Cedric J. Hagen

Updated: September 12, 2023
Department of Geosciences, Guyot Hall 113 ch0934@princeton.edu
Princeton University, Princeton, NJ 08544 cedrichagen.weebly.com

Education

Oregon State University, Corvallis, OR — Graduated June 2021
Doctor of Philosophy, Geology
Graduate Certificate, College and University Teaching

Macalester College, Saint Paul, MN
Bachelor of Arts, Geology (with honors) — Graduated May 2016
Geology major, Biology minor

James Cook University, Townsville, Australia — Feb. - June 2015
Study Abroad Program

Research

Agouron Postdoctoral Fellow, Princeton University: June 2021 - Present
Developing machine learning and artificial intelligence routines for quantitative classification of sedimentary facies with Dr. Adam Maloof.

NSF Graduate Research Fellow, Oregon State University: Sept. 2017 - June 2021
Graduate Research Assistant, Oregon State University: Sept. 2016 - June 2021
Graduate Teaching Assistant, Oregon State University: Sept. 2016 - Sept. 2017
Conducted research with Dr. Jessica Creveling (Oregon State University) to develop computational stratigraphic correlation tools and conceptual biogeochemical models. Served as a GTA for a 200-level physical geology course, a 200-level Earth history course, and a 300-level sedimentology and stratigraphy course.

Research Assistant, Macalester College: May 2013 - May 2016
Conducted research with Drs. Eric M. Roberts (James Cook University), Raymond Rogers (Macalester College), Brendan Miller (College of St. Scholastica), and John Cannon (Macalester College) in sedimentology, paleontology, and astrophysics, leading to 3 peer-reviewed publications and 8 conference presentations.

Peer-reviewed Publications

Journal Articles:

Hagen, C.J., and Creveling, J.R. Align: an open-source, user-friendly program for stratigraphic correlation. In Press at GSA Today.

Hagen, C.J. and Creveling, J.R. A numerically derived Ediacaran global composite $\delta^{13}C_{carb}$-B-MCMC age model. In revision for Palaeogeography, Palaeoclimatology, Palaeoecology.

Hagen, C.J., and Harper, J.T., 2023. Dynamic Time Warping to Quantify Age Distortion in Firn Cores Impacted by Melt Processes, Annals of Glaciology. doi: 10.1017/aog.2023.52

Hagen, C.J., Reilly, B.T., Stoner, J.S., and Creveling, J.R., 2020. Dynamic time warping of paleomagnetic secular variation data, Geophysical Journal International. doi: 10.1093/gji/ggaa004

Hay, C., Creveling, J.R., **Hagen, C.J.**, Maloof, A.C., and Huybers, P., 2019. A Library of Early Cambrian Chemostratigraphic Correlations from a Reproducible Algorithm, Geology 47, 457-460. doi: 10.1130/G46019.1

Hagen, C.J., E.M. Roberts, C. Sullivan, J. Liu, Y. Wang, P.O. Agyemang, and X. Xu, 2018. Taphonomy, Geological age and paleobiogeography of *Lotosaurus Adentus* (Archosauria: Poposauroidea) from the MiddleUpper Triassic Badong Formation, Hunan, China, PALAIOS 33, 3. doi: 10.2110/palo.2017.084

McNichols, A.T., Y. Teich, J.M. Cannon, *et al.* (including **C.J. Hagen**), 2016. SHIELD: Neutral Gas Kinematics and Dynamics, Astrophysical Journal 832, 89. doi: 10.3847/0004-637x/832/1/89

Teich, Y., A.T. McNichols, J.M. Cannon, *et al.* (including **C.J. Hagen**), 2016. SHIELD: Comparing gas and star formation in low-mass galaxies, Astrophysical Journal 832, 85. doi: 10.3847/0004-637x/832/1/85

In Preparation:
Hagen, C.J., Creveling, J.R., Moore, J.L., Maloof, A.C, Porter, S.M., and Huybers, P. Revisiting the early Cambrian South China carbon isotope stratigraphy. In preparation for GSA Bulletin.

Hagen, C.J., Cui, H., and Mix, A. A sulfate capacitor accommodates the Ediacaran Shuram anomaly. In preparation for Precambrian Research.

Jay, K.R., Hacker, S.D., **Hagen, C.J.**, Stepanek, J., Ruggiero, P., and Moore, L.J. Quantifying carbon sequestration in a U.S. Central Atlantic Coast dune ecosystem: the relative importance of sand deposition and dune grasses. In preparation for Global Change Biology.

Hagen, C.J., Maloof, A.C., Webster, M., Creveling, J.R., Huybers, P. On the feasibility of global carbon isotope correlation. In preparation for EPSL.

Hagen, C.J., Manzuk, R., Howes, B., Zhao, P., Ahm, A.-S., Higgins, J.A., and Maloof, A.C. Deconvolving the carbon isotope record. In preparation for Geology.

Presentations

Invited Talks:
Creveling, J.R., **Hagen, C.J.**, Herz, S.C., Jones, R.K., Martin, A.C., Schwarz, M.A., Moore, J.L., Maloof, A.C., Porter, S.M., and Huybers, P. 2022. Proterozoic-Phanerozoic Eon transition $\delta^{13}C_{carb}$ composites constructed with a reproducible dynamic programming algorithm: GSA Annual Meeting, 2022, Pardee Keynote Symposia.

Maloof, A.C., Manzuk, R., Geyman, E.C., Mehra, A., Kaandorp, J.A., Webster, M., Edmonsond, S., Howes, B., and **Hagen, C.J.** 2022. From modern analogs to three dimensions: lessons learned for interpreting the stratigraphic record of the Proterozoic-Phanerozoic transition: GSA Annual Meeting, 2022, Pardee Keynote Symposia.

Hagen, C.J. 2021. Revisiting the Terreneuvian fossil first appearance chronology with dynamic time warping and Bayesian age modelling: CU Geobiology Supergroup Seminar, University of Colorado, Boulder.

Hagen, C.J. and Creveling, J.R. 2021. A numerically derived Ediacaran global composite $\delta^{13}C_{carb}$-B-MCMC age model: Precambrian Geology Virtual Seminars, University of California, Riverside.

Creveling, J.R. and **Hagen, C.J.***. 2020. Combining a $\delta^{13}C_{carb}$ correlation algorithm and a refined radiometric chronology to advance Precambrian (Ediacaran) basin analysis: GSA Annual Meeting, 2020. *Hagen gave presentation in Creveling's absence.

Hagen, C.J. 2018. Applying Dynamic Time Warping to the early Cambrian chemostratigraphic record: Macalester College.

Conference Abstracts:

Hibner, B., Eckland, A., Cantine, M., **Hagen, C.J.**, Overeem, I., and Trower, E. 2023. Using radiocarbon dated sediment cores to understand the formation process of a Holocene carbonate island in the Turks and Caicos Islands: American Geophysical Union, AGU Annual Meeting, 2023.

Nadeau, M.D., Murphy, J.G., **Hagen, C.J.**, Wu, Z., Akhtar, A.A., Ahm, A.-S.C., Stolper, D.A., Maloof, A.C., and Higgins, J.A. 2023. Secular change, early diagenesis, or both? A case study from Cretaceous Ocean Anoxic Event 1a: Goldschmidt, Goldschmidt Annual Conference, 2023.

Hagen, C.J., Maloof, A.C., Geyman, E.C., Edmonsond, S., Manzuk, R., Howes, B., Higgins, J.A., and Zhao, P. 2022. Machine learning and computational image analysis leveraged to probe relationships between carbonate isotopic composition, diagenetic alteration, and sedimentary facies isotopic variability: American Geophysical Union, AGU Annual Meeting, 2022.

Hagen, C.J., Maloof, A.C., Geyman, E.C., Creveling, J.R., Huybers, P., Higgins, J.A., and Zhao, P. 2022. Testing the influence of sedimentary facies and diagenetic alteration on global carbon isotope correlation: a case study from the early Cambrian Period: Geological Society of America, GSA Annual Meeting, 2022.

Jay, K.J., **Hagen, C.J.**, Stepanek, J., Ruggiero, P., and Hacker, S.D. 2021. Quantifying carbon storage ecosystem services in US Atlantic coast dunes: Ecological Society of America, ESA Annual Meeting, 2021.

Creveling, J.R. and **Hagen, C.J.**. 2020. Combining a $\delta^{13}C_{carb}$ correlation algorithm and a refined radiometric chronology to advance Precambrian (Ediacaran) basin analysis: Geological Society of America, GSA Annual Meeting, 2020.

Reilly, B.T., **Hagen, C.J.**, Stoner, J.S., and Creveling, J.R. 2019. Dynamic Time Warping of Paleomagnetic Secular Variation (PSV) Data: Building Libraries of Objective and Reproducible Correlations for Northern North Atlantic Sedimentary Records: American Geophysical Union, AGU Annual Meeting, GC13A-04.

Hagen, C.J., Creveling, J.R., Hay, C.C., Maloof, A.C., and Huybers, P. 2019. Assessing uncertainty in early Cambrian biostratigraphic first apperance data from dynamic programming-determined $\delta^{13}C_{carb}$ correlations: Geological Society of America, GSA Abstracts with Programs Vol. 51, No. 5. doi: 10.1130/abs/2019AM-337794

Creveling, J.R., Hay, C.C., and **Hagen, C.J.** 2019. Chemostratigraphic correlation from a reproducible dynamic programming algorithm: Geological Society of America, GSA Abstracts with Programs Vol. 51, No. 5. doi: 10.1130/abs/2019AM-337753

Hagen, C.J., and Creveling, J.R. 2019. Forward modeling $\delta^{13}C_{carb}$ chemostratigraphies across carbonate platforms: Geological Society of America, GSA Abstracts with Programs Vol. 51, No. 5. doi: 10.1130/abs/2019AM-335339

Reynolds, P.J., **Hagen, C.J.**, Hay, C.C., and Creveling, J.R. 2019. Incorporating radiometric constraints in dynamic programming algorithms to align chemostratigraphic time series: Geological Society of America, GSA Abstracts with Programs Vol. 51, No. 5. doi: 10.1130/abs/2019AM-335349

Larson, A., Miller, B.P., Saar, S.H., Gallo, E., Wright, J., and **Hagen, C.J.** 2019. Stellar Activity of Main Sequence Stars: American Astronomical Society Meeting 234, 322.03, Bulletin of the American Astronomical Society, Vol. 51, No. 4.

Hagen, C.J., Creveling, J.R., Hay, C.C., Maloof, A.C., and Huybers, P. 2018. Revised first and last appearances of early Cambrian animals from dynamic programming-determined $\delta^{13}C_{carb}$ correlations: Geological Society of America, GSA Abstracts with Programs Vol. 50, No. 6. doi: 10.1130/abs/2018AM-324058

Creveling, J.R., Hay, C.C., **Hagen, C.J.**, Maloof, A.C., and Huybers, P. 2018. A library of early Cambrian chemostratigraphic correlations from a reproducible algorithm: Geological Society of America, GSA Abstracts with Programs Vol. 50, No. 6. doi: 10.1130/abs/2018AM-320789

Hagen, C.J., Creveling, J.R., and Mix, A.C. 2018. Sulfate evaporite dissolution, AOM, and the Neoproterozoic carbon cycle: Geological Society of America, GSA Abstracts with Programs Vol. 50, No. 6. doi: 10.1130/abs/2018AM-324043

Miller, B.P., **Hagen, C.J.**, Gallo, E., and Wright, J.T. 2018. Swift X-ray monitoring of stellar coronal variability: American Astronomical Society, AAS Meeting 231.

Miller, B.P., Gallo, E., Wright, J.T. and **Hagen, C.J.**. 2017. Swift X-ray monitoring of stellar coronal variability: American Astronomical Society, AAS HEAD Meeting 16.

Sullivan, C., Liu, J., **Hagen, C.J.**, and Roberts, E.M. 2017. Data From the Chinese Triassic on the Diversification of Poposauroid Archosaurs: Canadian Society of Vertebrate Paleontology Meeting 5, Vertebrate Anatomy Morphology Palaeontology 4:157.

Miller, B.P., **Hagen, C.J.**, Gallo, E., and Wright, J.T. 2017. Swift X-ray monitoring of M dwarf coronal variability: American Astronomical Society, AAS Meeting 229.

Hagen, C.J., Roberts, E.M., Liu, J., Sullivan, C., Wang, Y., Xu, X. 2015. New perspectives on the taphonomy and geological context of *Lotosaurus adentus* (Archosauria: Poposauroidea): Re-examination of the type locality from the Middle Triassic Badong Formation, Hunan, China: Geologic Society of America, GSA Abstracts with Programs Vol. 47, No. 7.

Hagen, C.J., Roberts, E.M., Liu, J., Sullivan, C., Wang, Y., Xu, X. 2015. Taphonomy, Age, and Geologic Context of the Original Lotosaurus adentus (Archosauria: Poposauroidea) Bonebed in the Middle Triassic Badong Formation, Hunan, China: Society of Vertebrate Paleontology, SVP 75th Annual Meeting, 278:B160.

Hagen, C.J., Miller, B.P., Gallo, E., Wright, J.T., Isaacson, H.T., and Henry, G.W. 2015. Chromospheric and coronal variation across stellar activity cycles: American Astronomical Society, AAS Meeting 225, 138.20.

Hagen, C.J., Cannon, J.M., Cave, I., McQuinn, K.B., Dolphin, A.B., Skillman, E.D., Adams, E.A., Elson, E.C., Giovanelli, R., Haynes, M.P., Ott, J., Saintonge, A., and Salzer, J.J. 2014. Structural Parameters of the SHIELD Galaxies From Hubble Space Telescope Images: American Astronomical Society, AAS Meeting 223, 355.16.

Funding

Primary Investigator

2021. Agouron Geobiology Postdoctoral Fellowship	$142,000
2021. NSF OCE Postdoctoral Fellowship (*declined*)	$160,000
2018. CEOAS Student Travel Grant	$500
2018. CEOAS Petrography Research Grant	$700
2017. NSF Graduate Research Fellowship	$138,000
2017. GSA Graduate Student Research Grant	$1,325
2016. ARCS Foundation Scholar Fellowship	$18,000
2015. Beltmann Summer Research Fellowship	$2,750
2015. Macalester Student Travel Grant	$350
2014. Macalester Student Travel Grant	$350
2014. NASA Minnesota Space Grant	$2,500
2014. Paul Anderson Research Grant	$4,400
Total	$470,875

Major Contributor

2020-2022. Revisiting the Cambrian Series 1 animal origination chronology
NSF Sedimentary Geology and Paleontology
Primary investigator: Jessica R. Creveling $370,110

Professional Affiliations

Member: American Geophysical Union	2022 - Present
Member: The Oceanography Society	2018 - Present
Member: Geological Society of America	2015 - Present
Student Member: Society of Vertebrate Paleontology	2015 - 2016

Teaching Experience & Training

Graduate Certificate in College and University Teaching June 2020
An 18-credit graduate certificate program in college and university teaching at Oregon State University. The program is designed to provide advanced course work and experiential learning opportunities to students who plan to pursue careers in teaching in higher education.

Center for Teaching and Learning TTT Certificate June 2019
A certificate awarded after completing eight teaching workshops that introduce a wide range of pedagogical techniques and educational technology at Oregon State University. These workshops are intended to support and celebrate the advancement of teaching excellence.

Graduate Teaching Assistant, Oregon State University Sept. 2016 - June 2017
Worked as a Teaching Assistant for a 200-level Earth history course, a 300-level stratigraphy and sedimentology course, and a 200-level physical geology course. Taught lab sections, prepared laboratory materials, held office hours, and graded course materials.

Teaching Assistant, Macalester College Sept. 2013 - May 2016
Worked as a Teaching Assistant for an introductory level historical geology course, an upper-level paleobiology course, an introductory level geology/biology course, and an introductory level computer science course. Assisted students during laboratory sessions, held office hours, helped create rubrics and prepare course materials, and graded course materials.

Mentoring

Undergraduate students
McKayla Meier (2017), Thomas Schmitt (2019), Paige Reynolds (2019), Daniel Gilles (2020), Susannah Herz (2022), Riley Jones (2022), Melanie Schwarz (2022), Aaron Martin (2022)

Graduate students
Bri Hibner (2022 - present)

Relevant Skills

Analytical Instruments
LA-ICP-MS, SEM/SEM-CL/SEM-EDS, clay sample preparation, XRD/XRF, C/O isotope analysis sample preparation, C/O mass spectrometry

Computer
MATLAB, R (and Shiny), Python (and Jupyter), IDL, Adobe CS, STELLA Modeling Software, Mathematica, HTML, LaTeX, Microsoft Office Suite, SQL, GIS

Field work
Great Salt Lake, UT (1 week), Paradox Basin, UT (2 weeks), Death Valley, CA (4 weeks), Outer Banks, NC (3 weeks)

Certifications & Professional Development
CPR & First Aid (2018), Wilderness First Aid (2019), Gatekeeper Suicide Prevention (2019), Mental Health First Aid: Higher education (2019), Social Justice Equality and Inclusion TIER I Training (2020), Mountaineering I (2021), AIARE Level I (2022)

Service to Profession

Journal referee
Earth and Planetary Science Letters

GSA Annual Meeting Session Chair
T67. Trends and Patterns in Neoproterozoic-Cambrian Biodiversity and Evolutionary Originations — Oct. 2020
T81. Hello (Ancient) World!: Exploring the Neoproterozoic to Cambrian Interval by Quantitatively Probing the Rock Record — Oct. 2019

Service to Institution

CGE Hardship Committee: Member	Sept. 2019 - June 2020
CGE Mental Health Caucus: Co-founder and Leader	May 2019 - June 2020
CEOAS Academic Mentoring Program: Mentor	Nov. 2016 - June 2020
CEOASGSA: Co-founder and Vice President	June 2019 - June 2020
CEOAS Graduate Student Committee: President	Sept. 2018 - June 2019
CEOAS Graduate Student Committee: Outreach Chair	Sept. 2016 - Sept. 2018
CEOAS Quaternary Tea: Organizer & web administrator	June 2017 - June 2018
CEOAS Geology Faculty Committee: Student rep.	June 2017 - June 2018
CEOAS External Grants Committee: Student rep.	Sept. 2016 - June 2017