

# American Journal of Science

Established in 1818 by Benjamin Silliman  
AN INTERNATIONAL EARTH SCIENCE JOURNAL

## EDITORS

MARK T. BRANDON  
NEW HAVEN, CONNECTICUT

DANNY M. RYE  
NEW HAVEN, CONNECTICUT

C. PAGE CHAMBERLAIN  
STANFORD, CALIFORNIA

## ASSOCIATE EDITORS

TO SERVE UNTIL JANUARY 1, 2021

PHILIP D. GINGERICH  
ANN ARBOR, MICHIGAN  
KATE MAHER  
STANFORD, CALIFORNIA  
NOAH PLANAVSKY  
NEW HAVEN, CONNECTICUT  
ZACHARY SHARP  
ALBUQUERQUE, NEW MEXICO

ANDREAS LUTTGE  
BREMEN, GERMANY  
ANDREAS MULCH  
FRANKFURT, GERMANY  
CHRISTOPHER POULSEN  
ANN ARBOR, MICHIGAN  
JOHN W. VALLEY  
MADISON, WISCONSIN

MICHAEL VELBEL  
EAST LANSING, MICHIGAN

TO SERVE UNTIL JANUARY 1, 2022

RUTH E. BLAKE  
NEW HAVEN, CONNECTICUT  
DARREL S. COWAN  
SEATTLE, WASHINGTON  
MARK GHIORSO  
SEATTLE, WASHINGTON  
PETER REINERS  
TUCSON, ARIZONA  
SEAN WILLETT  
ZURICH, SWITZERLAND

DONALD E. CANFIELD  
ODENSE, DENMARK  
DAVID A.D. EVANS  
NEW HAVEN, CONNECTICUT  
FRANK J. PAZZAGLIA  
BETHLEHEM, PENNSYLVANIA  
FRIEDHELM VON BLANCKENBURG  
POTSDAM, GERMANY  
MATTHEW WINNICK  
AMHERST, MASSACHUSETTS

TO SERVE UNTIL JANUARY 1, 2023

ETHAN F. BAXTER  
BOSTON, MASSACHUSETTS  
GRANT GARVEN  
MEDFORD, MASSACHUSETTS  
MICHAEL HREN  
STORRS, CONNECTICUT  
JEFFREY J. PARK  
NEW HAVEN, CONNECTICUT

BRAD SAGEMAN  
EVANSTON, ILLINOIS

BARB DUTROW  
BATON ROUGE, LOUISIANA  
JOHN I. GARVER  
SCHENECTADY, NEW YORK  
DANIEL IBARRA  
BERKELEY, CALIFORNIA  
JONATHAN PAYNE  
STANFORD, CALIFORNIA

TO SERVE UNTIL JANUARY 1, 2024

JAY J. AGUE  
NEW HAVEN, CONNECTICUT  
WILLIAM H. CASEY  
DAVIS, CALIFORNIA  
NADJA DRABON  
CAMBRIDGE, MASSACHUSETTS  
CIN-TY LEE  
HOUSTON, TEXAS  
RICHARD J. WALKER  
COLLEGE PARK, MARYLAND  
SIMON WILDE  
PERTH, AUSTRALIA

EDWARD W. BOLTON  
NEW HAVEN, CONNECTICUT  
PETER CAWOOD  
MELBOURNE, AUSTRALIA  
KIMBERLY LAU  
UNIVERSITY PARK, PENNSYLVANIA  
TIMOTHY W. LYONS  
RIVERSIDE, CALIFORNIA  
JOSHUA WEST  
LOS ANGELES, CALIFORNIA  
ROBERT WINTSCH  
MIDDLETON, CONNECTICUT