

# ALLISON A. CAMPBELL



## EDUCATION

- 1991 Ph.D. Physical Chemistry, State University of New York at Buffalo, Buffalo  
1985 B.A. Chemistry, Gettysburg College, Gettysburg, PA

## RESEARCH INTERESTS AND EXPERTISE

Dr. Campbell's research interests are in

- ♦ Biomaterials – bioactive calcium phosphate coatings, bone substitutes
  - ♦ Mechanistic studies of nucleation and growth of sparingly soluble salts from aqueous solutions
  - ♦ Interfacial control of crystallization – promotion and inhibition of mineral formation
- ♦ Interfacial control of protein adsorption – effects of surface parameters on protein conformation, structure/function, adsorption kinetics

Dr. Campbell is nationally recognized for her contributions toward materials development through her research in the field of biomaterials, and she is credited with co-inventing a bio-inspired process to “grow” a bioactive calcium phosphate layer, from the molecular level, onto the surfaces of artificial joint implants (total hip and knee) to extend implant life and reduce rejection. She is also recognized for her work in understanding the role of proteins in biomineralization. Dr. Campbell has authored numerous peer reviewed technical papers, been an invited speaker at national and international meetings, and has several patents based upon her research. Additionally, she is an avid promoter of science education, sharing her enthusiasm for science with young students through a number of hands-on education programs.

## PROFESSIONAL EXPERIENCE AND RELEVANT RESEARCH

2005 – Present	Director, EMSL, the Environmental Molecular Sciences Laboratory
2004 – 2005	Interim Director, EMSL
2000 – 2005	Associate Director, Scientific Experimental Resources, EMSL
2000 – 2008	Affiliate Associate Professor, Bioengineering Department, University of Washington
1999 – 2000	Technical Group Leader, Materials Synthesis and Modification, PNNL
1999 – 1999	Staff Scientist, Materials Sciences Department, PNNL
1999 – 1999	Visiting Assistant Professor of Chemistry, Whitman College, Walla Walla, WA
1995 – 1998	Senior Research Scientist, Materials Sciences Department, PNNL
1992 – 1995	Research Scientist, Material Sciences Department, PNNL
1994 – 1994	Invited Researcher, Max-Planck Society, Mechanics of Heterogeneous Solids Group, Dresden, Germany
1990 – 1992	The Northwest College and University Association for Science Postdoctoral Fellow, Material Sciences Department, PNNL

## HONORS AND AWARDS

2006	R&D100 Award
2006	Federal Laboratory Consortium Award
2005	American Chemical Society Regional Industrial Innovation Award
2003	George W. Thorn Award, State University of New York, Buffalo
2002	American Chemical Society Award for Women at the Forefront of Chemistry
2001	DOE Energy 100 Award for Biomimetic Coatings for Orthopedic Implants
2000	Young Alumni Achievement Award for Career Development, Gettysburg College
1999	Outstanding Team Performance Award, PNNL
1997	Fitzner-Eberhardt Award, Outstanding Contributions to Science & Engineering Education, PNNL

1997 Woman of Achievement Award, PNNL  
1995 DOE Basic Energy Sciences Award in Materials Science  
1994 Director's Award for Scientific and Engineering Excellence, PNNL  
1987 Excellence in Teaching Award; SUNY/Buffalo  
1985 Undergraduate Research Award; Gettysburg College

## PROFESSIONAL AFFILIATIONS AND SERVICE

Member, American Association for the Advancement of Science

Member, American Chemical Society

Member, International Association of Dental Researchers

Conference Organizer, EPSCoR 2002 Workshop, Sponsored by DOE and NSF Experimental Program to Stimulate Competitive Research (EPSCoR)

Ph.D. Thesis Committee Member, Denise Eileen Carney, State University of New York, Buffalo

Session Chair, "Materials Science of the Cell" and "Complex Fluids and Biomaterials" Symposia, Materials Research Society Annual Fall Meeting, Boston, MA, November 1997.

Session Chair, "Materials for Biomedical Applications" 30<sup>th</sup> Annual International Metallography Society Conference, Seattle, WA, July 1997.

## PATENTS AND LICENSES

03/22/05 US Pat. 6,869,588 – Stimulus Sensitive Gel with Radioisotope and Methods of Making  
08/23/04 License 513472 – Bacterin, Inc., Belgrade, Montana – "Polymer/Ceramic Composite Thin Films"  
07/09/02 US Pat. 6,417,247 – "Polymer/Ceramic Composites for Orthopedic Applications"  
10/02/02 US Pat. 6,296,831 – "Polymer/radioisotope Composites for Radiotherapeutic Applications"  
09/05/00 US Pat. 6,113,993 – "Method of Coating a Substrate with a Calcium Phosphate Compound"  
09/28/99 US Pat. 5,958,430 – "Thin Film Composition with Biological Substance and Method of Making"

## PUBLICATIONS

### *Invited*

1. Shaw WJ, AA Campbell, ML Paine, and ML Snead. 2004. "The COOH Terminus of the Amelogenin, LRAP, Is Oriented Next to the Hydroxyapatite Surface". *Journal of Biological Chemistry* 279 (39):40263-40266.
2. Campbell AA. 2003. "Bioceramic Coatings for Orthopaedic Implants." *Materials Today* 6 (11):26-30.
3. Campbell AA, BL Deatherage, XS Li, BJ Nelson, G Bottoni, and ES DeJong. 2002. "Hydroxyapatite Coatings Produced by Surface Induced Mineralization". In *Biomimetic Calcium Phosphate Coatings*, ed Hai Bo Wen, pp. 47-54. Research Signpost, India
4. DeJong ES, TM DeBerardino, DE Brooks, BJ Nelson, AA Campbell, CR Bottoni, AE Pusateri, RS Walton, CH Guymon, and AT McManus. 2001. "Anti-Microbial Efficacy of External Fixator Pins Coated with a Lipid Stabilized Hydroxyapatite-Chlorhexidine Complex to Prevent Pin Tract Infection in a Goat Model". *Journal of Trauma* 50:1008-1014.
5. Campbell AA, L Song, X Li, C Bottoni, BJ Nelson, DE Brooks, and ES DeJong. 2000. "Development, Characterization, and Anti-Microbial Efficacy of Hydroxyapatite-Chlorhexidine Coatings Produced by Surface Induced Mineralization". *Journal of Biomedical Materials Research (Applied Biomaterials)* 53:400-407.

6. Shaw WJ, JR Long, AA Campbell, PS Stayton, and GP Drobny. 2000. "A Solid State NMR Study of Dynamics in a Hydrated Salivary Peptide Adsorbed to Hydroxyapatite". *J. Am. Chem. Soc.* 122 (29):7118-7119.
7. Shaw WJ, JR Long, JL Dindot, AA Campbell, PS Stayton, and GP Drobny. 2000. "Determination of Statherin N-Terminated Peptide Conformation on Hydroxyapatite Crystals". *J. Am. Chem. Soc.* 122 (8):1709-1716.
8. Campbell AA. 1999. "Interfacial Regulation of Crystallization in Aqueous Environments". **Invited Review Article.** *Current Opinion in Colloid and Interface Science* 4:40-45.
9. Clark RH, AA Campbell, LA Klumb, CJ Long and PS Stayton. 1999. "Protein Electrostatic Surface Distribution can Determine Whether Calcium Oxalate Crystal Growth is Promoted or Inhibited". *Calcified Tissue International* 64:516-521.
10. Gao Y and AA Campbell. 1998. "Synthesis of Tricalcium Phosphate Coatings using Plasma-Enhanced Metalorganic Chemical Vapor Deposition". In *Bioceramics 11*, eds Sedel and Rey, pp. 201-204. World Scientific Publishing, New York.
11. Holy CE, MS Shoichet, AA Campbell, L Song and JE Davies. 1998. "Preparation of a Novel Calcium Phosphate Coated Scaffold for Bone Tissue Engineering". In *Bioceramics 11*, eds Sedel and Rey, pp. 509-512. World Scientific Publishing, New York.
12. Long JR, JL Dindot, H Zebroski, S Kihne, RH Clark, AA Campbell, PS Stayton, and GP Drobny. 1998. "A Peptide that Inhibits Hydroxyapatite Growth is in an Extended Conformation on the Crystal Surface". In *Proc. Natl. Acad. Sci. USA* 95 (21):12083-12087.
13. Letellier SR, MJ Lochhead, AA Campbell, and V Vogel. 1998. "Oriented Growth of Calcium Oxalate Monohydrate Crystals Beneath Phospholipid Monolayers". *Biochem. Biophys. Acta.* 1380 (1):31-45.
14. Nooney MG, AA Campbell, TS Murrell, XF Lin, LR Hossner, and DW Goodman. 1998. "Nucleation and Growth of Phosphate on Metal Oxide Thin Films". *Langmuir* 14 (10):2750-2755.
15. Wheeler DL, AA Campbell, GL Graff, and GJ Miller. 1997. "Histological and Biomechanical Evaluation of Calcium Phosphate Coatings Applied through Surface-Induced Mineralization Techniques". *Journal of Biomedical Materials Research* 34:539-543.
16. Fryxell GE, PC Rieke, LL Wood, GL Graff, AA Campbell, and A Halverson. 1996. "Nucleophilic Displacements in Mixed Self-Assembled Monolayers". *Langmuir* 12 (21):5064-5075.
17. Campbell AA, GE Fryxell, JC Linehan, and GL Graff. 1996. "Surface-Induced Mineralization: A New Method for Producing Calcium Phosphate Coatings". *Journal of Biomedical Materials Research* 32:111-118.
18. Song L, AA Campbell, XS Li, and BC Bunker. 1996. "Surface Induced Calcium Phosphate Nucleation and Growth". In *Thin Films and Surfaces for Bioactivity and Biomedical Applications*, eds Cotell, Meyer, Gorbatkin and Grobe III, pp. 35-41. MRS, Pittsburgh, PA.
19. Campbell AA, GL Graff, L Song, and KR Sump. 1996. "Bioactive Void Metal Composites for Orthopedic Implant Devices". In *Thin Films and Surfaces for Bioactivity and Biomedical Applications*, eds Cotell, Meyer, Gorbatkin and Grobe III, pp. 177-182. MRS, Pittsburgh, PA.
20. Campbell AA, W Pompe, and H Worch. 1995. "Biomimetische und Biomolekular zu Neuem Dunnschichtdesign". In *Metallpface* 12.
21. Rieke PC, GL Graff, AA Campbell, BC Bunker, S Baskaran, L Song, BJ Tarasevich and GE Fryxell. 1995. "Biomimetic Thin Film Deposition". In *Proc. 4th International SAMPE Symposium*, pp. 565-

570. Sept 25-28, 1995.

22. Campbell AA, BC Bunker, GE Fryxell, GL Graff, M Avila, GJ Miller, and DL Wheeler. 1995. "Surface Induced Mineralization of Bioceramic Coatings for Orthopedic Implants". In *Fourth Euro Ceramics*, Vol 8, pp. 155-160.
23. Song L, BC Bunker, GL Graff, MJ Pattillo, and AA Campbell. 1995. "Calcium Oxalate Nucleation and Growth on Oxide Surfaces". In *Mineral Scale Inhibition*, ed Z Amjad. American Chemical Society, Washington, DC.
24. Bunker BC, PC Rieke, BJ Tarasevich, AA Campbell, GE Fryxell, GL Graff, L Song, J Liu, JW Virden and GL McVay. 1994. "Ceramic Thin Film Formation on Functionalized Interfaces Through Biomimetic Processing". *Science* 264:48-55.
25. Campbell AA, GE Fryxell, GL Graff, PC Rieke, and BJ Tarasevich. 1993. "The Nucleation and Growth of Calcium Oxalate Monohydrate on Self-Assembled Monolayers (SAMs)". *Scanning Microscopy* 7 (1):423-429.
26. Tarasevich BJ, PC Rieke, GL McVay, GE Fryxell, and AA Campbell. 1992. "Synthesis of Ceramic Ultrastructures Utilizing Biologic Processes". In *Chemical Processing of Advanced Materials*, eds LL Hench and JK West, pp. 529-542. John Wiley and Sons, Inc., New York, NY.
27. Rieke PC, BJ Tarasevich, SB Bentjen, GE Fryxell, and AA Campbell. 1992. "Biomimetic Thin-Film Synthesis". In *Supramolecular Architecture: Synthetic Control in Thin Films and Solids*, ed T Bein, pp. 61-75. American Chemical Society, Washington, DC.
28. Nancollas GH, SA Smesko, AA Campbell, CF Richardson, M Johnsson, RA Iadicco, JP Binette, and M Binette. 1991. "Physical Chemical Studies of Calcium Oxalate Crystallization". *Amer. J. Kidney Diseases* 17 (4):392-395.
29. Campbell AA, M Lo Re, and GH Nancollas. 1991. "The Influence of Carbonate and Magnesium Ions on the Growth of Hydroxyapatite, Carbonated Hydroxyapatite, and Human Powdered Enamel". *Colloids and Surfaces* 54:25-31.
30. Campbell AA and GH Nancollas. 1991. "The Nucleation and Growth of Calcium Phosphate on Separated Salivary Protein Films". *Colloids and Surfaces* 54:33-40.
31. Campbell AA, JA Gardella Jr., CF Richardson, GH Nancollas, and RA Siordia. 1990. "Urinary Stone Analysis by Small Spot Electron Spectroscopy for Chemical Analysis (ESCA)". *Appl. Spectr.* 44 (6):1015-1019.
32. Campbell AA, A Ebrahimpour, L Perez, SA Smesko, and GH Nancollas. 1989. "The Dual Role of Polyelectrolytes and Proteins as Mineralization Promoters and Inhibitors". *Calif. Tiss. Int.* 45:122-128.
33. Nancollas GH, SA Smesko, AA Campbell, M Coyle-Rees, A Ebrahimpour, M Binette, and JP Binette. 1988. "Mineralization Inhibitors and Promoters". In *International Symposium on Urolithiasis and Related Clinical Research* 1-7.

## PRESENTATIONS

### *Invited*

1. Campbell AA. 2011. "EMSL: Capabilities for Biological Science." Presented by Allison A. Campbell at 2011 Genomic Science Program Genomic Sciences Contractor-Grantee Meeting, Washington, DC, on April 12, 2011.

2. Campbell AA. 2010. "EMSL: Science, capabilities and opportunities." Presented by Allison Campbell at Shaanxi Normal University, Xian, China on September 21, 2010.
3. Campbell AA. 2010. 2010. "EMSL: Science, capabilities and opportunities." Presented by Allison Campbell at Dalian Institute of Chemical Physics Seminar, Dalian, China on September 20, 2010.
4. Campbell AA. 2010. "EMSL: Science, capabilities and opportunities." Presented by Allison Campbell at Institute of Chemistry, Chinese Academy of Sciences Seminar, Beijing, China on September 17, 2010.
5. Campbell AA. 2010. "EMSL: Science, capabilities and opportunities." Presented by Allison Campbell at Tsinghua University Seminar, Beijing, China on September 16, 2010.
6. Campbell AA. 2010. "EMSL: Science, capabilities and opportunities." Presented by Allison Campbell at Shanghai Supercomputer Center Seminar, Shanghai, China on September 14, 2010.
7. Campbell AA. 2010. "EMSL: Science, capabilities and opportunities." Presented by Allison A. Campbell at Fudan University Seminar, Shanghai, China on September 13, 2010.
8. Campbell AA. 2010. "EMSL: Now and Into the Future." Presented by Allison A. Campbell at NNL, Sellafield, United Kingdom on March 29, 2010.
9. Campbell, AA. 2009. "Biomaterials: Past, Present and Future." Presented by Allison A. Campbell at the Oak Ridge Chapter of ASM International's May Technical Meeting, Knoxville, TN on May 21, 2009
10. Campbell, AA. 2009. "EMSL-A National Scientific User Facility." Presented by Allison A. Campbell at the Center for Environmental Chemistry and Geochemistry Wine and Cheese Event, University Park, PA on February 5, 2009.
11. Campbell AA. 2007. "EMSL Scientific Grand Challenges: Grand Challenge History, Perspective, and Drivers ." Presented by Allison A. Campbell (Invited Speaker) at BERAC Review of EMSL Grand Challenge, Pittsburgh, PA on November 1, 2007.
12. Campbell AA. 2007. "Radiological Capabilities at the Environmental Molecular Sciences Laboratory." Presented by Allison A. Campbell at 11th International Conference on the Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere, Munich, Germany on August 31, 2007.
13. Campbell AA. 2007. "Biomineralization, Biomimetics and Biomaterials: Lessons Learned from Nature." Presented by Allison A. Campbell at American Chemical Society, Women Chemists Symposium, Boston, MA on August 20, 2007.
14. Campbell AA. 2007. "Biomineralization, Biomimetics and Biomaterials: Lessons Learned from Nature." Presented by Allison A. Campbell at the Devon Walter Meek Lectures, The Ohio State University, Columbus, OH on May 4, 2007.
15. Campbell AA. 2007. "A Decade of Science at a National Scientific User Facility." Presented by Allison A. Campbell at the Devon Walter Meek Lectures, The Ohio State University, Columbus, OH on May 3, 2007.
16. Campbell AA, and DW Hoyt. 2005. "EMSL; National Scientific User Facility." Presented by David W. Hoyt and Allison A. Campbell at American Chemical Society, Washington D.C., MD on August 30, 2005.
17. Campbell AA. 2005. "Bioinspired Synthesis of Calcium Phosphate Coatings for Orthopedic Applications: A Science to Solutions Example." Presented by Allison A. Campbell at The American Chemical Society's Northwest Regional Meeting, Fairbanks, AK on June 17, 2005.

18. Campbell AA, XS Li, BJ Nelson, CR Bottoni, E Dejong, and DE Brooks. 2004. "Anti-Microbial Efficacy of Hydroxyapatite-Chlorhexidine Coated External Fixation Pins." Presented by AA Campbell at Ehrlich Symposia of the World Conference on Dosing of Antiinfectives, Nurnberg, Germany on September 9, 2004.
19. Campbell AA. 2003. "Hydroxyapatite Coatings for Orthopedic Implant Applications". Presented by AA Campbell at University of Washington's Materials Science Seminar Series, Seattle, Washington on February 2003.
20. Campbell AA. 2002. "Biomimetic Hydroxyapatite Coatings for Orthopedic Implants". Presented by AA Campbell at Presidential Symposium – Women at the Forefront in Chemistry, American Chemical Society National Meeting, Boston, MA on August 2002.
21. Campbell AA. 2001. "From Biomineralization to Biomimetics: Lessons Learned from Nature". Presented by AA Campbell at WSU Chemistry Seminar Series, Pullman, WA on February 2001.
22. Campbell AA. 2000. "New Advances in Bone and Cartilage Replacement and Repair". Presented by AA Campbell (Keynote Speaker) at MDI Biomaterials of the Future Conference, San Francisco, CA on June 2000.
23. Campbell AA. 2000. "Controlling Biological Response – Designing Biomaterials that Heal". Presented by AA Campbell (Keynote Speaker) at University of Puget Sound Biology Symposium on April 2000.
24. Campbell AA, L Song, X Li and M Avila. 1999. "Biomimetic Materials for the Delivery of Therapeutic Agents". Presented by AA Campbell at American Chemical Society National Meeting, Anaheim, CA on March 1999.
25. Campbell AA, M Avila, MI Seth, L Song, M Gilbert, W Shaw, JL Dindot, JR Long, RH Clark, GP Drobny, and PS Stayton. 1998. "Protein/Mineral Interactions in Biomineralization". Presented by AA Campbell at Gordon Conference on Biomineralization, Henniker, NH on August 1998.
26. Campbell AA. 1998. "Biomaterials as Tissue Templates and Therapeutic Delivery Systems". Presented by AA Campbell at MDI Biomaterials of the Future Conference, Chicago, IL on June 1998.
27. Campbell AA. 1998. "Metallic and Ceramic Coatings, Including Biomimetic Coatings for Biomedical Applications". Presented by AA Campbell at International Conference on Metallurgical Coatings and Films, San Diego, CA on April 1998.
28. Campbell AA. 1998. "Calcium Phosphate Nucleation and Growth In Vitro". Presented by AA Campbell at University of Washington Physical Chemistry Symposia, Seattle, WA on February 1998.
29. Campbell AA. 1998. "Materials for Tissue Templates and Drug Delivery". Presented by AA Campbell at J&J Corporate Biomaterials Center, Somerville, NJ on January 1998.
30. Campbell AA, L Song, X Li XY Shen and JE Davies. 1997. "Osteoclast Resorption of, and Bone Growth on, Octacalcium Phosphate Films In Vitro". Presented by AA Campbell at Cells and Materials National Meeting, Chicago, IL on May 1997.
31. Campbell AA, L Song and KR Sump. 1996. "Bioactive and Porous Metal Coatings for Orthopedic Implants". Presented by AA Campbell (Invited Speaker and Poster) at Biomineralization Gordon Conference, Plymouth, NH on August 1996.
32. Campbell AA and BL Armstrong. 1996. "Biocompatible Materials for Minimizing Complications and Reducing the Cost of Bone Restoration". Presented by AA Campbell at Healthinfo '96 on May 1996.
33. Campbell AA. 1993. "The Nucleation and Growth of Calcium Oxalate Monohydrate on Self-

Assembled Monolayers (SAMs)". Presented by AA Campbell at Pathology Department, University of Florida, Gainesville, FL on January 1993.

### **Contributed**

1. Anderson GA, and AA Campbell. 2006. "Environmental Molecular Sciences Laboratory." Presented by Allison Campbell at Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Richland, WA on August 25, 2006.
2. Campbell AA, JM Kuperberg, HB Pakrasi, and JM Zachara. 2006. "Unique Tools for Unique Science at a DOE National Scientific User Facility." Presented by Allison A. Campbell, J. Michael Kuperberg, Himadri Pakrasi, John M. Zachara at AAAS Annual Meeting, St. Louis, MO on February 17, 2006.
3. Gephart JM, N Prince, AA Campbell, and NS Foster. 2006. "Unique Tools, Unique Science: Unique National Scientific User Facility." Presented by Gordon A. Anderson at Joint Genomics: GTL Contractor-Grantee Workshop IV and Metabolic Engineering Working Group Interagency Conference, St. Louis, MO on February 13, 2006.
4. Klein JA, AA Campbell, RA Gies, H Wu, and KD Thrall. 2004. "In Vivo Determination Of 1,2-Diethylbenzene And 1,2-Diacetylbenzene In F344 Rat Blood." Presented by Joel A. Klein at PANWAT Meeting, Bend, OR on September 18, 2004.
5. Campbell AA, L Song, Shari L, BJ Nelson, CR Bottoni, ES DeJong, DE Brooks, and AT McManus. 2000. "Anti-Microbial Efficacy of Hydroxyapatite-Chlorhexidine Coated External Fixation Pins". Presented by AA Campbell at 6th World Biomaterials Congress, Kamuela, HI on May 2000.
6. Campbell AA, MI Seth, WJ Shaw, JR Long, GP Drobny and PS Stayton. 2000. "Interactions of Statherin and Statherin Peptides with Hydroxyapatite". Presented by AA Campbell at International Association of Dental Researchers General Meeting, Washington, DC on April 2000.
7. Campbell AA, L Song, X Li, C Bottoni, BJ Nelson, DE Brooks, and ES DeJong. 1999. "Development of Infection-Resistant Hydroxyapatite-Chlorhexidine Coatings for Orthopedic Applications". Presented by AA Campbell at Composites '99, Lake Louise, ON on November 1999.
8. Campbell AA, L Song, X Li, PC Rieke, GE Fryxell, BJ Tarasevich, C Chusuei, and DW Goodman. 1999. "Ceramic Thin Film Synthesis Utilizing Biological Processes". Presented by AA Campbell at Composites '99, Lake Louise, ON on November 1999.
9. Campbell AA, 1999. "Orthopedic Applications of Biomimetic Processing". Presented by AA Campbell at DOE's 1<sup>st</sup> Symposium on Biomedical Technologies, Washington, DC on July 1999.
10. Campbell AA, L Song, X Li and M Avila. 1999. "Infection Resistant Coatings for Orthopedic Implants". Presented by AA Campbell at International Conference of Metallic Coatings and Thin Films, San Diego, CA on April 1999.
11. Campbell AA, L Song, X Li and M Avila, 1999. "Antimicrobial Biomimetic Calcium Phosphate Coatings". Presented by L Song at International Symposium on Advanced Materials with Biomedical Applications, Washington, DC on June 1999.
12. Song L, XS Li, J Liu, and AA Campbell. 1998. "Synthesis of Three-Dimensional Calcium Phosphate Networks Using Self-Assembled Templates". Presented by L Song at Materials Research Society Meeting, Boston, MA on December 1998.
13. Stayton PS, AA Campbell, M Gilbert, W Shaw, JL Dindot, JR Long, RH Clark, and GP Drobny. 1998. "*Molecular Recognition at the Protein-Biomineral and Protein-Biomaterial Interface*". Presented by PS Stayton at Gordon Conference on Biomineralization, Henniker, NH on August 1998.

14. Campbell AA, L Song, X Li XY Shen and JE Davies. 1997. "Osteoclast Resorption and Bone Growth on Octacalcium Phosphate Films In Vitro". Presented by AA Campbell at 30<sup>th</sup> Annual IMS Convention, Seattle, WA on July 1997.
15. Campbell AA, L Song, X Li XY Shen and JE Davies. 1997. "Osteoclast Resorption and Bone Growth on Octacalcium Phosphate Films in Vitro". Poster presentation by AA Campbell at Society for Biomaterials 23<sup>rd</sup> Annual Meeting, New Orleans, LA.
16. Gutowska A and AA Campbell. 1997. "Thermoreversible Polymer Gels for Chemoembolization Therapy". Presented by A Gutowska at Society for Biomaterials 23<sup>rd</sup> Annual Meeting, New Orleans, LA on 1997.
17. Lochhead MJ, SR Letellier, V Vogel, and AA Campbell. 1997." Surface-Directed Mineralization at Organic-Aqueous Interfaces". Presented by MJ Lochhead at American Chemical Society National Meeting on September 1997.
18. Letellier SR, MJ Lochhead, AA Campbell and V Vogel. 1997. "Nucleation and Growth of Calcium Oxalate Crystals beneath Phospholipid Monolayers". Presented by SR Letellier at American Chemical Society National Meeting on September 1997.
19. Campbell AA, L Song, GL Graff, GE Fryxell and JE Davies. 1996. "Enhanced Implant Stabilization". Presented by AA Campbell at ACers Basic Sciences Meeting, San Antonio, TX on October 1996.
20. Campbell AA, PS Stayton and RH Clark. 1996. "Molecular Recognition at the Protein-Biomineral Interface". Presented by AA Campbell at ACers Basic Sciences Meeting, San Antonio, TX on October 1996.
21. Campbell AA, L Song, GL Graff, GE Fryxell, and KW Sump. 1996. "Bioactive and Porous Metal Calcium Phosphate Coatings for Improved Bone Regeneration". Presented by AA Campbell at 5<sup>th</sup> World Biomaterials Congress on May 1996.
22. Letellier SR, AA Campbell and V Vogel. 1996. "Calcium Oxalate Crystal Growth Beneath Phospholipid Monolayers". Poster presentation by SR Letellier at Biomineralization Gordon Conference, Plymouth, NH on August 1996.
23. Stayton PS, RH Clark and AA Campbell. 1996. "Molecular Recognition at the Protein-Mineral Interface". Presented by PS Stayton (Invited Poster and Talk) at Biomineralization Gordon Conference, Plymouth, NH on August 1996.
24. Campbell AA, GL Graff, L Song, and KR Sump. 1995. "Bioactive Void Metal Composites for Orthopedic Implant Devices". Presented by AA Campbell at Materials Research Society Fall Meeting, Boston, MA on November 1995.
25. Song L, AA Campbell, XS Li, and BC Bunker. 1995. "Surface Induced Calcium Phosphate Nucleation and Growth". Presented by L Song at Materials Research Society Fall Meeting, Boston, MA on November 1995.
26. Rieke PC, GL Graff, AA Campbell, BC Bunker, L Song, BJ Tarasevich, and GE Fryxell. 1995. "Biomimetic Thin Film Deposition: A Simple Aqueous Solution Route for the Coating of Plastic Substrates". Presented by PC Rieke at Materials Research Society Spring Meeting, San Francisco, CA on April 1995.
27. Fryxell GE, PC Rieke, AA Campbell, GL Graff, JC Linehan, RJ Wiacek, and L Lee. 1995. "Construction and Characterization of Customized Surfaces for Controlled Heterogeneous Nucleation". Presented by GE Fryxell (Invited Seminar) at Chemistry Department, University of Washington, Seattle, WA on February 1995.



28. Rieke PC, GE Fryxell, AA Campbell, GL Graff, BC Bunker, L Song, R Wiacek, and J Liu. 1994. "Tailoring the Surface Energies of Self-Assembled Monolayers to Control the Heterogeneous Nucleation of Minerals". Presented by PC Rieke at Materials Research Society Fall Meeting, Boston, MA on November 1994.
29. Campbell AA, GL Graff, GJ Miller, and DL Wheeler. 1994. "Surface Induced Deposition of Calcium Phosphate Coatings for Orthopedic Implants". Presented by AA Campbell at Society for Biomaterials Foundation, Scottsdale, AZ on September 1994.
30. Stayton PS, R. Clark, CL Long, L Humb, A Chiloti, AA Campbell, and G Drobny. 1994. "Molecular Recognition at Protein - Biological Composite Interfaces". Presented by PS Stayton at Materials Research Society Fall Meeting, Boston, MA on November 1994.
31. Bunker BC, PC Rieke, BJ Tarasevich, AA Campbell, GE Fryxell, GL Graff, L Song, J Liu, and J Virden. 1994. "Surface Induced Mineralization of Ceramic Thin-Films". Presented by BC Bunker at Annual Biomedical Engineers Society Meeting, Tempe, AZ on October 1994.
32. Stayton PS, R Clark, CL Long, L Klumb, A Chiloti, AA Campbell, and G Drobny. 1994. "Molecular Recognition at Protein-Biological Composite Interface". Presented by PS Stayton at 41st National Symposium of the American Vacuum Society, Denver, CO on October 1994.
33. Stayton PS, R Clark, CL Long, L Klumb, A Chiloti, AA Campbell, and G Drobny. 1994. "Molecular Recognition at the Protein-Biological Composite Interface". Presented by PS Stayton at Annual Biomedical Engineers Society Meeting, Tempe, AZ on October 1994.
34. Bunker BC, PC Rieke, BJ Tarasevich, AA Campbell, GE Fryxell, GL Graff, L Song, and J Liu. 1994. "Biomimetic Synthesis of Materials". Presented by BC Bunker (Invited Seminar) at Frontiers of Materials Science, University of New Mexico on September 1994.
35. PC Rieke, AA Campbell, GL Graff, GE Fryxell, D Baer, M Engelhard, and L Song. 1994. "Biomimetic Thin Film Deposition: Nucleation of Minerals from Aqueous Solutions on Self-Assembled Monolayers". Electrochemical Society Meeting, Chicago, IL on May 1994.
36. L Song, AA Campbell, and BC Bunker. 1994. "Heterogeneous Nucleation of Calcium Oxalate Monohydrate on Native Oxide Surfaces". Presented by L Song at American Ceramic Society Annual Meeting, Indianapolis, IN on April 1994.
37. L Song, MJ Pattillo, GL Graff, AA Campbell, and BC Bunker. 1994. "Heterogeneous Nucleation of Calcium Oxalate Monohydrate on Native Oxide Surfaces". Presented by BC Bunker at Materials Research Society Spring Meeting, San Francisco, CA on April 1994.
38. Campbell AA and GL Graff. 1994. "Low temperature Solution Deposition of Calcium Phosphate Coatings for Orthopedic Implants". Presented by AA Campbell at American Ceramic Society Annual Meeting, Indianapolis, IN on April 1994.
39. Bunker BC, PC Rieke, BJ Tarasevich, AA Campbell, GE Fryxell, GL Graff, L Song, and J Liu. 1994. "*Biomimetic Synthesis of Ceramic Materials*". Presented by BC Bunker (Invited Seminar) at Texas A&M University on March 1994.
40. Bunker BC, PC Rieke, BJ Tarasevich, AA Campbell, GE Fryxell, GL Graff, L Song, and J Liu. 1994. "*Biomimetic Synthesis of Ceramic Materials*". Presented by BC Bunker (Invited Seminar) at International Workshop on Biomimetics, Tegunsee, Germany on March 1994.
41. Fryxell GE, PC Rieke, JC Linehan, AA Campbell, GL Graff, and L Woods. 1993. "Synthetic Elaboration of Self-Assembled Monolayers". Presented by GE Fryxell at American Chemical Society Northwest Regional Meeting, Laramie on June 1993.

42. Song L, AA Campbell, and BC Bunker. 1993. "The Role of Interfacial Chemistry in Surface Nucleation and Growth of Calcium Oxalate". Presented by L Song at Materials Research Society Spring Meeting, San Francisco, CA on April 1993.
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