

Experience

Tec de Monterrey **09/2024 – Present**
Research Professor, Escuela de Gobierno y Transformaciones Publicas

RAND Corporation **09/2018 – 09/2024**
Assistant Policy Researcher

- Leveraged complex mathematical models and big data to answer policy questions and facilitate decision-making at country, state, and local levels in climate change mitigation & decarbonization; legislative redistricting; climate change adaptation in water resources, risk management, and infrastructure investment; health insurance and epidemiology; defense logistics and decision complexity; and more
- Developed and implemented large-scale **optimization** (LP/MIP/NLP), **graph** (Markov chains/decision processes, nonlinear systems, graph optimization, community detection), **probabilistic/risk** (Bayesian models, asset risk), **geospatial**, and **machine learning** models and algorithms in Python, Julia, C, and R, both from scratch and with existing toolkits, and applied to a broad range of topical areas
- Built and managed robust **data pipelines**—including data collection and preparation—and modeling systems for large scale (thousands to hundreds of thousands of scenarios) computational experiments for interactive/iterative policy research as part of **agile research teams**, leveraging AWS, Docker, SQL, cloud computing and HPC, Monte Carlo and Latin Hypercube sampling approaches, and more
- Identified and communicated strategies to achieve policy goals, including investment and system management decisions, through interpretation and analysis of model results and data
- Wrote and disseminated analyses, models, and results in a diverse array of media, including interactive **R Shiny** tools, technical reports, policy briefs, blog posts, journals, and code and model documentation
- Worked closely with **international** (Argentina, Chile, China, Costa Rica, México, Peru, World Bank, IADB) and **domestic** (Florida, Louisiana, California, etc.) clients and collaborators

Center for New Data **01/2020 – 06/2023**
Data Fellow

- Created, coded, and communicated a novel approach to leverage billions of device pings and Bayesian contact graphs into insights about legislative communities of interest for all 50 U.S. states
- As methodological lead, partnered with teams of data scientists/engineers to implement and coordinate data/code pipeline (Airflow/SQL, Python)
- Disseminated methods and results in public-facing R Shiny tool, blog posts, stakeholder meetings, and academic articles (forthcoming)

World Bank **11/2020 – 02/2022**
Short-Term Consultant

- Wrote 160+ page guidebook that formed the basis of Viet Nam's national guidelines for the use of downscaled climate change scenarios in adaptation planning
- Collaborated with experts in Viet Nam to target guidelines and disseminate results among stakeholders through workshops and discussions

RAND Corporation **06/2014 – 09/2018**
Research Assistant & Technical Analyst

- Developed and implemented models and scalable computational experiments for policy research projects
- Analyzed model, survey, and other data to support research activities and answer key questions
- Conducted literature reviews, coded surveys, and cleaned and collected data for use in research projects and wrote results and appendices as part of RAND policy briefs, reports, and academic journals

Mathematical Analyst – Full Time

07/2009 – 08/2012

Envirologic, Inc.

- Supported, created, implemented, and documented novel approaches to key hydrogeological problems

Key Projects

- Created **SISEPUEDE**—an integrated, cross-sectoral emissions and cost-benefit modeling framework for decarbonization planning under deep uncertainty (publication and Python/Julia public codebase forthcoming) at the **country/economy** level—and used it to assess costs and benefits of decarbonization in Latin America and other selected countries for global development banks (IDB, World Bank)
- Developed novel approach to identifying communities of interest using contact graphs and empirical data; implemented using both public and novel datasets with volunteers at Center for New Data; and disseminated among a range of key redistricting stakeholders and practitioners
- Developed Julia algorithmic toolkits for a range of graph-based problems, including Markov decision processes, fragmentation optimization, economic shock propagation, and community detection
- Constructed numerous water management and infrastructure models in the U.S., Latin America, and China, evaluated each over thousands of scenarios, and used results to facilitate investment and management decisionmaking at the country, state, and sub-state level
- Facilitated recovery efforts in Puerto Rico following hurricanes Maria and Irma by developing an interactive decision support tool, used by secretaries of Puerto Rico, to evaluate portfolios of courses of action for near- and long-term recovery

Education

Pardee RAND Graduate School (PRGS)

09/2018 – 12/2023

PhD. Policy Analysis, Santa Monica, CA

- Dissertation title: *Identifying Legislative Communities of Interest Using Contact Graphs*
- Voted **chair** of inaugural PRGS Student Leadership Council (2021 - 2022)
- Co-developed and **taught course** *Computational Methods for Iterative RDM with Complex Models* at PRGS and DMDU Summer School (held annually at Tecnológico de Monterrey in CDMX, Mexico)

University of Colorado Denver

08/2012 – 12/2013

M.S. Applied Mathematics

- Focused on modeling, optimization, and probability. Thesis: *A Mathematical Model of Political Borders*

University of New Mexico

08/2007 – 07/2011

B.S. Pure Mathematics/B.A. Political Science

- Focus on pure mathematics and international relations
- Four-year presidential scholarship recipient

Awards and Recognition

- **2024 RAND Bronze Medal** for The Costs and Benefits of Decarbonization in Latin America
- **3-time RAND Spotlight Award** (FY16, FY17, and FY20)
- **Gaylord K. Huth Memorial Dissertation Award (PRGS)** is awarded to the student who completes the best dissertation dealing with public policy in a technical field... or to a dissertation that is distinguished by its overall innovation and excellence.

Skills

- **Programming Languages:** Python, Julia, R, Jupyter, SQL, Mathematica, Matlab, C, C#/.Net, UNIX/SSH, HTML, CSS, JavaScript
- **Data Analysis and Engineering Tools** Docker, AWS (Athena/EC2/S3), Snowflake, GitHub/GitLab, GIS/QGIS/ArcGIS, GeoPandas, Pandas, NumPy, NetCDF
- **Modeling & Solvers** JuMP, NemoMod, WEAP, iGraph (C/Python/R), Barron, CPLEX, CoinOR (Cbc, Clp, GLPK, IPOPT, SCIP), GAMS, Gurobi, HiGHS, PATH, TensorFlow, sklearn, Flux.jl
- **Methods** Robust Decision Making (RDM), Decision Making under Deep Uncertainty (DMDU), high performance computing, cloud computing, parallelization, algorithms, optimization (convex, linear/nonlinear programming, numerical methods, heuristic, graph)
- **Data Visualization and Exploration:** Shiny (R/Python), Tableau, matplotlib, ggplot, Plots.jl, Adobe Creative Suite, Miro, Figma
- **Writing and Documentation:** LaTeX, MS Office, Google Docs, Technical and Academic Writing, Sphinx/RST, Readthedocs.io, Markdown
- **Languages** English, Spanish (working proficiency)

Selected Publications

- [1] James Syme. "Identifying Communities of Interest Using Contact Graphs". PhD thesis. 1776 Main Street, Santa Monica, CA: Pardee RAND Graduate School, Apr. 2024. DOI: <https://doi.org/10.7249/RGSDA3187-1>.
- [2] James Syme, Edmundo Molina-Pérez, Nidhi Kalra, and Fernando Esteves. "SISEPUEDE: An Integrated Emissions Accounting Modeling Framework for Evaluating the Costs and Benefits of Decarbonization". In: (*in progress*) (2023).
- [3] Nidhi Kalra, Edmundo Molina-Pérez, James Syme, Fernando Esteves, et al. *The Benefits and Costs of Reaching Net Zero Emissions in Latin America and the Caribbean*. IDB Monograph IDB-MG-1159. Inter-American Development Bank, Dec. 2023. URL: <https://publications.iadb.org/en/benefits-and-costs-reaching-net-zero-emissions-latin-america-and-caribbean>.
- [4] David G. Groves, Edmundo Molina-Perez, James Syme, Gabriela Alvarado, et al. *A Green Costa Rican COVID-19 Recovery: Aligning Costa Rica's Decarbonization Investments with Economic Recovery*. Santa Monica, CA: RAND Corporation, 2022. DOI: 10.7249/RRA1381-1.
- [5] Carlos Benavides, Luis Cifuentes, Manuel Díaz, Horacio Gilabert, et al. *Options to Achieve Carbon Neutrality in Chile: An Assessment Under Uncertainty*. Report. Inter-American Development Bank, 2021. DOI: <http://dx.doi.org/10.18235/0003527>. URL: <https://publications.iadb.org/en/options-achieve-carbon-neutrality-chile-assessment-under-uncertainty>.
- [6] David G. Groves, Michelle Miro, James Syme, Alejandro U. Becerra-Ornelas, et al. *Planificación de infraestructura hídrica para el futuro incierto en América Latina: un enfoque eficiente en costos y tiempo para tomar decisiones robustas de infraestructura, con un estudio de caso en Mendoza, Argentina*. Tech. rep. Banco Interamericano de Desarrollo, 2021. DOI: <http://dx.doi.org/10.18235/0003030>. URL: <https://publications.iadb.org/es/planificacion-de-infraestructura-hidrica-para-el-futuro-incierto-en-america-latina-un-enfoque>.

- [7] Bradley DeBlois, Patrick Mills, Anu Narayanan, Dara Gold, et al. *Fighter Basing Options to Improve Access to Advanced Training Ranges*. Santa Monica, CA: RAND Corporation, 2021. DOI: 10.7249/RR169-1.
- [8] David G. Groves, Nidhi Kalra, James Syme, Edmundo Molina-Perez, and Chandra Garber. *Water Planning for the Uncertain Future: An Interactive Guide to the Use of Methods for Decisionmaking Under Deep Uncertainty (DMDU) for U.S. Bureau of Reclamation Water Resources Planning*. Santa Monica, CA: RAND Corporation, 2021. DOI: 10.7249/TL320.
- [9] Michelle E. Miro, David Groves, Bob Tincher, James Syme, et al. "Adaptive water management in the face of uncertainty: Integrating machine learning, groundwater modeling and robust decision making". In: *Climate Risk Management* 34 (2021), p. 100383. ISSN: 2212-0963. DOI: <https://doi.org/10.1016/j.crm.2021.100383>. URL: <https://www.sciencedirect.com/science/article/pii/S2212096321001121>.
- [10] James Syme. *A novel way to measure communities of interest for redistricting (blog post)*. <https://electionlawblog.org/?p=126158>. Dec. 2021.
- [11] David G. Groves, James Syme, Edmundo Molina-Perez, Carlos Calvo, et al. *The benefits and costs of decarbonizing Costa Rica's economy: informing the implementation of Costa Rica's National Decarbonization Plan under uncertainty*. Report. Inter-American Development Bank, 2020.
- [12] Raffaele Vardavas, Sarah Parks, Daniela Rodrigues-Rincon, James Syme, et al. "Simulating HIV Transmission Dynamics and Predicting the Impact of Testing Policies in Men Who Have Sex with Men in the UK, France, and Poland". In: *Journal of HIV/AIDS and Infectious Diseases* 7 (2020), pp. 1-18.
- [13] Robert Lempert, James Syme, George Mazur, Debra Knopman, et al. "Meeting Climate, Mobility, and Equity Goals in Transportation Planning Under Wide-Ranging Scenarios: A Demonstration of Robust Decision Making". In: *Journal of the American Planning Association* Upcoming (2020). DOI: <https://doi.org/10.1080/01944363.2020.1727766>.
- [14] David G. Groves, Laura Bonzanigo, James Syme, Nathan Lee Engle, and Ivan Rodriguez Cabanillas. *Preparing for Future Droughts in Lima, Peru: Enhancing Lima's Drought Management Plan to Meet Future Challenges*. Tech. rep. <http://hdl.handle.net/10986/31695>: World Bank Group Water Global Practice, May 2019.
- [15] David G. Groves, Nidhi Kalra, James Syme, Hollie Ellis, et al. *Decision Support Tool for the San Francisco Bay-Delta Levees Investment Strategy: Documentation and Use*. Santa Monica, CA: RAND Corporation, 2019. DOI: 10.7249/RR2139.
- [16] David G. Groves, Debra S. Knopman, Neil Berg, Craig Bond, et al. *Adapting land use and water management plans to a changing climate in Miami-Dade and Broward Counties, Florida*. Tech. rep. RR-1932-MCF. RAND Corporation, 2018.
- [17] David G. Groves, Debra Knopman, James Syme, Nidhi Kalra, and Mao Zhimin. *Evaluation of the Jinan City Water Ecological Development Implementation Plan and Recommendations for Improvement*. Tech. rep. RR-1682-JWRB. RAND Corporation, 2017.
- [18] Adam C Resnick, Jeremy M Eckhause, and James Syme. *Army stock positioning: how can the distribution performance be improved?* Tech. rep. RR-1375-A. RAND Corporation, 2017.

- [19] Christine Buttorff, Sarah Nowak, James Syme, and Christine Eibner. *Private health insurance exchanges: early evidence and implications for the future*. Tech. rep. RR-1109-DHHS. Santa Monica, CA: RAND Corporation, 2016.
- [20] David G. Groves, Kenneth D. Kuhn, Jordan R. Fischbach, David R. Johnson, and James Syme. *Analysis to support Louisiana's flood risk and resilience program and application to the National Disaster Resilience Competition*. Tech. rep. RR-1449-CPRA. RAND Corporation, 2016.
- [21] David G. Groves, Robert J. Lempert, Deborah W. May, James R. Leek, and James Syme. *Using high-performance computing to support water resource planning: a workshop demonstration of real-time analytic facilitation for the Colorado River Basin*. Tech. rep. RAND/CF-346-RC. Santa Monica, CA: RAND Corporation, 2016.
- [22] Jennie W Wenger, Bruce R Orvis, Davd Stebbins, Eric Apaydin, and James Syme. *Strengthening prior service-civil life gains and continuum of service accessions into the Army's reserve components*. Tech. rep. RR-1376-A. RAND Corporation, 2016.
- [23] Paul Davis, James Syme, Jeffrey Heikoop, Julianna Fessenden-Rahn, et al. "Quantifying Uncertainty in Stable Isotope Mixing Models". In: *Journal of Geophysical Research: Biogeosciences* 120.5 (May 2015). 2014JG002839, pp. 903–923. ISSN: 2169-8961. DOI: 10.1002/2014JG002839. URL: <http://dx.doi.org/10.1002/2014JG002839>.
- [24] Thomas S. Szayna, Eric V. Larson, Angela. O'Mahony, Sean. Robson, et al. *Considerations for integrating women into closed occupations in the U.S. Special Operations Forces*. Tech. rep. RR-1058-USSOCOM. RAND Corporation, 2015.
- [25] Jeanne M Fair, Thomas B Ryder, Bette A Loiselle, John G Blake, et al. "Estimates of dietary overlap for six species of Amazonian manakin birds using stable isotopes". In: *Isotopes in Environmental and Health Studies* (2013). DOI: doi:10.1080/10256016.2013.784702.
- [26] James Syme. "A Mathematical Model of Political Borders". MA thesis. University of Colorado Denver, 2013.
- [27] Abbey Chrystal, Jeffrey M Heikoop, Paul Davis, James Syme, et al. "Probability distribution functions of delta15N and delta18O in groundwater nitrate to probabilistically solve complex mixing scenarios". In: *American Geophysical Union, Fall Meeting*. 2010.