

Ryan A. Green

PHD CANDIDATE · BIOGEOCHEMICAL MODELING · MARINE CARBON DIOXIDE REMOVAL

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Summary

My research focuses on utilizing carbon isotopes and biogeochemical modeling to gain insights into past and present carbon cycling dynamics. I investigate these questions using carbon cycle models and regional ocean modeling systems (ROMS). My particular area of interest lies in applying my expertise to marine carbon dioxide removal (mCDR) research, specifically focusing on ocean alkalinity enhancement (OAE).

Education

University of California, Santa Cruz

PHD EARTH SCIENCE

Santa Cruz, CA

2019 - present

- Dissertation: "Advancing Marine Carbon Dioxide Removal through Ocean Alkalinity Enhancement"

University of California, Davis

BS ENVIRONMENTAL POLICY

Davis, CA

2013 - 2018

- Minor in Oceanography
- Graduated with honors & a departmental citation

Research Experience

University of California Santa Cruz - Dept of Earth and Planetary Sciences

Santa Cruz, CA

CO-ADVISORS: DR. MATHIS P. HAIN, DR. PATRICK A. RAFTER

2019 - Present

- Built a regional carbon cycle model and coupled to a global model to study geologic analogs of Ocean Alkalinity Enhancement (OAE) in the eastern tropical North Pacific
- Simulated a range of OAE deployment scenarios within the California Current System using a coupled physical-biogeochemical model of ROMS and NEMUCSC, respectively

University of New South Wales - Climate Change Research Centre

Sydney, NSW

CO-ADVISORS: DR. LAURIE MENVIEL, DR. KATRIN J. MEISSNER

2018-2019

- Analyzed seasonal sea-ice cover at the Last Glacial Maximum (LGM). Determined the most likely summer and winter sea-ice edge at the LGM and constrained the mechanisms controlling sea ice in different Earth System Models

University of California, Davis - Dept of Evolution and Ecology

Davis, CA

SUPERVISOR: DR. NICOLE M. KOLLARS

2018

- Assisted in various laboratory techniques, including DNA extraction, polymerase chain reaction, gel electrophoresis, and spectroscopy to investigate the genetic composition of the seagrass species.

University of California, Davis - Dept of Environmental Science and Policy

Davis, CA

SUPERVISOR: DR. LAUREN YAMANE

2017

- Gathered fish life history data from surveys around the Channel Islands of California. Analyzed and identified key species characteristics, contributing to the development of models that predict species response to Marine Protected Areas (MPAs).

Professional Experience

Oceanid MRV

MCDR CONSULTANT

June 2023 - Present

- Providing scientific expertise on ocean carbon cycling and carbonate chemistry
- Helping develop monitoring, reporting, and verification (MRV) frameworks for different marine carbon dioxide removal (mCDR) pathways

Publications

PUBLISHED

Green, R.A., Menviel, L., Meissner, K.J., Crosta, X., Chandan, D., Lohmann, G., Peltier, W. R., Shi, X., and Zhu, J. 2022. Evaluating seasonal sea-ice cover over the Southern Ocean at the Last Glacial Maximum. *Climate of the Past*, 2(1): 1000-1100.

IN REVIEW

Green, R.A., Hain, M.H., and Rafter, P.A. 2023. Deglacial Pulse of Neutralized Carbon from the Pacific Seafloor: Constraints from the Radiocarbon Budget. *Geophysical Research Letters*.

IN PREP

Green, R.A., Hain, M.H., Rafter, P.A., and Sun, C. $\Delta^{14}\text{C}$ Anomalies Explained? Constraints on Neutralized Carbon Release into the Eastern Tropical North Pacific. *Paleoceanography and Paleoclimatology*.

Green, R.A., Rafter, P.A., and Hain, M.H. Evaluating $\delta^{13}\text{C}$ as a Tool to Verify Additionality After mCDR.

Awards, Fellowships, & Grants

2023	ARCS Fellowship , Achievement Rewards for College Scientists Foundation	\$11,070
	Graduate Dean's Research Travel Grant , UCSC Graduate Division	\$100
2022	Teaching Assistant of the Year , UCSC Earth Science Department	
	Graduate Dean's Research Travel Grant , UCSC Graduate Division	\$500
2021	Teaching Assistant of the Year-Honorable Mention , UCSC Earth Science Department	
2020	Teaching Assistant of the Year-Honorable Mention , UCSC Earth Science Department	
2019	Regents Fellowship , UCSC Earth and Planetary Science Department	\$21,762
	UNSW Summer Vacation Scholarship , UNSW Climate Change Research Centre	\$3,800
2018	University Honors , UC Davis	
	Departmental Citation , UC Davis Environmental Science and Policy Department	
2014-2017	Deans List , UC Davis	

Presentations

CONTRIBUTED PRESENTATIONS

Green, R.A., Hain, M.H., Rafter, P.A., Gray, W.R., Rae, J.W.B., and *Sun, C., 2023. Characterizing Geologic Carbon Release as an Explanation for Deglacial $\Delta^{14}\text{C}$ Anomalies within the Eastern Tropical North Pacific. Oral presentation: AGU, Chicago, Illinois.

Green, R.A. 2022. Introduction to Paleoclimatology. Oral presentation: No Jargon Talks, Santa Cruz, California.

Green, R.A., Hain, M.H., and Rafter, P.A. 2021. Constraints on Geologic Carbon Release at the End of the Last Ice Age from the Planetary Radiocarbon Budget. Oral presentation: AGU, New Orleans, Louisiana.

Green, R.A., Hain, M.H., and Rafter, P.A. 2021. Constraining Earth's Geologic Influence on the Global Carbon Cycle During the Last Ice Age from the Planetary Radiocarbon Budget. Poster presentation: Goldschmidt, Virtual.

Green, R.A., Hain, M.H., and Rafter, P.A. 2020. ^{14}C -Constraints on the Deglacial Release of Geologic Carbon Using Atmospheric Records. Poster presentation: AGU, Virtual.

Green, R.A., Menviel, L., Meissner, K.J. 2019. Evaluating seasonal sea-ice cover over the Southern Ocean at the Last Glacial Maximum. Oral presentation: PAGES C-SIDE workshop at ICP13, Sydney, Australia.

Teaching Experience

Winter 2023	Intro to Environmental Sciences , Teaching Assistant	UCSC
Winter 2022	Intro to Environmental Sciences , Teaching Assistant	UCSC
Winter 2021	Intro to Environmental Sciences , Teaching Assistant	UCSC
Fall 2020	Intro to Computer Programming for Geoscientists , Teaching Assistant	UCSC
Winter 2019	Intro to Environmental Sciences , Teaching Assistant	UCSC

Mentoring

2023-present	Colin Zerfass , Research Mentee	UCSC
2023-present	Srishreya Arunsaravanakumar , Research Mentee	UCSC
2022-present	David McCurdy , Research Mentee	UCSC
2021-present	Christopher Sun , Research Mentee	UCSC
2021	Beatrice O'Brien , Research Mentee	UCSC
2021	Caden Kang , Research Mentee	UCSC
2021	Jack Chang , Research Mentee	UCSC

Outreach & Professional Development

SERVICE AND OUTREACH

2014-2017	UC Davis Football Special Olympics , Volunteer	Davis, CA
2014-2017	Shriners Children's Hospital , Volunteer	Davis, CA
2016	Evening of Dreams Special Needs Prom , Volunteer	Davis, CA

LEADERSHIP

2022-present	International Carbon Ocean Network for Early Career Scientists - ICONEC , Founding Member	Santa Cruz, CA
2018-2019	University of New South Wales , Assistant Football Coach	Sydney, AUS
2013-2017	UC Davis Football , Division-1 Student Athlete	Davis, CA

PROFESSIONAL MEMBERSHIPS

American Geophysical Union
Geochemical Society