Dr Paula Parpart

Curriculum Vitae

Skills & Highlights

- Experimental Psychologist & Computational Cognitive Scientist
- Postdoc at the intersection of cognitive science and AI in a research lab (PI: Chris Summerfield, AI Security Institute & Google Deepmind) that studies one-shot learning, transfer learning and curriculum learning in humans and artificial agents
- Developed a new neural network architecture in PyTorch inspired by human cognition and meta-learning approaches that discovers simple decision heuristics (i.e., regularizers) as robust solutions that generalize well with little to no training data
- Founder of Brainpool AI - managed AI client projects, academia - industry partnerships, teams of engineers/data scientists, grant and VC funding, product development and leadership

Experience

2022–present **Senior Teacher & Product Developer**, *Machine Learning and AI*, Decoded, London, UK.

- Course design, teaching & product ownership on advanced ML and AI apprenticeships (Level 3, Level 4 and Level 6) funded by the Levy for clients including Astrazeneca, Gates Foundation, or Capital Group.
- Lectured on topics ranging from introductory Python programming to all main areas of ML (e.g., classification, regression, clustering, ensemble modelling, neural networks, Bayesian statistics, causal modelling), to developing novel AI immersions for clients with a focus on Generative AI & responsible AI
- Delivered Civil Service AI Accelerator programme to up-skill data scientists to ML Engineers - supervised final projects that built AI apps for government, relying on programme skills such as fine-tuning LLMs, Huggingface, Pipelines, or web APIs.

2019–2021 **Postdoctoral Researcher - Human Information Processing**, *(PI: Chris Summerfield), Computational Neuroscience*, Experimental Psychology, University of Oxford, UK.

- Research at the intersection of decision-making and artificial intelligence - My work developed an artificial agent that learns inductive biases (human decision heuristics) from scratch. The neural network architecture drew inspiration from previous meta-learning architectures developed at Deepmind
- Generalization, i.e., the ability to apply knowledge from training data to new data and domains, represents one of the greatest challenges that current AI systems struggle with. Heuristics are the human solution to this problem, which do not need much data, and are learnt via imitation learning/experience.
- Developed theoretical framework, ran neural network simulations in Pytorch, designed and programmed experiments in Javascript. Kept up to date with AI literature, and mentored PhD students in the lab.

2018–2019 **Postdoctoral Researcher - Behavioural Patterns in Financial Big Data**, *Behavioural Science Unit*, LLoyds Banking Group & Warwick Business School, UK.

- Published in Nature Human Behaviour: Our work provides the first evidence base in the UK for measuring gambling-related harm with a data-driven approach, helping shape policy as discussed in government white papers & Parliament. This project involved the analysis of vast amounts of financial mass transaction data of 25 million customers, and the deployment of predictive models with commerical impact

Jan 2018 –June 2018 **Visiting Research Scholar**, *Moore-Sloan Center for Data Science*, New York University, New York City, USA.

- Established academia-industry partnership between Brainpool AI and the Center for Data Science, expanding the Brainpool academic network.

2016–2018 **Founder & Director at Brainpool AI**, London, UK.

- Founded and build Brainpool AI out of UCL in 2016 with two co-founders. Brainpool has grown into an established machine learning consultancy with offices in London and Toronto, operating a global network of 700+ experts in machine learning & AI, spanning academics, PhDs, graduate students and professionals.
- Brainpool bridges the gap between academia and industry by creating a platform for academics to consult with organisations in healthcare, retail, finance, marketing or government.
- Partners include IBM, Kx Systems and Nvidia; example projects include the development of open-source neural network libraries for a Tier-1 investment bank, or Brainpool's product DAiSY - an AI tool to automate part of the design process in the construction industry, or Forstack - a demand forecasting tool for financial time series (brainpool.ai/case-studies).

2016–2017 **Teaching Fellow on MSc Cognitive & Decision Sciences**, *Department of Experimental Psychology*, UCL.

- Co-directed the Masters course - responsible for curriculum design, module owner for computational modules, teaching small and large groups, student mentoring and supervising.
- Supervisor and co-supervisor for 10 MSc and BSc students' research theses - involved designing, programming and running psychology experiments on online platforms Amazon Mechanical Turk and Prolific Academic.
- Won Teaching Award for Outstanding Reseacher Development & Outstanding Personal Support at 2017 Choice Teaching Awards

2007–2010 **Research Assistant**, *ABC Research Group, Max Planck Institute for Human Development*, Berlin, Germany.

- Designed, ran and analysed ca. 30 experimental psychology studies for scientists involving human data collection with classic psychometric test instruments measuring IQ and memory, lab-based games and decision-making tasks, as well as online data collection.

Education

2012–2017 **PhD in Experimental Psychology**, *Department of Experimental Psychology, University College London*, UK,
Title: Why less can be more: A Bayesian Framework for Heuristics
Supervisors: Prof Bradley C. Love & Prof Maarten Speekenbrink.

2012–2013 **MRes in Financial Computing**, *Department of Computer Science, University College London*, UK,
Part of the 4-year EPSRC PhD funding in Financial Computing. Focus: Statistical Computing and Machine Learning.

2010–2011 **MSc in Cognitive and Decision Sciences**, *Department of Experimental Psychology, University College London*, UK,
Title: Bayesian Modelling of the Recognition Heuristic.
Supervisors: Dr Anne Hsu & Prof Nick Chater.

2006–2010 **Vordiplom (eqvl. BSc) in Psychology**, *Humboldt University Berlin*, Germany.

Publications

Peer-reviewed articles

1. **Parpart, P.** (in progress), Using singular learning theory (SLT) to detect phase transitions in neural networks solving arithmetic tasks.
2. **Parpart, P.** & Summerfield, C., (under review), Neural simplicity: Learning simple heuristics from scratch with a meta-learning agent.
3. **Parpart, P.**, Schulz, E., Speekenbrink, M. & Love, B. (under review), Active learning reveals underlying decision strategies. Preprint: bioRxiv
4. Summerfield, C. & **Parpart, P.**, (2022), Normative principles for decision-making in natural environments. *Annual Review of Psychology 2022, 73:1*, Link
5. Muggleton, N., **Parpart, P.**, Newall, P., E., Leake, D., Gathergood, J., & Stewart, N. (2021), The association between gambling and financial, social and health outcomes in big financial data. *Nature Human Behaviour, 1-8* Link
6. **Parpart, P.**, Jones, M. & Love, B.C. (2018), Heuristics as Bayesian inference under extreme priors. *Cognitive Psychology, 102, 127-144*, Link
7. Guarda, P., **Parpart, P.**, Harvey, N., & Juan Carlos Muñoz (2018), Understanding decisions about time in public transport. *Proceedings of the 40th Annual Meeting of the Cognitive Science Society. Austin, TX: Cognitive Science Society.*
8. **Parpart, P.**, Schulz, E., Speekenbrink, M. & Love, B. (2015), Active learning as a means to distinguish among prominent decision strategies. *Proceedings of the 37th Annual Conference of the Cognitive Science Society*, PDF
9. Cokely, E.T., **Parpart, P.**, & Schooler, L.J. (2009), On the link between cognitive control and heuristic processes. *Proceedings of the 31st Annual Conference of the Cognitive Science Society*. PDF

Peer-reviewed abstracts, presentations & posters

2020

9. **Parpart, P.**, Schulz, E. & Love, B. (2020), Active learning as a tool for model comparison in psychology. *Workshop on Efficient Coding to Information Gain: Information-Theoretic Principles in Models of Human Decision Making, 42nd Annual Meeting of the Cognitive Science Society.*

2018

10. **Parpart, P.**, Schulz, E. & Love, B. (2018), Robustness through sparsity: A comparison of decision heuristics. *Poster presented at the 40th Annual Meeting of the Cognitive Science Society. Austin, TX: Cognitive Science Society.*

11. **Parpart, P.** (2018), Reinterpreting heuristics as Bayesian inference. *Workshop on Contemporary Decision Making, 40th Annual Meeting of the Cognitive Science Society.*

2016

12. Kopec, L., **Parpart, P.**, Wallang, P. & Love, B.C. (2016), Less Information Can Improve Clinical Risk Assessments. *Society for Medical Decision Making Biennial European Conference, 2016, London, United Kingdom*

2015

13. **Parpart, P.**, Schulz, E., Speekenbrink, M. & Love, B. (2015), Active learning as a means to distinguish among prominent decision strategies. *Talk presented at the 37th Annual Conference of the Cognitive Science Society, 2015, Pasadena, CA.*
14. **Parpart, P.**, Jones, M., & Love, B.C. (2015), Simple Heuristics as Special Cases of Bayesian Inference. *Poster presented at the Memory and Decision Making Workshop, University of Basel, Basel, Switzerland*
15. **Parpart, P.**, Jones, M., & Love, B.C. (2015), Simple Heuristics as Special Cases of Bayesian Inference. Simple Heuristics as Special Cases of Bayesian Inference. *Poster presented at the Cumberland Lodge PhD Conference, Windsor, United Kingdom*

2014

16. **Parpart, P.**, Jones, M., & Love, B.C. (2014), Heuristics as a Special Case of Bayesian Inference. *Talk at Decision Making Bristol 2014, University of Bristol, Bristol, United Kingdom*
17. **Parpart, P.**, Jones, M., & Love, B.C. (2014), Heuristics as Special Cases of Bayesian Inference. *Poster presented at the 36th Annual Conference of the Cognitive Science Society, 2014, Quebec City, Canada*
18. **Parpart, P.**, Jones, M., & Love, B.C. (2014), Heuristics as Special Cases of Bayesian Inference. *Talk at the Mathematical Psychology Conference 2014, Quebec City, Canada*
19. **Parpart, P.**, Jones, M., & Love, B.C. (2014), Heuristics as Special Cases of Bayesian Inference. Reconciling irrational and adaptive views of heuristics. *Talk at the Cumberland Lodge PhD Conference, Windsor, United Kingdom*

2013

20. **Parpart, P.**, Jones, M., & Love, B.C. (2013), Reconciling irrational and adaptive views of heuristics. Talk at the 34th International Conference on Subjective Probability, Utility and Decision Making (SPUDM24), ISCE, Barcelona, Spain
21. **Parpart, P.**, Jones, M., & Love, B.C. (2013), When is it rational to rely on heuristics? Poster presented at the 35th Annual Conference of the Cognitive Science Society, 2013, Berlin, Germany

2011

22. **Parpart, P.**, & Cokely, E.T. (2011), When does Cognitive Control lead to Biases? Evidence from Memory and Stock Profit Estimation Tasks. *Poster presented at the 23rd International Conference on Subjective Probability, Utility and Decision Making (SPUDM23), Kingston Upon Thames, United Kingdom*
23. Okan,Y., **Parpart, P.**, Cokely, E.T. & Garcia-Retamero, R. (2011), The effect of misleading graphs on the comprehension of health and political communications: Who is more susceptible to misinterpret data? *Poster presented at the 23rd International Conference on Subjective Probability, Utility and Decision Making (SPUDM23), Kingston Upon Thames, United Kingdom*
24. Okan, Y., Woller-Carter, M., Simon, S.R., Russell, K., Ghazal S., **Parpart, P.**, Garcia-Retamero R., Cokely, E.T. (2011), Overcoming distortions in political and health communication: Mechanisms of graph literacy. *Poster presented at the 83rd Annual meeting of the Midwestern Psychological Association, Chicago, IL*.

2010

25. **Parpart, P.**, & Cokely, E.T. (2010), Fluency and cognitive control in judgment: Influences of memory and elaborative encoding. *Poster presented at the Proceedings of the 32nd Annual Conference of the Cognitive Science Society, 2010, Portland, Oregon*

2009

26. Cokely, E.T., **Parpart, P.**, & Schooler, L.J. (2009), Mechanisms of superior judgment: Ironic effects of cognitive control. *Talk at the 23rd Annual Meeting of the Society for Judgment and Decision-Making, Boston, MA.*
27. Cokely, E.T., & **Parpart, P.** (2009), There is no "the" heuristic system: Modes of cognitive control in judgment and decision making. *Talk at the 16th European Society for Cognitive Psychology Conference, Krakow, Poland*
28. Cokely, E.T., & **Parpart, P.** (2009), Modes of cognitive control in judgment & decision making. *Talk at the 22nd Subjective Probability Utility Decision Making (SPUDM22) Conference, Reverto, Italy*
29. Cokely, E.T., & **Parpart, P.** (2008), There is no "the" heuristic system: Evidence of reflective heuristic processing. *Poster presented at the 49th Annual Meeting of the Psychonomic Society, Chicago, IL.*

2008

30. **Parpart, P.** & Cokely, E.T. (2008), Individual differences and the use of fluency in judgment: Paradoxical evidence of reflective heuristic processing. *Poster presented at the 2nd Biennial Symposium on Personality and Social Psychology, Warsaw, Poland*

Awards & Funding

June 2019 **EPS Grant**, *Research stay at the Santa Fe Institute for Complex Systems, New Mexico*, funded by the Experimental Psychology Society, United Kingdom.

2017 **Teaching Award for Outstanding Reseacher Development & Outstanding Personal Support**, *2017 Student Choice Teaching Awards*, UCL, Department of Experimental Psychology.

2014 **Sully Scholarship**, *PhD prize*, UCL Department of Experimental Psychology.

2012-2016 **EPSRC Financial Computing Grant**, *Full 4-year scholarship for PhD at UCL*, Centre for Doctoral Training in Financial Computing and Analytics, London, United Kingdom.

2010-2011 **German Government Graduate Scholarship (DAAD)**, *Full scholarship for MSc at UCL*, German Government Exchange Service, London, United Kingdom.

2009 **NYU Student Scholarship**, *Full scholarship for study abroad term at New York University*, Humboldt University, Berlin, Germany.

2008 **Poster Award**, *Second Biennial Conference on Personality and Social Psychology*, awarded by Prof. Michael W. Eysenck, Prof Maruszewski und Prof Gerald Matthews, Warsaw, Poland.

Research visits & workshops

June 2019 **Complex Systems Summer School**, *Santa Fe Institute for Complex Systems, University of Cambridge*, New Mexico, US,
4-week intensive project work in complexity sciences with focus on nonlinear dynamics, information theory, scaling theory, adaptation and evolution, networks, machine learning, agent-based models, and more. Project outcome: write-up for publication.

Nov 2016 **Isaac Newton Institute for Mathematical Sciences**, *University of Cambridge*, Cambridge, UK,
Invited participant at the 4-week workshop on "Probability and Statistics in Forensic Science".

2011, 2018 **Visitor**, *Center for Adaptive Rationality (ARC)*, Max Planck Insitute for Human Development, Berlin, Geramany.

Programming & Tools

Python (4 years), PyTorch for neural networks, R (> 15 years), Matlab, data visualization (ggplot2, matplotlib, D3), Huggingface, JavaScript, HTML, CSS, SQL, MySQL, Teradata, Stata, Aster, Java, PhP, SPSS, LaTEx, WinBugs, Mechanical Turk, Unipark, Qualtrics, psiTurk

Scientific Reviewing

Ad hoc reviewer **Journal of Experimental Psychology**
Cognitive Science Society Conference
Cognition

Book Review ***In Two Minds*** **(Jonathan St. Evans)**

References

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