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GOOGLE SCHOLAR PROFILE https://scholar.google.com/citations?hl=en&user=s0HIwUUAAAAJ

CITIZENSHIP Canadian

CURRENT POSITION

From 2016 **Postdoctoral Fellow**, Chemical Immunology, The Scripps Research Institute
Advisor: Professor James C. Paulson

FUTURE POSITION

From July 2021 **Assistant Professor**, Immunopharmacology, The University of Toronto
Department of Pharmacology and Toxicology, Temerty Faculty of Medicine

EDUCATION

2011 – 2016 **Ph.D.**, Chemistry, University of Toronto
Thesis: *Organotellurium Reagents for Multiparametric Interrogation of Dynamic Biology*
Thesis Advisor: Professor Mark Nitz

2007 – 2011 **Honours B.Sc. with First Class (Highest) Distinction**, Chemistry & Pharmacology, University of Toronto
Thesis: *Synthesis, Purification, and In Vitro Screening of Antibiofilm Molecular Mimics*
Thesis Advisor: Professor Mark Nitz

PREPRINT PUBLICATION

Edgar, L. J., Thompson, A. J., Vartabedian, V. F., Kikuchi, C., McBride, R., Woehl, J. L., Teijaro, J. R., Paulson, J. C. (2021) Sialic acid ligands of CD28 block co-stimulation of T cells. *BioRxiv*, DOI: 2021.02.22.432333. (Postdoctoral work, uploaded Feb. 22nd 2021)

PEER-REVIEWED PUBLICATIONS

9) Woehl, J. L.*, Kitamura, S.*, Dillon, N., Han, Z., **Edgar, L. J.**, Nizet, V., Wolan, D. W. (2020) An irreversible inhibitor to probe the role of *Sreptococcus pyogenes* cysteine protease SpeB in evasion of host complement defenses. *ASAP now online. ACS Chemical Biology*. (Postdoctoral work). *Denotes equal contribution

8) Bassan, J., Willis, L. M., Vellanki, R. N., Nguyen, A., **Edgar, L. J.**, Wouters, B. G., Nitz, M. (2019) TePhe: a phenylalanine analogue for monitoring protein synthesis with mass cytometry. *Proc. Natl. Acad. Sci.* 116(17), 8155–8160. (PhD work, published April 10th 2019)

7) **Edgar, L. J.**, Kawasaki, N., Nycholat, C. M., Paulson, J. C. (2019) Targeted Delivery of Antigen to Activated CD169+ Macrophages Induces Bias for Expansion of CD8+ T cells. *Cell Chemical Biology*. 26, 131–136. (Postdoctoral work, published Nov. 1st 2018) *Highlighted:* Featured article and listed as a most read article for Nov. 2018

6) **Edgar, L. J.**, Vellanki, R. N., McKee, T. D., Hedley, D., Wouters, B. G., Nitz, M. (2016) Isotopologous Organotellurium Probes Reveal Dynamic Hypoxia In Vivo with Cellular Resolution. *Angewandte Chemie International Edition*. 55, 13159–13163. (PhD work, published Sept. 22nd 2016)

5) Stewart, A. F., Williams, A. L., Lofgreen, J. E., **Edgar, L. J.**, Hoch, L. B., Dicks, A. P. (2015) Chemistry Writing Instruction and Training: Implementing a Comprehensive Approach to Improving Student Communication Skills. *Journal of Chemical Education*. 93(1), 86–92. (PhD work, published Nov. 16th 2015)

PEER-REVIEWED PUBLICATIONS CONTINUED:

4) Park, H., **Edgar, L. J.**, Lumba, M. A., Willis L. W., Nitz, M. (2015) Organotellurium Scaffolds for Mass Cytometry Reagent Development. *Organic and Biomolecular Chemistry*. 13, 7027–7033. (PhD work, published June 4th 2015) *Highlighted:* "2015 Hot Article" Royal Society of Chemistry

3) **Edgar, L. J.**, Vellanki, R. N., Halupa, A., Hedley, D., Wouters, B. G., Nitz, M. (2014) Identification of Hypoxic Cells Using an Organotellurium Tag Compatible with Mass Cytometry. *Angewandte Chemie International Edition*. 53, 11473–11477. (PhD work, published Sept. 3rd 2014) *Highlighted:* Sensors and probes: A mass cytometry activity-based probe, *Nature Methods*, 2014, 11, 1092.

2) **Edgar, L. J. G.**, Koroluk, K. J., Golmakani, M., Dicks, A. P. (2014) Green Chemistry Decision-Making in an Upper-Level Undergraduate Organic Laboratory. *Journal of Chemical Education*. 91, 1040–1043. (PhD work, published April 18th 2014) *Featured on the front cover of The Journal of Chemical Education*

1) **Edgar, L. J. G.**, Dasgupta, S., and Nitz, M. (2012) Protecting-Group-Free Synthesis of Glycosyl 1-Phosphates. *Organic Letters*. 14 (16), 4226–4229. (PhD work, published July 30th 2012)

SELECT HONOURS, AWARDS, AND SCHOLARSHIPS

Postdoctoral:

2018 **United States Advisory Committee for International Carbohydrate Symposium Travel Award ($1 400 USD)**
Awarded for achievement in glycosciences to enable attendance the International Carbohydrate Symposium in Lisbon, Portugal. National-level award. (Declined)

2017 – 2019 **Natural Sciences and Engineering Research Council of Canada Postdoctoral Fellowship (2 years) (#502448–2017) ($90 000 CAD)**
Highly competitive fellowship awarded to the top emerging Canadian postdoctoral researchers in the natural sciences. National-level award.

Graduate:

2016 **Alex Harrison Award in Analytical Mass Spectrometry ($4 500 CAD)**
Awarded for significant contributions to the field of mass spectrometry (either instrumentation design or application). Department-level award.

2015 **Boehringer Ingelheim Award of Excellence in Organic or Bio-organic Chemistry ($1 000 CAD)**
Awarded to a graduate student demonstrating excellence in research as exhibited by publications and presentations at conferences. The recipient is nominated by the university and jointly selected with BI. Department-level award.

2015 **Outstanding Poster Award – Bioorganic Chemistry Gordon Research Conference ($650 USD)**
Awarded to 4 out of >65 graduate student / post-doctoral participants for presenting exceptional quality research. International-level award.

2014 **Chemistry Travel Grant ($1 500 CAD)**
Awarded to a doctoral student whom has produced original research worthy of dissemination at a high-profile conference. Department-level award.

2013 **Croft Teaching Assistant Award ($100 CAD)**
Awarded based on outstanding student reviews for excellence in teaching tutorials in introductory organic chemistry (CHM138). Department-level award. Required a nomination by a department member.

2013 – 2016 **Natural Sciences and Engineering Research Council of Canada Post-Graduate Scholarship (Doctoral Level, 3 years) ($63 000 CAD)**
Awarded to high caliber scholars in order to allow them to fully concentrate on their research. Awarded based on academic merit and a highly impactful original research proposal. National-level award.

SELECT HONOURS, AWARDS, AND SCHOLARSHIPS CONTINUED:

2011 **Ontario Graduate Scholarship ($15 000 CAD)**
Awarded on the basis of consistent academic excellence and an original research proposal. Provincial-level award.

Select Undergraduate:

2011 **The Harold Willett Stewart Scholarship ($250 CAD)**
University College at the University of Toronto. Institutional-level award.

2011 **The Southern Ontario Undergraduate Student Chemistry Conference**
Primary author on second prize-winning presentation titled "Protecting Group-Free Synthesis and In Vitro Activity of Anti-Biofilm Molecular Mimics". Regional-level award.

2010 **The Robert and Jean Hadgraft Scholarship in Chemistry ($2 700 CAD)**
University of Toronto Faculty of Arts & Science 2010. Awarded based on outstanding academic merit. Institutional-level award.

2009 – 2011 **Dean's List Scholar Awards**
University of Toronto Faculty of Arts & Science.

2009 **Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award ($4 500 CAD)**
Awarded to academically exceptional undergraduates to provide financial support for a research project outside the scope of traditional coursework. (Declined)

2008 **Sydney Hermant Scholarship Award ($2 000 CAD)**
University of Toronto Faculty of Arts & Science. Institution-level award.

RESEARCH EXPERIENCE

2016 – Present **The Scripps Research Institute (CA) – Postdoctoral Fellow**
Investigating chemical methods for controlling adaptive immunity using synthetic glycans.

2014 – 2016 **TheraLase – ICP-MS Consultant**
Developed strategies for measuring the pharmacokinetic profile of proprietary phototherapeutics using inductively coupled plasma mass spectrometry.

2012 – 2016 **Fluidigm – Industrial Collaborator**
Established a partnership with industry providing access to prototype instrumentation. Routinely performed experiments at the Fluidigm R&D facility.

2012 – 2016 **The Wouters / Hedley Groups – Collaboration for Ph.D. Thesis**
Developed organotellurium molecules for use as probes for tumour hypoxia both *in vitro* and *in vivo* (Supervisors: Prof. Bradly Wouters, Prof. David Hedley, Prof. Mark Nitz)

2011 – 2016 **The Nitz Group – Ph.D. Thesis Project**
Synthesis and biological screening of organotellurium reagents for monitoring dynamic biological phenomena with spatiotemporal resolution

2010 – 2011 **The Nitz Group – 4th Year Thesis Project**
Synthesis and *in vitro* screening of carbohydrate-based inhibitors of the bacterial biofilm processing metalloenzyme pgaB

Summer 2009 **The Lautens Group – Undergraduate Researcher**
Research in asymmetric catalysis using rhodium-ligand systems to couple aryl boronic acids to allyl sulfones (Supervisor: Prof. Mark Lautens)

TEACHING EXPERIENCE

2011 – 2015 **Teaching Assistant Positions at the University of Toronto**

- Introductory, intermediate, and advanced organic chemistry courses (practical & classroom)
- Lead writing teaching assistant for the Department of Chemistry
- Biological chemistry coach for the international Canadian chemistry olympiad team (2015)
- Led a virtual flow cytometry technology workshop as an instructor at The Scripps Research Institute (2020)

STUDENTS MENTORED

- **Rishikesh Ariyakumaran:** University of Toronto undergraduate (3rd year). Now a JD candidate (University of Toronto).
- **Matthew Lumba:** University of Toronto master's student. Now a medical writer (INVIVO Communications Inc.).
- **Randy Marcus:** The Scripps Research Institute, undergraduate intern from The University of California San Diego. Now an officer in The United States Military.
- **Alan Nguyen:** University of Toronto Undergraduate. Now a DDS student at The University of Western Ontario.
- **Hanuel Park:** University of Toronto Ph.D. student. Currently finishing his degree.

SELECT PROFESSIONAL ACTIVITIES

2018 The Scripps Research Institute Immunology Journal Club, Committee member
2018 InterPEG Future Glycogen Student Symposium, Symposium organizer/committee member
2017 The Scripps Network for Women in Science (NWiS), mentor
2015 Graduate Student Advisory Committee, Department of Chemistry, The University of Toronto

SELECT PRESENTATIONS AND POSTERS

Select Oral Presentations (denotes presenting author, ‡ denotes invited presentation):*

17) ‡ **Edgar, L. J.***, Thompson, A. J., Vartabedian, V. F., Kikuchi, C., Woehl, J. L., Teijaro, J. R., Paulson, J. C. (2020), Invigorating T cells Through Carbohydrate Editing. Canadian Glycomics Network virtual seminar series. (Postdoctoral work, *invited* oral presentation (virtual))

16) ‡ **Edgar, L. J.***, Bassan, J., Willis, L. M., Vellanki, R. N., Nguyen, A., Thompson, A. J., Kikuchi, C., Hedley, D., Wouters, B. G., Nitz, M., Paulson, J. C. (2019), Mass, Spectral, and High-Throughput: Choosing the Best Cytometer for the Job. ZE5 Flow Cytometry Summit. Portland, Oregon, USA, Downtown Portland Hilton. (PhD and Postdoctoral work, *invited* oral presentation)

15) ‡ **Edgar, L. J.***, Vellanki, R. N., Bassan, J., Willis, L. M., Hedley, D., Wouters, B. G., Nitz, M., Paulson, J. C. (2018), Spectral and Mass Cytometries: Unique Applications of Powerful Platforms. Cells, Sensors, and Systems Symposium, San Diego, California, USA, Illumina Theater (at The Alexandria). (PhD and Postdoctoral work, *invited* oral presentation)

14) **Edgar, L. J.***, Kawasaki, N., Nycholat, C. M., Paulson J. C. (2018), Targeted Activation of Siglec-1+ Macrophages Enables Programming of T cell Responses. Immunochemistry and Immunobiology Gordon Research Seminar, West Dover, Vermont, USA, Mount Snow Grand Summit Resort. (Postdoctoral work, *selected* oral presentation)

13) **Edgar, L. J.***, Kawasaki, N., Nycholat, C. M., Paulson J. C. (2018), Programmable T Cell Responses Through Siglec-1+ Macrophages. Canadian Glycomics Symposium, Banff, Alberta, Canada, Banff Park Lodge. (Postdoctoral work, *selected* oral presentation)

12)‡ **Edgar, L. J.***, Kawasaki, N., Paulson J. C. (2018), Programmable Control Over T Cell Responses Through CD169+ Macrophages. InterPEG (Programs of Excellence in Glycosciences), San Diego, California, USA, Harbor Island Sheraton. (Postdoctoral work, *invited* oral presentation)

11) **Edgar, L. J.***, Elich, M., Paulson, J. C. (2017), Targeted Polarization of CD169+ Macrophages Through a Multivalent Display of Synthetic Glycans. 100th Canadian Chemistry Conference, Toronto, Ontario, Canada, Metro Toronto Convention Centre. (Postdoctoral work)

10) **Edgar, L. J.***, Elich, M., Paulson, J. C. (2017), Targeted Polarization of CD169 (Siglec-1)+ Macrophages Through a Multivalent Display of Synthetic Glycans. InterPEG (Programs of Excellence in Glycosciences), Bethesda, Maryland, USA, Doubletree Hilton. (Postdoctoral work, *selected* oral presentation)

9) **Edgar, L. J.***, Elich, M., Paulson, J. C. (2017), Controlling CD169+ Macrophage Polarization Using Targeted Lipid Vesicles. San Diego Glycobiology Symposium NextGen Meeting, San Diego, California, USA, Sheraton San Diego Hotel & Marina, Bay Tower. (Postdoctoral work, *selected* oral presentation)

SELECT ORAL PRESENTATIONS CONTINUED:

8) **Edgar, L. J. G.***, Vellanki, R. N., Park, H., Halupa, A., McKee, T., Hedley, D., Wouters, B. G., Nitz, M. (2016), Organotellurium Probes for Quantitative, Massively Multiparametric Interrogation of Dynamic Biology. Boehringer Ingelheim Award for Excellence in Organic Chemistry Award Lecture, Toronto, Ontario, Canada, University of Toronto (St. George Campus). (PhD work)

7) **Edgar, L.***, Vellanki, R., Park, H., Lumba, M., Willis, L., Wouters, B., Hedley, D., Nitz, M. (2015), Organotellurium Probes for Quantitative, Massively Multiparametric Biology: A Study in Cellular Hypoxia. High Throughput Chemistry & Chemical Biology Gordon Research Seminar, New London, New Hampshire, USA, Colby-Sawyer College. (PhD work, *selected* oral presentation)

6) Nitz, M.*, **Edgar, L.**, Vellanki, R., Wouters, B. (2014), New Reagents for Mass Cytometry: Low Molecular Weight Probes to Open New Dimensions. National Meeting of the Society for Applied Spectroscopy, Reno, Nevada, USA, Grand Sierra Resort. (PhD work)

5)‡ **Edgar, L. J. G.***, Williams, A., Dicks, A. P. (2014), Teaching Writing in Chemistry: Quantitative Analysis of an Integrative Approach. International Conference on Chemistry Education, Toronto, Ontario, Canada, Metro Toronto Convention Centre. (PhD work, *invited* oral presentation)

4) **Edgar, L. J. G.***, Williams, R., Paul, C. E., Nitz, M. (2013), Synthesis of Glycosyl Fluorides and Phosphates Without the Use of Protecting Groups. 9th Annual Midwest Carbohydrate and Glycobiology Symposium, Toledo, Ohio, USA, University of Toledo. (PhD work)

3) **Edgar, L. J. G.***, Dasgupta, S., and Nitz, M. (2012) Protecting Group Free Synthesis of Glycosyl Phosphates Mediated by a Copper(II)-Oxazoline Complex. 95th Annual Canadian Chemistry Conference and Exhibition, Calgary, Alberta, Canada, Telus Convention Center. (PhD work)

2) **Edgar, L. J. G.***, and Dicks, A. P. (2012) An Undergraduate-Directed Azlactone Challenge Synthesis. 95th Annual Canadian Chemistry Conference and Exhibition, Calgary, Alberta, Canada, Telus Convention Center. (PhD work)

1) **Edgar, L. J.*** , Poloczek, J., Chibba, A., Little, D., Howell, L., and Nitz, M. (2011) Protecting Group-Free Synthesis and In Vitro Activity of Anti-Biofilm Molecular Mimics. Southern Ontario Undergraduate Student Chemistry Conference, Waterloo, Ontario, Canada, University of Waterloo. (Undergraduate work, *award received*)

Select Poster Presentations (denotes presenting author):*

9) **Edgar, L. J.***, Paulson, J. C. (2019), Glycocalyx Engineering Guided by High-Dimensonality Single Cell Analysis. San Diego Glycobiology Symposium, San Diego, California, USA, Sheraton San Diego Hotel & Marina, Bay Tower. (Postdoctoral work)

8) **Edgar, L. J.***, Kawasaki, N., Nycholat, C. M., Paulson J. C. (2018), Targeted Activation of Siglec-1+ Macrophages Enables Programming of T cell Responses. Immunochemistry and Immunobiology Gordon Research Conference, West Dover, Vermont, USA, Mount Snow Grand Summit Resort. (Postdoctoral work)

7) **Edgar, L. J.***, Kawasaki, N., Nycholat, C. M., Paulson J. C. (2018), Targeted Activation of Sialoadhesin+ Macrophages Enables Control Over Downstream Immunity. Sialoglyco, Banff, Alberta, Canada, Banff Park Lodge. (Postdoctoral work)

6) **Edgar, L. J.***, Kawasaki, N., Paulson, J. C. (2018), Programmable T Cell Expansion Through CD169+ Macrophages. San Diego Glycobiology Symposium, San Diego, California, USA, Harbor Island Sheraton. (Postdoctoral work)

5) **Edgar, L. J.***, Paulson, J. C. (2017), A Polarizing Topic: Using Synthetic Glycans to Activate Rare Macrophages. La Jolla Immunology Conference, La Jolla, California, USA, Salk Institute for Biological Studies. (Postdoctoral work)

SELECT POSTER PRESENTATIONS CONTINUED:

4) **Edgar, L. J.***, Elich, M., Paulson, J. C. (2017), Targeted Polarization of CD169 (Siglec-1)+ Macrophages Through a Multivalent Display of Synthetic Glycans. InterPEG (Programs of Excellence in Glycosciences), Bethesda, Maryland, USA, Doubletree Hilton. (Postdoctoral work)

3) **Edgar, L. J.***, Elich, M. K., Paulson, J. C. (2017), Controlling CD169+ Macrophage Polarization Using Targeted Lipid Vesicles. San Diego Glycobiology Symposium, San Diego, California, USA, Sheraton San Diego Hotel & Marina, Bay Tower. (Postdoctoral work)

2) **Edgar, L.***, Vellanki, R., Park, H., Lumba, M., Willis, L., Wouters, B., Hedley, D., Nitz, M. (2015), Organotellurium Probes for Quantitative, Massively Multiparametric Biology: A Study in Cellular Hypoxia. Bioorganic Chemistry Gordon Research Conference, Andover, New Hampshire, USA, Proctor Academy. (PhD work, *award received*)

1) **Edgar, L. J. G.***, Vellanki, R. N., Halupa, A., Hedley, D., Wouters, B. G., Nitz, M. (2014), Tellurium Reagents for Mass Cytometry-Based Interrogation of Hypoxic Cells. European Molecular Biology Organization Chemical Biology Conference, Heidelberg, Baden-Württemberg, Germany, European Molecular Biology Laboratory. (PhD work)

INTELLECTUAL PROPERTIES

2) **Edgar, L. J.**, Paulson, J. C., Thompson, A. J., Kikuchi, C. "*Disruption of CD28-sialoside ligand complexes to enhance T cell activation*" US Provisional Patent Application No. 63/054,516, Filed July 2020.

1) **Edgar, L. J. G.**, Nitz, M., Wouters, B., Hedley, D., Vellanki, R., Willis, L. Park, H., Lumba, M. "*Organotellurium compounds, compositions and methods for use thereof.*" International Patent Application No. PCT/CA2015/050793, Filed August 20th, 2015. (*This intellectual property is currently licensed for commercial use*).