# Sébastien Hélie

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## Professional Experience

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|---|---|---|
| **Director** | Center for Research on Brain, Behavior, and NeuroRehabilitation (CEREBBRAL), Purdue University | 2020 – Now |
| **Associate Professor** | Department of Psychological sciences, Purdue University | 2016 – Now |
| **Associate Professor** | Department of Speech, Language, and Hearing sciences, Purdue University (by courtesy) | 2016 – Now |
| **Scientific Consultant** | Various academic projects in the USA and Canada | 2001 – Now |
| **Co-director** | Center for Research on Brain, Behavior, and NeuroRehabilitation (CEREBBRAL), Purdue University | 2016 – 2020 |
| **Associate Director** | Purdue Life Science MRI Facility, Purdue University | 2015 – 2018 |
| **Assistant Professor** | Department of Speech, Language, and Hearing sciences, Purdue University (by courtesy) | 2014 – 2016 |
| **Assistant Professor** | Department of Psychological sciences, Purdue University | 2012 – 2016 |
| **Assistant Researcher** | Department of psychological & brain sciences, University of California, Santa Barbara | 2011 – 2012 |
| **Lecturer** | Department of psychological & brain sciences, University of California, Santa Barbara | 2009 – 2011 |
| **Postdoctoral Scholar** | Department of psychological & brain sciences, University of California, Santa Barbara | 2008 – 2011 |
| **Postdoctoral Fellow** | Department of cognitive science, Rensselaer Polytechnic Institute | 2006 – 2008 |
| **Adjunct Professor** | Department of cognitive science, Rensselaer Polytechnic Institute | 2007 |

# Education

**Ph.D., Cognitive Science** 2007
Department of Computer Science, Université du Québec À Montréal

**M.Sc., Cognitive Psychology** 2003
Department of Psychology, Université de Montréal

**B.Sc., Psychology** 2001
Department of Psychology, Université de Montréal

**D.E.C, Humanities & Social Sciences** 1998
Collège Montmorency, Laval, Québec

# Citizenship

Canada, United States of America.

# Languages

French, English.

# Funding and Awards

### Research Grants

| Funding Organization | Period |
| --- | --- |
| Understanding information acquisition decisions in systems design through behavioral experiments and Bayesian analysis, National Science Foundation, award #1662230 (Co–PI; PI: Jitesh Pachal) | 08/2017 – 07/2022 |
| Pathways to substance use disorder: A unified model of animal and human neuroscience to predict illness development, Grand Challenge in Neuroscience, Purdue Institute for Integrative Neuroscience (PI) | 07/2020 – 06/2022 |
| Specifying a genetic and neurobiological pathway for depression risk, Purdue Office of the Executive Vice President for Research and Partnerships (New NIH R01/U01 Program) (Co–I; PI: Daniel Foti) | 06/2019 – 12/2020 |
| The cognitive neuroscience of human category learning, National Institute of Health, award #2R01MH063760 (MPI) | 08/2014 – 04/2020 |
| Implicit learning deficits in adults at high genetic risk for depression, Indiana Clinical and Translational Sciences Institute, award #UL1TR001108 (Co–I; PI: Daniel Foti) | 07/2017 – 06/2019 |
| Approaches to Rehabilitation Treatment and Technology (ART), College of Human and Health Sciences Research Area of Excellence Competition, Purdue University (Co–I; PI: Jessica Huber) | 07/2016 – 06/2019 |
| Project #19: Center of Excellence Student Outreach, Federal Aviation Administration (Co–I; PI: William Crossley) | 04/2017 – 08/2018 |

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| Collaborative Research: A behavioral and computational investigation of the generality and transferability of category representations, National Science Foundation, award #1349677-BCS (PI) | 07/2014 – 06/2018 |
| MR–compatible microphone, Purdue Institute for Integrative Neuroscience, Purdue University (Co–I; PI: Jessica Huber) | 06/2016 – 05/2017 |
| MR–compatible trigger console and response system, Purdue Institute for Integrative Neuroscience, Purdue University (PI) | 06/2016 – 05/2017 |
| Neurological Underpinnings of the Lombard Effect and Training with the Speech-Vive in People with Parkinson's Disease. College of Health and Human Sciences fMRI pilot funds, Purdue University (PI). | 10/2013 – 12/2016 |
| 3T MRI scanner dedicated to life science research, National Institute of Health, award #1S10OD012336-01A1 (Co–I; PI: Ulrike Dydak) | 04/2015 – 03/2016 |
| Rehabilitation through errorless learning in Parkinson's disease. Purdue Research Foundation Summer Faculty Grant (PI). | 06/2013 – 07/2013 |
| Integrated Cognitive-Neuroscience Architectures for Understanding Sensemaking (ICArUS). Intelligence Advanced Research Projects Activity (IARPA), through Lockheed Martin (PI). | 12/2010 – 12/2012 |

## Awards & Honors

| Society & Award | Year |
|---|---|
| The *Purdue University* 'Trailblazer Award' | 2019 |
| *Society for Mathematical Psychology* 'R. Duncan Luce Outstanding Paper Award' | 2016 |
| *European Group for Organizational Studies (EGOS)* 'Max Boisot Award' | 2015 |
| *European Group for Organizational Studies (EGOS)* Subtheme 52 (Paradoxes and Unreason: Provoking Greater Examination into Organizational Life) 'That's Interesting Award' | 2015 |
| The *Purdue University* 'Seed for Success Award' | 2015 |
| *International Neural Network Society (INNS)* 'Young Investigator Award' | 2012 |
| Postdoctoral travel award for the *41st Annual Meeting of the Society for Mathematical Psychology* | 2008 |
| Travel award to attend the doctoral consortium at the *6th International Conference on Cognitive Modelling* | 2004 |
| Best poster award at the *1st Colloque en Informatique Cognitive* (UQÀM-TÉLUQ) | 2003 |
| Best scientific popularization paper (DIRE journal) | 2002 |

## Fellowships & Scholarships

| Funding Organization | Period |
|---|---|
| Fonds de recherche sur la nature et les technologies (FRQNT, postdoctoral fellowship) | 09/2006 – 08/2008 |
| Fonds de recherche sur la nature et les technologies (NATEQ, Committee 03C - Mathematics) | 09/2003 – 08/2006 |
| Natural Sciences and Engineering Research Council of Canada (Life Sciences & Psychology committee) | 09/2003 – 08/2005 |

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|---|---|
| Fondation J. Armand Bombardier (Arts & Sciences) | 09/2002 – 08/2003 |
| Université de Montréal (Arts & Sciences) | 09/2001 – 08/2002 |

# Publications

## Books

1. S. Hélie (Ed.) (2013). *The Psychology of Problem Solving: An Interdisciplinary Approach.* Nova Publishers, New York.

## Articles published in peer–reviewed journals

1. Calic, G., Mosakowski, E., Bontis, N., & Hélie, S. (in press). Is maximizing creativity good? The importance of elaboration and internal confidence in producing creative ideas. *Knowledge Management Research & Practice.*

2. Hélie, S. & Pizlo, Z. (in press). When is psychology research useful in artificial intelligence? A case for reducing computational complexity in problem solving. *topiCS in Cognitive Science.*

3. Fansher, M., Shah, P., & Hélie, S. (2022). The effect of mode of presentation on Tower of Hanoi problem solving. *Cognition, 224,* 105041.

4. Hélie, S., Shamloo, F., Zhang, H., & Ell, S. W. (2021). The impact of training methodology and representation on rule–based categorization: An fMRI study. *Cognitive, Affective, & Behavioral Neuroscience, 21,* 717–735.

5. Kovacs, P., Hélie, S., Tran, A. N., & Ashby, F. G. (2021). A neurocomputational theory of how rule–guided behaviors become automatic. *Psychological Review, 128,* 488–508.

6. Edmondson, D. A., Yeh, C. L., Hélie, S., & Dydak, U. (2020). Whole–brain R1 predicts manganese exposure and biological effects in welder. *Archives of Toxicology, 94,* 3409–3420.

7. Ell, S. W., Smith, D. B., Deng, R., & Hélie, S. (2020). Learning and generalization of within–category representations in a rule–based category structure. *Attention, Perception, & Psychophysics, 82*(5), 2448–2462.

8. Fleischer, P. & Hélie, S. (2020). A unified model of rule–set learning and selection. *Neural Networks, 124,* 343–356.

9. Hélie, S., Shamloo, F., & Ell, S. W. (2020). The impact of training methodology and category structure on the formation of new categories from existing knowledge. *Psychological Research, 84,* 990–1005.

10. Mishra, P. & Hélie, S. (2020). 3D shape estimation in a constraint optimization network. *Vision Research, 177,* 118–129.

11. Shamloo, F. & Hélie, S. (2020). A study of individual differences in categorization with redundancy. *Journal of Mathematical Psychology, 99,* 102467.

12. Calic, G., Hélie, S., Bontis, N., & Mosakowski, E. (2019). Creativity from paradoxical experience: A theory of how individuals achieve creativity while adopting paradoxical frames. *Journal of Knowledge Management, 23*(3), 397–418.

13. Calic, G. & Hélie, S. (2018). Creative sparks or paralysis traps? The effects of contradictions on creative processing and creative products. *Frontiers in Psychology, 9,* 1489.

14. Crossley, M., Roeder, J., Hélie, S., & Ashby, F. (2018). Trial–by–trial switching between procedural and declarative categorization systems. *Psychological Research, 82*(2), 371–384.

15. Fleischer, P., Hélie, S., & Pizlo, Z. (2018). The role of problem representation in producing near–optimal TSP tours. *Journal of Problem Solving, 11,* 2.

16. Hélie, S. & Fansher, M. (2018). Categorization system–switching deficits in typical aging and Parkinson's disease. *Neuropsychology, 32,* 724–734.

17. Hélie, S., Turner, B., & Cousineau, D. (2018). Can categorical knowledge be used in visual search? *Acta Psychologica*, *191*, 52–62.

18. Sajedinia, Z. & Hélie, S. (2018). A new computational model for astrocytes and their role in biologically–realistic neural networks. *Computational Intelligence and Neuroscience*, *2018*, 3689487.

19. Ell, S. W., Smith, D. B., Peralta, G., & Hélie, S. (2017). The impact of category structure and training methodology on learning and generalizing within–category representations. *Attention, Perception, & Psychophysics*, *79*, 1777–1794.

20. Hélie, S. (2017). Practice and preparation time facilitate system–switching in perceptual categorization. *Frontiers in Psychology*, *8*, 1964.

21. Hélie, S. (2017). The effect of integration masking on visual processing in perceptual categorization. *Brain and Cognition*, *116*, 63–70.

22. Hélie, S., Shamloo, F., & Ell, S. W. (2017). The effect of training methodology on knowledge representation in categorization. *PLOS ONE*, *12*, e0183904.

23. Hélie, S., Shamloo, F., Novak, K., & Foti, D. (2017). The roles of valuation and reward processing in cognitive function and psychiatric disorders. *Annals of the New York Academy of Sciences*, *1395*, 33–48.

24. Hélie, S., Turner, B. O., Crossley, M. J., Ell, S. W., & Ashby, F. G. (2017). Trial–by–trial identification of categorization strategy using iterative decision bound modeling. *Behavior Research Methods*, *49*, 1146–1162.

25. Donaldson, K., Ait Oumeziane, B., Hélie, S., & Foti, D. (2016). The temporal dynamics of reversal learning: P3 amplitude predicts valence-specific behavioral adjustment. *Physiology & Behavior*, *161*, 24–32.

26. Hélie, S. & Fleischer, P. (2016). Simulating the effect of reinforcement learning on neuronal synchrony and periodicity in the striatum. *Frontiers in Computational Neuroscience*, *10*, 40.

27. Shamloo, F. & Hélie, S. (2016). Changes in default mode network as automaticity develops in a categorization task. *Behavioural Brain Research*, *313*, 324–333.

28. Hélie, S. & Cousineau, D. (2015). Differential effect of visual masking in perceptual categorization. *Journal of Experimental Psychology: Human Perception and Performance*, *41*(3), 816–825.

29. Hélie, S., Ell, S. W., & Ashby, F. G. (2015). Learning robust cortico-cortical associations with the basal ganglia: An integrative review. *Cortex*, *64*, 123–135.

30. Hélie, S., Ell, S. W., Filoteo, J. V., & Maddox, W. T. (2015). Criterion learning in rule-based categorization: Simulation of neural mechanism and new data. *Brain and cognition*, *95*(1), 19–34.

31. Hélie, S. & Paul, E. J. (2015). Computational models of cognitive deficits in Parkinson's disease. *Scholarpedia*, *10*, 32137.

32. Hélie, S., Roeder, J. L., Vucovich, L., Rünger, D., & Ashby, F. G. (2015). A neurocomputational model of automatic sequence production. *Journal of Cognitive Neuroscience*, *27*, 1412–1426.

33. Filoteo, J. V., Paul, E. J., Ashby, F. G., Frank, G. K. W., Hélie, S., Rockwell, R., Bischoff-Grethe, A., Wierenga, C., & Kaye, W. H. (2014). Simulating category learning and set shifting deficits in patients weight-restored from anorexia nervosa. *Neuropsychology*, *28*(5), 741–751.

34. Hélie, S. & Sun, R. (2014). An integrative account of memory and reasoning phenomena. *New Ideas in Psychology*, *35*(1), 36–52.

35. Hélie, S. & Sun, R. (2014). Autonomous learning in psychologically-oriented cognitive architectures: A survey. *New Ideas in Psychology*, *34*, 37–55.

36. Hélie, S., Chakravarthy, S., & Moustafa, A. A. (2013). Exploring the cognitive and motor functions of the basal ganglia: An integrative review of computational cognitive neuroscience models. *Frontiers in Computational Neuroscience*, *7*, 174.

37. Cousineau, D. & Hélie, S. (2013). Improving maximum likelihood estimation using prior probabilities: A tutorial on maximum a posteriori estimation and an examination of the weibull distribution. *Tutorials in Quantitative Methods for Psychology*, *9*(2), 61–71.

38. Cousineau, D., Lacroix, G. L., Giguère, G., & Hélie, S. (2013). Learning curves as strong evidence for testing models: The case of EBRW. *Journal of Mathematical Psychology*, *57*(3-4), 107–116.

39. Soto, F., Waldschmidt, J. G., Hélie, S., & Ashby, F. G. (2013). Brain activity across the development of automatic categorization: A comparison of categorization tasks using multi-voxel pattern analysis. *NeuroImage*, *71*, 284–297.

40. Sun, R. & Hélie, S. (2013). Psychologically realistic cognitive agents: Taking human cognition seriously. *Journal of Experimental & Theoretical Artificial Intelligence*, *25*(September 2013), 65–92.

41. Hélie, S. & Ashby, F. G. (2012). Learning and transfer of category knowledge in an indirect categorization task. *Psychological Research*, *76*, 292–303.

42. Hélie, S., Paul, E. J., & Ashby, F. G. (2012). A neurocomputational account of cognitive deficits in Parkinson's disease. *Neuropsychologia*, *50*(9), 2290–2302.

43. Hélie, S., Paul, E. J., & Ashby, F. G. (2012). Simulating the effects of dopamine imbalance on cognition: From positive affect to Parkinson's disease. *Neural Networks*, *32*, 74–85.

44. Ashby, F. G. & Hélie, S. (2011). The neurodynamics of cognition: A tutorial on computational cognitive neuroscience. *Journal of Mathematical Psychology*, *55*(4), 273–289.

45. Hélie, S., Proulx, R., & Lefebvre, B. (2011). Bottom-up learning of explicit knowledge using a Bayesian algorithm and a new Hebbian learning rule. *Neural Networks*, *24*(3), 219–232.

46. Hélie, S., Roeder, J. L., & Ashby, F. G. (2010). Evidence for cortical automaticity in rule-based categorization. *Journal of Neuroscience*, *30*(42), 14225–14234.

47. Hélie, S. & Sun, R. (2010). Incubation, insight, and creative problem solving: A unified theory and a connectionist model. *Psychological Review*, *117*(3), 994–1024.

48. Hélie, S., Waldschmidt, J. G., & Ashby, F. (2010). Automaticity in rule-based and information-integration categorization. *Attention, Perception & Psychophysics*, *72*(4), 1013–1031.

49. Hélie, S. (2008). Energy minimization in the nonlinear dynamic recurrent associative memory. *Neural Networks*, *21*(7), 1041–1044.

50. Hélie, S. (2007). Understanding statistical power using noncentral probability distributions : Chi - squared , G - squared , and ANOVA. *Tutorials in Quantitative Methods for Psychology*, *3*(2), 63–69.

51. Hélie, S. (2006). An introduction to model selection: Tools and algorithms. *Tutorials in Quantitative Methods for Psychology*, *2*(1), 1–10.

52. Hélie, S., Chartier, S., & Proulx, R. (2006). Are unsupervised neural networks ignorant? Sizing the effect of environmental distributions on unsupervised learning. *Cognitive Systems Research*, *7*, 357–371.

53. Hélie, S., Giguère, G., Cousineau, D., & Proulx, R. (2006). Using knowledge partitioning to investigate the psychological plausibility of mixtures of experts. *Artificial Intelligence Review*, *25*(1-2), 119–138.

54. Giguère, G., Hélie, S., & Cousineau, D. (2004). Manifeste pour le retour des sciences en psychologie. *Revue Québécoise de Psychologie*, *25*(3), 117–130.

55. Cousineau, D., Hélie, S., & Lefebvre, C. (2003). Testing curvatures of learning functions on individual trial and block average data. *Behavior Research Methods, Instruments, & Computers*, *35*(4), 493–503.

56. Cousineau, D., Lacroix, G., & Hélie, S. (2003). Redefining the rules: Providing race models with a connectionist learning rule. *Connection Science*, *15*(1), 27–43.

## Articles published in peer–reviewed conference proceedings

1. Lim, L. X. & Hélie, S. (2019). Exploration and exploitation reflect system-switching in learning. In G. Ashok, C. Seifert, & C. Freksa (Eds.). *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 2154–2160). Austin, TX: Cognitive Science Society.

2. Sajedinia, Z., Pizlo, Z., & Hélie, S. (2019). Investigating the role of the visual system in solving the traveling salesperson problem. In G. Ashok, C. Seifert, & C. Freksa (Eds.). *Proceedings of the 41st Annual Meeting of the Cognitive Science Society* (pp. 2702–2707). Austin, TX: Cognitive Science Society.

3. Berberian, N., Aamir, Z., Hélie, S., & Chartier, S. (2016). Encoding sparse features in a bidirectional associative memory. *Proceedings of the International Joint Conference on Neural Networks* (pp. 5119–5126). Vancouver, BC: IEEE Press.

4. Calic, G., Hélie, S., & Mosakowski, E. (2016). Big ideas, one small idea at a time: The power of cognitively proximate search to drive action on cognitively distant ideas. *32nd EGOS Colloquium*. Naples, IT: European Group for Organizational Studies.

5. Calic, G., Hélie, S., & Mosakowski, E. (2015). Nonlinear effects of paradoxical frames on creativity. *31st EGOS Colloquium*. Athens, GR: European Group for Organizational Studies.

6. Barbu, A., Barrett, D., Chen, W., Siddarth, N., Xiong, C., Corso, J., Fellbaum, C., Hanson, C., Hanson, S., Hélie, S., Malaia, E., Pearlmutter, B., Siskind, J., Talavage, T., & Wilbur, R. (2014). Seeing is worse than believing: Reading people's minds better than computer-vision methods recognize actions. In D. Fleet, T. Pajdla, B. Schiele, & T. Tuytelaars (Eds.). *Computer Vision – ECCV 2014* (pp. 612–627). Zurich, CH: Springer.

7. Hélie, S. (2013). Towards a unified neurobiological theory of creative problem solving. *Proceedings of the International Joint Conference on Neural Networks* (pp. 1622–1629). Dallas, TX: IEEE Press.

8. Sun, R. & Hélie, S. (2012). Reasoning with heuristics and induction: An account based on the CLARION cognitive architecture. *Proceedings of the International Joint Conference on Neural Networks* (pp. 1359–1366). Brisbane, AU: IEEE Press.

9. Hélie, S., Paul, E., & FG, A. (2011). Simulating Parkinson's disease patient deficits using a COVIS-based computational model. *Proceedings of the International Joint Conference on Neural Networks* (pp. 207–214). San Jose, CA: IEEE Press.

10. Hélie, S. & R, S. (2011). How the Core Theory of CLARION Captures Human Decision-Making. *Proceedings of the International Joint Conference on Neural Networks* (pp. 173–180). San Jose, CA: IEEE Press.

11. Hélie, S. & Sun, R. (2010). Creative Problem Solving: A CLARION theory. *Proceedings of the International Joint Conference on Neural Networks* (pp. 1460–1466). Barcelona, ES: IEEE Press.

12. Hélie, S. & Ashby, F. G. (2009). A neurocomputational model of automaticity and maintenance of abstract rules. *Proceedings of the International Joint Conference on Neural Networks* (pp. 1192–1198). Atlanta, GA: IEEE Press.

13. Hélie, S. & Sun, R. (2009). Simulating incubation effects using the Explicit Implicit Interaction with Bayes Factor (EII-BF) model. *Proceedings of the International Joint Conference on Neural Networks* (pp. 1199–1205). Atlanta, GA: IEEE Press.

14. Hélie, S. & Sun, R. (2008). Knowledge integration in creative problem solving. In B. C. Love, K. McRae, & V. Sloutsky (Eds.). *Proceedings of the 30th Annual Meeting of the Cognitive Science Society* (pp. 1681–1686). Austin, TX: Cognitive Science Society.

15. Hélie, S., Sun, R., & L, X. (2008). Mixed effects of distractor tasks on incubation. In B. C. Love, K. McRae, & V. Sloutsky (Eds.). *Proceedings of the 30th Annual Meeting of the Cognitive Science Society* (pp. 1251–1256). Austin, TX: Cognitive Science Society.

16. Hélie, S., Wilson, N., & Sun, R. (2008). The CLARION Cognitive Architecture : A Tutorial. In B. C. Love, K. McRae, & V. Sloutsky (Eds.). *Proceedings of the 30th Annual Meeting of the Cognitive Science Society* (pp. 9–10). Austin, TX: Cognitive Science Society.

17. Chartier, S., Hélie, S., Proulx, R., & Boukadoum, M. (2006). Vigilance Procedure Generalization for Recurrent Associative Memories. In R. Sun & N. Miyake (Eds.). *Proceedings of the 28th Annual Meeting of the Cognitive Science Society* (p. 2458). Mahwah, NJ: Lawrence Erlbaum Associates.

18. Hélie, S., Proulx, R., & Lefebvre, B. (2006). JPEX: A psychologically plausible Joint Probability EXtractor. In R. Sun & N. Miyake (Eds.). *Proceedings of the 28th Annual Meeting of the Cognitive Science Society* (pp. 1482–1487). Mahwah, NJ: Lawrence Erlbaum Associates.

19. Chartier, S., Hélie, S., Boukadoum, M., & Proulx, R. (2005). SCRAM: Statistically converging recurrent associative memory. *Proceedings of the International Joint Conference on Neural Networks* (pp. 723–728). Montréal, QC: IEEE Press.

20. Giguère, G., St-Louis, B., Hélie, S., & Harnad, S. (2005). The role of intra-stimulus variance in perceptual category learning. In B. Bara, L. Barsalou, & M. Bucciarelli (Eds.). *Proceedings of the 27th Annual Meeting of the Cognitive Science Society* (p. 2485). Mahwah, NJ: Lawrence Erlbaum Associates.

21. Hélie, S. & Cousineau, D. (2005). Mixed effects of training on transfer. In B. Bara, L. Barsalou, & M. Bucciarelli (Eds.). *Proceedings of the 27th Annual Meeting of the Cognitive Science Society* (pp. 929–934). Mahwah, NJ: Lawrence Erlbaum Associates.

22. Hélie, S., Giguère, G., Cousineau, D., & Proulx, R. (2005). Are Mixtures-of-Experts Psychologically Plausible? In N. Creany (Ed.). *AICS'05: Proceedings of the 16th Irish Conference on Artificial Intelligence and Cognitive Science* (pp. 61–70). Coleraine, UK: University of Ulster.

23. Hélie, S. (2004). Emergence of Bayesian structures from recurrent networks. In M. Lovett, C. Schunn, C. Lebiere, & M. P (Eds.). *Proceedings of the 6th International Conference on Cognitive Modelling* (pp. 408–409). Mahwah, NJ: Lawrence Erlbaum Associates.

24. Hélie, S., Chartier, S., & Proulx, R. (2004). Applying fuzzy logic to neural modeling. In M. Lovett, C. Schunn, C. Lebiere, & M. P (Eds.). *Proceedings of the 6th International Conference on Cognitive Modelling* (pp. 352–353). Mahwah, NJ: Lawrence Erlbaum Associates.

25. Hélie, S. & Cousineau, D. (2003). Testing the equality of learning rates using a linear hypothesis. In R. Alterman & D. Kirsh (Eds.). *Proceedings of the 25th Annual Meeting of the Cognitive Science Society* (p. 1355). Boston, MA: Cognitive Science Society.

## Book chapters

1. Hélie, S. & Olteteanu, A.-M. (in press). Computational models of creativity. In R. Sun (Ed.). *Cambridge Handbook of Computational Cognitive Sciences. 2nd Edition*. Cambridge University press.

2. Hélie, S. & Sajedinia, Z. (2019). Computational models of Parkinson's disease. In V. Cutsuridis (Ed.). *Multi–Scale Models of Brain Disorders* (pp. 105–112). Springer.

3. Ross, M., Chartier, S., & Hélie, S. (2017). The neurodynamics of categorization: Critical challenges and proposed solutions. In H. Cohen & C. Lefebvre (Eds.). *Handbook of Categorization in Cognitive Science. 2nd Edition* (pp. 1053–1076). Oxford: Elsevier.

4. Hélie, S. & Sun, R. (2015). Cognitive architectures and agents. In J. Kacprzyk & W. Pedrycz (Eds.). *Springer Handbook of Computational Intelligence* (pp. 683–696). Springer.

5. Sun, R. & Hélie, S. (2015). Accounting for creativity using a psychologically realistic cognitive architecture. In T. R. Besold, M. Schorlemmer, & A. Smaill (Eds.). *Computational Creativity Research: Towards Creative Machines* (pp. 151–166). Springer.

6. Hélie, S. & Cousineau, D. (2014). The cognitive neuroscience of automaticity: Behavioral and brain signatures. In M.-K. Sun (Ed.). *Advances in Cognitive and Behavioral Sciences* (pp. 141–159). Nova Science Publishers.

7. Hélie, S. & Sun, R. (2013). Implicit cognition in problem solving. In S. Hélie (Ed.). *The Psychology of Problem Solving: An Interdisciplinary Approach* (pp. 45–59). New York: Nova Publishers.

8. Ell, S. W., Hélie, S., & Hutchinson, S. (2012). Contributions of the putamen to cognitive function. In A. Costa & E. Villalba (Eds.). *Horizon in Neuroscience. Volume 7* (pp. 29–52). New York: Nova Publishers.

9. Proulx, R. & Hélie, S. (2005). Adaptive categorization and neural networks. In H. Cohen & C. Lefebvre (Eds.). *Handbook of Categorization in Cognitive Science* (pp. 793–815). Oxford: Elsevier.

## Manuscripts in preparation or submitted to peer–reviewed journals

1. Ashby, F., Musgrave, R., Wang, Y.-W., & Hélie, S. (in preparation). Rule discovery without stimulus-specific associative learning.

2. Donaldson, K. R., Ait Oumeziane, B., Lim, L. X., Baum, R., Hélie, S., Lynam, D. R., & Foti, D. (in preparation). Individual differences in reward and punishment learning in relation to pathological gambling and spontaneous eye–blink rate.

3. Hélie, S., Lim, L. X., Fansher, M., & Redick, T. (submitted). A computational model of the interaction of neurobiological circuits. *Psychological Review.*

4. Lim, L. X., Fansher, M., & Hélie, S. (submitted). Do cognitive and physical effort costs affect choice behavior similarly? *Journal of Mathematical Psychology.*

5. Monni, A., Scalas, L. F., Scandola, M., & Hélie, S. (submitted). A new reversal learning task paradigm and the comparison with the Wisconsin Card Sorting Test: The effect of gender and stress on cognitive flexibility assessment. *Psychological Research.*

# Presentations

## Abstracts published in peer–reviewed conference programs

1. Hélie, S., Lim, L. X., & Fansher, M. (June 2022). Is willingness to devote cognitive and physical effort a general trait? *5th Multi–disciplinary Conference on Reinforcement Learning and Decision Making.* Providence, RI.

2. Sack, L., Hélie, S., Singh, S., Scoppa, M., Savkovic, N., & Goffman, L. (June 2022). Does sequential pattern learning on a serial reaction time task relate to language, motor, and cognitive skills in preschool–aged children? *Symposium on Research in Child Language Disorders.* Madison, WI.

3. Lim, L. X., Hélie, S., & Fansher, M. (November 2021). Cognitive and physical effort-based decision–making: Comparable effort discounting in choice selection. *62nd Annual Meeting of the Psychonomic Society.* New Orleans, LA.

4. Randez, A. & Hélie, S. (November 2021). Cognitive effort–based decision-making without overt reward. *62nd Annual Meeting of the Psychonomic Society.* New Orleans, LA.

5. Lim, L. X. & Hélie, S. (November 2020). A computational model of the interaction of neurobiological circuits for category learning. *61st Annual Meeting of the Psychonomic Society.* Austin, TX.

6. Deng, R., Savoie, R., Michaud, S., Stevenson, O., Herbert, M., Driscoll, A., Smith, D., Hélie, S., & Ell, S. W. (November 2019). Generalization of within–category representations. *60th Annual Meeting of the Psychonomic Society.* Montréal, QC.

7. Sajedinia, Z. & Hélie, S. (October 2019). Investigating the role of glia astrocytes in Parkinson's disease by using a computational model of astrocytes. *49th Annual Meeting of the Society for Neuroscience.* Chicago, IL.

8. Fansher, M., Hélie, S., & Shah, P. (June 2019). The role of internal and external representations in strategy learning in the Tower of Hanoi. *13th Annual Meeting of the Society for Applied Research in Memory and Cognition.* Cape Cod, MA.

9. Hélie, S., Shamloo, F., Fansher, M., & Ell, S. W. (March 2019). Using fMRI to explore the effects of task instructions and response strategy. *26th Annual Meeting of the Cognitive Neuroscience Society.* San Francisco, CA.

10. Smith, D. B., Dang, R., Driscoll, A. B., Savoie, R., Hélie, S., & Ell, S. W. (November 2018). Learning and generalization of within–category representations in rule–based tasks. *59th Annual Meeting of the Psychonomic Society*. New Orleans, LA.

11. Calic, G. & Hélie, S. (August 2018). A theory of the relationship between organizational tensions and creative performance. *Academy of Management Annual Meeting*. Chicago, IL.

12. Fleischer, P., Pizlo, Z., & Hélie, S. (July 2018). Using log-polar representations of TSP problems to produce near–optimal tours. *51st Annual Meeting of the Society for Mathematical Psychology*. Madison, WI.

13. Edmondson, D. A., Yeh, C., Davis, J., Hélie, S., & Dydak, U. (April 2018). Whole-brain R1 imaging identifies workers exposed to manganese. *Toxicology and Risk Assessment Conference*. Cincinnati, OH.

14. Sajedinia, Z. & Hélie, S. (March 2018). Exploring the role of astrocytes in synaptic plasticity: A computational model. *Greater Indiana Chapter Society for Neuroscience*. West Lafayette, IN.

15. Hélie, S. & Fansher, M. (November 2017). The effects of typical aging and Parkinson's disease on trial–by-trial switching between categorization systems. *58th Annual Meeting of the Psychonomic Society*. Vancouver, BC.

16. Smith, D. B., Hélie, S., & Ell, S. W. (November 2017). Can within–category representations be learned and generalized in rule–based tasks? *58th Annual Meeting of the Psychonomic Society*. Vancouver, BC.

17. Fansher, M., Redick, T., & Hélie, S. (June 2017). Categorization system switching: The role of individual differences in executive function. *6th Midwestern Cognitive Science Conference*. Oxford, OH.

18. Taylor, J., Shamloo, F., Fansher, M., Ell, S. W., & Hélie, S. (June 2017). The impact of training methodology on the formation of new categories from existing knowledge. *6th Midwestern Cognitive Science Conference*. Oxford, OH.

19. Hutchison, Z., Hélie, S., & Ell, S. W. (March 2017). sFROST: A spiking model of working memory maintenance. *24th Annual Meeting of the Cognitive Neuroscience Society*. San Francisco, CA.

20. Peralta, G., Smith, D. B., Hélie, S., & Ell, S. W. (November 2016). The learning and generalization of within-category representations. *57th Annual Meeting of the Psychonomic Society*. Boston, MA.

21. Shamloo, F., Ell, S. W., & Hélie, S. (November 2016). The effects of training methodology and category similarity on the compositionality of rule–based categorization. *57th Annual Meeting of the Psychonomic Society*. Boston, MA.

22. Foti, D., Oumeziane, A., & Hélie, S. (September 2016). Reversal learning: Temporal dynamics and individual differences. *56th Annual Meeting of the Society for Psychophysiological Research*. Minneapolis, MN.

23. Berberian, N., Aamir, Z., Hélie, S., & Chartier, S. (June 2016). Sparse coding provides an efficient representation of the sensory environment. *26th Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science*. Ottawa, ON.

24. Calic, G. & Hélie, S. (June 2016). A theory of individual differences in creative responses to paradoxical situations. *26th Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science*. Ottawa, ON.

25. Hélie, S., Shamloo, F., Jellison, L. D., & Ell, S. W. (November 2015). Empirical cross-validation and generalization in perceptual categorization. *56th Annual Meeting of the Psychonomic Society*. Chicago, IL.

26. Szymula, L., Hutchison, S., Heikkinen, M., Hélie, S., & Ell, S. (November 2015). The impact of category structure and training methodology on the acquisition and generalizability of within-category information. *56th Annual Meeting of the Psychonomic Society*. Chicago, IL.

27. Fleischer, P. & Hélie, S. (March 2015). The effect of reinforcement learning on neural synchrony in the striatum. *22nd Annual Meeting of the Cognitive Neuroscience Society*. San Francisco, CA.

28. Shamloo, F. & Hélie, S. (March 2015). Changes in connectivity pattern in default mode network with development of automaticity. *22nd Annual Meeting of the Cognitive Neuroscience Society*. San Francisco, CA.

29. Hélie, S., Roeder, J., Vucovich, L., Rünger, & Ashby, F. (July 2014). Automatic sequence production in the brain: A neurocomputational model. *47th Annual Meeting of the Society for Mathematical Psychology.* Québec, QC.

30. Shamloo, F., Ashby, F., & Hélie, S. (April 2014). Decrease of default mode network deactivation in rule-based categorization during development of automaticity. *21st Annual Meeting of the Cognitive Neuroscience Society.* Boston, MA.

31. Hélie, S., Ell, S., Filoteo, J., Glass, B., & Maddox, W. (April 2013). A computational cognitive neuroscience model of criterion learning in rule-guided behavior. *20th Annual Meeting of the Cognitive Neuroscience Society.* San Farncisco, CA.

32. Hélie, S., Ell, S., Filoteo, J., Glass, B., & Maddox, W. (November 2012). A neurocomputational model of criterion learning in rule-based categorization. *53rd Annual Meeting of the Psychonomic Society.* Minneapolis, MN.

33. Hutchison, S., Hélie, S., McCoy, S., & Ell, S. (October 2012). An investigation of the impact of stress on a spiking model of working memory maintenance. *42nd Annual Meeting of Society for Neuroscience.* New Orleans, LA.

34. Roeder, J., Vucovich, L., Rünger, D., Hélie, S., & Ashby, F. (October 2012). A computational model of implicit motor sequence learning. *42nd Annual Meeting of Society for Neuroscience.* New Orleans, LA.

35. Soto, F., Waldschmidt, J. G., Hélie, S., & Ashby, F. G. (October 2012). Multi-voxel pattern analysis of fMRI data reveals changes in category representations accompanying the development of automaticity. *42nd Annual Meeting of Society for Neuroscience.* New Orleans, LA.

36. Turner, B., Paul, E., Hélie, S., & Ashby, F. (April 2012). Multiple functions of dopamine during human category learning: A genetic triple dissociation. *19th Annual Meeting of the Cognitive Neuroscience Society.* Chicago, IL.

37. Hélie, S., Paul, E., Turner, B., Foley, N., Gerber, C., Cheng, A., & Ashby, F. (April 2011). Parsing the effect of COMT genotypes on dimension selection and criterion learning in rule-based categorization. *18th Annual Meeting of the Cognitive Neuroscience Society.* San Francisco, CA.

38. Paul, E., Hélie, S., & Ashby, F. (April 2011). Simulating cognitive deficits in Parkinson's disease using a computational implementation of COVIS. *18th Annual Meeting of the Cognitive Neuroscience Society.* San Francisco, CA.

39. Waldschmidt, J., Hélie, S., Roeder, J., & Ashby, F. (April 2011). Separate systems for initial category learning, but a common system for automatic categorization. *18th Annual Meeting of the Cognitive Neuroscience Society.* San Francisco, CA.

40. Hélie, S., Roeder, J., Kaufman, S., Liban, K., & Ashby, F. (November 2010). Evidence for a rostrocaudal organization of the prefrontal cortex in rule representation and a ventrodorsal organization of the premotor cortex in rule automaticity. *40th Annual Meeting of the Society for Neuroscience.* San Diego, CA.

41. Paul, E., Hélie, S., & Ashby, F. (November 2010). A neurocomputational model of the effects of Parkinson's disease on perceptual category learning. *40th Annual Meeting of the Society for Neuroscience.* San Diego, CA.

42. Hélie, S., Waldschmidt, J., Liban, K., Morrison, M., Moser, A., & Ashby, F. (November 2009). The effect of button switch and dual task conditions on automatic categorization performance. *50th Annual Meeting of the Psychonomic Society.* Boston, MA.

43. Hélie, S. & Ashby, F. (March 2009). A neurocomputational model of automaticity in rule-guided behavior. *16th Annual Meeting of the Cognitive Neuroscience Society.* San Francisco, CA.

44. Hélie, S. & Sun, R. (July 2008). The ubiquity of implicit processing in free recall and insight problem solving: Reminiscence and overshadowing. *41st Annual Meeting of the Society for Mathematical Psychology.* Washington, DC.

45. Hélie, S. & Sun, R. (July 2007). Modeling the role of implicit processes in problem solving using a connectionist model. *40th Annual Meeting of the Society for Mathematical Psychology.* Costa Mesa, CA.

46. Hélie, S., Proulx, R., & Lefebvre, B. (August 2006). Locally learning joint probabilities using a new connectionist architecture. *39th Annual Meeting of the Society for Mathematical Psychology*. Vancouver, BC.

47. Giguère, G., Hélie, S., Cousineau, D., & Proulx, R. (July 2005). The effect of cue competition and complexity on the use of knowledge partitioning in function learning. *15th Annual Meeting of the Canadian Society for Brain, Behaviour, and Cognitive Science*. Montréal, QC.

48. Giguère, G., Hélie, S., Cousineau, D., & Proulx, R. (November 2003). Une étude de la généralité du phénomène de partition des connaissances en apprentissage de fonctions. *26th Annual Meeting of the Société Québécoise pour la Recherche en Psychologie*. Montréal, QC.

49. Hélie, S., Giguère, G., Proulx, R., & Cousineau, D. (November 2003). Partitioning polynomials: A study of context-dependent learning. *44th Annual Meeting of the Psychonomic Society*. Vancouver, BC.

50. Hélie, S. & Proulx, R. (November 2003). Effet de la distribution environnementale sur l'apprentissage dans un réseau autoassociatif. *26th Annual Meeting of the Société Québécoise pour la Recherche en Psychologie*. Montréal, QC.

51. Hélie, S. & Cousineau, D. (June 2003). Latent interference of task-related knowledge on learning transfer. *13th Annual Meeting of the Canadian Society for Brain, Behaviour, and Cognitive Science*. Hamilton, ON.

52. Vinette, C., Gosselin, F., Schyns, P., Giguère, G., Hélie, S., Lefebvre, C., & Tremblay, E. (2002). A comparison of the effective use of visual information in upright and inverted faces. *25th European Conference on Visual Perception*. Glasgow, UK.

53. Hélie, S., Cousineau, D., Charbonneau, D., & Lefebvre, C. (November 2002). Stimulus processing and task dependency. *43rd Annual Meeting of the Psychonomic Society*. Kansas City, MO.

54. Charbonneau, D., Lefebvre, C., Hélie, S., & Cousineau, D. (October 2002). échec de la stratégie et de la préparation sur l'amplitude du vacillement de l'attention. *25th Annual Meeting of the Société Québécoise pour la Recherche en Psychologie*. Trois-Rivière, QC.

55. Hélie, S. & Cousineau, D. (October 2002). Dissociation de l'apprentissage des stimuli et de l'apprentissage de la tâche dans le transfert des habiletés. *25th Annual Meeting of the Société Québécoise pour la Recherche en Psychologie*. Trois-Rivière, QC.

56. Cousineau, D., Hélie, S., & Lefebvre, C. (May 2002). (Learning Categorization With a Race Model) Brain: Democracy or Stock Market? *2nd Annual Meeting of the Vision Science Society*. Sarasota, FL.

57. Cousineau, D., Hélie, S., & Lefebvre, C. (November 2001). "Same"-"Different", cue validity and detection task fitted by a parallel race model: The ubiquitous presence of priming. *42nd Annual Meeting of the Psychonomic Society*. Orlando, FL.

58. Savoie, N., Robert, M., Chevrier, E., & Hélie, S. (June 2001). Are there gender differences in verbal and visuo-spatial working memory? *11th Annual Meeting of the Canadian Society for Brain, Behaviour, and Cognitive Science*. Québec, QC.

59. Lacroix, G., Hélie, S., & Larochelle, S. (July 2000). Testing the unconscious influence of exemplar memory on conscious category decisions. *4th Conference of the Association for the Scientific Study of Consciousness*. Brussels, BE.

## Invited speaker

1. Hélie, S. (March 2022). The complementary roles of the basal ganglia and cortex in automaticity. *Cognitive Science Colloquium*. Rensselaer Polytechnic Institute, Troy, NY.

2. Hélie, S. (March 2022). The effects of task manipulations on perceptual category representation and updating: an fmri study. *Talks on Cognitive Neuroscience*. Lesya Ukrainka Volyn National University, Lutsk, UA.

3. Hélie, S. (February 2022). Rule–based automaticity in perceptual categorization. *Mathematical and Computational Psychology Colloquia*. Purdue University, West Lafayette, IN.

4. Hélie, S. (December 2021). Flexible system–switching in perceptual categorization. *Cognitive Brownbag.* University of Illinois, Urbana–Champaign, IL.

5. Hélie, S. (April 2021). Workshop on computational cognitive neuroscience. *Society of Industrial and Applied Mathematics Webinar.* Purdue University, West Lafayette, IN.

6. Hélie, S. (March 2021). Different brain–based representation of rules in perceptual categorization. *Mathematical and Computational Psychology Colloquia.* Purdue University, West Lafayette, IN.

7. Hélie, S. (October 2019). Psychological and brain–based representation of rules in perceptual categorization. *Cognitive Colloquia.* Purdue University, West Lafayette, IN.

8. Hélie, S. (May 2019). The effect of task instructions on knowledge representation. *Psychology, Neuroscience & Behaviour Colloquium.* McMaster University, Hamilton, ON.

9. Hélie, S. (April 2019). What is the role of the basal ganglia in automatic sequence production? *Applied Quantitative Brownbag.* Colorado State University, Fort Collins, CO.

10. Hélie, S. (April 2019). What makes finding a needle in a haystack difficult? *Cognitive Psychology Brownbag.* Colorado State University, Fort Collins, CO.

11. Hélie, S. (March 2019). The impact of training methodology on category representation. *Cognition, Perception, and Cognitive Neuroscience Seminar.* University of California, Santa Barbara, CA.

12. Hélie, S. (March 2019). The role of task instructions for generalization in perceptual categorization. *Department of Cognitive Sciences Seminar.* University of California, Irvine, CA.

13. Hélie, S. (February 2019). fMRI in perceptual category learning. *Purdue Association for Magnetic Resonance.* Purdue University, West Lafayette, IN.

14. Hélie, S. (February 2019). Generalization in rule–based categorization. *Vison – Integration – Cognition Laboratory.* University of Ottawa, Ottawa, ON.

15. Hélie, S. (July 2018). Generating predictions about the iterative nature of innovation using the Explicit-Implicit Interaction theory of creative problem solving. *CreaCogMod 2018.* Workshop at the Annual Meeting of the Cognitive Science Society, Madison, WI.

16. Hélie, S. (April 2018). Exploring factors influencing trial–by–trial switching in categorization. *Health & Kinesiology Seminars.* Purdue University, West Lafayette, IN.

17. Hélie, S. (November 2017). Using fMRI to characterize category representation. *5th Indiana NeuroImaging Symposium.* West Lafayette, IN.

18. Hélie, S. (October 2017). Using multivariate pattern analysis to explore visual noise processing. *Mathematical and Computational Cognitive Science Colloquia.* Purdue University, West Lafayette, IN.

19. Hélie, S. (September 2017). System–switching in perceptual categorization. *Cognitive Colloquia.* Purdue University, West Lafayette, IN.

20. Hélie, S. (July 2017). Training your brain for auto–pilot. *Workshop on Convergent Data Science Solutions to Safer Systems.* West Lafayette, IN.

21. Hélie, S. (April 2017). Rule-based categorization in a multiple-system framework. *International Graduate School of Neuroscience.* Ruhr University, Bochum, DE.

22. Sun, R. & Hélie, S. (March 2017). Accounting for creativity within a unified framework. *International Convention of Psychological Science.* Vienna, AT.

23. Hélie, S. (December 2016). Generalization in perceptual categorization. *Mathematical and Computational Cognitive Science Colloquia.* Purdue University, West Lafayette, IN.

24. Hélie, S. (September 2016). A dopamine-based account of cognitive deficits in Parkinson's disease. *Monthly Seminar.* Center for Research on Brain, Behavior, and NeuroRehabilitation, Purdue University, West Lafayette, IN.

25. Hélie, S. (September 2016). What can computational models tell us about how the brain automatizes sequence production? *Lunch Seminar*. Center for Computational & Applied Mathematics, Purdue University, West Lafayette, IN.

26. Hélie, S. (June 2016). System-specific effect of visual masking in perceptual categorization. *26th Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science*. Ottawa, ON.

27. Hélie, S. (June 2016). The role of the supplementary motor area in automatic sequence production. *NeuroNetworking Seminar*. Purdue Institute for Integrative Neuroscience, Purdue University, West Lafayette, IN.

28. Hélie, S. (February 2016). The neurobiology of automatic sequence production in primates. *Behavioral Neuroscience Colloquia*. Purdue University, West Lafayette, IN.

29. Hélie, S. (November 2014). What can category learning tell us about knowledge representation? *Cognitive Colloquia*. Purdue University, West Lafayette, IN.

30. Hélie, S. (September 2014). Can biology constraint criterion learning in rule-based categorization? *Mathematics + Computation + Science = Solutions*. Indiana University-Purdue University, Indianapolis, IN.

31. Hélie, S. (September 2014). Un nouveau modèle neurocomputationel d'automaticité en production de séquences. *Exposés Séminaire Informatique Cognitive*. Université du Québec À Montréal, Montréal, QC.

32. Hélie, S. (March 2014). A neurocomputational model of automatic sequence production. *Mathematical and Computational Cognitive Science Colloquia*. Purdue University, West Lafayette, IN.

33. Hélie, S. (March 2014). The computational cognitive neuroscience of automatic sequence production. *School of Science Institute for Mathematical Modeling and Computational Science Seminar*. Indiana University-Purdue University, Indianapolis, IN.

34. Hélie, S. (November 2013). Using data-mining methods to account for human learning in psychology. *Machine Learning and Applications Seminar*. Purdue University, West Lafayette, IN.

35. Hélie, S. (August 2013). Towards a unified neurobiological theory of creative problem solving. *Neurocomputational Models of Thought and Creativity*. Special Session at the International Joint Conference on Neural Networks, Dallas, TX.

36. Hélie, S. (March 2013). Changes in behavior and BOLD response with over-training in rule-based categorization. *Cognitive Neuroscience Seminars*. Beckman Institute, University of Illinois, Urbana-Champaign, IL.

37. Hélie, S. (February 2013). Simulating cognitive deficits in Parkinson's disease using a computational cognitive neuroscience model. *Mathematical Neuroscience Seminar*. Indiana University-Purdue University, Indianapolis, IN.

38. Hélie, S. (October 2012). Autonomous learning in cognitive architectures. *Third INNS Winter Conference: Trends in Natural and Machine Intelligence*. Bangkok, TH.

39. Hélie, S. (October 2012). Bottom-up learning of causal knowledge using a hybrid connectionist/Bayesian network. *Mathematical and Computational Cognitive Science Colloquia*. Purdue University, West Lafayette, IN.

40. Hélie, S. (September 2012). Computational exploration of cognitive deficits in Parkinson's disease. *Learning & Memory/Cognitive Colloquia*. Purdue University, West Lafayette, IN.

41. Hélie, S. (September 2011). The cognitive neuroscience of automaticity in verbalizable categorization. *Cognitive Forum*. University of California, Los Angeles, CA.

42. Hélie, S. (January 2011). The neurodynamics of brain and behavior: An introduction to computational cognitive neuroscience. *INNS International Educational Symposium on Neural Networks*. Lima, PE.

43. Hélie, S. (October 2010). The cognitive neuroscience of automaticity in rule-based categorization. *Cognition, Perception, and Cognitive Neuroscience Seminar Series*. University of California, Santa Barbara, CA.

44. Hélie, S. (June 2009). Simulating incubation effects using the Explicit-Implicit Interaction with Bayes Factor (EII–BF) model. *Neural Network Models of the Human Mind: Thinking, Decision Making, and Social Interaction.* Special Session at the International Joint Conference on Neural Networks, Atlanta, GA.

45. Hélie, S. (February 2009). Modeling the interaction between explicit and implicit processing in creative problem solving. *Quantitative Methods in the Social Sciences Colloquia.* University of California, Santa Barbara, CA.

46. Hélie, S. (January 2009). Bayesian learning of explicit knowledge in a dual–process model. *Cognition, Perception, and Cognitive Neuroscience Seminar Series.* University of California, Santa Barbara, CA.

47. Hélie, S. (January 2008). An integrative account of incubation and insight in creative problem solving. *Issues in Cognitive Science Colloquia Series.* Rensselaer Polytechnic Institute, Troy, NY.

48. Hélie, S. (November 2007). Modeling the emergence of explicit causal knowledge with a Bayesian belief network. *Mathematical Sciences Colloquium.* Rensselaer Polytechnic Institute, Troy, NY.

49. Hélie, S. (November 2007). Modeling the role of implicit processes in creative problem solving. *Presentation at the Autonomous Learning Laboratory.* University of Massachusetts, Amherst, MA.

50. Hélie, S. (March 2007). Modeling bottom–up learning of explicit knowledge using a new Hebbian learning rule. *Minds & Machines Luncheons.* Rensselaer Polytechnic Institute, Troy, NY.

51. Hélie, S. (February 2007). Modeling bottom–up learning of explicit knowledge using a Bayesian belief network and a new Hebbian learning rule. *Cognitive Science Research Seminar.* Carleton University, Ottawa, ON.

52. Hélie, S. (March 2006). L'espace psychologique métrique et ses implications. *28th Annual Meeting of the Société Québécoise pour la Recherche en Psychologie.* Montréal, QC.

53. Hélie, S. (June 2005). Sélection de modèles. *4th École d'Été en Méthodes Quantitatives Avancées.* Montréal, QC.

54. Hélie, S. (June 2004). Introduction au connexionnisme. *3rd École d'Été en Méthodes Quantitatives Avancées.* Montréal, QC.

55. Hélie, S. (November 2003). Isomorphisme de surface et isomorphisme de propriétés: Faut-il avoir des plumes pour voler? *26th Annual Meeting of the Société Québécoise pour la Recherche en Psychologie.* Montréal, QC.

## Media and popular press

1. Award-Winning Associate Professor and Investigator Reveals his Academic Journey Coming to America. *Master's in Psychology Podcast* (06/18/2021).

2. Using machine learning and brain imaging to understand categorization in noisy environments. *Science Trends* (03/06/2018).

3. Hélie, S. & Sun, R. (2011). Accounting for creativity using a psychologically realistic cognitive architecture. *Natural Intelligence*, *1*, 7–12.

4. New psychology theory enables computers to mimic human creativity. *Science Daily* (12/02/2010).

5. Frontal lobe of the brain is key to automatic responses to various stimuli, say scientists. *Science Daily* (11/02/2010).

6. Hélie, S. (2002). Les réseaux de neurones: Est-ce le temps pour une nouvelle génération de modèles? *DIRE*, *11*, 28–29.

## Other abstracts

1. Lim, L. X., Hélie, S., & Fansher, M. (April 2022). Cognitive and physical effort: Similar discounting effect on reward motivation. *Fourth Annual CEREBBRAL Symposium*. West Lafayette, IN.

2. Randez, A., Yao, S., Johnson, J., & Hélie, S. (April 2022). Relative task demand & preference. *Fourth Annual CEREBBRAL Symposium*. West Lafayette, IN.

3. Lim, L. X., Miller, C., & Hélie, S. (April 2019). Choice–effort in motor and cognitive tasks. *Third Annual CEREBBRAL Symposium*. West Lafayette, IN.

4. Mishra, P., Mallick, R., & Hélie, S. (April 2019). A network for 3D perception using psychophysical constraints. *Third Annual CEREBBRAL Symposium*. West Lafayette, IN.

5. Sajedinia, Z. & Hélie, S. (April 2019). Using models of glia astrocytes in simulations of Parkinson's disease. *Third Annual CEREBBRAL Symposium*. West Lafayette, IN.

6. Novak, K, S, N. W., Oumeziane, B. A., Lee, T. C., Stump, T., Buck, S. P., Mitchell, M. E., B, T., Hélie, S., & Foti, D. (October 2018). Multimodal investigation of reward processing and procedural learning deficits in the fmr1 premutation: methodological approach and preliminary data. *Indiana Clinical and Translational Sciences Institute University of Notre Dame Retreat*. South Bend, IN.

7. Fansher, M. & Hélie, S. (April 2018). The role of internal and external representations in strategy acquisition. *Undergraduate Research Conference*. West Lafayette, IN.

8. Sajedinia, Z., Fleischer, P., & Hélie, S. (November 2017). Investigating the role of visual systems in solving the traveling salesperson problem. *HHS Fall Research Day*. West Lafayette, IN.

9. Fansher, M. & Hélie, S. (April 2017). The effects of aging and Parkinson's disease on trial–by-trial switching between categorization systems. *Undergraduate Research & Poster Symposium*. West Lafayette, IN.

10. Heikkinen, M., Rubin, N., Perry, E., Groat, A., G, P., Hutchinson, S., Hélie, S., & Ell, S. (May 2015). The impact of category structure and training methodology on the development and generalizability of within-category knowledge. *6th annual meeting of Mainely Data*. Biddeford, ME.

11. Giguère, G. & Hélie, S. (September 2003). Des sciences naturelles aux sciences humaines: Vers une vision intégrée de l'informatique cognitive. *1st Colloque du Doctorat en Informatique Cognitive*. Montréal, QC.

12. Hélie, S. & Cousineau, D. (July 2003). Negative transfer of task-related knowledge on a categorization task. *1st UQÀM Summer Institute in Cognitive Sciences on Categorization*. Montréal, QC.

13. Charbonneau, D., Lefebvre, C., Hélie, S., & Cousineau, D. (April 2003). Ballisticité du traitement attentionnel. *12th Journée Scientifique du GRENEC*. Orford, QC.

14. Hélie, S., Cousineau, D., Lefebvre, D., & Charbonneau, D. (April 2003). Le rôle de la composition du stimulus dans l'apprentissage d'une tâche. *12th Journée Scientifique du GRENEC*. Orford, QC.

## Other contributions

1. Hélie, S. (2007). Modélisation de l'apprentissage ascendant des connaissances explicites dans une architecture cognitive hybride. *Doctoral Dissertation*. Montréal, QC: Université du Québec À Montréal.

2. Hélie, S. (2003). Dissociation de l'apprentissage des stimuli et de l'apprentissage de la tâche dans le transfert des habiletés. *Master's Dissertation*. Montréal, QC: Université de Montréal.

# Professional society membership

- Behavioral and Brain Sciences, Associate
- Cognitive Neuroscience Society
- Cognitive Science Society
- International Neural Network Society, Senior Member
- Organization for Human Brain Mapping
- Psychonomic Society, Fellow
- Society for Judgment and Decision Making
- Society for Mathematical Psychology

# Professional activities

## Committees

- Editorial board, *Frontiers in Human Neuroscience* — 2015 – Now
- Editorial board, *Neural Networks* — 2015 – Now
- Editorial board, *The Quantitative Methods for Psychology* — 2005 – Now
- Editorial board, *Cognitive Systems Research* — 2012 – 2018
- Member of the program committee of the *International Joint Conference on Neural Networks* — 2019
- Member of the program committee of the *International Joint Conference on Neural Networks* — 2017
- Organizer of the symposium "Visual attention" at the *26th Annual Meeting of the Canadian Society for Brain, Behaviour and Cognitive Science* — 2016
- Member of the program committee of the *Annual Conference of the Cognitive Science Society* — 2010 – 2015
- Member of the program committee of the *International Joint Conference on Neural Networks* — 2015
- Co–chair of the *47th Annual Meeting of the Society for Mathematical Psychology* — 2014
- Panelist at a special session entitled Neurocomputational Models of Thought and Creativity at the *International Joint Conference on Neural Networks* — 2013
- Member of the program committee of the *International Joint Conference on Neural Networks* — 2013
- Member of the program committee of the *INNS Winter Conference (INNS-WC2012)* — 2012
- Member of the program committee of the *International Conference on Artificial Neural Networks* — 2011
- Member of the program committee of the *International Joint Conference on Neural Networks* — 2011
- Member of the program committee of the *INNS International Educational Symposium on Neural Networks* — 2011

- Chair of the tutorial on the CLARION cognitive architecture at the *International Joint Conference on Neural Networks*                                                    2009

- Panelist at a special session entitled Neural network models of the human mind: Thinking, decision making, and social interaction at the *International Joint Conference on Neural Networks*                                                    2009

- Chair of the tutorial on the CLARION cognitive architecture at the *30th Annual Meeting of the Cognitive Science Society (full day)*                                      2008

- Member of the program committee of the *International Joint Conference on Neural Networks*                                                    2007

- Organizer of the symposium "L'espace psychologique métrique et ses implications" (Metric psychological space and its implications) at the *28th Annual Meeting of the Société Québécoise pour la Recherche en Psychologie*                     2006

## Ad hoc reviewer (publications)

Academy of Management Review • American Journal of Psychology • Artificial Intelligence Review • Behaviour & Information Technology • Behavior Research Methods • Behavioural Brain Research • Behavioural Processes • Biological Cybernetics • Biological Psychiatry • Biological Psychology • Brain Research • Cambridge University Press • Cerebral Cortex • Cognitive Computation • Cognitive Neurodynamics • Cognitive Processing • Cognitive Psychology • Cognitive Science • Cognitive Systems Research • Current Directions in Psychological Science • Current Psychology of Cognition • Decision • Educational Psychology • Educational Psychology Review • eLife • Frontiers in Behavioral Neuroscience • Frontiers in Computational Neuroscience • Frontiers in Human Neuroscience • Hippocampus • IEEE Transactions on Autonomous Mental Development • IEEE Transactions on Neural Networks and Learning Systems • IEEE Transactions on Neural Systems and Rehabilitation Engineering • IEEE Transactions on Systems, Man and Cybernetics – Part B • Journal of Artificial General Intelligence • Journal of Cognitive Psychology • Journal of Experimental Child Psychology • Journal of Experimental Psychology: General • Journal of Experimental Psychology: Learning, Memory, and Cognition • Journal of Mathematical Psychology • Journal of Neurology, Neurosurgery, and Psychiatry • Journal of Neurophysiology • Journal of Problem Solving • Journal of Robotics • Lecture Notes in Artificial Intelligence (Springer) • Lecture Notes in Computer Science (Springer) • Memory & Cognition • Neural Networks • Neurocomputing • Neurodegenerative Diseases • NeuroImage • Neuropsychologia • Neuroscience & Biobehavioral Reviews • New Ideas in Psychology • Oxford University Press • PLoS Computational Biology • PLoS ONE • Proceedings of the Annual Meeting of the Cognitive Science Society (Lawrence Erlbaum Associates) • Proceedings of the Annual Meeting of the European Cognitive Science Society (Lawrence Erlbaum Associates) • Proceedings of the International Joint Conference on Neural Networks (IEEE Press) • Psychiatry Research • Psychological Bulletin • Psychonomic Bulletin & Review • Reviews in the Neuroscience • Theoretical Issues in Ergonomics Science • Tutorials in Quantitative Methods for Psychology.

## Ad hoc reviewer (funding agencies)

Air Force Office of Scientific Research • Austrian Science Fund: Humanities and Social Sciences • Center for Interdisciplinary Research (ZiF): Universität Bielefeld • Economic & Social Research Council (UK) • National Science Foundation: Perception, Action, and Cognition • Natural Sciences and Engineering Research Council of Canada • Netherlands Organisation for Scientific Research (NWO).

## Grant panels

*Canada Foundation for Innovation*, Multidisciplinary Assessment Committee (2015) • *Indiana Spinal Cord & Brain Injury Fund Research Grant Program* (2015) • *Fonds de Recherche du Québec – Nature et Technologies* (2013, 2018) • *National Institute of Health*, National Institute of General Medical Sciences Support of Competititve Research Program (2018).

# Teaching and mentoring

## Purdue University, West Lafayette, IN

- PSY200: Introduction to cognitive psychology

- PSY513: Introduction to computational cognitive neuroscience

- PSY629: fMRI design and analysis

- PSY692: The cognitive neuroscience of skill learning

## University of California, Santa Barbara, CA

- PSY221A: Design and measurement (Graduate statistics)

## Rensselaer Polytechnic Institute, Troy, NY

- COGS-6967 / PSYC-4968 / MATH-4961: Mathematical foundations of learning in models of cognition

## Guest lecturer

- PSY100: Introduction to the science and fields of psychology (Purdue University, West Lafayette, IN)

- PSY606: Human problem solving (Purdue University, West Lafayette, IN)

- COGS-6960: Prosem in cognitive science (Rensselaer Polytechnic Institute, Troy, NY)

- PSY-4031: Analyse quantitative en psychology (Quantitative methods for psychology; Université du Québec, Montréal, QC)

## Mentoring

### Graduate students

- Alyssa Randez, Purdue University, West Lafayette, IN, 2020 – Now

- Li Xin Lim, Purdue University, West Lafayette, IN, 2018 – Now

- Zahra Sajedinia, Purdue University, West Lafayette, IN, 2015 – 2021

- Pallavi Mishra, Purdue University, West Lafayette, IN, 2016 – 2019

- Farzin Shamloo, Purdue University, West Lafayette, IN, 2013 – 2019

- Pierson Fleischer, Purdue University, West Lafayette, IN, 2013 – 2018

### Postdoctoral scholars

- Dr. Goran Calic, Purdue University, West Lafayette, IN, 2016

- Dr. Matthew Crossley, University of California, Santa Barbara, CA, 2011-2012

### Undergraduate honors students

- Stella Yao, Purdue University, West Lafayette, IN, 2022 – Now

- Madison Fansher, Purdue University, West Lafayette, IN, 2017 – 2018