

Michael Cary

DEPARTMENT OF AGRICULTURAL AND APPLIED ECONOMICS, VIRGINIA TECH
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Academic Appointments

Instructor

DEPARTMENT OF AGRICULTURAL AND APPLIED ECONOMICS, VIRGINIA TECH

August 2026 - Present

Blacksburg, VA

Research Assistant Professor

DEPARTMENT OF AGRICULTURAL AND APPLIED ECONOMICS, VIRGINIA TECH

May 2023 - August 2026

Blacksburg, VA

Education

Ph.D. Natural Resource Economics

WEST VIRGINIA UNIVERSITY

Dissertation: The Economics of Pollution: Policy, Productivity, and the Structure of Road Networks

2023

Morgantown, WV

M.A. Economics

VIRGINIA STATE UNIVERSITY

2014

Petersburg, VA

B.A. History

VIRGINIA COMMONWEALTH UNIVERSITY

2011

Richmond, VA

Awards

Diggs Teaching Scholar

DIGGS TEACHING SCHOLAR ASSOCIATION, VIRGINIA TECH

2026

Krigsvold Fellowship

DISSERTATION GRANT, BOARD OF WESTARCTICA

2022

Professional Service

Reaching Regions

MEMBER - EDITORIAL BOARD

2023 - Present

Journal of Crop Improvement

MEMBER - EDITORIAL BOARD

2024 - Present

AfricArXiv

SUBMISSIONS MODERATOR

2019 - 2023

Publications

Journal Articles

[40] Cary, M. (2026). Time Zones, Productivity, and Discontinuities in the Spatial Equilibrium. *Cities*, *Accepted*.

[39] Cary, M. & Humphreys, B. (2026). Exit Discrimination Against Black Head Coaches in the National Football League. *Sociology of Sport Journal*, *Accepted*.

- [38] **Cary, M.** & Orteiz, M. (2026). Gone with the wind: Renewable energy projects and population change. *Energy Economics*, 158, 109303.
- [37] Wiggins, G., **Cary, M.**, & Chen, S.E. (2026). Optimal parcel-level photovoltaic and agrivoltaic site selection under physical and socioeconomic constraints. *Renewable Energy*, 257, 124822.
- [36] **Cary, M.** (2026). Economic Competition and the Structure of the Competition Graph of Random Networks. *Networks and Spatial Economics*, 26, 287-303.
- [35] **Cary, M.** Chen, S.E., Douthit, J., Jackson, N., McCloud, M., & Rosner, B. (2025). Estimating the Heterogeneous Effects of a Utility-Scale Solar Facility on House Prices. *Land Use Policy*, 159, 107796.
- [34] Bennett, E., & **Cary, M.** (2025). The Golden Ticket: Examining the Impact of Winning the Western States Endurance Run Lottery on Subsequent Ultramarathon Performance and Travel Decisions. *Journal of Sports Economics*, 26(4), 359-376.
- [33] **Cary, M.** (2025). Post-Kyoto emissions in the United States. *Renewable and Sustainable Energy Reviews*, 209, 115068.
- [32] **Cary, M.** (2025). A note proving the nullity of block graphs is unbounded. *Discrete Mathematics*, 348(2), 114289.
- [31] **Cary, M.** & Stephens, H. M. (2025). How COVID-19 Affected Participation in Ultramarathons: Gender, Risk Aversion, and Travel. *Journal of Sports Economics*, 26(1), 55-77.
- [30] **Cary, M.** (2025). Does Less Physical Play Lead to More Injuries? The Impact of the Hand-Check Rule in the National Basketball Association. *International Journal of Sport Finance*, 20(3), 115-128.
- [29] Prabhu, S., Nisha, Y. S., **Cary, M.**, Arulperumjothi, M., & Qi, X. (2024). On Detour Index of Join of Hamilton-connected Graphs. *Ars Combinatoria*, 160, 195-203.
- [28] **Cary, M.** (2024). Herding and investor sentiment after the cryptocurrency crash: evidence from Twitter and natural language processing. *Financial Innovation*, 10, 142.
- [27] **Cary, M.** & Stephens, H. (2024). Economic, Environmental, and Technical Gains from the Kyoto Protocol: Evidence from Cement Manufacturing. *Resources Policy*, 91, 104926.
- [26] **Cary, M.** (2023). Climate policy boosts trade competitiveness: Evidence from timber trade networks. *Renewable and Sustainable Energy Reviews*, 188, 113869.
- [25] **Cary, M.** (2023). Core-periphery models via integer programming: Maximizing the influence of the core. *Computational and Applied Mathematics*, 42(4), 162.
- [24] **Cary, M.** & Stephens, H. (2023). Gendered Consequences of COVID-19 Among Professional Tennis Players. *Journal of Sports Economics*, 24(2), 241-266.
- [23] **Cary, M.** & Ahmed, Z. (2022). Do heavy-duty and passenger vehicle emissions standards reduce per capita emissions of oxides of nitrogen? Evidence from Europe. *Journal of Environmental Management*, 320, 115786.
- [22] Haggerty, T., Stephens, H., Peckens, S., Bodkins, E., **Cary, M.**, Dino, G., & Sedney, C. (2022). Telemedicine versus in-person primary care: impact on visit completion rate in a rural Appalachian population. *Journal of the American Board of Family Medicine*, 35(3), 475-484.
- [21] Ahmed, Z., **Cary, M.**, Ali, S., Murshed, M., Ullah, H., & Mahmood, H. (2022). Moving toward a green revolution in Japan: Symmetric and asymmetric relationships among clean energy technology development investments, economic growth, and CO2 emissions. *Energy & Environment*, 0958305X211041780.
- [20] **Cary, M.** (2021). Down with the #Dogefather: Evidence of a Cryptocurrency Responding in Real Time to a Crypto-Tastemaker. *Journal of Theoretical and Applied Electronic Commerce Research*, 16(6), 2230-2240.
- [19] Ahmed, Z., **Cary, M.**, Shahbaz, M., & Vo, X.V. (2021). Asymmetric nexus between economic policy uncertainty, renewable energy technology budgets, and environmental sustainability: Evidence from the United States. *Journal of Cleaner Production*, 127723.
- [18] **Cary, M.** & Bekun, F. (2021). Democracy and Deforestation: The Role of Spillover Effects. *Forest Policy and Economics*, 125, 102398.
- [17] **Cary, M.** (2021). Dominator Chromatic Numbers of Orientations of Trees. *Open Journal of Discrete Applied Mathematics*, 4(1), 4-11.
- [16] **Cary, M.**, Cary, J., & Prabhu, S. (2021). Independent Domination in Directed Graphs. *Communications in Combinatorics and Optimization*, 6(1), 67-80.
- [15] Ahmed, Z., **Cary, M.** & Le, H.P. (2021). Accounting asymmetries in the long-run nexus between globalization and environmental sustainability in the United States: An aggregated and disaggregated investigation *Environmental Impact Assessment Review*, 86, 106511.
- [14] Ahmed, Z., Zhang, B. & **Cary, M.** (2021). Linking economic globalization, economic growth, financial development, and ecological footprint: Evidence from symmetric and asymmetric ARDL. *Ecological Indicators*, 121, 107060.

- [13] Frey, G. & **Cary, M.** (2020). Under what management and policy scenarios can alley cropping be a competitive alternative in the United States Southeast? *Agroforestry Systems*, 94(6), 2167-2183.
- [12] **Cary, M.** & Frey, G. (2020). Alley cropping as an alternative under changing climate and risk scenarios: A Monte-Carlo simulation approach. *Agricultural Systems*, 185, 102938.
- [11] **Cary, M.** (2020). A Linear Algorithm for Minimum Dominator Colorings of Orientations of Paths. *Engineering and Applied Science Letters*, 3(3), 10-14.
- [10] **Cary, M.** (2020). Dominator Colorings of Digraphs. *Open Journal of Discrete Applied Mathematics*, 3(2), 50-67.
- [9] Prabhu, S., Murugan, G., **Cary, M.**, Arulperumjothi, M., & Liu, J. (2020). On Certain Distance and Degree Based Topological Indices of Zeolite LTA Frameworks. *Materials Research Express*, 7(5), 055006.
- [8] **Cary, M.** & Rockwell, T. (2020). International Collaboration in Open Access Publications: How Income Shapes International Collaboration. *Publications*, 8(1), 13.
- [7] **Cary, M.** (2020). Molecules of Inefficiency: How tariffs impact carbon intensities, carbon dioxide emissions, and the environment. *Science of The Total Environment*, 136531.
- [6] **Cary, M.** (2020). Have Greenhouse Gas Emissions from US Energy Production Peaked? State Level Evidence from Six Subsectors. *Environment Systems and Decisions*, 40(1), 125-134.
- [5] **Cary, M.** (2020) Cycle intersection graphs and minimum decycling sets of even graphs. *Discrete Mathematics, Algorithms and Applications*.
- [4] **Cary, M.** (2019). Increasing Access to Clean Fuels and Clean Technologies: A Club Convergence Approach. *Clean Technologies*, 1(1), 247-264.
- [3] **Cary, M.** (2019). Vertices with the second neighborhood property in Eulerian digraphs. *Opuscula Mathematica*, 39(6) 765-772.
- [2] **Cary, M.** (2018). Perfectly regular and perfectly edge-regular fuzzy graphs. *Annals of Pure and Applied Mathematics*, 16(2), 461-469.
- [1] **Cary, M. A.**, Frey, G. E., & Mercer, D. E. (2014). The value of versatile alley cropping in the Southeast US: A Monte Carlo simulation. In: *Proceedings of the Inaugural Symposium of the International Society of Forest Resource Economics*, 6-11.

US Forest Service Technical Reports

- [1] Frey, G. E., **Cary, M. A.**, Goodwin, B. K., & Mercer, D. E. (2018). Agroforestry land-use economic yield and risk (ALLEY) model 2.0: a computer suite to simulate and compare stochastic yield and returns of alley crop, monocrop, and pine plantation systems in the US. e-Gen. Tech. Rep. SRS-235. Asheville, NC: US Department of Agriculture Forest Service, Southern Research Station. 235, 1-35.

Other Publications

- [2] Orteza, M., Isengildina-Massa, O., Grant, J., Legrand, N., and **Cary, M.** (2025). Assessment of Domestic and Export Market Opportunities for Virginia Soybeans and Development of a Virginia Soybean Market Intelligence Dashboard. *Report for the Virginia Soybean Association*.
- [1] Justin Sègbédji Ahinon, Hisham Arafat, Umar Ahmad, Joyce Achampong, Osman Aldirdiri, Obasegun Tekena Ayodele, Luke Okelo, Louise Bezuidenhout, **Michael Cary**, Nada Fath, Nabil Aziz Ksibi, Fayza Nasr, Carine Nguemini, Mahmoud Bukar Maina, Priscilla Mensah, Johanssen Obanda, Joy Owango, Ahmed Ogunlaja, Gregory Simpson, Johanna Havemann. (2020). AfricArXiv—the pan-African Open Scholarly Repository. *AfricArXiv*.

Book Reviews

- [1] **Cary, M.** Review of Céline Rozenblat and Zachary P. Neal, 2021 Handbook of Cities and Networks. Edward Elgar Publishing Limited: Cheltenham, UK. ISBN: 9781788114707, 651 pp., \$340. *The Review of Regional Studies* (2022) 52, 274–282.

Presentations

Southern Regional Science Association Conference

EXPOSURE TO PARTICULATE MATTER OBSTRUCTS POLICE PERFORMANCE DURING TRAFFIC STOPS

2026
Louisville, KY

Southern Regional Science Association Conference

TIME ZONES, PRODUCTIVITY, AND DISCONTINUITIES IN THE SPATIAL EQUILIBRIUM

2025
Louisville, KY

North American Regional Science Conference

ENVIRONMENTAL CONSEQUENCES OF JOB GROWTH: A STUDY OF LAND USE DYNAMICS

2024
New Orleans, LA

North American Regional Science Conference

ESTIMATING THE EFFECT OF A UTILITY-SCALE SOLAR FACILITY ON HOUSE PRICES

2024
New Orleans, LA

Missouri Valley Economic Association Conference

THE GOLDEN TICKET: EXAMINING THE IMPACT OF WINNING THE WESTERN STATES ENDURANCE RUN LOTTERY ON SUBSEQUENT ULTRAMARATHON PERFORMANCE AND TRAVEL DECISIONS

2024
Kansas City, MO

Southern Regional Science Association Conference

TIME ZONES, PRODUCTIVITY, AND DISCONTINUITIES IN THE SPATIAL (DIS)EQUILIBRIUM

2024
Washington, DC

North American Regional Science Conference

DESIGNING GEOSPATIAL AND REGIONAL SCIENCE TOOLS FOR VIRGINIA COOPERATIVE EXTENSION

2023
San Diego, CA

Southern Regional Science Association Conference

AMBIENT AIR POLLUTION AND PHYSICAL PRODUCTIVITY: EVIDENCE FROM ULTRAMARATHONS

2023
Savannah, GA

Mid-Continent Regional Science Association Conference

DOES ROAD NETWORK STRUCTURE AFFECT POLLUTION STOCKS AND FLOWS? EVIDENCE FROM ROAD CLOSURES IN VIRGINIA

2022
Virtual

Southern Regional Science Association Conference

DOES ROAD NETWORK STRUCTURE AFFECT POLLUTION STOCKS AND FLOWS? EVIDENCE FROM ROAD CLOSURES IN VIRGINIA

2022
Austin, TX

North American Regional Science Conference

AMBIENT AIR POLLUTION AND PHYSICAL PRODUCTIVITY: EVIDENCE FROM ULTRAMARATHONS

2021
Denver, CO

WVU Division of Resource Economics and Management Seminar

ECONOMIC, ENVIRONMENTAL, AND TECHNICAL GAINS FROM THE KYOTO PROTOCOL: EVIDENCE FROM CEMENT MANUFACTURING

2020
Morgantown, WV

Symposium of the International Society of Forest Resource Economics

THE VALUE OF VERSATILE ALLEY CROPPING IN THE SOUTHEAST US: A MONTE CARLO SIMULATION

2014
St. Louis, MO

Grants

[7] Cary, M., Fearer, C., and Harner, D. "Economic Implications of Spotted Lanternfly Infestations and Management in Virginia Vineyards", VT CALS Seed Grant, (2026-02-01 - 2027-06-30), \$49,500.

[6] Baughman, S., Cary, M., and Wang, L. "AI-Enhanced Dashboard for Virginia Cooperative Extension Situation Analysis", Virginia Cooperative Extension, (01-01-2026 - 06-30-2027), \$56,839.48.

[5] Orteza, M. and Cary, M. "Enhancing Dairy Sector Resilience", Dairy Alliance, (2025-08-01 - 2026-07-31), \$60,000.

[4] Chen, S. (PI), Cary, M., Alwang, J., Holt, M., Holmes, C., Gupta, A., Posadas, B. "Internship in Data Analytics in Agriculture, Community, and Rural Economics (DATA-ACRE)", USDA NIFA, (2022-01-15 - 2027-01-14), \$748,412.

[3] Orteza, M., Cary, M., and Wang, L. "Data-Science for grain marketing decision making: Planting progress and Crop Condition Interactive Dashboard", Virginia Corn Board, (2025-06-01 - 2026-05-31), \$10,000.

[2] Orteza, M., Cary, M., and Wang, L.. "Flourishing Main Street Buena Vista: Thriving community through thriving businesses", Main Street Buena Vista, (2025-01-01 - 2025-12-31), \$8,800.

[1] Easton, Z. (PI), White, R., Mercadante, V., Jacobs, L., Pent, G., Golightly, W., Stewart, R., Mehrizi-Sani, A., Cary, M., Stallknecht, E., Fike, J., Chen, Z., and Ignosh, J., (2024). "Sungrazers: Piloting Agri-photovoltaic Solutions for Sustainable Ruminant Production Systems", Virginia Tech Pratt Equipment Fund, (2024-01-01 - 2025-12-31), \$150,000.

Teaching Experience

Virginia Tech Data Science for the Public Good Summer REEU

VIRGINIA TECH

2023 - 2026

AAEC 5244 - Rural Development

VIRGINIA TECH

Fall 2023, Fall 2025

AAEC 5014 - Applied Economic Analytics

VIRGINIA TECH

Fall 2025

AAEC 4324 - Rural and Regional Development Policy

VIRGINIA TECH

Fall 2023, Fall 2025

AAEC 2434 - Foundations of Agribusiness

VIRGINIA TECH

Spring 2026

ARE 150 - Introductory Agricultural and Agribusiness Economics

WEST VIRGINIA UNIVERSITY

Spring 2022, Spring 2023

Advising

Sareth Moy

PH.D. ECONOMICS

2025-2030

Advisor

Collins Ugwu

PH.D. SUSTAINABLE BIOMATERIALS

2025-2030

Committee Member

Gabe Wiggins

M.S. AGRICULTURAL AND APPLIED ECONOMICS

December 2025

Advisor

Isaac Hull

M.S. AGRICULTURAL AND APPLIED ECONOMICS

May 2025

Committee Member

Computer Skills

SoftwarePython, R, Matlab, Stata, Julia, GAMS, git, $\LaTeX$, Markdown, Alteryx, Tableau**Skills**

Statistical Analysis, Causal Inference, GIS, Machine Learning, Network Analysis, Textual Analysis/NLP, Web Scraping, Simulation, Mathematical Programming, Data Management, Data Processing, Data Visualization, Dashboard Development, Web App Development

Professional Affiliations

North American Regional Science Association, Southern Regional Science Association, Regional Science Association International, Agricultural and Applied Economics Association, Southern Agricultural Economics Association, International Society for Forest Resource Economics

Industry Experience

Data Scientist

MYLAN (PRE-MERGER) / VIATRIS (POST-MERGER)

2019 - 2021

Morgantown, WV

Data Scientist

WVU CENTER FOR ALTERNATIVE FUELS, ENGINES, AND EMISSIONS

2017 - 2019

Morgantown, WV

Co-Founder

MORGANTOWN FERAL AND STRAY CATS

2015 - 2018

Morgantown, WV