

# Curriculum Vitae

Christopher Chatham, Ph. D.

## Professional Information

Senior Scientist and Biomarker Experimental Medicine Lead  
Biomarkers & Clinical Imaging for Neuroscience, Ophthalmology and Rare Diseases  
Roche Pharma Research and Early Development

## Contact Information

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## Education

Postdoctoral Training in Cognitive Neuroscience, Brown University, September 2011-October 2014  
Joint Ph.D. in Cognitive Psychology and Neuroscience, University of Colorado, August 2011  
MA in Cognitive Psychology, University of Colorado, December 2007  
B.A. in Psychology, University of Pennsylvania, May 2002

## Awards, Grants, Honors, and Fellowships

University Fellowship from the Graduate School at the University of Colorado, 2005-2011

Author of one of the Top 50 Science Blogs, as reviewed by *Nature*, 2006.

Dozier Outstanding Graduate Student Award, University of Colorado, 2010.

Awarded “Outstanding Trainee Poster” at Rotman Research Institute’s 20<sup>th</sup> Annual Conference on the Frontal Lobes, 2010.

National Institute of Child Health and Human Development (NICHD) Student Fellowship Award for workshop on Executive Functions in Preschoolers, June 8-9<sup>th</sup>, 2010.

Individual Performance Award, granted by Research Project Leader for contributions to clinical trial startup, Pfizer Worldwide R&D, 2014.

Individual Performance Award, granted by Vice President Leadership for contributions to clinical trial startup, Pfizer Worldwide R&D, 2014.

W.E. Upjohn Prize, granted by Senior Director of Statistics for contributions to improving Imaging/Statistics collaboration, Pfizer Worldwide R&D, 2015.

## Publications

*Peer-Reviewed Journal Papers*

Desrochers, T.M., Chatham, C.H. & Badre, D. (2016). The necessity of rostralateral prefrontal cortex for higher-level sequential behavior. *Neuron*. To appear September 25<sup>th</sup>.

Ranti, C. R., Chatham, C. H., & Badre, D. (2015). Parallel Temporal Dynamics in Hierarchical Cognitive Control. *Cognition*, 142, 205-229

Chatham, C. H. & Badre, D. (2015). Multiple Gates on Working Memory. *Current Opinion in Behavioral Sciences*.

Blackwell, K. A., Chatham, C. H., Wiseheart, M., & Munakata, Y. (2014). A developmental window into trade-offs in executive function: The case of task switching versus response inhibition in 6-year-olds. *Neuropsychologia*.

Herd, S. A., Hazy, T. E., Chatham, C. H., Brant, A. M., & Friedman, N. P. (2014). A neural network model of individual differences in task switching abilities. *Neuropsychologia*.

Chevalier, N., Chatham, C. H., & Munakata, Y. (2014). The Practice of Going Helps Children to Stop: The Importance of Context Monitoring in Inhibitory Control. *Journal of Experimental Psychology: General*. 143(3), 959-965.

Chatham, C. H., Frank, M. J., & Badre, D. (2014) Cortico-striatal systems supporting output gating during selection from working memory. *Neuron*. 81(4), 930-942.

Chatham, C.H. & Badre, D. (2013) Working memory management and predicted utility. *Frontiers in Behavioral Neuroscience*. 7:83.

Michaelson, L., de la Vega, A., Chatham, C.H. & Munakata, Y. (2013) Delaying gratification depends on social trust. *Frontiers in Cognition*. 4:355.

Green, M. C., Chatham, C.H., & Sestir, M. A. (2012). Emotion and transportation into fact and fiction. *Scientific Study of Literature*. 2(1), 37-59.

Munakata, Y., Snyder, H., Chatham, C. H. (2012). Developing cognitive control: Three key transitions. *Current Directions in Psychological Science*. 21(2), 71-77.

Chatham, C. H., Claus, E. D, Banich, M. T., Curran, T., Kim, A., & Munakata, Y. (2012) Cognitive control reflects context monitoring, not motoric stopping, in response inhibition. *PLoS One*. 7(2), e31546.

Chatham, C. H., Yerys, B., Munakata, Y. (2012). Why Won't You Do What I Want? The Informative Failures of Children and Models. *Cognitive Development*. 27(4), 349-366.

Munakata, Y., Herd, S. A., Chatham, C. H., Depue, B. E., Banich, M. T., O'Reilly, R. C. (2011). A unified framework for inhibitory control. *Trends in Cognitive Sciences* 15(10):453-9.

Chatham, C. H., Herd, S. A., Brant, A. M., Hazy, T. E., Miyake, A., O'Reilly, R., Friedman, N. P. (2011) From an Executive Network to Executive Functions: A Computational Model of the N-back Task. *Journal of Cognitive Neuroscience*. 23:11, 3598-619.

Chatham, C.H, Frank, M.J., Munakata Y. (2009). Pupillometric and behavioral markers of a developmental shift in the temporal dynamics of cognitive control. *Proceedings of the National Academy of Sciences*, 106:14, 5529-33.

#### *Book Chapters and Commentaries*

Chatham, C. H. & Badre, D. (in press) How to test cognitive theory with fMRI. To appear in “New Methods in Cognitive Psychology”, E. Schumacher and D. Spieler (Eds.), Psychology Press.

Swick, D & Chatham, C.H. (2014). Ten years of inhibition revisited. *Frontiers in Human Neuroscience*. May 21, 2014, doi: 10.3389/fnhum.2014.00329

Chatham, C. H. (2014) The Consistency Fallacy and Failures of Theory Embellishment. *Frontiers in Theoretical and Philosophical Psychology*. 4, 965.

Munakata, Y., Snyder, H. R., & Chatham, C. H. (2014). Developing cognitive control: The costs and benefits of active, abstract representations. To appear in “Developing Cognitive Control Processes: Mechanisms, Implications, and Interventions.” P. D. Zelazo & M. D. Sera (Eds.), Wiley.

Chatham, C. H. & Badre, D. (2012) Parts to principles: Anatomical Origins of Prefrontal Organization. *Cortex*. 48:10, 1373-5.

Munakata, Y., Chatham, C.H., & Snyder, H.R (2011). Mechanistic Accounts of Frontal Lobe Development. In “Principles of Frontal Lobe Function”, 2<sup>nd</sup> edition, D.T. Stuss and R.T. Knight (Eds.), Oxford University Press.

Munakata, Y., Stedron, J.M., Chatham, C.H., Kharitonova, M. (2008). Neural Network Models of Cognitive Development. In “The Handbook of Developmental Cognitive Neuroscience”, 2nd edition. C.A. Nelson and M. Luciana (Eds.), MIT Press.

#### *Manuscripts in Progress*

Chatham, C. H. & Munakata, Y. (under review) *A Neurocomputational Model of Monitoring and Stopping in Response Inhibition*.

Unger, K., Amso, D., Ackerman, L., Chatham, C.H., & Badre, D. (under revision). *Working Memory Gating Mechanisms Explain Developmental Change in Rule-Guided Behavior*.

Chatham, C. H. Badre, D. (in prep) *Single-pulse TMS effects on output gating during selection from working memory*.

#### **Conference Presentations**

Chatham, C.H., Frank, M.J., Munakata, Y. (2007, October) *Reacting as the Future Unfolds: A Child-Adapted Version of the AX-CPT Task*. Poster presented at the Cognitive Development Society, Santa Fe NM.

Chatham, C.H., Miyake, A. (2007, July) *Mechanisms of Visual Binding*. Poster presented at the 10 year anniversary meeting of the German Priority Program on Executive Functions, Leiden, NL.

- Chatham, C. H., Herd, S. A., Brant, A. M., Hazy, T. E., Miyake, A., O'Reilly, R., Friedman, N. P. (2009, November). *From the Executive Network to Executive Functions – A PBWM Model of the N-back Task*. Poster and contributed talk at the Computational Cognitive Neuroscience Conference, Boston, MA.
- Chatham, C. H., Claus, E. D, Banich, M. T., Curran, T., Kim, A., & Munakata, Y. (2010, March). *The Prefrontal Mechanism Underlying Inhibitory Control: Monitoring or Stopping?* Poster presented at the Rotman Research Institute Conference on the Frontal Lobes, Toronto, CA.
- Chatham, C. H., Claus, E. D, Banich, M. T., Curran, T., Kim, A., & Munakata, Y. (2010, April). *The Prefrontal Mechanism Underlying Inhibitory Control: Monitoring or Stopping?* Poster presented at the Cognitive Neuroscience Society, Montreal, CA.
- Chatham, C. H. (2010, June). *Summary of Recommendations from the Developmental Neuroscience Breakout Group*. Nominated to present at the National Institute of Child Health and Human Development (NICHD) workshop Executive Functions in Preschoolers, Bethesda, MD.
- Chatham, C. H., Brant, A. M., Herd, S. A., Hazy, T., O'Reilly, R. C., Friedman, N. F. (2012, January). *A Computational Model of the Stop Signal Task*. Poster presented at the Determinants of Executive Function and Dysfunction Annual Conference, Boulder, CO.
- Chatham, C. H., Badre, D. (2012, October). *Multiple Gates on Working Memory: An fMRI Study of Input Gating and Output Gating*. Nanosymposium presentation at Annual Meeting of the Society for Neuroscience, New Orleans, LA.
- Chevalier, N., Chatham, C. H., Gray, K. N., Schild, C. A., & Munakata, Y. (2013, April). *Context-monitoring practice can enhance response inhibition as much as motoric-stopping practice in children*. Paper presented at the Biennial Meeting of the Society for Research in Child Development, Seattle, WA.
- Chatham, C. H., & Badre, D. (2013, April). *Generalization of learned categories is supported by top-down control and working memory capacity*. Poster presented at the 20<sup>th</sup> Cognitive Neuroscience Society meeting.
- Chatham, C. H. & Badre, D. (2013, September). *Working Memory Management and Predicted Utility*. Poster presented at the Kavli Foundation Frontiers of Science symposium at the National Academy of Science, San Francisco, CA.
- Blackwell, K. A., Chatham, C. H., Wiseheart, M., & Munakata, Y. (2013, October) *Stop! But how? Multiple inhibitory processes in 5- and 6-year olds*. Poster presented at the Cognitive Development Society, Memphis TN.
- Ranti, C., Chatham, C. H. & Badre, D. (2013, November). *Characterizing the temporal dynamics of hierarchical cognitive control*. Poster presented Society for Neuroscience, San Diego, CA.
- Chatham, C. H. & Badre, D. (2013, November). *Working Memory Management and Predicted Utility*. Poster presented Society for Neuroscience, San Diego, CA.

Chatham, C.H. & Badre, D. (2014, April). *Modeling output gating during selection from working memory: Behavior, dopamine and neurostimulation*. Poster presented at the 21<sup>st</sup> Cognitive Neuroscience Society meeting, Boston MA, April 2014.

Desrochers, T. M., Chatham, C. H. & Badre, D (2014, April). *Stimulation of frontal polar cortex selectively disrupts hierarchical control of task sequences*. Poster presented at the 21<sup>st</sup> Cognitive Neuroscience Society meeting, Boston MA.

Gagne, C., Bhandari, A., Shih, P., Chatham, C. H., Badre, D. (2014, April). *The magic number 57 plus or minus 3%: Why is multi-voxel pattern classification success so low in the lateral prefrontal cortex?* Poster Presented at the 21<sup>st</sup> Cognitive Neuroscience Society meeting, Boston MA.

Chatham, C.H. & Badre, D. *Single pulse transcranial magnetic stimulation to the prePMd influences the output gating of working memory*. (2014, November). Poster presented at the Society for Neuroscience, Washington, D.C.

### **Teaching Experience**

Teaching Assistant, University of Colorado at Boulder, Cognitive Psychology (2005)

Teaching Assistant, University of Colorado at Boulder, Introduction to Psychology (2006)

Teaching Assistant, University of Colorado at Boulder, Computational Cognitive Neuroscience (2008)

Guest lectures delivered to undergraduates at the University of Colorado at Boulder in courses on Cognitive Psychology (2005), Computational Cognitive Neuroscience (2008), and Senior Seminar in Psychology (2010).

### **Mentoring Experience**

Honor's thesis mentor for Amanda Bennett (2009), Meghan Cronk (2009), Lindsay Provan (2010), Yetunde Akinde (2011), Carolyn Ranti (2013), Kieran Alessi (2013), and Jonathan Nicholas (2015).

### **Media Coverage**

Live Science: "Why Toddlers Don't Do What They're Told" By LiveScience staff, March 24<sup>th</sup>, 2009. Syndicated to MSN Health, Yahoo News, US News and World Report, and The Huffington Post.

The Daily Camera: "CU research gives glimpse into toddlers' memories," by Brittany Anas, March 23<sup>rd</sup>, 2009.

APA Monitor on Psychology: "Meet Psychology's Bloggers" By Rebecca Clay, December 2008.

Science Daily: "Ability to Delay Gratification May Be Linked to Social Trust", September 2013. Also covered by ScienceLine.com and The Daily Camera (Boulder's newspaper).

Medical Daily: "Working Memory Explained: How Your Brain Prioritizes Information When It's Time To Use It", February 2014. Also covered at The Brown Daily Herald (Brown Student Newspaper), and Science Daily.

Cognitive Neuroscience Society 2014 blog: “Children Need to Learn Context to Know When to Stop: Q&A with Christopher Chatham”, April 5<sup>th</sup>.  
[http://www.cogneurosociety.org/responseinhibition\\_chatham](http://www.cogneurosociety.org/responseinhibition_chatham)

## **Professional Activities**

Co-Chair of Symposium on *Mechanisms of Response Inhibition* at the 21<sup>st</sup> Cognitive Neuroscience Society meeting, Boston MA. (2014)

Cognitive Lunch Coordinator, Cognitive Program in the Department of Psychology (2006-2007)

Author of Developing Intelligence, a weblog for popularizing cognitive neuroscience (2006-2010).  
<http://scienceblogs.com/developingintelligence>

Ad-hoc peer reviews provided for:

*Biological Psychology*  
*Cerebral Cortex*  
*Cognitive, Affective and Behavioral Neuroscience*  
*Developmental Cognitive Neuroscience*  
*Developmental Science*  
*Experimental Brain Research*  
*Frontiers in Human Neuroscience*  
*Human Brain Mapping*  
*Journal of Experimental Psychology: General*  
*Journal of Neurophysiology*  
*Journal of Neuroscience*  
*Neural Networks*  
*Neuroimage*  
*Neuropsychologia*  
*PLoS One*  
*Psychoneuroendocrinology*  
*Psychonomic Bulletin & Review*  
*Quarterly Journal of Experimental Psychology*

## **Invited Talks**

University of Colorado, Boulder, Ekstrand Memorial Mini-Convention, April 2006

University of Colorado, Boulder, Ekstrand Memorial Mini-Convention, April 2007

LearningRX, Boulder, Colorado, May 2007

University of Colorado, Boulder, Cognitive Lunch, April 2008

University of Colorado, Boulder, IBSC Center on the Determinants of Executive Function and Dysfunction, May 2008

University of Colorado, Boulder, Cognitive Lunch, April 2009

University of Colorado, Boulder, Advisory Panel Meeting for the IBSC Center on the Determinants of Executive Function and Dysfunction, December 2009

University of Colorado, Boulder, Cognitive Lunch, April 2010

Brown University, Providence, Badre Lab, May 2010

Brown University, Providence, Cognition Seminar, September 2011

Children's Hospital of Boston, Sheridan Lab Meeting, April 2012

Brown University, Providence, Cognition Seminar, February 2013

Brigham Women's Hospital, Boston, Visual Attention (Wolfe) Lab Seminar, March 2013

Pfizer Research & Development, Precision Medicine core meeting, September 2014

Center for Depression, Anxiety and Stress Research speaker series, Harvard Medical School at McLean Hospital, September 2015

Biomarkers and Clinical Imaging Group Meeting, Roche Innovation Center Basel, September 2015