EPICENTERS

The Newsletter of the Department of Earth & Planetary Sciences

Judd A. and Marjorie Weinberg College of Arts and Sciences
Northwestern University | 2019-2020

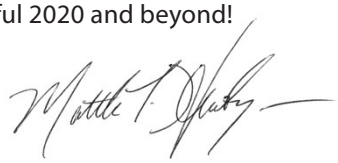
Message From the Chair

Greetings to all friends of Earth & Planetary Sciences,

I hope this first ever exclusively digital version of the EPS newsletter finds you safe and well. In mid-March, the increased threat and spread of the Coronavirus (COVID-19) forced the University to all but halt on-campus research and teaching activities, and it was announced that the Spring Quarter would be taught remotely. As you can imagine, this sent faculty, staff and students scrambling to adjust to a new, hopefully temporary, normal. Although our day-to-day work environment has shifted from the hallowed campus walls of the Technological Institute and Hogan Hall to Zoom events delivered from unfinished basements, already crowded bedrooms, and forts constructed in part from the work clothes we no longer need to wear, our mission has remained the same—to continue conducting high quality research and providing the best possible learning experience for students. Although many challenges have emerged, I am immensely proud of the compassion and resilience the EPS faculty, students, and staff have shown in navigating the 2020 Spring Quarter.

Building on the successes of years past, members of the EPS department continued to make fundamental contributions in Earth science research and teaching, and I encourage you to read more about these efforts in the pages that follow. Additionally, we welcomed a new group of graduates and two new staff members, Program Assistant Tia Ng Groce and Financial Assistant Richard Dodd. We also celebrated with Professor Donna Jurdy, who retired this past year after 38 years of service to EPS and Northwestern (see page 3).

We have been fortunate to receive alumni support, and your gifts allow us to offer extraordinary opportunities to our students—thank you! Please keep in touch—we would love to hear what you are up to. Be well, stay safe, and we hope you have a wonderful 2020 and beyond!



In This Issue:

Thank you to all members of the EPS community, including alumni, faculty, students, and staff, who contributed photos and stories for this newsletter. Please send additional photos and stories for next year to: earth@northwestern.edu

WELCOME!

We welcome two new staff members to the EPS community:

Financial Assistant **Richard Dodd** joined us last May with a background in finance.

Program Assistant **Tia Ng Groce** joined us in September with a background in activism and event planning.

We also welcome these young scientists to the EPS community (pictured right, from top to bottom).

Senior Research Associate **Andrew Masterson** welcomed his little firecracker Amelia on July 4, 2018.

Research Associate **Meagan Ankney** welcomed baby Alice on May 18, 2019 (on the geologically-significant 39th anniversary of the Mount St. Helens eruption).

Assistant Professor **Dan Horton** welcomed baby Zephyr on January 10, 2019. Zephyr was named for the Greek god of the fair westerly winds and a famous train connecting Chicago and San Francisco.

Environmental Sciences Visiting Assistant Professor Yingying Xie (right) with baby Ethan (born October 22, 2019), Ethan's grandmother, and Assistant Chair Trish Beddows (left).

Jurdy Retires, 38 Distinguished Years

Professor **Donna Jurdy** retired at the end of August after 38 years of service to the Department and the University. She joined the Northwestern faculty in 1981 and served as Chair of the Department of Geological Sciences from 2001 to 2005.

Professor Jurdy has had a distinguished scientific career. She was among the first to explore the relation between lithospheric plate tectonics and deep mantle dynamics, a research line that she continued for many years that yielded a number of very significant results. Many of her best papers are pioneering studies using plate reconstructions to study the dynamics of plate tectonics. Her approach was to test hypotheses proposed using the present plate geometry and velocities by using past plate relative and absolute motions. She has looked at the rotation of the lithosphere with respect to hotspots, correlations of plate speeds with latitude, speeds of continental versus oceanic plates, and motions between hotspots. She also showed that episodes of backarc spreading were often triggered by changes in plate motions. This required sophisticated integration of plate reconstructions with tectonic insight. Hence, she played a major role in developing an approach that is now a standard and powerful tool in geodynamic studies.

In recent years, she has also conducted a series of intriguing studies in comparative planetary science, looking at a number of different planets and moons. These show her typical sensible style: asking interesting questions and approaching them in imaginative ways, integrating her wealth of terrestrial experience to draw insight. Thank you Donna, and congratulations!

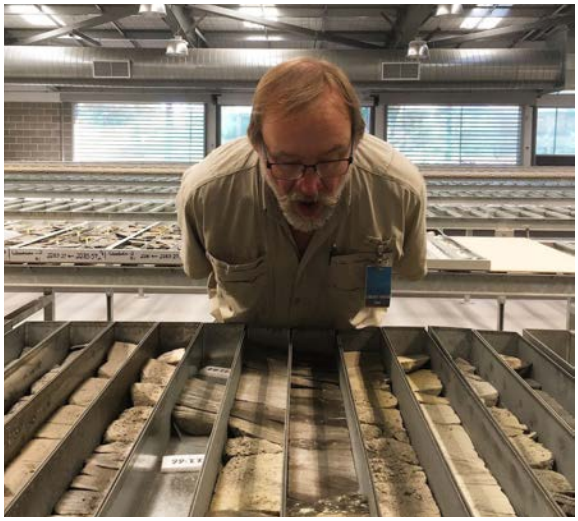
Donna Jurdy with students (from left to right) Igor Eufrasio, Reece Elling, Gabriel Nathan, Nooshin Saloor, Jamie Neely, and Maddy Lucas.

Sageman Awarded Fulbright

Professor **Brad Sageman** received a Fulbright Scholar Award in support of his sabbatical research visit to the University of Birmingham. The Fulbright Scholarship is one of the most well-regarded and impactful scholarship programs in the world.

As a participant, Sageman was selected from a strong applicant pool to collaborate with colleagues James Bendle and Sarah Greene (University of Birmingham) on the geochemical analysis of samples from a >90 million year old lake deposit formed by the separation of Antarctica and Australia. Sageman collected the samples during the first part of his sabbatical, when he visited the University of Adelaide, South Australia.

Commenting on receiving the Award, Sageman said: "I feel deeply fortunate to have been selected by the Fulbright Commission for this award. My objective in this project is to contribute new data bearing on the nature of the global carbon cycle during a so-called 'hyperthermal' interval of Earth history. Because the bulk of geochemical data on this time period is from the northern hemisphere, the project will contribute important new information from a southern hemisphere terrestrial site."



Brad Sageman studying core in Perth, Australia.

FRONT COVER

Graduate student **Matt Selensky** undertakes research in Lava Beds National Monument, California, last summer, as part of Professor **Maggie Osburn**'s NASA BRAILLE (Biologic and Resource Analog Investigations in Low-Light Environments) research project. The cover photo shows Matt studying a microbial biofilm (the yellow/green sheen) on the ceiling of Chocolate Cave. One of the goals of the research project is to better understand how the microbes in shallow caves cycle carbon and nitrogen in the complete absence of the sun. Photo by Brian Anschel.

EPS HIGHLIGHTS

YARROW AXFORD: It's been a year of exciting transitions for the Axford research team. **Everett Lasher (PhD 2019)** and **Jamie McFarlin (PhD 2019)** earned their PhDs and moved on to postdoc research at the University of Pittsburgh and University of Colorado at Boulder, respectively. Graduate student **Laura Larocca** received an NSF grant for travel to Copenhagen to digitize historically important aerial photos from mid-20th century Danish mapping expeditions over Greenland. Two new graduate students—**Pete Puleo** (**BA 2019**, a lab alum) and **Tim Coston** (a Bowdoin College alum)—began their graduate studies with an adventurous summer expedition to Greenland, where they recovered one of Greenland's longest continuous lake sediment records. Undergrads **Annika Hansen**, **Christine Lee**, **Jeremy Brooks** and **Regan Steigleder** all played important roles in the lab's research, as did EPS collaborators **Maggie Osburn**, **Mitch Barklage**, **Grace Schellinger** and **Andy Masterson**. Yarrow joined two international synthesis projects, one focused on climate in the Last Interglacial and another creating a comprehensive global database of Holocene temperature reconstructions.

PATRICIA BEDDOWS: Spring 2019 featured promotion to Associate Professor of Instruction, for which Trish sends out heartfelt gratitude to all the colleagues and students over the years. Graduate student **Emiliano Monroy-Ríos** is headed to shaking up the long-propagated paradigm of an immobile "tectonically stable" Yucatán Platform with his research efforts. Summer of 2019 was notably intensive. Over 100 Cave Pearl data loggers were serviced in July in the aquifer system of the Yucatán Peninsula. August featured "Science Week" combining cutting-edge hydrogeochemical and geomicrobial research by co-advised graduate students **Karyn DeFranco** and **Matthew Selensky,** with collaboration with colleagues **Andrew Jacobson** and **Maggie Osburn**, respectively. The Science Week Expedition was only possible with the unprecedented support of the Under the Jungle Dive Shop, led by Natalie Gibb and the highly-skilled volunteer cave dive team: Rory O'Keefe, Vlada Dekina, Alex K.S. Fraser, and Nikolas Tkachenko. Special thanks also for site access and deep diving to Luis Leal and Erika Morena and her team at the Ejido Dos Ojos. Tip of the hat also to dedicated field assistants **Kate Haile (BA 2019)** and undergraduate Alex Farmer. Additional achievements include advancing earth science pedagogy, in deep collaboration with Laura Rosales, Assistant Professor at Nevada State College, and collaborator Edward Mallon, as Laura trained over months to launch her version of the EARTH 360 Instrumentation course. The academic year 2020 looks very different though, with accepting the challenge of Director of the Environmental Sciences Program.

CRAIG BINA continues his collaborations on subduction dynamics with colleagues at Charles University in Prague, with some recent results published in *Earth and Planetary Science Letters* and others presented at the International Union of Geodesy and Geophysics General Assembly in Montréal. He also continues to collaborate on metastable minerals with colleagues at the University of Hawai'i at Mānoa, with some results published in *American Mineralogist* and in *Crystals*. He co-advises graduate students, often with Professor **Steve Jacobsen**, serves on the editorial board of *Progress in Earth and Planetary Sciences* for the Japan Geoscience Union, and was recently appointed to the International Advisory Board

for the Institute of Geophysics of the Czech Academy of Sciences. During spring 2019, Professor Bina spent a month at the Geodynamics Research Center of Ehime University in Matsuyama, Japan, and a month at Charles University in Prague. Later he joined alumnus **George Helffrich (PhD 1990)** and colleagues to explore the petrology of the Greek Cyclades.

NEAL BLAIR: The Blair lab continues to investigate how land use impacts the C-cycle. Civil and Environmental Engineering graduate student Jieun Kim is developing methods to identify sources of organic C in streams and rivers. She spent three weeks visiting the Universidad Nacional de San Martin (UNSM) this summer. In return, Julieta Pelusa (graduate student from UNSM) visited the Blair lab this fall and studied spectroscopic approaches to organic C identification. Undergraduate researchers include Josh Tabuena, who was awarded a Fletcher Award for the best undergraduate summer research project with his work on lake carbonates; EPS student **Rachel So**, who received a Hollings Fellowship that allowed her to spend the summer in an NOAA laboratory; Diana Velazquez, who participated in a Research Experience for Undergraduates at Stanford last summer; Lindsey Sonnefeldt, who is beginning work with fungal chitin; and Emily Fern, who is investigating clay mineral analysis with FTIR. Undergraduate Tiger Wang has recently joined the group.

ROSEMARY BUSH is continuing her work as a Weinberg College Adviser, working with undergraduate students across all Weinberg majors, and teaching in the department. In December, she taught at the Stateville Correctional Center as part of the Northwestern Prison Education Program. She also continues her paleobotany research on campus and at the Chicago Botanic Garden, supervising Environmental Sciences major Julia Ansolabehere, who is working on her senior thesis on the relationship between light environment, carbon isotope ratio, and leaf morphology.

DANIEL HORTON: The Climate Change Research Group (CCRG) has had a fabulous year of climate investigation. Graduate student **Howard Chen** was awarded the prestigious Future Investigators in NASA Earth and Space Science and Technology fellowship, as well as publishing the second chapter of his thesis in *The Astrophysical Journal*. Graduate student **Anastasia (Stacy) Montgomery** was selected for the NSF IDEAS fellowship to hone her data science skills, and was chosen to represent the state of Illinois during AGU's annual Congressional Visit Day in Washington, D.C. A new postdoc has joined the group, **Irene Crisologo**; Irene is an expert on weather radar, and will train her skills on better resolving hydrological impacts in urban and landslide prone regions. Ubben postdoctoral fellow **Jordan Schnell** published work on the air quality benefits and trade-offs of electric vehicle (EV) adoption in the U.S., and has inspired an army of undergraduate researchers investigating similar themes, including **Amy Rogin**, **Cassia Cai**, **Daniel Goldstein**, and **Daniel Peters**—who was awarded Most Outstanding Thesis honors for his work on the public health and carbon reduction co-benefits of EV use. Lastly, undergraduate **Lucy Yang** presented her work on breadfruit cultivation in current and future climates at this Fall's AGU meeting in San Francisco.

MATTHEW HURTGEN and the sedimentary geochemistry research group continue to reconstruct ocean chemistry through time to better understand the relationship among carbon cycle disruption, environmental change and extinction events. Graduate student **Jiuyuan Wang**, co-advised by **Andy Jacobson** and **Brad Sageman**, is measuring the Ca and Sr isotope composition of Neoprotoerozoic post glacial (Marinoan) cap carbonates to better resolve the balance between global weathering and carbonate burial rates and their relationship to environmental changes that followed Snowball Earth events and preceded the Ediacaran diversification of life. Graduate student **Niloufar Sarvian**, co-advised by Jacobson and **Maggie Osburn**, is exploring Neoproterozoic carbon cycle dynamics and global-scale glaciation using the Sr isotope composition of rocks deposited prior to the Sturtian Snowball Earth event. Graduate student **Luca Podrecca**, co-advised by Sageman and **Andy Masterson**, is exploring the factors that control the S isotope composition of sedimentary pyrite preserved in Cretaceous rocks.

STEVE JACOBSEN's group got smaller with three postdocs beginning new faculty positions: **Alisha Clark** now at University of Colorado, **Lily Thompson** now at Sewanee University of the South, and James Walsh (Chemistry) now at University of Massachusetts Amherst. **Michelle Wenz (PhD 2020)** co-discovered a new perovskite mineral and named it goldschmidtite (KNbO3) after the preeminent geochemist V.M. Goldschmidt. Graduate student **Fei Wang** co-discovered a new titanate mineral and named it nixonite (Na2Ti6O13) after mantle petrologist, Peter H. Nixon. Both articles were published in *American Mineralogist*. Graduate student **Hannah Bausch** held a one-month internship at Sandia National Laboratory, where in 2019 alumnus **Joshua Townsend (PhD 2016)** was promoted to Staff Scientist. Former postdoc **Xiaobing Liu** was promoted to Professor at Qufu Normal University, China, and alumnus **Yun-Yuan Chang (PhD 2014)** was promoted to Assistant Research Fellow at the Institute of Earth Sciences, Acadmia Sinica, Taiwan. Jacobsen is Editor at *Geophysical Research Letters* and serves on the National Academy of Sciences consensus committee (CORES) to identify funding priorities for the coming decade at NSF's Division of Earth Sciences. He co-authored the high-pressure materials genome in *Physical Review X* with Northwestern faculty (Materials Science and Engineering) Chris Wolverton.

ANDY JACOBSON congratulates former postdoc **Ben Linzmeier** (now a Postdoctoral Research Associate at the University of Wisconsin-Madison) for publishing his research examining Ca isotope variations across the end-Cretaceous mass extinction, as well as graduate student **Jiuyuan Wang** for publishing his research focusing on Ca and stable Sr isotope variations across the end-Permian mass extinction. Other members of the Jacobson group include Research Associate **Meagan Ankney**, graduate students **Karyn DeFranco**, **Gabby Kitch**, **Annie Nelson**, and **Nilou Sarvian**, and undergraduate students **Tia Chung-Swanson** and **Claudia Sandine**. In collaboration with Professors **Matt Hurtgen**, **Maggie Osburn**, and **Brad Sageman**, several students are using a combination of B, Ca, and stable Sr isotopes to study the causes and

Photos, top to bottom, left to right:

Aqueous Geochemistry Lab Group—*Tia Chung-Swanson, Andy Jacobson, Nilou Sarvian, Ben Linzmeier, Annie Nelson, Gabby Kitch, Grace Schellinger, Karyn DeFranco*

Axford Lab Group—*Peter Puleo, Tim Coston, Laura Larocca*

Seismologists: *Boris Rösler, Suzan van der Lee, Igor Eufrasio de Oliveira*

Blair Lab Group: *Neal Blair, Emily Fern, Lindsey Sonnefeldt, Jieun Kim, Diana Velazquez, Rachel So, Tiger Wang, Josh Tabuena*

consequences of environmental change in "deep time". Time periods of interest include the Neoproterozoic (Sarvian and Wang), OAE 1a (Wang), OAE 2 (Kitch), and the PETM (Kitch). Other students continue to investigate the Ca and stable Sr isotope geochemistry of chemical weathering. Field sites include Iceland (Nelson and DeFranco) and the Yucatán Peninsula (DeFranco). Several members of the Jacobson group presented research findings at the V. M. Goldschmidt meeting in Barcelona, Spain. Jacobson continues to serve as associate editor for *Geochimica et Cosmochimica Acta*.

DONNA JURDY officially graduated to Emerita Professor on September 1, 2019. For our first fall departmental seminar, we hosted Tom Brocher, USGS, presenting: "The 151st Anniversary of the Damaging 1868 Hayward Earthquake: Why it Matters and How we can Prepare for its Repeat" and afterward celebrated with the visiting speakers and friends and colleagues throughout the university. Donna Jurdy continues research focused on tectonic and volcanic activity on terrestrial planets, Venus and Mars, also the outer satellites. She was recently elected Chair of the Geophysics and Geodynamics Section of the Geological Society of America (GSA). With Gillian Foulger, she organized and chaired a very successful special session honoring Warren Hamilton at this year's Phoenix GSA meeting. She's actively planning similar special geophysics sessions at upcoming meetings.

For the last three years, **ABRAHAM LERMAN'**s research has continued to be in the field of the biogeochemical cycles of the past and present and in planetary science. In the field of terrestrial geochemistry, Abe Lerman and Fred Mackenzie, continuing their long-time collaboration, completed two articles, "Carbonate Minerals and the CO2-Carbonic Acid System" for *Encyclopedia of Geochemistry* and "Global Biogeochemical Cycling" for *Oxford Research Encyclopedia of Environmental Science*. In the field of planetary science, Abe presented on behalf of co-authors **Ashley E. Gilliam (PhD 2016)**, and Professor Jared Wunsch, "Explicit and Asymptotic Solutions of Simultaneous 1st-order and Riccati Equations for a Gas Reaction System" at the 2017 European Conference on Applied Mathematics and Informatics in Cambridge, UK. He also chaired one session at that conference. Ashley Gilliam's several articles, co-authored with Abraham Lerman, have also been published in peer-reviewed planetary science journals.

As Professor Emeritus, **EMILE OKAL** pursued his research on tsunamis and the quantification of earthquakes with alumni **Amir Salaree (PhD 2019),** who is now a Postdoctoral Fellow at the University of Michigan, and **Nooshin Saloor (PhD 2020)**. He is also involved in worldwide efforts for the preservation of historical seismological archives. This year, he took research trips to France, Malta, Japan, China and the Netherlands, and gave invited lectures in Iran, Croatia, Oman, China, Tunisia and India.

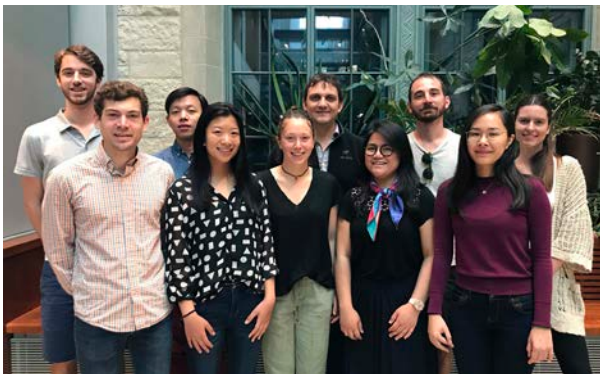
MAGGIE OSBURN: The Osburn Isotope Geobiology Lab had another busy year with many notable comings and goings as well as research achievements. Graduate student **Jamie McFarlin (PhD 2019)** successfully defended her thesis and moved on to a postdoc at University of Colorado Boulder. Undergraduate **Hannah Dion-Kirschner** has started graduate school at Caltech in addition to submitting her senior thesis on Greenland plant wax isotopes for publication. Maggie's team, including graduate student **Caitlin Casar** and postdoc **Lily Momper,** continue their work on the deep subsurface including multiple trips to the mine. Caitlin submitted a manuscript for publication in *Geobiology* titled "Mineral-hosted Biofilms in the Continental Deep Subsurface: Deep Mine Microbial Observatory, SD, USA". Second-year graduate student **Matt Selensky** had a busy summer, completing two back-to-back field seasons in Lava Beds National Monument, CA, (see front cover) and the Yucatán Peninsula, Mexico, to study the microbes found within different shallow subsurface environments. Graduate student **Niloufar Sarvian** received an honorable mention for an NSF

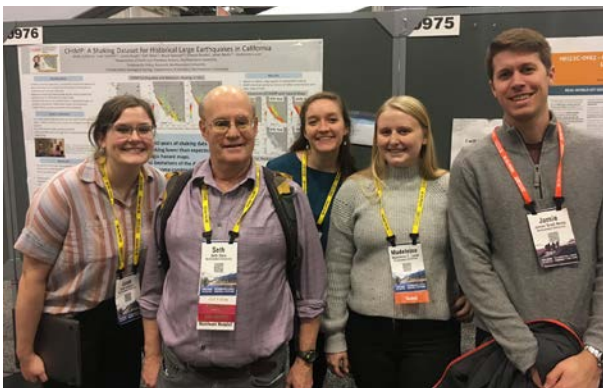
GRFP and passed her quals, and presented her first conference posters. New additions to the lab group include new graduate students **Floyd Nichols** and **Tim Coston** (joint with the Axford group). Floyd started off strong, joining Maggie on a field season to hypersaline lakes in British Columbia, Canada, which will be the subject of his thesis. Tim will be following in Jamie's footsteps, joining the forces of Osburn and Axford labs to better understand past climate variability in Greenland. While postdoc Lily Momper has moved on to start a career in environmental consulting, postdoc **Fabrizio Sabba** joined the group in November to probe deep subsurface microbial dark matter with metagenomics and cultivation approaches. Maggie was honored by an appointment as CIFAR fellow in the Earth 4D program and is hoping to build a more holistic view of subsurface microbiology in the coming year.

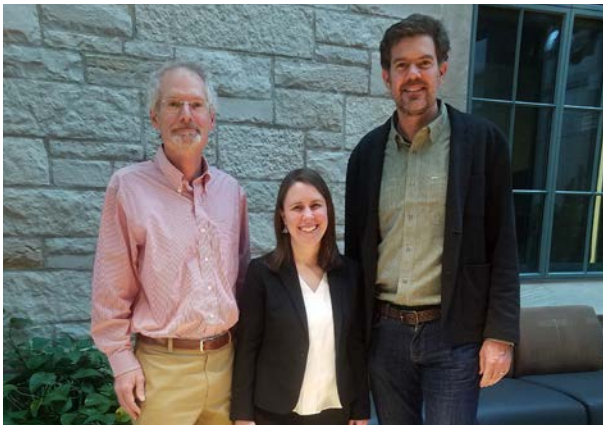
BRAD SAGEMAN relocated to the southern hemisphere in December 2018 to begin his post-chair sabbatical. After a stop in New Zealand, he settled into Adelaide, South Australia. Former NU colleague **Cesca McInerney** was a consummate host and five delightful months flew by. During that time Brad began research on the Kipper Shale, a Turonian lacustrine deposit, and the Cambrian SPICE event before returning to Evanston for the summer. For the last three months of sabbatical Brad was a Fulbright scholar at the University of Birmingham, U.K., collaborating with Professors James Bendle and Sarah Greene. He is a co-author of seven 2019 publications, with about the same number currently in review, or soon to be submitted. These include papers by former graduate students **Young Ji Joo (PhD 2013)**, **Matt Jones (PhD 2018),** and Jiri Laurin of Charles University in Prague; and current graduate students **Jiuyuan Wang** and **Gabby Kitch**, as well as 2018-19 postdoc **Ben Linzmeier**. Brad's newest graduate student, **Luca Podrecca**, spent the year doing research and preparing for qualifiers.

SETH STEIN, graduate students **Reece Elling** and **Molly Gallahue**, visiting scholars **Mitchell Barklage** and **Carol Stein**, and collaborators are studying the structure and evolution of North America's Midcontinent rift to learn more about this huge feature and what it tells us about how continents break apart to form new oceans. Stein, graduate students **Leah Salditch** and **James Neely**, undergraduate **Madeline Lucas**, statistics professor Bruce Spencer, and collaborators are exploring a broad range of issues in earthquake seismology including how well hazard maps forecast the shaking from natural and human-induced earthquakes, why large earthquakes occur in temporal clusters, how well earthquake stress drops can be measured, and what controls the magnitudes of earthquakes in different tectonic settings. A major project is the California Historical Intensity Mapping Project (CHIMP), a dataset of shaking data for the past 160 years for California and surroundings, to explore how well hazard maps performed and how to improve them. These studies seek to better understand the basic science and use the results to help society mitigate resulting hazards.

SUZAN VAN DER LEE and her research group congratulate **Trevor Bollmann (PhD 2019)** and former postdoc **Kevin Chao**, who left NU and now apply their seismic signal processing skills to resource exploration and detecting heart disease from sensor data. Graduate students **Vivian Tang** and **Boris Rösler** published papers in *Seismological Research Letters* on detecting tiny earthquakes with machine learning and on surface wave radiation, respectively. They submitted additional work to *Journal of Geophysical Research* on observations of dynamically triggered seismic events and the stresses and strains imposed by surface waves that lead up to triggering. Meanwhile, graduate student **Igor Eufrasio** explored multi-messenger modeling of lithospheric structure of the Mid-continent Rift and presented his conceptual results at the 2019 Fall AGU Meeting. Igor further joined Vivian and Boris as a trainee in IDEAS, an interdisciplinary data-driven discovery program co-steered by Van der Lee. Lastly, 2019 marked the beginning of Van der Lee's term as president-elect of the Seismology section of AGU.







Photos, top to bottom, left to right:

Osburn Isotope Geobiology Group—*Andy Masterson, Matt Selensky, Maggie Osburn, Niloufar Sarvian, Caitlin Casar, Floyd Nichols*

Climate Change Research Group— *Daniel Peters, Spencer Weiser, Howard Chen, Lucy Yang, Amy Rogin, Dan Horton, Irene Crisologo, Jordan Schnell, Cassia Cai, Stacy Montgomery*

CHIMP Team—*Leah Salditch, Seth Stein, Molly Gallahue, Maddy Lucas, Jamie Neely*

Michelle Wenz, 2019 PhD defense, *with Craig Bina and Steve Jacobsen*

2019 DEGREES & STUDENT AWARDS

Doctoral Degrees Conferred

Trevor Bollmann
Features of the North American Mantle during the Mesoproterozoic through Cenozoic Eras from Field Studies and Visualization Experiments

Eddie Brooks
Assessing the Performance of Earthquake Hazard Maps

Everett Lasher
Holocene Climate Change in Greenland: Investigations Using Oxygen Isotopes of Lacustrine Organic Materials

Jamie McFarlin
Calibrating and Applying Sedimentary Leaf Wax Hydrogen Isotopes to Reconstruct Greenland Hydroclimate of the Holocene and Last Interglacial

Amir Salaree
Theoretical and Computational Contributions to the Modeling of Global Tsunamis

Bachelor Degrees Conferred

Hannah Dion-Kirschner
Jamie Easton
Monica Ha
Katherine Haile
Ava Polzin
Peter Puleo
Eric Van Camp

Department Student Awards

Department awards are made possible by the generous support of our alumni.

Jeremy Brooks and Madeleine Lucas
Junior Year Research Excellence Award

Peter Puleo
Seymour Schlanger Undergraduate Earth Science Award

Vivian Tang
Horace A. Scott Award for Excellence in Graduate Research

Fei Wang
Marion Sloss Award for Outstanding Graduate Teaching Assistant

Additionally, the Elmer Herbaly Scholarship and Seagar Fellowship are given to undergraduate students to assist with engagement in Earth & Planetary Sciences.

Outside Awards & Honors

Jackson Barnes, Igor Eufrasio de Oliveira, Gabriel Nathan and **Stacy Montgomery**, 2019 IDEAS NSF research trainees.

Howard Chen, Future Investigators in NASA Earth and Space Science and Technology fellowship

Stacy Montgomery, Stephen H. Rothblatt Scholarship, Air & Waste Management Association

Jamie Neely, Seismological Society of American Student Presentation Award

Luca Podrecca, 2019-20 ISEN Cluster Fellow

Rachel So, 2018-2020 Ernest F. Hollings Undergraduate Scholarship

Photo by Justin Barbin

Undergraduate (turned graduate) student **Peter Puleo** received the 2019 Seymour Schlanger Undergraduate Earth Science Award. Peter worked with Professor **Yarrow Axford** and Brandon Curry and Mitchell Barklage (both of the ISGS) in completing his senior honors thesis titled "A ~14,500-year Paleoenvironmental and Paleoclimate Record from Sediments of Geneva Lake, Wisconsin". Peter, seen above with Professor **Matt Hurtgen**, is continuing his studies as a first-year graduate student in the department.

Graduate student **Vivian Tang** received the 2019 Horace A. Scott Award for Excellence in Graduate Research. Vivian, who works with Professor **Suzan van der Lee** received the award in recognition of two manuscripts. The first, currently in revision in the *Journal of Geophysical Research*, is titled "Detecting Dynamically Triggered Seismic Events in the United States during USArray." The second, published in *Seismological Research Letters*, is titled "Automating the Detection of Dynamically Triggered Earthquakes via a Deep Metric Learning Algorithm."

150 YEARS OF WOMEN

To mark the 150th anniversary of coeducation at Northwestern, the University is celebrating individuals—past, present and future—who take risks, chart their own course and inspire change. These include bold and brave women/womxn who led the struggle to open doors, creating greater access and opportunity for all who follow.

As part of the year-long celebration, One Book One Northwestern (the campus-wide reading program hosted by the Office of the President) selected *Hidden Figures* by Margot Lee Shetterly for the 2019-20 academic year. The Department of Earth and Planetary Sciences teamed up with One Book One Northwestern for a special seminar with NASA scientists Andrea Mosie and Ryan Zeigler, who spoke to EPS about the 50-year legacy of the Apollo lunar collection.

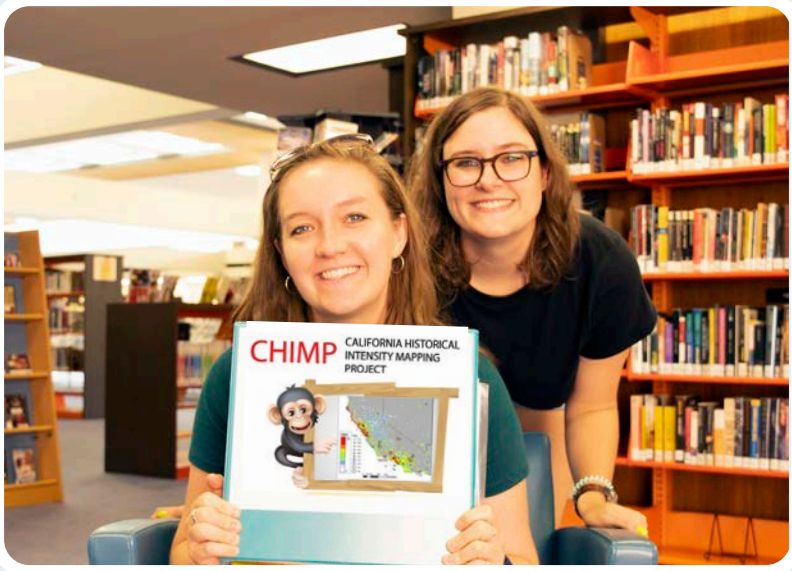
The Department of Earth and Planetary Sciences has its own interesting take on 150 years of women at Northwestern. According to department records, the first woman to graduate in geology from Northwestern was Gertrude Curme Bragg (BA 1908). We believe that Helen Skewes Plummer (MA 1925) and Lucille Ridgeway (MS 1925) were the first women to receive master's degrees in geology from Northwestern, and that Helen Belyea (PhD 1939) was the first women to receive a PhD in the department.

NASA Scientist Andrea Mosie with Professor Maggie Osburn.

Grad students Gabriel Nathan and Nilou Sarvian touch an Apollo lunar sample.

California Historical Intensity Mapping Project (CHIMP)

Graduate students **Leah Salditch** and **Molly Gallahue**, advisees of Professor **Seth Stein,** embarked on a journey last summer to collect oral history observations from witnesses to two large earthquakes— the magnitude 6.1 earthquakes of 1992 near Joshua Tree and 1993 near Big Pine, California. The trip was part of a larger project, termed CHIMP (California Historical Intensity Mapping Project), which aims to compile a historical shaking dataset for all of California and surroundings. Meeting in gathering places between Palm Springs and the Inyo National Forest, Salditch and Gallahue searched for residents whose accounts of these earthquakes could help the students study how well seismic hazard maps, which are used to design earthquake-resistant buildings, actually predict shaking. The trip was made possible by AGU's Celebrate 100 grant program.



Graduate students Molly Gallahue and Leah Salditch

ALUMNI NEWS

Steve Brand (BA 2016) currently works for the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). As an environmental scientist for DTSC, he regulates entities that manage hazardous waste under the Resource Conservation and Recovery Act (RCRA), including generators, transporters, and treatment, disposal, and storage facilities (TSDF). Steve's job is to make sure that these businesses comply with California and federal laws to ensure that hazardous waste is delivered to its proper destination and that releases are minimized along the process. He has been involved with responding to public complaints for hazardous waste mismanagement and inspecting businesses in vulnerable communities for an environmental justice initiative.

Steve Brand conducting a hazardous waste inspection.

Mark Dring (MS 2003) has been working in Milwaukee for the last 12 years for the FBI. He is currently using his science background as a Weapons of Mass Destruction (WMD) Coordinator. He performs outreach and acts as a liaison to business, academia and first responders on threats involving chemical, biological, radiological, nuclear and explosives. (CBRNE).

Professor Donna Jurdy (third from right) and Professor Seth Stein (far left) with alums (left to right): Jeremy Cooper (Environmental Sciences BA 1994), Audeliz Matias (PhD 2005), Fred Marton (PhD 1998), Sarah Andre (PhD 2004), and Eryn Klosko (PhD 2002).

Bethany Ketchem (BA 2017) completed an internship in Redwood National Park this past spring and is now in a permanent position with the US Forest Service based out of Pennsylvania.

Yuxi Suo (MS 2018) is currently an investment researcher for the BlackRock Sustainable Investing team, based in New York. Her job is focused on identifying drivers of long-term return associated with environmental, social and governance issues of all public-listed or private companies, integrating them throughout BlackRock's investment portfolios, and creating solutions to achieve sustainable environmental outcomes and investing returns.

Michael Witek (PhD 2017) and **Sung Joon Chang (Postdoc 2011)** are working together on the 3D structure of crust and mantle of east Asia.

Michael Witek and Sung Joon Chang enjoying Korean bbq in Chuncheon, Korea.

Top photo: 2019 Undergraduate Alumni Jamie Easton, Eric Van Camp, Peter Puleo, Katherine Haile, and Monica Ha.

Professor Chuck DeMets Receives Distinguished Alumni Award

The department proudly presented its Distinguished Alumni Award this past fall to Dr. Chuck DeMets, the Alfred Wegener Professor of Geophysics and Chair of the Department of Geophysics at the University of Wisconsin-Madison. DeMets received a BA in Physics and Geology from Lawrence University in 1982, and received his PhD in Geological Sciences from Northwestern in 1988. Following his time at Northwestern, DeMets worked as an NRC Postdoc for the Naval Research Lab and as a Staff Scientist at the Jet Propulsion Laboratory at Caltech. DeMets joined the UW Madison faculty in 1992.

While a faculty member at UW Madison, DeMets organized and taught GPS training workshops in El Salvador, Guatemala, and Costa Rica; worked on several editorial boards (*Journal of Geodynamics*, *Journal of Physics of the Earth*, *Journal Geophysical Research*, *Geology*, and *Central European Journal of Geosciences*); sat on the Board of Directors (geodesy consortium) of UNAVCO; and was recognized as a fellow of the American Geophysical Union in 2011. DeMets is the first author on the famous NUVEL-1 paper (1990 in *Geophysical Journal International*) and in 2000 was ranked by the Institute for Scientific Information (ISI) in the top 0.25% of the most highly cited scientists in the physical sciences.

DeMets is presently serving his third year as the department chair and is "enjoying the challenge of leading the department's fantastic faculty and staff members." While preparing for retirement next year, DeMets is "concentrating on finishing his ongoing research projects on Cenozoic tectonic plate motions and modeling of geodetic measurements of crustal deformation in the Caribbean region and Central America."

Professor Craig Bina presenting the Earth and Planetary Sciences Distinguished Alumni Award to Professor Chuck DeMets.

Hello all,
I was lucky enough to spend the summer and fall interning at Great Smoky Mountains National Park. I was based in Cades Cove, where I worked with the Interpretation and Education Divisions running junior ranger programs, giving bear talks, and leading field trips. I also created a junior ranger geology program where I taught kids that by using our powers of observation, we can figure out a rock's story. The kids learned about the three different types of rock and how they're all related through the rock cycle. If nothing else, they all walked away knowing (and sometimes even chanting) that metamorphic rocks form through the application of heat and pressure. I also got to work with black bears, learn blacksmithing, hike to waterfalls on the weekends, and much more. It was the experience of a lifetime!
Best, Basia Gawin (BA 2017)

Send us your news! earth@northwestern.edu

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EPS OUT AND ABOUT

Graduate student Laura Larocca conducting research last summer in Greenland as part of Professor Yarrow Axford's research group.

Graduate student Leah Salditch organized an AGU field trip along the Hayward Fault at UC Berkeley. Horst Rademcher of Berkeley Seismological Laboratory led the tour through the Berkeley campus, past the Hearst Mining building (that has been base isolated) and the borehole seismic vault, and into the retrofitted football stadium, where the fault runs nearly right down the middle of the football field.

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*in memoriam

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