

CURRICULUM VITAE

November, 2018

George Angelo Alvarez

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ACADEMIC APPOINTMENTS

2015-Present	Full Professor	Harvard University Department of Psychology
2012-2015	Associate Professor	Harvard University Department of Psychology
2008-2012	Assistant Professor	Harvard University Department of Psychology
2005 -2008	NIH Postdoctoral Fellow	Massachusetts Institute of Technology Dept. of Brain and Cognitive Sciences Sponsor: Dr. Aude Oliva

EDUCATION

2000-2005	Ph.D., Psychology	Harvard University Advisor: Dr. Patrick Cavanagh
1994-1998	A.B., Psychology	Princeton University Advisor: Dr. Ronald Kinchla

RESEARCH INTERESTS

General Areas

- Visual Cognition, Perception, Attention, and Memory
- Cognitive Capacity, Cognitive Resources, Efficient Coding in High-level Vision

Specific Research Topics

- What are our cognitive resources? How should we characterize them? How do they constrain cognitive function? Can they be enhanced through training?
- How does the visual system optimize the use of its limited resources? What strategies does the system use to manage, cope with, and even overcome these limitations?
- How do we select and keep track of visual information as it changes over time? What attention and memory mechanisms are involved, how do they function, what are their limits, and how do they interact to contribute to our visual experience?

AWARDS AND FELLOWSHIPS

- 2014 American Psychological Association (APA)
Distinguished Scientific Award for Early Career Contribution to
Psychology in the area of Cognition and Human Learning
- 2014 Association for Psychological Science (APS)
Selected as a Fellow, for sustained and outstanding contributions to
psychological science.
- 2012- John L. Loeb Associate Professor of the Social Sciences
Harvard University
- 2011 Young Investigator Award, Society of Experimental Psychologists
- 2010 Young Investigator Award, Vision Sciences Society
- 2010 National Science Foundation CAREER award
- 2005-2008 NIH/NEI National Research Service Award, Postdoctoral Fellowship,
Massachusetts Institute of Technology
- 2005 Herrnstein Prize for Doctoral Dissertation in the Social Sciences,
Harvard University
- 2004-2005 NIH/NIMH National Research Service Award, Pre-doctoral Fellowship,
Harvard University
- 2003 Certificate of Distinction in Teaching, Harvard University
- 1998 Honors, Department of Psychology, Princeton University

RESEARCH GRANTS

- 2018-2019 Foundations of Human Behavior, Harvard University
Title: Augmenting the 'Working' Component of Working Memory as a Gateway for
Enhancing Broader Cognition
PI: Alvarez
Total Amount: \$40,000
- 2018-2019 Dean's Competitive Fund for Promising Scholarship
Title: Eyes to the Horizon: A Quantitative Analysis of Emotional Responses to
Seascapes Using Biometrics and Eyetracking
PI: Alvarez
Total Amount: \$38,083
- 2015-2016 Foundations of Human Behavior, Harvard University

Title: Profiling the Cognitive Processes underlying (Un)Successful Retrieval of
Episodic Long-Term Memory
PI: Alvarez
Total Amount: \$39,000

2010-2016 National Science Foundation CAREER Award (BCS-0953730)
Title: Flexible Resource Allocation and Efficient Coding in Human Vision
PI: Alvarez
Total Amount: \$680,907

2010-2015 National Science Foundation CELEST Sub-Award (SMA-0835976)
Title: Fluid Allocation of Attentional Resources
PI: Alvarez
Total Amount: \$415,437

2013-2014 Harvard Mind/Brain/Behavior Faculty Award
Title: The Psychophysics of Memory for Objects, Events, and Experiences
PIs: Alvarez, Schacter, Güzeldere
Total Amount: \$50,000

2010-2012 NIH/NIMH (MH086743)
Title: Learning and Compression in Human Working Memory
PI: Alvarez
Total Amount: \$168,000

2009-2012 National Science Foundation REESE (DRL-0910070)
Title: Collaborative Research: Mental Abacus Education and Spatial Representations
PI: Alvarez
Total Amount: \$70,387

PUBLICATIONS (68 PEER-REVIEWED SCHOLARLY WORKS)

Refereed Journal Articles

available for download at <http://scorsese.wjh.harvard.edu/George/Publications.html>

1. De Freitas, J., & Alvarez, G. A. (2018). Your visual system provides all the information you need to make moral judgments about generic visual events. *Cognition*, 178, 133–146.
2. Strong, R. W., & Alvarez, G. A. (2017). Training enhances attentional expertise, but not attentional capacity: Evidence from content-specific training benefits. *Journal of Vision*, 17(4), 1-11.
3. Brady, T. F., Shafer-Skelton, A., and Alvarez, G.A. (2017). Global ensemble texture representations are critical to rapid scene perception. *Journal of Experimental Psychology: Human Perception and Performance*, 43(6), 1160-1176

4. Long, B.L., Störmer, V.S., & Alvarez, G.A. (2017). Mid-level perceptual features contain early cues to animacy. *Journal of Vision*, 17(6), 1-20.
5. Cohen, M.A., Alvarez, G.A., Nakayama, K., & Konkle, T. (2017). Visual search for object categories can be predicted across all of high-level visual cortex. *Journal of Neurophysiology*, 117, 388-402. doi: 10.1152/jn.00569.2016
6. Brady, T. F., Störmer, V., & Alvarez, G.A. (2016). Working memory is not fixed capacity: More active storage capacity for real-world objects than simple stimuli. *Proceedings of the National Academy of Sciences, USA*, 13(27), 7459-7464. doi: 10.1073/pnas.1520027113
7. Störmer, V. S. & Alvarez, G. A. (2016). Attention alters perceived attractiveness. *Psychological Science*, 27(4) 563–571. doi: 10.1177/0956797616630964
8. Suchow, J. W., Fougny, D., Alvarez, G. A. (2016). Looking Inward and Back: Real-Time Monitoring of Visual Working Memories. *Journal of Experimental Psychology: Learning, Memory, & Cognition*. doi: 10.1037/xlm0000320
9. Fougny, D. F., Cormiea, S., & Alvarez, G. A. (2016). Strategic trade-offs between quality and quantity in working memory. *Journal of Experimental Psychology: Human Perception and Performance*, 42(8), 1231-1240. doi: 10.1037/xhp0000211
10. Barner, D., Alvarez, G., Sullivan, J., Brooks, N., Srinivasan, M., & Frank, M. C. (2016). Learning mathematics in a visuospatial format: A randomized, controlled trial of mental abacus instruction. *Child Development*, 87(4): 1146-1158. doi: 10.1111/cdev.12515
11. Long, B., Konkle, T., Cohen, M.A., & Alvarez, G.A. (2015). Mid-level perceptual features distinguish objects of different real-world sizes. *Journal of Experimental Psychology: General*, 145(1), 95-109. doi: 10.1037/xge0000130
12. Brady, T. F., & Alvarez, G. A. (2015). Contextual effects in visual working memory reveal hierarchically structured memory representations. *Journal of Vision*, 15(15):6, 1–24. doi: 10.1167/15.15.6
13. Cohen, M.A., Nakayama, K., Konkle, T., Stantić, M. & Alvarez, G.A. (2015). Visual awareness is limited by the representational architecture of the visual system. *Journal of Cognitive Neuroscience*, 27(11):2240-2252. doi: 10.1162/jocn_a_00855.
14. Cohen, M. A., Rhee, J.Y., & Alvarez, G.A. (2015). Limits on perceptual encoding can be predicted from known receptive field properties of human visual cortex. *Journal of Experimental Psychology: Human Perception & Performance*, 42(1), 67-77. doi: 10.1037/xhp0000108
15. Brady, T. & Alvarez, G. A. (2015). No evidence for a fixed object limit in working memory: Spatial ensemble representations inflate estimates of working memory capacity for complex objects. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 41(3):921-9. doi: 10.1037/xlm0000075
16. Fougny, D., Cormiea, S.M., Zhang, J., Alvarez, G. A., & Wolfe, J.M. (2015). Winter is coming: How humans forage in a temporal structured environment. *Journal of Vision*, 15(11), 1-15.
17. Haberman, J. Brady, T.F., & Alvarez, G.A. (2015). Individual differences in ensemble perception reveal multiple, independent levels of ensemble representation. *Journal of Experimental Psychology: General*, 144(2), 432-446.

18. Störmer, V. S. & Alvarez, G. A. (2014). Feature-based attention elicits surround suppression in feature space. *Current Biology*, 24(17), 1985-1988. doi:10.1016/j.cub.2014.07.030
19. Störmer, V. S. Alvarez, G. A., & Cavanagh, P. (2014). Within-hemifield competition in early visual areas limits the ability to track multiple objects with attention. *The Journal of Neuroscience*, 34 (35), 11526–11533. doi:10.1523/JNEUROSCI.0980-14.2014.
20. Suchow, J., Fougny, D., Brady, T., & Alvarez, G. (2014). Terms of the debate on the format and structure of visual memory. *Attention, Perception, & Psychophysics*, 76(7), 2071-2079. doi: 10.3758/s13414-014-0690-7.
21. Cohen, M., Konkle, T., Nakayama, K., & Alvarez, G. A. (2014). Processing multiple visual objects is limited by overlap in neural channels. *Proceedings of the National Academy of Sciences, USA*, 111(24), 8955–8960. doi: 10.1073/pnas.1317860111
22. Plow, E. B., Cattaneo, Z., Carlson, T. A., Alvarez, G. A., Pascual-Leone, A., & Battelli, L. (2014). The compensatory dynamic of inter-hemispheric interactions in visuospatial attention revealed using rTMS and fMRI. [Original Research]. *Frontiers in Human Neuroscience*, 8. doi: 10.3389/fnhum.2014.00226
23. Naber, M., Alvarez, G. A., Nakayama, K. (2013). Tracking the allocation of attention using human pupillary oscillations. *Frontiers in Psychology*, 4:919, 1-12. doi: 10.3389/fpsyg.2013.00919.
24. Suchow, J. W., Brady, T. F., Fougny, D., Alvarez, G. A. (2013). Modeling visual working memory with the MemToolbox. *Journal of Vision*, 13(10):9, 1–8. doi: 10.1167/13.10.9
25. Brady, T. F., Konkle, T., Gill, J., Oliva, A., & Alvarez, G. A. (2013). Visual long-term memory has the same limit on fidelity as visual working memory. *Psychological Science*, 24(6), 981-990.
26. Thompson, T. W., Waskom, M. L., Garel, K. A., Cardenas-Iniguez, C., Reynolds, G. O., Winter, R., Change, P., Pollard, K., Lala, N., Alvarez, G. A., & Gabrieli, J. D. E. (2013). Failure of working memory training to enhance cognition or intelligence. *PLoS ONE*. 8(5), e63614, 1-15.
27. Franconeri, S. L., Alvarez, G. A., & Cavanagh, P. (2013). Flexible cognitive resources: competitive content maps for attention and memory. *Trends in Cognitive Sciences*, 17(3), 134-141.
28. Brady, T. F., Konkle, T., Alvarez, G. A., & Oliva, A. (2013). Real-world objects are not represented as bound units: Independent forgetting of different object details from visual memory. *Journal of Experimental Psychology: General*, 142(3), 791-808.
29. Fougny, D., Cormiea, S. & Alvarez, G. A. (2013). Object-based benefits without object-based representations. *Journal of Experimental Psychology: General*, 142(3), 621– 626.
30. Alvarez, G. A., Gill, J., & Cavanagh, P. (2012). Anatomical constraints on attentional selection: hemifield independence is a signature of multifocal spatial selection. *Journal of Vision*, 12(5):9, 1-20.
31. Fougny, D., Suchow, J. W., & Alvarez, G. A., (2012). Variability in the quality of visual working memory. *Nature Communications*, 3:1229, 1-8.
32. Fougny, D., & Alvarez, G. A. (2011). Object features fail independently in visual working memory: Evidence for a probabilistic feature-store model. *Journal of Vision*, 11(12),1-12.

33. Wolfe, J. M., Alvarez, G. A., Rosenholtz, R., Kuzmova, Y. I., Sherman, A. M. (2011). Visual search for arbitrary objects in real scenes. *Attention, Perception, and Psychophysics*, 73(6), 1650-1671.
34. Brady, T. F., Konkle, T., & Alvarez, G. A. (2011). A review of visual memory capacity: beyond individual items and towards structured representations. *Journal of Vision*, 11(5), 1-34.
35. Cohen, M. C., Alvarez, G. A., & Nakayama, K. (2011). Natural scene perception requires attention. *Psychological Science*, 22(9), 1165-1172.
36. Alvarez, G. A. (2011). Representing multiple objects as an ensemble enhances visual cognition. *Trends in Cognitive Sciences*, 15(3), 122-131.
37. Suchow, J. W., & Alvarez, G. A. (2011). Motion silences awareness of visual change. *Current Biology*, 21(2), 1-4. doi:10.1016/j.cub.2010.12.019
38. Brady, T. F., Alvarez, G. A. (2011). Hierarchical encoding in visual working memory: ensemble statistics bias memory for individual items. *Psychological Science*, 22(3), 384-392.
39. Konkle, T., Brady, T. F., Alvarez, G. A., & Oliva, A. (2010). Scene memory is more detailed than you think: the role of categories in visual long-term memory. *Psychological Science*, 21(11), 1551-1556.
40. Konkle, T., Brady, T. F., Alvarez, G. A., & Oliva, A. (2010). Conceptual distinctiveness supports detailed visual long-term memory for real-world objects. *Journal of Experimental Psychology: General*, 139(3), 558-578.
41. Carlson, T. C., Alvarez, G. A., Wu, D., Verstraten, F. (2010). Rapid assimilation of external objects into the body schema. *Psychological Science*, 21(7), 1000-1005.
42. Shim, W., Vickery, T., Alvarez, G. A., Jiang, Y. (2010). The number of attentional foci and their precision are dissociated in the posterior parietal cortex. *Cerebral Cortex*, 20, 1341-1349.
43. Vul, E., Frank, M. C., Alvarez, G., & Tenenbaum, J. (2009). Explaining multiple object tracking as resource-constrained approximate inference in a dynamic probabilistic model. *Advances in neural information processing systems*, 22, 1955-1963.
44. Franconeri, S. L., Bemis, D., & Alvarez, G. A. (2009). Number estimation relies on a set of segmented objects. *Cognition*, 113, 1-13.
45. Brady, T. F., Konkle, T., Alvarez, G. A. (2009). Compression in visual working memory: Using statistical regularities to form more efficient memory representations. *Journal of Experimental Psychology: General*, 138(4), 487-502.
46. Alvarez, G. A., & Oliva, A. (2009). Spatial ensemble statistics are efficient codes that can be represented with reduced attention. *Proceedings of the National Academy of Sciences, USA*, 106, 7345-7350.
47. Battelli, L., Alvarez, G. A., Carlson, T. A., & Pascual-Leone, A. (2009). The role of the parietal lobe in visual extinction studied with transcranial magnetic stimulation. *Journal of Cognitive Neuroscience*, 21(10), 1946-1955.
48. Horowitz, T. S., Wolfe, J. M., Alvarez, G. A., Cohen, M. A., & Kuzmova, Y. I. (2009). The speed of free will. *The Quarterly Journal of Experimental Psychology*, 62(11), 2262-2288.

49. Brady, T. F., Konkle, T., Oliva, A., Alvarez, G. A. (2009). Detecting changes in real-world objects: The relationship between visual long-term memory and change blindness. *Communicative & Integrative Biology*, 2:1, 1-3.
50. Alvarez, G. A., & Thompson, T. W. (2009). Overwriting and rebinding: Why feature-switch detection tasks underestimate the binding capacity of visual working memory. *Visual Cognition*, 17(1-2), 141-159.
51. Alvarez, G. A., & Cavanagh, P. (2008). Visual short-term memory operates more efficiently on boundary features than it does on the surface features. *Perception & Psychophysics*, 70(2), 346-364.
52. Alvarez, G. A., & Oliva, A. (2008). The representation of simple ensemble features outside the focus of attention. *Psychological Science*, 19(4), 392-398.
53. Brady, T. F., Konkle, T., Alvarez, G. A., Oliva, A. (2008). Visual long-term memory has a massive storage capacity for object details. *Proceedings of the National Academy of Sciences, USA*, 105(38), 14325-14329.
54. Shim, W., Alvarez, G. A., & Jiang, Y. (2008). Spatial separation between targets constrains maintenance of attention on multiple objects. *Psychonomic Bulletin & Review*, 15(2), 390-397.
55. Alvarez, G. A., & Franconeri, S. L. (2007). How many objects can you attentively track?: Evidence for a resource-limited tracking mechanism. *Journal of Vision*, 7(13):14, 1-10, <http://journalofvision.org/7/13/14/>, doi:10.1167/7.13/14.
56. Alvarez, G. A., Konkle, T., & Oliva, A. (2007). Searching in dynamic displays: Effects of configural predictability and spatio-temporal continuity. *Journal of Vision*, 7(14), 1-12. <http://journalofvision.org/7/14/12/>, doi:10.1167/7.14.12.
57. Alvarez, G. A., & Oliva, A. (2007). The role of global layout in visual short-term memory. *Visual Cognition*, 15(1), 70-73.
58. Carlson, T. A., Alvarez, G. A., & Cavanagh, P. (2007). Quadrantic deficit reveals anatomical constraints in attentional tracking. *Proceedings of the National Academy of Sciences*, 104(33), 13496-13500.
59. Franconeri, S., Alvarez, G. A., & Enns, J. (2007). How many locations can be selected at once? *Journal of Experimental Psychology: Human Perception and Performance*, 33(5), 1003-1012.
60. Horowitz, T. S., Klieger, S. B., Fencsik, D. E., Yang, K. K., Alvarez, G. A., & Wolfe, J. M. (2007). Tracking unique objects. *Perception & Psychophysics*, 69(2), 172-184.
61. Mitroff, S. R., & Alvarez, G. A. (2007). Space and time, not surface features, guide object persistence. *Psychonomic Bulletin & Review*, 14, 1199-1204.
62. Alvarez, G. A., & Scholl, B. J. (2005). How does attention select and track spatially extended objects? New effects of attentional concentration and amplification. *Journal of Experimental Psychology: General*, 134(4), 461-476.
63. Cavanagh, P. & Alvarez, G. A. (2005). Tracking multiple targets with multifocal attention. *Trends in Cognitive Sciences*, 9(7), 349-354.
64. Alvarez, G. A., Horowitz, T. S., Arsenio, H. C., & DiMase, J. S., & Wolfe, J. M. (2005). Do multielement visual tracking and visual search draw continuously on the same visual

- attention resources? *Journal of Experimental Psychology: Human Perception and Performance*, 31(4), 643-667.
65. Alvarez, G. A., & Cavanagh, P. (2005). Independent resources for attentional tracking in the left and right visual hemifields. *Psychological Science*, 16(8), 637-643.
 66. Alvarez, G. A., & Cavanagh, P. (2004). The capacity of visual short-term memory is set both by visual information load and by number of objects. *Psychological Science*, 15(2), 106-111.
 67. Wolfe, J. M., Alvarez, G. A., & Horowitz, T. S. (2000). Attention is fast but volition is slow. *Nature*, 406, 691.

Book Chapters

1. Alvarez, G. A. (2014). Attention and Action. In Oxford Handbook of Cognitive Neuroscience (Ochsner, K., and Kosslyn, S., eds), Oxford University Press (vol 1, 255-272).
2. Suchow, J. W., & Alvarez, G. A. (in press). Silencing the awareness of change. The Oxford Compendium of Visual Illusions (Shapiro, A. and Todorovic, D., eds), Oxford University Press.

CONFERENCE PRESENTATIONS

2018

- Conwell, C., & Alvarez, G. A. (2018). Your Visual System (Probably) Knows More Physics than You Do. *Journal of Vision*. 2018; 18(10):304-304. doi: 10.1167/18.10.304
- De Freitas, J., Hafri, A., Yamins, D., & Alvarez, G. A. (2018). From pixels to moral judgment: Extracting morally relevant information in minds and machines. *Journal of Vision*. 2018; 18(10):152-152. doi: 10.1167/18.10.152
- Pailian, H., & Alvarez, G. A. (2018). Sources of Error Underlying Visual Working Memory Manipulation. *Journal of Vision*. 2018; 18(10):673-673. doi: 10.1167/18.10.673
- Riley-Shepard, A., & Alvarez, G. A. (2018). Attentional Effort and Efficiency in Expert Dancers. *Journal of Vision*. 2018; 18(10):487-487. doi: 10.1167/18.10.487
- Strong, R., & Alvarez, G. A. (2018). Hemifield-specific control mechanisms for spatial working memory and attention: evidence from hemifield crossover costs. *Journal of Vision*. 2018; 18(10):191-191. doi: 10.1167/18.10.191

2017

- De Freitas, J., & Alvarez, G. A. (2017). Changing Moral Judgments by Exploiting the Visual System. *Journal of Vision*. 2017; 17(10):723-723. doi: 10.1167/17.10.723
- Pailian, H., Störmer, V., & Alvarez, G. A. (2017). Neurophysiological Marker of Visual Working Memory Manipulation. *Journal of Vision*. 2017; 17(10):1116-1116. doi: 10.1167/17.10.1116
- Strong, R., & Alvarez, G. A. (2017). Hemifield-specific attentional spotlights are dependent on a common global tracking template. *Journal of Vision*. 2017; 17(10):1315-1315. doi: 10.1167/17.10.1315

2016

- De Freitas, J. & Alvarez, G. A. (2016). Moral Psychophysics. *Journal of Vision*. 2016; 16(12):447-447. doi: 10.1167/16.12.447
- Fougnie, D., Kanabar, A., Brady, T., & Alvarez, G. A. (2016). Asymmetric confidence intervals reveal hidden information in working memory. *Journal of Vision*. 2016; 16(12):34-34. doi: 10.1167/16.12.34
- Pailian, H., Tran, E., & Alvarez, G. A. (2016). Constraints on Information Compression in Visual Working Memory. *Journal of Vision*. 2016; 16(12):356-356. doi: 10.1167/16.12.356
- Strong, R., & Alvarez, G. A. (2016). Evidence for successful transfer of information between the hemifields during focal, but not divided attention. *Journal of Vision*. 2016; 16(12):191-191. doi: 10.1167/16.12.191

2015

- Alaoui, S., Long, B., & Alvarez, G. A. (2015). Animate shape features influence high-level animate categorization. Poster presented at the 15th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL. *Journal of Vision*, 15(12):1159-1159. doi: 10.1167/15.12.1159
- Brady, T. F., Schacter, D., & Alvarez, G. A. (2015). The adaptive nature of false memories is revealed by gist-based distortion of true Memories. Poster presented at the 15th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL. *Journal of Vision*, 15(12):948-948. doi: 10.1167/15.12.948
- Cohen, M., Nakayama, K., Konkle, T., & Alvarez, G. A. (2015). Visual awareness is constrained by the functional organization of the higher-level visual system. Poster presented at the 15th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL. *Journal of Vision*, 15(12):585-585. doi: 10.1167/15.12.585
- Fougnie, D., Kanabar, A., Brady, T., & Alvarez, G. A. (2015). Using a betting game to directly reveal the rich nature of visual working memories. Poster presented at the 15th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL. *Journal of Vision*, 15(12):1290-1290. doi: 10.1167/15.12.1290
- Long, B., Konkle, T., & Alvarez, G. A. (2015). Real-world object size is automatically activated by mid-level shape features. Talk presented at the 15th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL. *Journal of Vision*, 15(12):1290-1290. doi: 10.1167/15.12.1290 *Journal of Vision*, 15(12):7-7. doi: 10.1167/15.12.7
- Long, B., Konkle, T., Moher, M., Alvarez, G.A., & Carey, S. (2015). Young children automatically access the real-world size of objects. Poster to be presented at the Cognitive Development Society Meeting.
- Long, B., Moher, M., Konkle, T., Alvarez, G.A., & Carey, S. (2015). Broad category membership guides visual attention in young children. Poster presented at 5th Annual CEU Conference on Cognitive Development, Budapest, Hungary, January 8-11.
- Störmer, V. S., Michael, C., & Alvarez, G. A. (2015). Tuning attention to high-level objects: Spatially global effects of attention to faces in visual processing. Talk presented at the 15th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL. *Journal of Vision*, 15(12):927-927. doi: 10.1167/15.12.927
- Strong, R., & Alvarez, G. A. (2015). Multiple-object tracking training benefits display incomplete transfer across motion type and retinotopic location. Poster presented at the 15th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL. *Journal of Vision*, 15(12):1136-1136. doi: 10.1167/15.12.1136

2014

- Brady, T. F., Shafer-Skelton, A., & Alvarez, G. A. (2014). Sensitivity to spatial ensemble statistics predicts rapid scene perception ability. Talk presented in the *Individual Differences Satellite Workshop* at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Brady, T., Störmer, V., & Alvarez, G. A. (2014). Working memory accumulates more information from real-world objects than from simple stimuli: Evidence from contralateral delay activity. *Journal of Vision*. Poster presented at the CNS Annual Meeting, Boston, MA.
- Brady, T., Störmer, V., & Alvarez, G. A. (2014). Working memory accumulates more information from real-world objects than from simple stimuli: Evidence from contralateral delay activity. *Journal of Vision*. Talk presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Cohen, M. A., Konkle, T., Nakayama, K., & Alvarez, G. A. (2014). Exploring the representational geometry of object representation in the ventral stream using brain-behavior correlations. *Journal of Vision*. Poster presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Cohen, M. A., Konkle, T., Nakayama, K., & Alvarez, G. A. (2014). Exploring the representational geometry of object representation in the ventral stream using brain-behavior correlations. *Journal of Vision*. Poster presented at the CNS Annual Meeting, Boston, MA.
- Fougnie, D., Brady, T., & Alvarez, G. A. (2014). If at first you don't retrieve, try, try again: The role of retrieval failures in visual working memory. *Journal of Vision*. Poster presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Haberman, J., Brady, T. F., & Alvarez, G. A. (2014). Independent ensemble processing mechanisms for high-level and low-level perceptual features. *Journal of Vision*. Talk presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Henry, M., & Alvarez, G. A. (2014). Emergence of orientation invariant representations within the visual cortex. *Journal of Vision*. Poster presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Long, B. L., Störmer, V. S., & Alvarez, G. A. (2014). Rapid extraction of category-specific shape statistics: Evidence from event-related potentials. *Journal of Vision*. Talk presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Long, B. L., Störmer, V. S., & Alvarez, G. A. (2014). Rapid extraction of category-specific shape statistics: Evidence from event-related potentials. *Journal of Vision*. Poster presented at the CNS Annual Meeting, Boston, MA.
- Long, B., Moher, M., Konkle, T., Alvarez, G. A., & Carey, S. (2014). Broad category membership guides visual attention in young children. Poster presented at the 5th annual meeting of the Budapest CEU Conference on Cognitive Development (BCCCD), Budapest, Hungary.

- Shafer-Skelton, A., & Brady, T. F., & Alvarez, G. A. (2014). Sensitivity to spatial ensemble statistics predicts rapid scene perception ability. *Journal of Vision*. Poster presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Störmer, V. S., & Alvarez, G. A. (2014). Feature-based attention elicits surround-suppression in color space. Talk presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Störmer, V. S., & Alvarez, G. A., & Cavanagh, P. (2014). Multifocal attention modulates early visual processing when attention is divided across hemifields (but not within a hemifield). Poster presented at the CNS Annual Meeting, Boston, MA.
- Suchow, J., & Alvarez, G. A. (2014). The more you try to remember, the faster you forget: load-dependent forgetting and mnemonic overreaching. Talk presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.
- Zhang, J., Fougne, D., Gong, X., Alvarez, G. A., & Wolfe, J. (2014). Winter is coming: How humans forage in a temporally structured environment. Poster presented at the 14th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL.

2013

- Alvarez, G. A., Brady, T. F., Fougne, D., & Suchow, J. W. (2013). Beyond slots vs. resources. *Journal of Vision*, 13(9): 1367; doi:10.1167/13.9.1367. Talk presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Brady, T. F., & Alvarez, G. A. (2013). Ensemble representations inflate estimates of working memory capacity. *Journal of Vision*, 13(9): 456; doi:10.1167/13.9.456. Talk presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Cohen, M., Rhee, J., & Alvarez, G. A. (2013). Hemifield effect for high-level, but not low-level, visual stimuli. *Journal of Vision*, 13(9): 643; doi:10.1167/13.9.643. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Cormiea, S., Fougne, D., & Alvarez, G. A. (2013). Quantity vs. quality: strategic tradeoffs in working memory. *Journal of Vision*, 13(9): 1352; doi:10.1167/13.9.1352. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Fougne, D., Suchow, J. W., Alvarez, G. A. (2013). Gradual decay and death by natural causes in visual working memory. *Journal of Vision*, 13(9): 19; doi:10.1167/13.9.19. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Haberman, J., Belkova, J., & Alvarez, G. A. (2013). Individual face representation limits the precision of average face representation. *Journal of Vision*, 13(9): 423; doi:10.1167/13.9.423. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.

- Herman, L., Suchow, J. W., & Alvarez, G. A. (2013). Frequency-based synesthetic associations between letters and colors. *Journal of Vision*, 13(9): 880; doi:10.1167/13.9.880. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Long, B., Konkle, T., Cohen, M. A., & Alvarez, G. A. (2013). Real-world size influences visual search efficiency. *Journal of Vision*, 13(9): 671; doi:10.1167/13.9.671. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Long, B., Konkle, T., Cohen, M. A., & Alvarez, G. A. (2013). Real-world size influences visual search efficiency. Poster and talk presented at the CAOS meeting, Rovereto, Italy.
- Naber, M., Alvarez, G. A., & Nakayama, K. (2013). Pupil frequency tagging: an on-line measure of visual attention. *Journal of Vision*, 13(9): 291; doi:10.1167/13.9.291. Talk presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Störmer, V., Cavanagh, P., & Alvarez, G. A. (2013). The profile of multifocal attention: surround-suppression between and within hemifields. *Journal of Vision*, 13(9): 1283; doi: 10.1167/13.9.1283. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.
- Suchow, J. W., Allen, B., Nowak, M. A., & Alvarez, G. A. (2013). Evolutionary dynamics of visual memory. *Journal of Vision*, 13(9): 20; doi:10.1167/13.9.20. Poster presented at the 13th Annual Meeting of the Vision Sciences Society, Naples, FL.

2012

- Long, B. L., & Alvarez, G. A. (2012). Implicit processing of labels facilitates the formation of compressed working memory representations. *Journal of Vision*, August 13, 2012 12(9): 855; doi:10.1167/12.9.855. Poster presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.
- Fougnie, D., & Alvarez, G. A. (2012). The volatility of working memory. *Journal of Vision*, August 13, 2012 12(9): 1101; doi:10.1167/12.9.1101. Talk presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.
- Suchow, J. W., Fougnie, D., & Alvarez, G. A. (2012). Visual working metamemory. *Journal of Vision*, August 13, 2012 12(9): 348; doi:10.1167/12.9.348. Poster presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.
- Cohen, M., Konkle, T., Rhee, J., Nakayama, K., & Alvarez, G. A. (2012). High-level neural similarity predicts perceptual competition during encoding of different object categories. *Journal of Vision*, August 13, 2012 12(9): 1269; doi:10.1167/12.9.1269. Talk presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.
- Haberman, J., Fougnie, D., & Alvarez, G. A. (2012). The visual system obligatorily integrates information over a greater spatial extent when attention is divided. *Journal of Vision*, August

13, 2012 12(9): 323; doi:10.1167/12.9.323. Poster presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Cormiea, S., Fougne, D., & Alvarez, G. A. (2012). Object-based benefits without object-based representations. *Journal of Vision*, August 13, 2012 12(9): 300; doi:10.1167/12.9.300. Poster presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Rhee, J., Konkle, T., Brady, T. & Alvarez, G. A. (2012). Does memory enhancement training alter perceptual representations? *Journal of Vision*, August 13, 2012 12(9): 299; doi: 10.1167/12.9.299. Poster presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Brady, T. & Alvarez, G. A. (2012). Structured representations in visual working memory: Using results from individual displays to constrain cognitive theory. *Journal of Vision*, August 13, 2012 12(9): 711; doi:10.1167/12.9.711. Poster presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Ayeroff, E., Gill, J., & Alvarez G. A. (2012). Estimating the quantity and quality of working memory representations with continuous report versus change detection. *Journal of Vision*, August 13, 2012 12(9): 345; doi:10.1167/12.9.345. Poster presented at the 12th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

2011

Ayeroff, E. & Alvarez, G. A. (2011). Individual differences in visual cognitive abilities. Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Brady, T. F., Konkle, T., Alvarez, G. A., & Oliva, A. (2011). Are real-world objects represented as bound units? Independent decay of object details from short-term to long-term memory. Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Cohen, M., Nakayama, K., Konkle, T., & Alvarez, G. A. (2011). Competition for working memory resources depends on the kind of stimuli being remembered. Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Fougne, D., & Alvarez, G. A. (2011). Breakdown of object-based representations in visual working memory. Talk presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Gill, J., & Alvarez, G. A. (2011). The bias towards a contralateral representation in parietal activity is increased during full-field attentional tracking. Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Haberman, J., Suchow, J., Alvarez, G. A. (2011). The visual system adapts to average orientation. Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Rhee, J., Konkle, T., Brady, T. F. & Alvarez, G. A. (2011). Learning statistical regularities speeds the encoding of information into working memory. Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Suchow, J., & Alvarez, G. A. (2011). Which kinds of motion silence awareness of visual change? Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Thompson, T., Waskom, M., Gabrieli, J., & Alvarez, G. A. (2011). Expanding attentional capacity with adaptive training on a multiple object tracking task. Poster presented at the 11th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

2010

Alvarez, G. A. (2010). The representation of ensemble statistics outside the focus of attention. Symposium Talk, *Representation in the visual System by Summary Statistics*, presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Alvarez, G. A. & Brady, T. F. (2010). Ensemble statistics influence the representation of items in visual working memory. Poster presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Cohen, M., Alvarez, G. A., & Nakayama (2010). Gist perception requires attention. Poster presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Doon, J., Mingolla, E., & Alvarez, G. A. (2010). Evidence for strategic, fluid allocation of visual attention. Poster presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Fan, J. & Alvarez, G. A. (2010). Accessing a working memory representation delays updating that representation. Poster presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Sherman, A., & Alvarez, G. A. (2010). Real-world statistical regularities guide the deployment of visual attention, even in the absence of semantic scene recognition. Poster presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Suchow, J. S., & Alvarez, G. A. (2010). Silent updating: cross-dimensional change suppression. Talk presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Thompson, T. W., & Alvarez, G. A. (2010). Adaptive training in multiple object tracking expands attentional capacity. Poster presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

Gill, J., & Alvarez, G. A. (2010). A cost for hemifield "crossover" during attentional tracking. Poster presented at the 10th Annual Meeting of the *Vision Sciences Society*, Naples, FL.

2009

- Alvarez, G. A., & Franconeri, S. (2009). Rapid enumeration is based on a segmented visual scene. Talk presented in the Symposium, *Is number visual?*, at the 9th Annual Meeting of the *Vision Sciences Society*, Naples, FL.
- Alvarez, G. A., Konkle, T., Brady, T. F., Gill, J., & Oliva, A. (2009). Comparing the Fidelity of Perception, Short-term Memory, and Long-term Memory: Evidence for Highly Detailed Long-term Memory Representations. Talk presented at the annual meeting of the *Vision Sciences Society*, May 8-13, Naples, FL.
- Gill, J., & Alvarez, G. A. (2009). Attentional Tracking of Spatially Extended Objects: Evidence for Object-based Competition Between Lateralized Attentional Systems. Poster presented at the annual meeting of the *Vision Sciences Society*, May 8-13, Naples, FL.
- Oliva, A., Konkle, T., Brady, T. F., & Alvarez, G. A. (2009). The high fidelity of scene representation in visual long-term memory. Talk presented at the annual meeting of the *Vision Sciences Society*, May 8-13, Naples, FL.
- Vul, E., Frank, M., Alvarez, G., Tenenbaum, J. (2009). Statistical decision theory and the allocation of cognitive resources in multiple object tracking. Talk presented at the annual meeting of *Computational and Systems Neuroscience*, Feb. 26-Mar. 1, Salt Lake City, Utah.
- Wu, D., Carlson, T., Alvarez, G. A., & Cavanagh, P. (2009). Visual manifestation of body schema abnormalities in a case of alien hand syndrome. Poster presented at the annual meeting of the *Vision Sciences Society*, May 8-13, Naples, FL.

2008

- Alvarez, G. A., & Franconeri, S. L. (2008). Crowding and multifocal attention: Splitting attention increases the size of the isolation field. Talk presented at the 31st annual meeting of the *European Conference on Visual Perception*, August 24-28, Utrecht, The Netherlands.
- Brady, T. F., Konkle, T., Alvarez, G. A., Oliva, A. (2008). How big is visual long-term memory? Evidence for massive and high fidelity storage. Poster presented at the 31st annual meeting of the *European Conference on Visual Perception*, August 24-28, Utrecht, The Netherlands.
- Carlson, T., Alvarez, G. A., Wu, D., Verstraten, F. (2008). Seeing objects in the dark: Evidence for a robust internal representation of external objects in the world. Talk presented at the 31st annual meeting of the *European Conference on Visual Perception*, August 24-28, Utrecht, The Netherlands.
- Brady, T. F., Konkle, T., Alvarez, G. A. (2008). Efficient coding in visual short-term memory: Evidence for an information-limited capacity. Paper presented at 30th annual meeting of the *Cognitive Science Society*, July 23-26, Washington, DC.

Alvarez, G. & Franconeri, S. (2008). The magical number 4 in visual cognition. Poster presented at the annual meeting of the *Vision Sciences Society*, May 9-14, Naples, FL.

Brady, T. F., Konkle, T., Alvarez, G. A., & Oliva, A. (2008). Compression in visual short-term memory: using statistical regularities to form more efficient memory representations. Poster presented at the annual meeting of the *Vision Sciences Society*, May 9-14, Naples, FL.

Frank, M., Vul, E., Mansinghka, V., & Alvarez, G. (2008). What limits performance in multiple object tracking? Poster presented at the annual meeting of the *Vision Sciences Society*, May 9-14, Naples, FL.

Konkle, T., Brady, T., Alvarez, G., & Oliva, A. (2008). Remembering thousands of objects with high fidelity. Talk presented at the annual meeting of the *Vision Sciences Society*, May 9-14, Naples, FL.

Wolfe, J., Alvarez, G., Rosenholtz, R., Oliva, A., Torralba, A., Kuzmova, Y., & Uhlenhuth, M. (2008). Search for arbitrary objects in natural scenes is remarkably efficient. Poster presented at the annual meeting of the *Vision Sciences Society*, May 9-14, Naples, FL.

2007

Alvarez, G. A. (2007). How attention determines what we see, and what we remember. Talk presented at the annual meeting of the *Society for Advancement of Chicanos and Native Americans in Science*, October 11-14, Kansas City, MO.

Rosenholtz, R., & Alvarez, G. A. (2007). How and why we perceive sets: What does modeling tell us? Talk presented at the annual meeting of the *European Conference on Visual Perception*, August 27-31, Arezzo, Italy.

Alvarez, G. A. & Oliva, A. (2007). The representation of ensemble visual features outside the focus of attention. Talk presented at the annual meeting of the *Vision Sciences Society*, May 11-16, Sarasota, FL. [Abstract published in *Journal of Vision*, 7(9), 129a, <http://www.journalofvision.org/7/9/129/>]

Shim, W., Alvarez, G. A., & Jiang, Y. (2007). Maintaining multiple attentional foci: spatial separation affects behavior but not posterior parietal activity. Talk presented at the annual meeting of the *Vision Sciences Society*, May 11-16, Sarasota, FL. [Abstract published in *Journal of Vision*, 7(9), 581a, <http://www.journalofvision.org/7/9/581/>]

2006

Alvarez, G. A. & Oliva, A. (2006). The effect of global image properties on memory for spatial layout. Talk presented at the annual *Object Perception, Attention, and Memory* meeting, November 16, Houston, TX.

- Mitroff, S. R., & Alvarez, G. A. (2006). Space and time, not surface features, guide object persistence. Talk presented at the annual meeting of the *Psychonomic Society*, November 16, Houston, TX.
- Shim, W. M., Alvarez, G. A., Vickery, T. J., & Jiang, Y. (2006). Effects of spatial and non-spatial attentional load on posterior parietal cortex. Talk presented at the annual meeting of the *Society for Neuroscience*, October 14, Atlanta, GA.
- Alvarez, G. A. & Cavanagh, P. (2006). Multifocal attention: what's fixed and what's flexible in the allocation of tracking resources? Talk presented at the annual meeting of the *Vision Sciences Society, Satellite Workshop, Twenty Years of Multiple Object Tracking: What have we learned?*, May 5, Sarasota, FL.
- Horowitz, T. S., Wolfe, J. M., Alvarez, G. A., & Fencsik, D. E. (2006). Attentional time-sharing in multiple object tracking. Talk presented at the annual meeting of the *Vision Sciences Society, Satellite Workshop, Twenty Years of Multiple Object Tracking: What have we learned?*, May 5, Sarasota, FL.
- Alvarez, G.A. & Cavanagh, P. (2006). Hemifield independence is a signature of location-based attentional filtering. Poster presented at the annual meeting of the *Vision Sciences Society*, May 5-10, Sarasota, FL. [Abstract published in *Journal of Vision*, 6(6), 943a, <http://www.journalofvision.org/6/6/943/>]
- Carlson, T., & Alvarez, G. A. (2006). Suboptimal allocation of visual short term memory. Poster presented at the annual meeting of the *Vision Sciences Society*, May 5-10, Sarasota, FL. [Abstract published in *Journal of Vision*, 6(6), 36a, <http://www.journalofvision.org/6/6/36/>]
- Shim, W. M., Alvarez, G. A., Vickery, T. J., & Jiang, Y. (2006). Effects of spatial and non-spatial attentional load on posterior parietal cortex. Poster presented at the annual meeting of the *Vision Sciences Society*, May 5-10, Sarasota, FL. [Abstract published in *Journal of Vision*, 6(6), 518a, <http://www.journalofvision.org/6/6/518/>]
- Battelli, L., Alvarez, G. A., Carlson, T., & Pascual-Leone, A. (2006). The role of MT and the parietal lobe in visual tracking studied with transcranial magnetic stimulation. Talk presented at the annual meeting of the *Vision Sciences Society*, May 5-10, Sarasota, FL. [Abstract published in *Journal of Vision*, 6(6), 822a, <http://www.journalofvision.org/6/6/822/>]
- 2005**
- Alvarez, G. A., & Franconeri, S. L. (2005). How many objects can you track? Evidence for a flexible tracking resource. Talk presented at the annual meeting of the *Vision Sciences Society*, May 6-11, Sarasota, FL. [Abstract published in *Journal of Vision*, 5(8), 641a, <http://www.journalofvision.org/5/8/641/>]

- Shim, W., Alvarez, G. A., & Jiang, Y. (2005). Capacity limit of visual working memory in parietal cortex reflects capacity limit of spatial selection. Talk presented at the annual meeting of the *Vision Sciences Society*, May 6-11, Sarasota, FL. [Abstract published in *Journal of Vision*, 5(8), 914a, <http://www.journalofvision.org/5/8/914/>]
- Scholl, B. J., & Alvarez, G. A. (2005). How does attention select and track spatially extended objects?: New effects of attentional concentration and amplification. Talk presented at the annual meeting of the *Vision Sciences Society*, May 6-11, Sarasota, FL. [Abstract published in *Journal of Vision*, 5(8), 640a, <http://www.journalofvision.org/5/8/640/>]
- Rein, J., Pylyshyn, Z., & Alvarez, G. A. (2005). Using multiple-object tracking (MOT) to test whether cerebral hemispheres share common visual attention resources. Poster presented at the annual meeting of the *Vision Sciences Society*, May 6-11, Sarasota, FL. [Abstract published in *Journal of Vision*, 5(8), 32a, <http://www.journalofvision.org/5/8/32/>]
- Franconeri, S. L., & Alvarez, G. A. (2005). How many locations can you select at once? Poster presented at the annual meeting of the *Vision Sciences Society*, May 6-11, Sarasota, FL. [Abstract published in *Journal of Vision*, 5(8), 1008a, <http://www.journalofvision.org/5/8/1008/>]
- Bemis, D., Franconeri, S. L., & Alvarez, G. A. (2005). It takes attention to capture attention. Poster presented at the annual meeting of the *Vision Sciences Society*, May 6-11, Sarasota, FL. [Abstract published in *Journal of Vision*, 5(8), 510a, <http://www.journalofvision.org/5/8/510/>]

2004

- Alvarez, G. A. & Franconeri, S. L. (2004). How many objects can you track? Talk given at the annual *Object Perception, Attention, and Memory* meeting, November 18, Minneapolis, MN.
- Franconeri, S. L. & Alvarez, G. A. (2004). Magic numbers in visual attention: The case of spatial location? Poster presented at the annual *Object Perception, Attention, and Memory* meeting, November 18, Minneapolis, MN.
- Alvarez, G. A. & Cavanagh, P. (2004). The structure of visual short-term memory: evidence for a flexible storage mechanism. Talk given at the 45th annual meeting of the *Psychonomic Society*, November 18-21, Minneapolis, MN. [Abstract published in *Abstracts of the Psychonomic Society*, 9, p. 17]
- Horowitz, T. S., Fensick, D., Wolfe, J. M. & Alvarez, G. A. (2004). How many unique objects can you track? Talk given at the 45th annual meeting of the *Psychonomic Society*, , November 18-21, Minneapolis, MN. [Abstract published in *Abstracts of the Psychonomic Society*, 9, p. 37]

Alvarez, G. A. & Franconeri, S. L. (2004). How many objects can you track? Talk given at the annual *Object Perception, Attention, and Memory* meeting, November 18, Minneapolis, MN.

Alvarez, G. A., & Cavanagh, P. (2004). Independent attentional resources for the left and right visual hemifields. Talk presented at the annual meeting of the *Vision Sciences Society*, April 30-May 5, Sarasota, FL. [Abstract published in *Journal of Vision*, 4(8), 29a, <http://www.journalofvision.org/4/8/29/>]

Franconeri, S., Halberda, J., Feigensun, L., & Alvarez, G. A. (2004). Common fate defined objects in multiple object tracking. Poster presented at the annual meeting of the *Vision Sciences Society*, April 30-May 5, Sarasota, FL. [Abstract published in *Journal of Vision*, 4(8), 365a, <http://www.journalofvision.org/4/8/365/>]

Bemis, D., Franconeri, S., & Alvarez, G. A. (2004). Rapid number estimation: A new paradigm for investigating the rules of objecthood. Poster presented at the annual meeting of the *Vision Sciences Society*, April 30-May 5, Sarasota, FL. [Abstract published in *Journal of Vision*, 4(8), 269a, <http://www.journalofvision.org/4/8/269/>]

Horowitz, T. S., Klieger, S. B., Wolfe, J. M., Alvarez, G. A., & Fencsik, D. E. (2004). Do you know what you're tracking? *European Conference on Visual Perception*, Budapest, Hungary.

2003

Alvarez, G. A., & Cavanagh, P. (2003). Visual short-term memory capacity for orientations is lower for oriented Gabors than for oriented lines. Talk presented at the annual meeting of the *Vision Sciences Society*, May 9-14, Sarasota, FL. [Abstract published in *Journal of Vision*, 3(9), 25a, <http://www.journalofvision.org/3/9/25/>]

DiMase, J. S., Alvarez, G. A., Horowitz, T. S. & Wolfe, J. M. (2003). Constraints on task switching in multielement tracking and visual search. Poster presented at the annual meeting of the *Vision Sciences Society*, May 9-14, Sarasota, FL. [Abstract published in *Journal of Vision*, 3(9), 337a, <http://www.journalofvision.org/3/9/337/>]

2002

Alvarez, G. A., & Cavanagh, P. (2002). The capacity of visual short-term memory is set by total information load, not number of objects. Talk presented at the annual meeting of the *Vision Sciences Society*, May 10-15, Sarasota, FL. [Abstract published in *Journal of Vision*, 2(7), 273a, <http://www.journalofvision.org/2/7/273/>]

Most, S. B. & Alvarez, G. A. (2002). But it's the only thing there! Sustained inattentional blindness for a solitary stimulus. Poster presented at the annual meeting of the *Vision Sciences Society*, May 10-15, Sarasota, FL. [Abstract published in *Journal of Vision*, 2(7), 444a, <http://www.journalofvision.org/2/7/444/>]

2001

Alvarez, G. A., Wolfe, J. M., Horowitz, T. S., & Arsenio, H. C. (2001). Limits on Multielement Tracking. Talk presented at the 1st annual meeting of the *Vision Sciences Society*, May 4-8, Sarasota, FL. [Abstract published in *Journal of Vision*, 1(3), 347a, <http://www.journalofvision.org/1/3/347/>]

2000

Horowitz, T. S., Alvarez, G. A., & Wolfe, J. M. (2000). Desperately seeking memory in visual search. Presented at the 41st annual meeting of the *Psychonomic Society*, Nov. 16-19, New Orleans, LA.

Alvarez, G. A., Horowitz, T. S., & Wolfe, J. M. (2000). Multielement tracking and visual search use independent resources. Talk presented at the annual meeting of the *Association for Research in Vision and Ophthalmology*, April 30-May 5, Ft. Lauderdale, FL. [Abstract published in *Investigative Ophthalmology & Visual Science*, 41(4)].

Wolfe, J. M., Horowitz, T. S., & Alvarez, G. A. (2000). Further evidence for amnesic search: attention is still lost in space. Talk presented at the annual meeting of the *Association for Research in Vision and Ophthalmology*, April 30-May 5, Ft. Lauderdale, FL. [Abstract published in *Investigative Ophthalmology & Visual Science*, 41(4)].

Horowitz, T. S., Holcombe, A. O., Alvarez, G. A., & Wolfe, J. M. (2000). Tracking ambiguous motion enables fast attentional shifts. Presented at the annual meeting of the *Association for Research in Vision and Ophthalmology*, April 30-May 5, Ft. Lauderdale, FL. [Abstract published in *Investigative Ophthalmology & Visual Science*, 41(4)].

1999

Alvarez, G. A., Horowitz, T. S., Wong, A., & Wolfe, J. M. (1999). New evidence against global accumulation of information in visual search. Poster presented at the annual meeting of the *Association for Research in Vision and Ophthalmology*, May 9-14, Ft. Lauderdale, FL. [Abstract published in *Investigative Ophthalmology & Visual Science*, 40(4)].

Wolfe, J. M., & Alvarez, G. A. (1999). Give me liberty or give me more time! Your visual attention is faster if you don't tell it what to do. Talk presented at the annual meeting of the *Association for Research in Vision and Ophthalmology*, May 9-14, Ft. Lauderdale, FL. [Abstract published in *Investigative Ophthalmology & Visual Science*, 40(4)].

Horowitz, T. S., Wolfe, J. M., Wong, A., & Alvarez, G. A. (1999). Amnesic search is not an artifact of stimulus duration. Presented at the 3rd annual *Vision Research Conference*, May 7-9, Ft. Lauderdale, FL.

PROFESSIONAL SERVICE

Ad-hoc Grant Reviewing

The National Science Foundation (PAC) x 2, The Israel Science Foundation

Ad-hoc Journal Reviewing

Acta Psychologica, Brain Research, Cognition, Current Biology, Journal of Cognitive Neuroscience, Journal of Experimental Psychology: General, Journal of Experimental Psychology: Human Perception and Performance, Journal of Experimental Psychology: Learning Memory and Cognition, Journal of Vision, Memory, Memory & Cognition, Perception & Psychophysics, PLoS ONE (Public Library of Science), Psychologia, Psychological Bulletin and Review, Psychological Research, Psychological Science, Quarterly Journal of Experimental Psychology, Science, Trends in Cognitive Sciences, Vision Research, Visual Cognition

Editorial Board

2016- Open Mind
2011- Psychological Science

Professional Society and Board Membership

2012- The Society of Experimental Psychologists (SEP)
2009- National Science Foundation-SLC (CELEST) Governing Board (*member*)
2009- American Psychological Association
2006- Society for the Advancement of Chicanos and Native Americans in Science
2005- American Psychological Society
2000- Vision Sciences Society

University Service (Harvard University)

2014 WJH Basement Renovation (*faculty advisor*)
2011- Standing Committee on Mind, Brain, and Behavior
2010- Mind, Brain, Behavior Program (*faculty head of the psychology track*)
2009- Summer Research Opportunities at Harvard (*mentor*)
2009 Gendered Spaces Committee (*faculty advisor*)

Departmental Service (Harvard University)

2009- Department Colloquium Committee (*chair, co-chair*)
2009-2013 Cognition Brain and Behavior Lunch Committee (*co-chair*)
2009- Vision Sciences Laboratory Seminar Committee (*co-chair*)

TEACHING AND ADVISING

Postdoctoral Fellow Supervision (Harvard University)

Viola Störmer	Marie Curie Fellow, July 2013-
Timothy Brady	Postdoctoral Fellow, August, 2011-
Jason Haberman	NIH-NRSA Postdoctoral Fellow, Sept., 2011-2014
Daryl Fougnie	NIH-NRSA Postdoctoral Fellow, Sept., 2010-2013
	NSF-CELEST Postdoctoral Fellow, Sept. 2013-Nov. 2015

Graduate Student Advising (Harvard University)

Julian De Freitas	Psychology, September, 2015-
Roger Strong	Psychology, August, 2013-
Bria Long	Psychology, September, 2011-
Jordan Suchow	Psychology, July 2009-2014, Ph.D. awarded 2014
Michael Cohen	Psychology, September 2009-2014, Ph.D. awarded 2014

Graduate Students, 2nd Year Project Reader (Harvard University)

Bria Long	Psychology, 2013
Kevin Madore	Psychology, 2013
Sam Anthony	Psychology, 2013
Jordan Suchow	Psychology, 2011
Michael Cohen	Psychology, 2011
Arin Teurk	Psychology, 2011
Sujin Jang	Psychology, 2011

Ph.D. Dissertation Committees (Harvard University)

Arin Teurk	Psychology (<i>committee member</i>), Ph.D. expected 2014
Sukeun Jeong	Psychology (<i>committee member</i>), Ph.D. expected 2014
Jordan Suchow	Psychology (<i>primary advisor</i>), Ph.D. awarded 2014
Michael Cohen	Psychology (<i>primary advisor</i>), Ph.D. awarded 2014
Brendan Gaesser	Psychology (<i>committee member</i>), Ph.D. awarded 2014
Manizeh Kahn	Psychology (<i>outside examiner</i>), Ph.D. awarded 2013
Justin Vincent	Psychology (<i>committee member</i>), Ph.D. awarded 2013
Laura Tully	Psychology (<i>committee member</i>), Ph.D. awarded 2013
Garga Chatterjee	Psychology (<i>committee member</i>), Ph.D. awarded 2011
Daniel Hyde	Psychology (<i>outside examiner</i>), Ph.D. awarded 2011
Jorge Almeida	Psychology (<i>outside examiner</i>), Ph.D. awarded 2010
Rebecca Rosenberg	Psychology (<i>outside examiner</i>), Ph.D. awarded 2009
Arash Afraz	Psychology (<i>moderator</i>), Ph.D. awarded 2009

Ph.D. Dissertation Committees (Other Universities)

Celest Kidd	Rochester, Brain and Cog Sciences, Ph.D. expected, 2013
Todd Thompson	MIT, Brain and Cognitive Sciences, Ph.D. expected, 2014
Timothy F. Brady	MIT, Brain and Cognitive Sciences, Ph.D. awarded 2011
Barbara Hidalgo-Sotelo	MIT, Brain and Cognitive Sciences, Ph.D. awarded 2010

Undergraduate Honors Thesis Committees (Harvard University)

Abla Alaoui-Soce	Psychology (<i>advisor</i>), A.B. expected, 2015
Mirta Stantic	Psychology (<i>advisor</i>), A.B. expected, 2015
Morgan Henry	Neurobiology (<i>advisor</i>), <i>Hoopes Prize</i> , A.B. awarded 2014
Alexandra Haber	Neurobiology (<i>advisor</i>), A.B. awarded 2014
Judy Fan	Neurobiology (<i>advisor</i>), awarded A.B. 2010
Ashley Sherman	Psychology (<i>advisor</i>), awarded A.B. 2010
Douglas Bemis	Mind, Brain, and Behavior (<i>advisor</i>), A.B. awarded 2005

Brian Yang	Neurobiology (<i>reader</i>), awarded A.B. 2013
Ann Carroll	Psychology (<i>reader</i>), awarded A.B. 2013
Haley Bennett	Psychology (<i>reader</i>), awarded A.B. 2013
Nadia Liyanage-Don	Neurobiology (<i>reader</i>), awarded A.B. 2012
David Dornblaser	Neurobiology (<i>reader</i>), awarded A.B. 2011
Basima Tewfik	Psychology (<i>reader</i>), awarded A.B. 2011
Nicholas Navarro	Psychology (<i>reader</i>), awarded A.B. 2010
Long Ouyang	Psychology (<i>reader</i>), awarded A.B. 2010

Courses Taught (Harvard University)

2015, Spring	Cutting Edge Neuroscience Through the Lens of Film and Television
2015, Spring	CBB Proseminar, Graduate Level (<i>1 Week Module</i>)
2015, Spring	Visual Cognition Seminar, Graduate Level
2014, Fall	Cognitive Neuroscience
2014, Fall	Visual Cognition Seminar, Graduate Level
2014, Spring	On Sabbatical
2013, Fall	Cognitive Neuroscience, Harvard Extension School
2013, Fall	Visual Cognition Seminar, Graduate Level
2013, Spring	Cognitive Neuroscience (@ <i>Harvard Extension School</i>)
2013, Spring	Visual Cognition Seminar, Graduate Level
2013, Spring	CBB Proseminar, Graduate Level (<i>1 Week Module</i>)
2012, Fall	Visual Cognition Seminar, Graduate Level
2012, Fall	Cognitive Neuroscience
2012, Summer	Cutting Edge Neuroscience Through the Lens of Film and Television
2012, Spring	Visual Cognition Seminar, Graduate Level
2012, Spring	MATLAB: Programming for Behavioral Research
2011, Fall	On Sabbatical
2011, Spring	Visual Cognition Seminar, Graduate Level
2011, Spring	Cognitive Neuroscience
2010, Fall	MATLAB: Programming for Behavioral Research
2010, Fall	Visual Cognition Seminar, Graduate Level
2010, Spring	Visual Cognition Seminar, Graduate Level
2010, Spring	CBB Proseminar, Graduate Level (<i>1 Week Module</i>)
2010, Spring	Methods of Behavioral Research
2009, Fall	Cognitive Neuroscience, Harvard Extension School
2009, Summer	Introduction to MATLAB Experiment Programming
2009, Spring	CBB Proseminar, Graduate Level (<i>1 Week Module</i>)

2009, Spring Methods of Behavioral Research

2006, Spring Vision and the Brain (*Head Teaching Fellow*)

2004, Spring Molecular and Cellular Biology (*Instructor, 3 Week Module*)

2004, Fall Vision and the Brain (*Teaching Fellow*)

2003, Spring Molecular and Cellular Biology (*Teaching Fellow, 3 Week Module*)

2003, Spring Vision and the Brain (*Teaching Fellow*)

2003, Fall Cognitive Psychology (*Teaching Fellow*)

2002, Fall Introduction to Psychology (*Teaching Fellow*)

Other Teaching

2010, Spring Visual Cognition Seminar (*Instructor*)

2010, Spring Mind, Brain, Behavior, Undergraduate Level Seminar (*Guest Lecturer*)

2009, Fall Visual Cognition Seminar (*Instructor*)

2009, Fall Psychology Department, Graduate Level Seminar (*Guest Lecturer*)

2009, Spring Visual Cognition Seminar (*Instructor*)

2009, Spring Vision Sciences Laboratory Talk Series (*organizer*)

2009, Spring Mind, Brain, Behavior, Undergraduate Level Seminar (*Guest Lecturer*)

2008, Fall Visual Cognition Seminar (*Instructor*)

2008, Fall Vision Sciences Laboratory Talk Series (*organizer*)

2008, Fall Psychology Department, Graduate Level Seminar (*Guest Lecturer*)

2008, Fall Psychology Live, Undergraduate Level (*Guest Lecturer*)

2006, Spring Sensation & Perception (*Emerson College, Instructor*)

2000, Spring Introduction to Psychology (*MIT, Teaching Fellow*)

1999, Spring Introduction to Psychology (*MIT, Teaching Fellow*)

INVITED UNIVERSITY TALKS AND COLLOQUIA

- 10/2015 *Massachusetts Institute of Technology, Department Colloquium*
- 01/2015 *Stanford University, Department Colloquium*
- 01/2015 *Stanford University, Area Talk*
- 12/2014 *Princeton University, Cognitive Science Colloquium*
- 08/2014 *NeuroCog Collective, Workshop on "Levels of Representation"*
- 04/2014 *Stanford University, Psychology Department Colloquium*
- 02/2014 *Yale University, Psychology Department Colloquium*
- 11/2013 *Harvard University, Faculty Interest Group on Representation*
- 05/2013 *Harvard University Center for Brain Sciences, Annual Retreat*
- 05/2013 *Vision Sciences Society, Symposium on "Slots vs. Resources"*
- 04/2012 *Johns Hopkins University, Department of Cognitive Science Colloquium*
- 04/2012 *Cornell University, Department of Psychology Colloquium*
- 02/2012 *Computational and Systems Neuroscience Workshop on Visual Working Memory*
- 01/2012 *NeuroCog Collective, Workshop on "Representations"*
- 10/2011 *University of Trento Italy, Rovereto Attention Workshop.*
- 08/2011 *Dartmouth University, Workshop on Vision Science*
- 05/2011 *Boston University, Conference on Cognitive and Neural Systems (ICCNS)*
- 03/2011 *New England College of Optometry*
- 11/2010 *University of Pennsylvania, Institute for Research in Cognitive Science (IRCS)*
- 04/2010 *SACNAS, Regional Meeting, Brandeis University*
- 10/2009 *SACNAS, Neuroscience Symposium*
- 05/2009 *Harvard University Center for Brain Science, Annual Meeting*
- 05/2009 *Vision Sciences Society, Workshop on Number Perception*
- 03/2009 *Temporal Dynamics of Learning and Memory (TDLC), NSF SLC Annual Meeting*
- 10/2008 *SACNAS, Neuroscience Symposium*
- 02/2008 *Vanderbilt University, Department of Psychology*
- 02/2008 *Massachusetts Institute of Technology, Dept. of Brain and Cognitive Sciences*
- 01/2008 *New York University, Department of Psychology*
- 01/2008 *Harvard University, Department of Psychology*
- 01/2008 *University of Rochester, Department of Psychology*
- 12/2007 *University of California San Diego, Department of Psychology*
- 11/2007 *University of Illinois at Urbana Champaign, Department of Psychology*
- 10/2007 *SACNAS, Neuroscience Symposium*
- 4/2007 *THRUST, CELEST NSF SLC Talk Series, Boston University*
- 5/2006 *Vision Sciences Society, Workshop on Attention*
- 3/2006 *Massachusetts General Hospital, NMR-MGH Center*
- 11/2005 *Duke University, Psychological & Brain Sciences*
- 10/2005 *Harvard University, MCB Consciousness Seminar*

03/2005 *Harvard Medical School, Visual Attention Laboratory*
02/2005 *Massachusetts Institute of Technology, Cognitive Group*
01/2004 *Yale University, Cognitive Group*

ACADEMIC REFERENCES

Patrick Cavanagh, Professor	<i>University of Paris</i>	patrick@wjh.harvard.edu
Jeremy M. Wolfe, Professor	<i>Harvard Medical School</i>	wolfe@bwh.harvard.edu
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