

Curriculum Vitae
Latha A. Gearheart

Presbyterian College
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Education:

- ∞ **Ph.D.**, Analytical Chemistry, University of South Carolina, Columbia, SC, May 2001
Thesis Title: “The development of semiconductor and metal nanoparticle optical probes for DNA binding”
- ∞ **BS**, Chemistry *cum laude*, Mary Washington College, May 1995

Teaching Experience:

Physical Chemistry and Physical Chemistry Lab, General Chemistry and General Chemistry Lab, Introduction to Research, Art and Chemistry (freshman only), Chemistry and Art (majors), Chemistry a Human Experience (non majors), Spectroscopy

Research Experience:

- ∞ Development of optical probes for chemical analysis
- ∞ Analysis of pigments in art using Raman spectroscopy
- ∞ Size and shape controlled synthesis of Au and Ag nanoparticles and quantum dot CdS in aqueous and ionic liquid solvents
- ∞ Ultrafast DNA dynamics studies using time-resolved luminescent spectroscopy
- ∞ Characterization of metal and semiconductor nanoparticles
- ∞ DNA mediated assembly and growth of metal nanoparticles
- ∞ Adsorption studies of DNA to nanosized substrates

Research Interests:

analytical and physical chemistry; materials science; optical properties of semiconductor and metal nanoparticles, nanoparticle self-assembly; DNA-nanoparticle interactions; surface-enhanced Raman Spectroscopy; steady state and time resolved fluorescence spectroscopy; gas chromatography-mass spectroscopy; high-performance liquid chromatography; atomic emission spectroscopy, DNA dynamics, art analysis, deep eutectic solvents

Positions:

- ∞ 04/14-present: *Professor*, Presbyterian College, Clinton SC
- ∞ 07/10-present: *Chemistry Department Chair*, Presbyterian College, Clinton SC
- ∞ 09/10-5/14: *Director of Biochemistry Major*, Presbyterian College, Clinton SC
- ∞ 5/8-present: *Director of PC Summer Fellows Program*, Presbyterian College, Clinton SC
- ∞ 06/07-present: *Associate Professor*, Presbyterian College, Clinton SC

- ∞ 08/01-05/07: *Assistant Professor*, Presbyterian College, Clinton SC
- ∞ 05/04-07/04: *Visiting Researcher*, University of South Carolina, Department of Chemistry and Biochemistry
- ∞ 05/03-07/03: *Visiting Researcher*, University of South Carolina, Department of Chemistry and Biochemistry
- ∞ 05/02-07/02: *Visiting Researcher*, University of South Carolina, Department of Chemistry and Biochemistry
- ∞ 05/01-08/01: *Postdoctoral Researcher*, University of South Carolina, Department of Chemistry and Biochemistry
- ∞ 05/96-05/01: *Research Assistant*, University of South Carolina, Department of Chemistry and Biochemistry, Advisor: Dr. Catherine J. Murphy
- ∞ Summer 1994: *Summer Internship*, Department of Environmental Quality, Fredericksburg, VA

Professional Associations:

- ∞ 2000-present: American Chemical Society
- ∞ 2005-2012: South Carolina Academy of Science
- ∞ 2004: Biophysical Society

Awards:

- ∞ Professor of the Year, Presbyterian College (2014)
- ∞ Excellence in Teaching Award, South Carolina Independent Colleges and Universities (2014)
- ∞ Faculty Scholar of the Year, Presbyterian College (2008)
- ∞ Outstanding Senior Chemistry Major, Mary Washington College (1995)
- ∞ Regional Scholar, Mary Washington College (1991-1994)

Publications:

18. S. Sen, L. A. Gearheart, E. Rivers, H. Liu, R. S. Coleman, C. J. Murphy, M. A. Berg, "Role of Monovalent Counterions in the Ultrafast Dynamics of DNA" *Journal of Physical Chemistry B*, **2006**; *110*(26); 13248-13255.
17. C. J. Orendorff, L. A. Gearheart, N. R. Jana, C. J. Murphy "Aspect Ratio Dependence on Surface Enhanced Raman Scattering Using Silver and Gold Nanorod Substrates," *Physical Chemistry Chemical Physics*, **2006**, *8*, 165-170.
16. C. J. Murphy, N. R. Jana, L. A. Gearheart, S. O. Obare, S. Mann, C. J. Johnson, K. J. Edler "Self-Organization of Metallic Nanorods into Liquid Crystalline Arrays," in *Nanoparticle Assemblies and Superstructures*, N. A. Kotov,., Editor; CRC Press: Boca Raton, FL, 2006.
15. S. Sen, N. A. Paraggio, L. A. Gearheart, E. E. Conner, A. Issa, R. S. Coleman, D. M. Wilson, M. D. Wyatt, M. A. Berg "Effect of Protein Binding on Ultrafast DNA Dynamics: Characterization of a DNA:APE1 Complex" *Biophysical Journal*, **2005**, *89*, 4129-4138.

14. X. Xu, R. Ray, Y. Gu, H. Ploehn, L. Gearheart, K. Raker, W. A. Scrivens “Electrophoretic Analysis and Purification of Fluorescent Single-Walled Carbon Nanotube Fragments,” *Journal of the American Chemical Society*, **2004**, *126*(40), 12736-12737.
13. C. J. Murphy, N. R. Jana, L. A. Gearheart, S. O. Obare, K. K. Caswell, S. Mann, C. J. Johnson, S. A. Davis, E. Dujardin, K. J. Edler, “Synthesis, Assembly, and Reactivity of Metallic nanorods,” *Chemistry of Nanomaterials*, C. N. R. Rao; A. Muller; and A. Cheetham, Editors; Wiley-VCH: Weinheim, 2004, Volume 1, pp. 285-307.
12. L. A. Gearheart, M. M. Somoza, W. E. Rivers, R. S. Coleman, C. J. Murphy, M. A. Berg “Sodium Ion Binding to DNA: Detection by Ultrafast Time-Resolved Stokes Shift Spectroscopy.” *Journal of the American Chemical Society* **2003**, *125*, 11812-11813.
11. N. R. Jana, L. Gearheart, S. O. Obare, C. Johnson, K. Edler, S. Mann, C. J. Murphy, “Liquid Crystalline Arrays of Ordered Gold Nanorods.” *Journal of Materials Chemistry* **2002**, 2909-2912.
10. N. R. Jana, L. Gearheart, S. O. Obare, C. J. Murphy, “Anisotropic Dissolution of Gold Spheroids and Nanorods,” *Langmuir* **2002**, *18*, 922-927.
9. L. Gearheart, H. H. Ploehn, C. J. Murphy, “Oligonucleotide Adsorption to Gold Nanoparticles: A Surface-Enhanced Raman Spectroscopy Study of Intrinsically Bent DNA.” *Journal of Physical Chemistry B* **2001**, *105*, 12608-12615.
8. L. Gearheart, K. K. Caswell, C. J. Murphy. “Recognition of Hypermethylated Triplet Repeats *in vitro* by Cationic Nanoparticles.” *Journal of Biomedical Optics* **2001**, *6*, 106-110.
7. N. R. Jana, L. Gearheart, C. J. Murphy, “Seeding Growth for Size Control of 5-40 nm Diameter Gold Nanoparticles,” *Langmuir* **2001**, *17*, 6782-6786.
6. N. R. Jana, L. Gearheart, C. J. Murphy. “Evidence for Seed-Mediated Nucleation in Formation of Gold Nanoparticles from Gold Salts.” *Chemistry of Materials* **2001**, *13*, 2313-2322.
5. N. R. Jana, L. Gearheart, C. J. Murphy. “Seed-Mediated Growth Approach for Shape Controlled Synthesis of Spheroidal and Rodlike Gold Nanoparticles using a Surfactant Template.” *Advanced Materials* **2001**, *13*, 1389-1393.
4. N. R. Jana, L. Gearheart, C. J. Murphy. “Wet Chemical Synthesis of High Aspect Ratio Gold Nanorods,” *Journal of Physical Chemistry B* **2001**, *105*, 4065-4067.
3. N. R. Jana, L. Gearheart, C. J. Murphy. “Wet Chemical Synthesis of Silver Nanorods and Nanowires.” *Chemical Communications* **2001**, 617-618.

2. C. J. Murphy, R. Mahtab, K. Caswell, L. Gearheart, N. R. Jana, S. Hammami, D. D. Best, "Inorganic Nanoparticles as Optical Sensors of DNA," *Proceedings SPIE* **2001**, 4258, 25-34.
1. C. J. Murphy, E. Brauns, L. Gearheart. "Quantum dots as inorganic DNA-binding proteins." *Materials Research Society Symposium Proceedings* **1997**, 452, 567-600.

Meetings and Presentations:

27. J. Lenti, M. Myers, L. A. Gearheart "Effect of Gold Nanoparticles on Supercoiled DNA Relaxation by Topoisomerase I" 245th American Chemical Society National Meeting, April 2013, New Orleans, LA.
26. J. Lenti, L. A. Gearheart "Synthesis of Gold and Silver Nanoparticles in Deep Eutectic Solvents" Presbyterian College Honors Day Symposium, April 18 2103, Clinton SC.
25. J. Lenti, L. A. Gearheart "Synthesis of Gold Nanoparticles in Deep Eutectic Solvent: Potential Catalysts in the Relaxation of Supercoiled DNA" SCICU Student/Faculty Undergraduate Research Program Symposium, February 13, 2013, Greer SC.
24. B. Nichols, A. Powell, L. A. Gearheart "Synthesis of Au and Ag Nanoparticles in Deep Eutectic Solvents" 241st American Chemical Society National Meeting; March 2011; Anaheim, CA.
23. J. C. Crocker, L. A. Gearheart "The Effect of Plasmid DNA Size on Binding to Au and Ag Nanoparticles" Presbyterian College Honors Day Symposium; April 2010; Clinton, SC.
22. J. M. Dias, L. A. Gearheart "Enhanced Solid-phase Raman Spectroscopy" Presbyterian College Honors Day Symposium; April 2010; Clinton, SC.
21. J. C. Crocker, L. A. Gearheart "The Effect of Plasmid DNA Size on Binding to Au and Ag Nanoparticles" 2009 Student/Faculty Undergraduate Research Program Symposium (SCICU), February 18, 2010; Greer SC.
20. L. A. Gearheart, A. Tobias, J. C. Crocker "Light Scattering Studies of Plasmid DNA-Nanoparticle Complexes" 61st Southeast Regional Meeting of the American Chemical Society, October 2009, San Juan, Puerto Rico.
19. R. Knotts, L. A. Gearheart "Detecting Pigments in Art using Surface-enhanced Raman Spectroscopy" 61st Southeast Regional Meeting of the American Chemical Society, October 2009, San Juan, Puerto Rico.
18. J. M. Dias, L. A. Gearheart "Enhanced Solid-phase Raman Spectroscopy" 61st Southeast Regional Meeting of the American Chemical Society, October 2009, San Juan, Puerto Rico.
17. D. Tobias, J. Murphy, L. A. Gearheart "Dynamic Light Scattering and Zeta-Phase Analysis Light Scattering Studies of Plasmid DNA-Nanoparticle Complexes" Western

- Carolinas American Chemical Society Undergraduate Research Symposium, April 16, 2009; Greenville, SC.
16. R. Knotts, L. A. Gearheart "Detecting Pigments in Art using Surface-enhanced Raman Spectroscopy" Presbyterian College Honors Day Symposium; April 2009; Clinton, SC.
 15. D. Tobias, J. Murphy, L. A. Gearheart "Dynamic Light Scattering and Zeta-Phase Analysis Light Scattering Studies of Plasmid DNA-Nanoparticle Complexes" Presbyterian College Honors Day Symposium; April 2009; Clinton, SC.
 - 14.D. Tobias, L. A. Gearheart "Light Scattering Study of Plasmid DNA Binding to Noble Metal Nanoparticles" Big South Undergraduate Research Symposium, March 27-28, 2009, Asheville, NC.
 13. L. A. Gearheart "The influence of nanoscience in gene therapy: it's a very small world afterall" Presbyterian College Honors Day Symposium; Keynote Speaker, April 2008; Clinton, SC.
 12. K. Glenn, Allison Serdah, L. A. Gearheart "Binding DNA Topoisomers to Au and Ag Nanoparticles" South Carolina Academy of Science; April 2007; Columbia, SC.
 11. R. D. Bodiford, P. R. Coleman, C. J. Murphy, L. A. Gearheart "Binding of Linear, Relaxed, and Supercoiled pUC19 Plasmid DNA to Au and Ag Nanoparticles" Presbyterian College Honors Day Symposium; April 2006; Clinton, SC.
 - 10.R. D. Bodiford, P. R. Coleman, C. J. Murphy, L. A. Gearheart "Binding of Linear, Relaxed, and Supercoiled pUC19 Plasmid DNA to Au and Ag Nanoparticles" Western Carolinas Section American Chemical Society Meeting; April 2006; Greenville, SC.
 9. P. R. Coleman, R. D. Bodiford, C. J. Murphy, L. A. Gearheart "Binding of Linear, Relaxed, and Supercoiled pUC19 Plasmid DNA to Au and Ag Nanoparticles" 231st American Chemical Society National Meeting; March, 2006; Atlanta, GA.
 8. Biophysical Society, 48th Annual Meeting, (2004), Baltimore, MD.
 7. S. Patterson, L. Gearheart, M. Samoza, C. Murphy, M. Berg, "Ultrafast Time-Resolved Stokes Shift Spectroscopy of Single-Stranded DNA," 55th Southeast Regional Meeting of the American Chemical Society, (2003), Atlanta GA.
 6. 54th Southeast Regional Meeting of the American Chemical Society, (2002), Charleston SC.
 5. L. Gearheart, N. R. Jana, R. Mahtab, C. J. Murphy. "Inorganic Colloids as Optical Probes for DNA." SPIE Southeast Regional Meeting on Optoelectronics, Photonics, and Imaging (2000), Charlotte, NC.

- 4.C. J. Murphy, L. Gearheart. "Detection of Unusual DNA Structures with Nanoparticles." Nanoscience and Nanotechnology Symposium: Shaping Biomedical Research (2000), National Institutes of Health, Bethesda, MD.
- 3.L. Gearheart, C. J. Murphy. "Using Surface Enhanced Raman Spectroscopy to Study Interactions Between Intrinsically Bent Oligonucleotides and Gold Colloids." 73rd American Chemical Society Colloid and Surface Science Symposium (1999), Massachusetts Institute of Technology, Cambridge, MA.
- 2.L. A. Gearheart, C. J. Murphy. "Inorganic Colloids as Mimics for Non-specific DNA-Protein Interactions." 72nd American Chemical Society Colloid and Surface Science Symposium (1998), Pennsylvania State University, University Park, PA.
- 1.L. A. Gearheart, C. J. Murphy. "Inorganic Colloids as Mimics for Non-specific DNA-Protein Interactions." 214th American Chemical Society National Meeting (1997), Las Vegas,

Undergraduate Research Students (all from Presbyterian College):

- | | | |
|------------------------|--------------|-------------------------------------|
| 1. Jo Ellen Fory | 8/02-12/02 | |
| 2. Sarah Patterson | 5/03-11/03 | |
| 3. Paul Coleman | 5/04-5/06 | |
| 4. Rachael Bodiford | 6/05-5/06 | (Honors Research) |
| 5. Katie Glenn | 1/06-4/07 | (Honors Research) |
| 6. Nick Picou | 6/06-8/06 | |
| 7. Allison Serdah | 6/06-8/06 | |
| 8. Kemper Booth | 8/06-4/07 | |
| 9. Jennifer Murphy | 5/07-12/07 | |
| 10. Nathen Head | 5/07-8/07 | |
| 11. James Lucy | 1/08-5/08 | |
| 12. Rosie Knotts | 6/08-12/09 | (PC Summer Fellow) |
| 13. Drew Tobias | 6/08-5/09 | (PC Summer Fellow) |
| 14. Jon Mark Dias | 1/09-5/10 | (PC Summer Fellow) |
| 15. Tony Chatham | 6/09-8/09 | (PC Summer Fellow) |
| 16. Johnny Crocker | 6/09-5/11 | (PC Summer Fellow) |
| 17. DJ Fredericks | 1/10-5/11 | |
| 18. Elizabeth Hughes | 1/10-5/11 | |
| 19. Brian Trail | 6/10-7/10 | (PC Summer Fellow) |
| 20. Bryan Nichols | 6/10-5/11 | (PC Summer Fellow) |
| 21. Stephanie Newell | 6/10-5/12 | (PC Summer Fellow) |
| 22. Martha Myers | 9/10-5/12 | |
| 23. Julianne Lenti | 9/11-5/13 | (PC Summer Fellow, Honors Research) |
| 24. Holly Tindal | 1/13-5/14 | (PC Summer Fellow) |
| 25. Stephanie Dohmeier | 1/13-5/14 | (PC Summer Fellow) |
| 26. Colt Crymes | 8/13-5/14 | |
| 27. Taylor Figura | 8/13-5/14 | |
| 28. Paul McGannon | 9/13-present | (PC Summer Fellow, Honors Reserach) |
| 29. Beau Dees | 8/14-present | |

30. Leah Lawson 8/14-present
 31. Mariah Whitaker 8/14-present

Funded Grants:

“Shape Effects on Polymer-Nanoparticle Interactions,” Milliken Foundation, 5/15/05-4/30/06, \$30,000 total.

“The Effect of Plasmid DNA Shape on Binding to Protein-Sized Inorganic Substrates” Collaborative Research Grant (with Dr. C. J. Murphy, USC) EPSCoR NSF/NIH, 5/1/06-4/30/08, \$60,000 total.

“The Effect of Plasmid DNA Size on Binding to Au and Ag Nanoparticles” South Carolina Independent Colleges and Universities Student/Faculty Research Grant, 6/1/09-12/9/09, \$7610 total.

“The Chinese Tallow Tree in Upstate South Carolina: Biodiesel, Soil Conditions, and Medicinal Properites” South Carolina Independent Colleges and Universities Student/Faculty Research Grant, 6/1/09-12/9/09, \$6590 total.

“PC Faculty Research Grant” Presbyterian College, 6/1/09-8/1/09, \$2500.

“Detecting Pigments and Dyes in Art using Surface-enhanced Raman Spectroscopy” Presbyterian College Summer Fellowship, 6/1/08-8/1/09, \$2000.

“Light Scattering studies of DNA Nanoparticle Interactions” Presbyterian College Summer Fellowship, 6/1/09-8/1/09, \$1000.

“Surface-enhance Raman Spectroscopy of Solids” Presbyterian College Summer Fellowship, 6/1/09-8/1/09, \$1000.

“NMR for Undergraduate Chemistry Labs” Pittsburgh Conference Memorial National College Grants Award Program, 2011, \$10,000.

“Synthesis of Gold and Silver Nanoparticles in a Choline Chloride-Urea Deep Eutectic Solvent”, South Carolina Independent Colleges and Universities Student/Faculty Research Grant, 6/1/012-12/9/12, \$4332 total.

Committees and Campus Service:

Honor Council	Fall 2103-present
Senior Faculty Council	Spring 2011-Spring 2013
Department Chair	Fall 2010-present
Biochemistry Director	Fall 2010-present
Associate Director of Undergraduate Research	Spring 2008-present
Director of the PC Summer Fellows Program	Spring 2008-present
Faculty Development Committee	Fall 2008-Spring 2009
Faculty Status Committee	Fall 2007-Fall 2010

Faculty Contact for Mitchell Scholarship	2007-present
Martha Anne Green Service Award Selection Committee	2007-2011
Senior Faculty Council	Fall 2007-Spring 2009
<i>Committees and Campus Service Continued</i>	
Honor Council	Fall 2006-Spring 2007
Faculty Qualifications Committee	Fall 2006
General Education Committee	Fall 2005, Fall 2006-2007
Academic Affairs	Fall 2005- Spring 2008
Honor Council Appeals Board	Fall 2004-Spring 2006
Editing Committee: Qualifications for faculty hiring:	Spring 2006
Freshman Advisor	Fall 2002-present
Student Life Committee	Fall 2002- Spring 2005
Student Life Budget Committee	Fall 2003-Spring 2005
Student Affiliate American Chemical Society Advisor	2002-2013

Community Service, Professional Service, and Outreach:

- ∞ Laurens County HAZMAT: 2004 -2007
- ∞ Christian Education Committee, First Presbyterian Church Clinton: 2005-2012
- ∞ Councilor for SC Academy of Science
- ∞ CHAMPS science labs for high school and middle school at -risk students, 2011-2013
- ∞ Organizer and Judge for South Carolina Upstate Research Symposium, 2010-2013
- ∞ Chemistry and Art activities, South Carolina Junior Academy of Science, 2012
- ∞ Campus Ministries Committee, First Presbyterian Church Clinton, 2013-present
- ∞ Church Elder, First Presbyterian Church Clinton, 2013-present
- ∞ “What is Cold?” chemistry demonstration for Clinton Elementary kindergarten class, 2013
- ∞ “Invisible Motion” science demonstrations for Clinton Elementary 1st grade, 2014
- ∞ “It’s Science!” chemistry demonstrations and opening address for Laurens School District 56 Elementary School Science Olympiad Competition, 2014
- ∞ Career Day, Ford Elementary School, Laurens SC, 2014

References:

Dr. Walter Ott

Presbyterian College, Dept. of Chemistry, wott@presby.edu, (864) 833-8404

Dr. Ed Gouge

Presbyterian College, Dept. of Chemistry, egouge@presby.edu, (864) 833-0570

Dr. Stuart Gordon

Presbyterian College, Dept. of Biology, sggordon@presby.edu, (864) 833-8405

Dr. A. Craig Powell

Presbyterian College, Dept. of Chemistry, cpowell@presby.edu, (864) 833-8418