

**ADAM F. WALLACE**

Department of Geological Sciences  
University of Delaware

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**EDUCATION****Virginia Polytechnic Institute and State University**

Blacksburg, VA

Ph.D., Geochemistry, May 2008

Department of Geosciences

Thesis: Biologically controlled mineralization and demineralization of amorphous silica

**University of California**

Davis, CA

B.S., Geology (minor in English Literature), September 2001

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**EXPERIENCE****University of Delaware**

Newark, DE

Assistant Professor, Department of Geological Sciences (August 2013 – present)

**Lawrence Berkeley National Laboratory**

Berkeley, CA

Postdoctoral Fellow, Earth Sciences Division and Molecular Foundry (August 2009 – August 2013)

**Virginia Polytechnic Institute and State University**

Blacksburg, VA

Postdoctoral Associate, Department of Geosciences (June 2008 – August 2009)

Graduate Research Assistant, Department of Geosciences (August 2004 – May 2008)

Graduate Teaching Assistant, Department of Geosciences (August 2003 – August 2004)

**Lawrence Livermore National Laboratory**

Livermore, CA

Scientific Technician, Energy and Environment Directorate (October 2001 – August 2003)

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**TEACHING****University of Delaware, Department of Geological Sciences**

Spring 2015

- GEOL 467/667, Geochemistry (18 students: 11 undergraduate, 7 graduate)

Fall 2014

- GEOL 202, Earth Materials, co-taught with Dr. Sue McGeary (21 undergraduate students), overall student rating: (4.17/5.0)
- GEOL 666, Special Problems (4 graduate students)
- GEOL 601, Geological Sciences at Delaware (4 graduate students)

– Prior to August 1<sup>st</sup> 2013 –**Virginia Polytechnic Institute and State University, Department of Geosciences**

Spring 2004

- GEOS 1124, Resources Geology Laboratory (3 sections), overall student rating: (3.83 / 4.00)

Fall 2003

- GEOS 1104, Physical Geology Laboratory (3 sections), overall student rating: (3.87 / 4.00)
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## PUBLICATIONS

21 published or in press peer-reviewed products with 405 citations since 2009  
h-index = 10, i10-index =10

### Journal Articles and Chapters in Preparation

Wang, D., **Wallace, A.F.**, Krogstad, D., Pintar, A., Sarkar, S., Fernandez-Martinez, A. and Lin-Gibson, S., Structural changes in amorphous calcium phosphate controlled by composition.

Jaisi, D.P., Li, H., Paudel, P., Joshi, S.R., **Wallace, A.F.** and Learch, N.L., Tracking sources of glyphosate and its mechanism of degradation using phosphate oxygen isotope ratios.

**Wallace, A.F.**, Two phase thermodynamic model of H<sub>2</sub>O and CO<sub>2</sub> within the structures palygorskite-sepiolite group clay minerals under conditions relevant to geological carbon sequestration.

**Wallace, A.F.**, Development of an empirical force field model for magnesium sulfate hydrates – a model system for investigating the coexistence of two aqueous phases in hydrothermal fluids.

**Wallace, A.F.**, Applications of Atomic Force Microscopy in Biogeochemistry, in *Analytical Geomicrobiology: A handbook of instrumental Techniques*, D. Alessi, H. Veeramani and J. Kenney eds. Cambridge University Press.

Gale, J., **Wallace, A.F.** and Raiteri, P., Computer simulation of prenucleation clusters and liquid-liquid separation, in *New perspectives on mineral nucleation and growth*, L. Benning, A. Van Driessche, D. Gebauer and M. Kellermier eds.

### Journal Articles in Press

1. Dideriksen, K., Frandsen, C., Bovet, N., **Wallace, A.F.**, Sel, O., Arbour, T., Navrotsky, N., De Yoreo, J.J. and Banfield, J.F., Formation and transformation of a short range ordered iron carbonate precursor. *Geochimica et Cosmochimica Acta*.
2. De Yoreo, J.J., Gilbert, P.U.P.A., Sommerdijk, N.A.J.M., Penn, R.L., Whitlam, S., Joester, D., Zhang, H.Z., Rimer, J.D., Navrotsky, A., Banfield, J.F., **Wallace, A.F.**, Michel, F.M., Meldrum, F.C., Cölfen, H. and Dove, P.M., Crystallization by particle attachment. *Science* (**under information embargo**).

### Chapters in Edited Volumes

3. **Wallace, A.F.**, Application of enhanced sampling approaches to the early stages of mineralization, in *Biomining Sourcebook: Characterization of Biominerals and Biomimetic Materials*, E. DiMasi and L.B. Gower eds., CRC Press, 2014.
4. Hamm, L.M., Bourg, I.C., **Wallace, A.F.** and Rotenberg, B., Molecular simulation of CO<sub>2</sub>- and CO<sub>3</sub>-brine-mineral systems, in *Geochemistry of Geologic CO<sub>2</sub> Sequestration, Reviews in Mineralogy and Geochemistry v. 77*, D. DePaolo, D. Cole, A. Navrotsky, and I.C. Bourg eds., Mineralogical Society of America, 2013.

– Prior to August 1<sup>st</sup> 2013 –

5. **Wallace, A.F.**, Knoll, A., Hamm, L.M., Wang, D. and Dove, P.M., Eukaryotic skeletal formation, in *Fundamentals of Geobiology*, A. Knoll, D. Canfield, and K. Konhauser eds., Wiley-Blackwell, 2012.

### Published Journal Articles

6. Schiffbauer J.D., Xiao, S., Cai, Y., **Wallace, A.F.**, Hua, H., Hunter, J., Xu, H., Peng, Y. and Kaufman, A.J., A unifying model for Neoproterozoic–Palaeozoic exceptional fossil preservation through pyritization and carbonaceous compression. *Nature Communications*, 2014, 5:5754 DOI: 10.1038/ncomms6754.
  7. Schiffbauer, J.D., **Wallace, A.F.**, Broce, J. and Xiao, S., Exceptional fossil conservation through phosphatization. *The Paleontological Society Papers*, 2014, 20, 59 – 82.
  8. **Wallace, A.F.**, Hedges, L.O., Fernandez-Martinez, A., Raiteri, P., Whitelam, S.L., Waychunas, G.A., Gale, J., Banfield, J.F. and De Yoreo, J.J., Microscopic evidence for liquid-liquid separation in supersaturated CaCO<sub>3</sub> solutions. *Science*, 2013, 341 (6148) 885-889.
  9. **Wallace, A.F.**, Replica exchange methods in biomineral simulations, *Methods in Enzymology*, 2013, 532 71-93.
- Prior to August 1<sup>st</sup> 2013 –
10. Schiffbauer, J.D., **Wallace, A.F.**, Hunter, J.L. Jr., Bodnar, R.J. and Xiao S., Thermally-induced structural and chemical alteration of organic-walled microfossils: an experimental approach to understanding fossil preservation in metasediments. *Geobiology*, 2012, 5, 402 – 423.
  11. Gibbs, G.V., Crawford, T.D., **Wallace, A.F.**, Cox, D.F., Parrish, R.M., Hohenstein, E.G. and Sherrill, C.D., Role of long-range intermolecular forces in the formation of inorganic nanoparticle clusters. *Journal of Physical Chemistry A*, 2011, 115, 12933-12940. Special issue in honor of Richard W. Bader.
  12. Dove, J.E., Shillaber, C.M., Wallace, A.F. and Dove, P.M., A biologically inspired silicification process for improving mechanical properties of sand. *Journal of Geotechnical and Geoenvironmental Engineering*, 2011, 137(10) 949-1048.
  13. Gibbs, G.V., **Wallace, A.F.**, Cox, D.F., Downs, R.T., Ross, N.L. and Rosso K.M., Thioarsenides: A case for long-range directed Lewis acid-base van der Waals interactions. *Physics and Chemistry of Minerals*, 2011, DOI: 10.1007/s00269-010-0402-3.
  14. Hamm, L.M., **Wallace, A.F.** and Dove, P.M., Molecular dynamics of ion hydration in the presence of small carboxylated molecules and implications for calcification. *Journal of Physical Chemistry B*, 2010, 114 (32) 10488-10495.
  15. Gibbs, G.V., **Wallace, A.F.**, Zallen, R., Downs, R.T., Ross, N.L., Cox, D.F. and Rosso, K.M., Bond paths and van der Waals interactions in orpiment, As<sub>2</sub>S<sub>3</sub>. *Journal of Physical Chemistry A*, 2010, 114(23) 6550-6557.
  16. **Wallace, A.F.**, Gibbs, G.V. and Dove, P.M., Influence of ion-associated water on the hydrolysis of Si – O bonded interactions. *Journal of Physical Chemistry A*, 2010, 114(7) 2534-2542.
  17. Wang, D., **Wallace, A.F.**, De Yoreo, J.J. and Dove, P.M., Biomolecules influence calcification by controlling magnesium content of amorphous calcium carbonate. *Proceedings of the National Academy of Sciences, USA*, 2009, 106(51) 21511 - 21516.
  18. **Wallace, A.F.**, De Yoreo, J.J. and Dove, P.M., Kinetics of silica nucleation on carboxyl- and amine-terminated surfaces: Insights for biomineralization. *Journal of the American Chemical Society*, 2009, 131(14) 5244-5250.
  19. Gibbs, G.V., **Wallace, A.F.**, Cox, D.F., Dove, P.M., Downs, R.T., Ross, N.L. and Rosso, K.M., Role of directed van der Waals bonded interactions in the determination of the structures of molecular arsenate solids. *Journal of Physical Chemistry A*, 2009, 113 (4) 736-749.
  20. Gibbs, G.V., **Wallace, A.F.**, Cox, D.F., Downs, R.T., Ross, N.L. and Rosso, K.M., Bonded interactions in silica polymorphs, silicates, and siloxane molecules. *American Mineralogist*, 2009, 94 1085 - 1102.

21. Dove, P.M., Han, N., **Wallace, A.F.** and De Yoreo, J.J., Kinetics of amorphous silica dissolution and the paradox of the silica polymorphs. *Proceedings of the National Academy of Sciences, USA*, 2008, 129(29) 9903-9908.

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## INVENTIONS AND PATENTS

– Prior to August 1<sup>st</sup> 2013 –

- US Letters Patent      Cementation of soils using a biologically inspired process  
Filed: January 27, 2010  
Patent Serial Number: 61/298,727  
Co-inventors: J.E. Dove and P.M. Dove
- VTIP-07-013              Intellectual Property Disclosure: A biologically inspired silicification process for ground treatment (serial number 61/023,745)

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## MEDIA COVERAGE

Myerson, A.S. and Bernhardt, B.L., Nucleation from solution. *Science*, 2013, 341 (6148) 855-856.

Wigginton, N.S., Microbes driving the time machine. *Science*, 2015, 347 (6218) 143.

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## PRESENTATIONS

### Invited Lectures

1. **Wallace, A.F.**, CaCO<sub>3</sub> precursors: A revised interpretation based on experimental and theoretical evidence. Creative Research Institution, Hokkaido University, Sapporo, Japan, 2014.
2. Schiffbauer, J.D. and **Wallace, A.F.**, Exceptional fossil conservation through phosphatization. *Paleontological Society Short Course*. Vancouver, British Columbia, 2014.
3. **Wallace, A.F.**, Liquid and liquid-like states at the onset of mineral formation. Chemistry Department, Franklin and Marshall College, Lancaster, PA, 2013.
4. **Wallace, A.F.**, The onset of mineralization as a liquid-liquid separation process. U.S. Department of Energy Geosciences Workshop, Berkeley, CA, 2013.

– Prior to August 1<sup>st</sup> 2013 –

5. **Wallace, A.F.**, Liquid-liquid separation explains “non-classical” behavior during CaCO<sub>3</sub> crystallization. Department of Geological Sciences, University of Delaware, Newark, DE, 2013.
6. **Wallace, A.F.**, Towards an understanding of biomineralization processes through interrogation of model systems. Department of Chemistry, University of Connecticut, Storrs, CT, 2012.
7. **Wallace, A.F.**, Exploring Mineralization and dissolution processes with theory and experiment. Calera Corporation, Los Gatos, CA, 2010.
8. **Wallace, A.F.**, Kinetics of silica nucleation on Carboxyl and amine-terminated surfaces: Insights for biomineralization. Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, MD, 2008.
9. **Wallace, A.F.**, Surface-assisted nucleation of amorphous silica on organic monolayers and the electrolyte-promoted hydrolysis of Si-O bonded interactions. William R. Wiley Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA, 2008.
10. **Wallace, A.F.**, New insights into silica biomineralization and demineralization processes from experimental and theoretical model systems. Department of Earth and Environmental Sciences, Rensselaer Polytechnic Institute, Troy, NY, 2008.
11. **Wallace, A.F.**, Silica Biomineralization: Recent discoveries, new insights, and future directions. Geophysical Laboratory, The Carnegie Institute of Washington, Washington D.C., 2008.

12. **Wallace, A.F.**, Thermodynamic and kinetic controls on the demineralization, and controlled nucleation of biogenic silica Earth Sciences Directorate, Lawrence Livermore National Laboratory, Livermore, CA, 2006.

#### Invited Conference Abstracts

13. **Wallace A.F.**, Exploring the physical basis of dense liquid formation in the CaCO<sub>3</sub>-H<sub>2</sub>O system. *Materials Research Society Fall Meeting*, Boston, MA, 2014.
14. **Wallace A.F.**, On the Behavior of Hydrated CaCO<sub>3</sub> Clusters in Supersaturated Solutions. *Goldschmidt Abstracts*, 2014 2611. Sacramento, CA, 2014.
15. Banfield, J.F., DeYoreo J.J., Dove, P.M., Gilbert, P., Joester, D., Michel, F.M., Murray, C.B., Navrotsky, A., Penn, R.L., Rimer, J.D., Sommerdijk, N.A.J.M., **Wallace, A.F.**, Whitlam, S., and Zhang, H., Keynote: Characterizing Particle Mediated Crystal Formation. *Goldschmidt Abstracts*, 2014 113. Sacramento, CA, 2014.
16. **Wallace, A.F.**, Hedges, L., Fernandez-Martinez, A., Raiteri, P., Gale, J., Waychunnas, G.A., Whitlam, S., Banfield, J.F. and De Yoreo, J.J., Microscopic evidence for a dense liquid phase of calcium carbonate. *American Geophysical Union*. San Francisco, CA, 2013.  
– Prior to August 1<sup>st</sup> 2013 –
17. **Wallace, A.F.**, Keynote: Towards an understanding of biomineralization processes through interrogation of model systems. *Gordon Research Seminar on Geobiology*, Ventura, CA, 2013
18. De Yoreo, J.J., **Wallace, A.F.**, Li, D., Nielsen, M., Lee, J., Banfield, J.F. and Frandsen, C., Non-Classical Pathways of Mineralization: Pre-Nucleation Clusters and Oriented Attachment. *Mineralogical Magazine*, 76(6) 1634, 2012.
19. Dove, P.M., **Wallace, A.F.**, Stephenson, A.E., Wang, D., Hamm, L.M., and De Yoreo, J.J., Toward a mechanism-based understanding of skeletal formation: Toolbox for biomineralization past, present, and future. *Eos Trans. AGU*, 89(23), *Jt. Assem. Suppl., Abstract B34A-01*. Fort Lauderdale, FL, 2008.
20. Dove, P.M., Stephenson, A., Wang, D., Hamm, L.M., **Wallace, A.F.** and De Yoreo, J.J., From observation of form to molecular scale mechanisms: biomineralization research past, present and future. *Geological Society of America Abstracts with Programs*, Vol. 39, No. 6, p. 204. Denver, CO, 2007.

#### Contributed Conference Abstracts

21. Jaisi, D.P., Li, H., Paudel, P. and **Wallace A.F.**, Mechanism of degradation and degradation pathways of glyphosate. *Goldschmidt Abstracts*, 2015. Prague, Czech Republic.
22. Wang, D., Krogstad, D., Pintar, A., Lin-Gibson, S., Fernandez-Martinez, A. and **Wallace, A.F.**, Understanding structural changes in amorphous calcium phosphates as function of composition. *Goldschmidt Abstracts*, 2014 2623. Sacramento, CA, 2014.
23. **Wallace, A.F.**, Application of enhanced sampling methods to mineral nucleation and growth processes. *American Geophysical Union*. San Francisco, CA, 2013.
24. **Wallace, A.F.**, Hedges, L., Fernandez-Martinez, A., Raiteri, P., Gale, J., Waychunas, G.A., Whitlam, S., Banfield, J.F. and De Yoreo, J.J., Evidence for liquid-liquid separation at the onset of CaCO<sub>3</sub> mineralization: Implications for carbonate deposition in natural environments. *Geological Society of America Abstracts with Programs*, Vol. 45, No. 7, p. 673. Denver, CO, 2013.

25. **Wallace A.F.**, Hedges L., Fernandez-Martinez A., Raiteri P., Whitelam S., Waychunas G.A., Gale J., Banfield J.F. and De Yoreo J.J., Liquid-liquid Separation at the onset of CaCO<sub>3</sub> Formation. *Mineralogical Magazine*, 77(5) 2440. Florence, Italy, 2013.
26. Dideriksen, K., Frandsen, C., Bovet, N., **Wallace, A.F.**, Arbour, T., De Yoreo, J.J., Stipp, S.L.S. and Banfield, J.F., Formation and transformation of nanocrystalline iron carbonate precursors. *Mineralogical Magazine*, 77(5) 987. Florence, Italy, 2013.
- Prior to August 1<sup>st</sup> 2013 –
27. **Wallace, A.F.**, De Yoreo, J.J. and Banfield, J.F., Liquid-liquid separation explains “non-classical” behavior during calcium carbonate crystallization. *Geological Society of America Abstracts with Programs*, Vol. 44, No. 7, p. 136. Charollote, NC, 2012.
28. **Wallace, A.F.**, Banfield, J.F. and De Yoreo, J.J., Application of replica-exchange methods to the early stages of carbonate mineralization. *Materials Research Society Spring Meeting*. San Francisco, CA, 2012.
29. **Wallace, A.F.**, De Yoreo, J.J. and Banfield, J.F., Vanishing nucleation barrier results in appearance of an ion-rich liquid-like phase prior to CaCO<sub>3</sub> crystallization. *American Conference on Crystal Growth and Epitaxy (West)*. Fallen Leaf Lake, CA, 2012.
30. **Wallace, A.F.**, Banfield, J.F. and De Yoreo, J.J., Liquid-liquid separation explains “non-classical” behavior during calcium carbonate crystallization. *American Geophysical Union*. San Francisco, CA, 2012.
31. **Wallace, A.F.**, De Yoreo, J.J. and Banfield, J.F., Early stages of carbonate mineralization revealed from molecular simulations: Implications for authigenic mineral formation in natural environments. *Geological Society of America Abstracts with Programs*, Vol. 43, No. 5, p. 328. Minneapolis, MN, 2011.
32. **Wallace, A.F.**, De Yoreo, J.J., and Banfield, J.F., Exploring the onset of order in growing metal carbonate clusters using replica-exchange molecular dynamics. *Materials Research Society Fall Meeting*. Boston, MA, 2011.
33. **Wallace, A.F.**, De Yoreo, J.J. and Banfield, J.F., Early stages of carbonate mineralization revealed from molecular simulations: Implications for biomineral formation. *American Geophysical Union*. San Francisco, CA, 2011.
34. **Wallace, A.F.**, Raiteri, P., Gale, J., De Yoreo, J.J. and Banfield, J.F., Simulation of FeCO<sub>3</sub> ion clusters in aqueous solution: Implications for crystal growth. *American Geophysical Union*. San Francisco, CA, 2010.
35. Hamm, L.M., **Wallace, A.F.** and Dove, P.M., Impact of carboxylated molecules on cation hydration dynamics: Implications for calcification. *Materials Research Society Spring Meeting*. San Francisco, CA, 2010.
36. Wang, D., **Wallace, A.F.**, De Yoreo, J.J. and Dove, P.M., Investigation an amorphous precursor pathway to calcification: Implications for high magnesium carbonates. *Geological Society of America Abstracts with Programs*. Vol. 42, No. 5, p.162. Denver, CO, 2010.
37. **Wallace, A.F.**, Raiteri, P., Gale, J., De Yoreo, J.J. and Banfield, J.F., Towards an atomistic model of microbially-influenced iron-carbonate formation. Gordon Research Conference on Biomineralization, New London, NH, 2010.
38. Hamm, L.M., **Wallace, A.F.** and Dove, P.M., A molecular dynamics study of ion hydration: Implications for the roles of macromolecules in biological calcification. *Gordon Research Conference on Biomineralization*, New London, NH, 2010.
39. **Wallace, A.F.**, Raiteri, P., Gale, J., De Yoreo, J.J. and Banfield, J.F., Atomistic simulation of metal-carbonate cluster formation. *Geochimica et Cosmochimica Acta*, 74(11) Supplement 1094. Knoxville, TN, 2010.
40. Han, N., **Wallace, A.F.** and Dove, P.M., Effect of amino acids on energy barriers to silica nucleation and polymerization. *Geochimica et Cosmochimica Acta*, 74(11) Supplement 377, Knoxville, TN, 2010.

41. Hamm, L.M., **Wallace, A.F.** and Dove, P.M., Impact of carboxylated molecules on cation hydration dynamics and implications for calcification. *Geochimica et Cosmochimica Acta*, 74(11) Supplement 375, Knoxville, TN, 2010.
  42. Hamm, L.M., **Wallace, A.F.** and Dove, P.M., Effect of acidic biomolecules on ion solvation during calcification: A molecular dynamics investigation. *Geological Society of America Abstracts with Programs*, Vol. 41, No. 7, p.190. Portland, OR, 2009.
  43. Wang, D, Dove, P.M. and **Wallace, A.F.**, Carboxylated biomolecules control magnesium content of amorphous calcium carbonate: Insights for calcification. *Geological Society of America Abstracts with Programs*, Vol. 41, No. 7, p.189. Portland, OR, 2009.
  44. L.M. Hamm, **A.F. Wallace** and P.M. Dove. Effects of acidic organic molecules on the solvation of biologically relevant divalent cations. *Geochimica et Cosmochimica Acta*, 73(13) Supplement 488. Davos, Switzerland, 2009.
  45. Hamm, L.M., **Wallace, A.F.** and Dove, P.M., The role of biomolecules in cation desolvation during calcification: A molecular dynamics study. *American Geophysical Union*. San Francisco, CA, 2008.
  46. **Wallace, A.F.**, De Yoreo, J.J. and Dove, P.M., Silica biomineralization promoted by kinetic drivers at the solution-matrix interface. *Gordon Research Conference on Biomineralization*. New London, NH, 2008.
  47. **Wallace, A.F.** and Dove, P.M., New insights into the molecular-level control of silica mineralization by diatoms. *American Geophysical Union*. San Francisco, CA, 2007.
  48. Dove, P.M., **Wallace, A.F.** and Gibbs, G.V., Electrolyte-promoted demineralization of biogenic, vitreous, and crystalline silica: A density functional investigation. *Geochimica et Cosmochimica Acta*, 71(15) Supplement 234. Cologne, Germany, 2007. American Geophysical Union, San Francisco, CA.
  49. Dove, P.M., **Wallace, A.F.** and Gibbs, G.V., Electrolyte-promoted demineralization of biogenic, vitreous, and crystalline silica: A density functional investigation. *American Geophysical Union*. San Francisco, CA, 2007.
  50. Wang, D., **Wallace, A.F.**, Han, T.Y., Lee, J.R., Hailey, P.D., De Yoreo, J.J. and Dove, P.M., Investigating the physical basis of amorphous precursor transformation to calcite using patterned alkanethiol surfaces. *American Geophysical Union*. San Francisco, CA, 2007.
  51. **Wallace, A.F.** and Dove, P.M., Towards an understanding of biosilicification mechanisms: Nucleation of amorphous silica on organic surfaces. *Geochimica et Cosmochimica Acta*, 71(15) Supplement 1081. Cologne, Germany, 2007.
  52. **Wallace, A.F.** and Dove, P.M., Kinetic and thermodynamic drivers of amorphous silica nucleation on organic surfaces: towards an understanding of biosilicification processes. *Geological Society of America Abstracts with Programs*, Vol. 38, No. 7, p. 182. Philadelphia, PA, 2006.
  53. **Wallace, A.F.** and Dove, P.M., Exploring silica chemistry at biological interfaces: kinetic and thermodynamic drivers of surface nucleation. *American Geophysical Union*. San Francisco, CA, 2006.
  54. Dove, P.M., **Wallace, A.F.**, Gibbs, G.V., The role of divalent alkaline earth cations in the electrolyte-promoted hydrolysis of Si—O—Si bonded networks. *American Geophysical Union*. San Francisco, CA, 2006.
  55. Han, N., De Yoreo, J.J., **Wallace, A.F.** and Dove, P.M., Using nucleation theory to understand the dissolution kinetics of vitreous and biogenic silica: the paradox of the silica polymorphs. *American Geophysical Union*. San Francisco, CA, 2006.
  56. **Wallace, A.F.** and Dove, P.M., Observation of nucleation and early stage growth of amorphous silica on carboxyl-terminated model biosubstrates. *American Geophysical Union*. San Francisco, CA, 2005.
  57. Burton, E.A., Bourcier, W.L., **Wallace, A.F.**, Bruton, C.J. and Leif, R., Silica scale management: lowering operation costs through improved scale control, and adding value by extracting marketable byproducts. *Geothermal Resources Council*. 2003.
  58. Bourcier, W.L., **Wallace, A.F.**, Ralph, B., and Bruton, C.J., Silica extraction at the Mammoth Lakes, CA geothermal site. *Geothermal Resources Council*. 2002.
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## PROPOSALS (UNFUNDED OR PENDING)

- Polysilicic acids as reusable templates for biopolymer assembly, **Searle Foundation**, PI Adam Wallace. Pre-proposal submitted 08/09/2013, full proposal submitted 11/19/2013, *not selected to go forward in internal competition*.
- Investigating the physical basis for the formation, persistence, and transformation of mesoscopic dense liquid phases in natural and engineered environments, **U.S. Department of Energy Early Career Program**, PI Adam Wallace, \$786,817. Pre-proposal submitted 09/05/2013, full proposal submitted 11/19/2013, *not recommended for funding*.
- Influence of orientation dependent forces during self-assembly of crystalline materials and nanoparticle aggregates, **University of Delaware Research Foundation**, PI Adam Wallace, \$35,000. Submitted 01/15/2015, *not recommended for funding*.
- Pre-proposal, **NASA EPSCoR**, PI Adam Wallace, co-PI James Schiffbauer (University of Missouri). Submitted 02/14/2014, *not selected to go forward in internal competition*.
- Authigenic mineral deposition during the early stages of soft tissue fossilization: Assessing the influence of tissue type and mineralization pathway on preservation potential, **American Chemical Society Petroleum Research Fund**, PI Adam Wallace, \$110,000. Submitted 03/12/2014, *not recommended for funding*.
- Collaborative Research: Investigating the physical basis for the postmortem biomineralization of labile soft tissues: Aluminosilicification, **National Science Foundation, Geobiology and Low-temperature Geochemistry Program**, PI Adam Wallace, co-PI James Schiffbauer (University of Missouri), \$164,548 (UD portion). Submitted 07/16/2014, *not recommended for funding*.
- Exploring the relationship between metal adsorption and the surface reactivity of SiO<sub>2</sub>-based nanomaterials, **National Science Foundation, Environmental Chemical Sciences Program**, PI Adam Wallace, \$238,296. Submitted 10/31/2014, *pending*.
- Towards development of simulation-based tools for predicting liquid-liquid immiscibility in salt-bearing geological fluids, **National Science Foundation, Petrology and Geochemistry**, PI Adam Wallace, \$123,374. Submitted 01/12/2015, *Pending*.
- Assessment of sepiolite-palygorskite group minerals for CO<sub>2</sub> capture and storage, **University of Delaware Research Foundation**, PI Adam Wallace, \$35,000. Submitted 01/13/2015, *pending*.
- The role of authigenic silicates in the stabilization of labile organic matter during early stage diagenesis, **American Chemical Society Petroleum Research Fund**, PI Adam Wallace, \$110,000. Submitted 03/13/2015, *pending*.

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## STUDENT ADVISING

- Brianna McEvoy, M.S., Geological Sciences, current
  - Yifei Ma, Ph.D., Geological Sciences, current
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## UNIVERSITY, COLLEGE AND DEPARTMENTAL SERVICE

- Organized Geological Sciences Seminar Series, Spring 2014 (co-organized with Dr. Michael O'Neal)
- Chair of the Geological Sciences Department Safety Committee and Chief Chemical Hygiene officer (Fall 2014 – present)
- Geological Sciences Faculty Senate Representative (Spring 2015 – present)
- Dissertation Committees:
  - Christopher Goodwin, Chemistry Department, University of Delaware (Ph.D. in progress)
- Geological Sciences Qualifying Exam Panel (Spring 2015)

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## PROFESSIONAL ACTIVITIES

- Proposal Reviewer, U.S. Department of Energy BES-Geosciences Program (2014)
- Proposal Reviewer and Panelist, NSF-EAR – Geobiology and Low-temperature Geochemistry program (2013)
- Session Organizer, New perspectives on mineral nucleation and phase transformations: Prenucleation clusters, dense liquid phases, and amorphous intermediates, *V.M. Goldschmidt Meeting*, Sacramento, CA (2013)
- Reviewer: *Geochimica et Cosmochimica Acta*, *Journal of Physical Chemistry*, *Proceedings of the National Academy of Sciences*, U.S.A., *Environmental Science and Technology*, *Langmuir*, *American Journal of Science*, *Clays and Clay Minerals*, *Geology*, *European Journal of Mineralogy*, *Nature Communications*, *Journal of the American Chemical Society*.
  - Prior to August 1<sup>st</sup> 2013 –
- Session Organizer, Nucleation, growth and aggregation of mineral particles in geochemical systems, *American Geophysical Union Annual Meeting*, San Francisco, CA (2012)
- Session Chair, Insights in Geochemistry, *Geological Society of America Annual Meeting*, Charlotte, NC (2012)
- Proposal Reviewer and Panelist, NSF-EAR – Geobiology and Low-temperature Geochemistry program (2011)
- Session Organizer, Non-classical nucleation and growth mechanisms: Insights from experimental and theoretical approaches, *American Chemical Society Annual Meeting*, Denver, CO (2011).
- Session Organizer, New frontiers in biomineralization research: Processes and signatures in natural and model systems, *American Geophysical Union Annual Meeting*, San Francisco, CA (2006)

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## SHORT COURSE PARTICIPATION

– Prior to August 1<sup>st</sup> 2013 –

- Mini Statistical Mechanics Meeting, Berkeley, CA (2010)
  - Synchrotron Environmental Science IV Short Course, San Francisco, CA (2008)
  - 13th International Summer School on Crystal Growth, Park City, UT (2007)
  - Mineralogical Society of America Short Course, Molecular Geomicrobiology, Berkeley, CA (2006)
  - Mineralogical Society of America Short Course, Biomineralization, Napa, CA (2003)
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## **OUTREACH AND COMMUNITY SERVICE**

**– Prior to August 1<sup>st</sup> 2013 –**

- Instructor – Igneous, Metamorphic, and Sedimentary Rocks: From the Classroom to the Playground, Bel Aire Elementary school, Tiburon, CA (2011)
- Instructor – NSF Earth to Life: The Mighty Tinies, Kipps Elementary School, Blacksburg, VA (2007)
- Instructor – NSF Earth to Life: Science of Seashells, Kipps Elementary School," Blacksburg, VA (2006)
- Foster care provider – Mid-Atlantic Pug Rescue (2004-2009)
- Student volunteer – Picnic Day, University of California, Davis (2001)

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## **AWARDS AND HONORS**

**– Prior to August 1<sup>st</sup> 2013 –**

- Dean's Roundtable Scholarship Award - Virginia Tech College of Science (2007)
  - Robinson-Holden Graduate Fellowship Award (2006)
  - D.R. Wones Geosciences Graduate Research Award (2006)
  - Honorable Mention, NSF Graduate Research Fellowship (2004)
  - U.C. Davis Presidential Undergraduate Fellowship (2000)
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