

CHRISTOPHER R. ARUMAINAYAGAM

Department of Chemistry
Wellesley College
Wellesley, MA 02181
(781) 283-3326 (Office)

EDUCATION

STANFORD UNIVERSITY, Stanford, CA (1985–1990).

Ph.D. in CHEMICAL PHYSICS (*September 1990*).

HARVARD UNIVERSITY, Cambridge, MA (1981–1985).

A.B. in CHEMISTRY and PHYSICS (*June 1985*).

Graduated *Magna Cum Laude*.

HONORS, AWARDS & SPECIAL RECOGNITIONS

- Research featured in a press conference (American Astronomical Society) (2016).
 - The Anna and Samuel Pinanski Teaching Prize (Wellesley College) (2014).
 - Henry Dreyfus Teacher-Scholar award (The Camille and Henry Dreyfus Foundation) (1996) .
 - Brachman Hoffman Fellowship, Wellesley College (1993).
 - Finalist for the Morton M. Traum award in Surface Science, American Vacuum Society (1990).
 - First prize for presentation at regional American Vacuum Society Conference (1988).
 - Onsager Fellowship (declined) (Yale University) (1985).
 - Harvard Scholarship (1984).
 - John Harvard Scholarship (1983).
 - Detur Prize, Harvard University (1982).
 - Selected to represent Sri Lanka at Fifth Stockholm International Youth Science Seminar (1980).
 - Arthur C. Clarke Award (national award, Sri Lanka) (1979).
 - Placed first out of 100,000+ students at national high school examination (Sri Lanka) (1979).
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PROFESSIONAL EXPERIENCE

Chair Chemistry Department: Wellesley College (2007–2010)

Professor of Chemistry: Wellesley College (2004–present).

Associate Professor of Chemistry: Wellesley College (1997–2003).

Assistant Professor of Chemistry: Wellesley College (1990–1996).

Visiting Scholar: Harvard University, with Professor C. M. Friend (May 1991–May 1992).

Research Assistant: Stanford University, with Professor R. J. Madix (Sept. 1985–Aug. 1990).

Head Teaching Assistant: Department of Chemistry, Stanford University (1987–1988).

Teaching Assistant: Department of Chemistry, Stanford University (1985–1989).

Teaching Assistant: Department of Chemistry, Harvard University (1984 –1985)

High School Teacher: St. Thomas College, Sri Lanka (1980).

PROFESSIONAL ACTIVITIES

Member: NASA Review Panel (2016)

Member: NSF Site Review Panel (2015)

Member: NSF-REU Site Review Panel (2010);

PhD Thesis Committee Member, College of Nanoscale Science and Engineering (Albany) (2009).

Member, Advisory Board of Petroleum Research Fund: American Chemical Society (2000–2004).

Co-organizer, Radiation Chemistry Symposium: American Chemical Society National Meeting (2001).

Grant reviewer: National Science Foundation, American Chemical Society, Research Corporation.

Manuscript reviewer: *J. of Physical Chemistry*, *J. of Molecular Catalysis*, *Surface Science*, *Monthly Notices of the Royal Astronomical Society*, *Physical Chemistry Chemical Physics*.

EXTERNAL GRANTS

1991	Research Corporation (PI)	\$ 30,000
1992	American Chemical Society-PRF Type G Grant (PI)	\$ 18,000
1996	Research Corporation (PI)	\$ 29,500
1996	Henry Dreyfus Teacher Scholar Award (PI)	\$ 60,000
1996	American Chemical Society-PRF Type B Grant (PI)	\$ 25,000
1997	National Science Foundation REU grant (co-PI)	\$171,000
2000	National Science Foundation REU grant (PI)	\$186,000
2003	National Science Foundation REU grant (PI)	\$204,000
2005	National Science Foundation RUI grant (PI)	\$380,000
2006	National Science Foundation REU grant (PI)	\$236,475
2010	National Science Foundation REU grant (PI)	\$300,200
2010	National Science Foundation RUI grant (PI)	\$390,000
2015	National Science Foundation RUI grant (PI)	\$290,000
2016	National Science Foundation RUI supplemental award (PI)	\$ 11,773

PUBLICATIONS

1. G.R. Schoofs, C.R. Arumainayagam, and R.J. Madix, "Summary Abstract: Dynamics of Ethane Adsorption on and Desorption from Pt(111) Determined from Direct Sticking Probability Experiments," *J. Vac. Sci. Technol. A* **6(3)** (1988) 882.
2. G.R. Schoofs, C.R. Arumainayagam, M.C. McMaster, and R.J. Madix, "Dissociative Chemisorption of Methane on Pt(111)," *Surface Sci.* **215** (1989) 1.
3. C.R. Arumainayagam, M.C. McMaster, G.R. Schoofs, and R.J. Madix, "Dynamics of Molecular CH₄ Adsorption on Pt(111)," *Surface Sci.*, **222** (1989) 213.
4. C.R. Arumainayagam, R.J. Madix, M.C. McMaster, V.M. Suzawa, and J.C. Tully, "Trapping Dynamics of Xenon on Pt(111)," *Surface Sci.*, **226** (1990) 180.
5. C.R. Arumainayagam, M.C. McMaster, and R.J. Madix, "The Dynamics of Precursor Adsorption: Ethane on Pt(111)," *Surface Sci.*, **237** (1990) L424.
6. C.R. Arumainayagam, G.R. Schoofs, M.C. McMaster, and R.J. Madix, "The Dynamics of Molecular Adsorption of Ethane on Pt(111): A Supersonic Molecular Beam Study," *J. Phys. Chem.*, **95** (1991) 1041.

7. C.R. Arumainayagam and R.J. Madix, "Molecular Beam Studies of Gas-Surface Collisional Dynamics," *Progress in Surface Science*, **38** (1991) 1.
8. C.R. Arumainayagam, M.C. McMaster, and R.J. Madix, "Coverage Dependence of Molecular Adsorption Dynamics: Ethane on Pt(111)," *J. Phys. Chem.*, **95** (1991) 2461.
9. C.R. Arumainayagam, M.C. McMaster, and R.J. Madix, "Molecular Beam Studies of Adsorption Dynamics," *J. Vac. Sci. Technol. A*, **9** (1991) 1581.
10. C.R. Arumainayagam, J.A. Stinnett, M.C. McMaster, and R.J. Madix, "Adsorbate Assisted Adsorption: Trapping Dynamics of Xe on Pt(111) at Non-Zero Coverages," *J. Chem. Phys.*, **95** (1991) 5437.
11. M.C. McMaster, C.R. Arumainayagam, and R.J. Madix, "Molecular Propane Adsorption Dynamics on Pt(111)," *Chemical Physics*, **177** (1993) 461.
12. T.D. Harris,* D.H. Lee,* M.Q. Blumberg,* and C.R. Arumainayagam, "Electron-Induced Reactions in Methanol Ultrathin Films Studied by Temperature-Programmed Desorption: A Useful Method to Study Radiation Chemistry," *J. Phys. Chem.*, **99** (1995) 9530.
13. C.R. Arumainayagam, E.C. Tripa, J. Xu, J.T. Yates, Jr., "IR Spectroscopy of Adsorbed Dinitrogen: A Probe of Defect Sites on Pt(111)," *Surface Sci.*, **360** (1996) 121.
14. K.L. Queeney, C.R. Arumainayagam, M.K. Weldon, C.M. Friend, and M.Q. Blumberg,* "Differential Reactivity and Structure of Mono- and Di-alkoxides: the Reactions of Ethylene Glycol on Mo(110)," *J. Am. Chem. Soc.*, **118** (1996) 3896.
15. C.E. Tripa, C.R. Arumainayagam, J.T. Yates, Jr., "Kinetics Measurements of CO Photooxidation on Pt(111)," *J. Chem. Phys.*, **105** (1996) 1691.
16. K.T. Queeney, C.R. Arumainayagam, A. Balaji,* and C.M. Friend, "Carbon-Carbon Coupling from Formaldehyde Reaction on Mo(110)," *Surface Sci.*, **418** (1998) L31-L38.
17. W.F. Coleman and C.R. Arumainayagam, "Book and Media Reviews: HyperChem 5," *J. Chemical Education*, **75** (1998) 416
18. E. Ferrenz,* A. Amare,* and C. R. Arumainayagam; "An Improved Method to Spot-Weld Difficult Junctions." *Review of Scientific Instruments*, **72** (2001) 4474.
19. N. Nakayama,* E. E. Ferrenz,* D.R. Ostling,* A.S. Nichols,* J.F. Faulk,* and C.R. Arumainayagam, "Surface Chemistry and Radiation Chemistry of Trifluoriodomethane (CF₃I) on Mo (110)." *Journal of Phys. Chem.*, **108** (2004) 4080-4085.
20. N. Nakayama,* S. C. Wilson,* L. E. Stadelmann,* H. D. Lee,* C. A. Cable,* and C. R. Arumainayagam, "Low Energy Electron-Induced Chemistry of CF₂Cl₂: Implications for the Ozone Hole?" *J. Phys. Chem. B* **108** (2004) 7950-4.
21. R. Gunawardane and C.R. Arumainayagam, "Auger Electron Spectroscopy" In *The Handbook of Applied Solid State Spectroscopy*; edited by D.R. Vij, Springer Science, New York, pp. 451-487 (2006).

22. L. Weeks,* L. Zhu,* M. Pellon,* D.R. Haines, and C.R. Arumainayagam, "Low-Energy Electron-Induced Oligomerization of Carbon Tetrachloride." *J. Phys. Chem.*, **111** (2007) 4815–4822.
23. Andrew D. Bass, Christopher R. Arumainayagam and Leon Sanche, "Revisiting the electron stimulated desorption of anions from thin films of CF₂Cl₂," *International Journal of Mass Spectrometry* **277** (2008) pp. 251–255.
24. M. Rajappan, L. Zhu,* A.D. Bass, L. Sanche, C.R. Arumainayagam, "Chemical Synthesis Induced by Dissociative Electron Attachment," *J. Phys. Chem.* **112** (2008) 17319–17323.
25. C.R. Arumainayagam, H.D. Lee,* R.B. Nelson,* D.R. Haines, R. Gunawardane, "Low-Energy Electron-Induced Reactions in Condensed Matter." *Surface Science Reports* **65** (2010) 1–144.
26. M. Rajappan, L. L. Zhu,* J. Wang,* G. Gardner,* K. Bu,* H. Mai,* M. Laupheimer,* Y. Shyur,* N. S. Abu Bakar,* S. K. Skinner-Hall,* C. Kim,* J. M. Haskins,* and C. R. Arumainayagam, "The Role of Low-Energy Electrons in the High-Energy Radiolysis of Condensed CF₃I." *J. Phys.: Condens. Matter* **22** (2010) 084006.
27. M. D. Boamah,* K. K. Sullivan,* K. E. Shulenberger,* C. M. Soe,* L. M. Jacob,* F. C. Yhee,* K. Atkinson, M. C. Boyer, D.R. Haines, and C. R. Arumainayagam, "Low-Energy Electron-Induced Chemistry of Condensed Methanol: Implications for the Interstellar Synthesis of Prebiotic Molecules," *Faraday Discussions* **168** (2014) 249–266.
28. M.C. Boyer, M. D. Boamah, K.K. Sullivan,* C.R. Arumainayagam M.M. Bazin, A. D. Bass, and Léon Sanche, "Dynamics of Dissociative Electron-Molecule Interactions in Condensed Methanol," *J. Phys. Chem. C*, 2014, **118**, 22592-22600.
29. Cuppen; Oba; Congiu; Dulieu; Kaiser; Price; Meuwly; Hama; Minissale; Ioppolo; McCoustra; Zins; Garrod; Watanabe; Herbst; Heard; Schram; Zacharias; Vidali; McGregor; Linnartz; Lamberts; Rawlings; Arumainayagam; Woods; Kamp; Mason; Meijer; Hornekraer; Jones; Mate; Rimola; Fukushima; Ellinger; Drozdovskaya; Jager; Fillion; Heays, General Discussion. *Faraday Discuss.* 2014, **168**, 571-615.
30. C. R. Arumainayagam, P. Swiderek, K. Tran, "Using Surface Science Techniques to Study Radiation Chemistry," 3rd edition, of the *Encyclopedia of Surface and Colloid Sciences* (Taylor and Francis Group) (2015).
31. Kristal K. Sullivan; Mavis D. Boamah; Katie E. Shulenberger; Sitara Chapman; Karen E. Atkinson; Michael C. Boyer; Arumainayagam, C. R., "Methanol Radiolysis of Astrochemical Interest," *Monthly Notices of the Royal Astronomical Society* **460** (2016) 664–672.
32. M.C. Boyer, N. Rivas, A.A. Tran, C.A. Verish, C.R. Arumainayagam, The Role of Low-Energy (≤ 20 eV) Electrons in Astrochemistry, *Surface Science* **652** (2016) 26–32.
33. M.C. Boyer, K.E. Atkinson, and C.R. Arumainayagam, "The Role of Low-Energy Electrons in Atmospheric Processes," accepted, *Low energy electron interaction in theory, fundamental processes and application;*" edited by Oddur Ingolfsson; Pan Stanford Publishing.

* Undergraduate/high school student

Oral Presentations Since (Since 2014)

1. Astrochemistry of Dust, Ice and Gas, Faraday Discussion 168, Leiden (April 2014)
2. Second Workshop on Experimental Laboratory Astrophysics, Hawaii, (February 2015).
3. 250th ACS National Meeting, Boston (August 2016)
4. 228th national meeting of the American Astronomical Society (AAS) San Diego (June 2016)
5. International Symposium and Workshop on Astrochemistry, Brazil (July 2016)
6. Hydride Toolbox Conference, Paris (December 2016)
7. International Astronomical Union, Chile (March 2017)
8. Symposium: Molecules in Space: Linking the Interstellar Medium to (Exo)-Planets, DC (August 2017)