
Jonathan W. Welburn, PhD

RAND Corporation

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Affiliations and Activities

Pardee RAND Graduate School

2020– Professor of Policy Analysis

2020– Lablet Lead for digital games & systemic risk, Tech & Narrative Lab

RAND Corporation

2019– Researcher, computational economics and operations research

2016–19 Associate Researcher, computational economics and operations research

University of Wisconsin – Madison

2010–16 Graduate Research Fellow

2010–11 Research Assistant

2010 Undergraduate Research Assistant

Past visiting positions

2013 Summer Associate, RAND Corporation, Santa Monica, CA.

2012 Visiting Researcher, Dept. of Social Sciences, University of Stavanger, Norway

2007–09 Summer Intern, Lockheed Martin, Sunnyvale, CA.

Other professional activities

2019– Editorial board member, Decision Analysis–

2019– Co-chair, Decision Analysis Society track, INFORMS Annual Conference

2020– Co-chair, Defense & Security Specialty Group, Society for Risk Analysis

2018– Reviewer: Computational Economics, Decision Analysis, Risk Analysis

2012– Member: Society for Risk Analysis, Institute for Operations Research

Education

Doctor of Philosophy, 2016

University of Wisconsin-Madison, Madison, WI

Decision Science and Operations Research – Industrial & Systems Engineering

Minor: Economics

Dissertation Title: Essays on Global Economic Risk

Advisor: Vicki M. Bier

Committee Members: Oghuzan Alagoz, Menzie Chinn, Kjell Hausken, Thomas Rutherford

Bachelors of Science, 2010

University of Wisconsin-Madison, Madison, WI

Dual Major: Industrial & Systems Engineering and Economics – Math Emphasis

Certificate (Minor): Mathematics

Budapest University of Technology and Economics (BME), Budapest,

Semester Abroad, Fall 2008

Publications and Presentations

Working Papers

Estimating the Impact of Hungary COVID-19 on Corporate Default Risk. **Jonathan W. Welburn** and Aaron Strong, *RAND Working Paper Series*, 2020. Santa Monica, CA.

Cyber Deterrence or: How We Learned to Stop Worrying and Love the Signal. **Jonathan W. Welburn**, Justin Grana, and Karen Schwindt, *RAND Working Paper Series*, 2019. Santa Monica, CA.

Published Papers & Reports

1. Systemic Cyber Risk and Aggregate Impacts. **Jonathan W. Welburn** and Aaron Strong, *Risk Analysis*, forthcoming.
2. Assessing the 2010-2018 Financial Crisis in Greece, Portugal, Ireland, Spain, and Cyprus. Kjell Hausken, **Jonathan W. Welburn**. *Journal of Economic Studies*, 2020.
3. Guizhou Wang, Jonathan W. Welburn, and Kjell Hausken. A Two-Period Game Theoretic Model of Zero-Day Attacks with Stockpiling. *Games*, 2020
4. Attack and Defense Strategies in Cyber War Involving Production and Stockpiling of Zero-Day Cyber Exploits. Kjell Hausken, **Jonathan W. Welburn**. *Information Systems Frontiers*, 2020
5. An Estimation of the Economic Costs of Social-Distancing Policies. Aaron Strong and **Jonathan W. Welburn**. *RAND Research Report*. Santa Monica, CA: RAND Corporation, 2020. https://www.rand.org/pubs/research_reports/RRA173-1.html
6. The Health and Economic Impacts of Nonpharmaceutical Interventions to Address COVID-19: A Decision Support Tool for State and Local Policymakers. Raffaele Vardavas, Aaron Strong, Jennifer Bouey, **Jonathan W. Welburn**, Pedro Nascimento de Lima, Lawrence Baker, Keren Zhu, Michelle Priest, Lynn Hu, and Jeanne S. Ringel. *RAND Tool Documentation*. Santa Monica, CA: RAND Corporation, 2020. <https://www.rand.org/pubs/tools/TLA173-1.html>. *Most downloaded RAND report in 2020.
7. Options for enhancing the effectiveness of maintenance force structure: examining the Decline in KC-135 availability. DeBlois, Bradley.; Light, Thomas.; Romano, Daniel M.; Boito, Michael; Drew, John G.; Emslie, Paul D.; Kennedy, Michael; O'Connor, Kathryn.; **Welburn, Jonathan William**. *RAND Research Report*. For Official Use Only. Santa Monica, CA: RAND Corporation, 2020.

8. Building Agile Combat Support Competencies to Enable Evolving Adaptive Basing Concepts. Patrick Mills, James A. Leftwich, John G. Drew, Daniel P. Felten, Josh Girardini, John P. Godges, Michael J. Lostumbo, Anu Narayanan, Kristin Van Abel, **Jonathan W. Welburn**, and Anna Jean Wirth. *RAND Research Report*. Santa Monica, CA: RAND Corporation, 2020. https://www.rand.org/pubs/research_reports/RR4200.html.
9. Measuring Cybersecurity and Cyber Resiliency. Don Snyder, Lauren A. Mayer, Guy Weichenberg, Danielle C. Tarraf, Bernard Fox, Myron Hura, Suzanne Genc, and **Jonathan W. Welburn**. *RAND Research Report*. Santa Monica, CA: RAND Corporation, 2020. https://www.rand.org/pubs/research_reports/RR2703.html.
10. Systemic Risk: It's Not Just in the Financial Sector. **Jonathan W. Welburn**, Aaron Strong, Florentine Eloundou Nekoul, Justin Grana, Krystyna Marcinek, Osonde A. Osoba, Nirabh Koirala, and Claude Messan Setodji. *RAND Research Brief*. Santa Monica, CA: RAND Corporation, 2020. https://www.rand.org/pubs/research_briefs/RB10112.html.
11. Systemic Risk in the Broad Economy: Interfirm Networks and Shocks in the U.S. Economy. **Jonathan W. Welburn**, Aaron Strong, Florentine Eloundou Nekoul, Justin Grana, Krystyna Marcinek, Osonde A. Osoba, Nirabh Koirala, and Claude Messan Setodji. *RAND Research Report*. Santa Monica, CA: RAND Corporation, 2020. https://www.rand.org/pubs/research_reports/RR4185.html. Also available in print form.
12. Deterring Attacks Against the Power Grid: Two Approaches for the U.S. Department of Defense. Anu Narayanan, **Jonathan W. Welburn**, Benjamin M. Miller, Sheng Tao Li, and Aaron Clark-Ginsberg. Santa Monica, CA: RAND Corporation, 2020. https://www.rand.org/pubs/research_reports/RR3187.html. Also available in print form.
13. Crises Beyond Belief: Findings on contagion, the role of beliefs, and the Eurozone debt crisis from a borrower lender game. **Jonathan W. Welburn**. *Computational Economics*, pp.1-55. 2019. <https://link.springer.com/content/pdf/10.1007/s10614-019-09926-7.pdf>
14. Assessing cybersecurity risk to the civil engineering infrastructure: a methodology for implementation at Air Force bases. Caolionn O'Connell, Lara, Schmidt, Myron Hura, Joshua Baron, Andrew J. Lohn, Irina Danescu, **Jonathan W. Welburn**. Santa Monica, Calif.: RAND Corporation, 2018. RAND Report No 2354.
15. An evaluation of the Department of Defense's excess property program: law enforcement agency equipment acquisition policies, findings, and options. Aaron Davenport, **Jonathan W. Welburn**, Andrew Lauand, Annelise Pietenpol, Marc L. Robbins, Erin Rebhan, Patricia M. Boren, Kevin Jack Riley. Santa Monica, Calif.: RAND Corporation, 2018. RAND Report No 2464.
16. Estimating the Global Cost of Cyber Risk: Methodology and Examples. Dreyer, Paul, Therese Jones, Kelly Klima, Jenny Oberholtzer, Aaron Strong, **Jonathan W. Welburn**, and Zev Winkelman, Santa Monica, Calif.: RAND Corporation, 2018. RAND Report No 2299.
17. Stateless Attribution: Toward International Accountability in Cyberspace. John S Davis, Benjamin Adam Boudreaux, **Jonathan W. Welburn**, Jair Aguirre, Cordaye Ogletree, Geoffrey McGovern, Michael Chase. Santa Monica, CA: RAND Corporation, 2017. RAND Report No 2081.
18. Import Security: Assessing the Risks of Imported Food. **Jonathan W. Welburn**, Vicki M. Bier, Steven Q. Hoerning. *Risk Analysis*. January, 2016. Vol. 36, No. 11.

19. Game Theoretic Modeling of Economic Systems and the European Debt Crisis. **Jonathan W. Welburn** and Kjell Hausken. *Computational Economics*. December, 2015.
20. A Game Theoretic Model of Economic Crises. **Jonathan W. Welburn** and Kjell Hausken. *Applied Mathematics and Computation*. September, 2015. Vol 266, pp 738-762.
21. Wisconsin Pipeline Information Synthesis. Vicki M. Bier, Theresa M. Adams, **Jonathan W. Welburn**, Andrew J. Lindquist. Study for Wisconsin Office of Justice Assistance funded by the Department of Homeland Security. January 2012.

Commentary and media

1. Teachers Should Get the Covid Vaccine First. Aaron Strong and **Jonathan W. Welburn**. *Commentary*. The Wall Street Journal. November 2020. https://www.wsj.com/articles/teachers-should-get-the-covid-vaccine-first-11605809192?mod=opinion_lead_pos6 **Top 10 RAND comentaries of 2020*.
2. Big Tech's Domination of Business Reaches New Heights. *Interview*. The New York Times. October 2020. <https://www.nytimes.com/2020/08/19/technology/big-tech-business-domination.html>
3. The Systemic Risk Of An Interconnected—And An IoT-Connected—Society. *Interview*. The Cyber Society – ITSP Magazine. October 2020. <https://itspmagazinepodcast.com/episodes/the-systemic-risk-of-an-interconnected-and-iot-connected-society-with-jen-ellis-and-jonathan-welburn-OC7bqzU5>
4. Too Interconnected to Fail. **Jonathan W. Welburn** and Aaron Strong. *Commentary*. The Wall Street Journal. August 2020. <https://www.wsj.com/articles/too-interconnected-to-fail-11595523324>
5. The Health and Economic Impacts of COVID-19 Interventions. State Policy Evaluation Tool. Raffaele Vardavas, Aaron Strong, Jennifer Bouey, **Jonathan W. Welburn**, Pedro Nascimento de Lima, Lawrence Baker, Keren Zhu, Michelle Priest, Lynn Hu, and Jeanne S. Ringel. *Web Tool*. May 2020. <https://www.rand.org/pubs/tools/TLA173-1/tool.html>
6. The Danger of Converting a Health Crisis into a Financial Crisis. Krishna B. Kumar, Shanthi Nataraj, **Jonathan William Welburn**. *Commentary*. CNN. April 2020. <https://edition.cnn.com/2020/04/13/perspectives/business-recession-failure/index.html>.
7. Supply Chain Disruptions Due to COVID-19 and Social Distancing. Aaron M. Strong, **Jonathan W. Welburn**. *Commentary*. The RAND Blog. April 2020. <https://www.rand.org/blog/2020/04/supply-chain-disruptions-due-to-covid-19-and-social.html>.
8. The Social Distancing Economy: Q&A with RAND Experts. The RAND Blog. March 2020. <https://www.rand.org/blog/2020/03/the-social-distancing-economy-qa-with-rand-experts.html>
9. Accountability in Cyberspace: The Problem of Attribution. John Davis, **Jonathan W. Welburn**, Benjamin Boudreaux, Jair Aguirre , Shini Somara. *Video*. <https://www.youtube.com/watch?v=ca9xomGmZPc>
10. When Cyber Attacks Occur, Who Should Investigate? John S. Davis II, **Jonathan W. Welburn**, Benjamin Boudreaux, Jair Aguirre. *Commentary*. UPI. December 2018. <https://www.rand.org/blog/2018/12/when-cyber-attacks-occur-who-should-investigate.html>

11. Let's (Not) Play Games with Dodd-Frank. **Jonathan W. Welburn**, Raffaele Vardavas, Zev Winkelman. *Commentary*. The Hill. May 2017. <https://thehill.com/blogs/congress-blog/economy-budget/331832-lets-not-play-games-with-dodd-frank>

Presentations

1. 2020 State of the Field Conference on Cyber Risk to Financial Stability. University of Columbia and the Federal Reserve Bank of New York, *Panel presentation*. December 2020.
2. Systemic Risk in the Era of COVID-19. INFORMS 2020. *Panel Presentation*. Session Chair.
3. Systemic Risk. RAND Board of Trustees and Board of Governors joint session. *Oral Presentation*. November 2020.
4. Cyber Norms. RAND Center for Global Risk & Security Board meeting. *Panel presentation*. October 2020.
5. Economic and Occupational Analysis of COVID-19. RAND Social & Economic Policy Board meeting. Jonathan W. Welburn and Aaron Strong. *Oral Presentation*. October 2020.
6. Accountability as Deterrence in Cyberspace. Jonathan W. Welburn. Strauss Center at UT Austin. *Invited Seminar*. September 2020. <https://www.strausscenter.org/events/accountability-as-deterrence-in-cyberspace/>
7. Panel Discussion on COVID-19. RAND Board of Trustees. *Panel Presentation*. April 2020.
8. Systemic Cyber Risk. Jonathan W. Welburn. Aaron Strong. NYU Volatility and Risk Institute 2020. *Oral Presentation*. <https://youtu.be/Ticiv0-UGx4>
9. Cyber Deterrence OR: How We Learned to Stop Worrying and Love the Signal. Jonathan W. Welburn, Justin Grana, Karen Schwindt. SMA Speaker Series. November 2019. *Invited seminar*. <https://nsiteam.com/cyber-deterrence-or-how-we-learned-to-stop-worrying-and-love-the-signal/>
10. Systemic Risk in the Broad Economy. Jonathan W. Welburn, Aaron Strong, Justin Grana, Osonde Osoba, Florentine Eloundou, Claude Messan Setodji. INFORMS 2019. *Oral Presentation*.
11. Cyber Deterrence OR: How We Learned to Stop Worrying and Love the Signal. Jonathan W. Welburn, Justin Grana, Karen Schwindt. INFORMS 2019. *Oral Presentation*.
12. Burdensharing and its Discontinuities. RAND Center for Global Risk & Security Board meeting. *Oral presentation*. October 2019.
13. Systemic Risk in Cyberspace. Jonathan W. Welburn. The Second Conference on Risk Analysis, Decision Analysis and Security. Buffalo/Niagara Falls, NY, 2019.
14. Systemic Risk in the Broad Economy. Jonathan W. Welburn. Princeton University. CAARMS 2019. *Oral Presentation*.
15. Measuring Systemic Cyber Risk Welburn, Jonathan W. Welburn. Aaron Strong, Sasha Romanosky. Society for Risk Analysis 2018. *Poster Presentation*.
16. The Cyber Threat and Options For Deterrence. Jonathan W. Welburn. INFORMS 2018. *Oral Presentation*.

17. The Saga Continues: Insight Into The Greek Debt Crisis Through a Repeated Game. Jonathan W. Welburn, Kjell H. Hausken. Society for Risk Analysis 2017. *Oral Presentation.*
18. Understanding global economic risks through game-theoretic modeling. Jonathan W. Welburn. International Conference on Risk Analysis, Decision Analysis and Security, Tsinghua University, Beijing, China, 2017. *Oral Presentation.*
19. Economic Contagion And The Role Of Beliefs: Findings From A Borrower-lender Game. Jonathan W. Welburn. INFORMS 2016. *Oral Presentation.*
20. Economic Contagion. Jonathan W. Welburn. INFORMS 2015. *Oral Presentation.*
21. Import Security: Assessing the Risks of Imported Food. Jonathan W. Welburn, Vicki M. Bier, Steven Q. Hoerning. INFORMS 2015. *Oral Presentation.*
22. Contagion. Jonathan Welburn. INFORMS Minority Issues Forum (MIF) Poster Session, INFORMS 2015. *Poster Presentation.*
23. Models of Economic Contagion. Jonathan Welburn, Vicki Bier, and Kjell Hausken. Purdue Perspective Faculty Workshop, 2015. *Poster Presentation.*
24. Understanding the Channels of Contagion: A Game between Borrower and Lender Countries. Jonathan Welburn, Vicki Bier, and Kjell Hausken. Society for Risk Analysis (SRA) 2014. *Poster Presentation.*
25. Understanding the Channels of Contagion: A Game between Borrower and Lender Countries. Jonathan Welburn, Vicki Bier, and Kjell Hausken. INFORMS 2014. *Oral Presentation.*
26. Understanding the Channels of Contagion: A Game between Borrower and Lender Countries. Jonathan Welburn, Vicki Bier, and Kjell Hausken. INFORMS Minority Issues Forum (MIF) Poster Session, INFORMS 2014. *Poster Presentation.*
27. A Game Theoretic Model of Financial Crises. Jonathan W. Welburn and Kjell Hausken. Advances in Decision Analysis 2014. *Presentation of Paper to Research Incubator.*
28. A Game-theoretic Model of Economic Contagion. Jonathan W. Welburn and Kjell Hausken. CAARMS20 2014. *Poster Presentation.* Received Angela E Grant Award for best algorithm.
29. A Game-theoretic Model of Economic Contagion. Jonathan W. Welburn and Kjell Hausken. ISERC 2014. *Oral Presentation.*
30. Quantifying and Modeling Risks of Food Imports. Jonathan W. Welburn, Vicki M. Bier, Steven Q. Hoerning. INFORMS 2013. *Oral Presentation.*
31. A Game Theoretic Model of Financial Crises. Jonathan W. Welburn and Kjell Hausken. INFORMS 2013. *Oral Presentation.*
32. A Game Theoretic Model of Financial Crises .Jonathan W. Welburn and Kjell Hausken. INFORMS Minority Issues Forum (MIF) Poster Session, INFORMS 2013. *Poster Presentation.* Awarded Honorable Mention.
33. Import Security: Assessing the Risks of Imported Food. Jonathan W. Welburn, Vicki M. Bier, Steven Q. Hoerning. ISERC 2013. *Poster Presentation.*
34. Import Security: Assessing the Risks of Imported Food. Jonathan W. Welburn, Vicki M. Bier, Steven Q. Hoerning. SRA 2012. *Poster Presentation.* Awarded SRA Best Poster Award.

35. A Game Theoretic Model of Financial Contagion and Global Economic Risks. Jonathan W. Welburn, Kjell Hausken. INFORMS-MIF Poster Session, 2012. *Poster Presentation*. Awarded Semifinalist.
36. Analysis of Food Import Refusals as a Key Indicator of Risk for Food Safety. Jonathan W. Welburn, Vicki M. Bier, Steven Q. Hoerning. INFORMS-MIF Poster Session, INFORMS 2012. *Poster Presentation*.
37. Import Security: Assessing the Risks of Imported Food. Jonathan W. Welburn, Vicki M. Bier, Steven Q. Hoerning. INFORMS 2012. *Oral Presentation*.
38. Observations from OASIS Violations Data for Border Inspection. Jonathan Welburn, Vicki M. Bier, Steven Hoerning. Production and Operations Management Society (POMS), Chicago, IL, 4/21/2012, *Oral Presentation*.
39. Import Security: Analyzing the risks of imported food. Jonathan Welburn, Vicki M. Bier, Steven Hoerning. Graduate Engineering Research Scholars/ Science-Medicine Poster Session, Madison, WI, 4/26/2012, *Poster Presentation*.
40. Observations from OASIS Violations Data for Border Inspection. Jonathan W. Welburn, Vicki M. Bier. World Affairs in the Global Economy: Achieving Safety in the Global Food Supply Chain – Integrating Science and Policy. April 28, 2011. *Oral Presentation*.

Additional Skills

- Intermediate French reading/writing/speaking ability
- GAMS, Python, R, STATA, MS Excel for data analysis, VBA, Bloomberg, and Mathematica.

Awards and Honors

2015	Society for Risk Analysis (SRA) Economics and Benefits Specialty Group Student Merit Award
2014	SRA Decision Analysis and Risk Specialty Group Student Merit Award
2011-15	Fellowship: National Science Foundation Graduate Research Fellow
2010-16	Fellowship: University of Wisconsin Graduate Engineering Research Scholars
2005-10.1	Scholarship: University of Wisconsin Chancellor's Scholar, 2005-2010
2005-10	Scholarship: UW-Madison College of Engineering LEED Scholar
2005	Scholarship: Tucson Alumni Club Scholarship

Teaching

2020 –	Computational Economics -- Pardee RAND Graduate School
2014–15	Engineering Economics Analysis. Lecturer. UW – Madison
2010	Engineering Economics Analysis Teaching Assistant, UW – Madison