

**Christa L. Brosseau****Professional Profile**

---

Christa L. Brosseau *B.Sc.H (Dalhousie), M.Sc (Acadia), Ph.D. (Guelph)*

Professor (Tenured)

**Canada Research Chair (Tier 2) in Sustainable Chemistry and Materials**

*Department of Chemistry*

*Saint Mary's University*

*Halifax, NS, Canada*

[www.brosseaulab.com](http://www.brosseaulab.com)

**Research Expertise**

Interfacial electrochemistry

Plasmonics

Surface Vibrational Spectroscopy

Nanotechnology

Analytical and Biophysical Chemistry

**Professional Memberships**

American Chemical Society (ACS)

Canadian Institute of Chemistry (CIC) – Analytical Chemistry Division Member-at-Large

International Society of Electrochemistry (ISE)

Electrochemical Society (ECS) –Vice-Chairperson of Canadian section

**Academic Leaves:**

June 2013 – June 2014 (Parental Leave)

September 2016 - September 2017 (Sabbatical Leave)

**Published and Accepted Articles: Refereed Journals**

---

\*\*It should be noted that in the field of chemistry, the principal investigator on a publication is listed as the last author; the other authors are listed in order of their contribution to the work.

**34.** "On the Origin of Electrochemical Surface-enhanced Raman Spectroscopy (EC-SERS) Signals for Bacterial samples: The Importance of Filtered Control Studies in the Development of New Bacterial Screening Platforms" K.E.R. McLeod, T. P. Lynk, C.S. Sit, C.L. Brosseau, *Analytical Methods*, **2019**, 11, 924-929.

**33.** "Electrochemical Surface-Enhanced Raman Spectroscopy as a Platform for Bacterial Detection and Identification" T.P. Lynk, C.S. Sit, C.L. Brosseau. *Analytical Chemistry*, **2018**, 90(21), 12639-12646.

32. "Development of an electrochemical surface-enhanced Raman spectroscopy (EC-SERS) fabric-based plasmonic sensor for point-of-care diagnostics" S.D. Bindesri, D.S. Alhatab, C.L. Brosseau. *Analyst*, **2018**, 143(17), p. 4128.
31. "Development of a sustainable plasmon-enhanced spectroelectrochemical sensor using avocado pit (*Persea Americana*) extract" T.P. Lynk, O.J.R. Clarke, N. Kesavan, C.L. Brosseau. *Sensors and Actuators B: Chemical*, **2018**, 257, p. 270.
30. "Electrochemical surface-enhanced Raman spectroscopy (EC-SERS) study of the interaction between protein aggregates and biomimetic membranes" R.A. Karaballi, S. Merchant, S.R. Power, C.L. Brosseau. *Physical Chemistry Chemical Physics*, **2018**, 20, p. 4513.
29. "Electrochemical-Surface Enhanced Raman Spectroscopic (EC-SERS) Study of 6-Thiouric Acid: A Metabolite of the Chemotherapy Drug Azathioprine" B.H.C. Greene, D.S. Alhatab, C.C.Pye, C.L. Brosseau. *Journal of Physical Chemistry C*, **2017**, 121(14) p.8084.
28. "Evaluation of an Electrodeposited Bimetallic Cu/Ag Nanostructured Screen Printed Electrode for Electrochemical Surface-Enhanced Raman Spectroscopy (EC-SERS) Investigations" O.J.R. Clarke, G.J.H. St. Marie, C.L. Brosseau. *Journal of the Electrochemical Society*, **2017**, 164(5), p.B3091. **Invited contribution for focus issue: Biosensors and Micro-Nano Fabricated Electromechanical Systems.**
27. "Development of a SERS-Based Rapid Vertical Flow Assay for Point-of-Care Diagnostics" O.J.R. Clarke, B.L. Goodall, H.P. Hui, N. Vats, C.L. Brosseau. *Analytical Chemistry*, **2017**, 89(3), p.1405.
26. "Development of an Electrochemical Surface-Enhanced Raman Spectroscopy (EC-SERS) Aptasensor for Direct Detection of DNA Hybridization" R. Karaballi, A. Nel, S. Krishnan, J. Blackburn, C.L. Brosseau. *Physical Chemistry Chemical Physics*, **2015**, 2015, 17, p.21356. **Invited contribution for special issue on Surface-Enhanced Spectroscopies.**
25. "Quantitative Detection of Uric Acid by Electrochemical-Surface Enhanced Raman Spectroscopy (EC-SERS) Using a Multilayered Au/Ag Substrate" L. Zhao, J. Blackburn, C.L. Brosseau. *Analytical Chemistry*, **2015**, 87(1), p.441. **Featured in C&E News online: <http://cen.acs.org/articles/92/web/2014/12/SERS-Method-Offer-Earlier-Screening.html>**
24. "The development of "Fab-Chips" as low-cost, sensitive surface-enhanced Raman spectroscopy (SERS) substrates for prospective disease diagnosis" A. M. Robinson, L. Zhao, M. Yasmin, P. Bhandari, S.G. Harroun, D. Dendukuri, J. Blackburn, C.L. Brosseau. *Analyst*, **2015**, 140(3), p.779. **Featured in ACCN News, 2015.**
23. "A Simple Complex on the Verge of Breakdown: Isolation of the Elusive Cyanofornate Ion." L.J. Murphy, K.N. Robertson, S.G. Harroun, C.L. Brosseau, U. Werner-Zwanziger, J. Moilanen, H.M. Tuononen, J.A. Clyburne. *Science*, **2014**, 344(6179), p.75

22. "Electrochemical Surface-Enhanced Raman Spectroscopy (E-SERS) of Novel Biodegradable Ionic Liquids" S.G Harroun, T.J. Abraham, C. Prudhoe, Y. Zhang, P.J. Scammells, C.L. Brosseau, C.C. Pye, R.D. Singer. *Phys. Chem. Chem. Phys.*, **2013**, 15(44), p.19205
21. "Electrochemical SERS Study of a Biomimetic Membrane Supported at a Nanocavity Patterned Ag Electrode" M. Vezvaie, C.L. Brosseau, J. Lipkowski. *Electrochimica Acta*, **2013**, 110, p.120.
20. "Electrochemical and PM-IRRAS Characterization of Cholera Toxin Binding at a Model Biological Membrane" J. J. Leitch, C.L. Brosseau, S.G. Roscoe, K. Bessonov, J.R. Dutcher, J. Lipkowski, *Langmuir*, **2013**, 29, 965.
19. "Electrochemical-Surface Enhanced Raman Spectroscopy (E-SERS) of uric acid: A Potential Rapid Diagnostic Method for Early Preeclampsia Detection" B.L. Goodall, A.M. Robinson, C.L. Brosseau, *Physical Chemistry Chemical Physics*, **2013**, 15, p.1382.
18. "Use of Surface Enhanced Raman Spectroscopy for Studying Fouling on Nanofiltration Membrane" R. Lamsal, S.G. Harroun, C.L. Brosseau, G.A. Gagnon, *Separation and Purification Technology*, **2012**, 96, p.7.
17. "A Portable Electrochemical SERS system for Routine Spectroelectrochemical Analysis" A. Robinson, S. Harroun, J. Bergman, C.L. Brosseau. *Analytical Chemistry*, **2012**, 84, p.1760.
16. "Surface-Enhanced Raman Spectroscopy of House Paint and Wallpaper Samples from an 18<sup>th</sup> Century Historic Property". S.G. Harroun, J. Bergman, E. Jablonski, C.L. Brosseau, *Analyst*, **2011**, 136 (17), p. 3453. **Invited contribution for special issue featuring "Emerging Investigators"**
15. "Revealing the Invisible – Using Surface-enhanced Raman Spectroscopy to Identify Minute Remnants of Color in Winslow Homer's Colorless Skies." C. L Brosseau, F. Casadio, V.P. Van Duyne, *Journal of Raman Spectroscopy*, **2011**, 42(6), p. 1305.
14. "Surface-enhanced Raman spectroscopy of  $\beta$ -Thioglucose adsorbed on Nano-structured silver electrodes" M. Vezvaie, C.L. Brosseau, J.D. Goddard, J. Lipkowski, *Chemphyschem*, **2010**, 11(7) p. 1460.
13. "Surface-enhanced Raman spectroscopy of dyes: from single molecules to the artists' canvas." K. L. Wustholz, C.L. Brosseau, F. Casadio, R.P Van Duyne. *Physical Chemistry Chemical Physics*, **2009**, 11(34), p. 7350.
12. "Surface-Enhanced Raman Spectroscopy: A Direct Method to Identify Colorants in Various Artist Media" C.L. Brosseau, K. Rayner, F. Casadio, C.M Grzywacz, R.P Van Duyne. *Analytical Chemistry*, **2009**, 81(17) p.7443.
11. "Ad-Hoc SERS Methodologies for the Detection of Artist Dyestuffs: Thin Layer Chromatography – Surface-Enhanced Raman Spectroscopy (TLC-SERS) and In Situ On

the Fiber Analysis” C.L. Brosseau, A. Gambardella, F. Casadio, C.M. Grzywacz, J. Wouters, R.P. Van Duyne. *Analytical Chemistry*, **2009**, 81(8), p. 3056.

10. “AFM Studies of the Effect of Temperature and Electric Field on the Structure of a DMPC-Cholesterol Bilayer Supported on a Au(111) Electrode Surface” M. Chen, M. Li, C.L. Brosseau, J. Lipkowski, *Langmuir*, **2009**, 25(2), 1028.

9. “Electrochemical and PM-IRRAS Studies of a Glycolipid Containing Biomimetic Membrane Prepared using Langmuir Blodgett / Langmuir Schaefer Deposition” C.L. Brosseau, J. Leitch, X. Bin, M. Chen, S.G. Roscoe, J. Lipkowski, *Langmuir*, **2008**, 24(22), p. 13058.

8. “AFM Studies of Solid-Supported Lipid Bilayers formed at a Au(111) Electrode Surface Using Vesicle Fusion and a Combination of Langmuir-Blodgett and Langmuir-Schaefer Techniques” M. Li, M. Chen, E. Sheepwash, C. L. Brosseau, H-Q Li, B. Pettinger, H. Gruler, J. Lipkowski, *Langmuir*, **2008**, 24(18), p. 10313.

7. “In Situ STM Study of Field Driven Transitions in the Film of a Cationic Surfactant Adsorbed on a Au(111) Electrode Surface” S. Sek, C.L. Brosseau, M. Chen, J. Lipkowski, *Langmuir* (COVER), **2007**, 23, p.12529.

6. “Electrochemical and PM-IRRAS Characterization of DMPC/Cholesterol Bilayers Prepared Using Langmuir-Blodgett / Langmuir-Schaefer Deposition” C.L. Brosseau, X. Bin, S.G. Roscoe, J. Lipkowski, *Journal of Electroanalytical Chemistry*, **2008**, 621, p. 222.

5. “Adsorption of N-Decyl-N,N,N-Trimethyl Ammonium Triflate (DeTATf), A Model Cationic Surfactant, on the Au(111) Surface” C.L. Brosseau, E. Sheepwash, I. Burgess, E. Cholewa, J. Lipkowski, S.G. Roscoe, *Langmuir*, **2007**, 23, p. 1784.

4. “Layer by layer Characterization of DMPC Bilayers Deposited on a Au(111) Electrode Surface by PM-IRRAS” N. Garcia-Araez, C.L. Brosseau, P. Rodriguez, J. Lipkowski. *Langmuir*, **2006**, 22(25), p. 10365.

3. “Electrochemical Quartz Crystal Nanobalance and Chronocoulometry Studies of Phenylalanine Adsorption on Au” C.L. Brosseau and S.G. Roscoe, *Electrochimica Acta*, **2006**, 51(11), p. 2145

2. “Electrochemical Quartz Crystal Nanobalance (EQCN) Studies of the Adsorption Behaviour of an Enzyme, Mandelate Racemase, and its Substrate, Mandelic acid on Pt” C.L. Brosseau and S.G. Roscoe, *Electrochimica Acta*, **2005**, 50(6), p. 1289.

1. “L-Phenylalanine Adsorption on Pt: Electrochemical Impedance Spectroscopy and Quartz Crystal Nanobalance Studies” J.E.I Wright, K. Fatih, C.L. Brosseau, S. Omanovic, and S.G. Roscoe, *Journal of Electroanalytical Chemistry*, **2003**, 550, p. 41

**Peer-reviewed Book chapters, Books, and Edited Collections and Critical editions:**

“PM-IRRAS Studies of a Biomimetic membrane supported at a gold electrode surface”; A.H. Kycia, Z. Su, C.L. Brosseau, J. Lipkowski in “Vibrational Spectroscopy at Electrified Interfaces”. John Wiley Publications, Hoboken, New Jersey, ed. A. Wieckowski. Wiley Series on Electrocatalysis and Electrochemistry. Chapter 11: “In-situ PM-IRRAS Studies of Biomimetic Membranes Supported at Gold Electrode Surfaces” A.H. Kycia, Z. Su, C.L. Brosseau, J. Lipkowski. p.345

#### **Patents:**

**US 9518986 B2** - Method of detecting and/or quantifying an analyte in a biological sample

**Filing Date: November 2, 2012**

**Publication Date: December 13, 2016**

**National phase filing launched in May 2014 in six countries: South Africa, China, Brazil, USA, Europe, India.**

**Intellectual contribution = 10%**

#### **Presentations: Refereed (Past 6 Years)**

---

“Plasmonics at the Electrified Interface – Advances and Applications in EC-SERS” C.L. Brosseau, S. Bindesri, T.P. Lynk, K. McLeod. 9<sup>th</sup> International Conference on Enhanced Spectroscopies. Jun 17-20, 2019, London, Ontario. **Invited lecture.**

“Electrochemical SERS – Advances and Applications in Bioanalytical Chemistry” C.L. Brosseau, R. Karaballi, S. Merchant, S. Power. 102<sup>nd</sup> Canadian Chemistry Conference and Exhibition. June 3-7, 2019, Quebec City, Quebec.

“Electrochemical SERS – A Tool for Bacterial Detection and Identification” C.L. Brosseau, T.P. Lynk, K. McLeod, C.S. Sit. 102<sup>nd</sup> Canadian Chemistry Conference and Exhibition. June 3-7, 2019, Quebec City, Quebec. **Invited lecture.**

“Spectroelectrochemical and Computational Studies of Tetrahydrocannabinol – Towards a Point-of-Need Sensor” C.L. Brosseau, C.C. Pye, S. Bindesri, R. Jebailey, N. Albarghouthi. 102<sup>nd</sup> Canadian Chemistry Conference and Exhibition. June 3-7, 2019, Quebec City, Quebec. **Invited lecture.**

“Plasmonics at the Point-of-Care” C.L. Brosseau, D. Alhatab, S. Bindesri, R. Karaballi. 26<sup>th</sup> International Conference on Raman Spectroscopy” August 26-31, 2018. Jeju, South Korea. **Invited lecture.**

“Spectroelectrochemistry at the Point-of-Care” C.L. Brosseau, D. Alhatab, S. Bindesri. 101<sup>st</sup> Canadian Chemistry Conference and Exhibition, May 29, 2018, Edmonton, Alberta. **Invited lecture.**

“Spectroelectrochemical and Computational Studies of Tetrahydrocannabinol” C.L. Brosseau, C.C. Pye, N. Albarghouthi, S. Bindesri. Spring meeting of the Canadian section of the Electrochemical Society, May 26, 2018.

“Plasmonics at the Patient Point-of-Care: Advances and Applications” C.L. Brosseau, R. Karaballi, D. Alhatab. 9<sup>th</sup> International Conference on Advanced Vibrational Spectroscopy” June 15, 2017, Victoria, British Columbia. **Invited lecture.**

“Evaluation of an Electrodeposited Cu/Ag Bimetallic Screen Printed Electrode for Electrochemical Surface-Enhanced Raman Spectroscopy (EC-SERS) Investigations” O.J.R Clarke, G. St. Marie, C.L. Brosseau. 100<sup>th</sup> Canadian Chemistry Conference and Exhibition, May 24, 2017, Toronto, Ontario. **Invited lecture.**

“Recent Advances in Surface-Enhanced Raman Spectroscopy (SERS) for Point-of-Care Diagnostics” C.L. Brosseau, R. Karaballi, L. Zhao, D. Alhatab. Pittcon 2017, Chicago, IL, USA, March 9, 2017. **Invited lecture.**

“Electrochemical Surface-Enhanced Raman Spectroscopy (EC-SERS): A Tool for Exploring Protein-Biomembrane Interactions at the Molecular Level” C.L. Brosseau, R. Karaballi, S. Merchant, S. Power. SciX 2016, Minneapolis, MN, USA, September 20, 2016. **Invited lecture**

“Plasmon-Enhanced Spectroelectrochemistry: An Advanced Tool for Point-of-Care Diagnostics” C.L. Brosseau, L. Zhao, R. Karaballi, S.G. Harroun. 67<sup>th</sup> ISE Meeting, The Hague, The Netherlands, August 21-26, 2016.

“Plasmon-Enhanced Spectroelectrochemistry: Advances and Applications” C.L. Brosseau, L. Zhao, R. Karaballi, S.G. Harroun, J. Blackburn. Gordon Research Conference, June 2016. Mount Holyoke College, South Hadley, MA.

(a) “Electrochemical Surface-Enhanced Raman Spectroscopy (EC-SERS): Advances and Applications for Bioanalytical Chemistry” C.L. Brosseau, R. Karaballi, S. Merchant, S. Power, P. MacMillan **Invited lecture** (b) “Sustainable Plasmonics: Towards a Sustainable Future for an Emerging Technology” C.L. Brosseau, O. Clarke, J. d’Eon. 99<sup>th</sup> Canadian Chemistry Conference and Exhibition, Halifax, Canada. June 5-9, 2016

“Plasmon-Enhanced Spectroelectrochemistry: An Advanced Tool for Biosensing” C.L. Brosseau, L. Zhao, R. Karaballi, S.G. Harroun, J. Blackburn, Pacifichem 2015, Honolulu, Hawaii, USA. December 17, 2015.

“Plasmon-Enhanced Spectroelectrochemistry: An Advanced Tool for Biosensing” C.L. Brosseau, L. Zhao, R. Karaballi, J. Blackburn, SciX 2015, Providence, Rhode Island, USA, Sept 30, 2015. **Invited lecture**

“Electrochemical Surface-Enhanced Raman Spectroscopy: A plasmonic tool for understanding and detecting human disease. C.L. Brosseau, L. Zhao, R. Karaballi, S.

Merchant, J. Blackburn. 98<sup>th</sup> Canadian Chemistry Conference and Exhibition, Ottawa, Canada. June 13-17, 2015.

“Plasmon-Enhanced Spectroelectrochemistry: An Advanced Tool for Biosensing” C.L. Brosseau, L. Zhao, R. Karaballi, S.G. Harroun, Surface Science Canada Meeting, Saskatoon, Saskatchewan, May 21, 2015. **Invited lecture**

“Spectroelectrochemical Studies of Protein Aggregate – Biomembrane Interactions” C.L. Brosseau, S. Merchant, R. Karaballi. ECS Canadian Section, Spring Meeting, Saskatoon, Saskatchewan, May 19, 2015. **Invited lecture**

### **Presentations: Non-refereed (Past 6 Years)**

---

#### **Anderson Award Lecture Series: *Invited award lectures***

(a) “Adventures in Plasmonics: From Sensing to Sustainability”, Memorial University, St. Johns, Newfoundland. May 17, 2018.

(b) “Chemistry and Culture: Perspectives from the world of cultural heritage science” Memorial University, St. Johns, Newfoundland. May 18, 2018.

“Adventures in Plasmonics: From Sensing to Sustainability”, Department of Chemistry, University of Victoria, Victoria, BC. April 3, 2017. **Invited lecture**

“Plasmonic Sensing: A Tool for Understanding and Diagnosing Human Disease” C.L. Brosseau, L. Zhao, R. Karaballi. Department of Biochemistry, Dalhousie University, February 24, 2016. **Invited lecture**

“Development of a Novel Biosensing Platform for Rapid TB Detection at the Point-of-Care” J. Blackburn, S. Krishnan, K. Dheda, M. Glucksberg, R.P. Van Duyne, M. Khati, M. Evans & C.L. Brosseau. Grand Challenges Meeting, December 2012.

“Electrochemical Surface-Enhanced Raman Spectroscopy (E-SERS): A Plasmonic Tool for Biochemistry” C.L. Brosseau, Dalhousie University, Department of Biochemistry, November 1<sup>st</sup>, 2012. **Invited lecture**

“Electrochemical PM-IRRAS Studies of Cholera Toxin Binding at a Model Biomembrane Surface” C.L. Brosseau, J.J. Leitch, S.G. Roscoe, J. Lipkowski. 2<sup>nd</sup> Ertl Symposium on Surface and Interface Chemistry, Stuttgart, Germany, June 24-27<sup>th</sup>, 2012. **Invited lecture**

“Development of a Hand-held DNA-aptamer based SERS Biosensor” J. Blackburn (PI), C.L. Brosseau, J. Yuen, S. Krishnan, A. Nel, R. Karaballi, S. Harroun, M. Glucksberg, R.P. Van Duyne, M. Khati, M. Evans, Point-of-Care Diagnostics Meeting, Bill and Melinda Gates Foundation, Seattle, Washington, USA. May 2012.

**Media Mentions:**

---

*Research was highlighted in the following press articles:*

Chemistry World, January 2010, p 44-47

C&E News, August 10, 2009, 87(32), p. 31

Photonics Spectra, November 2009, p. 19

Anal. Chem. 2009, 81(17) p.7128

<http://www.smu.ca/newsreleases/2011/04-18-11-chemistryandconservation.html>

<http://older.unews.ca/story/item/smu-prof-a-rising-star-in-promoting-world-health/>

<http://www.progressmedia.ca/article/2013/12/breaking-down-barriers>

<http://atlantic.ctvnews.ca/star-trek-technology-being-developed-at-saint-mary-s-university-1.1295881>

<http://www.smu.ca/about/news/2013/dr-christa-brosseau-named-emerging-professional-.html>

<http://www.businessbee.com/resources/news/technology-buzz/6-impressive-universities-that-are-breaking-the-barriers-of-technology/>

Research highlight in the general newsletter of the Analytical Chemistry division of the Canadian Society for Chemistry:

<http://nebula.wsimg.com/3cd39512b0910252c1deda3b667be385?AccessKeyId=04D2ED6DAFADEC70EE95&disposition=0>

<http://nsrit.ca/projects/fighting-disease-one-instrument-at-a-time/>

<http://cen.acs.org/articles/92/web/2014/12/SERS-Method-Offer-Earlier-Screening.html>

<http://www.cbc.ca/news/canada/nova-scotia/saint-mary-s-university-researches-fabrics-that-can-analyze-health-1.2980513>

- Participated in the SMU “Meet our Researchers” highlights

<http://www.smu.ca/research/dr-christa-brosseau.html>

- Participated as a panel speaker in the President’s Roundtable on Immigration

<https://president.smu.ca/roundtable-on-immigration-and-innovation>