2015
- **Storms, algal blooms, and CuSO4 treatment in a drinking water reservoir**
  CD Buelo, CS Hanley, ML Pace, GM Wilkinson. *Water Resources Conference of the Virginias*
- **Data analysis and visualization with R**
  CD Buelo. *Environmental Electronics Undergrad Course* **(Guest Lecture)**

2014
- **Trophic cascades, early warnings of regime shifts, and terrestrial subsidies in lakes**
  CD Buelo, JT Kurtzweil. *University of Notre Dame Environmental Research Center Summer Seminar Series*

2012
- **Effects of a food web shift on largemouth bass diet and juvenile growth**
  CD Buelo. *UW-Madison Biology 152 Mentored Research Poster Session* **(poster presentation)**
- **Changes in fish growth during a trophic cascade**
  CD Buelo. *UW Trout Lake Station Undergraduate Research Seminar*

HONORS, AWARDS, GRANTS

2022
- **UVA Dept. of Environmental Sciences Student Excellence Award**

2019
- **UVA Presidential Fellowship in Data Science**
  $41,000
- **UVA Dept. of Environmental Sciences Moore Graduate Research Award**
  $5,000

2018 **UVA Environmental Resilience Institute Rapid Response Grant**
$14,000. PI: Michael Pace, Co-PIs: Alice Besterman and **Cal Buelo**

NASA Virginia Space Grant Consortium Graduate Fellowship Renewal
$6,000

2017 **UVA Dept. of Environmental Sciences Exploratory Research Award**
$1,250

NASA Virginia Space Grant Consortium Graduate Fellowship
$6,000

2016 **National Science Foundation Graduate Research Fellowship**
$138,000

2013 **UW College of Agriculture and Life Sciences Irving W. Gerhardt Scholarship**

2012 **National Science Foundation Research Experience for Undergraduates Award**

PROFESSIONAL ACTIVITIES

Mentoring

- Dat Ha, University of Virginia, 2018-2019
- Kayla Wernsing, Iowa State University, 2019
- Sara McCormack, University of Denver, 2019
- Carson Lambert, University of Virginia, 2019
- Anne Marie Saunders, University of Virginia, 2018
- Jon Stetler, Paul Smith's College, 2016-2017
- Meredith Kadjeski, Wells College, 2016
- Daniel De Jesús, University of Puerto Rico at Cayey, 2016
- Brandon Dobraska, University of Wisconsin, 2016
- Anders Uppgaard, University of Wisconsin, 2015
- Rachel Meulman, University of Virginia, 2015-2016
- Colin Dassow, St. Norbert College, 2014-2015
- Devon Brown, University of Virginia, 2014
- Charlie Hanley, University of Virginia, 2014

Volunteer

- UW Center for Limnology DEI and Computer Committees (2021 - 2022)
- UW Trout Lake Open House (2013 - 2016, 2018)
- NSF GRFP Applicant Review Panel, UVA Office of Graduate & Postdoc. Affairs (2017)

Membership

• Association for the Sciences of Limnology and Oceanography

Reviewer

• Environmental Science & Technology Water
• Ecological Applications
• Limnology and Oceanography
• Limnology and Oceanography: Methods
• Hydrobiologia