February 6, 2025

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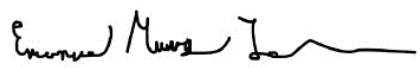
Greetings,

My name is Emmanuel Murray Leclair. I am a postdoctoral researcher at the University of Chicago and the Market Shaping Accelerator. I will start as an Assistant Professor at the University of Melbourne in the fall of 2025.

As an economist specializing in empirical industrial organization with environmental and climate applications, I want to express my interest in this week-long workshop. Over the course of my postdoc, I have been involved in multiple projects related to climate innovation and performance incentives, such as pull mechanisms. Among these projects, I have investigated the scope for climate-resilient crop innovation in sub-Saharan Africa, the development of a vaccine and breeding strategies to reduce enteric methane in livestock, and strategies to scale up and reduce the cost of greenhouse-gas removal technologies. These projects have garnered interest from a multitude of actors in the economy—from academics to policymakers, philanthropists, and various subject-matter experts. As I start my professorial career, I would like to expand my toolset to further develop my research in the space of innovation.

For a recommendation, please contact Dr. Christopher Snyder:
Christopher.Snyder@dartmouth.edu

Sincerely,



Emmanuel Murray Leclair

Research Statement

I started my research career working on deep decarbonization in industries heavily reliant on fossil fuels, such as steel and cement. I have developed quantitative models and used granular data to study important pathways for the green transition, including inter-fuel substitution, electrification of heavy manufacturing processes, investments in energy efficiency, and output reallocation towards cleaner firms. Throughout my postdoc, I have worked on multiple research projects related to climate innovation and performance incentives (e.g., pull mechanisms). These include investigating climate-resilient crop innovation in sub-Saharan Africa, developing vaccines and breeding strategies to reduce enteric methane in livestock, and exploring ways to scale up and lower the cost of greenhouse-gas removal technologies. While working on these topics with my colleagues, we have encountered several unusual theoretical and empirical challenges that I would like to explore further.

For instance, we are studying the costs and benefits of developing seeds more resilient to climate shocks—such as extreme heat, drought, and pests—in sub-Saharan Africa, and we are examining how best to finance these innovations to encourage farmer adoption. One central question is how agnostic funders or philanthropists should be when financing these innovations. Should a funding mechanism allow innovators to choose among multiple desirable innovation targets? Are there trade-offs for excessive funder agnosticism? Parts of this discussion relate to recent work by Dix and Lensman (2025) on complementary cancer treatments, but many of these issues remain largely unexplored.

In our work on greenhouse-gas removal, we face complex dynamics with far-reaching implications. There are numerous technologies for removing greenhouse gases from the atmosphere, ranging from “natural” or biotic approaches like reforestation to engineering-based or abiotic methods such as direct air capture (DAC) and enhanced rock weathering (Cael et al. 2023). It is unclear which technology is most promising based on its ability to be scaled up and its cost-reduction potential, raising novel questions about how to finance R&D in this space. Should we scale existing technologies or prioritize investing in basic science? In addition, cost-benefit analysis is complicated by the varying storage times of different technologies since carbon captured today will be re-released in the future. I am planning a collaboration with scientists at the Climate Systems Engineering Initiative (CSEi) within the University of Chicago regarding this last point.

I am interested in joining this workshop for several reasons:

- I want to investigate whether some of my ideas resonate with other academics working on similar topics.

- As an empirical/structural economist, I would like to learn ways to make quantitatively robust assessments in contexts where data can be limited by uncertainty about the future.
- I am curious about ongoing work in innovation economics. Over the past year, I began researching agriculture and livestock emissions, which I had not anticipated, and I want to remain open to new ideas.

Lastly, building on my decarbonization work, I want to improve research on carbon leakage and scope 3 emissions. Current studies use machine learning with high-resolution satellite imagery to investigate the spatial distribution of economic activity and pollution (Haler et al., 2023, Sharman et al., 2023; Vogel et al., 2024; Wei et al., 2023). I believe these approaches can be extended to examine cross-border industry and supply chain dynamics. Currently, the lack of granular, cross-country data presents a significant barrier to research in this space due to the limited jurisdictional scope of data-sharing policies, making it difficult to combine datasets. This lack of data challenges the study of firms linked through global value chains. Although there are some efforts to learn about scope 3 emissions (e.g., Project Gigaton), I see the potential for innovations in remote sensing data collection and processing to bridge these gaps. I would like to be involved in developing and sharing such data to open new opportunities for researchers.

Emmanuel Murray Leclair

References

Cael, B. B. and P. Goodwin and C. R. Pearce and D. Stainforth. 2023. “Benefit-cost ratios of carbon dioxide removal strategies”. *Environmental Research Letters*, 18(11).

Dix, Rebekah and Todd Lensman. 2025. “Combining Complements: Theory and Evidence from Cancer Treatment Innovation”. https://rebekahanne.github.io/files/dix_lensman_cancer.pdf

Halder, Bijay, Iman Ahmadianfar, Salim Heddam, Zainab Haider Mussa, Leonardo Goliatt, Mou Leong Tan, Zulfaqar Sa’adi, Zainab Al-Khafaji, Nadhir Al-Ansari, Ali H Jawad, et al. 2023. “Machine learning-based country-level annual air pollutants exploration using Sentinel-5P and Google Earth Engine.” *Scientific Reports*, 13(1): 7968.

Sherman, Luke, Jonathan Proctor, Hannah Druckenmiller, Heriberto Tapia, and Solomon M Hsiang. 2023. “Global high-resolution estimates of the United Nations Human Development Index using satellite imagery and machine-learning.” *National Bureau of Economic Research.*

Vogel, Kathryn Baragwanath, Gordon H Hanson, Amit Khandelwal, Chen Liu, and Hogeun Park. 2024. “Using Satellite Imagery to Detect the Impacts of New Highways: An Application to India.” *National Bureau of Economic Research.*

Wei, Jing, Zhanqing Li, Jun Wang, Can Li, Pawan Gupta, and Maureen Cribb. 2023. “Groundlevel gaseous pollutants (NO 2, SO 2, and CO) in China: Daily seamless mapping and spatiotemporal variations.” *Atmospheric Chemistry and Physic*s, 23(2): 1511–1532.

EMMANUEL MURRAY LECLAIR

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Development Innovation Lab
Department of Economics
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EDUCATION

University of Western Ontario Aug. 2018 - Spring 2024
Ph.D. Economics
Committee: Dr. David Rivers (Advisor), Dr. Salvador Navarro, Dr. Sergio Ocampo Díaz

Carleton University 2017-2018
Master of Arts, Economics

Université de Montréal 2013-2016
Bachelor of Arts, Economics and Political Science

Memorial University of Newfoundland 2015-2017
Exchange Student, Economics and Political Science

RESEARCH INTERESTS

Empirical Industrial Organization, Environmental/Energy Economics, Applied Econometrics

PRIMARY ACADEMIC EXPERIENCE

Senior Lecturer – University of Melbourne

Equivalent to Assistant Professor (tenure-track) 2025-

Postdoctoral Scholar – Market Shaping Accelerator, University of Chicago

Climate-resilient crops, enteric methane, greenhouse gas removal (GHGR) 2024-2025

WORKING PAPERS

1. Balancing Production and Carbon Emissions with Fuel Substitution (**Job Market Paper**)
   (Best Student Paper – 2023 Canadian Resource and Environmental Economics Association Conference)
   2023 Bank of Canada Graduate Student Paper Award (Runner-up)
2. Green Transition in Korea, with *Costas Arkolakis* and *Cheolhwan Kim*

3. Asymmetric Environmental Regulation, Interfuel Substitution and Carbon Leakage
4. Long-Term Contracts and Secondary Markets: Theory and Evidence from Natural Gas Pipelines, with *Yanyou Chen* and *Adam Wyonzek*

ACADEMIC AWARDS & SCHOLARSHIPS

Bank of Canada Graduate Student Paper Award (Runner-up) ($1,000)	Bank of Canada - 2023
Lasserre-Renzetti Prize for Best Student Paper ($500)	CREEA - 2023
Summer Paper Prize ($500)	Western University – 2020
Huntley Schaller Memorial Scholarship in Economics Research ($2,036)	Carleton University – 2018
Ontario Graduate Scholarship - OGS ($15,000 per year)	2020-2022
Productivity Partnership Grant ($5,000 per year)	2019-2023

CONFERENCE PRESENTATIONS

The University of Chicago, Society of Economic Dynamics (SED, Barcelona), University of Toronto, University of Melbourne, Pekin University, University of Virginia, University of Stavanger, King's University College (London Ontario)	2024
The 2023 Bank of Canada Student Paper Award Workshop (Ottawa) The 33rd Canadian Resource and Environmental Economics Association Conference Conference (CREEA, Ottawa), The 57th Annual Conference of the Canadian Economics Association (Winnipeg), UM-UWO-MSU Labo(u)r Day (East Lansing), The 21st Annual International Industrial Organization Conference (Washington DC), The 2023 EEA-ESEM Congress (Barcelona), The 2023 European Association for Research in Industrial Economics (EARIE, Rome)	2023
Young Economist Symposium (Yale University), The 56th Annual Canadian Economics Association Meetings (Ottawa), The 17th CIREQ PhD Students' Conference (Montreal)	2022
The 55th Annual Canadian Economics Association Meetings (remote)	2021

UNPUBLISHED PAPERS AND NON-ACADEMIC PUBLICATIONS

1. Herding in the Cryptocurrency Market (MA thesis)
2. Canadian Industrial Outlook: Residential Construction - Summer 2017, *Conference Board of Canada*, (with Kristelle Audet)

OTHER ACADEMIC EXPERIENCE

Primary Instructor – University of Western Ontario

ECONOMIC 2223: Econometrics II (Honors)	Winter 2022
ECONOMIC 2123: Econometrics II	Summer 2022, Winter 2023, Summer 2023
ECONOMIC 3328: Public Economics: Expenditure	Fall 2022

Teaching Assistant – University of Western Ontario

ECONOMIC 1021: Principles of Microeconomics	2018-2019
ECONOMIC 1022: Principles of Macroeconomics	2018-2019

Research Assistant – University of Western Ontario

Dr. David Rivers	2023
Dr. Sergio Ocampo Díaz and Dr. Rory McGee	2022
Dr. Sergio Ocampo Díaz	2021
Dr. Juan Carlos Hatchondo	2020

ACADEMIC REFEREE

JPE: Micro, The Journal of the European Economic Association (JEEA) 2024

NON-ACADEMIC WORK EXPERIENCE

Industrial Economics Intern - *Conference Board of Canada*, Ottawa Summer 2017, Summer 2018
Corporate Tax Officer - *Canada Revenue Agency*, St. John's Newfoundland 2016-2017
Research Intern - *National Assembly of Quebec*, Quebec City Summer 2016

SKILLS

Programming and Statistical softwares

Stata, Julia, CUDA, Matlab, Fortran, Eviews, R, Python, LaTeX, Git, Excel

Languages

French (native)
English (fluent)

GRADUATE ECONOMICS COURSES TAKEN

University of Western Ontario

Micreoconomics I & II
Macroeconomics I & II
Econometrics & Quantitative Methods I & II
Economic Mathematics
Advanced Applied Economics
Topics in Applied Econometrics
Empirical Industrial Organization
Labor Economics — Inequality
Advanced Macroeconomics I
Applied Microeconometrics
International Trade & Finance
Economics of Education