Thomas Serre

Thomas J. Watson, Sr. Professor of Science

Thomas Serre is the Thomas J. Watson, Sr. Professor of Science at Brown University and Professor of Cognitive & Psychological Sciences and Computer Science. He is Faculty Director of the Center for Computation & Visualization and Associate Director of the Nancy G. Zimmerman Center for Computational Brain Science, and is affiliated with the Robert J. and Nancy D. Carney Institute for Brain Science, the Center for Theoretical Physics and Innovation, and the Data Science Institute. He is a Fellow of the European Laboratory for Learning and Intelligent Systems and holds an International Chair in Artificial Intelligence at the Artificial and Natural Intelligence Toulouse Institute in France. His research focuses on understanding the computational principles of biological vision and developing brain-inspired models of visual intelligence.

Research Interests

Machine and Biological Vision • Computational Neuroscience • AI • NeuroAI • XAI

Contact

- Brown Vivo • https://vivo.brown.edu/display/tserre
- Lab Website • https://serre.lab.brown.edu
- Personal Website • https://thomas-serre.com
- Social Media • Twitter/X • Bluesky • LinkedIn • Zotero

Education

- Ph.D. in Neuroscience • MIT (Cambridge, MA) • Brain & Cognitive Sciences Department • Advisor: Prof. Tomaso Poggio • 2001–2006
- M.Sc. in Statistics and Probability Theory • Université de Rennes (Rennes, France) • 1999–2000
- M.Sc. in Electrical Engineering and Computer Science • Ecole Nationale Supérieure des Télécommunications de Bretagne (Brest, France) • Major in image processing • 1997–2000
- BSc in Mathematics and Physics (Classes préparatoires aux Grandes Ecoles) • Lycée Pasteur (Neuilly, France) • 1995–1997

Professional Appointments

- Brown University, Departments of Cognitive & Psychological Sciences and Computer Science • Robert J. and Nancy D. Carney Institute for Brain Science • Nancy G. Zimmerman Center for Computational Brain Science • Center for Theoretical Physics and Innovation • Data Science Institute • Full Professor • 2021–present

- Brown University, Nancy G. Zimmerman Center for Computational Brain Science • Associate Director • 2020–present
- Brown University, Center for Computation and Visualization • Faculty Director • 2018–present
- ANR-3IA Artificial and Natural Intelligence Toulouse Institute (France) • International Chair in AI • 2019–present
- Brown University, Department of Cognitive, Psychological and Linguistic Sciences • Associate Professor • 2017–2021
- Brown University, Carney Behavioral Phenotyping Core Facility • Associate Director • 2011–2020
- Brown University, Department of Cognitive, Psychological and Linguistic Sciences • Manning Assistant Professor • 2010–2017
- MIT (MA), McGovern Institute for Brain Research • Postdoctoral Associate • 2006–2009

Entrepreneurship & Industry Involvement

- Adelle Diagnostic • Technology and Innovation Advisor • 2023–present
  - High-throughput, AI-based platform for biomarker identification and validation
  - Development of minimally invasive blood-based diagnostic tests for NPH diagnosis and shunt surgery benefit prediction

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Publications

Google Scholar • citations: 23,403 • h-index: 57 • i10-index: 103

Under Review / in Progress

- Structuring sparsity: Block-sparse featurizers capture visual concept manifolds. T. Fel, M. Kowal, M. Jacobs, D. Hazra, U. Bhalla, L. Sharkey, L. Bushnaq, S. Grant, T. Haklay, T. Icard, C. Rager, M. Pearce, D. Wurgaft, A. Swann, F. Doshi, S. Boppana, C. Tigges, N. Cammarata, T. Serre, V. Shyam, O. Lewis, T. McGrath, J. Merullo, E.S. Lubana & A. Geiger. *arXiv* • 2026
- Recurrent network dynamics explain the time course of perceptual grouping in natural scenes. S. Mollard, A.K. Ashok, L. Goetschalckx, D. Linsley, T. Serre, S. Bohte & P. Roelfsema. *arXiv* • 2026
- A unifying framework for concept-based representational similarity. G. Dhimoïla, V. Boutin, A.M. Picard, T. Fel & T. Serre. *arXiv* • 2026
- Capability ≠ interpretability: Human interpretability of vision foundation models. J. Colin, L. Goetschalckx, N. Oliver[‡] & T. Serre[‡]. *arXiv* • 2026
- Recurrent vision in parallel: Spectral convolutional state space models. D. Linsley[†], G. Dhimoïla[†], A.K. Ashok, B. Kim & T. Serre. 2026
- GASPnet: Global agreement to synchronize phases. A. Alamia, S. Muzellec, T. Serre & R. VanRullen. *arXiv* • 2025

123. Perilesional neuromodulation replaces lost sensorimotor function in persons with spinal cord injury. J.S. Calvert, S.R. Parker, L.N. Govindarajan, R. Darie, E. Shaaya, R. Solinsky, L.M. Del Valle, P. Miranda, J. Jang, E. Tiwari, S. Syed, R.M. Villalobos, L.M. Aguiar, J.A. Taylor, H. Tang, S. McPherson, W. Xue, A.G. Carayannopoulos, A.A. Oyelese, Z.L. Gokaslan, A.K. Bansal, L.J. Resnik, T. Serre, J.S. Fridley & D.A. Borton. *Nature Biomedical Engineering* • 2026

122. Not too generative, not too discriminative: The human alignment sweet spot. J. Chang, B. Le Lan, T. Serre‡ & V. Boutin‡. *Advances in Neural Information Processing Systems* • 2026

121. A unified spectral theory of multimodal losses. Y. Cheng, S. Chen, Z. Lu, X. Yu, G. Dhimoïla & T. Serre. *Advances in Neural Information Processing Systems* • 2026

120. Is this just fantasy? Language model representations reflect human judgments of event plausibility. M.A. Lepori, J. Hu, I. Dasgupta, R. Patel, T. Serre & E. Pavlick. *International Conference on Learning Representations* • 2026

119. Better artificial intelligence does not mean better models of biology. D. Linsley, P. Feng & T. Serre. *Trends in Cognitive Sciences* • 2026

118. From interpretability methods to interpretable models. J. Colin, N. Oliver‡ & T. Serre‡. *ECCV 2026 Workshop on Explainable Computer Vision (eXCV)* • 2026

117. Choosing the right basis for interpretability: Psychophysical comparison between neuron-based and dictionary-based representations. J. Colin, L. Goetschalckx, T. Fel, V. Boutin, T. Serre‡ & N. Oliver‡. *Transactions on Machine Learning Research* • 2026

116. Feature binding in biological and artificial vision. P. Roelfsema & T. Serre. *Trends in Cognitive Sciences* • 2026

115. Does human-alignment benefit interpretability?. J. Colin, N. Oliver‡ & T. Serre‡. *ICLR 2026 Workshop on Representational Alignment* • 2026

114. From prediction to understanding: Will AI foundation models transform brain science?. T. Serre & E. Pavlick. *Neuron* • 2025

113. Follow the energy, find the path: Riemannian metrics from energy-based models. L. Béthune, D. Vigouroux, Y. Du, R. VanRullen, T. Serre & V. Boutin. *Advances in Neural Information Processing Systems* • 2025

112. Enhancing deep neural networks through complex-valued representations and Kuramoto synchronization dynamics. S. Muzellec, A. Alamia, T. Serre & R. VanRullen. *Transactions on Machine Learning Research* • 2025

111. Tracking objects that change in appearance with phase synchrony. S. Muzellec, D. Linsley, A.K. Ashok, E. Mingolla, G. Malik, R. VanRullen & T. Serre. *International Conference on Learning Representations* • 2025

110. The 3D-PC: A benchmark for visual perspective taking in humans and machines. D. Linsley, P. Zhou, A.K. Ashok, A. Nagaraj, G. Gaonkar, F.E. Lewis, Z. Pizlo & T. Serre. *International Conference on Learning Representations* • 2025

109. Beyond adversarial robustness: Breaking the robustness-alignment trade-off in object recognition. P. Feng, D. Linsley, T. Boissin, A.K. Ashok, T. Fel, S. Olaiya & T. Serre. *ICLR 2025 Workshop on Representational Alignment* • 2025

108. An active electronic, high-density epidural paddle array for chronic spinal cord neuromodulation. S.R. Parker, J.S. Calvert, R. Darie, J. Jang, L.N. Govindarajan, K. Angelino, G. Chitnis, Y. Iyassu, E. Shaaya, J.S. Fridley, T. Serre, D.A. Borton & B.L. McLaughlin. *Journal of Neural Engineering* • 2025

107. Evaluating dogs' real-world visual environment and attention. M.H. Pelgrim, S.S. Raman, T. Serre & D. Buchsbaum. *Cognitive Science* • 2025

106. Monkeys engage in visual simulation to solve complex problems. A. Ahuja, N.Y. Rodriguez, A.K. Ashok, T. Serre, T. Desrochers & D. Sheinberg. *Current Biology* • 2024

105. RTify: Aligning deep neural networks with human behavioral decisions. Y. Cheng[†], I.F. Rodriguez[†], S. Chen, K. Kar, T. Watanabe & T. Serre. *Advances in Neural Information Processing Systems* • 2024

104. Understanding visual feature reliance through the lens of complexity. T. Fel, L. Bethune, A.K. Lampinen, T. Serre & K. Hermann. *Advances in Neural Information Processing Systems* • 2024

103. Beyond the doors of perception: Vision transformers represent relations between objects. M.A. Lepori, A.R. Tartaglini, W.K. Vong, T. Serre, B.M. Lake & E. Pavlick. *Advances in Neural Information Processing Systems* • 2024

102. Latent representation matters: Human-like sketches in one-shot drawing tasks. V. Boutin, R. Mukherji, A. Agrawal, S. Muzellec, T. Fel, T. Serre & R. VanRullen. *Advances in Neural Information Processing Systems* • 2024

101. Uncovering intermediate variables in transformers using circuit probing. M.A. Lepori, T. Serre & E. Pavlick. *Conference on Language Modeling* • 2024

100. Saliency strikes back: How filtering out high frequencies improves white-box explanations. S. Muzellec, T. Fel, V. Boutin, L. Andeol, R. VanRullen & T. Serre. *International Conference on Machine Learning* • 2024

99. Deceptive learning in histopathology. S. Shahamatdar, D. Saeed-Vafa, D. Linsley, F. Khalil, K. Lovinger, L. Li, H. McLeod, S. Ramachandran & T. Serre. *Histopathology* • 2024

98. Ecological data and objectives align deep neural network representations with humans. A. Nagaraj, A.K. Ashok, D. Linsley, F.E Lewis, P. Zhou & T. Serre. *"UniReps: Unifying Representations in Neural Models" NeurIPS workshop* • 2023

97. Fixing the problems of deep neural networks will require better training data and learning algorithms. D. Linsley & T. Serre. *Behavioral and Brain Sciences* • 2023

96. Unlocking feature visualization for deeper networks with magnitude constrained optimization. T. Fel[†], T. Boissin[†], V. Boutin[†], A. Picard[†], P. Novello[†], J. Colin, D. Linsley, T. Rousseau, R. Cadène, L. Goetschalckx, L. Gardes & T. Serre. *Advances in Neural Information Processing Systems* • 2023

95. Computing a human-like reaction time metric from stable recurrent vision models. L. Goetschalckx, L.N. Govindarajan, A.K. Ashok, A. Ahuja, D.L. Sheinberg & T. Serre. *Advances in Neural Information Processing Systems* • 2023

94. A holistic approach to unifying automatic concept extraction and concept importance estimation. T. Fel, V. Boutin, L. Béthune, R. Cadène, M. Moayeri, L. Andéol, M. Chalvidal & T. Serre. *Advances in Neural Information Processing Systems* • 2023

93. Break it down: Evidence for structural compositionality in neural networks. M.A. Lepori, T. Serre & E. Pavlick. *Advances in Neural Information Processing Systems* • 2023

92. Performance-optimized deep neural networks are evolving into worse models of inferotemporal visual cortex. D. Linsley, I.F. Rodriguez, T. Fel, M. Arcaro, S. Sharma, M. Livingstone & T. Serre. *Advances in Neural Information Processing Systems* • 2023

91. Learning functional transduction. M. Chalvidal, T. Serre & R. VanRullen. *Advances in Neural Information Processing Systems* • 2023

90. Diffusion models as artists: Are we closing the gap between humans and machines?. V. Boutin, T. Fel, L. Singhal, R. Mukherji, A. Nagaraj, J. Colin & T. Serre. *International Conference on Machine Learning* • 2023

89. CRAFT: Concept recursive activation factorization for explainability. T. Fel, A. Picard, L. Bethune, T. Boissin, D. Vigouroux, J. Colin, R. Cadene & T. Serre. *IEEE/CVF Conference on Computer Vision and Pattern Recognition* • 2023

88. Cerebrospinal fluid transcripts may predict shunt surgery responses in normal pressure hydrocephalus. Z. Levin, O.P. Leary, V. Mora, S. Kant, S. Brown, K. Svokos, U. Akbar, T. Serre, P. Klinge, A. Fleischmann & M.G. Ruocco. *Brain* • 2023

87. GAMR: A guided attention model for (visual) reasoning. M. Vaishnav & T. Serre. *International Conference on Learning Representations* • 2023

86. Don't lie to me! Robust and efficient explainability with verified perturbation analysis. T. Fel, M. Ducoffe, D. Vigouroux, R. Cadène, M. Capelle, C. Nicodème & T. Serre. *IEEE/CVF Conference on Computer Vision and Pattern Recognition* • 2023

85. The emergence of visual simulation in task-optimized recurrent neural networks. A.K. Ashok, L.N. Govindarajan, D. Linsley, D. Sheinber & T. Serre. T. *NeurIPS Workshop on Shared Visual Representations in Human & Machine Intelligence* • 2022

84. Fast inference of spinal neuromodulation for motor control using amortized neural networks. L.N. Govindarajan, J.S. Calvert, S.R. Parker, M. Jung, R. Darie, P. Miranda, E. Shaaya, D.A. Borton[‡] & T. Serre[‡]. *Journal of Neural Engineering* • 2022

83. What I cannot predict, I do not understand: A human-centered evaluation framework for explainability methods. J. Colin[†], T. Fel[†], R. Cadène & T. Serre. *Advances in Neural Information Processing Systems* • 2022

82. Harmonizing the object recognition strategies of deep neural networks with humans. T. Fel[†], I.F. Rodriguez[†], D. Linsley[†] & T. Serre. *Advances in Neural Information Processing Systems* • 2022

81. A benchmark for compositional visual reasoning. A. Zerroug, M. Vaishnav, J. Colin, S. Musslick & T. Serre. *Advances in Neural Information Processing Systems* • 2022

80. Meta-reinforcement learning with self-modifying networks. M. Chalvidal, T. Serre & R. VanRullen. *Advances in Neural Information Processing Systems* • 2022

79. Diversity vs. recognizability: Human-like generalization in one-shot generative models. V. Boutin, L. Singhal, X. Thomas & T. Serre. *Advances in Neural Information Processing Systems* • 2022

78. A practitioner's guide to improve the logistics of spatiotemporal deep neural networks for animal behavior analysis. L.N. Govindarajan, R. Kakodkar & T. Serre. *Workshop on Visual Observation and Analysis of Vertebrate and Insect Behavior (VAIB)* • 2022

77. Xplique: A deep learning explainability toolbox. T. Fel, L. Hervier, D. Vigouroux, A. Poche, J. Plakoo, R. Cadene, M. Chalvidal, J. Colin, T. Boissin, L. Bethune, A. Picard, C. Nicodeme, L. Gardes, G. Flandin & T. Serre. *CVPR workshop on XAI4CV: Explainable Artificial Intelligence for Computer Vision* • 2022

76. Decoding family-level features for modern and fossil leaves from computer-vision heat maps. E.J. Spagnuolo, P. Wilf & T. Serre. *American Journal of Botany* • 2022

75. How and what to learn: Taxonomizing self-supervised learning for 3D action recognition. A. Ben Tanfous, A. Zerroug, D. Linsley & T. Serre. *IEEE/CVF Winter Conference on Applications of Computer Vision* • 2022

74. How good is your explanation? Algorithmic stability measures to assess the quality of explanations for deep neural networks. T. Fel, D. Vigouroux, R. Cadene & T. Serre. *IEEE/CVF Winter Conference on Applications of Computer Vision* • 2022

73. Understanding the computational demands underlying visual reasoning. M. Vaishnav, R. Cadene, A. Alamia, D. Linsley, R. VanRullen & T. Serre. *Neural Computation* • 2022

72. Superhuman cell death detection with biomarker-optimized neural networks. J.W. Linsley, D.A. Linsley, J. Lamstein, G. Ryan, K. Shah, N.A. Castello, V. Oza, J. Kalra, S. Wang, Z. Tokuno, A. Javaherian, T. Serre & S. Finkbeiner. *Science Advances* • 2021

71. Look at the variance! Efficient black-box explanations with Sobol-based sensitivity analysis. T. Fel, R. Cadene, M. Chalvidal, M. Cord, D. Vigouroux & T. Serre. *Advances in Neural Information Processing Systems* • 2021

70. Tracking without re-recognition in humans and machines. D. Linsley[†], G. Malik[†], J.K. Kim, L.N. Govindarajan, E. Mingolla[‡] & T. Serre[‡]. *Advances in Neural Information Processing Systems* • 2021

69. The challenge of appearance-free object tracking with feedforward neural networks. G. Malik, D. Linsley, T. Serre & E. Mingolla. *CVPR Workshop on Dynamic Neural Networks Meets Computer Vision* • 2021

68. An image dataset of cleared, x-rayed, and fossil leaves vetted to plant family for human and machine learning. P. Wilf, S.L. Wing, H.W. Meyer, J.A. Rose, R. Saha, T. Serre, N.R. Cúneo, M.P. Donovan, D.M. Erwin, M.A. Gandolfo, E. González-Akre, F. Herrera, S. Hu, A. Iglesias, K.R. Johnson, T.S. Karim & X. Zou. *PhytoKeys* • 2021

67. Deep learning networks and visual perception. G. Lindsay & T. Serre. *Oxford Research Encyclopedia of Psychology* • 2021

66. Go with the flow: Adaptive control for neural ODEs. M. Chalvidal, M. Ricci, R. VanRullen & T. Serre. *International Conference on Learning Representations* • 2021

65. Same-different conceptualization: A machine vision perspective. M. Ricci, R. Cadène & T. Serre. *Current Opinion in Behavioral Sciences* • 2021

64. Differential involvement of EEG oscillatory components in sameness versus spatial-relation visual reasoning tasks. A. Alamia, C. Luo, M. Ricci, J. Kim, T. Serre & R. VanRullen. *eNeuro* • 2021

63. Development of a deep learning algorithm for the histopathologic diagnosis and Gleason grading of prostate cancer biopsies: A pilot study. O. Kott[†], D. Linsley[†], A. Amin, A. Karagounis, C. Jeffers, D. Golijanin, T. Serre[‡] & B. Gershman[‡]. *European Urology Focus* • 2021

62. Iterative VAE as a predictive brain model for out-of-distribution generalization. V. Boutin, A. Zerroug, M. Jung & T. Serre. *NeurIPS workshop on Shared Visual Representations in Human and Machine Intelligence (SVRHM)* • 2020

61. Stable and expressive recurrent vision models. D. Linsley, A.K. Ashok, L.N. Govindarajan, R. Liu & T. Serre. *Advances in Neural Information Processing Systems* • 2020

60. Hierarchical models of the visual system. M. Ricci & T. Serre. *Encyclopedia of Computational Neuroscience* • 2020

59. Discriminating between sleep and exercise-induced fatigue using computer vision and behavioral genetics. K.N. Schuch[†], L.N. Govindarajan[†], Y. Guo, S.N. Baskoylu, S. Kim, B. Kimia, T. Serre[‡] & A.C. Hart[‡]. *Journal of Neurogenetics* • 2020

58. Beyond the feedforward sweep: Feedback computations in the visual cortex. G. Kreiman & T. Serre. *Annals of the New York Academy of Sciences* • 2020

57. Disentangling neural mechanisms for perceptual grouping. J.K. Kim[†], D. Linsley[†], K. Thakkar & T. Serre. *International Conference on Learning Representations* • 2020

56. Recurrent neural circuits for contour detection. D. Linsley[†], J.K. Kim[†], A. Ashok & T. Serre. *International Conference on Learning Representations* • 2020

55. Deep learning: The good, the bad, and the ugly. T. Serre. *Annual Review of Vision Science* • 2019

54. Learning what and where to attend. D. Linsley, D. Schiebler, S. Eberhardt & T. Serre. *International Conference on Learning Representations* • 2019

53. Early life stress leads to sex differences in development of depressive-like outcomes in a mouse model. H. Goodwill, G. Manzano-Nieves, M. Gallo, H.I. Lee, E. Oyerinde, T. Serre & K. Bath. *Neuropsychopharmacology* • 2019

52. Robust pose tracking with a joint model of appearance and shape. Y. Guo, L.N. Govindarajan, B. Kimia & T. Serre. *arXiv* • 2018

51. Learning long-range spatial dependencies with horizontal gated-recurrent units. D. Linsley, J. Kim, V. Veerabadran, C. Windolf & T. Serre. *Advances in Neural Information Processing Systems* • 2018

50. Complementary surrounds explain diverse contextual phenomena across visual modalities. D.A. Mély, D. Linsley & T. Serre. *Psychological Review* • 2018

49. Neural computing on a Raspberry Pi: Applications to zebrafish behavior monitoring. L.N. Govindarajan, T. Sharma, R. Colwill & T. Serre. *Workshop on Visual Observation and Analysis of Vertebrate and Insect Behavior (VAIB)* • 2018

48. Not-So-CLEVR: Learning same–different relations strains feedforward neural networks. J.K. Kim, M. Ricci & T. Serre. *Interface Focus* • 2018

47. Same-different problems strain convolutional neural networks. M. Ricci, J.K. Kim & T. Serre. *Annual Meeting of the Cognitive Science Society* • 2018

46. TDP-43 gains function due to perturbed autoregulation in a Tardbp knock-in mouse model of ALS-FTD. M.A. White, E. Kim, A. Duffy, R. Adalbert, B.U. Phillips, O.M. Peters, J. Stephenson, S. Yang, F. Massenzio, Z. Lin, S. Andrews, A. Segonds-Pichon, J. Metterville, L.M. Saksida, R. Mead, R.R. Ribchester, Y. Barhomi, T. Serre, M.P. Coleman, J.R. Fallon, T.J. Bussey, R.H. Brown & J. Sreedharan. *Nature Neuroscience* • 2018

45. Learning to predict action potentials end-to-end from calcium imaging data. D. Linsley, J. Linsley, T. Sharma, N. Meyers & T. Serre. *IEEE Conference on Information Sciences and Systems* • 2018

44. What are the visual features underlying human versus machine vision?. D. Linsley, S. Eberhardt, T. Sharma, P. Gupta & T. Serre. *IEEE ICCV Workshop on the Mutual Benefit of Cognitive and Computer Vision* • 2017

43. Models of visual categorization. T. Serre. *Wiley Interdisciplinary Reviews: Cognitive Science* • 2016

42. How deep is the feature analysis underlying rapid visual categorization?. S. Eberhardt, J. Cader & T. Serre. *Advances in Neural Information Processing Systems* • 2016

41. Computer vision cracks the leaf code. P. Wilf, S. Zhang, S. Chikkerur, S. Little, S. Wing & T. Serre. *Proceedings of the National Academy of Sciences* • 2016

40. Fast ventral stream neural activity enables rapid visual categorization. M. Cauchoix[†], S.M. Crouzet[†], D. Fize & T. Serre. *NeuroImage* • 2016

39. Source modeling of electrocorticography (ECoG) data: Stability analysis and spatial filtering. A. Pascarella, C. Todaro, M. Clerc, T. Serre & M. Piana. *Journal of Neuroscience Methods* • 2016

38. Towards a theory of computation in the visual cortex. D. Mely & T. Serre. *Computational and Cognitive Neuroscience of Vision* • 2016

37. An end-to-end generative framework for video segmentation and recognition. H. Kuehne, J. Gall & T. Serre. *IEEE Winter Conference on Applications of Computer Vision* • 2016

36. A systematic comparison between visual cues for boundary detection. D.A. Mély, J. Kim, M. McGill, Y. Guo & T. Serre. *Vision Research (Special Issue on Vision and the Statistics of the Natural Environment)* • 2016

35. Explaining the timing of natural scene understanding with a computational model of perceptual categorization. I. Sofer, S. Crouzet & T. Serre. *PLOS Computational Biology* • 2015

34. Unsupervised invariance learning of transformation sequences in a model of object recognition yields selectivity for non-accidental properties. S.M. Parker & T. Serre. *Frontiers in Computational Neuroscience* • 2015

33. Reduced expression of MYC increases longevity and enhances healthspan. J.W. Hofmann, X. Zhao, M. De Cecco, A.L. Peterson, L. Pagliaroli, J. Manivannan, G.B. Hubbard, Y. Ikeno, Y. Zhang, B. Feng, X. Li, T. Serre, W. Qi, H. Van Remmen, R.A. Miller, K.G. Bath, R. de Cabo, H. Xu, N. Neretti & J.M. Sedivy. *Cell* • 2015

32. The neural dynamics of face detection in the wild revealed by MVPA. M. Cauchoix[†], G. Barragan–Jason[†], T. Serre[‡] & E.J. Barbeau[‡]. *Journal of Neuroscience* • 2014

31. Neuronal synchrony in complex-valued deep networks. D. Reichert & T. Serre. *International Conference on Learning Representations* • 2014

30. The language of actions: Recovering the syntax and semantics of goal-directed human activities. H. Kuehne, A. Arslan & T. Serre. *IEEE Conference on Computer Vision and Pattern Recognition* • 2014

29. Hierarchical models of the visual system. T. Serre. *Encyclopedia of Computational Neuroscience* • 2014

28. Learning sparse prototypes for crowd perception via ensemble coding mechanisms. Y. Zhang, S. Zhang, Q. Huang & T. Serre. *5th International Workshop on Human Behavior Understanding* • 2014

27. Neural representation of action sequences: How far can a simple snippet-matching model take us?. C. Tan, J. Singer, T. Serre, D. Sheinberg & T. Poggio. *Advances in Neural Information Processing Systems* • 2013

26. Models of visual cortex. T. Poggio & T. Serre. *Scholarpedia* • 2013

25. The ANK3 bipolar disorder gene regulates psychiatric-related behaviors that are modulated by lithium and stress. M.P. Leussis, E.M. Berry-Scott, M. Saito, H. Jhuang, G. de Haan, O. Alkan, C.J. Luce, J.M. Madison, P. Sklar, T. Serre, D.E. Root & T.L. Petryshen. *Biological Psychiatry* • 2013

24. A new biologically inspired color image descriptor. J. Zhang, Y. Barhomi & T. Serre. *European Conference on Computer Vision* • 2012

23. The neural dynamics of visual processing in monkey extrastriate cortex: A comparison between univariate and multivariate techniques. M. Cauchoix, A. Arslan, D. Fize & T. Serre. *Neural Information Processing Systems – Workshop on Machine Learning and Interpretation in Neuroimaging* • 2012

22. What are the visual features underlying rapid object recognition?. S.M. Crouzet & T. Serre. *Frontiers in Psychology* • 2011

21. Object decoding with attention in inferior temporal cortex. Y. Zhang[†], E. Meyers[†], N. Bichot, T. Serre, T. Poggio & R. Desimone. *Proceedings of the National Academy of Sciences* • 2011

20. HMDB: A large video database for human motion recognition. H. Kuehne, H. Jhuang, E. Garrote, T. Poggio & T. Serre. *IEEE International Conference on Computer Vision* • 2011

19. Automated home-cage behavioural phenotyping of mice. H. Jhuang, E. Garrote, X. Yu, V. Khilnani, T. Poggio, A.D. Steele & T. Serre. *Nature Communications* • 2010

18. What and where: A Bayesian inference theory of attention. S. Chikkerur, T. Serre, C. Tan & T. Poggio. *Vision Research* • 2010

17. Elements for a neural theory of the processing of dynamic faces. T. Serre & M. Giese. *Dynamic Faces: Insights from Experiments and Computation* • 2010

16. Reading the mind's eye: Decoding category information during mental imagery. L. Reddy, N. Tsuchiya & T. Serre. *NeuroImage* • 2010

15. The story of a single cell: Peeking into the semantics of spikes. R. Kliper, T. Serre, D. Weinshall & I. Nelken. *IAPR Workshop on Cognitive Information Processing* • 2010

14. A neuromorphic approach to computer vision. T. Serre & T. Poggio. *Communications of the ACM* • 2010

13. Robust object recognition with cortex-like mechanisms. T. Serre, L. Wolf, S. Bileschi, M. Riesenhuber & T. Poggio. *IEEE Transactions on Pattern Analysis and Machine Intelligence* • 2007

12. A feedforward architecture accounts for rapid categorization. T. Serre, A. Oliva & T. Poggio. *Proceedings of the National Academy of Sciences* • 2007

11. A quantitative theory of immediate visual recognition. T. Serre, G. Kreiman, M. Kouh, C. Cadieu, U. Knoblich & T. Poggio. *Progress in Brain Research, Computational Neuroscience: Theoretical Insights into Brain Function* • 2007

10. A biologically inspired system for action recognition. H. Jhuang, T. Serre, L. Wolf & T. Poggio. *IEEE International Conference on Computer Vision* • 2007

9. A component-based framework for face detection and identification. B. Heisele, T. Serre & T. Poggio. *International Journal of Computer Vision* • 2007

8. Learning features of intermediate complexity for the recognition of biological motion. R. Sigala, T. Serre, T. Poggio & M. Giese. *ICANN 2005* • 2005

7. Object recognition with features inspired by visual cortex. T. Serre, L. Wolf & T. Poggio. *IEEE Conference on Computer Vision and Pattern Recognition* • 2005

6. Using component features for face recognition. Y. Ivanov, B. Heisele & T. Serre. *International Conference on Automatic Face and Gesture Recognition* • 2004

5. Hierarchical classification and feature reduction for fast face detection with support vector machines. B. Heisele, T. Serre, S. Prentice & T. Poggio. *Pattern Recognition* • 2003

4. On the role of object-specific features for real-world object recognition in biological vision. T. Serre, M. Riesenhuber, J. Louie & T. Poggio. *Workshop on Biologically Motivated Computer Vision* • 2002

3. Categorization by learning and combining object parts. B. Heisele, T. Serre, M. Pontil, T. Vetter & T. Poggio. *Advances in Neural Information Processing Systems* • 2002

2. Feature reduction and hierarchy of classifiers for fast object detection in video images. B. Heisele, T. Serre, S. Mukherjee & T. Poggio. *IEEE Conference on Computer Vision and Pattern Recognition* • 2001

1. Component-based face detection. B. Heisele, T. Serre, M. Pontil & T. Poggio. *IEEE Conference on Computer Vision and Pattern Recognition* • 2001

Unpublished Preprints

- Diagnosing and exploiting the computational demands of videos games for deep reinforcement learning. L.N. Govindarajan, R.G. Liu, D. Linsley, A.K. Ashok, M. Reuter, M.J. Frank & T. Serre. *arXiv* • 2023

- Using computational analysis of behavior to discover developmental change in memory-guided attention mechanisms in childhood. D. Amso, L.N. Govindarajan, P. Gupta, D. Placido, H. Baumgartner, A. Lynn, K. Gunther, T. Sharma, V. Veerabadran, K. Thakkar, S. Kim & T. Serre. *psychArXiv* • 2021

- KuraNet: Systems of coupled oscillators that learn to synchronize. M. Ricci, M. Jung, Y. Zhang, M. Chalvidal, A. Soni & T. Serre. *arXiv* • 2021

- Robust neural circuit reconstruction from serial electron microscopy with convolutional recurrent networks. D. Linsley, J.K. Kim, D. Berson & T. Serre. *arXiv* • 2018

- Learning complex cell invariance from natural videos: A plausibility proof. T. Masquelier, T. Serre, S. Thorpe & T. Poggio. *MIT Computer Science and Artificial Intelligence Laboratory Technical Report* • 2007

- Learning a dictionary of shape-components in visual cortex: Comparison with neurons, humans and machines. T. Serre. *MIT Computer Science and Artificial Intelligence Laboratory Technical Report* • 2006

- A theory of object recognition: Computations and circuits in the feedforward path of the ventral stream in primate visual cortex. T. Serre, M. Kouh, C. Cadieu, U. Knoblich, G. Kreiman & T. Poggio. *MIT Computer Science and Artificial Intelligence Laboratory* • 2005
- Realistic modeling of simple and complex cell tuning in the HMAX model, and implications for invariant object recognition in cortex. T. Serre & M. Riesenhuber. *MIT Computer Science and Artificial Intelligence Laboratory* • 2004
- Conviformers: Convolutionally guided vision transformer. M. Vaishnav, T. Fel, I.F. Rodríguez & T. Serre. *arXiv* • 2022

Conference Abstracts (2022–present)

- What does the global latent workspace learn? Y-A. Cheng, S. Chen, Z. Lu, X. Yu, G. Dhimoïla & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2026
- Predictive learning explains emergence of objects in infants. A.K. Ashok, D. Linsley & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2026
- Learning long-range spatial dependencies with spectral convolutional state space models. D. Linsley, G. Dhimoïla, B. Kim, A.K. Ashok & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2026
- Large-scale vision models show sparks of visual reasoning from natural image training. B. Kim, S. Zeng, D. Linsley, A.K. Ashok, A. Nagaraj & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2026
- Temporal prediction produces viewpoint-consistent, human-aligned vision in DNNs. P. Zhou, D. Linsley, A. Nagaraj, A.K. Ashok & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2026
- NeuroTIMM: Harmonizing the TIMM model zoo with human visual strategies. A. Nagaraj, D. Linsley, J. Gopal, P. Zhou & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2026
- Can human perceptual similarity alignment improve interpretability in visual representations? J. Colin, N.M. Oliver & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2026
- Recurrent inhibition preserves existing representations during new visual learning: Evidence from psychophysics, recurrent circuit models, and deep neural networks [Talk 35.14]. Y-A. Cheng, Y. Sasaki, T. Serre & T. Watanabe. *Vision Science Society (VSS)* • May 2026
- When form meets motion: Recurrent connections enhance biological motion perception [Talk 55.26]. S. Han, Z. Wang, T. Serre & M. Zhang. *Vision Science Society (VSS)* • May 2026
- Advancing paleobotany with AI-guided expert fossil leaf identification. I. Rodriguez, T. Fel, G. Gaunkar, M. Vaishnav, H.W. Meyer, P. Wilf & T. Serre. *43rd Mid-Continent Paleobotanical Colloquium, STRI, Panamá* • 2026
- Performance decreases for untrained orientation observed in dominant computational models but not humans are mitigated by divisive normalization in encoding processes of visual perceptual learning. Y-A. Cheng, Y. Sasaki, T. Serre & T. Watanabe. *Vision Science Society (VSS); Journal of Vision* • May 2025

- Comparing a Dual-stream Architecture with Single-stream CNNs to Simulate Vision in Locomotor Control. Z. Zhu, T. Serre & W.H. Warren. *Vision Science Society (VSS); Journal of Vision* • May 2025
- Tracking in space and features with complex-valued units. S. Muzellec, D. Linsley, A. Ashok, R. VanRullen & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- Walk a mile in my shoes! 3d visual perspective taking in humans and machines. P. Zhou, D. Linsley, A. Ashok, G. Gaonkar, A. Nagaraj, F. Lewis & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- Building better models of biological vision by searching for more ecological data diets and learning objectives. S. Chen, A. Ashok, A. Kimata, D. Sheinberg, W. Asaad & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- Modeling the effects of language on visual perception with deep learning. C. Wood[†], J. Gopal[†], D. Linsley, P. Feng & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- Predicting human behavioral decisions with recurrent neural networks. Y-A. Cheng, I.F. Rodriguez & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- Ecological data and objectives for human alignment. A. Nagaraj, A.K. Ashok, D. Linsley, F. Lewis, P. Zhou & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- HMAX strikes back: Self-supervised learning of human-like scale invariant representations. N. Pant, I.F. Rodriguez, A. Beniwal, S. Warren & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- Benefits of synchrony: Improving deep neural networks using complex values and kuramoto synchronization. S. Muzellec, A. Almada, T. Serre & R. VanRullen. *Cognitive Computational Neuroscience (CCN)* • Aug 2024
- Integrating vision and decision-making models with end-to-end trainable recurrent neural networks. Y-A. Cheng, I.F. Rodriguez, T. Watanabe & T. Serre. *Vision Science Society (VSS)* • May 2024
- Building better models of biological vision by searching for more ecological data diets and learning objectives. D. Linsley, A. Ashok, A. Nagaraj, P. Zhou, F. Lewis & T. Serre. *Vision Sciences Society (VSS)* • May 2024
- Time to consider time: Comparing human reaction times to dynamical signatures from recurrent vision models on a perceptual grouping task. A.K. Ashok, L. Goetschalckx, L.N. Govindarajan, A. Ahuja, D. Sheinberg & T. Serre. *Vision Science Society (VSS)* • May 2024
- Rtify: Aligning deep neural networks with human behavioral decisions. Y-A. Cheng, I.F. Rodriguez, S. Chen, K. Kar, T. Watanabe & T. Serre. *Cold Spring Harbor: From Neuroscience to Artificially Intelligent Systems (NAISys)* • 2024
- Computing a human-like reaction time metric from stable recurrent vision models. L. Goetschalckx[†], L. Govindarajan[†], A.K. Ashok & T. Serre. *Cognitive Computational Neuroscience (CCN)* • Aug 2023
- Harmonizing the visual strategies of image-computable models with humans yields more performant and interpretable models of primate visual system function. I. Felipe, D. Linsley & T. Serre. *Vision Sciences Society (VSS)* • May 2023

- Toward modeling visual routines of object segmentation with biologically inspired recurrent vision models. L. Goetschalckx, M. Zolfaghar, A.K. Ashok, L.N. Govindarajan, D. Linsley & T. Serre. *Vision Sciences Society (VSS)* • May 2022

Contributed and Invited Talks & Seminars

- Dartmouth College (Jones Seminar, Hanover, NH) • Oct 2026
- ECCV Workshop on Human-inspired Computer Vision (Malmö, Sweden) • *Keynote* • Sep 2026
- SFARI Workshop on Quantitative Behavioral Phenotyping (New York, NY) • Sep 2026
- CBMM Summer School (Woods Hole, MA) • Aug 2026
- IEEE CVPR (Denver, CO) • *Keynote* • June 2026
- Stiles-Nicholson Brain Institute Neuroscience Seminar Series (Boca Raton, FL) • May 2026
- Seminar in Cognitive Informatics (Université du Québec à Montréal) • Feb 2026
- Winter Conference on Brain Research (Big Sky, MT) • Jan 2026
- CBMM Summer School (Woods Hole, MA) • Aug 2025
- Flatiron Inst. SSL Workshop (New York, NY) • April 2025
- CiNet (Osaka, Japan) • Feb 2025
- Harvard (Cambridge, MA) • Neuro 140/240: Biological and Artificial Intelligence • Feb 2025
- MIT Quest Seminar Series (Cambridge, MA) • Feb 2025
- AIC conference (Jackson, WY) • Jan 2025
- Univ. of Amsterdam (CS) (Computer Science, Netherlands) • Oct 2024
- CBMM Summer School (Woods Hole, MA) • Aug 2024
- Univ. of Pennsylvania (Vision seminar, Philadelphia, PA) • April 2024
- AIC conference (Jackson, WY) • Jan 2024
- MIT (Cambridge, MA) • 9.520/6.860: Statistical Learning Theory • Nov 2023
- SUNY School of Optometry (New York, NY) • Oct 2023
- CBMM Summer School (Woods Hole, MA) • Aug 2023
- Columbia Univ. (Center for Theoretical Neuroscience, NYC) • May 2023
- Harvard Univ. (Psychology Dept, Cambridge, MA) • Apr 2023
- Harvard (Cambridge, MA) • Neuro 1400: Biological and Artificial Intelligence • Feb 2023
- École Normale Supérieure (Data Science seminar, Paris, France) • March 2023
- AIC conference (Jackson, WY) • Jan 2023

- Univ. of Texas (Center for Perceptual Systems, Austin, TX) • Jan 2023
- MIT (Cambridge, MA) • 9.520/6.860: Statistical Learning Theory • Nov 2022
- Bernstein workshop on "Symmetries in neuroscience" (Berlin, Germany) • Sep 2022
- Harvard Univ. Psychology Dept (Cambridge, MA) • Aug 2022
- ICMNS (Virtual) • *Keynote* • July 2022
- TU Darmstadt (Comp. Cognitive Science Colloquium, Germany) • June 2022
- VSS Symposium on Perceptual Organization (St Pete's Beach, FL) • May 2022
- AIC conference (Jackson, WY) • Jan 2022
- MIT (Cambridge, MA) • 9.520/6.860: Statistical Learning Theory • Nov 2021
- MIT Brain & Cognitive Sciences Dept (Cambridge, MA) • Nov 2021
- Simons Foundation workshop (ML for Large-Scale Neuroscience, NYC) • Oct 2021
- CRCN workshop (Computational Neuroscience, NYC) • Oct 2021
- CBMM Summer School (Woods Hole, MA) • Aug 2021
- ICLR workshop (Virtual) • Apr 2021
- Harvard (Cambridge, MA) • Neuro 1400: Biological and Artificial Intelligence • Feb 2021
- AIC conference (Jackson, WY) • Jan 2021
- Facebook AI Research (Paris, France) • Jan 2021
- MIT, Center for Brains, Minds and Machines (Cambridge, MA) • Invited discussant • Dec 2020
- MIT (Cambridge, MA) • 9.520/6.860: Statistical Learning Theory • Nov 2020
- Washington Univ. (Neuroscience Seminar, St Louis, MO) • Oct 2020
- Univ. of Amsterdam Computer Science (Amsterdam, Netherlands) • Sept 2020
- CBMM Summer School (Woods Hole, MA) • Aug 2020
- CNS Meeting (Workshop on ML for brain modeling, Melbourne, Australia) • July 2020
- Bristol Univ. (Generalization in Mind and Machine series, UK) • June 2020
- Vision Science Society (St Pete's Beach, FL) • June 2020
- Harvard (Cambridge, MA) • NEURO140: Biological and Artificial Intelligence • Feb 2020
- AIC Conference (Jackson Hole, WY) • Feb 2020
- Paul-Sabatier Univ. (Toulouse, France) • Jan 2020
- EPFL (EPFL, Switzerland) • Jan 2020
- MIT (Brains, Minds and Machines Seminar) • Nov 2019
- Univ. of Rhode Island (RI-AI Meetup, North Kingstown, RI) • Nov 2019

- OSHEANCon'19 (Providence, RI) • *Keynote* • Nov 2019
- Dartmouth Univ. (Dept of Epidemiology, NH) • Oct 2019
- Symposium: Humans & Machines Learn to See (Ebsdorfergrund, Germany) • Aug 2019
- Univ. of Pennsylvania Vision Seminar (Philadelphia, PA) • Aug 2019
- IEEE CVPR workshop (Long Beach, CA) • *Keynote* • Jun 2019
- Johns Hopkins Univ. (Cognitive Science Dept, Baltimore, MD) • May 2019
- York Univ. (Center for Vision Research, Toronto, Canada) • Mar 2019
- IEEE CVPR Area Chair Workshop (San Diego, CA) • Feb 2019
- UMass (Psychological and Brain Sciences, Amherst, MA) • Feb 2019
- ECVP Workshop on 3D shape (Trieste, Italy) • Aug 2018
- Workshop: Bio & Computer Vision (Royal Society, London) • Feb 2018
- RIT (Center for Imaging Science, NY) • Oct 2017
- New England Machine Learning Day (Cambridge, MA) • May 2017
- AIC Conference (Breckenridge, CO) • Jan 2017
- MIT Brain & Cognitive Sciences Dept (Cambridge, MA) • Nov 2016
- Cornell Univ. (Ithaca, NY) • Distinguished Speakers in Behavioral and Brain Sciences • Oct 2016
- Univ. of Barcelona (Barcelona, Spain) • Aug 2016
- Workshop: Visual Neuroscience & CS (Pre-ECVP, Barcelona, Spain) • Aug 2016
- Consortium of Northeastern Herbaria meeting (Providence, RI) • Jun 2016
- Workshop on Deep Learning (Cambridge, MA) • May 2016
- SUNY School of Optometry (New York, NY) • Jan 2016
- Genova Univ. (Computer Science seminar, Italy) • May 2015
- Workshop on Deep Learning (Bertinoro, Italy) • May 2015
- Columbia Univ. (Theoretical Neuroscience Seminar, NYC) • May 2015
- MIT (Brains, Minds and Machines Seminar) • Apr 2015
- Univ. of Maryland (Neuroscience Seminar, University Park, MD) • Mar 2015
- Institut de la Vision (Paris, France) • Nov 2014
- Washington Univ. (St Louis, MO) • Oct 2014
- Bristol-Myers Squibb (Wallingford, CT) • Sep 2014
- Indiana Univ. (Bloomington, IN) • Sep 2014
- Johns Hopkins Univ. Applied Physics Lab (Laurel, MD) • Sep 2014

- Université de Bretagne Sud (Lorient, France) • July 2014
- Telecom Bretagne (Brest, France) • July 2014
- Columbia Univ. Center for Theoretical Neuroscience (New York, NY) • July 2014
- Design Automation Conference (San Francisco, CA) • May 2014
- Vision Science Society (St. Pete Beach, FL) • Contributed • Apr 2014
- MIT (Cambridge, MA) • 9.S913: Understanding Visual Attention • Apr 2014
- Harvard Univ. Psychology Dept (Cambridge, MA) • Nov 2013
- SUNY (New York, NY) • Apr 2013
- IPAM Graduate Summer School (Deep Learning, Los Angeles, CA) • Jul 2012
- Neuromorphic Engineering workshop (Telluride, CO) • Jul 2012
- Univ. of Memphis (Memphis, TN) • Jan 2012
- Edinburgh Univ. (Edinburgh, UK) • Mar 2011
- Harvard Univ. (Schwartz Institute, Cambridge, MA) • Mar 2011
- Harvard Univ. Psychology Dept (Cambridge, MA) • Feb 2011
- Scene Understanding Symposium (Cambridge, MA) • Jan 2011
- Brown Univ. (Applied Math Dept, Theory seminar) • Nov 2010
- Workshop: Inversion Methods (Cagliari, Italy) • Jun 2010
- Columbia Univ. (New York, NY) • Mar 2010
- Max Planck Institute for Cybernetics (Tubingen, Germany) • Feb 2010
- Ecole Normale Supérieure Data Science Seminar (Paris, France) • Jan 2010

Patents

- D. Linsley, J. Kim, A.K. Ashok, L.N. Govindarajan, R.G. Liu & T. Serre • Recurrent neural circuits • US20200356862A1 • 2020
- T. Serre, Y. Barhomi, Z. Nado, K. Bath & S. Eberhardt • Method and system for automated behavior classification of test subjects • US20180225516A1 • 2018
- T. Serre, T. Poggio, M. Riesenhuber, L. Wolf & S.M. Bileschi • High-performance vision system exploiting key features of visual cortex • US7606777B2 • 2009
- Y. Ivanov & T. Serre • Confidence weighted classifier combination for multi-modal identification • US20060120609A1 • 2006

Training Grants

- *Brown Postdoctoral Training Program in Computational Psychiatry*. NIH/NIMH, T32 training grant. Grant #T32 MH126388. Contact PI (2026–); MPI (Frank/Jones/Philip/Serre). Co-PI (2021–2026). $3,667,000 • 2021-2031

Research Grants

Current Grants

- *High-performance compute cluster for brain science*. NIH, Instrumentation grant. Grant #S10OD036341. PI. $1,999,744 • 2025-2030
- *One vision: Computational alignment of deep neural networks with humans*. NSF, Research grant. Grant #2402875. co-PI (Serre/Linsley). $1,190,678 • 2024-2028
- *Brain-inspired deep learning models of visual reasoning*. ONR, Research grant. Grant #N00014-24-1-2026. PI. $2,478,465 • 2023-2028
- *AI Research Institute on Interaction for AI Assistants (ARIA)*. NSF, National AI Research Institute, Cooperative Agreement. Grant #2433429. Senior Personnel (Institute PI: Pavlick). $20,000,000 (institute total) • 2025-2030
- *REPRISM: Flexible embodied problem-solving by manipulating the representational prism*. ONR, Multi-University Research Initiative (MURI). Grant #N000142412603. co-I (PI: Konidaris). $4,476,529 • 2024-2027
- *SEA-CROGS: Scalable, efficient and accelerated causal reasoning operators, graphs and spikes for earth and embedded systems*. DOE, Research grant. Grant #DE-SC0023191. Co-I (PI: Maxey). $2,000,000 • 2022-2027
- *The next generation of operator regression networks: Theory, algorithms, applications*. ONR, Research grant. Grant #N00014-22-1-2795. Co-I (PI: Karniadakis). $2,999,480 • 2022-2027
- *Enhancing suicide risk detection through computer vision*. NIH/NIMH, Research grant. Grant #R01 MH140004. Co-I (PI: Burke). 2026-2030
- *A mechanistic analysis of the transition from nonsuicidal to suicidal self-injury in adolescents*. NIH/NIMH, Research grant. Grant #R01 MH143695. Co-I (MPIs: Ammerman/Burke). 2026-2031

Completed Grants

- *Secondary analysis of resting state MEG data using the Human Neocortical Neurosolver software tool for cellular and circuit-level interpretation*. NIH/NIMH, Research grant. Grant #1RF1MH130415. Co-I (PI: Jones). $1,173,602 • 2022-2025
- *Origins of Southeast Asian rainforests from paleobotany and machine learning*. NSF, Collaborative research grant in Frontier Research in Earth Sciences (FRES). Grant #EAR-1925481. co-PI (Wilf/Gandolfo/Serre). $665,000 • 2019-2024
- *Intelligent spine interface (ISI)*. DARPA, Research grant. Grant #D19AC00015. Co-I (PI: Borton). $6,307,353 • 2019-2024

- *Leveraging computer vision to augment suicide risk*. NIH/NIMH, Research grant. Grant #R21 MH127231. co-PI. $275,000 • 2021-2023
- *Oscillatory processes for visual reasoning in deep neural networks*. NSF, CRCNS US-France Research grant. Grant #IIS-1912280. co-PI (Serre/VanRullen). $548,809 • 2019-2023
- *Brain-inspired deep learning models of visual reasoning*. ONR, Research grant. Grant #N00014-19-1-2029. PI. $1,947,983 • 2018-2023
- *Next-generation machine vision for automated behavioral phenotyping of knock-in ALS-FTD mouse models*. NIH/NINDS, R21 research grant. Grant #R21 NS 112743. MPI (Fallon/Serre). $450,000 • 2020-2022
- *Understanding the neural basis of the volitional state through continuous recordings in humans*. NIH/NINDS, U01 research grant. Grant #U01NS098968. Co-I (PI: Cash, MGH). $133,217 • 2016-2019
- *Automating pathology with deep learning*. NIGMS / Advance-CTR, U54 research grant. Grant #U54GM115677. PI. $50,000 • 2018-2019
- *Naturalistic data collection in the SmartPlayroom*. NIH/NIMH, R21 research grant. Grant #R21 MH 113870. co-PI (Amso/Serre). $446,875 • 2017-2019
- *WildCog: Evolution and local adaptation of cognitive abilities and brain structure in the wild*. Human Frontier Science Program (HFSP), Research grant. Grant #RGP0006/2015. co-PI (Chaine/Morand-Ferron/Serre). $235,123 • 2015-2018
- *Scaling up computational models of visual processing in cortex*. DARPA, DARPA Young Faculty Award, DARPA Director's Award. Grant #N66001-14-1-4037. PI. $1,000,000 • 2015-2018
- *Computational mechanisms of rapid visual categorization: Models and psychophysics*. NSF, NSF early career award. Grant #IIS-1252951. PI. $500,001 • 2013-2018
- *Development of a machine vision system for high-throughput computational behavioral analysis*. NSF, I-Corps grant. Grant #IIP-164456. PI. $50,000 • 2016-2016
- *Towards a biologically-inspired vision system for the control of navigation in complex environments*. ONR, Research grant. Grant #N000141110743. PI. $839,227 • 2011-2014
- *Development of a machine-learning and computer-vision platform for automated behavioral analysis*. Sponsored research. PI. $262,639 • 2012-2013
- *Towards a human-level neuromorphic artificial visual system*. Defense Advanced Research Projects Agency (DARPA), Research grant. Grant #N10AP20013. PI. $543,332. • 2010-2011

Service

To the University

- Member, CoPsy Peer Teaching Conference Committee (Fall) • 2026
- Task Force on Applied Sciences, Computing & Engineering • 2026–present
- Cognitive & Psych Sciences Faculty Search Committee • 2026–2027

- Cognitive & Psych Sciences Faculty Search Committee (chair) • 2025–2026
- Research Computing Advisory Committee co-chair • 2018–present
- Freshman and sophomore advisor (most years) • 2011–present
- CCBS Faculty Search Committee (co-chair) • 2023–2024
- CCBS Faculty Search Committee (chair) • 2022–2023
- Cognitive Ling. & Psych Sciences Faculty Search Committee • 2022–2023
- Cognitive Neuroscience undergrad concentration advisor • 2022–2024
- CCBS Faculty Search Committee • 2021–2022
- OVPR's Research Computing Advisory Committee co-chair • 2018–present
- Data Science Initiative Executive Committee • 2018–2022
- Data Science Initiative Campus Advisory Board co-chair • 2018–2022
- Cognitive Science undergraduate concentration advisor • 2015 – 2018
- Computation in Brain and Mind Initiative Steering Committee • 2013 – 2020
- Academic Technology Steering Committee • 2012 – 2020
- Carney Cluster Executive Committee • 2013–2023

To the Profession

- Senior Editor, Minds, Machines, and Brains (MIT Press) • 2026–present
- Board Member, Courtois Chair Scientific Committee (U. Montreal) • 2025–2026
- CIFAR Scientific Review Board • 2025–2026
- Deputy Editor & Section Editor (Neuroscience), PLOS Comp. Biology • 2021–2026
- Section Editor (Visual System), Encyclopedia of Computational Neuroscience • 2017–present
- Area Chair, ICLR • 2026
- Area Chair, ICML • 2026
- Area Chair, NeurIPS • 2026
- Area Chair, NeurIPS • 2025
- Area Chair, ICLR • 2025
- Senior Area Chair, CCN • 2025
- Senior Area Chair, CCN • 2026
- Area Chair, ICML • 2024
- Area Chair, NeurIPS • 2023
- Area Chair, ICML • 2023

- Area Chair, ICLR • 2023
- Area Chair, CVPR • 2023
- Area Chair, NeurIPS • 2022
- Area Chair, ICML • 2022
- Area Chair, ICLR • 2022
- Area Chair, CVPR • 2022
- Area Chair, NeurIPS • 2021
- Area Chair, ICML • 2021
- Area Chair, ICLR • 2021
- Area Chair, NeurIPS • 2020
- Board of Reviewing Editors eLIFE • 2019–2023
- Senior Program Committee, AAAI 2020 • 2019
- Area Chair, CVPR • 2019
- Area Chair, CVPR • 2018
- Associate Editor Frontiers in Perception Science • 2011 –2018
- Co-organizer of the Beyond Deep Learning symposium • 2017
- Local Chair, CRCN annual PI meeting • 2017
- Local Chair, IEEE ICDL-EpiRob • 2015
- Area Chair, CVPR • 2014
- Area Chair, NeurIPS • 2011
- Co-organizer of the MIT Scene Understanding Symposium (SUnS) • 2006 –2011

Ad-Hoc Reviewing

- Organizations and funding agencies • (French) National Research Agency, European Research Council, Human Frontier Science Program, National Science Foundation, National Institute of Health (Analytics and Statistics for Population Research Panel B study section)
- Journals • Current Biology, Journal of Vision, Nature Machine Intelligence, Nature Neuroscience, Neuron, Proceedings of the National Academy of Sciences, Science

To the Community

- Lecture on neuroscience and AI in Prof. Valla's studio at RISD • 2024
- Brown-RISD AI lab with Profs. Valla and Cardini • 2020
- Lecture on high-level vision in Prof. Rose's studio at RISD • 2019

- Lecture on high-level vision in Prof. Rose's studio at RISD • 2018
- Lecture on high-level vision in Prof. Rose's studio at RISD • 2017
- Lecture on high-level vision in Prof. Rose's studio at RISD • 2016
- Lecture on high-level vision in Prof. Rose's studio at RISD • 2014
- Communicating science project with Prof. Rose and design student (RISD) • 2012

Sample Media Coverage

- Study: Electrical stimulation can restore ability to move limbs, receive sensory feedback after spinal cord injury (Brown University) • 2026
- AI foundation models may revolutionize neuroscience, Brown researchers say (Brown Daily Herald) • 2026
- Brown University offers cash incentive to assist with 'Click Me' AI research (Brown News) • 2025
- Brown to lead national institute for intuitive, trustworthy AI assistants (Brown News) • 2025
- Inside ClickMe: Professor Serre and Jay Gopal on advancing explainable AI (American Bazaar Online) • 2025
- Training AI to see more like humans (NSF) • 2025
- Explainable AI busts open black boxes (Carney News) • 2024
- Explainable AI busts open black boxes (Carney News) • 2024
- New tool explains how AI 'sees' images and why it might mistake an astronaut for a shovel (Brown News) • 2023
- Summers are for science: A look at what Brown researchers were up to this summer (Brown Daily Herald) • 2023
- Finding the art in artificial intelligence (Venture Beat) • 2019
- Brain research blooms at Brown (Brown Daily Herald) • 2019
- Carney Institute settles in above Brown bookstore (Brown Daily Herald) • 2019
- Intel and Brown University researchers embark on a two-year project to bridge spinal cord breaks using AI (Venture Beat) • 2019
- Brown researchers teach computers to see optical illusions (Brown News) • 2018
- Focus on early stage illness may be key to treating ALS, study suggests (Brown News) • 2018
- Research identifies a key weakness in modern computer vision systems (Brown News) • 2018
- University conference explores future of AI (Brown Daily Herald) • 2018
- Researchers gather at Brown to discuss next-generation AI (Brown News) • 2018
- TDP-43 Mouse Model Research Featured (Brown News) • 2018

- AI helps scientists map behavior in the fruit fly brain (Science Magazine) • 2017
- Linking two labs a learning opportunity for Ph.D. student (Brown News) • 2016
- A computer with a great eye is about to transform botany (Wired) • 2016
- Meeting of minds leads to brain science technology venture (Brown News) • 2016
- Computer vision can help classify leaves (Brown News) • 2016
- Leaf mysteries revealed through the computer's eye (Science Daily) • 2016
- People make the easiest judgments first when analyzing scenery (News Medical Science) • 2015
- In analyzing a scene, we make the easiest judgments first (Brown News) • 2015
- Making the easiest judgments first when viewing new environments (Science Daily) • 2015
- Future watch: understanding the brain (Science Daily) • 2015
- Research featured (Pour la recherche magazine) • 2011
- Catégorisation socio-politique: Entretien croisé. (Revue Emulations) • 2010
- Computer-based video analysis boosts data gathering in behavioral studies (Brown News) • 2010
- Cerveau: Le voici tout près d'être mis en équation (Science & Vie magazine) • 2009
- Reverse engineering the brain (Biomedical Computation Review) • 2009
- Research featured in the BBC series Visions of the Future (BBC) • 2008
- Understanding the brain (PC Magazine) • 2008
- Computer vision inspired by the human brain (IEEE Comp) • 2008
- News Bytes (Biomedical Computation Review) • 2007
- When computer vision imitates life (EyeNet) • 2007
- Computer model mimics the blink of an eye (MIT Tech Talk, Apr 4, 2007) • 2007
- Easy on the eyes (The Economist) • 2007
- Visual-cortex simulator sees animals as humans do (New Scientist) • 2007
- Biologically Inspired Vision Systems (Technology Review) • 2007
- Computer model mimics neural processes in object recognition (MIT News) • 2007
- Mimicking how the brain recognizes street scenes (Naval Res) • 2007
- Recognizing scenes like the brain does (Slashdot) • 2007
- Visionary Research: Teaching computers to see like a human (Scientific American) • 2007
- Reverse-Engineering the Brain (Technology Review) • 2006

Academic Honors, Fellowships, and Honorary Societies

- Thinking About Thinking Fellow • 2026–present
- Elevated to IEEE Senior Member • 2026
- NTU Tan Chin Tuan Exchange Fellowship in Engineering • 2026
- Elected Fellow of the ELLIS Network (Eur. Lab. for Learn. & Intell. Sys.) • 2024
- Brown Mid-Career Research Achievement Award • 2024
- Awarded Thomas J. Watson, Sr. Professor of Science endowed Chair • 2023
- IEEE PAMI Mark Everingham Prize for pioneering human action recognition datasets. • 2022
- IEEE PAMI Helmholtz Prize for significant impact on computer vision research. • 2021
- Awarded International Chair in AI (ANITI, France) • 2019–present • 2019
- DARPA Director's Award • 2016
- Distinguished Speaker in Behavioral and Brain Sciences, Cornell University (Ithaca, NY) • 2016
- DARPA Young Faculty Award • 2014
- Professeur Invité, Lorient University (Lorient, France) • 2014
- NSF Early Career Award • 2013
- Teaching with Technology Course Design Award • 2012
- Sheridan Junior Faculty Teaching Fellows Program • 2011–2012
- Awarded Manning Assistant Professorship • 2010–2013

Professional Memberships

- Cognitive Science Society • 2026–present
- Association for Computing Machinery • 2025–present
- American Association for the Advancement of Science • 2025–present
- IEEE, Senior Member (elevated 2026) • 2017–present
- Vision Science Society • 2002–present
- Society for Neuroscience • 2001–present

Teaching (2022–present)

- CPSY 2107 Graduate Seminar in NeuroAI • Spring 2027
- CPSY 1291 Computational Methods for Mind, Brain, & Behavior • Fall 2026
- CPSY 1950 Deep Learning in Brains, Minds & Machines (54 students) • Spring 2026
- CPSY 1291 Computational Methods for Mind, Brain, & Behavior (51 students) • Fall 2025
- CLPS 1950 Deep Learning in Brains, Minds & Machines (24 students) • Spring 2024
- CLPS 1291 Computational Cognitive Science (70 students) • Fall 2023
- CLPS 1291 Computational Cognitive Science (32 students) • Fall 2022
- CLPS 1950 Deep Learning in Brains, Minds & Machines (24 students) • Spring 2022
- CLPS 1950 Deep Learning in Brains, Minds & Machines (24 students) • Spring 2022

Mentoring

Postdoctoral Fellows (14)

- C. Cueva • 2024–present
- L. Rosendhal (Assistant Professor; Florida Atlantic University) • 2024–2025
- J. Jang (Senior Researcher, Center for Brain Function, KIST) • 2022–2024
- L. Goetschalckx (AI Researcher, imec) • 2020–2024
- R. Liu (Machine Learning Researcher, CENIA, Chile) • 2019–2022
- A. Ben Tafous (industry) • 2020–2021
- M. Jung (industry) • 2019–2021
- S. Eberhardt (industry) • 2015–2017
- S. Zhang (Professor, Harbin Institute of Technology) • 2013–2014
- D. Reichert (Research Scientist, DeepMind) • 2012–2014
- S. Bonneaud (industry) • 2012–2013
- S. Crouzet (industry) • 2010–2012
- J. Corbett (Research scientist, MIT) • 2010–2011
- H. Jhuang (industry) • 2011

Graduate Students (24 Advised)

- J. Chang (ANITI; co-advised with V. Boutin) • 2026–present
- G. Dhimoïla (ANITI; co-advised with F. Malgouyres & F. Mamalet) • 2026–present

- P. Zhou (CoPsy) • 2025–present
- S. Chen (CoPsy) • 2023–present
- J. Colin (Ellis Alicante; co-advised with Nuria Oliver) • 2023–present
- M. Lepori (NSF GRFP; CS; co-advised with E. Pavlick) • 2022–present
- Y.-A. Cheng (CoPsy; co-advised with T. Watanabe) • 2022–present
- B. Le Lan (ANITI; co-advised with V. Boutin) • 2024–present
- A. Ashok • 2021–present
- A. Nagaraj (CS) • 2026–present
- S. Muzellec (ANITI; co-advised with R. VanRullen) • 2022–2025
- I. Rodriguez (CoPsy; industry) • 2019–2025
- A. Ahmed (Neuroscience; co-advised with M. Nassar) • 2018–2025
- T. Fel (ANITI; GoodFire, Inc.) • 2021–2024
- M. Chalvidal (ANITI; co-advised with R. VanRullen; industry) • 2020–2023
- A. Zerroug (ANITI; startup founder) • 2019–2023
- M. Vaishnav (ANITI; startup founder) • 2019–2023
- P. Sailamul (CoPsy; industry) • 2016–2023
- L. Govindarajan (CoPsy; Assistant Professor, UC Irvine) • 2017–2022
- M. Ricci (NSF GRFP; CoPsy; Assistant Professor, Institut Imagine, Paris, France) • 2014–2020
- J.K. Kim (CoPsy; DeepMind) • 2014–2019
- D. Mely (CoPsy; OpenAI) • 2011–2016
- A. Arslan (CoPsy; industry) • 2010–2015
- I. Sofer (CoPsy; industry) • 2011–2014

Full-Time Research Staff (16)

- V. Nema • 2024–2025
- F. Lewis • 2023–2024
- A. Arjun • 2022–2023
- M. Reuter • 2020–2021
- K. Thakkar • 2018–2019
- D. Yang • 2018–2019
- R. Saha • 2018–2019
- V. Veerabadran • 2017–2018

- T. Sharma • 2017–2018
- Y. Haji • 2016–2018
- P. Gupta • 2015–2018
- Y. Wang • 2015–2016
- Y. Barhomi • 2010–2016
- X. Li • 2011–2015
- M. Capps • 2010–2011
- Y. Guo • 2012

Ph.D. Thesis Committees (14)

- A. Soni (Neuroscience) • 2025
- A. Fengler (Cognitive Science) • 2022
- J. Bai (Cognitive Science, Advisor: W. Warren) • 2022
- D.C. Burk (Neuroscience) • 2020
- D. Burk (Neuroscience, Advisor: D. Sheinberg) • 2019
- R. Xia (Neuroscience, Advisor: D. Sheinberg) • 2019
- S. Guan (Neuroscience, Advisor: D. Sheinberg) • 2018
- J. Hynes (Neuroscience, Advisor: M. Paradiso) • 2016
- B. Kent (CoPsy, Advisor: R. Burwell) • 2015
- K. Rio (CoPsy, Advisor: W. Warren) • 2014
- T. Wiecki (CoPsy, Advisor: M. Franck) • 2014
- J.H. Park (CoPsy, Advisor: S. Sloman) • 2011
- S. Dimitriadis (CoPsy, Advisor: J. Anderson) • 2010
- D. Buchanan (CoPsy, Advisor: D. Sobel) • 2010

External Examiner on Ph.D. Dissertation (15)

- M. Pajot (NeuroSpin, France. Advisor: S. Dehaene) • 2026
- A. Gopalakrishnan (Dalle Molle Institute for AI, Switzerland. Advisor: J. Schmidhuber) • 2025
- S. Loewe (University of Amsterdam, Netherlands. Advisor: M. Welling) • 2024
- C. Hamberlin (Harvard University. Advisors: T. Konkle and G. Alvarez) • 2024
- G. Malik (Northeastern University, MA. Advisor: E. Mingolla) • 2023
- S. Stabinger (Innsbruck University, AT. Advisor: A. Rodríguez-Sánchez) • 2022

- A. Franciosini (Institut des Neurosciences de la Timone, France; Advisor: L. Perrinet) • 2021
- P. Mehrani (York University, OT. Advisor: John Tsotsos) • 2021
- Y. Chen (Stony Brook University, NY. Advisor: Greg Zelinsky) • 2021
- R. Cadene (Sorbonne, France. Advisor: Matthieu Cord) • 2020
- A. Doerig (EPFL, Switzerland. Advisor: Michael Herzog) • 2020
- I. Hadji (York University, ON. Advisor: Richard Wildes) • 2019
- G. Lindsay (Columbia, NY. Advisor: Ken Miller) • 2017
- J. Zhang (Hefei University, China, Advisor: Jun Gao) • 2015
- M. Cauchoix (CNRS, France. Advisor: Denis Fize) • 2014

Masters Students (7)

- T. Gunasar (Computer Science) • 2026–present
- A. Nagaraj (Computer Science) • 2024–2026
- X. Yu (Computer Science) • 2024–2026
- P. Feng (Computer Science) • 2022–2024
- A. Karagounis (Computer Science) • 2017–2018
- A. Jones (Computer Science) • 2017–2018
- M. Spector (Computer Science) • 2013–2014

Undergraduate Honors Thesis Students (18)

- M. Kim (Computer Science) • 2026
- N. Pant (Computer Science) • 2024
- S.O. Olaiya (Neuroscience) • 2023
- C. Moyer (Computer Science) • 2024
- I. Logonria-Valenzuela (Cognitive Neuroscience) • 2022
- C. Jeffers (Computational Biology) • 2019
- D. Murphy (Computer Science) • 2019
- M. Winter (Independent concentration) • 2018
- C. Holtz (Cognitive Neuroscience) • 2018
- J. Cader (Independent concentration) • 2016
- Z. Nado (Computer Science) • 2016
- R. Feinman (Applied Math) • 2015

- S. Parker (Neuroscience) • 2015
- J.K. Kim (Independent concentration) • 2014
- R. Martens (CoPsy; industry) • 2014
- S. Shahamatdar (Bio-engineering) • 2013
- G. Riesen (Cognitive neuroscience; Departmental award) • 2012
- E. Sanford (Neuroscience) • 2012

International/visiting Graduate Students (22)

- A. Menezes (BITS Pilani K K Birla, Goa, India) • 2025–2026
- G. Dhimoïla (École Normale Supérieure, Paris, France) • 2025–2026
- Y. Jiao (East China University of Science and Technology, China) • 2018–2019
- L. Xu (Xi'an Jiaotong University, China) • 2017–2018
- A. Singh (Cambridge University, UK) • 2016
- A. Adoubib (Ecole Normale Supérieure des Télécommunications de Bretagne, France) • 2015
- O. Boisard (Université de Bourgogne, France) • 2015
- J. Brochard (Ecole Normale Supérieure, France) • 2014
- R. Danilo (Université de Bretagne Sud, France) • 2014
- J. Brochard (Ecole Normale Supérieure, France) • 2013
- K. Lee (KAIST, S. Korea) • 2012
- J.P. Noel (Gustavus Adolphus College, MN) • 2012
- K. Olfer (Leiden University, Netherlands) • 2012
- P. Sailamul (KAIST, S. Korea) • 2012
- G. Irwin (Osnabrueck University, Germany) • 2012
- S. Zhang (Harbin Institute of Technology, China) • 2012
- M. Cauchoix (CNRS, France) • 2011
- H. Kuehne (Karlsruhe University, Germany) • 2010
- K. Olfer (Leiden University, Netherlands) • 2010
- T. Stemmler (Bremen University, Germany) • 2010
- M. Cauchoix (CNRS, France) • 2010
- E. Garrote (University of the Basque Country, Spain) • 2010