

## **Matthew S. Sanchez**

### **Education:**

Ph.D., Geology, University of Idaho, 2012  
M.S., Geology, University of Idaho, 2007  
B.S., Geology, University of Idaho, 2005

### **Career/Employment:**

2012-Present RJ Lee Group, Inc., Technical Manager, Technical Consulting Services  
2011-2012 RJ Lee Group, Inc., Technical Manager, Optical, TEM and XRD Services  
2009-2011 RJ Lee Group, Inc., Technical Manager, Optical and XRD Services  
2007-2009 RJ Lee Group, Inc., Scientist

### **Summary:**

- » Technical oversight of optical microscopy and x-ray diffraction services
- » Quantitation of amphibole and chrysotile group minerals by powder X-ray Diffraction
- » Optical characterization of minerals and materials
- » Determination of asbestos minerals in bulk materials samples
- » Quantitative mineralogy of building materials by light microscopy
- » Determinative mineralogy of rock quarry samples by light microscopy
- » Characterization of amphibole minerals
- » Applied analytical techniques include polarized light microscopy (PLM), Scanning electron microscopy, Powder X-ray diffraction, and Electron probe microanalysis.

### **Honors, Awards, Fellowships & Current Memberships:**

Mineralogical Society of America  
Mineralogical Association of Canada  
Geological Society of America

## Publications & Presentations

Sanchez, M.S. and Bandli, B.R. (2014) Direct Analysis of Amphiboles on Tree Bark by SEM Utilizing both EDS and EBSD techniques from Libby, Montana and Implications on Public Perception. Geological Society of America Abstracts with Programs.

Sahmel, J., C.A. Barlow, B. Simmons, S.H. Gaffney, H.J. Avens, A.K. Madl, J. Henshaw, R.J. Lee, D. Van Orden, M. Sanchez, M. Zock, D.J. Paustenbach, "Evaluation of Take-Home Exposure and Risk Associated with the Handling of Clothing Contaminated with Chrysotile Asbestos", Risk Analysis, 34:8, pp. 1448-1468, 2014.

Lee, R.J., M.S. Sanchez, D.R. Van Orden, L. Li, "Acceptability of Method Short Cuts in TEM Asbestos Analysis", presented at Inter/Micro, McCrone Research Institute, June 2014.

Lee, R. J, M. Sanchez, D.R. Van Orden, L. Li, "Acceptability of Method Short Cuts in TEM Asbestos Analysis", presented at Inter/Micro 2014, Chicago, IL, June 2014.

Sahmel, J., C. Barlow, B. Simmons, S. Gaffney, H. Avens, A. Madl, J. Henshaw, R. Lee, D. Van Orden, M. Sanchez, M. Zock., D.J. Paustenbach, "Evaluation of Take-Home Exposure and Risk Associated with the Handling of Clothing Contaminated with Chrysotile Asbestos", Risk Analysis, 34:8, pp. 1448-1468, 2014.

Sanchez, M.S., M.E. Gunter, Calculated Nominal Ranges of Refractive Indices for the Amphiboles Found in the Rainy Creek Igneous Complex, The Microscope 61(2), 75-84, 2013.

Van Orden, D. R., M. Sanchez, J.M. Wilmoth, "Effect of Sample Preparation on Observed Airborne Fiber Characteristics", The Microscope, 60, pp. 51-61, 2012.

Van Orden, D.R., R.J. Lee, M.S. Sanchez, M.D. Zock E.B. Ilgren, Y. Kamiya, Y. (2012) Evaluation of Airborne Crocidolite Fibers at an Asbestos-Cement Plant. Annals of Respiratory Medicine, In Press.

Sanchez, M.S. and M.E. Gunter (2012) Quantifying amphibole asbestos by powder X-ray diffraction and polarizing light microscopy: Using Soils from Libby Montana and El Dorado Hills, California, Geological Society of America Abstracts with Programs.

Sanchez, M.S., and Gunter M.E. (2012) Calculated average refractive indices for the amphiboles found in the Rainy Creek Igneous Complex, near Libby, Montana, USA. Inter/Micro Abstracts with Programs.

Van Orden, D.R., R.J. Lee, M.S. Sanchez, M.D. Zock, "The Size Distribution of Airborne Bolivian Crocidolite Fibers", Annals of Respiratory Medicine, July 2012.

Van Orden, D.R., R.J. Lee, M.S. Sanchez, M.D. Zock, E.B. Ilgren, Y. Kamiya, "Evaluation of Airborne Crocidolite Fibers at an Asbestos-Cement Plant", Annals of Respiratory Medicine, July 2012.

Van Orden, D.R., J.M. Wilmoth, M. Sanchez, "Effect of Size Reduction Processes on the Apparent Fiber Content of Rock Samples", *The Microscope*, Vol 60:1, pp3-9, 2012.

Van Orden, D., M. Sanchez, "Asbestos – What's in a Name?" presented at the 2011 Geological Society of America Annual Meeting, Minneapolis, MN, October 2011.

Van Baalan, M.R., Arlauckas, S.M., and Sanchez, M.S. (2011) Amphiboles From New Idria California. Geological Society of America Annual Meeting, Abstracts with Programs.

Sanchez, M.S., and Bieber, D. (2010) Recommendations For The Characterization of NIOSH Asbestos Fibers in NOA Materials. American Environmental Geologist Annual Meeting Abstracts with Program.

Lee, R.J., D. Van Orden, M.S. Sanchez, (Common Errors Associated with the Analysis of Tremolitic Talc. ASTM Michael Beard Conference, 2010.

Strohmeier, B.R., J.C. Huntington, K.L. Bunker, M.S. Sanchez, K. Allison, R.J. Lee, "What is asbestos and why is it important? Challenges of defining and characterizing asbestos," *International Geology Review*, Volume 52, Issue 7 & 8, pp. 801-872, July 2010.

Hall, R.J., M.S. Sanchez, K.P. Rickabaugh, "An Evaluation of Fly Ash in Sediment by Microscopy", TVA Fly Ash Symposium, 2010.

Lee, R.J., K.A. Allison, K.L. Bunker, K.E. Harris, J.C. Huntington, M.S. Sanchez, B.R. Strohmeier, D. R. Van Orden, "The Challenges of Defining and Characterizing Asbestos", presented at the 45th Annual Meeting of the Northeastern Section, GSA, Baltimore, Maryland, March 2010.

Lee, R. J., D.R. Van Orden, M. Sanchez, "Common Errors Associated with the Analysis of Tremolitic Talc", presented at ME Beard Conference, San Antonio, TX, January 2010.

Van Orden, D. R. and M. Sanchez, "CARB Definitions of Asbestos", presented at GSA Annual Meeting, Portland, OR, October 2009.

Gunter, M.E., M.S. Sanchez, "Amphibole Forensics: Using the Composition of Amphiboles to Determine Their Source, the Libby, Montana, Example," *American Mineralogist*, Vol. 94, pp 837-840, 2009.

Sanchez, M.S., "Things once known now forgotten? The use of Optical Mineralogy in Regulatory Methods: The Libby Montana Example," presented to Geological Society of America, 2009.

Sanchez, M.S., M.E. Gunter, C.L. Lopano, "Using Powder X-Ray Diffraction to Screen for Asbestos Minerals Occurring in their Natural Settings," presented at The 14th International Clay Conference, Castellaneta, Italy, 2009.

Sanchez M.S., M.E. Gunter, "Correlations Between Trace Elements and Morphology of a Fibrous Tremolite from Montgomery County, Maryland, USA," *Periodico di Mineralogia*, Vol. 77, No. 2, pp 20-25, 2008.

Sanchez, M.S., R.J. Lee, D.R. Van Orden, "Extinction Characteristics of Six Tremolites with Differing Morphologies", *The Microscope*, Vol. 56, No.1, pp 13-27, 2008.

Sanchez, M.S., M.E. Gunter, M.D. Dyar, "Characterization of Historic Amphibole Samples from the Former Vermiculite Mine near Libby, Montana U.S.A.," *European Journal of Mineralogy*, Vol. 20, pp 1043–1053, 2008.

Gunter, M.E., M.S. Sanchez, "Amphibole Content of Commercial Vermiculites by Powder X-Ray Diffraction," *Periodico di Mineralogia*, Vol. 77, No. 2, pp 35-41, 2008.

Bunker, K.L., M.S. Sanchez, G. Casuccio, T. Lersch, B. R. Strohmeier, R J. Lee, "Complementary STEM and SEM Imaging of Nanoparticles in an Ultra-High Resolution, Low kV SEM", presented at *Microscopy & Microanalysis*, Albuquerque, NM, August 2008.

Lee, R.J., B.R. Strohmeier, K.L. Bunker, M.S. Sanchez, D.R. Van Orden, "The Challenge of Naturally Occurring Asbestos-Characterization of Amphibole Particles in Mixed Mineral Dust," presented at the Roy J. Shlemon Specialty Conference on the Geological Assessment of Naturally Occurring Hazardous Substances, AEG Foundation and Association of Environmental & Engineering Geologists, Folsom, CA, June 2008.

Gunter, M.E., M.S. Sanchez, T.J. Williams, "Characterization of Chrysotile Samples for the Presence of Amphiboles from the Carey Canadian Deposit, Southeastern Quebec, Canada," *The Canadian Mineralogist*, Vol. 45, pp 263-280, 2007.

Williams, T.J., M.E. Gunter, M.S. Sanchez, "Needle in the X-Ray Haystack: Detection Limits in Powder X-Ray Diffraction of Geologic Materials," presented to the Geological Society of America, 2007.

Sanchez, M.S., M.E. Gunter, "Quantification of Amphibole Content in Expanded Vermiculite Products from Libby, Montana U.S.A. Using Powder X-Ray Diffraction," *American Mineralogist*, 91, pp 1448-1451, 2006.

Gunter, M.E., M.S. Sanchez, "Characterization of Chrysotile Samples and Ores for the Presence of Amphiboles from the Former Carey Canadian Mine, Southeastern Quebec, Canada," *Eos Trans. AGU*, 87(36), Jt. Assem. Suppl., V23A-04, 2006.

Sanchez, M.S., M.E. Gunter, M.D. Dyar, S.R. Badger, G.C. Hobbs, D.R. Van Orden, M.S. Potter, "Characterization of Historical Amphibole Samples from the Former Vermiculite Mine Near Libby, Montana U.S.A.," presented at the Geological Society of America, Philadelphia, PA, October 2006.

Gunter, M.E., T.J. Williams, M.S. Sanchez, K.E. Harris, K.L Bunker, R.K. Wyss, R.J. Lee, "Amphiboles Between the Sheets: An Interesting Occurrence with Even More Interesting Morphologies," presented to the Geological Society of America, 2006.

Gunter, M.E., R.T. Downs, K.L. Bartelmehs, S.H. Evans, C.J.S. Pommier, J.S. Grow, M.S. Sanchez, F.D. Bloss, "Optic Properties of Centimeter-Sized Crystals Determined in Air with the Spindle Stage Using EXCALIBRW," American Mineralogist, Vol. 90, pp 1648-1654, 2005.

Nell, M., J. Grow, M.S. Sanchez, C. Pink, J. Bird, B. Tillquis, John S. Oldow, B. McClelland, "Late Cretaceous and Tertiary Structures of the Western Idaho and Orofino Shear Zones, West Central Idaho," presented to the Geological Society of America, October 2005.

Sanchez, M.S., M.E. Gunter, "Low-Level Detection of Libby Amphiboles in Attic Insulation," presented at the 15th Annual Goldschmidt Conference, Moscow, Idaho USA, 2005.