

Adam D. McFarland

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Date of Birth: July 11, 1977
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Education

- 1999 **B.S.**, Chemistry, University of Dayton, Dayton, OH
Thesis Title: "Charge Transfer Interactions Involving Sulfur Compounds"
- 2001 **M.S.**, Chemistry, Northwestern University, Evanston, IL
- 2004 **Ph.D.**, Chemistry, Northwestern University, Evanston, IL
Thesis Title: "Using Nanoparticle Optics for Ultrasensitive Chemical Detection and Surface-Enhanced Spectroscopy"

Employment

- July 2004 – Present **Postdoctoral Fellow** Northwestern University, Department of Materials Science. Design and Construction of a low temperature optical ultra-high vacuum scanning tunneling microscope.
- 1999-2004 **Teaching Assistant** Northwestern University, Department of Chemistry. Taught General Chemistry lab and Advanced Physical Chemistry lab.
- 1997-1999 **Teaching Assistant** University of Dayton, Department of Chemistry. Supervised General Chemistry lab.
- 1996-1999 **Research Assistant** Wright-Patterson Air Force Base/University of Dayton Research Institute. Performed computational and X-ray diffraction studies of conducting polymers.

Awards

- 2003-2004 **Nanoscale Science and Engineering Center Graduate Fellowship** from Northwestern University

Awards (cont.)

- 2003-2004 **University Graduate Fellowship** from Northwestern University
- 2000-2001 **Materials Research Science and Engineering Center Fellowship** from Northwestern University
- 1999 **National Institute of Chemists Award** from the University of Dayton
- 1998 **Patterson College Chemistry Award** from the University of Dayton
- 1996-1999 **Sherwin-Williams Chemistry Scholarship** from the Sherwin-Williams Company
- 1996 **Bernard Katchman Chemistry Scholarship** from the University of Dayton

Publications (20)

"Syntheses, Structure, Some Band Gaps, and Electronic Structures of CsLnZnTe₃ (Ln) La, Pr, Nd, Sm, Gd, Tb, Dy, Ho, Er, Tm, Y)," J. Yao, B. Deng, L. J. Sherry, **A. D. McFarland**, D. E. Ellis, R. P. Van Duyne, and James A. Ibers, *Inorg. Chem.*, 43, 7735-7740 (2004).

"Refractive index sensitive, plasmon resonant scattering, and surface-enhanced Raman scattering nanoparticles and arrays as biological sensing platforms," D. A. Stuart, A. J. Haes, **A. D. McFarland**, S. Nie, and R. P. Van Duyne, *Proceedings of SPIE-The International Society for Optical Engineering*, 5327, 60-72 (2004).

"Nanoparticles with Tunable Localized Surface Plasmon Resonance," Haynes, C. L., Haes, A. J., **McFarland, A. D.**, and Van Duyne, R. P. in *Metal Effects in Spectroscopy*, Lakowicz, J. R., Ed. Plenum Press: New York, 2004.

"Synthesis, Crystal Structure, and Optical Properties of CeMn_{0.5}OSe," Ijjaali, I., Mitchell, K., Haynes, C. L., **McFarland, A. D.**, Van Duyne, R. P., and Ibers, J. A., *J. Solid State Chem.*, 176, 170-174(2003).

"Syntheses, Structures, Optical Properties, and Theoretical Calculations of Cs₂Bi₂ZnS₅, Cs₂Bi₂CdS₅ and Cs₂Bi₂MnS₅," Huang, F. Q., Somers, R. C., **McFarland, A. D.**, Van Duyne, R. P., Ibers, J. A., *J. Solid State Chem.*, 174, 334-341(2003).

"Syntheses, Structure, and Selected Physical Properties of CsLnMnSe₃ (Ln = Sm, Gd, Tb, Dy, Ho, Er, Tm, Yb, Y) and AYbZnQ₃ (A = Rb, Cs; Q = S, Se, Te)," Mitchell, K., Huang, F. Q., Caspi, E. N., **McFarland, A. D.**, Haynes, C. L., Somers, R. C., Jorgensen, J. D., Van Duyne, R. P., Ibers, J. A., *Inorg. Chem.*, 43, 1082-1089 (2003).

"Color My Nanoworld", **A. D. McFarland**, C. L. Haynes, C. A. Mirkin, R. P. Van Duyne, H. A. Godwin, *J. Chem. Edu.*, 81, 544A-544B (2004).

"Nanopatterning with Lithography," Haynes, C. L., **McFarland, A. D.**, Van Duyne, R. P., and Godwin, H. A., *J. Chem. Ed.*, in press.

"Soda Can Atomic Force Microscope," **McFarland, A. D.**, Haynes, C. L., Van Duyne, R. P., and Godwin, H. A., *J. Chem. Ed.*, submitted.

"Nanoparticle Optics: Sensing with Nanoparticle Arrays and Single Nanoparticles", Haes, A. J., **McFarland, A. D.**, and Van Duyne, R. P. *Proceedings of SPIE-The International Society for Optical Engineering*, 5223, 197-207 (2003).

"Single Silver Nanoparticles as Real-Time Optical Sensors with Zeptomole Sensitivity," **McFarland, A. D.**, Van Duyne, R. P., *Nano Lett.*, 3, 1057-1062 (2003).

"The CsLnMSe₃ Semiconductors (Ln=Rare-Earth Element, Y; M=Zn, Cd, Hg)," Mitchell, K., Huang, F. Q., **McFarland, A. D.**, Haynes, C. L., Somers, R. C., Van Duyne, R. P., Ibers, J. A., *Inorg. Chem.*, 42(13), 4109-4116 (2003).

"Nanoparticle Optics: The Importance of Radiative Dipole Coupling in Two-Dimensional Nanoparticle Arrays," Haynes, C. L., **McFarland, A. D.**, Zhao, L., Van Duyne, R. P., Schatz, G. C., Gunnarsson, L., Prikulis, J., Kasemo, B., Kall, M., *J. Phys. Chem. B.*, 107(30), 7337-7342 (2003).

"Synthesis, Structure, and Optical Properties of the New Lanthanum Copper Oxysulfide La₃CuO₂S₃," Ijjaali, I., Haynes, C. L., **McFarland, A. D.**, Van Duyne, R. P., Ibers, J. A., *J. Solid State Chem.*, 172, 257-260 (2003).

"Synthesis and Characterization of La₄MnCu₆S₁₀," Ijjaali, I., **McFarland, A. D.**, Haynes, C. L., Van Duyne, R. P., Ibers, J. A., *J. Solid State Chem.*, 172, 127-131 (2003).

"A Nanoscale Optical Biosensor: Real Time Immunoassay and Nanoparticle Adhesion," Riboh, J. C., Haes, A. J., **McFarland, A. D.**, Ranjit, C., Van Duyne, R. P., *J. Phys. Chem. B*, 107, 1772-1780 (2003).

"Tuning of Optical Band Gaps: Syntheses, Structures, Magnetic, and Optical Properties of CsLnZnSe₃ (Ln = Sm, Tb, Dy, Ho, Er, Tm, Yb, and Y)," Mitchell, K., Haynes, C. L., **McFarland, A. D.**, Van Duyne, R. P., Ibers, J. A., *Inorg. Chem.*, 41, 1199-1204 (2002).

"Angle-Resolved Nanosphere Lithography: Manipulation of Nanoparticle Size, Shape, and Interparticle Spacing," Haynes, C. L., **McFarland, A. D.**, Smith, M. T., Hulteen, J. C., Van Duyne, R. P., *J. Phys. Chem. B*, 106, 1898-1902 (2002).

“Metal Film Over Nanosphere (MFON) Electrodes for Surface-Enhanced Raman Spectroscopy (SERS): Improvements in Surface Nanostructure Stability and Suppression of Irreversible Loss,” Dick, L. A., **McFarland, A. D.**, Haynes, C. L., Van Duyne, R. P., *J. Phys. Chem. B*, 106, 853-860 (2002).

“Polythiophene Dications: Polarons and Bipolarons,” **McFarland, A. D.**, Fratini, A. V., and Dudis, D. S. *Polymer Preprints*, 1998, 39(2), 655-656.

Presentations

- 2001 National American Chemical Society Conference Poster Session
Analytical Chemistry Gordon Research Conference Poster Session
American Vacuum Society Regional Poster Session (2nd place winner)
- 2000 Northwestern University Industrial Associates Poster Session
Society for Applied Spectroscopy Regional Poster Session (1st place winner)
- 2003 Northwestern University Materials Research Science and Engineering
Center Meeting Presentation
- 2004 Northwestern University Department of Chemistry Physical/Analytical Chemistry
Seminar Presentation

Synergistic Activities

- 2004 Co-author of the research proposal entitled “Single Nanoparticle Optics for Sensing, Spectroscopy, and Probe Microscopy,” National Science Foundation, \$450,000.
- 2003-2004 Co-author of upcoming *Materials World Module* entitled “Nanoscience” for use in high school science and engineering courses.
- 2003 Co-organizer of 1st annual “Nanoscience Day” for local Boy Scout troops.
- 2002 Co-author of the research proposal entitled “Surface-Enhanced Raman Spectroscopy: Single Molecule Studies and Size-Tunable Distance Dependence,” Petroleum Research Fund, American Chemical Society, \$40,000.
- 2001 Co-organizer of 2001 Regional Society for Applied Spectroscopy Student Poster Session.

Professional Affiliations

Phi Lambda Upsilon, Graduate Chemistry Honor Society

Society for Applied Spectroscopy

American Chemical Society