

**MINERALOGICAL SOCIETY  
OF  
AMERICA**

**2019  
ANNUAL REPORT**



# In 2019, MSA . . .



. . . celebrated its 100th Anniversary with a Centennial Symposium and Reception in Washington, DC, page 9.

. . . signed with GeoScienceWorld as a publishing partner on the new open access journal *Lithosphere*.



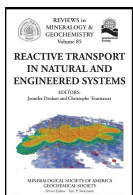
. . . thanked 2019 President Mickey Gunter for his leadership and welcomed 2020 President Carol Frost at GSA, page 10.

. . . celebrated 25 years with Executive Director J. Alex Speer.



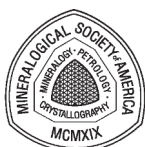
. . . thanked Ian Swainson for his nine years as Letters Editor for the *American Mineralogist*.

. . . launched the MSA Centennial Ambassadors Program through the inspiration of Peter Heaney, page 9.



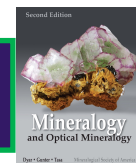
. . . published RIMG #85: *Reactive Transport in Natural and Engineered Systems*, page 18.

. . . hired Ann Benbow as the incoming Executive Director.



. . . had a banner year for contributions, thanks to many generous donors and the Centennial, pages 21-22.

. . . published a full-color edition of *Mineralogy and Optical Mineralogy*, page 18.



. . . published 169 science papers from 33 countries in the *American Mineralogist*, page 17.

## LETTER FROM MSA PRESIDENTS



**Mickey Gunter**

MSA was founded on December 30, 1919, and it has been our honor to serve as presidents during its centennial year. There has been much celebration, with a highly successful Centennial Symposium in Washington DC in June and centennial sessions at meetings throughout the year. It is clear from these events that the fields of mineralogy, crystallography, geochemistry, and petrology are as vibrant and relevant today as they were in 1919, and that MSA's role is fundamental.



**Carol Frost**

**MSA is the premiere professional society for mineralogy and petrology, internationally.** It may not be obvious from a society named Mineralogical Society of America, but MSA is truly an international organization. Half of its members reside outside of the US and its committee members, MSA Lecturers, fellows, and medalists come from around the world.

**MSA promotes mineralogy and petrology by recognizing outstanding fundamental research and public service.** The society's *Roebling Medal*, *Dana Medal*, *MSA Award*, and *Distinguished Public Service Award* promote accomplished geoscientists and important discoveries to the world.

**MSA publishes scholarly research in mineralogy, crystallography, petrology, and geochemistry, broadly defined.** *American Mineralogist*, the international journal of Earth and planetary materials, and *Reviews in Mineralogy and Geochemistry* publish important advances. MSA was a founding society creating and publishing *Elements*. MSA also publishes textbooks and other monographs.

**MSA activities promote scientific literacy and support the next generation of mineralogists and petrologists.** Our society provides educational opportunities for all ages, but many activities are targeted to students. MSA Lecturers visit with undergraduates and graduate students on campuses around the world. MSA hosts educational materials on the web, available to all. Students are eligible for Kraus and Min/Pet research grants and also benefit from special membership rates.

Modern society has benefited greatly over the past 100 years from MSA members' discoveries, and the need will continue as society evolves. Solving problems as varied as correct identification of minerals in consumer products to developing sustainable energy resources requires a robust community of mineralogists, crystallographers, petrologists and geochemists who undertake fundamental research about Earth's natural materials and educate and mentor the next generations of experts. Who are these mineralogists, crystallographers, petrologists and geochemists? They are members of the Mineralogical Society of America—past, present and future.

*Mickey E. Gunter*

**Mickey E. Gunter**, MSA President #100

*Carol D. Frost*

**Carol D. Frost**, MSA President #101



## MISSION

The Mineralogical Society of America (MSA) was founded in 1919 for the advancement of mineralogy, crystallography, geochemistry, petrology, and promotion of their uses in other sciences, industry, and the arts. MSA encourages fundamental research about natural materials; supports the teaching of mineralogical concepts and procedures; and works to raise the scientific literacy of society on issues involving mineralogy in the widest sense. The Society encourages the preservation of mineral collections, displays, mineral localities, type minerals and scientific data. MSA represents the United States internationally with regard to the science of mineralogy.

To accomplish its goals, the Society publishes journals, magazines, and books, as well as uses short courses, lectureships, Internet website, awards, grants, symposia, and meetings for professionals, students, and the public. MSA depends on the involvement of all individuals who are concerned with the health and direction of the field of mineralogy. The society cooperates with other scientific and organizations, and continually explores and adopts new programs and policies to better serve its members.

## MEMBERS

Membership in the Society is open to any person interested in mineralogy and related sciences regardless of residence or citizenship. Individuals from all 50 states, the District of Columbia, several territories, and about 40 countries belong to the Society, giving it and its publications an international aspect. In addition to joining a global community of mineralogists and petrologists, MSA Members receive online access to *American Mineralogist*, print and electronic access to *Elements* magazine, and discounts on publications and registrations.

The membership of the Society comprises Honorary Fellows, Fellows, Members, Early Career, Students, Senior Fellows and Members, and Sustaining Fellows and Members. All members are eligible to participate in Society affairs.

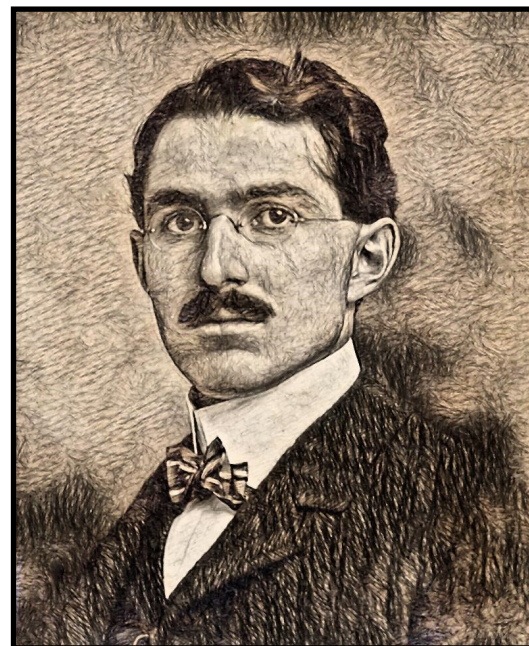
**In 2019, membership was 2,009.**



# MSA HISTORY

The Mineralogical Society of America (MSA) was founded in 1919 in Boston, MA by Dr. Edward H. Kraus of the University of Michigan. Twenty-eight mineralogists attended the organizational meeting of MSA on December 30, 1919 at the Harvard University Geological Museum. The first meeting of the Executive Council was the next day, at which time, a vote was taken to make *The American Mineralogist*, first published in 1916, the Society's journal.

MSA had its first annual meeting in 1920. Thereafter, MSA focused its attentions on improving the journal and the financial health of the society, a task made easier by a gift from Washington Roebling in 1927, but then more difficult by the Great Depression and WW II. Except for initiating the Roebling Medal in 1937 and the MSA Award in 1950, MSA remained much the same for years. From the time of the organization's 50th anniversary, however, MSA started to expand its programming: Special publications in the 1960s; short courses, *Reviews*, and research grants in the 1970s; Lecture Program, AMU Awards, and a stand-alone office in the 1980s, Distinguished Public Service Medal, monographs, textbooks, MSA-Talk, and website in the 1990s; Mineralogy-4-Kids, Ask-a-Mineralogist, Dana Medal, *Handbook of Mineralogy*, GeoScienceWorld, online archive of the *American Mineralogist*, and *Elements* magazine in the 2000s.



MSA's Founder, Dr. Edward H. Kraus

# MSA GOVERNANCE

## Officers and Council

The MSA Council, which meets three times a year, is comprised of the President, Past-President, Vice-President, Treasurer, Secretary, and six Councilors elected from the membership. The President, Past-President, Vice-President, Secretary, Treasurer form the Executive Committee, which governs the Society when Council is not in session.

Both the 2019 and 2020 Council Members are included in this report, as the 2020 term began on September 21, 2019 at the First 2020 Council Meeting held at the Annual Conference of the Geological Society of America.



# 2019 Council Officers



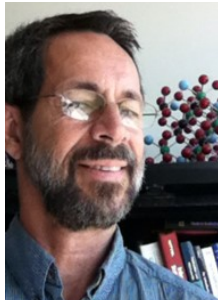
**Mickey E. Gunter, President**  
University of Idaho



**Michael Brown, Past President**  
University of Maryland



**Carol D. Frost, Vice President**  
University of Wyoming



**Bryan Chakoumakos, Secretary**  
Oak Ridge National Laboratory



**Thomas Duffy, Treasurer**  
Princeton University

## Councilors



**Donna Whitney**  
University of Minnesota



**Jay Ague**  
Yale University



**Adam Simon**  
University of Michigan



**Mark Caddick**  
Virginia Tech



**Sarah Penniston-Dorland**  
University of Maryland



**Sarah Carmichael**  
Appalachian State University

# 2020 Council

## Officers



**Carol D. Frost, President**  
University of Wyoming



**Mickey E. Gunter, Past President**  
University of Idaho



**Mark Ghorso, Vice-President**  
University of Washington



**Kimberly Tait, Secretary**  
Royal Ontario Museum



**Thomas Duffy, Treasurer**  
Princeton University

## Councilors



**Donna Whitney**  
University of Minnesota



**Jay Ague**  
Yale University



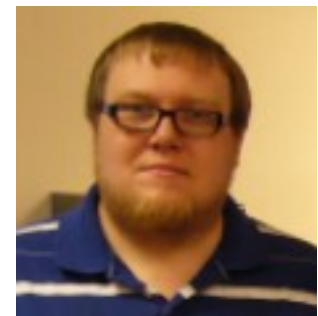
**Adam Simon**  
University of Michigan



**Mark Caddick**  
Virginia Tech



**Przemyslaw Dera**  
University of Hawaii at  
Manoa



**Francis McCubbin**  
NASA Johnson  
Space Center

## Office and Staff



The MSA Business Office and the *American Mineralogist* Editorial Office are located at 3635 Concorde Parkway, Suite 500, Chantilly, VA 20151, a few miles from Dulles Airport. In addition to its offices, MSA's space includes a full warehouse for its many publications.

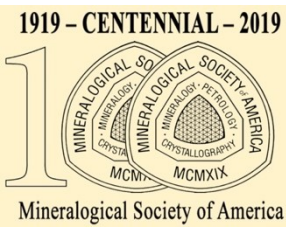
There are both full-time and part-time staff members: J. Alex Speer, Executive Director; Ann Benbow, Incoming Executive Director, Rachel Russell, Managing Editor, *American Mineralogist*; Christine Elrod, Assistant Managing Editor, *American Mineralogist*; Kristi Bailey, Editorial Assistant, *American Mineralogist*; Mary Edsomwan, Accountant; Everett Johnson, Accounts Coordinator; and Michael Harris, Administrative Assistant.

Information Technology (IT) is handled by contractors Gloria McFarland and Gordon Nord. The business office of the Clay Minerals Society (CMS) is also in the Chantilly office space, with Mary Gray as the CMS Office Manager. In addition, the MSA staff handles the business aspects of *Elements* magazine and the memberships of The Meteoritical Society and the Geological Society of Washington.





# Centennial



As MSA was founded in 1919, 2019 was the organization's Centennial Year. The celebration of the Centennial began with a two-day symposium and reception on June 20-21, 2019 in Washington, DC. The symposium was held at the Carnegie Institution for Science and included such topics as: The mineralogy of Mars; diamonds and plate tectonics; minerals and sustainability, unraveling the roots of continents; museum mineral collections in the next century; mineral dusts and human health; mineralogy and ancient ceramics; and a number of others.

A reception was held for symposium attendees and guests on the evening of June 20 at the Gem and Mineral Hall at the U.S. National Museum of Natural History, Smithsonian Institution. Over 160 people from across the globe attended the symposium and more than 180 people attended the reception at the Smithsonian. Videos of the symposium talks are on the MSA's website.

MSA wishes to thank Centennial Symposium Co-Organizers Dr. Peter Heaney and Dr. Steven Shirey for their tireless efforts in making the event a success. MSA also wishes to thank the Symposium sponsors (listed on the Benefactors' Page of this report), the presenters, attendees, and meeting planners.



## MSA Centennial Ambassadors Program

The MSA Centennial Ambassadors Program was launched by Past President and Centennial Symposium organizer Dr. Peter Heaney. Ambassadors are any MSA Members who give talks on mineralogical topics suited to the general public and subsequently inform the MSA Business Office that they have done so. Talks should also include information about MSA as an organization. A list of Ambassadors and their topics are on the MSA website.

# Annual Meeting



MSA's Annual Meeting takes place at the Annual Conference of the Geological Society of America. The 2019 meeting was in Phoenix, Arizona, USA from Sept. 21-25. Events included: MSA Council Meetings; Awards Luncheon; Joint MSA/MGPV/Geochemical Society Reception; *MSA at 100* Luncheon; and Awards Lectures.



**Mickey Gunter and Carol Frost, Co-Chairs of MSA at 100 Past Presidents' Symposium**



**Attendees and Awardees at MSA's 2019 Awards Luncheon, September 24, Phoenix, Arizona**

At MSA's Annual Meeting there were more events celebrating the Centennial Year. On September 23, there was an all-day series of talks by Past MSA Presidents, organized and chaired by 2019 President Mickey Gunter and 2020 President Carol Frost.

In addition, there were two other *MSA at 100* sessions at GSA: *Mineralogical Society of America at 100: The Many Faces of Tourmaline—From Crystallographic Complexity to Recorder of Crustal Evolution* organized by Darrell J. Henry and Barbara L. Dutrow, and *Metamorphic Petrology Past, Present and Future: Preparing for the Next 100 Years with the Mineralogical Society of America* organized by Robert M. Holder, Mark J. Cad-dick, and Sarah C. Penniston-Dorland.

# Programs

## Distinguished Lecture Program

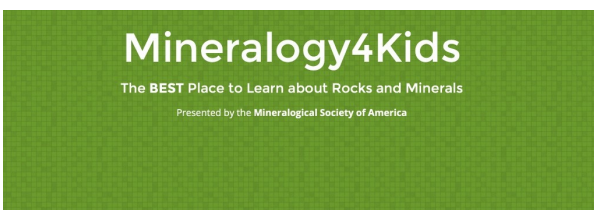
Since 1989, MSA has offered schools the opportunity to hear talks about recent advances in mineralogy through its Distinguished Lecture Program. MSA pays travel expenses of the Lecturers and the host institution is responsible for local expenses, including accommodation and meals. Each year MSA Lecturers visit about 30 colleges and universities world-wide.

### In 2019:

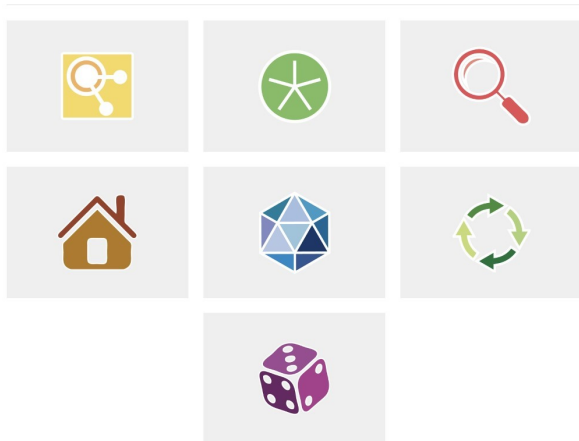
- ◆ Distinguished Lecturers were Caroline L. Peacock, Laura Wasylenki, and Allen F. Glazner. The Lecture Program Administrator is David M. Jenkins.



Laura Wasylenki and Allen F. Glazner



Welcome to MSA's Rockin' Internet Site



You can find **K-12 Resources** on the MSA web site at <http://www.mineralogy4kids.org/>.

**Mineralogy4Kids** is a mini-site with information for students and teachers on mineral groups, properties, and identification; household minerals; crystals; the rock cycle; and mineral games. It is the **most visited** part of the MSA website.

## Education Programs

MSA's education programs include short courses, workshops, and Mineralogy4Kids.

**Short Courses** are two- to four-day, in-depth instructional courses, typically given in conjunction with major meetings. They are taught by several invited speakers who also write the accompanying *Reviews in Mineralogy and Geochemistry* volume. There have been 58 courses since 1974.

### In 2019:

- ◆ The Short Course was on August 17-18 at the Goldschmidt Conference in Barcelona, Spain. Jennifer Druhan and Christophe Tournassat taught the course, entitled *Reactive Transport in Natural and Engineered Systems*.

**Workshops** are shorter than Short Courses, on a focused topic or technique.

### In 2019:

- ◆ There were no MSA-sponsored workshops.

# Research Grants

## Mineralogy/Petrology Research Grant

The Mineralogical Society of America's Grants for Student Research in Mineralogy and Petrology are funded by an endowment created by contributions from the MSA membership. The grant comprises two awards of up to \$5,000 each for research in mineralogy and petrology. Students, including graduate and undergraduate students, may apply. All proposals are considered together.

The award selection will be based on the qualifications of the applicant, the quality, innovativeness, and scientific significance of the research, and the likelihood of success of the project. The 2019 winners of the grant were **Clementine Hamelin**, University of Minnesota, Minneapolis, MN, USA - "Putting QuiG to the test: A high-resolution, micro-scale investigation of the Quartz-in-Garnet barometer in a progressive metamorphic sequence" and **Marie Takach**, Oregon State University, Corvallis, OR, USA - "Documenting magma mixing processes and timescales in tephra fall deposits: El Misti Volcano, Peru."



Clementine Hamelin



Marie Takach



Kathryn Hobart

## Kraus Crystallography Research Grant

The Mineralogical Society of America's Grant for Research in Crystallography is funded by the Edward H. Kraus Crystallographic Research Fund with contributions from MSA members and friends. The grant awards up to \$5,000 for research in the field of mineralogical crystallography. This grant targets projects within the areas of mineralogy, crystal chemistry, petrology, mineral physics, biomineralization, and geochemistry that can employ a variety of crystallographic, spectroscopic, analytical, and computational techniques. Students, including graduate and undergraduate students, as well as beginning faculty and young researchers are encouraged to apply. All proposals are considered together.

The 2019 winner of the Kraus Grant was **Kathryn Kiku Hobart**, University of Minnesota, Minneapolis, MN, USA for her project "Crystallographic Controls on Abiotic and Microbially-Mediated Pyrrhotite Dissolution."

# Awards

## Roebling Medal

First awarded in 1937, the Roebling Medal is the Society's highest honor. It is given in recognition of an individual's lifetime scientific eminence as represented primarily by publication of outstanding original research in mineralogy.

The 2019 Roebling Medal awardee was **Dr. Peter R. Buseck** of Arizona State University, Tempe, AZ USA in recognition of his outstanding and pioneering contributions in mineralogy using transmission electron microscopy (TEM). Dr. Buseck's contributions have included, among many others, aerosol particle research, extensive work in meteoritics, and his investigations of biomineralogical questions. Through his efforts, Dr. Buseck established Arizona State University as an international center for high resolution TEM. He has been inspirational as a mentor to a great number of students and colleagues throughout his career. Many of his students have gone on to stellar careers of their own, a testament to Dr. Buseck's influence, support, and stature as a scientist and visionary.



Peter R. Buseck, 2019 Roebling Medalist



Matthew J. Kohn, 2019 Dana Medalist

## Dana Medal

This award is intended to recognize sustained outstanding scientific contributions through original research in the mineralogical sciences by an individual in the midst of his or her career who has not been previously recognized [for his/her achievements-remove] as a recipient of the MSA Award.

The 2019 Dana Medal awardee was **Dr. Matthew J. Kohn** of Boise State University, Boise, ID USA. Dr. Kohn is cited for his stellar body of work in such widely varying fields as paleoclimatology and metamorphic petrology. He is known as a broad and deep thinker whose primary focus is on addressing the major unresolved problems in mineralogy, petrology, and geochemistry. Dr. Kohn is also celebrated for developing new tools for analysis, which have changed the scope of what can be studied in the mineralogical sciences. In addition, he has a strong record of service to the community, by editing journals, organizing workshops and symposia, and chairing technical sessions at academic meetings.

# Awards

## Distinguished Public Service Medal

This award is presented to an individual who has provided outstanding contributions to public policy and awareness about mineralogical topics in the widest sense. The 2019 Distinguished Public Service Medal was awarded to **Dr. Rodney C. Ewing**, Stanford University, CA USA in recognition of unequalled contributions to public policy, particularly in the area of nuclear waste management. As Chair of the U.S. Nuclear Waste Technical Review Board, he was instrumental in ensuring that the nation's nuclear waste policies were informed by solid science and concern for the environment. Dr. Ewing was the driving force behind the genesis of the highly successful *Elements* magazine, which first appeared in 2005 and now has 17 participating Societies. Dr. Ewing was responsible for overseeing the preservation of the Harding Pegmatite in New Mexico when he chaired the Earth and Planetary Sciences Department at the University of New Mexico. His efforts allowed the site to continue to be available to both the public and students for study and exploration. In addition, Dr. Ewing secured funding which saved the mineral collection at the University of Michigan.



**Rodney C. Ewing, 2019 Distinguished Public Service Medalist**

## 2019 MSA Award

This is an award for an outstanding single or series of published contributions in the areas of mineralogy, crystallography, geochemistry, petrology, or related fields. The award is meant to recognize a scientist beginning his or her career. The 2019 MSA Awardee was **Dr. Olivier Namur** of KU Leuven, Belgium. Dr. Namur is recognized for his wide-ranging contributions to mineralogy, and for linking these to the large-scale evolution of the Earth, Moon, and Mercury. Dr. Namur has made new and insightful discoveries in the field of layered intrusions. He is known for his excellent fieldwork combined with careful and imaginative laboratory experiments. Dr. Namur's hallmark is his meticulous collation of geochemical data, which are then subjected to detailed numerical analysis. In addition, he provides mentorship for both graduate and undergraduate students, sharing his knowledge and his creative ways of formulating and investigating complex research problems in petrology and mineralogy.



**Olivier Namur, 2019 MSA Award Recipient**

# 2019 Fellows

Members who have contributed significantly to the advancement of mineralogy, crystallography, geochemistry, petrology, or allied sciences and whose scientific contribution used mineralogical studies or data, may be designated as Fellows upon proper accreditation by the Committee on Nomination for Fellows and election by the Council. Recipients of the Roebling Medal and Mineralogical Society of America Award automatically become Fellows. The 2019 Fellows are pictured below in alphabetical order.



**Luca Bindi**  
*University of Florence*



**Frank Brenker**  
*J.W. Goethe-Universitaet*



**Rajdeep Dasgupta**  
*Rice University*



**James Gardner**  
*University of Texas-  
Austin*



**Marian Holness**  
*University of Cambridge*



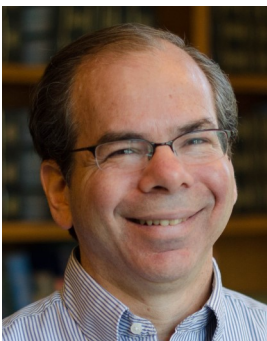
**Melissa Lane**  
*Fibernetics, LLC*



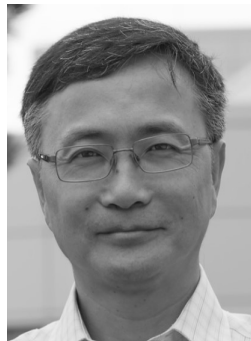
**Zhu Mao**  
*University of Science and  
Technology of China*



**Clive Neal**  
*University of Notre  
Dame*



**Craig Schriffries**  
*Carnegie Institution for  
Science*



**Guoyin Shen**  
*Carnegie Institution for  
Science*



**Kimberly Tait**  
*Royal Ontario Museum*



**Alan Woodland**  
*Goethe-Universitaet  
Frankfurt am Main*

# Undergraduate Prize

The Mineralogical Society of America's **Undergraduate Prize** (formerly *American Mineralogist* Undergraduate (AMU) Award) program recognizes outstanding students who have shown an interest and ability in the discipline of mineralogy. Each student was cited by his or her department for outstanding achievement in mineralogy-related courses. The MSA Prize allow MSA to join with the individual faculty to formally recognize outstanding students. Each student is presented a certificate at an awards ceremony at his or her university or college. In addition, each recipient receives a student membership in MSA with access to the electronic version of *American Mineralogist* and *Elements*, as well as in *Reviews in Mineralogy and Geochemistry* or *Monograph* volume chosen by the sponsor, student, or both.

## Recipients of the 2019 Undergraduate Prize:

- Megan "Forest" Balemian-Spencer, Pomona College, Sponsored by Dr. Jade Star Lackey
- Odalys Callejas, University of California-Santa Barbara, Sponsored by Dr. Roberta L. Rudnick
- Alix Marie Ehlers, University of Vermont, Sponsored by Dr. John Hughes
- Ashely V Fernandes, University of Maryland, Sponsored by Dr. Sarah Penniston-Dorland
- Cristy Q Ho, University of Maryland, Sponsored by Dr. Sarah Penniston-Dorland
- Sydney Klinzing, University of Wisconsin-Madison, Sponsored by Dr. Professor Huifang Xu
- Ranpeng Li, University of California-Santa Barbara, Sponsored by Prof. Roberta Rudnick
- Felice Lugos, University of California-Santa Barbara, Sponsored by Prof. Matthew E. Rioux
- Zoe MacClure, University of Otago, Sponsored by Dr. J. Michael Palin
- Eleanor McLeod, University of Victoria, Sponsored by Prof. Dante Canil
- Erikka Renee Olson Williams College, Sponsored by Prof. Reinhard Wobus
- Owen Perfect, University of British Columbia, Sponsored by Dr. James Scoates
- Matthew Raabe, Towson University, Sponsored by Dr. Wendy Nelson
- Addison K Savage, University of Texas at Austin, Sponsored by Dr. Elizabeth Catlos
- Yi Sun, Universitat Heidelberg, Sponsored by Prof. Axel K. Schmitt
- Jonathan Umbaar, University of Calgary, Sponsored by Dr. J. Alex Speer



# Publications

## American Mineralogist

*American Mineralogist*, subtitled *An International Journal of Earth and Planetary Materials*, is the print journal of the Society, and it has continuously appeared since 1916. It publishes the results of original scientific research in the fields of mineralogy, crystallography, geochemistry, and petrology with the goal of providing readers with the best in earth science research. Editors are Dr. Donald Baker, McGill University, Montreal, Quebec, Canada, and Dr. Hongwu Xu, Los Alamos National Laboratory, Los Alamos New Mexico, USA.

### In 2019:

- ◆ 1,400 institutional subscribers (including GeoScienceWorld and DeGruyter subscribers).
- ◆ 395 paper submissions; 169 papers published from 33 countries.
- ◆ 57% acceptance rate.

1919 – CENTENNIAL – 2019

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MINERALOGICAL SOCIETY OF AMERICA  
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Mineralogical Society of America

# American Mineralogist

Journal of Earth and Planetary Materials

Vol. 104, No. 11 November 2019

CROSSROADS IN EARTH AND PLANETARY MATERIALS

1533 Thermal diffusivity and thermal conductivity of granulites at 283–988 K and 0.3–1.5 GPa  
Huangli Fu, Baozhu Zhang, Jianhua Ge, Zili Xiong, Shangrong Zhu, Shuangting Sun, and Heping Li

SPECIAL COLLECTION: MICROPOROUS MATERIALS: CRYSTAL-CHEMISTRY PROPERTIES, AND UTILIZATIONS

1546 Computer modeling of apparently straight bond angles: The intriguing case of all-silica ferrisilite  
Federica Trudu, Gloria Tabacchi, and Ettore Fois

1556 Composite materials based on zeolite stibite from Faroe Islands for the removal of fluoride from drinking water  
Jianxi Dai, Luis Gomez-Fernandez, Pilar Galvez, Joaquín Pérez-Paterson, and Jana Olaváková

SPECIAL COLLECTION: EARTH ANALOGS FOR MARTIAN GEOLOGICAL MATERIALS AND PROCESSES

1565 The Italian Solfataria as an analog for Mars fumarolic alteration  
Jessica Falanga, Janice L. Hibop, Simone Silvestri, Dario Tedesco, Isabelle Durand, and Damien Leterme

ARTICLES

1578 Change of cracking noise in granite by thermal damage: Monitoring nuclear waste deposits  
Kaitian Xie, Xiang Jiang, Deyi Jiang, Yang Xiao, Shouan Chen, Karin A. Dahmon, Eduard Vives, Antoni Planas, and Richard K.H. Sze

1585 Constraining the timing and character of crustal melting in the Adirondack Mountains using multi-scale compositional mapping and in-situ monazite geochronology  
Michael L. Williams, Timothy Grover, Michael J. Jurewicz, Sean P. Regan, Chun R. Peng, and Kathryn A. Sorez

1603 Melting in the Fe-FeO system to 204 GPa: Implications for oxygen in Earth's core  
Kenta Oka, Kai Hirose, Shoji Tagawa, Yumiko Kakimoto, Yoshiki Nakajima, Yoshiko Koyama, Guillaume Moret, Nicolas Cousson, and Guillaume Faugot

1608 Controls on tetrahedral Fe(II) abundance in 2:1 phyllosilicates  
Javier Cuadros, Joseph R. Michalski, M. Darby Dyer, and Vesselin Dikov

1620 Stability, composition, and crystal structure of Fe-bearing Phase E in the transition zone  
Li Zhang, Joseph R. Smyth, Takaki Kawazoe, Steven D. Jacobson, Jingjing Niu, Xiangjun He, and Shan Qin

INVITED CENTENNIAL ARTICLE

1701 High-pressure minerals  
Oliver Tschaner

CROSSROADS IN EARTH AND PLANETARY MATERIALS

1732 Investigation of the kieserite–szomolnokite solid-solution series, (Mg,Fe)SO<sub>4</sub>·H<sub>2</sub>O, with relevance to Mars: Crystal chemistry, FTIR, and Raman spectroscopy under ambient and martian temperature conditions  
Dimitris Talla and Manfred Wilner

SPECIAL COLLECTION: DYNAMICS OF MAGMATIC PROCESSES

1750 Intra-eruptive trachyte-phonolite transition: Natural evidence and experimental constraints on the role of crystal mushes  
Marco Brenna, Alessio Paveselli, Silvio Mollo, Matteo Masotta, Shana J. Cronin, Ian E.M. Smith, Mohammed Raftan Hassan Mousli, and Piergiorgio Scarlato

SPECIAL COLLECTION: HIGH-GRADE METAMORPHISM, ANATAXIS, AND GRANITE MAGMATISM

1765 Geochemistry of phosphorus and the behavior of apatite during crustal anatexis: Insights from melt inclusions and nanogranitoids  
Chris Yalovsky and Antonio Acosta-Vigil

SPECIAL COLLECTION: PHYSICS AND CHEMISTRY OF EARTH'S DEEP MANTLE AND CORE

1781 Static compression of Fe<sub>2</sub>N to 77 GPa and its implications for nitrogen storage in the deep Earth  
Helene Besson, Tetsuya Katayabashi, Samuel Thompson, Nicola Pao, Christopher McGarr, Sho Saeburo, Simone Azicelli, and Yasuo Ohishi

ARTICLES

1788 A comparison between the stability fields of a Cl-rich scapolite and the end-member marialite  
Katalin M.F. Almeida and David M. Jenkins

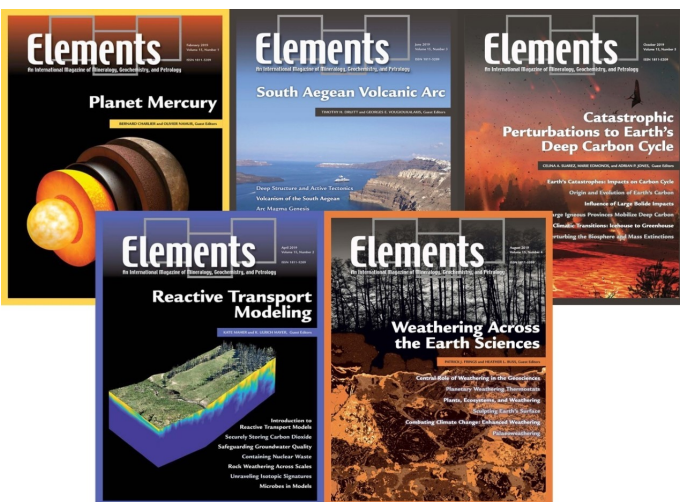
1800 Electrical conductivity studies on silica phases and the effects of phase transformation  
George M. Amodeo, Anthony W. Lawati, and Simon M. Clark

1806 REE-, Sr-, Ca-aluminum-phosphate-sulfate minerals of the alunitic supergroup and their role as hosts for radionuclides  
Nicholas D. Owen, Nigel J. Cook, Mark Rollag, Kathy J. Ehrig, Daniela S. Schimanski, Rabal Ram, Jeff Bragger, Cristiana L. Coburn, Benjamin Wade, and Paul Gaughan

1820 Experimental quantification of the Fe-Valence state at amosite-asbestos boundaries using acSTEM dual-electron energy-loss spectroscopy  
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(Contents continued on outside back cover)



## Elements

*Elements* is an international magazine of mineralogy, petrology, and geochemistry, which was founded in 2005. Published bimonthly, every issue explores a theme of broad and current interest. *Elements* publishes invited peer-reviewed articles for each thematic collection of papers.

The magazine also publishes such regular features as opinion articles, event calendar, short course announcements, awards, conference reports, policy news, as well as news of the 18 participating geoscientific societies.

### In 2019:

- ◆ *Elements* had a combined institutional and individual subscriber base of 15,000.

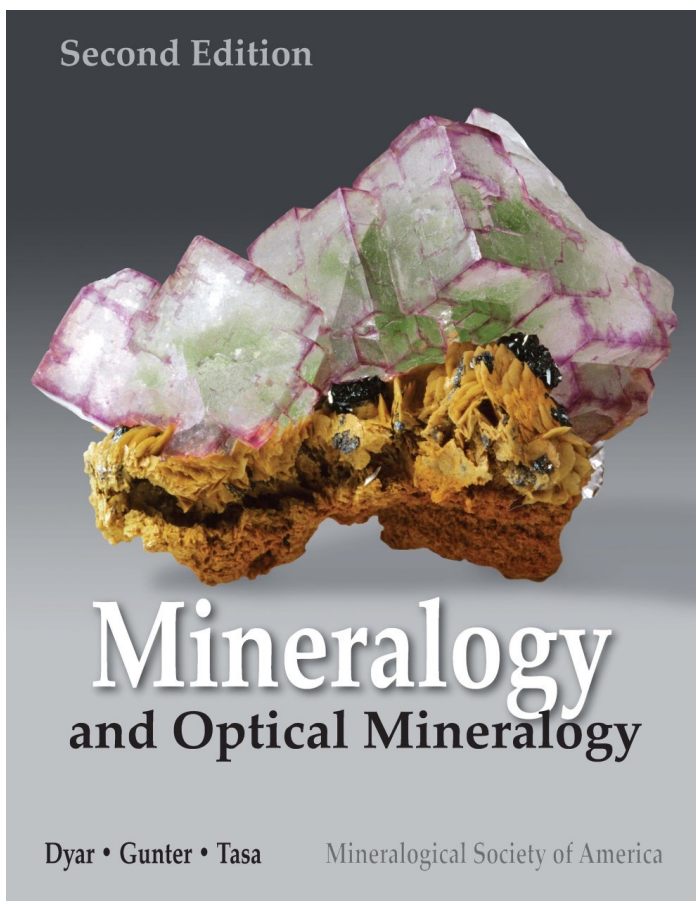
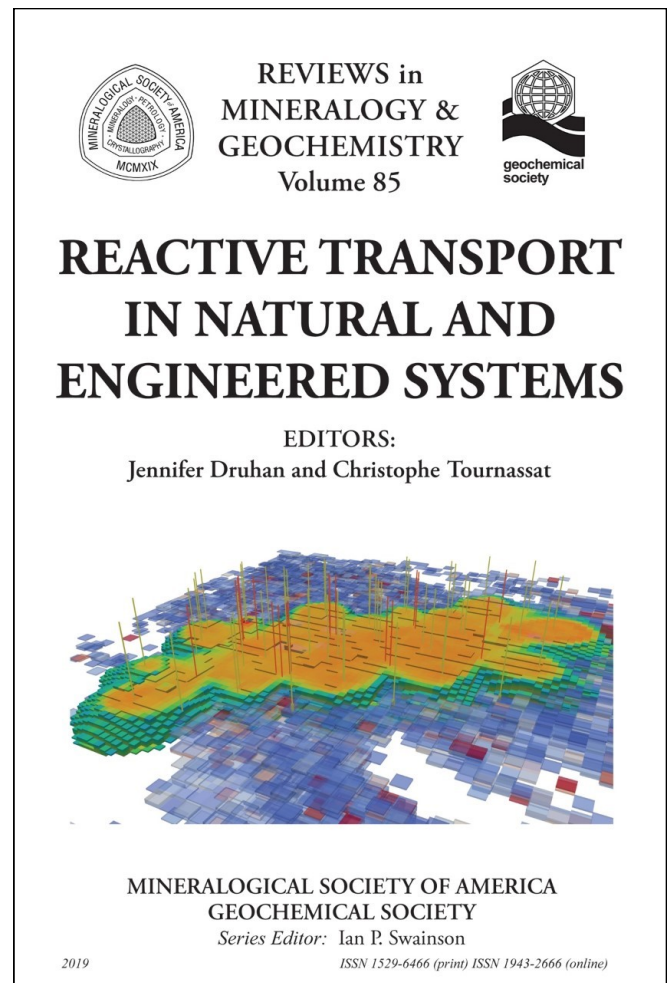
# Publications

## *Reviews in Mineralogy and Geochemistry*

*Reviews in Mineralogy and Geochemistry* (RiMG) is a series of multi-authored, soft-bound volumes containing concise reviews of the literature and advances in theoretical and/or applied mineralogy, crystallography, petrology, and geochemistry. Volumes are used for self-study, research, or as textbooks for graduate-level courses. The series is jointly published by MSA and the Geochemical Society.

### In 2019:

- ◆ RiMG Volume 85: *Reactive Transport in Natural and Engineered Systems* (Jennifer Druhan and Christophe Tournassat) was published.



## *Textbooks and Monographs*

MSA publishes textbooks and a collection of monographs on a variety of topics. These range from mineralogy and optical mineralogy to crystallography, mineral collections, teaching mineralogy, memoirs of mineralogists and more.

### In 2019:

- ◆ The second edition of *Mineralogy and Optical Mineralogy* (Dyar, Gunter, and Tasa) was published in color for the first time. It became available in both print and online editions (complete text or individual chapters). The textbook's animations are freely available online on the MSA website. Information about all the MSA publications is also posted at [www.minsocam.org](http://www.minsocam.org).

# Communications

## MSA-Talk

MSA-Talk is a highly active listserv moderated by the MSA Business Office. Postings include mineralogical questions, jobs, equipment requests, teaching suggestions, upcoming conferences, calls for papers and other similar items.

### In 2019:

MSA-Talk had 3,183 subscribers.

## MSA Website

The MSA website at [www.minsocam.org](http://www.minsocam.org) is the public face of MSA, with information about the organization, publications, grants and awards, governance, membership, and special events.

### In 2019:

- ◆ Mineralogy4Kids was the most popular feature of the site, with X visitors.

## MSA-Announce

MSA-Announce is a monthly e-newsletter sent to MSA members when a new volume of *American Mineralogist* is available online. MSA-Announce also includes information about new publications available through MSA, deadlines for awards and grants, and upcoming events and conferences.

## MSA on Facebook

MSA's Facebook (FB) page is moderated by Andrea Koziol, MSA's new Social Media Liaison.

### In 2019:

- ◆ MSA's FB group had close to 35,000 members and over 3,000 followers.

## MSA on YouTube

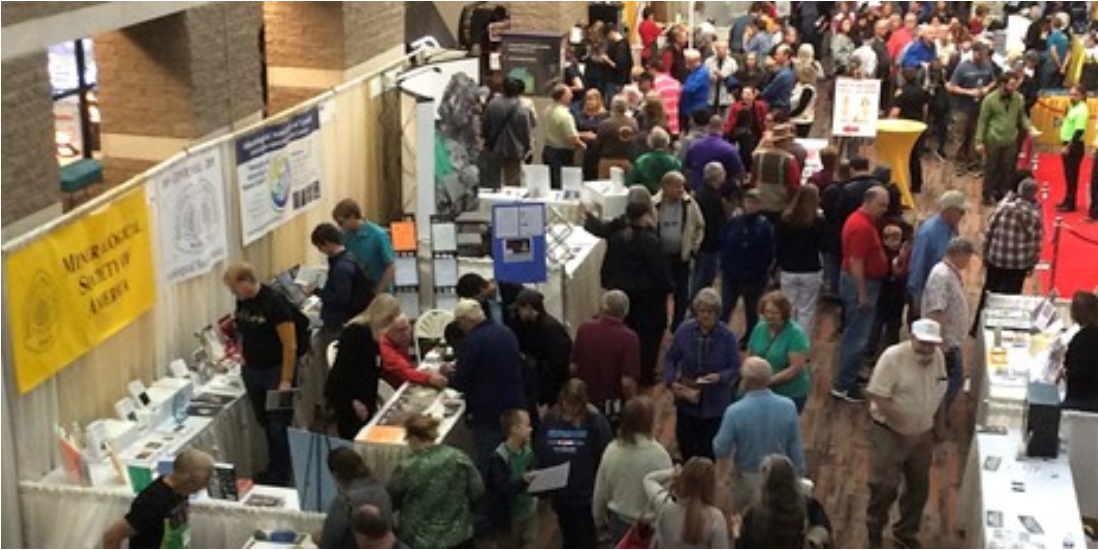
MSA's YouTube Channel features videos on wide-ranging topics in mineralogy, petrology, and geochemistry.

### In 2019:

- ◆ MSA posted 48 videos from the Centennial Symposium, June 20-21, Washington, DC.

The screenshot shows the homepage of the Mineralogical Society of America. At the top, there is a search bar and navigation links for "Join MSA", "MSA Book Store", and "Contact Us". A dark blue navigation bar contains the following menu items: Home, Publications, American Mineralogist, Reviews, Awards & Grants, Education & Outreach, Directory, Membership Benefits, Meetings & Tutorials, Mineral Related Links, About MSA & Contacts, and Interest Groups. The main content area features a large image of a green mineral crystal on the left. In the center, there is a banner for the "1919 - CENTENNIAL - 2019" with a circular logo and the text "Mineralogical Society of America" and "Information on All MSA Centennial Events". To the right of the banner are several book covers, including "Rubellite" (Tourmaline Rouge), "REACTIVE TRANSPORT IN NATURAL AND ENGINEERED SYSTEMS", and "Mineralogy and Optical Mineralogy". At the bottom, there is a section for "Online Access to MSA Publications" with a "MinPubs.org" logo and the text "Buy Articles or Book Chapters, (print or electronic) from MSA or Elements".

## Other Meetings



MSA Booth at the  
2019 Tucson Gem  
and Mineral Show  
(TGMS)

**Tucson Gem and Mineral Show.** MSA started the year with a booth at the 65th Tucson Gem and Mineral Show (TGMS), Tucson, AZ, (14-17 February 2019). The large space was shared with the Mineralogical Association of Canada, which allowed for an even large, walk-through booth. The show theme was "Wulfenite." MSA Members John Rakovan and Carl Bowser (retired to Tucson from University of Wisconsin) again assisted at the booth. The purpose of a booth at TGMS is to promote mineralogy and MSA, to a large, new audience enthusiastic about minerals. The booth is busy with questions from the public, and there is a variety of display items that attract visitors. 2019 was unusually busy with people looking at and asking questions about the "*Mineralogy, Petrology, Geochemistry, and Volcanology at Every Age*" display. A number of engaged people read every word or took pictures for each item.

**2019 Spring SE-GSA.** MSA had a highly interactive booth at the Southeastern Section of the Geological Society of America in Charleston, SC, 28-29 March 2019.



MSA Booth at the Southeast  
Regional Meeting

# Contributions

MSA wishes to thank its very generous corporate benefactors and special contributors to the Centennial events. Their gifts made 2019 a highly successful year for donations. MSA also wishes to thank all of its members who have made contributions to MSA's endowment funds. These support our student research grants, the distinguished lecture program, our educational offerings, and overall infrastructure. All those who gave to MSA in 2019 are listed on our website.

Many members support MSA by including a contribution with their annual dues and/or by responding to special appeals. Depending on the wishes of the member, the money is deposited with the principal of the MSA Endowment, MSA Outreach, MSA Mineralogy/Petrology, J. B. Thompson, Edward H. Kraus Crystallographic Research, Bloss, or General Operating Funds. The income of these Funds is used to support MSA's research grants in crystallography, mineralogy, and petrology; publishing of the *American Mineralogist*; the MSA Undergraduate Prizes; the Mineralogical Society of America Award; the Distinguished Public Service Award, the Dana Medal, the Roebling Medal, the website, the lectureship program, and the Centennial Symposium.

## Centennial Contributors

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Geochemical Society



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# Contributions

## *University Centennial Contributors Honoring MSA Presidents*

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# A Tribute to J. Alex Speer

## MSA Executive Director

### 1995—2020

J. Alexander Speer came on board as MSA's chief business officer in 1995. At that time, MSA, like many professional science organizations, was facing the challenges of declining membership, an economic recession, and threats to publication subscriptions. As an organization founded in 1919, MSA knew that, to survive, it needed to be financially stable. MSA also needed a solid business infrastructure and staff to maintain and grow its programs and publications.

Alex, as a mineralogist, knew the value of MSA to the scientific community, and was able to create new ways of increasing that value. He anticipated the onset of online publishing. He ensured that, through the new consortium GeoScience-World, and through MSA's website, *American Mineralogist* and MSA's other publications would be available online.

He was also instrumental in the launch of *Elements* magazine, an effort spearheaded by then MSA President Rodney Ewing. Since the first issue in 2005, *Elements* has been a huge success, climbing to 15,000 subscribers with 18 participating Societies.

Alex also made sure that MSA's programs educated a variety of audiences about the importance of mineralogy in the world. The successful Distinguished Lecture Program provides college audiences with the opportunity to hear about the latest discoveries in the field. Mineralogy4Kids is a well-crafted and informative resource for the K-12 audience, and Collectors' Corner is designed to meet the needs of the collector community.

Alex also personally designs and staffs MSA's booth displays for the Geological Society of America conference each year, as well as the annual Tucson Gem and Mineral Show. These engaging and educational displays raise the profile of MSA to many younger scholars, as well as the general public.

For all of his efforts over the years, Alex received MSA's Distinguished Public Service Medal in 2015. This award is given by the MSA Council to "individuals or organizations who have made important contributions to furthering the vitality of the geological sciences, especially, but not necessarily, in the fields of mineralogy, geochemistry, petrology, and crystallography." In his citation for the award, Peter Heaney referred to Alex this way: "Alex is not merely the Executive Director of MSA. He is its heart and soul as well."

Alex decided to retire at the end of 2019, but will still be involved in many capacities as an MSA Senior Fellow. MSA offers huge thanks to Alex for his 25 years of dedicated and inspired leadership of the organization, and wishes him the very best in his retirement. We will miss him!



