Patrick Shafto, PhD

402 Bradley Hall
Department of Mathematics and Computer Science
Rutgers University – Newark
Newark, NJ 07102
617.223.7967
patrick.shafto@rutgers.edu
shaftolab.com
Erdös number = 5

Professional Positions

Rutgers University–Newark
- Professor of Mathematics and Computer Science, 2019-present.
- Affiliate faculty, Rutgers Cognitive Science Center (RUCCS), 2021-present.
- Affiliate faculty, Department of Computer Science, Rutgers, New Brunswick, 2020-present.
- Director of the Graduate Program in Data Science, 2015-2020.
- Founding Director of the Minor in Data Science, 2020-2020.
- Henry Rutgers Term Chair in Data Science, 2015-2020.
- Associate Professor of Mathematics and Computer Science, 2015-2019.
- Courtesy appointments in Psychology, Rutgers Business School, and the Center for Molecular and Behavioral Neuroscience, 2015–present

Defense Advanced Research Programs Agency (DARPA)
- Program Manager, I2O, 2023-present. (IPA loan from Rutgers).

Redpoll, LLC
- Founder and Scientist-at-Large, 2023-present.
- Founder and Chief Scientist, 2019-2023.

University of Louisville
- Associate Professor of Psychology, 2013-2015.
- Affiliated faculty, Program in Bioinformatics, University of Louisville, 2011-2015.
- Courtesy appointment in Computer Engineering & Computer Science, 2013-2015.
- Assistant Professor of Psychology, 2007-2013.

Massachusetts Institute of Technology
- Postdoctoral Associate, 2004-2007. (Advisor: Joshua B. Tenenbaum)

Northeastern University
- Statistical Consultant, Department of Psychology, Northeastern University, 2003.
- Instructor, Department of Psychology, Northeastern University, 2000, 2002, 2003.

Education

Ph.D., Northeastern University, Boston, MA, 2004. (Advisor: John D. Coley)

M.S., Northeastern University, Boston, MA, 2002.

M.S., Northeastern University, Boston, MA, 1999.

B.S., Northeastern University, Boston, MA, 1998, with honors, *magna cum laude*.

Research Interests

Mathematics: Probability, (Riemannian) geometry, Optimal Transport.

Machine learning: Cooperation, reinforcement learning, Gaussian processes, Bayesian nonparameterics.
Human learning: Learning, reasoning, planning, development, language, vision.

Awards and Honors

Fellow of the Cognitive Science Society, 2024.

Member, Interdisciplinary Assessment Board for AI, Ministry of Universities, Government of Spain.

Member, School of Mathematics, Institute for Advanced Study (IAS), Princeton, N.J., 2021-2023.

Participant, DARPA Reimagining the Future of AI for National Security Workshop, June 2023.

Faculty, Diverse Intelligences Summer Institute, St. Andrews, Scotland, 2022.

Outstanding reviewer, Advances in Neural Information Processing Systems (NeurIPS), 2021; International Conference on Machine Learning (ICML), 2022.

Panelist, DARPA ISAT, 2021.

Henry Rutgers Term Chair in Data Science, Rutgers University – Newark, 2015-2020.

Participant, Future Directions in Human Machine Teaming workshop, Basic Research Office of the Under Secretary of Defense for Research and Engineering OUSD(R&E)/BRO, Sept 2019.

Fellow, Center for the Study of Language and Information (CSLI), Stanford University, Winter 2015.

Outstanding Scholarship, Research and Creative Activity Award in Basic and Applied Sciences, University of Louisville, College of Arts and Sciences, 2012-2013.

NSF Faculty Early Career Development (CAREER) award, 2012.

University of Louisville Faculty Favorite, 2012.

Best Student Paper, Honorable Mention, with Charles Kemp, Alison Berke & Josh Tenenbaum, 2006.

Travel Award to attend the annual meeting of the Cognitive Science Society, 2005.

Graduate Student Fellowship, Northeastern University, 1999-2004.

Phi Kappa Phi, 1998.

Carl S. Ell Scholarship, academic scholarship including full tuition, room, and board, 1993-1998.

Funding

Total external funding as PI or Co-PI: $14,812,832.85.

CURRENT

- DARPA IPA. *Program Manager in Information Innovation Office (I2O)*. Role: PI. Years: 2023-2025. Costs: $677,826
- NSF EHR (2301180) *Cognitive Mechanisms of Guided Instruction in the Early Elementary Years.* Role: Co-PI, (PI, Elizabeth Bonawitz, Harvard University). Years: 2023-2026, Costs (to Rutgers): $39,996.
- DARPA SNAP-ON program (HR0011-23-9-0050) *Bayesian nonparametrics for Snap-on open-world novelty.* Role: Sub-PI, (PI, Baxter Eaves, Redpoll, LLC.) Years: 2023-2025, Costs (to Rutgers): $627,938.
- DARPA ASIST program (W912CG22C0001) *ASI Measures for Test and Evaluation of Cooperative Communication*, Role: Subcontract (Prime: Aptima), Years: 2021-2024, Costs: $414,394.
- National Science Foundation: MRI (2117429) *MRI: Acquisition of a High-Performance Computing Cluster for Research and Teaching at Rutgers University-Newark*, Role: co-PI, (PI, Michele Pavanello), Years: 2021-2024, Total Costs to Rutgers: $559,288.

COMPLETED

- DARPA Sail-on program (W911NF2020001), *Open world intelligence through composition of non-parametrics*, Role: PI (subcontract to Redpoll, LLC), Years: 2020-2023, Total Costs: $3,471,894.

- DEFENSEWERX Partnership Intermediary Agreement No. ("PIA") 2021-21072100002. *Computational Social Science (CoSSci).* Role: PI, Years: 2022-2023, Costs: $159,000.
- DARPA ASIST program (HR00112020039), *Artificial social intelligence through optimal cooperation*, Role: PI, Years: 2020-2022, Total Costs: $528,652.85.
- DARPA XAI program (FA8750-17-2-0146), *Model explanation by optimal selection of teaching examples*, Role: PI, Years: 2017-2022, Total Costs: $2,509,868.
- DARPA RED program (20-430 Rev00-NJ-112), *Symbolic Signatures for Attack Toolchains (SymSAT)*, Role: co-PI, (PI, Alberto Santamaria, GE Research), Years: 2020-2022, Total Costs to Rutgers: $207,676.
- National Science Foundation, MRI (1828528), *MRI: Acquisition of a GPU cluster to support interdisciplinary research in human learning, machine learning, and data science.* Role: PI (co-PIs, Liz Bonawitz, Michael Cole, William Graves, Les Michaelson), Years: 2018-2023, Total Costs: $99,999.
- CIA Crystal Forest (Aluminum Oak), *Cyber Identity and Behavioral Analytics Research Consortium (CIBAR).* Role: Subcontract (PI, Michael King, FIT), Years: 2018-2021, Total Costs to Rutgers: $444,288.
- Department of Defense, Research and Education Program for Historically Black Colleges and Universities and Minority-Serving Institutions (HBCU/MI) (72531RTREP), *Enhancing research capacity in computing science and earth sciences through basic research engaging underrepresented minority (URM) graduate students.* Role: Co-PI (PI: Lee Slater, Rutgers University–Newark), Years: 2018-2021, Total Costs: $599,791.
- National Science Foundation, EHR:Core (1660885), *Why questions: Investigating the social basis of questioning for learning.* Role: Co-PI (PI, Liz Bonawitz), Years: 2017-2021, Total Costs: $499,984.
- NIH, NIDCD R21 DC017217-01. *Optimizing input for language interventions.* Role: Co-PI (PI, Naomi Feldman, University of Maryland), Years: 2018-2020. Total Costs to Shafto: $193,677.
- National Science Foundation, CISE (1848955) *Engaged Research Around Data Science and Artificial Intelligence with Implications for Workforce Development.* Role: PI, Years: 2019, Total Costs: $24,639.
- National Science Foundation, Trust worthy computing (CNS-1564034) *TWC SBE: Medium: Collaborative: Building a Privacy-Preserving Social Networking Platform from a Technological and Sociological Perspective.* Role: Co-PI (with Wei Jiang at Missouri University of Science and Technology and Jaideep Vaidya), Years: 2016-2019, Total costs: $539,173.
- National Science Foundation, Science of Learning Collaborative Networks (SMA-1640816). *SL-CN: Guiding guided learning: Developmental, educational and computational perspectives.* Role: PI (with Liz Bonawitz, Co-PI and Corriveau, Golinkoff, Hirsh-Pasek, and Xu), Years: 2016-2019, Total Costs: $749,016.
- National Science Foundation, INSPIRE (IIS and SBE; NSF-1549981). *INSPIRE: Not unbiased: The implications of human algorithm interaction on algorithm performance and human learning.* Role: Co-PI (with Olfa Nasraoui at University of Lousiville), Years: 2015-2019, Total costs to Shafto: $399,972.
- National Science Foundation, EAGER: MAKER (CISE-1623486). *EAGER: MAKER: The origins of making: A Data Science approach to investigating cognitive and affective basis of learning through constructing.* Role: Co-PI (with Liz Bonawitz and Vanessa LoBue), Years: 2016-2019, Total Costs: $297,772.
- National Science Foundation, Cyber-human systems (CHS-1524888). *CHS: Small: Human visual perception as optimal, dynamically adaptive, information encoding.* Role: PI, Years: 2015-2019, Total costs: $499,442.
- National Science Foundation, BRAIN supplement: Integrative Strategies for Understanding Neural and Cognitive Systems Supplements (NSF:CHS) *An integrated system for storing and systematizing human visual experience.* Role: PI, Years: 2016-2018, Total Costs: $99,956.
- Chancellor's Seed Grant Program. *Enabling Quantum Material Science with Machine Learning.* Role: Co-PI (PI, Michele Pavanello), Years: 2018-2019, Total Costs: $50,000.

- Chancellor's Seed Grant Program. *A Data Science approach to investigating cognitive and affective basis of learning through constructing in the Newark Community.* Role: Co-PI (with Liz Bonawitz and Vanessa LoBue). Total costs: $75,000.
- Chancellor's Seed Grant Program. *Creation of the Rutgers Cognitive Science Center (RCSC).* Role: Co-PI (with Katalin Balog, Jennifer Austin, Elizabeth Bonawitz, Michael Cole, Raffaella De Rosa, William Graves, Kent Harber, and Stephen José Hanson). Total costs: $50,000.
- Australian Research Council. *Learning from others: Inductive reasoning based on human-generated data.* (DP150103280). Role: Co-PI (with Amy Perfors at University of Adelaide), Years: 2015-2018, Total costs: $301,300. Total costs to Shafto: $0.
- National Science Foundation, CAREER. *A rational analysis of the implications of instruction for student learning.* (DRL-1149116). Role: PI, Years: 2012-2017, Total costs: $625,835.
- Amazon Education Research Grants. Role: PI. Date: 12/2015. 7500 credits.
- NVIDIA Corporation. *NVIDIA Hardware Grant: NVIDIA Tesla K40 active.* Requesters: Baxter Eaves & Patrick Shafto. Date: 8/2015. Approximate value: $3,000.
- National Science Foundation, CAREER supplement. *A rational analysis of the implications of instruction for student learning.* (DRL-1149116). Role: PI, Years: 2014-2015, Total costs: $77,291.
- Defense Advanced Research Projects Agency (DARPA), XDATA. *Automated Bayesian CrossCat (ABC) Family of Machine Learning Systems for XDATA.* Role: Co-PI (with SSCI and Vikash Mansinghka at MIT), Years: 2012-2015, Total costs to Shafto: $219,646.
- National Science Foundation, Research Experiences for Undergraduates (REU). *Undergraduate Research Experiences in the Integrated Science of Learning.* Role: PI, Years: 2012-2013, Total costs: $21,810.
- James S. McDonnell Foundation, Subcontract. *The role of experience in pedagogical reasoning.* Role: Subcontractor, Years: 2011, Total costs: $8,397.
- University of Louisville, Intramural Research Incentive Grant. *Computational modeling of epistemic trust in causal learning.* Role: PI, Years: 2011, Total costs: $3,600.
- University of Louisville, Intramural Research Incentive Grant. *Computational modeling of reasoning about knowledge and intent.* Role: PI, Years: 2010, Total costs: $3,000.
- Cognitive Science Society, Tutorials and Workshop Program. *An interdisciplinary workshop on pedagogical reasoning.* Role: Organizer (with Co-organizer Noah Goodman), Years: 2009, Total costs: $1,200.

Publications

^{U} indicates undergraduates, ^{R} research staff, ^{G} graduate students, ^{P} postdocs, and ^{S} research scientists
^{1} indicates joint first authorship. Note: I adopt last author position on papers coming out of my lab.

JOURNAL ARTICLES

1. Hao, X.^{G}, Jhaveri, Y.^{P}, & **Shafto, P.** (2023). Common ground in cooperative communication. *Advances in Neural Information Processing Systems (NeurIPS).* **(spotlight)**
2. Wang, P.^{P}, Wang, J.^{P}, & **Shafto, P.** (2023). Generalized Belief Transport. *Advances in Neural Information Processing Systems (NeurIPS).*
3. Barak, L.,^{P} Harmon, Z., Feldman, N.H., Edwards,J. & **Shafto, P.** (2023). When Children's Production Deviates from Observed Input: Modeling the variable production of the English past tense. *Cognitive Science.*
4. Hao, X.^{G} & **Shafto, P.** (2023). Coupled variational autoencoder. *International Conference on Machine Learning (ICML).*
5. Wang, J.^{P}, Wang, P.^{P}, & **Shafto, P.** (2023). Efficient discretization of Optimal Transport. *Entopy.*

6. Yang, S., C-H.^{S}, Folke, T.^{P}, & **Shafto, P.** (2023). The inner loop of collective human-machine intelligence. *Topics in Cognitive Science.*
7. Kominsky, J., Bascandziev, I., **Shafto, P.**, & Bonawitz, E. (2023). Talk of the Town Mobile App Platform: New method engaging family in STEM learning and research in homes and communities. *Frontiers in Psychology.*
8. Chiu, W-T.^{P}, Wang, P.^{P}, & **Shafto, P.** (2022). Probabilistic inverse Optimal Transport. *International Conference on Machine Learning (ICML).*
9. Yang, S, C-H.^{S}, Folke, T.^{P}, & **Shafto, P.** (2022). A psychological theory of explainability. *International Conference on Machine Learning (ICML).*
10. Paranamana, P.^{P}, Wang, P.^{P}, & **Shafto, P.** (in press). Evolution of beliefs in social networks. Collective Intelligence. doi: https://doi.org/10.1177/26339137221111151
11. Richard, B.^{S} & **Shafto, P.** (2022). Sensitivity to the slope (α) of the amplitude spectrum of natural scenes is dependent on the α of recently viewed environments: A visual adaptation study in modified reality. *Vision Research.*
12. Harmon, Z., Barak, L.^{P}, **Shafto, P.**, Edwards, J., & Feldman, N. (2022). The competition–compensation account of Developmental Language Disorder. *Developmental Science.*
13. Bokadia, H.^{R}, Yang, S, C-H.^{S}, Li, Z.^{R}, Folke, T.^{P}, & **Shafto, P.** (2022). Evaluating perceptual and semantic interpretability of saliency methods: A case study of melanoma. *Applied AI Letters.*
14. Thomas, D., Kleinberg, S., Brown, A., Crow, M., Bastian, N., Reisweber, N., Lasater, R., Kendall, T.,**Shafto, P.**, Blaine, R., Smith, S., Ruiz, D., Morrell, C., & Clark, N. (2022). Model Machine Learning Practices to Support the Principles of AI and Ethics in Nutrition Research. *Nutrition and Diabetes*,12:4, https://doi.org/10.1038/s41387-022-00226-y.
15. Lu, C.-K.^{S} & **Shafto, P.** (2021). Conditional Deep Gaussian Processes: multi-fidelity kernel learning. *Entropy.*
16. Lu, C.-K.^{S} & **Shafto, P.** (2021). Conditional Deep Gaussian Processes: Empirical Bayes hyperdata learning. *Entropy*, 23, 1387. https://doi.org/10.3390/e23111387
17. **Shafto, P.**, Wang, J.^{P} & Wang, P.^{P} (2021). Cooperative communication as Belief Transport. *Trends in Cognitive Sciences*, (25)10, 826-828. doi: 10.1016/j.tics.2021.07.012.
18. Nguyen, K., Misra, D., Schapire, R., Dudík, M., & **Shafto, P.** (2021). Interactive learning from activity description. *International Conference on Machine Learning (ICML)*, PMLR 139:8096-8108.
19. Folke, T.^{P}, Yang, S.C-H.^{S}, Anderson, S.^{R}, & **Shafto, P.** (2021). Explainable AI for medical imaging: explaining pneumothorax diagnoses with Bayesian teaching. *Proc. SPIE 11746, Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications III.* https://doi.org/10.1117/12.2585967
20. Kominsky, J.^{P}, **Shafto, P.**, & Bonawitz, E.B. (2021). There's something inside: Children's intuitions about animate agents. *PLoS ONE* 16(5): e0251081. https://doi.org/10.1371/journal.pone.0251081
21. Colantonio, J.A., Durkin, K., Caglar, L.R., **Shafto, P.**, & Bonawitz, E. (2021). The intentional selection assumption. *Frontiers in Psychology*, 12. doi: 10.3389/fpsyg.2021.569275.
22. Yang, S.,C-H.^{S}, Vong, W-K.^{P}, Sojitra, R.B.^{R}, Folke, T.^{P}, & **Shafto, P.** (2021). Mitigating belief projection in explainable artificial intelligence via Bayesian Teaching. *Scientific Reports*, 11, 9863 (2021). https://doi.org/10.1038/s41598-021-89267-4
23. Wang, P.^{P}, Wang, J.^{P}, Paranamana, P.^{P}, & **Shafto, P.** (2020). A mathematical theory of cooperative communication. *Advances in Neural Information Processing Systems (NeurIPS)*, 33, 17582–17593. arXiv:1910.02822 arXiv:1910.02822. **Oral presentation, 1.5% acceptance rate.**
24. Daubert, E. N.^{P}, Yu, Y., Grados, M., **Shafto, P.**, & Bonawitz, E. (2020). Pedagogical questions promote causal learning in preschoolers. *Scientific Reports*, 10(1), 1-8.

25. Wang, J.^{P}, Wang, P.^{P}, & **Shafto, P.** (2020). Sequential cooperative Bayesian inference. *International Conference on Machine Learning (ICML)*, PMLR 119:10039-10049. arXiv:2002.05706.

26. Lu, C-K^{S}, Hao, X.^{G}, Yang, S.C-H.^{P}, & **Shafto, P.** (2020). Interpretable deep Gaussian Processes with moments. *Proceedings of the 23rd international conference on Artificial Intelligence and Statistics (AISTATS)*, PMLR 108:613-623, 2020. arXiv:1905.10963.

27. Yu, Y.^{P}, **Shafto, P.**, & Bonawitz, E. (2020). Inconvenient samples: Modeling biases related to parental consent by coupling observational and experimental results. *Open Mind*, 4, 13-24.

28. Sun, W., Nasraoui, O., & **Shafto, P.** (2020). Evolution and impact of bias in human and machine learning algorithm interaction. *Plos one*, 15(8), e0235502.

29. Bonawitz, E.B.[1], **Shafto, P.**[1], Gonzalez, A., & Bridgers, S. (2019). Children change their answers in response to neutral follow-up questions by a knowledgeable asker. *Cognitive Science*.

30. Williams, J.D., Lopez, D., **Shafto, P.**, Lee, K. (2019). Technological workforce and its impact on algorithmic justice in politics. *Consumer Needs and Solutions*, 6, 84–91.

31. Richard, B.^{P}, Hansen, B.C., Johnson, A.P. & **Shafto, P.** (2019). Spatial summation of broadband contrast. *Journal of Vision*, 19(5), 1-19.

32. Wang, P.^{P}, Paranamana, P.^{P}, & **Shafto, P.** (2019). Generalizing the theory of cooperative inference. *Proceedings of the 22nd international conference on Artificial Intelligence and Statistics (AISTATS)*, PMLR 89:1841–1850.

33. Yu, Y.^{P}, Bonawitz, L.B., & **Shafto, P.** (2019). Pedagogical questions in mother-child conversations. *Child Development*, 90(1), 147-161.

34. Yang, S.C-H^{P}, Yu, Y.^{P}, Vong, W.K.^{P}, & **Shafto, P.** (2019). A unifying computational framework for teaching and active learning. *Topics in Cognitive Science*, 11(2), 316-337. doi:10.1111/tops.12405.

35. Bass, I., Gopnik, A., Hanson, M., Ramarajan, D., **Shafto, P.**, Wellman, H., & Bonawitz, E.B. (2019). Children's developing theory of mind and pedagogical evidence selection. *Developmental Psychology*, 55(2):286-302. doi: 10.1037/dev0000642.

36. Lu, C-K.^{P}, Yang, S.C-H.^{P}, & **Shafto, P.** (2018). Standing wave decomposition Gaussian Process. *Physical Review E*, 98, 032303. doi:10.1103/PhysRevE.98.032303.

37. Yu, Y.^{P}, **Shafto, P.**, Bonawitz, E.B., Yang, S.C-H.^{P}, Golinkoff, R.M., Corriveau, K.H., Hirsh-Pasek, K., & Xu, F. (2018). The theoretical and methodological opportunities afforded by guided play. *Frontiers in Psychology* 9:1152. doi:10.3389/fpsyg.2018.01152.

38. Yu, Y.^{P}, Landrum, A.^{P}, Bonawitz, L.B., & **Shafto, P.** (2018). Questioning supports effective transmission of knowledge and increased exploratory learning in pre-kindergarten children. *Developmental Science*, 21(6), e12696. doi:10.1111/desc.12696.

39. Gweon, H., **Shafto, P.** & Schulz, L.E. (2018). Development of children's sensitivity to overinformativeness in learning and teaching. *Developmental Psychology*, 54(11), 2113-2125. doi: http://dx.doi.org/10.1037/dev00005802113

40. Yang, S.C-H.^{P}, Yu, Y.^{P}, Givchi, A.^{G}, Wang, P.^{P}, Vong, W.K.^{P}, & **Shafto, P.** (2018) Optimal cooperative inference. *Proceedings of the 21st international conference on Artificial Intelligence and Statistics (AISTATS).*

41. Lane, J. & **Shafto, P.** (2017). Preschoolers and toddlers attribute causal power to novel invisible entities. *Journal of Experimental Child Psychology*, 162, 268-281.

42. Schweinhart, A.^{P}, **Shafto, P.** & Essock, E. (2017). Distribution of content in recently-viewed scenes whitens perception. *Journal of Vision*, 17(3):8, 1-13. doi: 10.1167/17.3.8

43. Eaves, B.S.^{P} & **Shafto, P.** (2017). Parameterizing developmental changes in epistemic trust. *Psychonomic Bulletin and Review*, 24(2), 277-306.

44. McCrink, K., **Shafto, P.** & Barth, H. (2017). The relationship between non-symbolic multiplication and division in childhood. *Quarterly Journal of Experimental Psychology*, 70(4), 686-702.

45. Searcy, S.^{G} & **Shafto, P.** (2016). Cooperative inference: Features, objects, and collections. *Psychological Review*, 123(5), 510-533.

46. Eaves, B.S.^{P}, Feldman, N., Griffiths, T. & **Shafto, P.** (2016). Infant-directed speech is consistent with teaching. *Psychological Review*, 123(6),758-771.

47. Mansinghka, V., **Shafto, P.**, Jonas, E., Petschulat, C., Gasner, M. & Tenenbaum, J.B. (2016). CrossCat: A fully Bayesian nonparametric method for analyzing heterogenous, high dimensional data. *Journal of Machine Learning Research*, 17, 1-49.

48. Durkin, K.^{P} & **Shafto, P.** (2016). Epistemic trust and education: Effects of informant reliability on student learning of decimal concepts. *Child Development*, 84, 154-164.

49. Rafferty, A., Brunskill, E., Griffiths, T.L. & **Shafto, P.** (2015). Faster teaching via POMDP planning. *Cognitive Science*, 40(6), 1290-332. DOI: 10.1111/cogs.12290.

50. Rhodes, M., Bonawitz, E.B., **Shafto, P.**, Chen, A. & Calgar, L. (2015). Controlling the message: Preschoolers' use of evidence to teach and deceive others. *Frontiers in Psychology*, 6:867. doi: 10.3389/fpsyg.2015.00867.

51. Landrum, A.R.^{P}, Eaves, B.S.^{G} & **Shafto, P.** (2015). Trusting to learn and learning to trust: A theoretical framework. *Trends in Cognitive Sciences*, 19, 109-111.

52. **Shafto, P.**, Goodman, N.D. & Griffiths, T.L. (2014). A rational account of pedagogical reasoning: Teaching by, and learning from, examples. *Cognitive Psychology*, 71, 55-89.

53. **Shafto, P.**, Goodman, N.D. & Frank, M.C. (2012). Learning from others: The consequences of psychological reasoning for human learning. *Perspectives on Psychological Science*, 7, 341-351.

54. **Shafto, P.**, Eaves, B.^{G}, Perfors, A. & Navarro, D.J. (2012). Epistemic trust: Modeling children's reasoning about others' knowledge and intent. *Developmental Science*, 15, 436-447.

55. Kemp, C., **Shafto, P.** & Tenenbaum, J.B. (2012). An integrated account of generalization across objects and features. *Cognitive Psychology*, 64, 35-73.

56. **Shafto, P.**, Kemp, C., Mansinghka, V.K. & Tenenbaum, J.B. (2011). A probabilistic model of cross-categorization. *Cognition*, 120, 1-25.

57. Bonawitz, E.B.[1], **Shafto, P.**[1], Gweon, H., Goodman, N.D., Spelke, E. & Schulz, L. (2011). The double-edged sword of pedagogy: Instruction limits spontaneous exploration and discovery. *Cognition*, 120, 322-330.

58. Buchbaum, D., Griffiths, T.L., Gopnik, A. & **Shafto, P.** (2011). Children's imitation of causal action sequences is influenced by statistical and pedagogical evidence. *Cognition*, 120, 331-340.

59. Li, D.^{G} & **Shafto, P.** (2011). Bayesian hierarchical cross-clustering. *Proceedings of the Fourteenth International Conference on Artificial Intelligence and Statistics. JMLR W&CP, 15*, 443-451.

60. Rafferty, A., Brunskill, E., **Shafto, P.** & Griffiths, T.L. (2011). Faster teaching by POMDP planning. *Proceedings of the 15th international conference on Artificial Intelligence in Education (AIED). Lecture Notes in Artificial Intelligence*, 6738, 280-287.

61. **Shafto, P.**, Kemp, C., Bonawitz, E.B., Coley, J.D. & Tenenbaum, J.B. (2008). Inductive reasoning about causally transmitted properties. *Cognition*, 109, 175-192.

62. Feeney, A., **Shafto, P.** & Dunning, D. (2007). Who is susceptible to the conjunction fallacy in category-based induction? *Psychonomic Bulletin & Review*, 14, 884-889.

63. **Shafto, P.**, Coley, J.D. & Baldwin, D. (2007). Effects of time pressure on context-sensitive property induction. *Psychonomic Bulletin & Review*, 14, 890-894.

64. Kemp, C., **Shafto, P.**, Berke, A. & Tenenbaum, J.B. (2006). Combining causal and similarity-based reasoning. *Advances in Neural Information Processing Systems (NIPS)*. **Best Student Paper, Honorable Mention.**

65. **Shafto, P.** & Coley, J.D. (2003). Development of categorization and reasoning in the natural world: Novices to experts, naïve similarity to ecological knowledge. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 29, 641-649.

66. Ahn, W., Kalish, C., Gelman, S.A., Medin, D.L., Luhmann, C., Atran, S., Coley, J.D. & **Shafto, P.** (2001). Why essences are essential in the psychology of concepts. *Cognition*, 82, 59-69.

PEER-REVIEWED CONFERENCE PROCEEDINGS

67. Barak, L.^{P}, Fernandez, N., Feldman, N., & **Shafto, P.** (2023) Modeling substitution errors in Spanish morphology learning. *Proceedings of the 45th annual conference of the Cognitive Science Society.*

68. Givchi, A.^{G}, Wang, P.^{P}, Wang, J.^{P}, & **Shafto, P.** (2022). Policy Optimization with Distributional Constraints: An Optimal Transport view. *The 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM2022).*

69. Bascandziev, I.^{P}, **Shafto, P.**, Bonawitz, E.B. (2021). The sound of pedagogical questions. *Proceedings of the 43rd annual conference of the Cognitive Science Society.*

70. Harmon, Z., Barak, L.^{P}, **Shafto, P.**, Edwards, J., & Feldman, N. (2021). Making Heads or Tails of it: A competition–compensation account of morphological deficits in language impairment. *Proceedings of the 43rd annual conference of the Cognitive Science Society.*

71. Bascandziev, I.^{P}, **Shafto, P.**, & Bonawitz. E. (2020). Prosodic features carry information about a question's intent. *Proceedings of the 42nd annual conference of the Cognitive Science Society.*

72. Barak, L.^{P}, Yang, S, C-H.^{P}, Rank, C.^{R} & **Shafto, P.** (2020). Replicating L2 learning in a computational model. *Proceedings of the 42nd Annual Conference of the Cognitive Science Society.*

73. Jean, A., Daubert, E.^{P}, Yu, Y.^{P}, **Shafto, P.**, & Bonawitz, E.B. (2019). Pedagogical questions empower exploration. *Proceedings of the 41st annual conference of the Cognitive Science Society.*

74. Badami, M., Nasraoui, O. & **Shafto, P.** (2018). PrCP: Pre-recommendation counter-polarization. *10th International Conference on Knowledge Discovery and Information Retrieval (KDIR).*

75. Sun, W., Nasraoui, O. & **Shafto, P.** (2018). Iterated algorithmic bias in the interactive machine learning process of information flitering. *10th International Conference on Knowledge Discovery and Information Retrieval (KDIR).* **Best Paper Award Winner.**

76. Vong, W-K.^{P}*, Sojitra, R.B.^{R}*, Reyes, A.^{U}, Yang, S.C-H.^{P}, & **Shafto, P.** (2018). Bayesian teaching of image categories. *Proceedings of the 40th annual conference of the Cognitive Science Society.*

77. Choi, K., Lapidow, E., Austin, J., **Shafto, P.**, & Bonawitz, E.B. (2018). Preschoolers are more likely to direct questions to adults than to other children (or selves) during spontaneous conversational acts. *Proceedings of the 40th annual conference of the Cognitive Science Society.*

78. Bass, I., **Shafto, P.**, & Bonawitz, E.B. (2018). That'll teach 'em: How expectations about teaching styles may constrain inferences. *Proceedings of the 40th annual conference of the Cognitive Science Society.*

79. Perfors, A., Navarro, D.J., & **Shafto, P.** (2018). Stronger evidence isn't always better: A role for social inference in evidence selection and interpretation. *Proceedings of the 40th annual conference of the Cognitive Science Society.*

80. Bass, I., Bonawitz, L.B., **Shafto, P.**, Ramarajan, D., Gopnik, A. & Wellman, H. (2017). I know what you need to know: Children's developing theory of mind and pedagogical evidence selection. *Proceedings of the 39th annual conference of the Cognitive Science Society.*

81. Baker, L.^{P}, LoBue, V., Bonawitz, E.B. & **Shafto, P.** (2017). Towards automated classification of emotional facial expressions. *Proceedings of the 39th annual conference of the Cognitive Science Society.*

82. Yang, S.C-H.^{P} & **Shafto, P.** (2017). Teaching versus active learning: A computational analysis of conditions that affect learning. *Proceedings of the 39th annual conference of the Cognitive Science Society.*

83. Yang, S.C-H.^{P}, Whritner, J.A.^{R}, Nasraoui, O. & **Shafto, P.** (2017). Unifying recommendation and active learning for human-algorithm interactions. Paper presented at the *Proceedings of the 39th annual conference of the Cognitive Science Society.*

84. Yu, Y.^{P}, Bonawitz, E.B. & **Shafto, P.** (2017). Inconvenient samples: Modeling the effects of non-consent by coupling observational and experimental results. *Proceedings of the 39th annual conference of the Cognitive Science Society.*

85. **Shafto, P.** & Nasraoui, O. (2016). Human-recommender systems: From benchmark data to benchmark cognitive models. *Proceedings of the 10th ACM Conference on Recommender Systems (RecSys 2016)*, 127-130.

86. Yu, Y., Bonawitz, E.B. & **Shafto, P.** (2016). Questions in informal teaching: A study of mother-child conversations. *Proceedings of the 38th annual conference of the Cognitive Science Society.*

87. Durkin, K.^{P}, Caglar, L.R., Bonawitz, E.B. & **Shafto, P.** (2015). Explaining choice behavior: The intentional selection assumption. *Proceedings of the 37th annual conference of the Cognitive Science Society.*

88. Landrum, A.R.^{P}, Cloudy, J.^{U} & **Shafto, P.** (2015). More than true: Developmental changes in use of inductive strength for selective trust. *Proceedings of the 37th annual conference of the Cognitive Science Society.*

89. Noles, N.S., Danovitch, J.H. & **Shafto, P.** (2015). Children's learning from technological and human sources. *Proceedings of the 37th annual conference of the Cognitive Science Society.*

90. Danovitch, J.H, Noles, N.S. & **Shafto, P.** (2015) How children seek out information from technological and human informants. *EuroAsianPacific Joint Conference on Cognitive Science.*

91. Gweon, H., **Shafto, P.** & Schulz, L.E. (2014). Children consider prior knowledge and the cost of information both in learning from and teaching others. *Proceedings of the 36th annual conference of the Cognitive Science Society.*

92. Eaves, B.^{G} & **Shafto, P.** (2014). Order effects in learning relational structures. *Proceedings of the 36th annual conference of the Cognitive Science Society.*

93. Searcy, N.^{G} & **Shafto, P.** (2014). Learning biases for teaching boolean concepts. *Proceedings of the 36th annual conference of the Cognitive Science Society.*

94. Rhodes, M., Bonawitz, E.B., **Shafto, P.** & Chen, A. (2014) Controlling the message: Preschoolers' use of evidence to teach and deceive others. *Proceedings of the 36th annual conference of the Cognitive Science Society.*

95. **Shafto, P.**, Gweon, H., Fargen, C.^{U} & Schulz, L.E. (2012). Enough is enough: Inductive sufficiency guides learners' ratings of informant helpfulness. *Proceedings of the 34th annual conference of the Cognitive Science Society.*

96. Gonzalez, A., **Shafto, P.**, Bonawitz, E.B. & Gopnik, A. (2012). Is that your final answer? The effects of neutral queries on children's choices. *Proceedings of the 34th annual conference of the Cognitive Science Society.*

97. Warner, R.^{G}, Stoess, T.^{U} & **Shafto, P.** (2011). Reasoning about teaching and misleading situations. *Proceedings of the 33rd annual conference of the Cognitive Science Society.*

98. Montague, R.^{G}, Navarro, D.J., Perfors, A., Warner, R.^{G} & **Shafto, P.** (2011). To catch a liar: The effects of truthful and deceptive testimony on inferential learning. *Proceedings of the 33rd annual conference of the Cognitive Science Society.*

99. Smith, N.A.^{G} & **Shafto, P.** (2011). The role of cross-cutting systems of categories in category-based induction. *Proceedings of the 33rd annual conference of the Cognitive Science Society.*

100. **Shafto, P.**, Goodman, N.D., Gerstle, B.^{U} & Ladusaw, F.^{U} (2010). Prior expectations in pedagogical situations. *Proceedings of the 32nd annual conference of the Cognitive Science Society.*

101. Li, D.^{G}, Rouchka, E. & **Shafto, P.** (2010). Phylogenomic analysis using Bayesian congruence measuring. *Proceedings of the 2nd International Conference on Bioinformatics and Computation (BICoB)*, 30-37.

102. Bonawitz, E.B.[1], **Shafto, P.**[1], Gweon, H., Chang, I, Katz, S. & Schulz, L. (2009). The double-edged sword of pedagogy: Modeling the effect of pedagogical contexts on preschoolers' exploratory play. *Proceedings of the 31st annual conference of the Cognitive Science Society.*

103. Warner, R.^{G}, **Shafto, P.**, Baker, C.L. & Tenenbaum, J.B. (2009). Abstract knowledge guides search and prediction in novel situations. *Proceedings of the 31st annual conference of the Cognitive Science Society.*

104. **Shafto, P.** & Goodman, N. (2008). Teaching games: Statistical sampling assumptions for learning in pedagogical situations. *Proceedings of the 30th annual conference of the Cognitive Science Society.*

105. **Shafto, P.**, Kemp, C., Mansinghka, V.K., Gordon, M. & Tenenbaum, J.B. (2006). Learning cross-cutting systems of categories. *Proceedings of the 28th annual conference of the Cognitive Science Society.*

106. **Shafto, P.**, Kemp, C., Baraff, E., Coley, J.D. & Tenenbaum, J.B. (2005). Context-sensitive induction. *Proceedings of the 27th annual conference of the Cognitive Science Society.*

CHAPTERS IN EDITED VOLUMES

107. Bonawitz, E.B. & **Shafto, P.** (2016). Computational models of development, Social influences. *Current Opinion in Behavioral Sciences*, 7, 95-100.

108. Eaves, B.S.^{P}, Schweinhart, A.^{P} & **Shafto, P.** (2016). Tractable Bayesian teaching. In Jones, M. (Ed.) *Big Data in Cognitive Science*, New York, NY: Psychology Press, 65-90.

109. **Shafto, P.** & Bonawitz, L.B. (2015). Choice from among intentionally selected options. In Ross, B. (Ed.) *Psychology of Learning and Motivation Volume 63*, San Diego: Elsevier, 295-320.

110. Eaves, B.^{G} & **Shafto, P.** (2012). Unifying pedagogical reasoning and epistemic trust. In Xu, F. and Kushnir, T. (Eds.) *Advances in Child Development and Behavior*, 43, 295-319. San Diego, CA: Elsevier.

111. Tenenbaum, J.B., Kemp, C. & **Shafto, P**. (2007). Theory-based Bayesian models of inductive reasoning. In Feeney, A. & Heit, E. (Eds.), *Induction.* Cambridge, U.K.: Cambridge University Press.

112. **Shafto, P.**, Vitkin, A. & Coley, J.D. (2007). Availability in category-based induction. In Feeney, A. & Heit, E. (Eds.), *Induction.* Cambridge, U.K.: Cambridge University Press.

113. Coley, J.D., **Shafto, P.**, Stepanova, O. & Baraff, E. (2005). Knowledge and category-based induction. In Ahn, W., Goldstone, R.L., Love, B.C., Markman, A.B. & Wolff, P. (Eds.), *Categorization inside and outside the laboratory: Essays in honor of Douglas L. Medin.* Washington, DC: American Psychological Association.

114. Coley, J.D., Solomon, G.E.A. & **Shafto, P.** (2002). The development of folkbiology: A cognitive science perspective on children's understanding of the biological world. In Kahn, P. & Kellert, S. (Eds.),

Children and nature: Psychological, sociocultural, and evolutionary investigations (65-91). Cambridge, MA: MIT Press.

PEER-REVIEWED PAPERS IN WORKSHOPS

115. Li, Z^R & Shafto, P. (2023). On feasibility of intent obfuscating attacks. *New Frontiers in Adversarial Machine Learning: AdvML 2023 at ICML.*

116. Folke, $T.^P$, Yang, S., C-H.^{S}, Li, $Z.^R$, Sojitra, $R.B.^R$, & **Shafto, P.** (2021). Explainable AI for Natural Adversarial Images. Poster presented at the *ICLR-21 Workshop on Responsible AI.*

117. Wang, $P.^P$, Givchi, $A^G.$, & **Shafto, P.** (2020). Manifold learning from a teacher's demonstrations. *NeurIPS workshop: TDA and beyond.* arXiv:1910.04615.

118. Sun, W., Khenissi, S., Nasraoui, O. & **Shafto, P.** (2019). Debiasing collaborative filtering recommender systems. *The Third International Workshop on Augmenting Intelligence with Bias-Aware Humans-in-the–Loop (HumBL@WWW2019).*

119. Sun, W., Khenissi, S., Nasraoui, O. & **Shafto,P.** (2018). Debiasing Recommender Systems with propensity counteraction and active learning. *The Second IEEE International Workshop on Benchmarking, Performance Tuning and Optimization for Big Data Applications (BPOD 2018).*

120. Yang, S.C-H.^{P} & **Shafto, P.** (2017) Explanable Artificial Intelligence via Bayesian Teaching. *NIPS 2017 workshop on Teaching Machines, Robots, and Humans.*

121. Badami, M., Nasraoui, O., Sun. W., & **Shafto, P.** (2017). Detecting polarization in ratings: An automated pipeline and a preliminary quantification on several benchmark data sets. *IEEE Big Data 2017, International Workshop on Big Social Media Data Management and Analysis.*

122. Schweinhart, $A.^P$, Eaves, $B.S.^P$, & **Shafto, P.** (2016). Automating the recoding, analysis, and interpretation pipeline using naturalistic visual scenes. *IJCAI 2016 workshop on Closing the Cognitive Loop: Third Workshop on Knowledge, Data, and Systems for Cognitive Computing.*

123. Eaves, $B.S.^P$ & **Shafto, P.** (2016). Toward a general, scalable framework for Bayesian teaching with applications to topic models. *IJCAI 2016 workshop on Interactive Machine Learning: Connecting Humans and Machines.*

124. Mansinghka, V.K., **Shafto, P.**, Baxter, J. & Eaves, B.S. (2014) BQL and BayesDB: a probabilistic DSL and runtime system for data analysis and predictive analytics. *NIPS Probabilistic Programming Workshop.*

125. Mansinghka, V.K., Jonas, E., Petschulat, C., Cronin, B., **Shafto, P.** & Tenenbaum, J.B. (2009). Cross-categorization: a method for discovering multiple overlapping clusterings. *NIPS 2009 Workshop on Nonparametric Bayesian Statistics.*

PREPRINTS

126. Yang, S, C-H., Eaves, B., Schmidt, M., Swanson, K., & **Shafto, P.** (2024). Structured Evaluation of Synthetic Tabular Data. arXiv:2403.10424.

127. Nasraoui, O. & **Shafto, P.** (2016). Human-algorithm interaction biases in the Big Data cycle: A Markov Chain Iterated Learning framework. arXiv:1608.07895.

128. Mansinghka, V., Tibbetts, R., Baxter, J., **Shafto, P.** & Eaves, $B.^P$ (2015). BayesDB: A probabilistic programming system for querying the probable implications of data. arXiv preprint arXiv:1512.05006.

SOFTWARE

129. Baxter, J., Lovell, D., Eaves, $B.^G$, **Shafto, P.** & Mansinghka, V.K. (2013). BayesDB.

130. Lovell, D., Baxter, J., Eaves, $B.^G$, **Shafto, P.** & Mansinghka, V.K. (2013). CrossCat.

Conference Presentations

1. Huang, Y., Rudinger, R., Carpuat, M., & **Shafto, P.** (2024). Assessing common ground via language-based cultural consensus in humans and LLMs. *37th Annual Conference on Human Sentence Processing.*
2. Richard, B.^{S}, Barbosa, C., & **Shafto, P.** (2023). The time course of adaptation in modified reality: Isotropic environments and orientation anisotropies. *Annual meeting of the Vision Sciences Society (VSS).*
3. Barak, L.^{P}, Fernandez, N., Feldman, N., & **Shafto, P.** (2023). Modeling substitution errors in spanish morphology learning. Paper presented at the *Society for Computational Linguistics (SCiL 2023).*
4. Bascandziev, I., **Shafto, P.**, & Bonawitz, E., (2022). Can children recognize pedagogical intent in the prosody of speech? Poster presented at the *44th Annual Conference of the Cognitive Science Society.* Toronto, Canada.
5. Harmon, Z., Barak, L.^{P}, **Shafto, P.**, Edwards, J., & Feldman, N. (2022). Can novelty detection explain grammatical deficits in children with Developmental Language Disorder? *Statistical Learning 2022.*
6. Richard, B.^{S} & **Shafto, P.** (2022). Adaptation to the slope of the amplitude spectrum in modified reality. *Annual meeting of the Vision Sciences Society (VSS).*
7. Kominsky, J., **Shafto, P.**, & Bonawitz, E.B. (2022). Do children make pedagogical interpretations of counterfactual questions? Paper presented at the 22nd annual *Budapest CEU Conference on Cognitive Development (BUCCD22).*
8. Barak, L.^{P}, Harmon, Z., **Shafto, P.**, Feldman, N. & Edwards, J. (2021). The competition–compensation account of morphological deficits in children with developmental language disorder. Poster presented at the 62nd annual meeting of the *Psychonomic Society.*
9. Barak, L.^{P}, Harmon, Z, **Shafto, P.**, Feldman, N. & Edwards, J. (2021). A computational analysis of language delay and intervention. Paper presented at the 46th annual *Boston University Conference on Language Development.*
10. Bass, I., **Shafto, P.**, & Bonawitz, E. (2021). How expectations about teaching style may shape inferences and exploration. Poster presented at the annual meeting of the *Society for Philosophy and Psychology (SPP).*
11. Nguyen, K., Misra, D., Schapire, R., Dudík, M., & **Shafto, P.** (2021). Towards Teaching Machines with Language: Interactive Learning From Only Language Descriptions of Activities. *NAACL Workshop on Visually Grounded Interaction and Language (ViGIL).*
12. Nguyen, K., Misra, D., Schapire, R., Dudík, M., & **Shafto, P.** (2021). Towards Teaching Machines with Language: Interactive Learning From Only Language Descriptions of Activities. *ICLR 2021 Workshop on Embodied Multimodal Learning (EML).*
13. Bascandziev, I.^{P}, **Shafto, P.**, & Bonawitz, E.B. (2021). The sound of pedagogical questions. Poster presented at the *43rd annual conference of the Cognitive Science Society.*
14. Harmon, Z., Barak, L.^{P}, **Shafto, P.**, Edwards, J., & Feldman, N. (2021). Making Heads or Tails of it: A competition–compensation account of morphological deficits in language impairment. Poster presented at the *43rd annual conference of the Cognitive Science Society.*
15. Folke, T.^{P}, Yang, S., C-H.^{S}, Li, Z.^{R}, Sojitra, R.B.^{R}, & **Shafto, P.** (2021). Explainable AI for Natural Adversarial Images. Poster presented at the *ICLR-21 Workshop on Responsible AI.*
16. Harmon, Z., Barak, L.^{P}, Feldman, N., Edwards, J., & **Shafto, P.** (2021). The role of novelty in accounting for morphological deficits of children with Developmental Language Disorder: A

computational modeling study. Poster presented at the *41st annual, virtual Symposium on Research in Child Language Disorders.*

17. Folke, T.^{P}, Yang, S., C-H.^{S}, Li, Z.^{R}, Sojitra, R.B.^{R}, & **Shafto, P.** (2021). Explainable AI for Natural Adversarial Images. Poster presented at the *ICLR-21 Workshop on Responsible AI.*
18. Harmon, Z., Barak, L.^{P}, Feldman, N., Edwards, J., & **Shafto, P.** (2021). The role of novelty in accounting for morphological deficits of children with Developmental Language Disorder: A computational modeling study. Poster presented at the *41st annual, virtual Symposium on Research in Child Language Disorders.*
19. Kominsky, J.^{P}, **Shafto, P.**, & Bonawitz, E. (2021). Children's intuitions about the insides of animate agents. Poster presented at the biennial meeting of the *Society for Research in Child Development (SRCD).*
20. Folke, T.^{P}, Anderson, S.^{R}, Yang, S.,C-H.^{S}, & **Shafto, P.** (2021). XAI: Using examples to explain pneumothorax classification from xrays. *The International Society for Optics and Photonics (SPIE).*
21. Bascandziev, I.^{P}, Bridgers, S., **Shafto, P.**, & Bonawitz, E. (2021). The sound of pedagogy: acoustic features of pedagogical and information-seeking questions. Paper presented at the 11th Annual BCCCD Conference. Vienna, Austria.
22. Barak, L.^{P}, Harmon, Z., Feldman, N., Edwards, J. & **Shafto, P.** (2020). Bare Form Production for Past-tense: A Computational Analysis of 3 Accounts. Paper presented at the 45th annual *Boston University Conference on Language Development.*
23. Bascandziev, I.^{P}, **Shafto, P.**, & Bonawitz. E. (2020). Prosodic features carry information about a question's intent. Poster presented at the *42nd Annual Conference of the Cognitive Science Society.* Toronto, Canada.
24. Barak, L.^{P}, Yang, S, C-H.^{P}, & **Shafto, P.** (2020). Replicating L2 learning in a computational model. Poster presented at the *42nd Annual Conference of the Cognitive Science Society.* Toronto, Canada.
25. Bass, I., **Shafto, P.** & Bonawitz, E. (2020). How expectations about teaching styles may shape inferences and exploration. Poster presented at the annual meeting of the *Society for Philosophy and Psychology (SPP).*
26. Jean, A., Daubert, E., Yu, Y., **Shafto, P.**, & Bonawitz, E.B. (2020). Children's spontaneous question-asking and help-seeking behaviors following pedagogical questions or direct instruction. Poster presented at the annual meeting of the *Society for Philosophy and Psychology (SPP).*
27. Bass, I., **Shafto, P.**, & Bonawitz, E. (2019). Expectations about teaching styles shape inferences and exploration. Poster presented at the *11th Biennial Meeting of the Cognitive Development Society*, Louisville, KY.
28. **Shafto, P.** (2019). XAI via Bayesian Teaching. Paper presented in symposium "What makes a good explanation? Cognitive dimensions of explaining intelligent machines" at the *41st annual conference of the Cognitive Science Society.*
29. Jean, A., Daubert, E., Yu, Y., **Shafto, P.**, & Bonawitz, E.B. (2019). Pedagogical questions empower exploration. Paper presented at the *41st annual conference of the Cognitive Science Society.*
30. Richard, B.^{P} & **Shafto, P.** (2019). Adaptation to the Amplitude Spectrum Slope of Natural Scenes in Modified Reality. *Annual meeting of the Vision Sciences Society (VSS).*
31. Choi, K., Lapidow, E., Austin, J., **Shafto, P.**, Bonawitz, E.B. (2019). Choosing Whom and What to Ask: Preschoolers' Naturalistic Question As king in a Preschool Setting. *Biennial meeting of the Society for Research in Child Development (SRCD).*
32. Jean, I, **Shafto, P.**, & Bonawitz, E.B. (2018). Pedagogical questions empower exploration. *2018 Annual Biomedical Research Conference for Minority Students (ABRCMS).*

33. Bass, I, **Shafto, P.** & Bonawitz, E.B. (2018) Expectations about teaching styles shape explore-exploit tradeoffs during learning. Poster presented at pre-conference workshop on *Understanding exploration-exploitation trade offs* at the annual meeting of the Cognitive Science Society.

34. Richard, B.^{P}, Sojitra, R.^{R}, Hansen, B.C., & **Shafto, P.** (2018). Characterizing Non-Linear Processes in Cross-Orientation Suppression (XOS) with Steady-State Visual Evoked Potentials (SSVEPs). *Annual meeting of the Vision Sciences Society (VSS).*

35. Vong, W-K.^{P}*, Sojitra, R.B.^{R}*, Reyes, A.^{U}, Yang, S.C-H.^{P}, & **Shafto, P.** (2018). Bayesian teaching of image categories. Poster presented at the *40th annual conference of the Cognitive Science Society.*

36. Choi, K., Lapidow, E., Austin, J., **Shafto, P.**, & Bonawitz, E.B. (2018). Preschoolers are more likely to direct questions to adults than to other children (or selves) during spontaneous conversational acts. Paper presented at the *40th annual conference of the Cognitive Science Society.*

37. Bass, I., **Shafto, P.**, & Bonawitz, E.B. (2018). That'll teach 'em: How expectations about teaching styles may constrain inferences. Poster presented at the *40th annual conference of the Cognitive Science Society.*

38. Perfors, A., Navarro, D.J., & **Shafto, P.** (2018). Stronger evidence isn't always better: A role for social inference in evidence selection and interpretation. Paper presented at the *40th annual conference of the Cognitive Science Society.*

39. Yu, Y., Landrum, A., Bonawitz, E.B., & **Shafto, P.** (2017) Questioning supports effective transmission of knowledge and increased exploratory learning in prekindergarten children. *Annual meeting of the Cognitive Development Society.*

40. Yu, Y., Bonawitz, E.B. & **Shafto, P.** (2017) Pedagogical questions in parent-child conversations. *Annual Meeting of the Cognitive Development Society.*

41. Yu, Y., Bonawitz, E.B. & **Shafto, P.** (2017) Pedagogical questions during parent-child interactions correlate with children's causal learning and exploration. *Annual meeting of the Cognitive Development Society.*

42. Richard, B.^{P}, Whritner, J.A.^{R} & **Shafto, P.** (2017) Local masking in natural videos. The *First Annual Conference on Cognitive Computational Neuroscience (CCN).*

43. Sojitra, R.^{R}, Vong, W.K.^{P}, & **Shafto, P.** (2017) The dynamics of human visual experiences. The *First Annual Conference on Cognitive Computational Neuroscience (CCN).*

44. Bass, I., Bonawitz, L.B., **Shafto, P.**, Ramarajan, D., Gopnik, A. & Wellman, H. (2017). I know what you need to know: Children's developing theory of mind and pedagogical evidence selection. Paper presented at the *39th annual conference of the Cognitive Science Society.*

45. Baker, L.^{P}, LoBue, V., Bonawitz, E.B. & **Shafto, P.** (2017). Towards automated classification of emotional facial expressions. Poster presented at the *39th annual conference of the Cognitive Science Society.*

46. Yang, S.C-H.^{P} & **Shafto, P.** (2017). Teaching versus active learning: A computational analysis of conditions that affect learning. Poster presented at the *39th annual conference of the Cognitive Science Society.*

47. Yang, S.C-H.^{P}, Whritner, J.A.^{R}, Nasraoui, O. & **Shafto, P.** (2017). Unifying recommendation and active learning for human-algorithm interactions. Paper presented at the *39th annual conference of the Cognitive Science Society.*

48. Yu, Y.^{P}, Bonawitz, E.B. & **Shafto, P.** (2017). Inconvenient samples: Modeling the effects of non-consent by coupling observational and experimental results. Paper presented at the *39th annual conference of the Cognitive Science Society.*

49. Bonawitz, E., Bass, I., Ramarajan, D., **Shafto, P.**, Gopnik, A. & Wellman, H. (2017). I know what you need to know: Children's developing theory of mind and pedagogical evidence selection. Poster presented at the *Society for Philosophy and Psychology (SPP).*

50. Colantonio, J.^{U}, Durkin, K.^{P}, Bonawitz, E.B. & **Shafto, P.** (2017). Why are these my options? Roles of social inferences in choice behavior. Poster presented at the *Society for Philosophy and Psychology (SPP).*

51. Yu, Y.^{P}, Bonawitz, E.B. & **Shafto, P.** (2017). Questioning supports effective transmission of knowledge and increased exploratory learning in pre-kindergarten children. Paper presented at the *Society for Philosophy and Psychology (SPP).*

52. Schweinhart, A.^{P}, Essock, E., Baker L.J., Jonnalagedda, D. & **Shafto, P.** (2017). The time course of adaptation to changes in environmental orientation statistics. *Annual meeting of the Vision Sciences Society (VSS).*

53. Schweinhart, A.^{P}, Eaves, B.S.^{P}, & **Shafto, P.** (2016). Automating the recoding, analysis, and interpretation pipeline using naturalistic visual scenes. *IJCAI 2016 workshop on Closing the Cognitive Loop: Third Workshop on Knowledge, Data, and Systems for Cognitive Computing.*

54. Eaves, B.S.^{P} & **Shafto, P.** (2016). Toward a general, scalable framework for Bayesian teaching with applications to topic models. *IJCAI 2016 workshop on Interactive Machine Learning: Connecting Humans and Machines.*

55. Danovitch, J.H., Noles, N.S., & **Shafto, P.** (2016). The development of trust in internet search engines. *2016 SRCD Special Topic Meeting: Technology and Media in Children's Development.*

56. Searcy, N. & **Shafto, P.** (2016). Cooperative inference: Features, objects, and collections. *2016 meeting of the Society for Philosophy and Psychology (SPP).*

57. Searcy, N., Lane, J., Rodriguez, F. & **Shafto, P.** (2016). Cause and Affect. Annual meeting of the *Mathematical Psychology Society.*

58. Yu, Y., Bonawitz, E.B. & Shafto, P. (2016). Questions in informal teaching: A study of mother-child conversations. Poster presented at the *38th annual conference of the Cognitive Science Society.*

59. **Shafto, P.**, Bonawitz, E.B., Landrum, A. & Yue, Y. (2016). Questioning supports effective transmission of knowledge and increased exploratory learning in pre-kindergarden children. *International Conference on Thinking 2016.*

60. Schweinhart, A.M., Eaves, B.S. & **Shafto, P.** (2016). Exploring scene categorization based on the orientation distribution of natural images. Poster presented at the *Vision Sciences Society.*

61. **Shafto, P.** (2016). Computational models of teaching, learning, and epistemic trust. Paper presented at the annual meeting of the *Eastern Psychological Society.*

62. **Shafto, P.** & Searcy, N. (2015). Cooperative inference: Features, objects, and collections. Paper presented at the annual International Conference on *Biologically Inspired Cognitive Architectures (BICA).* *Plenary

63. Eaves, B.S., Feldman, N., Griffiths, T.L. & **Shafto, P.** (2015). Infant-directed speech is consistent with teaching. Paper presented at the *40th annual Boston University Conference on Language Development (BUCLD).*

64. Messmer, J., Noles, N., Danovitch, J. & **Shafto, P.** (2015) What can the Internet tell you about Pangolins?: Children's Questions for Internet and Human Sources. Poster presented at the biennial meeting of the *Cognitive Development Society.*

65. Landrum, A.R., Bamforth, A. & **Shafto, P.** (2015). Ways of knowing: Investigating the epistemic aspect of selective trust. Poster presented at the biennial meeting of the *Cognitive Development Society.*

66. Noles, N., Danovitch, J. & **Shafto, P.** (2015) Developmental changes in learning from the internet. Poster presented at the *Annual meeting of the Association for Psychological Science.*

67. **Shafto, P.** (2015) Teaching, learning and trust: Computational models and behavioral results. Poster presented at *Mechanisms of learning in social contexts, workshop at ICDL.*

68. Durkin, K., Caglar, L.R., Bonawitz, E.B. & **Shafto, P.** (2015). Explaining choice behavior: The intentional selection assumption. Poster presented at the *37th annual conference of the Cognitive Science Society.*

69. Landrum, A.R., Cloudy, J. & **Shafto, P.** (2015). More than true: Developmental changes in use of inductive strength for selective trust. Poster presented at the *37th annual conference of the Cognitive Science Society.*

70. Noles, N.S., Danovitch, J.H. & **Shafto, P.** (2015). Children's learning from technological and human sources. Poster presented at the *37th annual conference of the Cognitive Science Society.*

71. Durkin, K. & **Shafto, P.** (2015). Epistemic trust and education: Informant reliability affects learning of decimal concepts. Paper presented at the *45th annual meeting of the Jean Piaget Society.*

72. Schweinhart, A.M., **Shafto, P.** & Essock, E.A. (2015). Effects of recent exposure to atypical environmental statistics on orientation perception: Analyzing the plasticity of the horizontal effect. Poster presented at the *Vision Sciences Society.*

73. Noles, N., Danovitch, J. & **Shafto, P.** (2015). Is it better to ask a friend or ask Google? Children's trust in people and the internet. Poster presented at the biennial meeting of the *Society for Research in Child Development.*

74. Durkin, K., Landrum, A.R., Savage, P., Eglian, M. & **Shafto, P.** (2015). Avoiding hasty conclusions: Manipulating informant expertise to avoid conceptual entrenchment. Poster presented at the biennial meeting of the *Society for Research in Child Development.*

75. Landrum, A.R., Bonawitz, E.B., Omar, F. & **Shafto, P.** (2015). Teaching through questioning: Examining how pedagogical questions elicit learning. Paper presented at the biennial meeting of the *Society for Research in Child Development.*

76. Durkin, K. & **Shafto, P.** (2015). Epistemic trust and education: Effects of informant reliability on student learning of decimal concepts. Poster presented at the annual meeting of the *American Educational Research Association.*

77. Mansinghka, V.K., **Shafto, P.**, Baxter, J. & Eaves, B.S. (2014) BQL and BayesDB: a probabilistic DSL and runtime system for data analysis and predictive analytics. Poster presented at the *NIPS Probabilistic Programming Workshop.*

78. Gweon, H., **Shafto, P.** & Schulz, L.E. (2014). Children consider prior knowledge and the cost of information both in learning from and teaching others. Paper presented at the *36th annual conference of the Cognitive Science Society.*

79. Eaves, B.^{G} & **Shafto, P.** (2014). Order effects in learning relational structures. Paper presented at the *36th annual conference of the Cognitive Science Society.*

80. Searcy, N.^{G} & **Shafto, P.** (2014). Learning biases for teaching boolean concepts. Paper presented at the *36th annual conference of the Cognitive Science Society.*

81. Rhodes, M., Bonawitz, E.B., **Shafto, P.** & Chen, A. (2014). Controlling the message: Preschoolers' use of evidence to teach and deceive others. Paper presented at the *36th annual conference of the Cognitive Science Society.*

82. Gweon, H., **Shafto, P.**, Chu, V. & Schulz, L.E. (2014). To give a fish or to teach how to fish? Children weigh costs and benefits to decide what and how much information to transmit. Poster presented at the *40th annual meeting of the Society for Philosophy and Psychology (SPP).*

83. **Shafto, P.** (2014). Direct instruction: More than meets the eye. Paper presented at the annual meeting of the *American Educational Research Association.*

84. Eaves, B., Feldman, N., Griffiths, T.L. & **Shafto, P.** (2013). Infant directed speech as statistically optimal input. Paper presented at the biennial meeting of the *Cognitive Development Society.*

85. **Shafto, P.**, Gonzalez, A., Bonawitz, E.B. & Gopnik, A. (2013). Is that your final answer? The effects of neutral queries on children's choices. Paper presented at the biennial meeting of the *Society for Research in Child Development.*

86. **Shafto, P.**, Gweon, H., Fargen, C. & Schulz, L. (2012). Enough is enough: Inductive sufficiency guides learners' ratings of informant helpfulness. Paper presented at the *34th annual conference of the Cognitive Science Society.*

87. Gonzalez, A., **Shafto, P.**, Bonawitz, E.B. & Gopnik, A. (2012). Is that your final answer? The effects of neutral queries on children's choices. Poster presented at the *34th annual conference of the Cognitive Science Society.*

88. Gweon, H., **Shafto, P.**, Tenenbaum, J.B. & Schulz, L.E. (2012). Children's sensitivity to informant's inductive efficiency and learner's epistemic states in pedagogical contexts. Poster presented at the *34th annual conference of the Cognitive Science Society.*

89. **Shafto, P.** & Eaves, B. (2012). Epistemic trust: Modeling children's reasoning about others' knowledge and intent. Paper presented at the *42nd annual meeting of the Jean Piaget Society.*

90. Rafferty, A., Brunskill, E., **Shafto, P.** & Griffiths, T.L. (2011). Faster teaching by POMDP planning. Poster presented at the *44th annual meeting of the Society for Mathematical Psychology.*

91. Warner, R., Stoess, T. & **Shafto, P.** (2011). Reasoning about teaching and misleading situations. Paper presented at the *33rd annual conference of the Cognitive Science Society.*

92. Montague, R., Navarro, D.J., Perfors, A., Warner, R. & **Shafto, P.** (2011). To catch a liar: The effects of truthful and deceptive testimony on inferential learning. Paper presented at the *33rd annual conference of the Cognitive Science Society.*

93. Smith, N.A. & **Shafto, P.** (2011). The role of cross-cutting systems of categories in category-based induction. Paper presented at the *33rd annual conference of the Cognitive Science Society.*

94. Li, D. & **Shafto, P.** (2011). Bayesian hierarchical cross-clustering. Poster presented at the *14th international conference on Artificial Intelligence and Statistics (AISTATS).*

95. **Shafto, P.**, Bonawitz, E.B., Gweon, H., Goodman, N.D. & Schulz, L. (2011). Vicarious pedagogical learning: When overheard instruction affects exploration and discovery. Paper presented at the biennial meeting of the *Society for Research in Child Development.*

96. Eaves, B. & **Shafto, P.** (2011). Modeling epistemic trust and implications for learning. Poster presented at the biennial meeting of the *Society for Research in Child Development.*

97. Buchbaum, D., Griffiths, T.L., Gopnik, A. & **Shafto, P.** (2011). Children's imitation of causal action sequences is influenced by statistical and pedagogical evidence. Paper presented at the biennial meeting of the *Society for Research in Child Development.*

98. Warner, R., Stoess, T. & **Shafto, P.** (2010). Reasoning in pedagogical versus deceptive situations. Poster presented at the *32nd annual conference of the Cognitive Science Society.*

99. **Shafto, P.**, Goodman, N.D., Gerstle, B. & Ladusaw, F. (2010). Prior expectations in pedagogical situations. Poster presented at the *32nd annual conference of the Cognitive Science Society.*

100. Li, D., Rouchka, E. & **Shafto, P.** (2010). Phylogenomic analysis using Bayesian congruence measuring. Paper presented at the *2nd International Conference on Bioinformatics and Computation (BICoB).*

101. **Shafto, P.**, Bonawitz, E.B., Gweon, H. & Schulz, L. (2010). Modeling the effects of pedagogy on preschoolers' exploratory play and discovery. Poster presented at the opening conference of the *Cognitive Development Center at Central European University.*

102. Mansinghka, V., Jonas, E., Petschulat, C., Cronin, B., **Shafto, P.** & Tenenbaum, J.B. (2009). Cross-categorization: A method for discovering multiple overlapping clusterings. Paper presented at the *NIPS* workshop on nonparameteric Bayes.

103. Buchbaum, D., Griffiths, T.L., Gopnik, A. & **Shafto, P.** (2009). The influence of statistical and pedagogical cues on children's imitation of causal action sequences. Poster presented at the annual meeting of the *Cognitive Development Society.*

104. **Shafto, P.** (2009). Causal reasoning in pedagogical settings. Poster presented at the *50th Annual Meeting of the Psychonomics Society.*

105. Bonawitz, E.B., **Shafto, P.**, Gweon, H., Chang, I, Katz, S. & Schulz, L. (2009). The double-edged sword: Modeling the effect of pedagogy on preschoolers' exploratory play. Poster presented at the *31st annual conference of the Cognitive Science Society.*

106. Warner, R., **Shafto, P.**, Baker, C.L. & Tenenbaum, J.B. (2009). Abstract knowledge guides prediction and search in novel settings. Poster presented at the *31st annual conference of the Cognitive Science Society.*

107. **Shafto, P.** & Goodman, N.D. (2009). Intuitive pedagogical reasoning: Computational model and experimental investigations. Paper presented at the biennial meeting of the *Society for Research in Child Development.*

108. **Shafto, P.** & Goodman, N.D. (2008). Bayesian pedagogical reasoning. Poster presented at *NIPS* workshop on human and machine intelligence.

109. **Shafto, P.** & Goodman, N.D. (2008). A Bayesian model of pedagogical reasoning. Paper presented at the *AAAI Fall symposium.*

110. **Shafto, P.** & Goodman, N.D. (2008). Inductive learning based on communicative intent. Paper presented at the *6th International Conference on Thinking.*

111. Feeney, A., Crisp, A. & **Shafto, P.** (2008). Dual processes and category-based conjunction fallacies. Paper presented at the *6th International Conference on Thinking.*

112. **Shafto, P.** & Goodman, N.D. (2008). Teaching games: Statistical sampling assumptions for learning in pedagogical situations. Poster presented at the *30th annual conference of the Cognitive Science Society.*

113. **Shafto, P.** & Goodman, N.D. (2008). Intuitive pedagogy and causal learning. Paper presented at the annual meeting of the *Eastern Psychological Association.*

114. Kemp, C., **Shafto, P.**, Berke, A. & Tenenbaum, J.B. (2006). Combining causal and similarity-based reasoning. Paper presented at *NIPS.*

115. Coley, J.D., **Shafto, P.** & Baldwin, D. (2006). Availability and context-sensitive inductive reasoning. Poster presented at the *47th Annual Meeting of the Psychonomics Society.*

116. **Shafto, P.**, Kemp, C., Mansingka, V. & Tenenbaum, J.B. (2006). Learning cross-cutting systems of categories. Poster presented at the *47th Annual Meeting of the Psychonomics Society.*

117. Kemp, C., **Shafto, P.** & Tenenbaum, J.B. (2006). Combining causal and similarity-based reasoning. Poster presented at the *47th Annual Meeting of the Psychonomics Society.*

118. Kemp, C., **Shafto, P.** & Tenenbaum, J.B. (2006). Combining causal and similarity-based reasoning. Paper presented at the *Annual Meeting of the Society for Mathematical Psychology.*

119. **Shafto, P.**, Kemp, C., Mansinghka, V., Gordon, M. & Tenenbaum, J.B. (2006). Learning cross-cutting systems of categories. Poster presented at the *28th Annual Conference of the Cognitive Science Society.*

120. **Shafto, P.**, Coley, J.D. & Baldwin, D. (2005). Availability in category-based reasoning. Poster presented at the *46th Annual Meeting of the Psychonomic Society.*

121. **Shafto, P.**, Kemp, C., Baraff, E., Coley, J.D. & Tenenbaum, J.B. (2005). Context-sensitive induction. Paper presented at the *27th Annual Conference of the Cognitive Science Society.*

122. **Shafto, P.**, Kemp, C., Baraff, E., Coley, J.D. & Tenenbaum, J.B. (2004). Inductive generalizations of novel diseases: Causal generalizations over food web relations. Paper presented at the *5th International Conference on Thinking.*

123. **Shafto, P.** & Coley, J.D. (2001). From the depths of the sea to you and me: Expertise and adult conceptual development. Poster presented at the biennial meeting of the *Society for Research in Child Development.*

Invited Presentations

Cognitive Science Colloquium Series, University of Maryland, College Park, MD, September, 2024.

National Security Agency (NSA), Washington DC, April, 2024.

Keynote, Machine Teaching for Humans, Valencia, Spain, January, 2024.

Basis Research Institute, New York Academy of Sciences, January, 2024.

Colloquium, I2O Office, Defense Advanced Research Projects Agency (DARPA), Arlington, VA, July, 2023.

Colloquium, Center for Studies in Physics and Biology, Rockefeller University, NYC, NY, May, 2023.

Probability seminar, Math department, MIT, Cambridge, MA, March, 2023.

Keynote, Symposium on Inverse Optimal Transport, SIAM Conference on Computational Science and Engineering, Amsterdam, Netherlands, February, 2023.

Keynote, Machine Teaching for Humans: Rethinking Example-Based Explanations, Funschal, Madiera, January, 2023.

Colloquium, Yale University, Institute for Network Science (YINS), New Haven, CT, November, 2022.

Information Geometry: What and Why, Mathematical Conversations, Institute for Advanced Study, Princeton, November, 2022.

Colloquium, DeepMind, London, UK, October, 2022.

Colloquium, Harvard University, Cognition, Brain & Behavior, Cambridge, MA, September, 2022.

Colloquium, Rutgers University–New Brunswick, Cognitive Science (RUCCS), New Brunswick, NJ, March, 2022.

Colloquium, Stevens Institute of Technology, Department of Computer Science, Hoboken, NJ, February, 2022.

Mathematics of Intelligence, Institute for Pure and Applied Mathematics (IPAM), UCLA, Los Angeles, CA, February, 2022.

Seminar on Science, Technology, Mathematics, and Society, Institute for Advanced Study (IAS), Princeton, NJ, December, 2021.

Members Colloquium, Institute for Advanced Study (IAS), Princeton, NJ, November, 2021.

Keynote, Cognitive Science Undergraduate Interdisciplinary Research Conference, Rutgers–New Brunswick, April, 2021.

Tech Talk, Google X, January, 2021.

DIMACS workshop on co-development of Computing and the Law, Rutgers University, November, 2020.

Seminar, University of Wisconsin–Madison, HAMLET (human, animal, machine, learning: experimental and theory!), November, 2020.

Colloquium, Stanford Research International (SRI), August, 2020.

Colloquium, Central European University, April, 2020.

Colloquium, Microsoft Research, April, 2020.

Invited speaker, Geekweek AI event, Rutgers University, February 2020.

Colloquium, TRIPODS DATA-INSPIRE Institute at Rutgers University–New Brunswick, February, 2020.

Keynote, eLUCID8, Madison, WI, Aug 6-7, 2019.

Future directions in Human-Machine Teaming, A Workshop on the Intersection of AI and Human Cognitive Sciences by Office of the Under Secretary of Defense for Research and Engineering, OUSD(R&E), Basic Research Office, July 2019.

Colloquium, Rutgers University–New Brunswick Computer Science department, April 2019.

Computer Science Colloquium, CUNY Graduate Center, February 2019.

Keynote, International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2018), August, 2018.

Invited speaker, Cognition meets Vision Workshop, IEEE CVPR, June 2018.

Colloquium, Cognitive Science & Psychology, University of California, Berkeley, February 2018

Invited speaker, Virtual Reality showcase sponsored by CWD-G, Rutgers University, February 2018.

Invited speaker, Global Convergence on the Science of Learning, National Science Foundation, February 2018.

IAS Nighttime Topology Seminar, Institute for the Advanced Study, November 2017.

Lunch with President of Rutgers Barchi and Cabinet, November, 2017.

Santa Fe Institute's Annual Complexity Network and Board of Trustees Symposium, November, 2017.

Science of Learning Conference with Philadelphia Playscape opening, June 2017.

Industrial Advisory Board, Center for Hybrid Multicore Productivity Research, June 2017.

SRI International: Princeton, May 2017.

Norman lab, Princeton University, May 2017.

Genetic Programming Theory & Practice XV (Keynote), May 2017.

Rutgers-New Jersey Medical School, December 2016.

ConCats meeting, New York University, October 2016.

Psychology Department, Princeton University, September 2016.

IAS Nighttime Topology Seminar, Institute for the Advanced Study, April 2016.

Distinguished Seminar, Computer & Information Sciences department, Florida International University, January, 2016.

Earth and Environmental Sciences department, Rutgers-Newark, October, 2015.

Advanced Analytic Lectures Series, Prudential Financial Services, October, 2015.

Cognitive Brown bag, University of Pittsburgh, October, 2015.

London Neuroscience Conference, University College London, April, 2015.

Schwartz/Weiman/McCandliss group meeting, Stanford University, February, 2015.

Center for the Study of Language and Information, Stanford University, February, 2015.

Cognitive Science Program, Tufts University, February, 2015.

Learning Sciences, Worcester Polytechnic Institute, January, 2015.

I-DSLA, Rutgers University–Newark, January, 2015.

Psychology Department, Rutgers University–Newark, November, 2014.

Psychology Department, Rutgers University–New Brunswick, November, 2014.

ConCats Group Meeting, NYU, November, 2014.

Spelke Lab, Harvard University, September, 2014.

Draper Laboratory, Distinguished Speaker Series, September, 2014.

Philosophy Department, University of Louisville, September, 2014.

Educational Psychology Department, University of Illinois, Urbana-Champaign, December, 2013.

Cognitive Development Society Pre-conference Workshop, Computational Models of Cognitive Development, October, 2013.

Psychology Department, University of New South Wales, July, 2013.

Teachers College, Columbia University, February, 2013.

Computer Science Department, University of Louisville, October, 2012.

Computer Science Department, University of Louisville, October, 2011.

McDonnell Workshop, Stanford University, December, 2010.

Computer Science Department, University of Louisville, October, 2010.

McDonnell Workshop, Center for Human Growth and Development, University of Michigan, May, 2010.

Cognitive Development Center, Department of Philosophy, Central European University, March, 2010.

Probabilistic Models of Cognitive Development Workshop, Banff International Research Station, May, 2009.

Leuven Workshop on Learning Semantic Knowledge, Leuven, Belgium, June, 2008.

Grand Rounds, Department of Psychiatry, University of Louisville, May, 2008.

Computer Science Department, University of Louisville, April, 2008.

Spanning the Socio-Cognitive Modeling Gap: From Development to Social Simulation, ONR Workshop, February, 2008.

Statistics Research Group, University of Louisville, November, 2007.

CGeMM Computational Biology Meeting, University of Louisville, September, 2007.

Cognitive Science Department, Indiana University, Bloomington, September, 2007.

Cognitive Science Department, University of California, Irvine, January, 2007.

Department of Psychological and Brain Sciences, University of Louisville, January, 2007.

Psychology Department, University of Hawaii, January, 2007.

Language & Cognition Group, Northeastern University, January, 2007.

Categorization & Causality Workshop, Brown University, September, 2006.

Psychology Department, University College London, March, 2006.

Language & Cognition group, Northeastern University, February, 2006.

Psychology Department, University of Durham, January, 2006.

Culture & Cognition group, Northwestern University, March, 2004.

Sloman Lab, Brown University, February, 2004.

Conferences, Symposia & Workshops

Co-organizer of "Mathematics of Intelligence", long workshop at the Institute of Pure and Applied Mathematics (IPAM), Fall 2024.

Organizer of "Algorithms, Justice, and Opportunity", conference held at Rutgers University–Newark, Sept 2019.

Co-organizer of "What makes a good explanation? Cognitive dimensions of explaining intelligent machines", symposium at the *41st annual meeting of the Cognitive Science Society*, 2019.

Co-organizer of "Guided playful learning", Workshop at the *41st annual meeting of the Cognitive Science Society*, 2019.

Organizer of "Guiding guided play: Developmental, educational, and computational perspectives", Rutgers University–Newark, 2018.

Co-organizer of "Guided Play–What, Why and How", Symposium at the *2017 APA Convention*, 2017.

Organizer of "Pickin' and grinnin': Children's ability to choose evidence for themselves and others", Symposium at the biennial meeting of the *Society for Research in Child Development*, 2011.

Co-organizer of "Intuitive Pedagogical Reasoning: An Interdisciplinary Workshop", Workshop at *31st annual meeting of the Cognitive Science Society*, 2009.

Organizer of "Inductive Reasoning: Categories and Properties", Symposium at *6th International Conference on Thinking*, 2008.

Press (selected)

03/30/18 – Learning With Mobile Maker Center, Rutgers A&S newsletter.

03/20/18 – Rutgers Virtual Reality Showcase Speakers Discuss Impact of VR on Cognition and Medicine, New Jersey Tech Weekly.

11/09/16 – Research Shows Infants May Benefit From Baby Talk, NJTV.

07/05/16 – Between the ears: Study tests the value of baby talk, Seattle Times.

02/16/15 – What children think of the internet and why it matters, New York Times.

12/20/13 – 5 Q's for the Creators of BayesDB, a Database Built for Data Science, Center for Data Innovation, 5 Q's with a Data Innovator.

06/17/13 – "What's the most 'natural' way to learn? It might surprise you", The Washington Post.

07/07/11 – "The educational value of creative disobedience", Scientific American.

06/30/11 – "Direct instruction can thwart independent exploration" Science Daily.

05/26/11 – "Now you know: When should you teach children, and when should you let them explore?", The Economist.

03/16/11 – "Why preschool shouldn't be like school", Slate Magazine.

01/18/11 – "When teaching constrains discovery", Discover Magazine.

Blogging

02/22/16 – Why big tech companies are open-sourcing their AI systems, The Conversation.

Reviewing

Journals: *Founding editor:* Foundations and Trends in Cognitive Science, 2024–present. *Associate editor:* Open Mind, 2022–present. *Ad-hoc reviewer* for Applied AI Letters, Artificial Intelligence; Behavioral and Brain Sciences; Child Development; Cognition; Cognitive Psychology; Cognitive Development; Cognitive Science; Collective Intelligence; Contemporary Perspectives in Early Childhood Education; Current Biology; Developmental Psychology; Developmental Science; Frontiers in Human Neuroscience; Frontiers in Psychology: Quantitative Psychology and Measurement; IEEE Transactions on Autonomous Mental Development; IEEE Transactions on Pattern Analysis and Machine Intelligence; Journal of Experimental Child Psychology; Journal of Experimental Psychology: General; Journal of Experimental Psychology: Learning, Memory & Cognition; Journal of Memory and Language; Learning & Instruction; Memory & Cognition; Mind & Language; Nature; Nature Human Behavior; Perspectives on Psychological Science; Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences; PLoS Computational Biology; Psychological Science; Psychological Review; Psychonomic Bulletin & Review; Transactions of Machine Learning Research (TMLR); Trends in Cognitive Sciences (TiCS); Quarterly Journal of Experimental Psychology; WIREs: Cognitive Science. *Special issue editor:* for Entropy "Probabilistic models in machine and human learning", 2022. *Consulting editor* for Child Development, 2015-2016.

Grants: *Panel member* for National Defense Science and Engineering Graduate (NDSEG) Fellowship, National Science Foundation (NSF) Expeditions in Computing, Science and Technology Centers, Big Data in Education, Education Core Research (ECR), Fostering Interdisciplinary Research on Education (FIRE), Research and Evaluation on Education in Science and Engineering (REESE), Science of Learning and Augmented Intelligence, and Graduate Research Fellowship Program (GRFP). *Ad-hoc reviewer* for the NSF Faculty Early Career Development (CAREER); Perception, Action, and Cognition; Methodology, Measurement, and Statistics (MMS); Research and Evaluation on Education in Science and Engineering

(REESE); Developmental Science; and the Decision, Risk and Management Science programs; U.S.-Israel Binational Science Foundation.

Conferences: International Conference on Learning Representations (ICLR); International Conference on Machine Learning (ICML); Artificial Intelligence and Statistics (AIStats); Proceedings of the Cognitive Science Society (CogSci); Advances in Neural Information Processing Systems (NeurIPS); Reinforcement Learning Conference (RLC); Society for Research in Child Development (SRCD), Society for Philosophy and Psychology (SPP). *Area Chair:*

Program Committees: Advances in Neural Information Processing Systems (NeurIPS; area chair 2024–present); International Conference on Artificial Intelligence and Statistics (AIStats; area chair 2022–present); IJCAI-PRICAI 2020 Workshop on Explainable Artificial Intelligence (XAI).

Teaching

Graduate: Statistics and Machine Learning (2017-present); Introduction to Data Science (2016-2020); Computational Cognitive Science (2008, 2010-2015); Introduction to Computer Programming for Behavioral Science (2009-2011, 2013); Learning & Reasoning (2008).

Undergraduate: Introduction to Computer Programming for Behavioral Science (2009-2011, 2013-2014); Quantitative Methods (2007-2011); Research Methods (2003); Cognition (2001-2002).

Advising

Research Scientists Bruno Richard (2019-present); Chi-Ken Lu (2019-2022); Scott Cheng-Hsin Yang (2021-2022; Machine Learning Scientist, Redpoll).

Postdocs: Yash Jhaveri (2022-present; PhD in Math); Wei-ting Chiu (2020-2023; PhD in Physics; Quantum researcher at Fidelity); Ben Sheller (2020-2023, PhD in Math; Assistant Professor at Drake University); Tomas Folke (2020-2022, PhD in Cognitive Psychology; UX at Google); Azadeh Tafreshi (2020-2020, PhD in Biomedical Engineering); Igor Bascandziev (2019-2021, PhD in Experimental Psychology; Postdoc at Harvard); Jonathan Kominsky (2019-2020, PhD in Experimental Psychology; Assistant Professor at CEU); Junqi (Jesse) Wang, (2019-2021; PhD in Math; Machine learning researcher); Emily Daubert (2018-2019; PhD in Education; Assistant Professor at University of Hawaii); Libby Barak (2018-2023; PhD in Computer Science; Assistant Professor at Montclair State University); Pushpi J. Paranamana (2018-2020; PhD in Math; Assistant Professor at St. Mary's College); Chi-Ken Lu (2017-2019; PhD in Physics; Research associate at Rutgers); Pei Wang (2017-2022; PhD in Math; Machine learning researcher at Merck); Bruno Richard (2017-2019; PhD in Vision Science); Wai Keen Vong (2016-2019; PhD in Cognitive Science; Postdoc at NYU); Scott Cheng-Hsin Yang (2016-2021; PhD in Biophysics; Research Associate at Rutgers); Yue Yu (2015-2018; PhD in Human Development; Research Scientist Center of Research in Child Development, National Institute of Education, Singapore); Lewis Baker (2016-2017; PhD in Experimental Psychology; Data scientist at PyMetrics); Baxter Eaves (2015-2016; PhD in Experimental Psychology–Computational modeling; Data Scientist with Monsanto); April Schweinhart (2015-2017; PhD in Experimental Psychology–Vision Science; researcher at PIRE); Kelley Durkin (2013-2015; PhD in Educational Psychology; Research Scientist at Peabody Research Institute at Vanderbilt University); Asheley Landrum (2013-2015; PhD in Developmental Psychology; Assistant Professor at Texas Tech).

Graduate Students: Kirill Khvenkin (Mathematics, 2022-present); Alejandro Vientos (Mathematics, 2019-2021); Xiaoran Hao (Mathematics, 2018-present); Arash Givchi (PhD Mathematics, 2016-2021; Senior ML Specialist, Vanguard); Sophie Searcy (Experimental Psychology, MS 2015; ABD); Baxter Eaves (Experimental Psychology, MS, 2013; PhD 2014; Cognitive Data Scientist with Monsanto), Russell Warner (Experimental Psychology, MS, 2010).

Post-bac researchers: ZhouBin Li (2021-2023); Sean Anderson (2021-2023; Stanford Psych PhD program); Ravi Sojitra (2016-2020; Stanford Management Science & Engineering PhD program); Brian Higgins (2019-2020; Rutgers–Newark Environmental Sciences PhD); Terri Beckles (2018-2019; Data Scientist,

AmEx); Chirag Rank (2016-2022; Software developer, RightData); Jake Whritner (2016-2018; UT–Austin Psychology PhD program).

Intellectual Property

12/15/21: International Patent Application PCT/US22/52683. Method for inferring individual capabilities from team performance.

12/04/18: United States Patent No. 11,468,322. METHOD FOR SELECTING EXAMPLES TO EXPLAIN DECISIONS OF ALGORITHMS

Memberships and Societies

Current: Cognitive Science Society, 2004-present; AI Existential Safety Community, Future of Life Institute, 2023-present; Association of the American Academy of Scientists (AAAS), 2023-present; American Mathematical Society, 2023-present; Association for Members of the Institute for Advanced Study (AMIAS), 2022-present; Black in AI, 2019-present.

Past: New York Academy of Sciences, Cognitive Development Society (CDS), Society for Research for Child Development (SRCD), American Education Research Association (AERA).

Last updated: March 28, 2024