February 21, 2024

Dear Hiring Team,

I am very excited to be applying for the Senior Applied Scientist position at Microsoft. Microsoft's contributions to data analytics and decision support were a major inspiration for me pursuing education in economics and statistics and seeking work that leverages data analysis to inform intelligent decisions and strategies, and my earliest forays into simulation were enabled by Microsoft products and tools. I'm looking forward to the opportunity to join and work together with this talented and diverse team to inform and enable the next stage of innovation at Microsoft.

In my current role in Sandia National Laboratories' Strategic Futures and Policy Analysis group, which serves as an independent consulting arm of the laboratories, I work together with executives and other stakeholders to help develop strategy and provide objective assessments of their systems and plans of action. As a part of this work, I have designed and conducted strategic foresight studies that investigate how Sandia could be better prepared to respond to economic, technological, and geopolitical trends and uncertainties over the coming decades. Given the wide range of what the future may hold, these studies are necessarily ambiguous at their inception. Using established foresight and expert elicitation techniques, we engage with multidisciplinary and cross-functional groups of stakeholders and subject matter experts to identify foreseeable challenges and disruptive dynamics. We draw on trusted relationships across the laboratory, built through consistent engagement and rigorous objectivity, to consider the confluence of multiple dynamics and identify second- and higher-order effects that could be very consequential but are often less obvious to individual stakeholders. We synthesize and distill our findings to produce valuable insights for executives and actionable plans for stakeholders, enabling Sandia to be better prepared for an increasingly dynamic and uncertain future. I then work with stakeholders through implementation to gather and analyze metrics of initiative success and identify adjustments that can improve implementation or more effectively mitigate risks. I have personally conducted and contributed to a number of these foresight studies and policy efforts, including informing Sandia's transition to remote and hybrid work through COVID-19, developing laboratory strategy around the future of knowledge management and workforce development (including leveraging the next generation of AI), and guiding facilities and infrastructure investment plans in the face of rapidly-evolving economic and geopolitical environments.

Throughout my time at Sandia, I have also conducted objective risk and reliability analyses for a number of critical national security systems. As an example, I serve on the Interagency Nuclear Safety Review Board (INSRB), which conducts independent assessments of safety analyses of spacecraft that carry significant amounts of nuclear material onboard, such as the two most recent missions that landed rovers on Mars. Ultimately, these analyses are delivered to and signed off by the President of the United States, acknowledging that risk of radiation exposure to the public is acceptable for the given mission. As a result, it is critical that these safety analyses both accurately reflect our best understanding of risk to the public as well as incorporate and convey all relevant sources of uncertainty. Through my role on INSRB, I have leveraged my expertise and passion for statistics and uncertainty quantification and drawn on my technical background in Bayesian statistics and simulation to continuously push for improvements to our methodology and our understanding of risk. These efforts, while very important, are frequently challenging and professionally risky, requiring questioning, carefully assessing, and, where appropriate, overturning norms and methods that have been held across decades of these analyses. By drawing on the expertise of a multi-disciplinary and cross-functional team and thoughtfully engaging with sponsors and stakeholders, we improved our understanding of risk for the launch of the Mars 2020 Perseverance Rover and improved the process to evaluate risk for future missions. My experiences both on INSRB and as a cybersecurity researcher in Sandia's Cyber Resilience group, where I worked together with engineers and leveraged my background in simulation to quantify resilience of cyber-physical industrial control systems, have strengthened my enjoyment and appreciation of working with diverse multi-disciplinary teams.

I believe my experiences at Sandia exemplify and have strengthened values emphasized by Microsoft's culture. My passion for excellence and intellectual curiosity have yielded innovative approaches to challenging problems that have provided decision-makers with improved insights and understanding to guide their decisions. I have relied on teams that are diverse across many dimensions and bring many different valuable experiences to the problem at hand, resulting in analysis products and insights that are robust and well-founded as well as appealing to a broad audience. I am not afraid to challenge existing norms and approaches, and I seek to understand stakeholder objectives and constraints to make informed process improvements. I am excited by the opportunity to leverage these skills and collaborate with others who also embody these values to continue and further Microsoft's legacy of innovation.

Sincerely,

Taylor McKenzie

Taylor K McKenzie

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Education

Ph.D. Economics *June 2017*
University of Oregon, Eugene, OR
Dissertation: Railroads, Their Regulation, and Its Effect on Efficiency and Competition
Committee: Dr. Wesley W. Wilson, Dr. Van Kolpin, Dr. Jeremy Piger, Dr. Diane Del Guercio, Dr. Keaton Miller

M.S. Economics *December 2013*
University of Oregon, Eugene, OR
Advisor: Dr. Wesley W. Wilson

B.A. Mathematics and Economics *May 2012*
Willamette University, Salem, OR *Summa Cum Laude*
Advisors: Dr. Raechelle Mascarenhas and Dr. Peter Otto

Work Experience

Sandia National Laboratories *March 2020 - Present*
Senior Systems Analyst, Strategic Futures and Policy Analysis Group

- In Sandia's Systems Analysis group, which serves as an independent consulting arm for the laboratories, I conducted and contributed to quantitative and qualitative analyses to assess and inform laboratory policy. These efforts include foresight studies that continue to inform strategies for knowledge management and workforce development over the coming decades (including leveraging future AI tools), development of Sandia's transition to a hybrid work posture, and assessments of capabilities of and future demands on Sandia's facilities and infrastructure. Each of these studies engaged several dozen subject-matter experts across and beyond Sandia and balanced objectives of many stakeholders across multiple mission areas at the laboratory, providing an objective understanding of challenges, tradeoffs, and uncertainties for executives and other stakeholders.
- Conducted quantitative risk and resilience analyses for multiple national security systems. These studies involved designing experiments, implementing statistical and machine learning methods, and communicating results and insights to senior executives and stakeholders.

Sandia National Laboratories *August 2017 - March 2020*
Senior Cybersecurity Researcher, Cyber Resilience Group

- Designed and implemented statistical analyses of risk and resilience of cyber-physical industrial control systems drawing on classical and Bayesian statistics and uncertainty quantification methods. Performed and analyzed experiments on cyber systems using state-of-the-art emulation systems and statistical techniques. These studies informed stakeholders how to improve system resilience to cyber disruptions as well as highlighted statistical issues around cyber emulation outcomes that guided cyber resilience strategies.

University of Oregon *Fall-Spring 2012-2017*
Graduate Teaching Fellow
Department of Economics

- Developed curriculum and acted as independent instructor of five courses covering intermediate microeconomic theory, industrial organization, and development economics. Served as a teaching assistant and provided additional instruction to undergraduate and graduate students.

Pacific Northwest National Laboratory *Summers of 2010-2012, 2014*
National Security Intern
Knowledge Discovery and Informatics Group
Mentors: Dr. Courtney Corley and Dr. Satish Chikkagoudar

- Conducted research into biosurveillance, disease propagation, social media phenomenology, and cybersecurity. Developed systems models to describe spread of disease, predictive statistical models to describe social media trends and topics, and game-theoretic statistical models used to recreate inter-organizational email traffic for use in cyber simulations.

Relevant Skills

- Extensive experience using R, Python, Excel, and SQL to perform simulations, implement statistical methods, and create visualizations that inform policy analyses. Well-practiced in drawing on and synthesizing disparate data sources including quantitative, qualitative, and simulation data to arrive at objective and informative insights.
- Expertise in working with stakeholders to identify problems and goals, then crafting objective studies that provide understanding of dynamics and tradeoffs and inform intelligent strategy. Experience working with internal stakeholders, such as program managers and executive leadership, as well as external customers from NASA, the US Army, and DOE.
- Expertise in organizing, leading, and collaborating with multi-disciplinary and cross-functional teams that utilize breadth of expertise and perspectives to produce robust, imaginative, and insightful analyses. Experience with developing connections with individuals and groups across and beyond Sandia that were leveraged to understand second- and third-order effects of trends and policies.

Notable Results and Accomplishments

- Sandia Employee Recognition Award for contributions to COVID-19 Pandemic Modeling Effort. Personal contributions: Performed analysis of economic impacts under various projected pandemic and return-to-workplace scenarios. This work also earned personal recognition from J. Stephen Binkley, Acting Director of DOE Office of Science on February 3, 2021.
- Sandia Employee Recognition Award for contributions to Disablement Laser project. Personal contributions: Performed statistical analysis of kill times under various scenarios and configurations, informing expectations real-world outcomes.
- Performed review of statistical methodology in risk assessment of Mars 2020 rover launch as a member of the Interagency Nuclear Safety Review Board. Developed alternative methodology that more accurately described physical phenomenology of crash events. Worked closely with Air Force/NASA and risk assessment team to demonstrate improvements provided by alternative methodology, eventually leading to that methodology being adopted for current and future missions.
- Involved in development of theory of uncertainty quantification for experiments that quantify risk posed to and resilience of cyber systems. Developed framework to address often unusual statistical properties of outcomes from cyber experiments and applying those methods to existing simulations to inform customer decisions.
- Development and maintenance of R package `snfa` (Smooth Non-Parametric Frontier Analysis), available on the Comprehensive R Archive Network (CRAN). Applications to projects analyzing technology transfer efficiency at national laboratories are being explored.
- Best dissertation award from the American Economic Association's Transportation and Public Utilities Group and Ph.D. Research Paper Award from the University of Oregon for paper titled "Markups and Scale Elasticities for Differentiated Railroad Networks."

Publications and Reports

- McKenzie, Taylor, Munaf Aamir, and Regina Lucero (2024). Sandia Facilities Futures. Working paper (CUI//PROPIN).
- Brodsky, Benjamin, Ryan Kennedy, Munaf Aamir, Kelsey Abel, Timothy Berg, Reina Buenconsejo, Koushik Ghosh, Taylor McKenzie, Marilee Orr, and Trey Reilly (2024). Global Futures Series: The Future of Advanced Manufacturing. SAND2024-01096R (CUI//PROPIN).
- McKenzie, Taylor, Marilee Orr, Kelsey Abel, Benjamin Brodsky, Ryan Kennedy, Wesley Odom, Judi See, and Elizabeth Keller (2023). Global Futures Series: The Future of Knowledge Management and Workforce Development. SAND2023-11508PE (UUR).

- Kennedy, Ryan, Munaf Aamir, Kelsey Abel, Benjamin Brodsky, Geoffrey Forden, Joseph Hanosh, Taylor McKenzie, Marilee Orr, Trey Reilly, Michael Vannoni, and Elizabeth Keller (2023). Global Futures Series: The Future of Strategic Competition and Cooperation. SAND2023-14103R (CUI//PROPIN).
- Aamir, Munaf, Taylor McKenzie, Walter Beyeler, Ryan Kennedy, Raymond Reilly III (2022). Global Futures Series: The Future of Economic Value and National Security. SAND2022-8480PE (UUR).
- Hayden, Nancy, Marie Arrieta, Mary Ann Cordova, Taylor McKenzie, and Michael Vannoni (2020). Telecommuting Best Practices. SAND2020-5530R (UUR).
- Keller, Elizabeth Kistin, Ryan Kennedy, Nancy Hayden, Catherine Branda, Julia Fruetel, Kelsey Abel, Mikaela Armenta, Ashley Maes, Taylor McKenzie, Emily O'Bryan, Danielle Rodriguez, Bryn Stuart, and Nerayo Teclemariam (2020). Sandia Covid-19 Scenarios Initiative: Anticipating and Shaping Mission Futures. SAND2020-7168R (OUO Ex. 5).
- Hayden, Nancy, Munaf Aamir, John Foley, Patricia Hernandez, Elizabeth Keller, Caroline Maloney, Taylor McKenzie, Carrie McNeil, Thomas Nelson, Emily O'Bryan, Elizabeth Roll, Matthew Sumner, and David White (2020). SLT COVID-19 Scenario Exercise. SAND2020-12622R (OUO Ex. 5).
- McKenzie, Taylor, Thomas D. Tarman, Christopher Lamb (2020). Uncertainty Quantification for Cyber-Physical PWR Experiments. Proceedings of the 28th Annual International Conference on Nuclear Engineering. SAND2020-1357C (UUR).
- Keller, Elizabeth Kistin, Ryan Kennedy, Taylor McKenzie, Emily O'Bryan, Bryn Stuart, and Nerayo Teclemariam (2020). Sandia Covid-19 Scenarios Initiative: FY21 Budget Fluctuations and Adaptations. SAND2020-7166R (OUO Ex. 5).
- Galiardi, Meghan, Nicholas Jacobs, Christine Lai, Taylor McKenzie, Trisha Miller, Christopher Perr, Zachary Thomas, Eric Vugrin, and Lynn Yang (2019). Metric Development for the NETCOM System Impact and Resilience (SIR) Project. SAND2019-0875R (OUO Ex. 7).
- Yang, Lynn Rossitza Homan, Sean DeRosa, Ann Hammer, Dennis Raymond Imbro, Taylor McKenzie, Trisha Hoette Miller, Daniel J. Pless, Mark D. Tucker, and Gregory D. Wyss (2018). CSA Engagement Prioritization Methodology (EPM) Overview and Process. SAND-2018-11322 (OUO Ex. 7).
- Färe, Rolf, Taylor McKenzie, Wesley Wilson, and Wenfeng Yang (2017). Mergers, efficiency, and productivity in the railroad industry: An attribute-incorporated data envelopment analysis approach. Transportation Policy and Economic Regulation: Essays in Honor of Theodore Keeler.
- Corley, C.D., C. Dowling, S.J. Rose, and Taylor McKenzie (2013). SociAL Sensor Analytics: Measuring Phenomenology at Scale. *2013 IEEE International Conference on Intelligence and Security Informatics*, 61-66.
- Corley, C.D., et al, including Taylor McKenzie (2012). Assessing the Continuum of Event-Based Biosurveillance Through an Operational Lens. *Biosecurity and Bioterrorism 10(1)*, 131-41.