



Alan Lujan

ECONOMICS PH.D. CANDIDATE · THE OHIO STATE UNIVERSITY

5032 Baffin Bay Ln., Rockville, MD 20853

☎ (832) 567 - 2665 | ✉ alanlujan91@gmail.com | 🌐 quantmacro.org | 📷 alanlujan91 | 📺 alanlujan91

Econometric Society Summer School in Dynamic Structural Econometrics

May 11, 2023

DEEP LEARNING FOR SOLVING AND ESTIMATING DYNAMIC MODELS

UNIVERSITY OF LAUSANNE, SWITZERLAND

Personal Statement

To whom it may concern,

I am a Ph.D. candidate at The Ohio State University and work under the direction of Professor Christopher Carroll (Johns Hopkins University) whom I met when he recruited me to work on the **Econ-ARK/HARK** project. I have been working with Chris and have been an **Econ-ARK/HARK** collaborator for 3 years. My areas of specialization are Quantitative Macroeconomics, Computational Economics, and Household Finance.

My primary research interest is understanding the financial decisions of households and exploring how macroeconomic policies can help mitigate inequality and precarity. To achieve this, I develop quantitative models that analyze a range of questions in areas including housing and mortgage choice, portfolio choice, and household spending on children's development. I am motivated by the potential impact of my research on understanding how conditions change over the business cycle for marginalized communities.

My job market paper, "EGMⁿ: The Sequential Endogenous Grid Method," proposes an extension to the Endogenous Grid Method (EGM) in a multidimensional setting. The method introduces a novel way of breaking down complex problems into a sequence of simpler, smaller, and more tractable problems that can use multiple EGM steps; examples in the paper show that each decomposition of multidimensional EGM problems into a sequence of lower-dimensional EGM stages can speed up the solution by orders of magnitude. Additionally, the paper highlights the value of modern machine learning techniques for multidimensional interpolation such as the Gaussian Process Regression advocated by Simon Schideger to tackle these problems effectively.

Attending DSE2023 summer school would greatly benefit my research. My job market paper was inspired by Simon Schideger's work on machine learning for solving high-dimensional problems. I am also working on extending Iskakov, Jorgensen, Rust, and Schjerning's work on discrete-continuous dynamic models to multidimensional sequential models with discrete choice. John Stachurski's work on abstract dynamic programming provides a robust framework for defining recursive problems, which I am using to generalize the **Econ-ARK/HARK** toolkit.

My hope is both that my work will benefit from what I learn and that it will be reciprocally interesting to the other students and possibly even the organizers.

Reference

Christopher D. Carroll
email: ccarroll@jhu.edu

Best regards,

Alan Lujan