

Falk Lieder, Ph.D.

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POSITIONS

- 07/23- **Assistant Professor**, Department of Psychology, University of California, Los Angeles.
- 07/18-06/23 **Max Planck Research Group Leader**, Max Planck Institute for Intelligent Systems, Tübingen.
- 10/12-07/13 **Research Assistant**, Translational Neuromodeling Unit, University of Zurich, Switzerland, Topic: Computational modeling of decision-making and learning in depression, Supervisor: Quentin Huys.

EDUCATION and TRAINING

- Ph.D. **University of California, Berkeley, USA**, Neuroscience, May 2018,
Thesis: *Beyond bounded rationality: reverse-engineering and enhancing human intelligence*,
Advisor: Thomas L. Griffiths.
- M.Sc. **ETH Zurich, Switzerland**, Neural Systems and Computation, 2012, with distinction,
Thesis: *Resource-Rational Probabilistic Inference*.
Advisors: Noah D. Goodman (Stanford University) and Klaas E. Stephan (ETH Zurich)
- Summer School **Graduate Summer School Probabilistic Models of Cognition**, 07/2011, UCLA.
- B.Sc. **University of Osnabrück**, Cognitive Science, 2010, with distinction,
Thesis: *Computational models of perceptual learning in the roving oddball paradigm*.
Advisors: Klaas E. Stephan and Peter König
- B.Sc. **University of Osnabrück**, Mathematics/Computer Science, 2010, with distinction,
Thesis: *Approximate Bayesian inference on dynamical systems: An application to modeling neural activity during auditory perception*.
Advisors: Klaas E. Stephan and Volker Sperschneider

BIBLIOMETRICS AND REPRESENTATIVE PUBLICATIONS

- Metrics: **h-index: 27**, 3572 citations, i10-index: 34, [Google Scholar Profile](#)
- Article Callaway, F., Jain, Y. R., van Opheusden, B., Krueger, P. M., Das, P., Iwama, G., Gul, S., Becker, F., Griffiths, T. L., & **Lieder, F.** (2022). Leveraging artificial intelligence to improve people's planning strategies. *Proceedings of the National Academy of Sciences*, 119(12), e2117432119. [doi:10.1073/pnas.2117432119](https://doi.org/10.1073/pnas.2117432119)
- Article **Lieder, F.**, & Griffiths, T. L. (2020). Resource-rational analysis: Understanding human cognition as the optimal use of limited computational resources. *Behavioral and Brain Sciences*, 43, e1. [doi:10.1017/S0140525X1900061X](https://doi.org/10.1017/S0140525X1900061X).
- Article Consul, S., Heindrich, L., Stojcheski, J., & **Lieder, F.** (2022). Improving human decision-making by discovering efficient strategies for hierarchical planning. *Computational Brain & Behavior*, 5(2), 185-216. [doi:10.1007/s42113-022-00128-3](https://doi.org/10.1007/s42113-022-00128-3)
- Article **Lieder, F.**, Griffiths, T. L., & Hsu, M. (2018). Overrepresentation of extreme events in decision making reflects rational use of cognitive resources. *Psychological Review*, 125, 1-32. [doi:10.1037/rev0000074](https://doi.org/10.1037/rev0000074)
- Article **Lieder, F.**, Chen, O., Krueger, P. M., & Griffiths, T.L. (2019). Cognitive prostheses for goal achievement. *Nature Human Behavior*, 3, 1096-1106. [doi:10.1038/s41562-019-0672-9](https://doi.org/10.1038/s41562-019-0672-9)

GRANTS AND FUNDING

- 2019-2023 A scalable machine learning approach to improving human decision-making, **Cyber Valley Research Fund** (€231,970)
- 2019-2022 ACTrain: a personalized companion for enhancing executive functions based on adaptive metacognitive feedback, **Cyber Valley Research Fund**] (€174,895)
- 2019-2021 Robust learning of decision strategies, sub-project of the Tübingen AI Center “Beyond Deep Learning” (Coordinators: Matthias Bethge and Bernhard Schölkopf), **BMBF** (€169,793)
- 2018-2022 CompCog: Helping People make more Future-minded Decisions using Optimal Gamification, **National Science Foundation** (with Thomas L. Griffiths as PI), National Science Foundation (€159,786 to Falk Lieder; total: \$500,000)
- 2018-2021 Ecologically rational strategy selection, with Thorsten Pachur (Lead PI), Ralph Hertwig, and Oliver Brock, **Cluster of Excellence *Science Of Intelligence*** ($\approx$ €370,000)
- 2022 Looking back to find a clear view forward: Improving managerial decision-making through systematic reflection, with Ksenia Keplinger (Co-PI) and Phoenix van Wagoner (Co-Investigator), **MPI-IS Grassroots Program** (€13,789)
- 2018-2023 Max Planck Research Group, Cyber Valley Initiative (€1,550,000)

AWARDS AND FELLOWSHIPS

- 04/2020 **Robert J. Glushko Dissertation Prize in Cognitive Science** (\$10 000)
- 09/2018 Best poster award of the 14th Biannual Conference of the German Cognitive Science Society
- 12/2017 **Outstanding Paper Award**, NIPS workshop on Cognitively Informed Artificial Intelligence
- 06/2017 RLDM 2017 Student Travel Award
- 08/13-07/15 **Berkeley Fellowship** for graduate study
offered to the top 4% of prospective graduate students
- 07/14 German Society for Cognitive Science Student Travel Award
- 08/13 German Society for Cognitive Science Student Travel Award
- 2011-2012 ETH Scholarship for International Students
- 2008-2012 **Scholarship of the German National Academic Foundation**
awarded to the top 0.5% of German students
- 2009-2011 Study Abroad Scholarship of the German National Academic Foundation

STUDENT ADVISING

- Thesis advisor 4 Ph.D. students (ongoing), 4 M.Sc. theses (3 completed), 7 B.Sc. theses (5 completed, 1 received high honors)
- Mentoring 3 postdocs, 4 Ph.D. student, 3 researchers, 11 interns, 14 undergraduate research assistants, 7 postgraduate research assistants

Professional Development

- 10/2021 **Effective Proposal Writing**, Professional Development Workshop, SB Science Management UG
- 06/2020 **Recruitment and Interviewing Skills**, Webinar, Corporate Learning Solutions
- 9/2019 **Conflict Management in Academia**, Workshop, Golin Wissenschaftsmanagement
- 12/2018-9/2019 **Management Development Program in Science**, 3 modules on leadership and management, Corporate Learning Solutions
- 06/2015 **Designing, Deploying, and Evaluating Behavioral Intervention Technologies for Positive Psychology**, *Pre-Congress Workshop*, World Congress on Positive Psychology.

Memberships in Research Associations

- from 03/2021 **German Center for Mental Health**, Site: Tübingen.
from 10/2020 **Max Planck ETH Center for Learning Systems**.
from 02/2020 **CS @max planck**.
Since 01/2020 **IMPRS for the Mechanisms of Mental Function and Dysfunction**, Graduate Training Center of Neuroscience, Tübingen, Faculty Member.
from 08/19 **Cluster of Excellence *Science of Intelligence***, Berlin, External Principle Investigator.
from 10/18 **Tübingen AI center (BMBF Competence Center for Machine Learning)**, Tübingen.
from 10/2018 **Bernstein Center for Computational Neuroscience at Tübingen**.
Since 07/2018 **IMPRS for Intelligent System**, Faculty member.

TEACHING EXPERIENCE

Postgraduate courses

- Fall 2015 **Graduate Student Instructor**, *Computational Models of Cognition*, Teaching effectiveness according to student evaluations: 6.1/7, Lecturer: Tom Griffiths.
This course was offered to postgraduate students and advanced undergraduate students.
Spring 2017 **Guest Lecture**, Topic: *Bounded Optimality*, Class: Probabilistic Models of Cognition, Lecturer: Tom Griffiths, University of California, Berkeley.
Spring 2018 **Invited Lecture**, *Resource-Rational Analysis and Learning How to Decide*, Summer School on Cognitive Foundations of Economic Behavior, Vitznau, Switzerland.
Spring 2019 **Invited Lecture**, *Resource-Rational Analysis*, International Interdisciplinary Computational Cognitive Science Spring School (IICSSS), Freiburg, Germany.
October 2020 **Guest Lecture**, Topic: *Bounded Optimality*, Class: Probabilistic Models of Cognition, Lecturer: Tom Griffiths, Princeton University.

Undergraduate courses

- Fall 2008 **Teaching Assistant**, *Statistics I*, Lecturer: Reinhard Suck.
Fall 2008 **Teaching Assistant**, *Functional Network Analysis*, Lecturer: Jacqueline Griego.
Fall 2014 **Graduate Student Instructor**, *Introduction to Cognitive Science*, Teaching effectiveness according to student evaluations: 5.2/7, Lecturer: Terry Regier.

SERVICE TO THE ACADEMIC COMMUNITY

- Conference Organizer Lead Organizer and Chair of the Program Committee of the Inaugural Life Improvement Science conference (2021) which had 600 registered participants
Grant Reviewing National Science Foundation, Swiss National Science Foundation, Grassroots Program of the MPI for Intelligent Systems
Mentoring I am volunteering as a mentor at Effective Thesis to help students find research topics with a high expected positive social impact.
Reviewing Psychological Review, Nature Machine Intelligence, Cognitive Psychology, Cognition, Behavior Research Methods, Psychonomic Bulletin & Review, Topics in Cognitive Science, NeurIPS, Developmental Review, PLoS Computational Biology, NeuroImage, Brain and Behavior, Reinforcement Learning and Decision Making, Proceedings of the Annual Meeting of the Cognitive Science Society (22 times)
External Evaluator 1 Ph.D. thesis, 1 M.Sc. thesis
Co-Organizer NIPS 2015 Workshop on Bounded Optimality and Rational Metareasoning
Co-Organizer Student Invited Speaker Series of the Helen Wills Neuroscience Institute, 2016 and 2017

Complete Publication List

JOURNAL ARTICLES

25. Becker, F., Skirzynski, J., van Opheusden, B., & **Lieder, F.** (accepted). Boosting human decision-making with AI-generated decision aids. *Computational Brain & Behavior* <https://doi.org/10.48550/arXiv.2203.02776>
24. Mehta, A., Jain, Y. R., Kemtur, A., Stojcheski, J., Consul, S., Tasic, M., & **Lieder, F.** (2022). Leveraging machine learning to automatically derive robust decision strategies from imperfect models of the real world. *Computational Brain & Behavior*. <https://doi.org/10.1007/s42113-022-00141-6>
23. Callaway, F., Jain, Y. R., van Opheusden, B., Krueger, P. M., Das, P., Iwama, G., Gul, S., Becker, F., Griffiths, T. L., & **Lieder, F.** (2022). Leveraging artificial intelligence to improve people's planning strategies. *Proceedings of the National Academy of Sciences*, 119(12), e2117432119. [doi:10.1073/pnas.2117432119](https://doi.org/10.1073/pnas.2117432119)
22. Consul, S., Heindrich, L., Stojcheski, J., & **Lieder, F.** (2022). Improving human decision-making by discovering efficient strategies for hierarchical planning. *Computational Brain & Behavior*, 5(2), 185–216. [doi:10.1007/s42113-022-00128-3](https://doi.org/10.1007/s42113-022-00128-3)
21. Jain, Y. R., Callaway, F., Griffiths, T. L., Dayan, P., He, R., Krueger, P. M., & **Lieder, F.** (in press). A Computational process-tracing method for measuring people's planning strategies and how they change over time. *Behavior Research Methods*. [doi:10.3758/s13428-022-01789-5](https://doi.org/10.3758/s13428-022-01789-5)
20. Callaway, F., van Opheusden, B., Gul, S., Das, P., Krueger, P. M., Griffiths, T. L. *, & **Lieder, F.*** (2022). Rational use of cognitive resources in human planning. *Nature Human Behaviour*. <https://doi.org/10.1038/s41562-022-01332-8> * Joint senior authorship.
19. Prystawski, B., Mohnert, F., Tošić, M., & **Lieder, F.** (2021). Resource-rational models of human goal pursuit. *Topics in Cognitive Science*. [doi:10.1111/tops.12562](https://doi.org/10.1111/tops.12562)
18. **Lieder, F.**, & Iwama, G. (2021). Toward a formal theory of proactivity. *Cognitive, Affective, & Behavioral Neuroscience*, 21, 490–508. [doi:10.3758/s13415-021-00884-y](https://doi.org/10.3758/s13415-021-00884-y)
17. Skirzynski, J., Becker, F., & **Lieder, F.** (2021). Automatic discovery of interpretable planning strategies. *Machine Learning*, 110, 2641–2683. [doi:10.1007/s10994-021-05963-2](https://doi.org/10.1007/s10994-021-05963-2)
16. Bustamante, L.*, **Lieder, F.***, Musslick, S., Shenhav, A., & Cohen, J. D. (2021). Learning to overexert cognitive control in a Stroop task. *Cognitive, Affective, & Behavioral Neuroscience*, 21, 453–471. [doi:10.3758/s13415-020-00845-x](https://doi.org/10.3758/s13415-020-00845-x)
15. Milli, S., **Lieder, F.**, & Griffiths, T. L. (2021). A rational reinterpretation of dual process theories. *Cognition*, 217, 104881. [doi:10.1016/j.cognition.2021.104881](https://doi.org/10.1016/j.cognition.2021.104881)
14. **Lieder, F.**, & Griffiths, T. L. (2020). Advancing rational analysis to the algorithmic level. *Behavioral and Brain Sciences*, 43, e27. [doi:10.1017/S0140525X19002012](https://doi.org/10.1017/S0140525X19002012)
13. **Lieder, F.**, & Griffiths, T. L. (2020). Resource-rational analysis: Understanding human cognition as the optimal use of limited computational resources. *Behavioral and Brain Sciences*, 43, e1. [doi:10.1017/S0140525X1900061X](https://doi.org/10.1017/S0140525X1900061X)
12. **Lieder, F.**, Chen, O., Krueger, P. M., & Griffiths, T. L. (2019). Cognitive prostheses for goal achievement. *Nature Human Behavior*, 3, 1096–1106. [doi:10.1038/s41562-019-0672-9](https://doi.org/10.1038/s41562-019-0672-9)
11. Griffiths, T. L., Callaway, F., Chang, M., Grant, E., Krueger, P. M., & **Lieder, F.** (2019). Doing more with less: Meta-reasoning and meta-learning in humans and machines. *Current Opinion in Behavioral Sciences*, 29, 24–30. [doi:10.1016/j.cobeha.2019.01.005](https://doi.org/10.1016/j.cobeha.2019.01.005)
10. **Lieder, F.**, Griffiths, T. L., & Hsu, M. (2018). Overrepresentation of extreme events in decision making reflects rational use of cognitive resources. *Psychological Review*, 125, 1–32. [doi:10.1037/rev0000074](https://doi.org/10.1037/rev0000074)
9. **Lieder, F.**, Shenhav, A., Musslick, S., & Griffiths, T. L. (2018). Rational metareasoning and the plasticity of cognitive control. *PLoS Computational Biology*, 14, e1006043. [doi:10.1371/journal.pcbi.1006043](https://doi.org/10.1371/journal.pcbi.1006043)

8. **Lieder, F.**, Griffiths, T. L., Huys, Q. J. M., & Goodman, N. D. (2018). The anchoring bias reflects rational use of cognitive resources. *Psychonomic Bulletin & Review*, 25, 322–349. doi:10.3758/s13423-017-1286-8
7. **Lieder, F.**, Griffiths, T. L., Huys, Q. J. M., & Goodman, N. D. (2018). Empirical evidence for resource-rational anchoring and adjustment. *Psychonomic Bulletin & Review*, 25, 775–784. doi:10.3758/s13423-017-1288-6
6. Shenhav, A., Musslick, S., **Lieder, F.**, Kool, W., Griffiths, T. L., Cohen, J. D., & Botvinick, M. M. (2017). Toward a rational and mechanistic account of mental effort. *Annual Review of Neuroscience*, 40, 99-124. doi:10.1146/annurev-neuro-072116-031526
5. **Lieder, F.**, & Griffiths, T. L. (2017). Strategy selection as rational metareasoning. *Psychological Review*, 124, 762-794. doi:10.1037/rev0000075
4. Griffiths, T. L., **Lieder, F.**, & Goodman, N. D. (2015). Rational use of cognitive resources: Levels of analysis between the computational and the algorithmic. *Topics in Cognitive Science*, 7, 217-229. doi:10.1111/tops.12142
3. **Lieder, F.**, Stephan, K. E., Daunizeau, J., Garrido, M. I., Friston, K. J. (2013). A neuro-computational model of the mismatch negativity. *PLoS Computational Biology*, 9, e1003288. doi:10.1371/journal.pcbi.1003288
2. **Lieder, F.**, Daunizeau, J., Garrido, M. I., Friston, K. J., & Stephan, K. E. (2013). Modeling trial-by-trial changes in mismatch negativity amplitudes. *PLoS Computational Biology*, 9, e1002911. doi:10.1371/journal.pcbi.1002911
1. Petersen, L.-E., & **Lieder, F.** (2006). The effectiveness of written and graphic health warnings on cigarette packs: An examination of the revised model of protection motivation. *Zeitschrift für Sozialpsychologie*, 37, 245-258. doi:10.1024/0044-3514.37.4.245

PEER-REVIEWED CONFERENCE ARTICLES

19. **Lieder, F.**, Chen, P.-Z., Stojcheski, J., Consul, S., & Pammer-Schindler, V. (2022). A cautionary tale about AI-generated goal suggestions. *Mensch und Computer 2022 (MuC '22)*, September 4–7, 2022, Darmstadt, Germany. DOI:10.1145/3543758.3547539
18. He, R., Jain, Y. R., & **Lieder, F.** (2021). Measuring and modelling how people learn how to plan and how people adapt their planning strategies to the structure of the environment. *International Conference on Cognitive Modeling*. <https://mathpsych.org/presentation/604#/document>
17. Kentur, A., Jain, Y. R., Mehta, A., Callaway, F., Consul, S., Stojcheski, J., & **Lieder, F.** (2020). Leveraging machine learning to automatically derive robust planning strategies from biased models of the environment. In S. Denison, M. Mack, Y. Zu, & B. C. Armstrong (Eds.), *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*. Cognitive Science Society. <https://cogsci.mindmodeling.org/2020/papers/0380/index.html>
16. Jain, Y. R., Callaway, F., & **Lieder, F.** (2019). Measuring how people learn how to plan. In A. K. Goel, C. M. Seifert, & C. Freksa (Eds.) *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 1956-1962). Cognitive Science Society. <https://cogsci.mindmodeling.org/2019/papers/0344/index.html>
15. Mohnert, F., Pachur, T., & **Lieder, F.** (2019). What's in the adaptive toolbox and how do people choose from it? Rational models of strategy selection in risky choice. In A. K. Goel, C. M. Seifert, & C. Freksa (Eds.) *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 2378-2384). Cognitive Science Society. <https://cogsci.mindmodeling.org/2019/papers/0412/index.html>
14. Xu, L., Wirzberger, M. & **Lieder, F.** (2019). How should we incentivize learning? An optimal feedback mechanism for educational games and online courses. In A. K. Goel, C. M. Seifert, & C. Freksa (Eds.) *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 3136-3142). Cognitive Science Society. <https://cogsci.mindmodeling.org/2019/papers/0527/index.html>

13. Pothos, E. M., Busemeyer, J. R., Pleskac, T. J., Yearsley, J. M., Tenenbaum, J. B., Goodman, N. D., Tessler, M. H., Griffiths, T. L., **Lieder, F.**, Hertwig, R., Pachur, T., Leuker, C., & Shiffrin, R. M. (2019). Extending rationality. In A. K. Goel, C. M. Seifert, & C. Freksa (Eds.), *Proceedings of the 41st Annual Conference of the Cognitive Science Society* (pp. 39-40). Cognitive Science Society. <https://cogsci.mindmodeling.org/2019/papers/0020/index.html>
12. Callaway, F.*, Gul, S., Griffiths, T. L., Krueger, P. M., Griffiths, T. L., & **Lieder, F.*** (2018). Learning to select computations. *Uncertainty in Artificial Intelligence: Proceedings of the Thirty-Fourth Conference*. doi:arXiv:1711.06892
11. Callaway, F.*, **Lieder, F.***, Das, P., Gul, S., Krueger, P. M., & Griffiths, T. L. (2018). A resource-rational analysis of human planning. In C. Kalish, M. Rau, J. Zhu, & T. T. Rogers (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp. 178-183). Cognitive Science Society. <https://cogsci.mindmodeling.org/2018/papers/0054/index.html>
10. Krueger, P. M.*, **Lieder, F.***, & Griffiths, T. L. (2017). Enhancing metacognitive reinforcement learning using reward structures and feedback. In G. Gunzelmann, A. Howes, T. Tenbrink, & E. Davelaar (Eds.), *Proceedings of the 39th Annual Conference of the Cognitive Science Society* (pp. 2469-2474). Cognitive Science Society. <https://cogsci.mindmodeling.org/2017/papers/0469/index.html>
9. **Lieder, F.***, Krueger, P. M.*, & Griffiths, T. L. (2017). An automatic method for discovering rational heuristics for risky choice. In G. Gunzelmann, A. Howes, T. Tenbrink, & E. Davelaar (Eds.), *Proceedings of the 39th Annual Conference of the Cognitive Science Society* (pp. 742-747). Cognitive Science Society. <https://cogsci.mindmodeling.org/2017/papers/0149/index.html>
8. Bourgin, D. D.*, **Lieder, F.***, Reichman, D.*, Talmon, N.*, & Griffiths, T. L. (2017). The structure of goal systems predicts human performance. In G. Gunzelmann, A. Howes, T. Tenbrink, & E. Davelaar (Eds.), *Proceedings of the 39th Annual Conference of the Cognitive Science Society* (pp. 1660-1665). Cognitive Science Society. <https://cogsci.mindmodeling.org/2017/papers/0324/index.html>
7. **Lieder, F.**, & Griffiths, T. L. (2016). Helping people make better decisions using optimal gamification. In Papafragou, A., Grodner, D., Mirman, D., & Trueswell, J. C. (Eds.), *Proceedings of the 38th Annual Meeting of the Cognitive Science Society* (pp. 2075-2080). Cognitive Science Society. <https://cogsci.mindmodeling.org/2016/papers/0361/index.html>
6. **Lieder, F.**, & Griffiths, T. L. (2015). When to use which heuristic: A rational solution to the strategy selection problem. In D. C. Noelle, R. Dale, A. S. Warlaumont, J. Yoshimi, T. Matlock, C. D. Jennings, & P. P. Maglio (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society* (pp. 1362-1367). Cognitive Science Society. <https://cogsci.mindmodeling.org/2015/papers/0239/>
5. **Lieder, F.***, Sim, Z.*, Hu, J. C., Griffiths, T. L., & Xu, F. (2015). Children and adults differ in their strategies for social learning. In D. C. Noelle, R. Dale, A. S. Warlaumont, J. Yoshimi, T. Matlock, C. D. Jennings, & P. P. Maglio (Eds.), *Proceedings of the 37th Annual Conference of the Cognitive Science Society* (pp. 1368-1373). Cognitive Science Society. <https://cogsci.mindmodeling.org/2015/papers/0240/>
4. **Lieder, F.**, Plunkett, D., Hamrick, J. B., Russell, S. J., Hay, N. J., & Griffiths, T. L. (2014). Algorithm selection by rational metareasoning as a model of human strategy selection. *Advances in Neural Information Processing Systems 27*, 2870-2878. <https://dl.acm.org/doi/abs/10.5555/2969033.2969147>
3. **Lieder, F.**, Hsu, M., & Griffiths, T. L. (2014). The high availability of extreme events serves resource-rational decision-making. In P. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proceedings of the 36th Annual Conference of the Cognitive Science Society* (pp. 2567-2572). Cognitive Science Society. <https://escholarship.org/uc/item/5433c2jb>
2. **Lieder, F.**, Goodman, N.D., & Huys, Q.J.M. (2013). Learned helplessness and generalization. In M. Knauff, M. Pauen, N. Sebanz, & I. Wachsmuth (Eds.) *Proceedings of the 35th Annual Conference of the Cognitive Science Society* (pp. 900-905). Cognitive Science Society. <https://escholarship.org/uc/item/31362551>

1. **Lieder, F.**, Griffiths, T.L., & Goodman, N.D. (2012). Burn-in, bias, and the rationality of anchoring. *Advances in Neural Information Processing Systems 25*, 2690-2798. [\[Paper\]](#)

PEER-REVIEWED WORKSHOP PAPERS

7. Consul, S., Stojcheski, J., & **Lieder, F.** (2022, September). Leveraging AI for effective to-do list gamification. *5th international workshop Gam-R – Gamification Reloaded*. DOI: [10.18420/muc2022-mci-ws08-241](#)
6. Becker, F., & **Lieder, F.** (2021, December). Promoting metacognitive learning through systematic reflection. *NeurIPS Workshop on Metacognition in the Age of AI*. [\[Paper\]](#)
5. He, R., Jain, Y. R., & **Lieder, F.** (2021, December). Have I done enough planning or should I plan more? *NeurIPS Workshop on Metacognition in the Age of AI*. [\[Paper\]](#)
4. Kentur, A., Jain, J. R., Mehta, A., Callaway, F., Stojcheski, J., Consul, S., & **Lieder, F.** (2020, December). Improving Human Decision-Making using Metalevel-RL and Bayesian Inference. *NeurIPS Workshop on Challenges of Real-World RL*. [Paper](#)
3. **Lieder, F.***, Callaway, F.*, Gul, S.*, Krueger, P., & Griffiths, T. L. (2017). Learning to select computations. *NIPS Workshop on Cognitively Informed Artificial Intelligence*. [\[Paper\]](#)
2. **Lieder, F.**, Goel, S., Kwan, R., & Griffiths, T. L. (2015). Optimism can be boundedly rational. *NIPS 2015 Workshop on Bounded Optimality and Rational Metareasoning*.
1. **Lieder, F.**, Goodman, N.D., & Griffiths, T. L. (2013). Reverse-engineering resource-efficient algorithms. *Resource-Efficient Machine Learning Workshop at NIPS 2013*. [\[Paper\]](#)

Encyclopedia Entries

1. **Lieder, F.**, & Prentice, M. (accepted). Life Improvement Science. In F. Maggino (Ed.), *Encyclopedia of Quality of Life and Well-Being Research*, 2nd Edition, Springer. doi:[10.13140/RG.2.2.10679.44960](#)

DISSERTATION

Lieder, F. (2018). Beyond bounded rationality: Reverse-engineering and enhancing human intelligence (Ph.D. thesis). University of California, Berkeley. doi:[10.13140/RG.2.2.16888.55041](#)

FORTHCOMING JOURNAL ARTICLES

10. Becker, F., Wirzberger, M., Pammer-Schindler, V., Srinivas, S., & **Lieder, F.** (submitted). Systematic metacognitive reflection helps people discover far-sighted decision strategies: a process-tracing experiment. DOI [10.17605/OSF.IO/DUQYJ](#)
9. **Lieder, F.**, Prentice, M., & Corwin-Renner, E. R. (accepted subject to minor revisions). An interdisciplinary synthesis of research on understanding and promoting well-doing. *Social and Personality Psychology Compass*, https://osf.io/gy9q7/?view_only=e9262c521dcd4796916a75c536e0531b
8. Reynante, B. M., Wilcox, J. E., Stephenson, O. L., **Lieder, F.**, Thielmann, I., & Lacopo, C. (submitted). Cultivating Changemakers: A review of Metachangemaking. [\[Paper\]](#)
7. Heindrich, L., Consul, C. & **Lieder, F.** (submitted). Leveraging AI to improve human planning in large partially observable environments.
6. Felso, V., & **Lieder, F.** (under review). Measuring individual differences in the depth of planning. DOI: [10.31234/osf.io/xmf3y](#)
5. He, R., & **Lieder, F.** (under review). Where do adaptive planning strategies come from? DOI: [10.13140/RG.2.2.28966.60487](#)
4. Krueger, P.M.¹, Callaway, F.¹, Gul, S., Griffiths, T. L.^{*}, & **Lieder, F.*** (in revision). Discovering rational heuristics for risky choice. <https://doi.org/10.31234/osf.io/mg7dn> ¹Joint first-authorship ^{*}Joint senior-authorship.
3. Iwama, G., Weber, F., Prentice, M., & **Lieder, F.** (in revision). Development and Validation of a Goal Characteristics Questionnaire. doi:[10.31219/osf.io/dzhwv](#)
2. Skirzynski, J., Jain, Y. R., & **Lieder, F.** (in revision). Automatic discovery and description of human planning strategies. doi:[10.13140/RG.2.2.27983.82089](#)

1. Reichman, D.*, **Lieder, F.***, Bourgin, D. D.*, Talmon, N., & Griffiths, T. L. (*under review*). The computational challenges of pursuing multiple goals: network structure of goal systems predicts human performance. [doi:10.31234/osf.io/fqh3x](https://doi.org/10.31234/osf.io/fqh3x)
- PEER-REVIEWED CONFERENCE ABSTRACTS
38. Prentice, M., Gonzalez Cruz, H., & **Lieder, F.** (2022, September 8-10). Evaluating Life Reflection Techniques to Help People Select Virtuous Life Goals. *Integrating Research on Character and Virtues: 10 Years of Impact*. [Abstract](#)
 37. Jähnichen, S., Weber, F., Prentice, M., & **Lieder, F.** (2022, September 5-7). Does deliberate prospection help students set better goals? [Poster Presentation] *KogWis 2022* “Understanding Minds”, Freiburg, Germany. [Abstract](#)
 36. Pauly, R., Heindrich, L., Amo, V., & **Lieder, F.** (2022, June). What to learn next? Aligning gamification rewards to long-term goals using reinforcement learning. The 5th Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM2022)
 35. Amo, V., Prentice, M., & **Lieder, F.** (2022, February). Promoting value-congruent action by supporting effective metacognitive emotion-regulation strategies with a gamified app. *Society for Personality and Social Psychology (SPSP) Annual Convention 2022*. San Francisco, USA.
 34. Becker, F., Skirzynski, J. M., van Opheusden, B., & **Lieder, F.** (2021, July). Encouraging far-sightedness with automatically generated descriptions of optimal planning strategies: Potentials and limitations. In T. Fitch, C. Lamm, H. Leder, & K. Teßmar-Raible (Eds.), *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*. [\[Abstract\]](#)
 33. Teo, J., Pauly, R., Heindrich, L., Amo, V., & Lieder, F. (2021, June). Leveraging AI to support the self-directed learning of disadvantaged youth in developing countries. *The first Life Improvement Science Conference*.
 32. Heindrich, L., Consul, S., Stojcheski, J., & **Lieder, F.** (2021, June). Improving Human Decision-Making by Discovering Efficient Strategies for Hierarchical Planning. *The first Life Improvement Science Conference*.
 31. Gonzalez, H., Prentice, M., & **Lieder, F.** (2021, May). ‘What do you want in life and how can you get there?’ An evaluation of a hierarchical goal-setting chatbot. *13th Annual meeting of the Society for the Science of Motivation*. [\[Abstract\]](#)
 30. Prentice, M., Gonzalez, H., & **Lieder, F.** (2021, May). Evaluating life reflection techniques to help people set better value-driven life goals. *13th Annual meeting of the Society for the Science of Motivation*. [\[Abstract\]](#)
 29. Felso, V., Jain, Y. R., & **Lieder, F.** (2020, July). Measuring the costs of planning. In S. Denison, M. Mack, Y. Zu, and B. C. Armstrong (Eds.), *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*. Cognitive Science Society. [\[Abstract\]](#)
 28. Amo, V., & **Lieder, F.** (2020). A Gamified App that Helps People Overcome Self-Limiting Beliefs by Promoting Metacognition. *EARLI SIG 8 Meets SIG 16*. [\[Abstract\]](#)
 27. Wirzberger, M., Lado, A., Eckerstorfer, L., Oreshnikov, I., Passy, J., Stock, A., Shenhav, A., & **Lieder, F.** (2020). How to navigate everyday distractions: Leveraging optimal feedback to train attention control. In S. Denison, M. Mack, Y. Zu, and B. C. Armstrong (Eds.), *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*. Cognitive Science Society. [\[Abstract\]](#)
 26. Wirzberger, M., Oreshnikov, I., Passy, J., Lado, A., Shenhav, A., & **Lieder, F.** (2020). ACTrain: Ein KI-basiertes Aufmerksamkeitstraining für die Wissensarbeit. *66th Spring Conference of the German Ergonomics Society*. [\[Abstract\]](#)
 25. Das, P., Callaway, F., Griffiths, T. L., & Lieder, F. (2019). Remediating Cognitive Decline with Cognitive Tutors. *The 4th Multidisciplinary Conference on Reinforcement Learning and Decision Making*. <http://dx.doi.org/10.13140/RG.2.2.36052.45443>
 24. **Lieder, F.**, Callaway, F., Jain, Y. R., Krueger, P. M., Das, P., Gul, S., & Griffiths, T. L. (2019, July). A Cognitive Tutor for Helping People Overcome Present Bias. *The 4th Multidisciplinary Conference on Reinforcement Learning and Decision Making*. [\[Abstract\]](#)

23. Jain, Y. R., Gupta, S., Rakesh, V., Dayan, P., Callaway, F., & **Lieder, F.** (2019). How do people learn how to plan? *Conference on Cognitive Computational Neuroscience*. doi:10.32470/CCN.2019.1313-0
22. Mohnert, F., Tasic, M., & **Lieder, F.** (2019). Testing computational models of goal pursuit. *Conference on Cognitive Computational Neuroscience*. doi:10.32470/CCN.2019.1350-0
21. Iwama, G., Greenberg, S., Moore, D., & **Lieder, F.** (2019). Introducing the Decision Advisor: A simple online tool that helps people overcome cognitive biases and experience less regret in real-life decisions. *40th Annual Meeting of the Society for Judgment and Decision Making*. doi:10.13140/RG.2.2.10816.07689
20. Iwama, G., Wirzberger, M., & **Lieder, F.** (2019). The Goal Characteristics (GC) questionnaire: A comprehensive measure for goals' content, attainability, interestingness, and usefulness. *40th Annual Meeting of the Society for Judgment and Decision Making*. doi:10.13140/RG.2.2.24237.84961
19. Iwama, G., Wirzberger, M., & **Lieder, F.** (2019). The Goal Characteristics (GC) questionnaire: Measuring goals' content, attainability, interestingness, and usefulness. *The 60th Annual Meeting of the Psychonomic Society*.
18. Gul, S., Krueger, P. M., Callaway, F., Griffiths, T. L., & **Lieder, F.** (2018). Discovering rational heuristics for risky choice. *KogWis 2018*. [Abstract]
17. **Lieder, F.**, Callaway, F., Krueger, P. M., Griffiths, T. L., & Gul, S. (2018). Discovering and teaching optimal planning strategies. *KogWis 2018*. [Abstract]
16. Lieder, F., Krueger, P. M., Callaway, F., & Griffiths, T. L. (2017). A computerized training program for teaching people how to plan better. *Annual Meeting of the Society for Judgment and Decision-Making*. doi:10.31234/osf.io/uj8ys
15. **Lieder, F.**, & Griffiths, T. L. (2017). Optimal gamification can help people procrastinate less. *Annual Meeting of the Society for Judgment and Decision-Making*.
14. **Lieder, F.***, Krueger, P. M.*, Callaway, F.*, & Griffiths, T. L. (2017). A reward shaping method for promoting metacognitive learning. *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*. doi:10.31234/osf.io/qj346
13. Callaway, F.*, **Lieder, F.***, Krueger, P. M.*, & Griffiths, T. L. (2017). Mouselab-MDP: A new paradigm for tracing how people plan. *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*. [Abstract]
12. Bustamante, L.*, **Lieder, F.***, Musslick, S., Shenhav, A., & Cohen, J. (2017). Learning to (mis)allocate control: Maltransfer can lead to self-control failure. *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*. [Abstract]
11. Callaway, F., **Lieder, F.**, & Griffiths, T. L. (2017). Helping people choose subgoals with sparse pseudo rewards. *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*. [Abstract]
10. Krueger, P. M.*, **Lieder, F.***, & Griffiths, T. L. (2017). Enhancing metacognitive reinforcement learning using reward structures and feedback. *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*.
9. **Lieder, F.***, Krueger, P. M.*, & Griffiths, T. L. (2017). Automatically deriving rational heuristics for risky choice. *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*.
8. **Lieder, F.**, & Griffiths, T. L. (2016). People learn to make rational use of fallible heuristics. *Annual Meeting of the Society of Judgment and Decision Making 2016*.
7. **Lieder, F.**, Griffiths, T. L., & Hsu, M. (2016). Overweighting extreme events reflects rational use of cognitive resources. *Annual Meeting of the Society of Judgment and Decision Making 2016*.
6. **Lieder, F.**, Griffiths, T. L., & Hsu, M. (2015). Utility-weighted sampling in decisions from experience. *The 2nd Multidisciplinary Conference on Reinforcement Learning and Decision Making*. [Abstract]

5. **Lieder, F.**, & Griffiths, T. L. (2015). Model-based strategy selection learning. *The 2nd Multidisciplinary Conference on Reinforcement Learning and Decision Making*. [\[Abstract\]](#)
4. Hu, J., **Lieder, F.**, Griffiths, T. L., & Xu, F. (2015). Learning from others: Adult and child strategies in assessing conflicting ratings. *Biennial Meeting of the Society for Research in Child Development*, Philadelphia, Pennsylvania, USA.
3. Diaconescu, A., **Lieder, F.**, Mathys, C., Stephan, K. E. (2014). Layers of Abstraction: (Neuro)computational models of learning local and global statistical regularities. *The 20th Annual Meeting of the Organization for Human Brain Mapping*, Hamburg, Germany.
2. **Lieder, F.**, Goodman, N. D., & Huys, Q. J. M. (2013). Controllability and resource-rational planning. *Cosyne Abstracts 2013*, Salt Lake City USA. [\[Abstract\]](#)
1. **Lieder, F.**, Daunizeau, J., Garrido, M. I., Stephan, K. E., & Friston, K. J. (June 2011). Free-energy minimization and the mismatch negativity: Simulations based on generalised filtering. *Human Brain Mapping 2011*, Quebec City, Canada.

TECHNICAL REPORTS

3. Consul, S., Stojcheski, J., Felso, V., & **Lieder, F.** (2021). Optimal to-do list gamification for long-term planning. *arXiv*. [arXiv:2109.06505](#)
2. Stojcheski, J., Felso, V., & **Lieder, F.** (2020). Optimal to-do list gamification. *arXiv*. [arXiv:2008.05228](#)
1. **Lieder, F.**, Griffiths, T. L., Huys, Q. J. M., & Goodman, N. D. (2017). Testing models of anchoring-and-adjustment. *PsyArXiv*. [doi:10.17605/OSF.IO/94YVZ](#)

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INVITED PRESENTATIONS

- Summer 2022 Society for the Improvement of Psychological Science, Toward a better method for choosing scientific questions, [\[Recording\]](#)
- Spring 2022 Brains, Minds, and Markets Lab Seminar Series, University of Melbourne, Australia
- Spring 2022 Global Priorities Institute, Oxford University, Oxford, UK
- Spring 2022 Center for Humans and Machines, Max Planck Institute for Human Development, Berlin, Germany
- Fall 2021 University of California, Irvine, Department of Cognitive Science, USA
- Spring 2021 Cluster of Excellence *Science Of Intelligence*, Berlin
- Fall 2020 Department of Computer Science, Technical University of Graz, Austria
- Summer 2020 Glushko Symposium, CogSci 2020, Beyond Bounded Rationality: Reverse-Engineering and Enhancing Human Intelligence, [\[Recording\]](#)
- Winter 2019 University of Osnabrück
- Winter 2019 Workshop on Neuroadaptive Technologies, Fraunhofer Institute for Industrial Engineering, Stuttgart
- Fall 2019 ELLIS Workshop on Natural Intelligence
- Summer 2019 Transcontinental Computational Psychiatry Workgroup
- Summer 2019 Symposium on “Extending Rationality” at the Annual Meeting of the Cognitive Science Society
- Summer 2019 Workshop “Heuristics, hacks, and habits: Boundedly optimal approaches to learning, reasoning and decision making” at the Annual Meeting of the Cognitive Science Society
- Summer 2019 Workshop “Everyday Activity” at the Annual Meeting of the Cognitive Science Society
- Summer 2019 University of Toronto
- Summer 2019 RLDM Workshop “Variability in learning and decision-making: failure or feature?”
- Spring 2019 Keynote Lecture of the Dresden Spring School on Cognitive-Affective Neuroscience 2019
- Summer 2019 Donders Institute for Cognition, Brain, and Behavior, Nijmegen University

Spring 2019 International Interdisciplinary Computational Cognitive Science Spring School, Bernstein Center for Computational Neuroscience, Freiburg
Fall 2018 Psychology Guest Seminar Series, University of Warwick
Fall 2018 Cognitive Science Colloquium, University of Tübingen
Summer 2018 Workshop on Contemporary Cognitive Approaches to Decision-Making, Madison, WI, USA
Spring 2018 MIT, Computational Cognitive Science Lab
Spring 2018 Harvard University, Economics Seminar
Spring 2018 UCSD, Department of Psychology, Cognitive Brownbag Seminar
Fall 2017 Google DeepMind, London, UK
Summer 2017 Rational Process Models Symposium, 50th Annual Meeting of the Society for Mathematical Psychology, Warwick, UK
Summer 2017 Center for Adaptive Rationality, Max Planck Institute for Human Development, Berlin, GER
Summer 2017 Shenhav Lab, Brown University, Providence, RI, USA
Summer 2017 Neuroscape, University of California, San Francisco (UCSF), CA, USA
Summer 2016 5th CSLI Workshop on Logic, Rationality & Intelligent Interaction, Stanford, CA, USA
Fall 2015 NIPS 2015 Workshop on Bounded Optimality and Rational Metareasoning, Montreal, CAN
Fall 2014 Dagstuhl Seminar on Resource-Bounded Problem Solving, GER
Fall 2012 Bay Area Cognitive Science Meeting, Stanford, CA, USA

LAST UPDATE

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