



We Are SSA.
One Community.
One Mission.

2020 Highlights



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Right: While much fieldwork was delayed, postponed or canceled due to COVID-19, Rebecca Kramer of USGS Cascades Volcano Observatory was able to follow new safety and fieldwork protocols to work on the installation of a GPS mast.





Message from the President

Holding fast to SSA's tradition of scientific excellence



Advancing seismology and earthquake science worldwide.

This is the longtime mission of SSA. It's a mission that our member-driven community moved forward in 2020—in spite of the global pandemic. I couldn't be more inspired by all that we have accomplished together.

When office doors and in-person meetings closed, our members pivoted with us to keep communicating science online:

- » A new editorial team formed to bring us The Seismic Record, a fresh scientific journal that will answer our community's call for rapid publication and open access.
- » Members took virtual seats in SSA's new series of technical sessions on tomography, sharing and providing feedback on research that just couldn't wait.
- » Others filled the SSA in-box with hundreds of abstracts for our reimagined and expanded virtual 2021 Annual Meeting.
- » Dozens more volunteered to share their expertise with the next generation of seismologists in the new SSA Connects mentoring program—sharing their personal time that has certainly never been in shorter supply.
- » Most importantly, through contributions to our new Diversity Equity and Inclusion Taskforce and participation in our Ally Skills Training courses, our members supported our efforts to make sure that everyone is welcomed and supported in this community.

Throughout this tumultuous year, together we managed to hold fast to SSA's tradition of scientific excellence. There is no more inspiring example of this excellence than the 2020 recipients of SSA's highest honors—the Charles F. Richter Early Career Award, Frank Press Public Service Award, Distinguished Service to SSA Award and Harry Fielding Reid Medal.

We salute our outstanding and hard-working Executive Director Nan Broadbent and the dedicated SSA professional staff. They kept the Society functioning on time and on budget, working remotely through challenging times.

Finally, thank you for staying connected to SSA and the cause that unites us. Your ideas, time, talents, papers, presentations and financial gifts are the reason we keep moving ahead.

It's been an honor to serve as your president.

W_R. al=

Bill Walter *President*



Awards and Honors

2020 Awards



Gail M. Atkinson
Professor Emeritus,
University of Western Ontario

HARRY FIELDING REID MEDAL

This award honors outstanding contributions in seismology or earthquake engineering.

Gail M. Atkinson is honored for her seminal contributions in engineering seismology, especially regarding ground motion characterization. She is one of the pioneers of the stochastic ground motion simulation method, used to predict strong ground motions from earthquakes in regions where seismic data are limited.

Her work to develop ground-motion prediction equations (GMPEs) has made her a leading authority on seismic hazard relevant to engineering in central and eastern North America. These GMPEs underlie seismic hazard probability maps in these regions that inform new construction and retrofitting building codes.

In recent years, Atkinson has also become a leader in the study of induced seismicity, especially in investigating the relationship between hydraulic fracturing and seismicity in western Canada. Her painstaking work, which drew together disparate groups from academia, industry and government to collaborate on the controversial issue, has made major critical contributions to this relatively new field within seismology, her colleagues noted.

Atkinson has published more than 250 papers in refereed journals, with at least 10 publications cited more than 400 times, and more than 18,000 citations as of this writing—making her one of the most cited researchers in engineering seismology.

Along with her research contributions, Atkinson has served in several high-profile leadership positions within the geoscience community, including as the first woman president of both the Canadian Geophysical Union in 2011 and the Seismological Society of America in 2001.

She has served as lead advisor for 19 master's students and 16 Ph.D. students.

"Professor Atkinson is an internationally recognized authority on earthquake strong motion and the hazard earthquakes pose to society," said William Ellsworth, a Stanford University professor of geophysics and former SSA president, who nominated Atkinson for the award. "She has made transformative contributions to engineering seismology in essentially every subdiscipline of the field."



Alice-Agnes Gabriel
Assistant Professor, Institute
of Geophysics at LudwigMaximilians-Universität
München

CHARLES F. RICHTER EARLY CAREER AWARD

This award honors outstanding contributions to the goals of the Society by a member early in her or his career.

Alice-Agnes Gabriel is honored for her innovative research in earthquake rupture dynamics and tsunami genesis, among other topics, using physics-based models and high-performance computing.

Gabriel is best known for her prolific research in earthquake physics, using high-performance computing to simulate large earthquakes. Her computational simulations are notable for their inclusion of complex rock responses and 3D fault geometry provided by real-world geophysical and geological investigations. In particular, her studies have focused on the influence of off-fault rock deformation and fault complexities such as roughness and segmentation on rupture properties.

Her simulations of the 2004 Sumatra earthquake and tsunami, the 2016 Kaikoura and the 2018 Sulawesi earthquakes, addressing the growth and seismic

radiation of earthquakes under complex fault conditions, "have broad implications for seismic and tsunami hazard assessments," said Martin Mai of the King Abdullah University of Science and Technology, who nominated Gabriel for the award.

Gabriel is also known for her work in developing and expanding SeisSol, the most advanced open-source software package for earthquake source dynamics and seismic wave propagation. Gabriel and her students have collaborated with applied mathematicians and computer scientists to use SeisSol in computations that zero in on the small-scale processes taking place during rupture of large earthquakes.

"By making SeisSol accessible to the whole community," Mai said, "Alice is enabling a new generation of computational earthquake dynamics studies seamlessly integrated into multidisciplinary studies in seismology and tectonics."

The Joyner Fund provides the financial support for the Richter honorarium.



Christa von Hillebrandt-Andrade

Manager, U.S. National Weather Service Caribbean Tsunami Program

FRANK PRESS PUBLIC SERVICE AWARD

This award honors outstanding contributions to the advancement of public safety or public information relating to seismology.

Christa von Hillebrandt-Andrade is honored for her work in developing real-time data acquisition systems, rapid response capabilities and pioneering public outreach and education efforts. Her strong push for consistent funding of the Puerto Rico and Virgin Islands seismic networks, as well her work to identify and minimize seismic station coverage gaps through regional partnerships, are among the accomplishments cited by her colleagues in nominating her for the award.

As director of the Puerto Rico Seismic Network, von Hillebrandt-Andrade worked with José Martínez Cruzado, director of the Puerto Rico Strong Motion Program, in 2004 to craft an initiative that would assign part of Puerto Rico's annual budget to earthquake and tsunami monitoring, research and public outreach. She was a key player in the creation of the U.S. National Weather Service's Caribbean Tsunami Warning Program in 2010. In 2015, von Hillebrandt-Andrade developed the initial protocols for the International Tsunami Ready Program, a UNESCO-International Oceanographic Commission effort to recognize countries and coastal communities for consistent tsunami preparedness and mitigation.

In their nominations for the award, von Hillebrandt-Andrade's colleagues noted her unflagging dedication and success in public outreach, citing in particular her ability to interpret complex science and to foster community-centered earthquake and tsunami education.

"Christa's successes have been powered by her enormous energy, enthusiasm, intelligence and dedication to science and public safety and have been aided by a good sense of humor and an unfailingly upbeat attitude," said Jay Pulliam, the W.M. Keck Foundation Professor of Geophysics at Baylor University in Texas.



Zhigang Peng Professor, Georgia Institute of Technology

DISTINGUISHED SERVICE TO SSA AWARD

This award honors outstanding contributions to the work of SSA.

Zhigang Peng is honored for his six years of service to SSA as Editor-in-Chief of *Seismological Research Letters* (*SRL*). In their nomination of Peng for the award, past SSA journal editors Andrew Michael and John Ebel cited Peng's innovative spirit and energetic work to expand the journal's reach and prestige from 2013 to 2019.

"Under his leadership *SRL* improved in every way imaginable," Michael and Ebel said. "Zhigang's vision, energy and enthusiasm for the journal has taken *SRL* to a new level that we hadn't pictured, and we are excited when each issue becomes available."

Two years after Peng began his tenure as editor-inchief, the average time to obtain reviews for papers dropped from 40 days to 21 days, and the time to a first decision going to an author decreased from 61 to 42 days. The faster review process led in part to the growth of the journal and its positive impact on the Society's finances.

Peng also introduced three new columns to the journal: Data Mine, Communicating Science and Emerging Topics, each of which expanded the kinds of content available in *SRL* and efficiently shared new data and techniques throughout the seismological community.

He significantly increased the number of focus sections as well, overseeing the production of 18 sections across a variety of topics in six years. The Geophysical Networks and Related Developments in Latin America focus section, in particular, was instrumental in cementing a new relationship between SSA and the Latin America and Caribbean Seismological Commission (LACSC) that has continued after the 2018 joint SSA-LACSC Annual Meeting in Miami.



2020/21 Honor



Julian J. Bommer Senior Research Investigator, Imperial College London

WILLIAM B. JOYNER MEMORIAL LECTURE

Julian J. Bommer has worked for more than 30 years at the interface between seismology and earthquake engineering as both a researcher and practitioner.

His Joyner lecture, delivered at the 2021 SSA Annual Meeting, focuses on the impact of small-magnitude earthquakes, of both tectonic and anthropogenic origin, on the built environment and how the risk associated with such events can be quantified and mitigated.

Awarded by the Earthquake Engineering Research Institute and SSA, the lectureship honors William B. Joyner's career at the U.S. Geological Survey and his commitment to continuing communication and education at the interface between research findings of earthquake science and the practical realities of earthquake engineering.



We Are Knowledge Sharers

Meetings matter. Our mission can only move forward when our community collaborates, when we share our findings with our colleagues and receive critically important feedback. We need each other—to build bridges (literal and figurative ones), identify errors, inspire and encourage, and take our work in new directions.

As our world changed dramatically in 2020, SSA held fast to the belief that research cannot wait. Data cannot wait to be shared and analyzed. Members must stay connected and continue our conversations. This is the way we advance earthquake science.

When the pandemic forced us to cancel our 2020 Annual Meeting, even after work done by many to make it a success, immediately ambitious plans began for our next gathering. 2021 Annual Meeting Co-Chairs Rich Briggs, Diego Melgar and Jenny Nakai joined SSA's efforts to help members connect once again for networking and information sharing via an expanded, five-day online forum.

And when the pandemic forced postponement of our much-anticipated in-person meeting on seismic tomography, Co-Chairs Clifford Thurber of the University of Wisconsin, Madison and Andreas Fichtner of ETH Zürich led a new effort to keep the information sharing going: a series of five virtual technical sessions leading up to an in-person gathering (rescheduled for October 2022 in Toronto, Canada).

The "courageous, forward-looking, wild ideas" that the chairs had sought to share with our community were not set aside. Rather, they evolved. SSA kicked off its first virtual poster presentations and discussion groups in the fall, and members can look forward to a continuing conversation.

It was especially important to move forward and offer a "chance for early-career people to get to know the really important people in their field," said Fichtner. And, added Thurber, the chance for SSA's newest members "to get to know each other."







Brandon Schmandt

THANK YOU

We are grateful to all who gave their time and talents to the planning of the 2020 Annual Meeting, especially Technical Program Committee Co-Chairs Rick Aster (Colorado State University) and Brandon Schmandt (University of New Mexico), who led the creation of the program, as well as the many volunteers who submitted session proposals and planned sessions as conveners.

We Are Advocates and Allies

As a Society, we want to create and maintain a more diverse, inclusive and equitable scientific community. It's the reason SSA formed a Diversity, Equity and Inclusion Task Force in 2020.

Chaired by Aaron Velasco, professor of geological sciences and computational sciences at the University of Texas at El Paso, the 13-member group is working to address diversity and inclusion across all SSA activities. Together, with ideas and input from the entire SSA community, the group will make its recommendations to the SSA Board of Directors in Spring 2021.

The goal of a more diverse and inclusive scientific community also inspired SSA to join dozens of scientific organizations across the nation in an impassioned plea to the White House in October. Together we wrote a letter asking the Administration to rescind an executive order that called for the elimination of federal employee training programs related to diversity, equity and inclusion.

"While there has been progress, the participation of women and racial and ethnic minorities in the U.S. scientific and technical workforce does not reflect the diversity of our population," we wrote. "Their underrepresentation negatively impacts the U.S. R&D enterprise by depriving it of diverse perspectives that are shown to boost innovation and productivity."

SSA's ethics policy already outlined our commitment to maintaining "a supportive, inclusive and respectful environment, free from any discrimination, harassment or bullying," but 2020 called the Society to deepen that commitment.

Last summer, thanks to support from the General Fund, SSA offered free Ally Skills Training courses to our members so that they have the tools they need to support their colleagues and stop these unacceptable behaviors that threaten scientific progress.

DIVERSITY, EQUITY AND INCLUSION TASK FORCE (AUGUST 2020)

- » Aaron Velasco (Chair)
- » Kasey Aderhold (IRIS liaison)
- » Richard Alfaro-Diaz
- » Wesley Brown
- » Mike Brudzinski
- » Fabia Terra
- » Margaret Fraiser (AGU liaison)
- » Monique Holt
- » Jim Mori
- » Gabriela Noriega (SCEC liaison)
- » Kate Scharer
- » Dennise Templeton
- » Sherilyn William-Stroud

66 As a Society, we seek to do all we can to make science accessible to all."

-BILL WALTER. SSA President



Standing Up for Seismology

SSA works to ensure that U.S. policymakers understand the importance of our science and its impact on the safety and security of our nation.

In 2020 we began revising our policy statement on workforce development in an effort to make sure there is a sufficient number of geoscientists to meet the projected national and global future STEM needs.

We worked collaboratively with our coalition and caucus partners to educate and inform Members of Congress and relevant House and Senate Appropriations Committee Staff on the importance of federal earthquake programs within government agencies.

Through targeted virtual Hill meetings and joint letters, SSA combined outreach efforts with other geoscience organizations to successfully advocate for robust budgets in the consolidated appropriations omnibus for the U.S. Geological Survey and National Foundation of Science.

We cheered when the National Landslide Preparedness Act was signed into law as we said goodbye to 2020. It was one more step forward in a joint effort with our colleagues near and far to advance science and protect public safety.



de Physique du Globe de Paris, fault field trip in Greece.



Mentor Lisa Schleicher, USGS, standing over one of the many ruptures from the 5 July 2019 magnitude 7.1 earthquake in

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We Are Mentors

Who couldn't use a guide on their professional journey? Someone who has traveled the same roads and can share what they've learned along the way.

We all get turned around. Sometimes we just need a little direction to reach our next destination or a redirect out of a dead end. At SSA we have always been fortunate to have veterans who take the time to stop, pull over and assist the next generation of seismologists.

Over the years, the SSA Annual Meeting Mentoring Breakfast has been a source of career advice for our members, but it wasn't enough. We know because you told us you needed more mentoring. Thanks to dozens of volunteers who stepped forward to share their insight, SSA delivered this support from a distance throughout 2020.

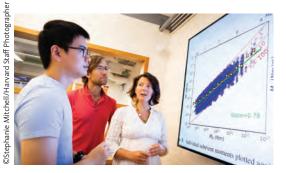
SSA CONNECTS

Launched in June, the new SSA Connects program offers our student and early-career members the opportunity to meet with advisors online. Each bimonthly mentoring session focuses on a topic that our members have requested, from how to write a better abstract to how to advocate for seismology in Washington. Special career training webinars complemented the mentoring sessions, helping to boost those much needed skills when searching for a job.

Supported by the Kanamori Fund, the program is critically important to our mission. Wherever our members live and whatever travel restrictions they face, SSA Connects offers our community the opportunity to meet with a veteran, ask anything and move their careers—and earthquake science—ahead.

66 My SSA mentor Diane Doser encouraged me to volunteer for SSA Connects. It was so rewarding to pass on what I've learned as a mentee. Mentorship programs advance our collaboration in the field of seismology, opening up new and interesting opportunities!"

—Lisa Schleicher



Above: Mentor Marine Denolle of Harvard University with her team created numerical models to predict an earthquake's final magnitude 10 to 15 seconds faster than today's best algorithms. Right: Mathew Siegfried, Sarah Neuhaus, Marino Protti (Mentor), Cooper Elsworth, Jules Hanna and Aurora Roth retrieving the instruments of a seismic network installed to monitor events associated with the motion of the Williams Ice Stream in Antarctica.



2020 MENTORS

- » Natalie Balfour (GNS Science)
- » Fabian Bonilla (Universite Paris Est)
- » Mike Brudzinski (Miami University)
- » Carisa Bunge (Legislative Assistant to Congressman Joe Neguse, U.S. House of Representatives)
- » Vernon Cormier (University of Connecticut)
- » Lori Dengler (Humboldt State University)
- » Marine Denolle (Harvard)
- » Diane Doser (University of Texas, El Paso)
- » Cindy Ebinger (Tulane University)
- » Karen Fischer (Brown University)
- » Paul Friberg (Instrumental Software Technologies, Inc.)
- » Alice-Agnes Gabriel (Ludwig Maximilians University of Munich)
- » Ruth Harris (U.S. Geological Survey)
- » Barry Hirshorn (Pacific Tsunami Warning Center, NOAA)
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- » Jenny Nakai (University of New Mexico)
- » Marino Protti (Observatorio Vulcanológico y Sismológico de Costa Ricao)
- » Valerie J. Sahakian (University of Oregon)
- » Lisa Schleicher (U.S. Geological Survey)
- » David Shelly (U.S. Geological Survey)
- » Anne Trehu (Oregon State University)
- » Victor Tsai (Brown University)
- » John Vidale (University of Southern California)
- » Beau Whitney (University of Western Australia)

→ Looking for career advice or ready to share it? Get connected with our mentoring program at:

seismosoc.org/jobs/ssa-connect

Seismological Society of America | 2020 Highlights Seismological Society of America | 2020 Highlights

We Are Good Listeners

SSA exists to support you in your daily work.
Tell us what you need, and we'll make it happen.

In a comprehensive member survey, you supported the launch of a new kind of scientific journal. A journal that would offer openaccess and rapid publication to keep up with the latest events and most urgent topics in seismology. Throughout 2020 SSA worked to breathe life into that idea.

SSA assembled an outstanding editorial team—Editor-in-Chief Keith Koper, Deputy Editor-in-Chief Vera Schulte-Pelkum and Editor-at-Large Jeroen Ritsema—and *The Seismic Record (TSR)*, the Society's first fully open-access journal, was born.

Scheduled to launch in April 2021 and available exclusively online, *TSR* will provide rigorous and rapid peer-review of short form papers.

"My main goal," said Koper, professor and director of the University of Utah Seismograph Stations, "is to make *The Seismic Record* a home for all types of cutting-edge research in seismology and earthquake science."

→ Your feedback is welcome

The key to making SSA's third peer-reviewed journal as successful as *SRL* and *BSSA* is our community. Your articles, reviews and feedback are welcomed at: seismosoc.org/publications/the-seismic-record

MEET THE TSR TEAM

Editor-in-Chief

Keith Koper

Deputy Editor-in-Chief

Vera Schulte-Pelkum

Editor-at-Large Ieroen Ritsema

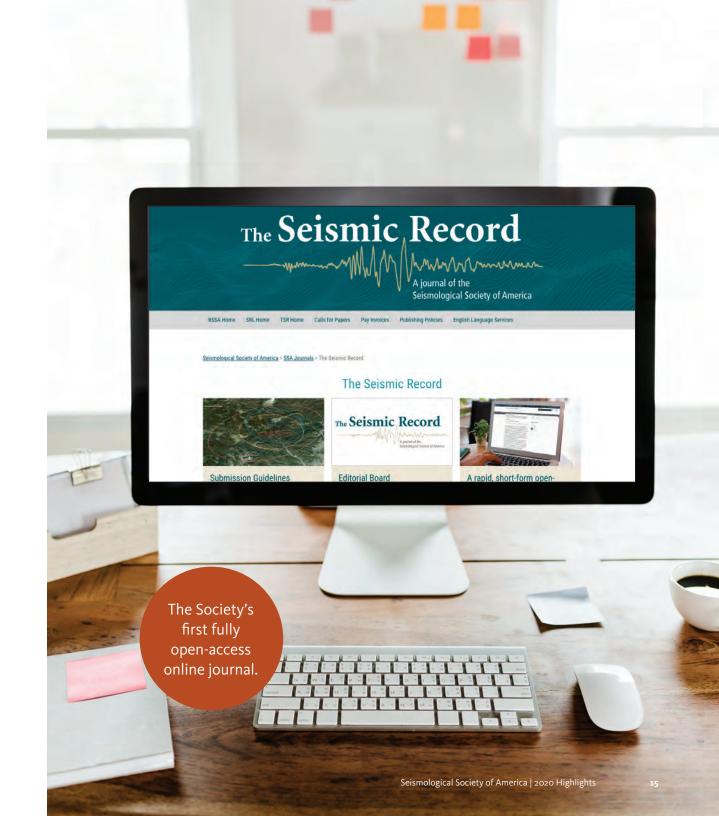
Associate Editors

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- » Pascal Audet (University of Ottawa)
- » Brendan Crowell (University of Washington)
- » Steven J. Gibbons (Norwegian Geotechnical Institute)
- » Lucia Gualtieri (Stanford University)
- » Jessica Irving (University of Bristol)
- » Hiroe Miyake (University of Tokyo)
- » Zachary Ross (California Institute of Technology)
- » Lingling Ye (Sun Yat-Sen University)



66 My main goal is to make *The Seismic Record* a home for all types of cutting-edge research in seismology and earthquake science."

-KEITH KOPER, Editor-in-Chief



Milestones

SSA celebrates 20+ years of service provided by the following BSSA Associate Editors (AEs).



Martin Chapman





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Cezar

Ivan Wong

We Are Fact Checkers

Truth matters. Professional Society-managed, peer-reviewed publications remain the standard for conveying trusted information to our members, the broader scientific community and the public.

SSA publications continued uninterrupted throughout the global pandemic thanks to the dedicated and voluntary work of the editors, the reviewers and the authors, as well as our publishing staff.

A rigorous review process has helped *The Bulletin of the Seismological Society of America (BSSA)* and *Seismological Research Letters (SRL)* remain the definitive source of information for seismic and earthquake science around the globe.

Together with dozens of volunteer assistant editors and reviewers, *BSSA* Editor-in-Chief Thomas L. Pratt and *SRL* Editor-in-Chief Allison Bent ensure that our readers receive accurate and insightful information on the latest events, technology and basic research that shapes our understanding of seismology.

The joy of being an AE is primarily attending the historical moments of new discoveries, especially by young researchers. It is really rewarding to see the significant improvements by the revisions based on the suggestions made by the AE."

 $-\mbox{HIROSHI}$ KAWASE, who joined the BSSA editorial board in 1996

More Information in 2020

In 2020, we launched our redesigned journals and offered more content and specialization than ever before.



BSSA

The latest and most advanced technical research in seismology and earthquake science.

2020 Special Issues

2019 Ridgecrest, California, Earthquake Sequence (published 1 August 2020; *BSSA* Volume 110, Number 4)

Observations, Mechanisms and Hazards of Induced Seismicity (published 1 October 2020; BSSA Volume 110, Number 5)

SRL

The only peer-reviewed forum for informal communication among seismologists, engineers and earthquake hazards-policy professionals.

2020 Focus Sections

EarthScope: Alaska and Canada (Guest Editors: Geoffrey Abers, Meghan Miller and Natalia Ruppert) (published November 2020; SRL Volume 91, Number 6)

Past and Present of Historical Earthquake Data and Research (Guest Editors: Paola Albini; Kenji Satake) (published 1 September 2020; SRL Volume 91, Number 5)

2019 Ridgecrest, California, Earthquake Sequence (Guest Editor: Taka'aki Taira) (published 1 July 2020; *SRL* Volume 91, Number 4)

Historical Seismograms (Guest Editors: Allison L. Bent, Diane I. Doser, Lorraine J. Hwang) (published 1 May 2020; *SRL* Volume 91, Number 3)

North American Regional Seismic Networks (Guest Editors: John E. Ebel, Elizabeth Vanacore and Mitchell Withers) (published 12 February 2020; SRL Volume 91, Number 2A)

SSA at a Glance in 2020

2,456
Members worldwide

75
Countries our





Additional days of science and networking planned for 2021 Annual Meeting



At Work profiles online highlighting our members' commitment to the SSA mission



Hrvoje Tkalčić

Amanda Lough





rah Imps

Funding Our Mission

Today SSA operates from a strong financial position and continues to weather the pandemic.

The cancellation of the 2020 Annual Meeting had only a minor impact on our financial health, as SSA subsidizes rather than generates profits from the gathering. Our reserves have benefitted from our conservative investment strategy.

The William B. Joyner Memorial Fund continues to make both the William B. Joyner Lecture Series and the Charles F. Richter Early Career Award possible. Our travel-related funds—The Geo-CVD Travel Fund and Student Travel Fund—remain ready to assist members when in-person conferences resume.

During 2020, your gifts to our General Fund helped SSA provide its members with much-needed virtual offerings, including workshops, trainings and a new series of technical sessions on seismic tomography. They also helped SSA expand the 2021 Annual Meeting into a five-day virtual experience and prepare to launch our new open-access journal.

In 2020 your gifts to the Kanamori Fund backed SSA Connects, a new program which provides student and early-career members with job-related advice from veteran seismologists. The fund continues to help SSA roll out new virtual trainings, including recent ones on how to speak up for colleagues and create more inclusive workplaces.

Thank you.

Your financial gifts help **SSA** continue making scientific progress. Thank you to all who gave generously in 2020.

Jonathan Ajo-Franklin Sinan Akciz Douglas Anderson Rasool Anooshehpoor David Applegate Walter Arabasz Ralph Archuleta Ramon Arrowsmith Marcelo Assumpcao Richard Aster Luciana Astiz Gail Atkinson **Brian Atwater** Muawia Barazangi **Noel Barstow** Nicholas Beeler Glenn Biasi Roger Bilham DelWayne Bohnenstiehl Oluwaseyi Bolarinwa Michael Boltz Julian Bommer Oliver Boyd

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José Vidal-Villegas Christa von Hillebrandt- Andrade Marianne Walck William Walter Dun Wang Joachim Wassermann
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Above: Following COVID-19 safety protocols, Colorado School of Mines geophysics students safely partnered with the Colorado Geological Survey (CGS) to install a broadband sensor on campus in October 2020.



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Front cover (left to right): USGS/Hawaiian Volcano Observatory team members; Joshua Robert Jones, Virginia Tech.

Back cover (left to right): Jennifer Andrews, Caltech; Wenyuan Fan, Florida State University; Tim Draelos, Sandia National Laboratories.