

# Nathan K Smith

Contact: nathan.smith@nih.gov

## EDUCATION

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**PhD, Epidemiology and Applied Health Research, Dalhousie University** 2019 – 2024

Title: Integrating Frailty and Physical Resilience to Improve Risk Estimation in Aging Populations

Supervisors: Dr. Yukiko Asada and Dr. Susan Kirkland

**MSc, Community Health & Epidemiology, Dalhousie University** 2015 – 2017

Title: Investigating the Association between Arsenic Exposure and Chronic Disease Using Toenail

Speciation Biomarkers: A Pilot Study in Atlantic Canada

Supervisor: Dr. Jong Sung Kim

**BSc, Psychology & Biology with Neuroscience Option, Acadia University** 2009 – 2013

Double Major with Specialization in Neuroscience

## PUBLICATIONS

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1. Grignon M, Asada Y, Asma S, **Smith NK**, Hurley J, Kirkland S. “Cardinalizing” self-assessed health in studies of health inequalities: Risks and challenges of scaling on health utility measures. *Journal de gestion et d'économie de la santé*. 2023. 4:274-300. <https://www.cairn.info/revue-journal-de-gestion-et-d-economie-de-la-sante-2023-4-page-274.htm>.
2. Asada Y, Grignon M, Hurley J, Stewart SA, **Smith NK**, Kirkland S, McMillan J, Griffith LE, Wolfson C, Raina P. Trajectories of the socioeconomic gradient of mental health: Results from the CLSA COVID-19 Questionnaire Study. *Health Policy*. 2023. May;131:104758. <https://doi.org/10.1016/j.healthpol.2023.104758>.
3. MacNabb K, **Smith N**, Robinson A, Ilie G, Asbridge M. Self-reported injuries among Canadian adolescents: rates and key correlates. *Health Promot Chronic Dis Prev Can*. 2022 May 1;42(5):199-208. <https://doi.org/10.24095/hpcdp.42.5.03>.
4. Sweeney CL, **Smith NK**, Sweeney E, Cohen AM, Kim JS. Analysis of human serum and urine for tentative identification of potentially carcinogenic pesticide-associated N-nitroso compounds using high-resolution mass spectrometry. *Environ Res*. 2022 Apr 1;205:112493. <https://doi.org/10.1016/j.envres.2021.112493>.
5. **Smith NK**, Keltie E, Sweeney E, Weerasinghe S, MacPherson K, Kim JS. Toenail speciation biomarkers in arsenic-related disease: a feasibility study for investigating the association between arsenic exposure and chronic disease. *Ecotoxicol Environ Saf*. 2022 Mar 1;232:113269. <https://doi.org/10.1016/j.ecoenv.2022.113269>.
6. **Smith NK**, Brubacher J, Andreou P, Asbridge M. Does the inclusion of vehicle impoundment in provincial short-term administrative driver's license suspension programs reduce total and alcohol-related fatal collisions in Canada?. *Traffic Inj Prev*. 2019 Nov 17;20(8):771-6. <https://doi.org/10.1080/15389588.2019.1663509>.

7. Thompson LM, Stone W, Eldesoky A, **Smith NK**, McFarlane CM, Kim JS, Johnson MB, Petibon R, Dahn JR. Quantifying changes to the electrolyte and negative electrode in aged NMC532/graphite lithium-ion cells. *J Electrochem Soc*. 2018 Jan 1;165(11):A2732-40. <http://dx.doi.org/10.1149/2.0721811jes>.
8. Slaine PD, Kleer M, **Smith NK**, Khaperskyy DA, McCormick C. Stress granule-inducing eukaryotic translation initiation factor 4A inhibitors block influenza A virus replication. *Viruses*. 2017 Dec;9(12):388. <https://doi.org/10.3390/v9120388>.

## RESEARCH FUNDING AND AWARDS

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Dalhousie Faculty of Medicine 2022 Graduate Studentship. 2022-2023. Value: \$10,000.

Cancer Research Training Program Award. Beatrice Hunter Cancer Research Institute. 2016-2017. Value: \$17,850.

Kim JS, Sweeney E, and **Smith NK**. "Toenail Biomarkers of Environmental Arsenic Exposure and Metabolism, and Their Relation to Skin, Lung, Bladder and Kidney Cancer." *Seed Funding. Beatrice Hunter Cancer Research Institute*. 2016-2018. Value: \$10,000.

## RESEARCH EXPERIENCE

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### Research Fellow

Aug 2024 – Present

*Department of Bioethics, National Institutes of Health, Bethesda, MD, USA*

*Supervisor: Dr. Yukiko Asada*

- Working with the FairLab research team to conduct empirical studies of health inequality and inequity using interdisciplinary quantitative methods.

### Lab Biologist III

Jan 2024 – June 2024

*Public Health Agency of Canada, National Microbiology Laboratory (Remote)*

*Supervisors: Dr. Carmen Lia Murall and Dr. Michael Li*

- Part of the Synthesis and Integrative Analytics for Genomic Epidemiology (SIAGE) group.
- Integrated dynamic genomic and epidemiological data to develop a predictive model of the relative size of global SARS-CoV-2 waves. Developed R code to be used in analytical pipelines for routine internal crunches of SARS-CoV-2 data.

### Research Assistant

June 2023 – Aug 2024

*Department of Bioethics, National Institutes of Health, Bethesda, MD, USA (Remote)*

*Supervisor: Dr. Yukiko Asada*

- Assisted in project development and data analysis for ongoing Equality of Opportunity in health work using US data.

### Co-op Student

Mar 2023 – May 2023

*Public Health Agency of Canada, National Microbiology Laboratory (Remote)*

*Supervisors: Dr. Carmen Lia Murall and Dr. Michael Li*

- Trained in genomic epidemiology and statistical methods used in viral surveillance.
- Contributed to the characterization of historical Canadian SARS-CoV-2 variant dynamics.

**Research Assistant**

Feb 2021 – Aug 2024

*Dalhousie University, Halifax, NS**Supervisor: Dr. Leslie Anne Campbell*

- Analyst for a retrospective cohort study linking administrative health service utilization data with data from the Nova Scotia Early Psychosis Program (NSEPP).

**Research Assistant**

Aug 2019 – May 2024

*Dalhousie University, Halifax, NS**Supervisors: Dr. Yukiko Asada and Dr. Michel Grignon*

- Assisted in project development, data analysis, and manuscript preparation with an interdisciplinary team of aging and equity researchers. Projects include examining trajectories of the socioeconomic gradient of mental health during the COVID-19 pandemic, using growth curve modelling to evaluate the socioeconomic gradient of health at advanced ages, evaluating regression model residuals in health inequality analyses, and evaluating methodological issues related to self-assessed health.

**CSTADS Provincial Coordinator, Nova Scotia**

Aug 2018 – Aug 2019

*Dalhousie University, Halifax, NS**Supervisor: Dr. Mark Asbridge*

- Recruited, coordinated, and implemented data collections in 44 schools throughout Nova Scotia for the Canadian Student Tobacco, Alcohol and Drugs Survey (CSTADS) 2018-19 cycle.
- Worked as a research assistant on various projects including evaluation of low risk drinking guidelines, evaluation of impaired driving policy, and exploration of adolescent injury rates and correlates.

**Project Manager**

Sept 2017 – Aug 2018

*HERC Laboratory, Dalhousie University, Halifax, NS**Supervisor: Dr. Jong Sung Kim*

- Responsible for coordinating and facilitating collaborative research on various biomonitoring and environmental health projects. Maintained positive ongoing relationships with many stakeholders including academic departments within and beyond Dalhousie, industry partners, and government.
- Maintained laboratory equipment (HPLC, LA, ICP-MS, IC, GC), ran samples, and organized, coordinated, trained, and supervised students and external users.

**Directed Studies Research Project MICI 4702**

Winter 2015

*Dalhousie University, Halifax, NS**Supervisor: Dr. Craig McCormick*

- Completed a directed research project entitled "The eIF4A RNA Helicase Inhibitor Silvestrol as an Antiviral Candidate for Influenza A Virus Infection."

**TEACHING EXPERIENCE**

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**Guest Lecture EPAH4010 – Principles of Epidemiology and Research Methods**

Oct 2023

*Faculty of Science, Dalhousie University, Halifax, NS*

- Topic: Critical Appraisal and evaluation of a prospective cohort studying using NIH quality assessment tools.

**Instructor CHE4010 – Epidemiology Principles***Faculty of Science, Dalhousie University, Halifax, NS*

Fall Term 2022

Winter Term 2022

- Co-instructor (50%) for CHE4010, a required course for Medical Science undergraduates with enrollment typically between 70-90 students.

**Guest Lecture CHE6019 – Biostatistical Modelling***Department of Community Health and Epidemiology, Dalhousie University, Halifax, NS*

March 2022

- Topic: Longitudinal data analysis with a focus on mixed effects modelling. Session included a lecture and a practical lab component using STATA.

**Problem-Based Learning Tutor***Dalhousie University College of Pharmacy, Halifax, NS*

Sept 2021 – Dec 2021

Oct 2020 – Dec 2020

Aug 2016 – Dec 2016

- Facilitated problem-based learning tutorial groups of 9 students.
- Provided verbal and written assessments of student performance.

**Teaching Assistant CHE4010 – Epidemiology Principles***Faculty of Science, Dalhousie University, Halifax, NS*

Winter Term 2021

- Worked closely with the instructor to transition course to an online format to accommodate pandemic restrictions. I was given the opportunity to teach two lectures and create extra weekly review content at students' request.
- Both the course and my instruction were well received in the student evaluations, and I was invited back as a full co-instructor for future offerings.

**English Teacher***Avalon English Academy, Yongin City, Korea*

Aug 2013 – Mar 2014

- Taught beginner to advanced middle school speaking and writing classes.
- Created lessons plans and managed several classes each semester.

**PROFESSIONAL DEVELOPMENT**

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**Healthy Aging Innovation Challenge Program***Pulse Health Innovation Sandbox*

Jan 2022 – Apr 2022

**Cancer Research Training Program***Beatrice Hunter Cancer Research Institute*

Sept 2016 – June 2017

**Explore French Immersion Program***Université de Montréal*

Summer 2013

**Teaching English as a Secondary Language (TESL) 100 Hour Certification***Oxford Seminars*

May 2013

**SERVICE**

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**CH&E Departmental Representative***Canadian Society for Epidemiology and Biostatistics (CSEB) Conference, Halifax, NS*

June 2023

<b>Writing Lab Co-Lead</b> <i>Department of Community Health and Epidemiology, Dalhousie University, Halifax, NS</i>	Sept 2020 – Dec 2021
<b>PhD Student Representative</b> <i>Department of Community Health and Epidemiology, Dalhousie University, Halifax, NS</i>	Dec 2019 – Dec 2020
<b>Teaching Assessment Advisory Committee</b> <i>Department of Community Health and Epidemiology, Dalhousie University, Halifax, NS</i>	Mar 2020 – Dec 2020
<b>Cancer Research Training Program Volunteer</b> <i>Beatrice Hunter Cancer Research Institute, Dalhousie University, Halifax, NS</i>	Aug 2016 – Aug 2017

## **PRESENTATIONS**

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### **Integrating frailty and physical resilience to improve risk estimation in aging populations**

- Community Health and Epidemiology Research Day, September 22<sup>nd</sup>, 2023.

### **Integrating frailty and resilience to improve mortality prediction in aging populations**

- Community Health and Epidemiology Research Day, March 4<sup>th</sup>, 2022.

### **Improving health forecasting in aging populations through dynamic measures of robustness, resilience, and frailty**

- PREP Graduate Student Research Day. June 1<sup>st</sup>, 2021.

### **Improving health forecasting in aging populations through dynamic measures of robustness, resilience, and frailty**

- Community Health and Epidemiology Research Day, March 5<sup>th</sup>, 2021.

### **Kill the rich? Innovative methods for incorporating the dead in longitudinal health inequality research**

- Community Health and Epidemiology Research Day, March 6<sup>th</sup>, 2020.

### **Characterizing heavy metal exposure and arsenic speciation profiles of individuals with skin, lung, bladder, and kidney cancer (Workshop title: Environmental public health: Health risk assessment for emerging hazardous exposures)**

- Public Health 2017, June 6<sup>th</sup>, 2017.

### **Characterizing heavy metal exposure and arsenic speciation profiles of individuals with skin, lung, bladder, and kidney cancer**

- Research and Collaboration in Oncology (TFRI/BHCRI workshop), May 26<sup>th</sup>, 2017.

### **Toenail biomarkers of environmental arsenic exposure and metabolism, and their relation to cancer and diabetes mellitus (poster)**

- The 2016 BHCRI/TFRI Cancer Research Conference in Atlantic Canada, November 8<sup>th</sup>, 2016.
- 99th Canadian Chemistry Conference and Exhibition, June 8<sup>th</sup>, 2016.