

Christopher Lee Asplund

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Research Interests

I have long been fascinated by both our amazing cognitive abilities and their severe limitations. Despite having complex brains with billions of neurons, we have trouble doing two things at once or making fairly elementary inferences. So why do attention, working memory, and reason so often fail? What can we do about such failures? And what can we learn from them?

I study these questions by conducting behavioral experiments, building computational models, and employing functional neuroimaging. Using these approaches, my colleagues and I hope to better understand cognition and its neural underpinnings.

Teaching Interests

I am passionate about both communicating science and helping others develop into thoughtful, productive, and happy members of society. To these ends, I use multiple teaching approaches, including giving lectures, conducting seminars, and mentoring one-on-one. I also believe that my active involvement in research benefits students, allowing me to bring current approaches and issues into the classroom while providing them with opportunities for hands-on learning and experimentation.

In May of 2013, I became an inaugural faculty member at Yale-NUS College. As a liberal arts college, the institution focuses on providing an excellent undergraduate education with a broad sampling of courses ranging from the humanities to the sciences, active learning in small seminar-style classes, participation in community initiatives, and deep investigation through research.

Education

- **Vanderbilt University (Vanderbilt Brain Institute)** Nashville, TN, USA
Ph.D. Integrative & Cognitive Neuroscience 2004 – 2010
 - Advisor: René Marois, Ph.D.
 - Dissertation: The coordination and control of attention in lateral prefrontal cortex
- **Princeton University** Princeton, NJ, USA
A.B. Psychology (Cognitive) 1999 – 2003
 - Thesis advisor: Philip Johnson-Laird, Ph.D.
 - Senior thesis: Considerations on the relationship of causal induction and concept attainment
- **University College London** London, England, UK
Junior year abroad 2001 – 2002

- **The Ohio State University**
Supplementary coursework and lab experience

Columbus, OH, USA
1998 – 2004

Current Appointments

- **Assistant Professor**
Yale-NUS College, Division of Social Sciences *2013 – present*
- **Head of Studies (Psychology)**
Yale-NUS College, Division of Social Sciences *2017 – present*
- **Assistant Professor**
A*STAR-NUS Clinical Imaging Research Centre *2017 – present*
- **Principal Investigator**
Singapore Institute for Neurotechnology (SINAPSE) *2014 – present*
- **Assistant Professor (courtesy appointment)**
Duke-NUS Medical School, Neuroscience and Behavioral Disorders *2013 – present*
- **Assistant Professor (courtesy appointment)**
National University of Singapore, Department of Psychology *2016 – present*

Previous Research Appointments

- **Research Fellow**
Duke-NUS Graduate Medical School, Singapore *2010 – 2013*
– Lab of Dr. Michael W.L. Chee, M.D.
- **Neuroscience Graduate Student**
Vanderbilt University, Nashville, Tennessee, USA *2004 – 2010*
– Lab of Dr. René Marois, Ph.D.
- **Research Assistant**
The Ohio State University, Columbus, Ohio, USA *2003 – 2004*
– Lab of Dr. Bennet Givens, Ph.D.
- **Research Assistant**
Princeton University, Princeton, New Jersey, USA *2002 – 2003*
– Lab of Dr. Jonathan Cohen, Ph.D., supervised by Dr. Jack Gelfand, Ph.D.

Previous Teaching Appointments

- **Teaching Scholar**
Duke-NUS & National University Singapore, Singapore *2011 – 2013*
– Course coordinator & lecturer for NUS Freshman seminar
From Bench to Bedside (FMS1201D)

- **Teaching Assistant & Guest Lecturer**
Vanderbilt University, Nashville, Tennessee, USA 2009
– *Introductory Neuroscience (PSY/NSC 201)* under Dr. Leslie Smith, Ph.D.
- **Tutor & Lab Assistant**
The Ohio State University, Learning Assistance Center, Newark, Ohio, USA 2001
– Human anatomy and physiology under Dr. F. Lee St. John, Ph.D.

Courses Developed & Taught

- **Understanding Behavior & Cognition (YSS2201)**
Course coordinator, unit developer & section leader (solo with 2 sections) *Autumn 2017*
- **Cognitive Psychology (YSS3215)**
Course coordinator, unit developer & section leader *Spring 2017*
- **Human Neuroscience (YSS3249)**
Course coordinator, unit developer & section leader *Spring 2017*
- **Understanding Behavior & Cognition (YSS2201)**
Course coordinator, unit developer & section leader (solo with 2 sections) *Autumn 2016*
- **Cognitive Psychology (YSS3215)**
Course coordinator, unit developer & section leader *Autumn 2015*
- **Understanding Behavior & Cognition (YSS2201)**
Course coordinator, unit developer & section leader (team of 2 with 2 sections) *Autumn 2015*
- **Quantitative Reasoning (YCC1122)**
Unit developer & section leader (team of 7) *Spring 2015*
- **Understanding Behavior & Cognition (YSS2201)**
Course coordinator, unit developer & section leader (solo) *Spring 2015*
- **Scientific Inquiry (YCC1131)**
Unit developer & section leader (team of 8) *Autumn 2014*
- **Understanding Behavior & Cognition (YSS2201)**
Course coordinator, unit developer & section leader (team of 2) *Autumn 2014*
- **Quantitative Reasoning (YCC1122)**
Unit developer & section leader (x2) (team of 8) *Spring 2014*
- **Scientific Inquiry (YCC1131)**
Unit developer & guest lecturer (team of 10) *Autumn 2013*
- **Comparative Social Institutions (YCC1121)**
Unit developer & guest lecturer (team of 10) *Autumn 2013*
- **Bench to Bedside (FMS1201D)**
Course coordinator, unit developer, & lecturer (team of 8) *2011-2013*

Academic Service

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| Faculty Advisor, Aloe: A Mental Health Group | 2017 – present |
| Member, Yale-NUS Science Curriculum Task Force | 2016 – 2017 |
| Member, Yale-NUS Common Curriculum Self-Study Committee | 2015 – 2016 |
| Member, Yale-NUS Readmissions Committee | 2014 – 2015 |
| Member, Yale-NUS Committee for Faculty Affairs | 2014 – 2015 |
| - (formerly Yale-NUS Extended Academic Committee) | |
| Member, Yale-NUS Information Technology Committee | 2013 – 2014 |
| Committee Member, DUNES (Duke-NUS Early Career Scientists Association) | 2011 – 2013 |
| Vanderbilt Brain Blast, Adventure Science Center | 2005 – 2009 |
| Academic Coordinator, Vanderbilt Neuroscience Student Organization | 2007 – 2008 |
| Webmaster, Vanderbilt Neuroscience Student Organization | 2006 – 2007 |

Ad hoc reviewer for Neuron, Cerebral Cortex, Journal of Neurophysiology, Journal of Neuroscience, Journal of Cognitive Neuroscience, Journal of Experimental Psychology: Human Perception & Performance, PLoS ONE, NeuroImage, Cognition, Psychonomic Bulletin & Review, Neuropsychologia, Attention Perception & Psychophysics, Journal of Experimental Psychology: Learning Memory & Cognition, and Journal of Experimental Psychology: General

Awards & Honors

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| Elaine Sanders-Bush Graduate Research Award | 2010 |
| Vanderbilt Brain Institute Graduate Poster Prize | 2009 |
| Graduate Training Fellowship, Vanderbilt Brain Institute | 2004 – 2006 |
| Phi Beta Kappa | 2004 |
| Sigma Xi National Honor Society | 2003 |
| National Merit Award Scholarship Recipient | 1999 |

Grants & Funding

- LIFT: Using machine Learning to Identify predictive neuropsychological Factors behind cogniTive improvements** *2017 – 2020*
Role: PI, Source: DSO National Laboratories, Amount: S\$709,920
- Promoting academic interests in Junior College students through a growth mindset** *2017 – 2019*
Role: Co-PI, Source: MoE Academies Fund, Amount: S\$250,000
- High-memory, high-core, high-performance research computer** *2016 – 2017*
Role: Co-PI, Source: Yale-NUS Instrumentation Grant, Amount: S\$81,370
- A neurocognitive approach to characterizing and predicting training outcomes** *2015 – 2017*
Role: PI, Source: SINAPSE & MinDef, Amount: S\$456,703

- **An fMRI investigation of visual speed of processing in MCI patients** 2015 – 2018
Role: Co-PI, Source: Clinical Imaging Research Centre, Amount: S\$49,700
- **Neural and Behavioural Predictors of Detection and Distraction** 2015 – 2016
Role: PI, Source: NUS Cross-Faculty Research Grant, Amount: S\$25,000
- **Information processing in the brain: Trade-offs and timing** 2013 – 2018
Role: PI, Source: Yale-NUS Start-up Grant, Amount: S\$75,000

Peer-Reviewed Publications (also available at www.chrisasplund.com)

- 1) Kong, D., **Asplund, C.L.**, Ling, A., & Chee, M.W.L. (2015). Increased automaticity and altered temporal preparation following sleep deprivation. *Sleep*, *38*(8): 1219-1227. (PubMed, PDF)
- 2) Yeo, B.T.T., Krienen, F.M. Eickhoff, S.B., Yaakub, S.N., Fox, P.T., Buckner, R.L., **Asplund, C.L.**, & Chee, M.W.L. (2015). Functional specialization and flexibility in human association cortex. *Cerebral Cortex*, *25*: 3654-3672. (PubMed, PDF, interactive ontology - NUS or MIT)
- 3) Treadway, M.T., Buckholtz, J.W., Martin, J.W., Jan, K., **Asplund, C.L.**, Ginther, M.R., Jones, O.D., & Marois, R. (2014). Corticolimbic gating of emotion-driven punishment. *Nature Neuroscience*, *17*(9): 1270-1275. (PubMed, PDF)
- 4) Kong, D., **Asplund, C.L.**, & Chee, M.W.L. (2014). Sleep deprivation reduces the rate of rapid picture processing. *NeuroImage*, *91*: 169-176. (PubMed, PDF)
- 5) **Asplund, C.L.**, Fougny, D., Zughni, S., Martin, J.W., & Marois, R. (2014). The attentional blink reveals the probabilistic nature of discrete conscious perception. *Psychological Science*, *25*(3): 824-831. (PubMed, PDF)
- 6) Ong, J.L., **Asplund, C.L.**, Chia, T.T.Y., & Chee, M.W.L. (2013). Now you hear me, now you don't: Eyelid closures as an indicator of auditory task disengagement. *Sleep*, *36*(12): 1867-1874. (PubMed, PDF)
- 7) Yaakub, S.N., Dorairaj, K., Poh, J.S., **Asplund, C.L.**, Krishnan, R., Lee, J., Keefe, R.S.E., Adcock, R.A., Wood, S.J., & Chee, M.W.L. (2013). Preserved working memory and altered brain activation in persons at risk for psychosis. *American Journal of Psychiatry*, *170*(11): 1297-1307. (PubMed, PDF)
- 8) **Asplund, C.L.** & Chee, M.W.L. (2013). Time-on-task and sleep deprivation effects are evidenced in overlapping brain areas. *NeuroImage*, *82*: 326-335. (PubMed, PDF)
- 9) Wong, P., Peebles, J.K., **Asplund, C.L.**, Collins, C.E., Herculano-Houzel, S., & Kaas, J.H. (2013). Faster scaling of auditory neurons in cortical areas relative to subcortical structures in primate brains. *Brain, Behavior and Evolution*, *81*(4): 209-218. (PubMed, PDF)
- 10) Wee, N., **Asplund, C.L.**, & Chee, M.W.L. (2013). Sleep deprivation accelerates delay-related loss of visual short-term memories without affecting precision. *Sleep*, *36*(6): 849-856. (PubMed, PDF)
- 11) Tamber-Rosenau, B.J., Dux, P.E., Tombu, M.N., **Asplund, C.L.**, & Marois, R. (2013). Amodal processing in human prefrontal cortex. *The Journal of Neuroscience*, *33*(28): 11573-11587. (PubMed, PDF)
- 12) Tombu, M.N., **Asplund, C.L.**, Dux, P.E., Godwin, D., Martin, J.W., & Marois, R. (2011). A unified attentional bottleneck in the human brain. *Proceedings of the National Academy of Sciences*, *108*(33): 13426-31. (PubMed, PDF)

- 13) Jepma, M., Deinum, J., **Asplund, C.L.**, Rombouts, S.A.R.B, Tamsma, J.T., Tjeerdema, N., Spapé, M.M., Garland, E.M., Robertson, D., Lenders, J.W.M., & Nieuwenhuis, S. (2011). Neurocognitive function in dopamine- β -hydroxylase deficiency. *Neuropsychopharmacology*, *36*(8): 1608-19. (PubMed, PDF)
- 14) **Asplund, C.L.**, Todd, J.J., Snyder, A.D., Gilbert, C.M., & Marois, R. (2010). Surprise-induced Blindness: A stimulus-driven attentional limit to conscious perception. *Journal of Experimental Psychology: Human Perception & Performance*, *36*(6): 1372-81. (PubMed, PDF)
- 15) Fougner, D.L., **Asplund, C.L.**, & Marois, R. (2010). What are the units of storage in visual working memory? *Journal of Vision*, *10*(12): 27, 1-11. (PubMed, PDF)
- 16) Rogers, B.P., Katwal, S.B., Morgan, V.L., **Asplund, C.L.**, & Gore, J.C. (2010). Functional MRI and multivariate autoregressive models. *Magnetic Resonance Imaging*, *28*(8): 1058-65. (PubMed, PDF)
- 17) **Asplund, C.L.**, Todd, J.J., Snyder, A.D., & Marois, R. (2010). A central role for the lateral prefrontal cortex in goal-directed and stimulus-driven attention. *Nature Neuroscience*, *13*(4): 507-12. (PubMed, PDF)
- 18) Dux, P.E., **Asplund, C.L.**, & Marois, R. (2009). Both exogenous and endogenous target salience manipulations support resource depletion accounts of the attentional blink: A reply to Olivers et al. (2009). *Psychonomic Bulletin & Review*, *16*(1): 219-24. (PubMed, PDF)
- 19) Buckholz, J.W., **Asplund, C.L.**, Dux, P.E., Zald, D.H., Gore, J.C., Jones, O.D., & Marois, R. (2008). The neural correlates of third-party punishment. *Neuron*, *60*(5), 930-40. (PubMed, PDF)
- 20) Dux, P.E., **Asplund, C.L.**, & Marois, R. (2008). An attentional blink for sequentially presented targets: Evidence in favor of resource depletion accounts. *Psychonomic Bulletin & Review*, *15*(4), 809-13. (PubMed, PDF)
- 21) Dux, P.E., Ivanoff, J.G., **Asplund, C.L.**, & Marois, R. (2006). Isolation of a central bottleneck of information processing with time-resolved fMRI. *Neuron*, *52*(6), 1109-20. (PubMed, PDF)

Book Chapters, Educational Publications, & Relevant Popular Articles

- 1) **Asplund, C.L.** & Venkatesan, T.L. (2013). Communicating Science. (Interview edited by Lim, R.) *Asia Pacific Biotech News*, *17*(10-11): 25-28.
- 2) Chee, M.W.L. & **Asplund, C.L.** (2013). Neuroimaging of attention and alteration of processing capacity in sleep-deprived persons. In *Neuroimaging of Sleep and Sleep Disorders* (E. Nofzinger, P. Maquet, & M.J. Thorpy, eds.), Cambridge University Press: 137-144.
- 3) Pang, S.J., Tan, Q.A., Chong, C., & **Asplund, C.L.** (2013). Neurobiology of Attention. In *The Brain Book 2* (Lim, K.-L. & Tuck, W.S., eds.), Department of Physiology, NUS Yong Loo Lin School of Medicine (Singapore): 5-8.

Conference Abstracts

- 1) Liaw, G.J., Obana, T., Chia, T.T.Y., & **Asplund, C.L.** (2017). Shared and distinct information processing limitations across attentional forms and modalities. Poster presented at the Asia-Pacific Conference on Vision. Tainan, Taiwan.

- 2) **Asplund, C.L.**, Ongchoco, J.D.K., Liaw, G.J., & Reid, J.M. (2017). The attentional blink reveals discrete perceptual transitions, whereas both spatial and temporal cueing show graded attentional effects. Poster presented at the Vision Sciences Society annual meeting. St. Pete Beach, FL, USA.
- 3) Obana, T., Lim, S.W.H., & **Asplund, C.L.** (2015). Surprise-induced deafness: Investigating a bottleneck of stimulus-driven auditory attention. Poster presented at the Psychonomic Society annual meeting. Chicago, IL, USA.
- 4) **Asplund, C.L.**, Ongchoco, J.D.K., & Reid, J.M. (2015). The attentional blink reveals the probabilistic nature of discrete conscious perception. Talk given at the Asia-Pacific Conference on Vision. Singapore.
- 5) Yeo, B.T.T., Tandil, J., Ong, J.L., **Asplund, C.L.**, Kong, D., & Chee, M.W.L. (2014). Stronger anti-correlations in association cortex predict resiliency to sleep deprivation. Poster presented at the Organization for Human Brain Mapping annual meeting. Hamburg, Germany.
- 6) Ong, J.L., Kong, D., Chia, T.T.Y., **Asplund, C.L.**, & Chee, M.W.L. (2014). Neural correlates of eye closure during sleep deprivation. Poster presented at the Organization for Human Brain Mapping annual meeting. Hamburg, Germany.
- 7) **Asplund, C.L.**, Fougny, D., Zughni, S., Martin, J.W., & Marois, R. (2014). The attentional blink reveals the probabilistic nature of discrete conscious perception. Talk given at the Australasian Society for Experimental Psychology annual meeting. Brisbane, Australia.
- 8) Chee, M.W.L., Ling, A., & **Asplund, C.L.** (2013). Preserved implicit timing and altered preparation strategy during sleep deprivation. Poster presented at the Society for Neuroscience annual meeting. San Diego, CA, USA.
- 9) **Asplund, C.L.**, Yeo, B.T.T., Krienen, F.M., Yaakub, S.N., & Chee, M.W.L. (2013). Large-scale meta-analysis of functional specialisations in prefrontal cortex. Poster presented at the Society for Neuroscience annual meeting. San Diego, CA, USA.
- 10) Yeo, B.T.T., Krienen, F.M., **Asplund, C.L.**, Yaakub, S.N., & Chee, M.W.L. (2013). Discovering latent cognitive processes involved in internal mentation tasks via a large-scale meta-analysis. San Diego, CA, USA.
- 11) **Asplund, C.L.**, Wee, N., & Chee, M.W.L. (2013). Sleep deprivation accelerates delay-related loss of visual short-term memories without affecting precision. Poster presented at the Cognitive Science Society annual meeting. Berlin, Germany.
- 12) Yeo, B.T.T., Krienen, F., Yaakub, S.N., **Asplund, C.L.**, Buckner, R., & Chee, M.W.L. (2013). Inferring ontologies of mind-brain relations from neuroimaging data. Poster presented at the Organization for Human Brain Mapping annual meeting. Seattle, WA, USA.
- 13) Kong, D., **Asplund, C.L.**, & Chee, M.W.L. (2013). Sleep deprivation exacerbates temporal limitations in object processing. Poster presented at the Organization for Human Brain Mapping annual meeting. Seattle, WA, USA.
- 14) Kong, D., **Asplund, C.L.**, & Chee, M.W.L. (2012). Sleep deprivation exacerbates temporal processing limitations in object processing. Poster presented at the Society for Neuroscience annual meeting. New Orleans, LA, USA.
- 15) **Asplund, C.L.**, Mulick, D., De Havas, J. & Chee, M.W.L. (2012). Convergence of vigilance decrements and sleep deprivation effects in brain areas recruited by an attention-demanding task. Talk given at the Associated Professional Sleep Societies annual meeting. Boston, MA, USA.

- 16) Yaakub, S.N., Dorairaj, K., Poh, J.S., **Asplund, C.L.**, Keong, J.L.C., Krishnan, R., Keefe, R., Adcock, R.A., Wood, S.J., & Chee, M.W.L. (2012). Individuals at-risk for psychosis show altered brain activity during working memory task. Poster presented at the Organization for Human Brain Mapping annual meeting. Beijing, China.
- 17) Marois, R., **Asplund, C.L.**, Zughni, S., Fougny, D., & Martin, J. (2012). Graded vs. quantal allocation of attention and awareness. Talk given at the Vision Sciences Society annual meeting. Naples, FL, USA.
- 18) Tamber-Rosenau, B.J., Dux, P.E., Tombu, M.N., **Asplund, C.L.**, & Marois, R. (2011). Multivoxel pattern analysis fMRI evidence for amodal central processing in the human prefrontal cortex. Poster presented at the Society for Neuroscience annual meeting. Washington, D.C., USA.
- 19) **Asplund, C.L.** & Chee, M.W.L. (2011). Convergence of vigilance decrements and sleep deprivation effects in brain areas recruited during an attention-demanding task. Poster presented at the Society for Neuroscience annual meeting. Washington, D.C., USA.
- 20) **Asplund, C.L.** & Marois, R. (2010). Functional dissociation of lateral prefrontal cortex and the dorsal network in the endogenous control of attention. Poster presented at the Society for Neuroscience annual meeting. San Diego, CA, USA.
- 21) Fougny, D., **Asplund, C.L.**, Watkins, T.J. & Marois, R. (2010). Object features reduce the precision of working memory. Talk given at the Vision Sciences Society annual meeting. Naples, FL, USA.
- 22) Tombu, M., **Asplund, C.L.**, Dux, P.E., & Marois, R. (2010). A unified processing bottleneck in human prefrontal cortex. Poster presented at the Cognitive Neuroscience Society annual meeting. Montreal, Quebec, Canada.
- 23) **Asplund, C.L.**, Todd, J.J., Snyder, A.D., & Marois, R. (2009). Convergence of goal-directed and stimulus-driven attention in ventrolateral prefrontal cortex. Poster presented at the Society for Neuroscience annual meeting. Chicago, IL, USA.
- 24) **Asplund, C.L.**, Todd, J.J., Snyder, A.D., Gilbert, C.M., & Marois, R. (2009). Convergence of goal-directed and stimulus-driven selection in lateral prefrontal cortex. Talk given at Vision Sciences Society annual meeting. Naples, FL, USA.
- 25) Dux, P.E., **Asplund, C.L.**, & Marois, R. (2009). Both exogenous and endogenous target salience manipulations support resource depletion accounts of the attentional blink. Talk given at Vision Sciences Society annual meeting. Naples, FL, USA.
- 26) Fougny, D.L., **Asplund, C.L.**, & Marois, R. (2009). Visual working memory capacity can be assessed independent of comparison errors. Poster presented at the Vision Sciences Society annual meeting. Naples, FL, USA.
- 27) **Asplund, C.L.**, Todd, J.J., Snyder, A.D., Gilbert, C.M., & Marois, R. (2008). The ventral, but not dorsal, attention network mediates a stimulus-driven attentional limit to conscious perception. Talk given at the Society for Neuroscience annual meeting. Washington, D.C., USA.
- 28) Buckholz, J.W., **Asplund, C.L.**, Dux, P.E., Zald, D.H., Gore, J.C., Jones, O.D., & Marois, R. (2007). The neural basis of legal decision making. Talk given at the Society for Neuroscience annual meeting. San Diego, CA, USA.
- 29) **Asplund, C.L.** & Marois, R. (2007). An fMRI comparison of Theory of Mind, Default Mode of Processing, stimulus-driven attention, and egocentric spatial attention networks. Poster presented at the Organization for Human Brain Mapping annual meeting. Chicago, IL, USA.

- 30) Dux, P.E., **Asplund, C.L.**, & Marois, R. (2007). Evidence in favor of a resource depletion account of the attentional blink. Poster presented at the Vision Sciences Society annual meeting. Sarasota, FL, USA.
- 31) Dux, P.E., Ivanoff, J.G., **Asplund, C.L.**, & Marois, R. (2006). Isolation of a central bottleneck of information processing with time-resolved fMRI. Poster presented at the Society for Neuroscience annual meeting. Atlanta, GA, USA.