

Dr Ryan Burnell

WORK EXPERIENCE

2023 - present	Senior Research Scientist , Google DeepMind, Gemini Team
2023	Senior Research Associate , The Alan Turing Institute
2021 - 2023	Research Associate , Leverhulme Centre for the Future of Intelligence, University of Cambridge
2022 - 2023	Academic Adviser , Masters in AI Ethics and Society, University of Cambridge
2020-2021	Research Associate , Imperial College London

EDUCATION

2021	PhD, Psychology (Cognitive Science) , University of Waikato, New Zealand
2016	BSc with Honours, Psychology (minor in Computer Science) , Victoria University of Wellington, New Zealand

SELECTED PUBLICATIONS

Gemini Team Google: Georgiev, P., Lei, I. V., **Burnell, R.**, et al. (2024). Gemini 1.5: Unlocking multimodal understanding across millions of tokens of context. *ArXiv pre-print*: <https://arxiv.org/abs/2403.05530>

Burnell, R., Schellaert, W., Burden, J., Ullman, T. D., Martinez-Plumed, F., Tenenbaum, J. B., Rutar, D., Cheke, L. G., Sohl-Dickstein, J., Mitchell, M., Kiela, D., Shanahan, M., Voorhees, E. M., Cohn, A. G., Leibo, J. Z., & Hernandez-Orallo, J. (2023). Rethinking the reporting of evaluation results in artificial intelligence. *Science*, 380, 136-138.

Burnell, R., Hao, H., Conway, A. G., & Hernandez-Orallo, J. (2023). Revealing the structure of language model capabilities. *ArXiv pre-print*: <https://arxiv.org/pdf/2306.10062>

Zmigrod, L., **Burnell, R.**, & Hameleers, M. (2023). The Misinformation Receptivity Framework: Political Misinformation and Disinformation as Cognitive Bayesian Inference Problems. *European Psychologist*, 28, 173-188.

Zhou, L., Moreno-Casares, P. A., Martínez-Plumed, F., Burden, J., **Burnell, R.**, Cheke, L., Ferri, C., Marcoci, A., Mehrbakhsh, B., Moros-Daval, Y., Ó hÉigeartaigh, S., Rutar, D., Schellaert, W., Voudouris, K., Hernández-Orallo, J. (2023). Predictable Artificial Intelligence. *ArXiv pre-print*: <https://arxiv.org/abs/2310.06167>

Burnell, R., Burden, J., Rutar, D., Voudouris, K., Cheke, L. G., & Hernandez-Orallo, J. (2022). Not a Number: Identifying instance features for capability-oriented AI evaluation. *Proceedings of the 31st International Joint Conference on Artificial Intelligence*, 2827-2835.

Voudouris, K., Donnelly, N., Rutar, D., **Burnell, R.**, Burden, J., & Cheke, L. G. (2022). Evaluating Object Permanence in Embodied Agents using the Animal-AI Environment. *Evaluation Beyond Metrics Workshop, International Joint Conference on Artificial Intelligence*.

La Malfa, E., Petrov, A., Frieder, S., Weinhuber, C., **Burnell, R.**, Cohn, A. G., Shadbolt, N., Wooldridge, M. (in press). Language-Models-as-a-Service: Overview of a New Paradigm and its Challenges. *JAIR (ArXiv pre-print*: <https://arxiv.org/abs/2309.16573>)

Burnell, R.*, Burden, J.*., Voudouris, K.*., Rutar, D., Cheke, L. G., & Hernandez-Orallo, J. (*Under review*). Inferring AI Capabilities from Task Performance with Bayesian Triangulation.

HONOURS, GRANTS, AND AWARDS

2023	Outstanding Service Award, Society for Applied Research in Memory & Cognition
2023	Microsoft Accelerate Foundation Model Research Grant
2023	TAILOR Connectivity Grant, Trustworthy AI Network, EU Horizon
2022	Postdoctoral Fellow, Pembroke College, University of Cambridge
2022	EnterpriseTECH Program, Cambridge Judge Business School
2017-2020	University of Waikato Doctoral Scholarship
2019	Society for Applied Research in Memory and Cognition Travel Award
2016	University of Waikato Summer Research Scholarship
2015	Victoria Graduate Award, Victoria University of Wellington
2014	Beaglehole Prize for highest grades in Psychology, Victoria University
2014	Victoria University Summer Research Scholarship
2013-2015	Victoria Excellence Scholarship, Victoria University of Wellington

LEADERSHIP ROLES

2023	Co-organiser, Evaluating Frontier Models , The Alan Turing Institute
2023	Co-organiser, Predictable AI Workshop , Valencia
2022	Co-organiser, Evaluation Beyond Metrics Workshop , IJCAI
2022-2023	Diversity and Inclusivity Committee Chair , Society for Applied Research in Memory and Cognition
2019-2023	Board member & Student Caucus President , Society for Applied Research in Memory and Cognition
2022-2023	Equality, Diversity, Wellbeing, and Inclusivity Committee , Leverhulme Centre for the Future of Intelligence
2018-2020	Organised and delivered PSYCH Survivor , a yearly programme for underrepresented students starting first-year psychology

ADDITIONAL PUBLICATIONS

Burnell, R., Peters, D., Ryan, R. M., & Calvo, R. A. (2023). Technology evaluations are associated with psychological need satisfaction across different spheres of experience: an application of the METUX scales. *Frontiers in Psychology*, 14.

Hohma, E., **Burnell, R.**, Corrigan, C., & Luetge, C. (2022). Individuality and fairness in public health surveillance technology: A survey of user perceptions in contact tracing apps. *IEEE Transactions on Technology and Society*.

Burnell, R., Umanath, S., & Garry, M. (2022). Collective memories of important historical events serve similar functions to people's autobiographical memories. *Memory*.

Burnell, R., Nash, R. A., Umanath, S., & Garry, M (2022). Memories people no longer believe in can still affect them in helpful and harmful ways. *Memory & Cognition*.

Rasmussen, A.S., **Burnell, R.**, & Garry, M. (2022). The memories that people would save or erase differ from their most positive and negative memories on function, emotion, and correspondence with the life script. *Memory*.

Porat, T., **Burnell, R.**, et al. (2021). "Vaccine Passports" may backfire: Findings from a cross-sectional study in the UK and Israel on willingness to get vaccinated against COVID-19. *Vaccines*, 9.

Burnell, R., & Garry, M. (2021). People draw on the consequences of others' negative experiences to make unwarranted appraisals about those experiences. *Journal of Applied Research in Memory and Cognition*, 10(4), 656-666.

Taylor, A., Sanson, M., **Burnell, R.**, Wade, K., & Garry, M. (2020). Disfluent difficulties are not desirable difficulties: The (lack of) effect of sans forgetica on memory. *Memory*, 28, 850-857.

Burnell, R., Garry, M., & Rasmussen, A. S. (2020). Negative memories can serve functions in both adaptive and maladaptive ways. *Memory*, 24, 494-505.

Undorf, M., Mah, E. Y., McDonald, D. L., Hamzagic, Z. I., **Burnell, R.**, Garry, M., & Bernstein, D. M. (2020). People who cheat on tests accurately predict their performance on future tests. *Learning and Instruction*, 66.

SELECTED INVITED TALKS

Universitat Politècnica de València. *Evaluating General-Purpose AI*.

Technische Universität Berlin (February, 2023). *A framework for evaluating the cognitive capabilities of AI systems*. Science of Intelligence Seminar.

Imperial College London (September, 2022). *Developing a cognitive framework for AI evaluation*. ExplAIn Workshop.

Claremont Graduate University, USA (September, 2022). *Memories people no longer believe in can still affect them in helpful and harmful ways*. Cognitive Forum.

Evaluation Beyond Metrics Workshop, IJCAI (July, 2022). *Cognitive Evaluation with the Animal AI Environment* (panel chair).

The University of Waikato (April, 2022). *Applying cognitive paradigms to evaluate AI systems*. Department Seminar.

University of Victoria, Canada (October, 2020). *The helpful and harmful effects of autobiographical memories*. Cognition and Brain Sciences Seminar.

SELECTED CONFERENCE PROCEEDINGS

Burnell, R., Rutar, D., Hernandez-Orallo, J., & Cheke, L (2022). *Developing a cognitive framework for AI evaluation*. Paper presented at the ExplAIn workshop, London, UK and at the Cognitive Artificial Intelligence meeting of The Royal Society, London, UK.

Burnell, R., Burden, J., Rutar, D., Voudouris, K., Cheke, L., & Hernandez-Orallo, J. (2022). *Not a Number: Identifying instance features for capability-oriented AI evaluation*. Poster presented at the 31st IJCAI, Vienna, Austria.

Burnell, R., Umanath, S., & Garry, M. (2019). *Collective memories serve similar functions to people's autobiographical memories*. Poster presented at the 60th annual meeting of the Psychonomic Society, Montreal, Canada.

Burnell, R., Garry, M., & Zajac, R. (2018). *The effect of ease-of retrieval on people's ratings of autobiographical memory functions*. Poster presented at the 59th annual meeting of the Psychonomic Society, New Orleans, LA, USA.

SELECTED MEDIA COVERAGE

BBC News, The Atlantic, The Telegraph, STAT News, MIT Technology Review, Deutschlandfunk, Science Daily

TEACHING

Lecturing experience: Masters in AI and Society; Advanced Cognitive Psychology; Memory & Cognition; Psychological Research Methods; Cyber Security and Crime Science.

Supervising experience: Intro to Computer Program Design; Intro to Data Structures & Algorithms; Cognitive Psychology, AI ethics.

Mentoring experience: Over a dozen masters, honours, and undergraduate students from Cambridge, Imperial, Waikato, and Victoria.

TECHNICAL SKILLS

Programming languages: Python, R, SQL, Java

Machine learning frameworks: PyTorch, TensorFlow, JAX

Experimental design tools: Qualtrics, SurveyMonkey, PsychoPy

Analysis tools: Numpy/Pandas, R Studio, JASP, JMP, SPSS

Statistical techniques: General Linear Models, Bayesian Modelling, SEM, Factor Analysis