# The Clay Minerals Society

www.clays.org

## THE PRESIDENT'S CORNER

W. Crawford Elliott

Size matters. In small scientific societies, such as the Clay Minerals Society (CMS), the role of Chair or President often involves doing lots of work with a dedicated staff member or two and making many requests to delegate additional work. The work gets done. All is well. That routine has been my experience for the past few years. I have had strong CMS office support, and I have had the ear and time of many colleagues who have stepped up when needed. I thank the staff and many members for their dedicated efforts to help further the reach of the CMS.

Size also matters in considering the work and impact of smaller scientific groups. The CMS is a relatively small group in the *Elements* family (maybe mid-sized), yet we wield an appropriate (perhaps more than appropriate) amount of influence on our related scientific communities. In addition to our ability to convey results via our annual meeting, our journal (*Clays and Clay Minerals*), and our workshop volumes, our stock and trade is in understanding the many roles played by the small minerals in rocks, soils, and industrial materials. We marshal many technologies to study these small, but important, minerals. We are at the leading edge in some technologies (e.g. quantitative mineral determination via X-ray diffraction). We exert considerable influence on paleoclimate reconstructions, the geomechanics of soils and sedimentary media, the fate and transport of anthropogenic contaminants, the thermal-history analysis of sedimentary basins, fluid flow in source and reservoir rocks for crude oil and natural gas, the isolation of landfills and high-level nuclear waste repositories, and many others. Economically, society depend on kaolin, bentonite, and other fine-grained clays for many nonglamorous, but useful, applications. And let us not forget the ongoing exploration of Mars and the stories that Martian clay minerals are telling us. All told, clay minerals are able to do what they do in rocks and soils because size matters. In these examples, being a small mineral is a key to the success of these applications. We all appreciate that size matters, big and small.

The CMS is pleased to be a contributing part of the *Elements* family. We have much more to contribute in the years to come. I am hopeful that CMS members will continue to take leadership and author roles in *Elements*. As the outgoing president, I thank our friends in *Elements* for another great year of good science and good published work. I also thank Ian Bourg for his work in putting together the CMS society pages for *Elements*.

My final task for my final report is to introduce Dr. Prakash Malla, the new CMS president effective 11 July 2015. Prakash is well-known in clay mineral circles for his innovative work on kaolin and related clays. He is a technical director at Thiele Kaolin Company. I wish Prakash much success in his presidential duties for this coming year.

Sincerely,

**W. Crawford Elliott**, President, The Clay Minerals Society
wcelliott@gsu.edu

## GLOSSARY OF CLAY SCIENCE

The latest version of the *Glossary of Clay Science* (April 2015) is now available on the CMS website. It can be viewed online or downloaded in .doc or .pdf format at www.clays.org/glossary/clay_glossary.htm. The updated glossary includes about 65 new terms and definitions, primarily related to clay textures. Requests for other terms to be included in future editions should be directed to the chair of the CMS Nomenclature Committee, Dr. S. Guggenheim (xtal@uic.edu).

## STUDENT RESEARCH SPOTLIGHT

Congratulations to **Mathias Köster** (Technische Universität München), **Joanna Wilford** (University of Georgia), and **Kyle Cox** (Western Michigan University) for winning a CMS Student Research Grant!

Mathias H. Köster's doctoral research is on **the genesis of bentonite deposits.** His research uses X-ray diffraction, portable X-ray fluorescence, stable and radiogenic isotope analyses, secondary ion mass spectrometry, and prompt gamma neutron activation analysis to examine the origin of smectites and associated carbonates. Mathias has shown that boron (B) isotopes indicate the involvement of both marine and nonmarine, B-rich saline fluids during sodium bentonite formation. Mathias also found that carbonate minerals in bentonites can be used as proxies for water compositions, redox states, and as tracers of Mg and Ca ions for microbial dolomitization and associated bentonitization. One practical implication is that freshwater bentonites in southern Germany are practically free of sodium and contain only small amounts of other water-leachable components. This makes them particularly well suited as fining agents for treating beer and wine. Mathias' student research grant was accompanied by the **Robert C. Reynolds, Jr. Award** for the best proposal received by the CMS in 2014.

Joanna Wilford's research focuses on identifying **mineralogical controls on sandstone weathering in quarries and in the built environment**. Joanna has examined quarry samples of the sandstones used to construct the Angkor temples in Cambodia (Kulen Mountain sandstone), the nineteenth-century brownstone buildings of the northeastern United States (Portland brownstone), and the pre-1906 campus buildings of Stanford University (Stanford sandstone). These sandstones undergo weathering in a variety of climates and they present preservation challenges in historically significant structures. Joanna used thin section petrography, X-ray diffraction, and electron microprobe analysis to characterize the mineralogy of the sandstones, focusing on the matrix and cement. In all samples, she discovered that the sandstone matrix contained swelling clays (mixed chlorite–smectite or illite–smectite) that can explain the contour scaling and cracking observed in the historic buildings.

Kyle Cox investigated the **thermal history of the Michigan Basin** by analyzing the authigenic minerals of the Upper Paleozoic strata: secondary dolomites in the Devonian Dundee Formation and clay cements in the Mississippian Marshall sandstone. The diagenetic conditions for the authigenic minerals were compared to expected thermal and chemical conditions based on depositional and burial history. Kyle found that the authigenic dolomite and illite had formed at temperatures greater than expected from burial alone and that they had formed in the presence of saline brines sourced from deeper within the basin. This reinforces the idea that the thermal history of the Michigan Basin results from episodic and extensive hydrothermal activity associated with the reactivation of basement faults in the failed Proterozoic rift that underlies the basin, possibly due to Appalachian tectonic events.