

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
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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
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2021 • **Research Associate, Dugan and Hanson Labs**
University of Wisconsin, Center for Limnology 📍 Madison, WI
- 2016
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2014 • **Research Technician, Pace Lab**
University of Virginia, Dept. of Environmental Sciences 📍 Charlottesville, VA
- 2014
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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

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🌐 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**
 Cal Buelo, Robert Ladwig, Kait Reinl, Hilary Dugan, Paul 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