
Douglas B. Cameron, Ph.D.

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Corporate Contribution

- Scientist with the ability to discover and apply scientific solutions to product development in chemistry, physics, and software algorithms including:
 - analytical chemistry, molecular physics, scientific instrumentation, nanotechnology, software development, applied mathematics, numerical analysis, numerical simulation, image and signal processing
- The ability to:
 - Find solutions in the laboratory or on a computer
 - Design and articulate plans to solve complex problems
 - Gather and direct a team to solve technical challenges
 - Communicate solutions to less technical customers, managers, and employees

Employment Interest

- Technical leader or member of a skilled and motivated team
- Applying scientific or mathematical techniques to commercial product research and development. Likely to involve my skills bridging chemistry and physics with technical software development.
- Preference for a small company or independent, dynamic group within a larger company

Academic Background

Post-Doctoral, Molecular Physics,
[The Rowland Institute at Harvard](#) (1997)

Ph.D. Chemical Physics and Computational Chemistry,
Northwestern University (1994)

M.S. Chemical Physics,
Northwestern University (1989)

B.S. Physical Chemistry,
Wheaton College, Wheaton, IL (1985)



Skills

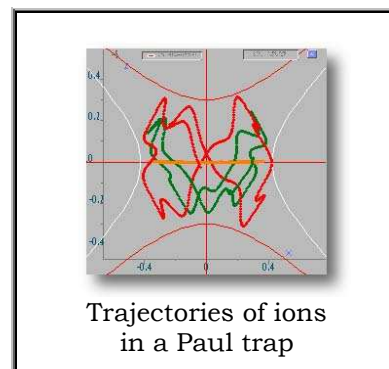
- Solid understanding of a wide range of physical sciences: analytical and physical chemistry, nanotechnology, molecular physics, and scientific instrumentation.

- Able to enthusiastically present technical material to a non-technical audience. Capable writer and presenter of technical material to inform. Excellent writing skills. Capable group leader.
- Experienced computer scientist specializing in instrumentation interfaces, numerical simulation, algorithms for optimization, pattern recognition and machine learning. Expert level knowledge of C++. Extensive application development with [mathematical and GUI C++ library design experience](#). Detailed knowledge of Win32 API, multithreading, Visual C++.
- Laboratory and mechanical skills related to the design, construction and operation of [world class research in molecular physics](#). Experience designing and building laboratory electronics, mass spectrometers, chemical detectors, laser optics, and ultra-high vacuum equipment.
- Mathematical and numerical analysis skills commensurate with graduate level work in *ab initio* quantum chemistry. Developer of custom software for molecular dynamics and molecular structure optimization. Adept user of [Mathematica](#) for theoretical modeling and data analysis.

Research and Employment History

- 2003-present
Senior Scientist with [Sionex Corporation](#), Waltham, MA
Experimental R&D scientist developing a compact chemical sensor for use in the detection of explosives, chemical warfare agents and other small molecules. Major contributor to initial design, developmental testing, embedded software architecture, and detection algorithm. Acquired expertise in the theory and simulation of ion mobility spectrometry (IMS/DMS/FAIMS).
- 2000-2002
Independent Consultant, [Genetical.com](#) and [AlphaSquared.com](#), Wellesley, MA
Developer of statistical and information theoretic software for non-linear pattern recognition. Data mining on large databases based on genetic algorithm. Continuing development. Additional consulting work providing Internet and networking expertise to a few Boston area companies.
- 1999-2000
Principal, Lamarck, Inc., 171 Newbury Street, Boston, MA
Lead programmer for a small team. Designed and developed software for a novel computing environment in investment research and data mining for financial services sector. Venture capital funded start up. Principal architect of C++ interfaces and protocols for TCP/IP access to large, high-speed real-time databases.
- 1998
External Consultant, [The Rowland Institute at Harvard](#), Cambridge, MA
Developed computer [simulations](#) of scientific experiments involving molecular dynamics and specialized image processing.

- 1997-1998
Research Scientist, [The Rowland Institute](#), Cambridge, MA
1994-1997
Post-Doctoral Position, [The Rowland Institute](#)
Designed and built the world's first ion trap capable of [simultaneous mass analysis and electron diffraction](#) for molecular structure determination. Studied unique ion-molecule reactions of C₆₀ and other fullerenes in custom mass spectrometers. [Joel Parks](#), research director.



- 1992-1994
Graduate Student, [Physical Chemistry, Universität Karlsruhe](#), Karlsruhe, Germany
Extended graduate research in an international environment. Trained a team of German graduate students in experimental physics techniques building custom mass spectrometers and lasers. Theoretical and computation work on [quantum physics of atomic clusters](#).
- 1988-1992
Graduate Student, [Northwestern University](#), Evanston, IL
Experimental and theoretical study of chemical and electronic properties of gas-phase metal clusters. Laser desorption and spectroscopy of atomic and molecular species in a molecular beam. Member of a team that designed and built electronics, laser, and high vacuum chamber for the first determination of [ionization potentials of silver clusters](#), Ag₂-Ag₁₀₀. [Thesis](#) work under [Prof. Manfred M. Kappes](#).
Computational chemistry using local density theory on a Cray YMP supercomputer to study alkali clusters with [Prof. Donald E. Ellis](#), Dept. of Physics.
Taught physical chemistry recitation classes. Teaching assistant in general chemistry and spectroscopy.
- 1986-1988
Analytical chemist, R & D [Baxter International](#), Round Lake, IL
Chromatographic analysis of amino acids for intravenous solutions. Reported to the Food and Drug Administration (FDA) on attainment of product manufacturing requirements and product stability. Developed protocols for chemical and statistical analysis. Employed a variety of analytical methods such as High Performance Liquid Chromatography, Atomic Absorption, and Gas Chromatography. (Later graduate work with UV-VIS, NMR, SEM, STM instruments.)

Additional Skills

- Extensive experience with interfacing computers and laboratory instrumentation. [LabView](#) developer. Experience with digital-analog interfaces and signal and image processing. Developer of custom software for scientific CCD camera. Developer of assembly and C/C++ routines for embedded processors, especially DSPs for controlling scientific instruments and complex FPGA algorithms.
- Developer of low level multithreaded C++ code handling TCP/IP and HTTP communications. Experienced in HTML design, and Windows network management.
- Experience with a range of lasers and optics, techniques of ultra-high vacuum design and generation, mass spectroscopy (linear and reflectron time-of-flight, quadrupole), and radio frequency ion (Paul) traps.

- Majority of computing and development experience is on Windows and Mac platforms, with less experience on Unix and Linux systems. Open to improving Linux skills.
- Personable leadership style. Patient teacher.

Publications (10), Patents (3 pending)

1. [Electron Diffraction of Trapped Cluster Ions](#)
Mathias Maier-Borst, Douglas B. Cameron, Mordechai Rokni, and Joel H. Parks
Physical Review A, 59 (1999) R3162-R3165.
2. [Charge-exchange collisions of \$C_{60}^{z+}\$: a probe of the ion charge distribution](#)
Douglas B. Cameron, J.H. Parks
Chemical Physics Letters, 272 (1997) 18-24.
3. [Charge-Exchange and Cluster Formation in an rf Paul Trap: Interaction of Alkali Atoms with \$C_{60}^+\$](#)
Stuart Pollack, Douglas Cameron, Mordechai Rokni, Winfield Hill, J.H. Parks
Chemical Physics Letters, 256 (1996) 101-108.
4. [Photofragmentation of \$Aq_4\(N_2\)_x^+\$, \$x=0-3\$: \$N_2\$ Binding Energies](#)
Susanne Haupt, Julian Kaller, Douglas Cameron, Detlef Schoof, Manfred M. Kappes
Z. Physik D, 40, Issue 1-4 (1997) 331-333.
5. [Photodissociation Spectroscopy of Metal Clusters: a Status Report](#)
Douglas Cameron, Susanne Haupt, Julian Kaller and Manfred M. Kappes, SPIE Proceedings, 1994, 2124, 418-425.
6. [Electronic and Geometric Structure in Silver Clusters.](#)
George Alameddin, Joanna Hunter, Douglas Cameron and Manfred Kappes, Chem. Phys. Lett., 1992, 192, 122-128.
7. Impurity Doped Simple Metal Clusters: Optical Response.
Geoffrey M. Koretsky, Tina A. Dahlseid, Stuart Pollack, C.R. Chris Wang, George Alameddin, Joanna Hunter, Douglas Cameron, Shengzhong Liu and Manfred Kappes, Ber. Bunsenges. Phys. Chem., 1992, 96, 1270-1272.
8. Optical Response of Doped s^1 -Electron Metal Clusters.
Tina A. Dahlseid, Geoffrey M. Koretsky, Stuart Pollack, C.R. Chris Wang, Joanna Hunter, George Alameddin, Douglas Cameron, Shengzhong Liu and Manfred Kappes, Z. Physik D., Proceedings of the 88th Heraeus Seminar, "Nuclear Concepts in the Study of Atomic Cluster Physics," R. Schmidt, H. Lutz and R. Dreizler (Eds.), pp. 262-265, Springer Verlag, Berlin, 1992.
9. Photoabsorption Spectra of s^1 -Electron Metal Clusters.
C.R. Chris Wang, Stuart Pollack, Joanna Hunter, George Alameddin, Tina Dahlseid, Douglas Cameron, Shengzhong Liu and Manfred Kappes, Z. Physik D, 1991, 19, 13-17.
10. [Optical absorption spectroscopy of sodium clusters as measured by collinear molecular beam photodepletion.](#) C.R. Chris Wang, Stuart Pollack, Douglas Cameron and Manfred Kappes, J. Chem. Phys., 1990, 93, 3787-3801.

Online Resources

www.genetical.com/dc/resume.html

1. [Electron Diffraction of Trapped Cluster Ions](#) (poster)
2. [C₆₀⁺ Reactions with Alkali Metals in an rf Trap](#) (poster)
3. [Paul Traps, Fullerenes, and Electron Diffraction](#) (talk slides)
4. [Silver Clusters: Spectroscopic Probes and Theoretical Models of Gas Phase Structure](#) (thesis)
5. [Scientific, publicly available programs](#)
6. [Personal web site](#)



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