

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

Santa Cruz, CA

PHD EARTH SCIENCE

2019 - present

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

University of California, Davis

Davis, CA

BS ENVIRONMENTAL POLICY

2013 - 2018

- Minor in Oceanography
- Graduated with honors & 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

- Developed a regional carbon cycle model to study geologic analogs of Ocean Alkalinity Enhancement (OAE) in the eastern tropical North Pacific
- Simulated a range of OAE deployment scenarios using the California Current System Regional Ocean Modeling System (CCS-ROMS)

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 the different 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. Analyzed and identified key species characteristics, contributing to the development of models that predict species response to Marine Protected Areas (MPAs).

Consulting 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

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 \$4,000

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	<i>UCSC</i>
Winter 2022	Intro to Environmental Sciences , Teaching Assistant	<i>UCSC</i>
Winter 2021	Intro to Environmental Sciences , Teaching Assistant	<i>UCSC</i>
Fall 2020	Intro to Computer Programming for Geoscientists , Teaching Assistant	<i>UCSC</i>
Winter 2019	Intro to Environmental Sciences , Teaching Assistant	<i>UCSC</i>

Mentoring

2023-present	Srishreya Arunsaravanakumar , Research Mentee	<i>UCSC</i>
2022-present	David McCurdy , Research Mentee	<i>UCSC</i>
2021-present	Christopher Sun , Research Mentee	<i>UCSC</i>
2021	Beatrice O'Brien , Research Mentee	<i>UCSC</i>
2021	Caden Kang , Research Mentee	<i>UCSC</i>
2021	Jack Chang , Research Mentee	<i>UCSC</i>

Outreach & Professional Development

SERVICE AND OUTREACH

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

LEADERSHIP

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

PROFESSIONAL MEMBERSHIPS

American Geophysical Union
Geochemical Society