FRANK TONG

CURRICULUM VITAE

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EDUCATION

1990–1995	Queen's University, Canada	B.S. in Psychology
1995–1998	Harvard University	M.A. in Experimental Psychology
1998–1999	Harvard University	Ph.D. in Experimental Psychology *Awarded on November 16, 1999*

ACADEMIC APPOINTMENTS

1999 – 2000	McDonnell-Pew Post-Doctoral Research Fellow University of California, Los Angeles, Department of Psychology
2000 – 2004	Assistant Professor Princeton University, Department of Psychology
2004 – 2007	Assistant Professor Vanderbilt University, Department of Psychology
2007 – present	Associate Professor Vanderbilt University, Department of Psychology

RESEARCH INTERESTS

General Areas

- Human neural bases of perception, attention, object recognition, and awareness

Specific Topics

- Neural decoding of perceptual and mental states using brain imaging
- Neural representations of visual features and objects in the human visual system, and their role in conscious perception
- Neural mechanisms of binocular rivalry, bistable perception, perceptual filling-in
- Top-down control of perception by voluntary attention or imagery

AWARDS AND HONORS

1990 – 1995	Full undergraduate scholarship plus stipend, Queen's University
1992 – 1993	NSERC Summer Research Award
1994	Ann Adamson Award in Psychology, Queen's University
1995	Medal in Psychology for highest GPA, Queen's University
1995 – 1997	Merit-Based Graduate Fellowship, Harvard University
1995 – 1999	NSERC Post-Graduate Scholarship
1999 – 2002	*McDonnell-Pew* Training Fellowship in Cognitive Neuroscience
2003 – 2004	*Robert K. Root Preceptorship*, Princeton University
2004 – 2005	*Scientific American 50*. Award to honor 50 individuals, teams, companies or other organizations for accomplishments in research, business, or policy making in 2004 – 2005
2006	*Young Investigator Award*, Cognitive Neuroscience Society
2008	*Chancellor's Award for Research*, Vanderbilt University

PUBLICATIONS

Tong, F., Nakayama, K., Vaughan, J. T., & Kanwisher, N. (1998). Binocular rivalry and visual awareness in human extrastriate cortex. *Neuron*, *21*, 753-759.

Kanwisher, N., Tong, F., & Nakayama, K. (1998). The effects of face inversion on the human fusiform face area. *Cognition, 68*, B1-B11.

Tong, F., & Nakayama, K. (1999). Robust representations for faces: Evidence from visual search. *Journal of Experimental Psychology: Human Perception and Performance, 25,* 1016-1035.

Tong, F., Nakayama, K., Moscovitch, M., Weinrib, O., & Kanwisher, N. (2000). Response properties of the human fusiform face area. *Cognitive Neuropsychology, 17*, 257-279.

Tong, F. (2001). Brain at work: Play by play. *Nature Neuroscience, 4,* 560-562.

Cohen, J. D., & Tong, F. (2001). The face of controversy: *Science, 293,* 2405-2407.

Tong, F., & Engel, S. A. (2001). Interocular rivalry revealed in the human cortical blind-spot representation. *Nature, 411,* 195-199.

Tong, F. (2001). Competing theories of binocular rivalry: A possible resolution. *Brain and Mind, 2,* 55–83.

Tong, F. (2003). Out of body experiences: From Penfield to present. *Trends in Cognitive Sciences, 7,* 104-106.

Tong, F. (2003). Primary visual cortex and visual awareness. *Nature Reviews Neuroscience, 4,* 219-229.

Tong, F. (2004). Splitting the spotlight of visual attention. *Neuron, 42,* 524-526.

Meng, M. & Tong, F. (2004). Can attention bias bistable perception? Differences between binocular rivalry and ambiguous figures. *Journal of Vision, 4,* 539-551.

Awater, H., Kerlin, J. K., Evans, K. K., & Tong, F. (2005). Cortical representation of space around the blind spot. *Journal of Neurophysiology, 94,* 3314-3324.

Kamitani, Y., & Tong, F. (2005). Decoding the visual and subjective contents of the human brain. *Nature Neuroscience, 8*, 679-685.

Meng, M., Remus, D. R., & Tong, F. (2005). Filling-in of visual phantoms in the human brain. *Nature Neuroscience, 8*, 1248-1254.

Kamitani, Y, & Tong, F. (2006). Decoding seen and attended motion directions from activity in the human visual cortex. *Current Biology*, 16, 1096-1102.

Tong, F., Meng, M., & Blake, R. (2006). Neural bases of binocular rivalry. *Trends in Cognitive Science*, *10*, 502-511.

McKeeff, T. J., & Tong, F. (2007). The timing of perceptual decisions for ambiguous face stimuli in the human ventral visual cortex. *Cerebral Cortex*, *17*, 669-678.

McKeeff, T. J., Remus, D. R., & Tong, F. (2007). Temporal limitations in object processing across the human ventral visual pathway. *Journal of Neurophysiology, 98*, 382-393.

Meng, M., Ferneyhough, E., Tong, F. (2007). Dynamics of perceptual filling-in of visual phantoms revealed by binocular rivalry. *Journal of Vision, 7*(13):8, 1-15.

Yamashita, O., Sato, M.-A., Yoshioka, T., Tong, F., Kamitani, Y. (2008). Sparse estimation automatically selects voxels relevant for the decoding of fMRI activity patterns. *Neuroimage*, 42, 1414-1429.

Pearson, J., Clifford, C., & Tong, F. (2008). The functional impact of mental imagery on conscious perception. *Current Biology, 18,* 982-986.

MANUSCRIPTS UNDER REVIEW

Harrison, S., & Tong, F. (*Submitted*). Decoding reveals the contents of visual working memory in early visual areas.

Harrison, S., Kamitani, Y., Dewey, J., & Tong, F. (*Submitted*). Orientation-selective response properties of the human visual system.

McKeeff, T. J., Tong, F., & Gauthier, I. (*Submitted*). Expertise reduces the functional cerebral distance between face and object perception.

Tong, F., Kim, D. J., Swisher, J. D. (*Submitted*). Emergence of position-invariant selectivity for objects in the human visual pathway.

BOOK CHAPTERS

Tong, F. (2005). Investigations of the neural basis of binocular rivalry. In D. Alais & R. Blake (Eds.), *Binocular rivalry and perceptual ambiguity*, Cambridge, MA: MIT Press.

Wolfe, J. M., Seiffert, A. E., & Tong, F. (2006). Perception. In E. E. Smith & S. M. Kosslyn (Eds.), *Cognitive Psychology: Mind and Brain*, Prentice Hall.

Tong, F. & Pearson, J. (2007). Vision. In Baars & Gage (Ed.) *Cognition, Brain, and Consciousness*, Academic Press, London.

MEDIA COVERAGE OF LAB RESEARCH

New York Times, April 25, 2005. Improved scanning technique uses brain as portal to thought.

New York Times Sunday Magazine, May 8, 2005. Of two minds.

New Scientist, April 25, 2005. Mind-reading machine knows what you see.

Scientific American, Science News, April 25, 2005. Brain scans help scientists "read" minds.

Science Now, Apr 25, 2005. A new angle on mind reading.

New Scientist, Cover article on May 6, 2006 issue. *Through the mind's eye, pp 32-36.*

SCIENTIFIC COMMENTARIES ON LAB RESEARCH

Culham, J. (1999). What you see is what you get activated. *Trends in Cognitive Science 3*, 126.

Andrews, T. J. (2001). Binocular rivalry and visual awareness. *Trends in Cognitive Science, 5*, 407-409.

Rees, G. (2001). Blinding revelations about rivalry. *Trends in Cognitive Science, 5*, 374-375.

Blake, R., & Logothetis, N. K. (2002). Visual competition. *Nature Reviews Neuroscience, 3,* 1-11.

Rees, G. (2002). Neural correlates of consciousness in humans. *Nature Reviews Neuroscience, 3*, 261–270.

Boynton, G. M. (2005). Imaging orientation selectivity: decoding conscious perception in V1. *Nature Neuroscience, 8*, 541-542.

Jones, R. (2005). Seeing all the angles. *Nature Reviews Neuroscience, 6*, 419.

Komatsu, H. (2006). The neural mechanisms of perceptual filling-in. *Nature Reviews Neuroscience, 7,* 220-231.

Haynes, J. D. & Rees, G. (2006). Decoding mental states from brain activity in humans. *Nature Reviews Neuroscience, 7,* 523-534.

Norman, K. A., Polyn, S. M., Detre, G. J., & Haxby, J. V. (2006). Beyond mind-reading: multi-voxel pattern analysis of fMRI data. *Trends in Cognitive Science, 10*, 424-430.

Slotnick, S. D. (2008). Imagery: mental pictures disrupt perceptual rivalry. *Current Biology, 18*(14), R603-605.

GRANTS FUNDED

Project Title:	The Neural Basis of Binocular Rivalry and Visual Awareness in Human Visual Cortex
Funding Agency:	J. S. McDonnell Foundation and Pew Charitable Trusts
Grant Type:	McDonnell-Pew Grant in Cognitive Neuroscience
Investigator Role:	PI
Dates of Funding:	09/01/99 – 05/01/03

Project Title:	Conflict and Control in Perception (Project 2)
Funding Agency:	National Institute of Health
Grant Type:	NIH Silvio O. Conte Center Grant for Neuroscience Research
Investigator Role:	Co-PI
Dates of Funding:	09/22/00 – 08/31/05

Project Title:	Neural Mechanisms of Human Visual Perception
Funding Agency:	National Institutes of Health, National Eye Institute
Grant Type:	R01 Investigator Initiated Grant Application
Grant Number:	R01 EY14202-01
Investigator Role:	PI
Dates of Funding:	09/15/02 – 09/15/06

Project Title:	Neural representations of objects across the human visual pathway
Funding Agency:	National Science Foundation
Grant Type:	Cognitive Neuroscience Initiative
Grant Number:	BCS-0642633
Investigator Role:	Principal Investigator
Dates of Funding:	04/15/07 – 03/31/11

Project Title:	Neural representation of features in the human visual cortex
Funding Agency:	National Institutes of Health, National Eye Institute
Grant Type:	R01 Investigator Initiated Grant Application
Grant Number:	R01 EY017082
Investigator Role:	PI
Dates of Funding:	09/01/07 – 08/31/12

Project Title:	Integrated imaging of brain function at 7 Tesla
Funding Agency:	National Institutes of Health, National Institute of Biomedical Imaging and Bioengineering
Grant Type:	R01 Bioengineering Research Partnerships Grant Application
Grant Number:	2R01 EB000461-07
Investigator Role:	co-PI
Dates of Funding:	2/01/2008 – 01/31/2013

INVITED TALKS AND COLLOQUIA

1998 June	Invited speaker, McDonnell-Pew Annual Meeting in Cognitive Neuroscience, Montreal, Canada
1998 November	Beckman Laboratories, California Institute of Technology, Pasadena, CA
1999 October	Cognitive Forum, UCLA, Los Angeles, CA
2000 December	NEC Research Institute, Princeton, NJ
2001 February	Vision Sciences Series, Harvard University, Cambridge, MA
2001 February	Brain and Cognitive Sciences Seminar, MIT, Cambridge, MA
2001 June	Special Symposium on *The Neural Correlates of Awareness*, Cambridge Medical Research Council, Cambridge, UK
2002 April	Chair and speaker of *Symposium on The Role of V1 in Human Visual Awareness*, Cognitive Neuroscience Society, San Francisco, CA
2002 June	Invited speaker, Workshop on Binocular Rivalry and Perceptual Ambiguity, San Miniato, Italy
2002 August	Vision Sciences Laboratory, Harvard University, Cambridge, MA
2003 April	Departmental Colloquium, McMaster University, Hamilton, Canada
2003 May	Invited speaker, *Time Colloquium* for Princeton Alumni, Washington DC
2003 June	Invited speaker, Association for the Scientific Study of Consciousness, Memphis, TN
2004 March	Departmental Colloquium, University of Pennsylvania, Philadelphia, PA
2004 March	Departmental Colloquium, John Hopkins University, Baltimore, MD
2004 April	Satellite Symposium on *Visual Attention and Awareness*, Cognitive Neuroscience Society, San Francisco, CA
2004 September	Invited speaker, Opening of new MRI center, University of Rochester
2004 October	Departmental Colloquium, Psychology Dept, Cornell University
2004 November	Cognitive Neuroscience Seminar, California Institute of Technology
2005 June	Visual Neuroscience Seminar, Salk Institute
2005 June	Invited speaker, Neurophilosophy conference, California Institute of Technology
2005 December	Invited Tutorial Speaker, Neural Information Processing Systems Conference, Vancouver, Canada
2006 January	Workshop on Brain and Cognition, Taiwan ministry of education, (Invited speakers: Shinsuke Shimojo, Frank Tong, Anne Treisman)
2006 May	Departmental Colloquium, Department of Neurobiology and Anatomy, University of Texas Medical School
2006 June	Speaker for Symposium on *Imaging Consciousness: New Methods and Approaches*, Human Brain Mapping Conference, Florence, Italy
2006 June	Dartmouth Summer Institute in Cognitive Neuroscience, Hanover, NH
2006 November	Departmental Colloquium, Psychology Dept, University of Louisville
2006 April	Colloquium, Center for Cognitive Sciences, University of Minnesota
2007 May	Invited speaker, International Conference on Cognitive and Neural

	Systems, Boston University (Organizer: Prof. Stephen Grossberg)
2007 June	Invited speaker, Centre for Vision Research International Conference, York University (Organizer: Prof. Hugh Wilson)
2007 October	Colloquium, Cognitive Science, University of Arizona
2007 November	Vision Sciences Seminar, Harvard University
2007 November	Departmental Colloquium, Psychology Dept, Boston University
2008 March	Mind, Brain and Behavior Seminar, Harvard University
2008 May	Invited speaker, Symposium of the Center for Visual Science, Rochester University
2008 June	Invited speaker, Computational Neuroscience of Vision, Cold Spring Harbor.

PROFESSIONAL ACTIVITIES AND MEMBERSHIPS

1997 – 1998	*Organizer* of the Vision Science Seminar, Harvard University
2001 Fall	*Organizer* of the Cognitive Seminar Series, Princeton University
2002 April	*Chair* of Symposium on "The Role of V1 in Human Visual Awareness", Cognitive Neuroscience Society, San Francisco, CA
2003 – 2004	*Ad Hoc* Study Section Member, National Institutes of Health, Sensory, Motor, and Cognitive Neuroscience (ZRG1 F02B)
2004 – 2005	*Ad Hoc* Study Section Member, National Institutes of Health, Cognitive Neuroscience Study Section (COG)
2007	*Ad Hoc* Study Section Member, National Institutes of Health, Special Emphasis Panel, Sensorimotor Integration Study Section

Ad Hoc Reviewing

General Science Journals
Current Biology
Nature
PLOS: Biology
PNAS
Science

Neuroscience and Neuroimaging Journals
Cerebral Cortex
Cognitive Neuropsychology
Journal of Cognitive Neuroscience
Journal of Neurophysiology
Journal of Neuroscience
Nature Neuroscience
Nature Reviews Neuroscience
Neuroimage
Neuron
Neuropsychologia

Psychology Journals
Brain and Mind
Cognition
Journal of Experimental Psychology: Human Perception and Performance
Journal of Vision
Journal of Personality and Social Psychology
Perception
Perception and Psychophysics
Psychological Science
Trends in Cognitive Science
Vision Research

Organizations and Funding Agencies
Organization for Human Brain Mapping
National Science Foundation
National Institutes of Health
Wellcome Trust

Professional Memberships

American Physiological Association
Association for Psychological Science
Association for Scientific Study of Consciousness
Cognitive Neuroscience Society
Human Brain Mapping Organization
Society for Neuroscience
Vision Sciences Society

TEACHING AND ADVISING

2001 spring	Instructor, Graduate Quantitative Methods for Psychology, Princeton University
2001 fall	Instructor, Cognitive Psychology, Princeton University
2002 fall	Instructor, Graduate Proseminar in Cognitive Psychology, Princeton University
2002 – 2003	Freshman and Sophomore Faculty Advisor, Mathey College, Princeton University
2003 fall	Instructor, Cognitive Psychology, Princeton University
2004 fall	Instructor, Mind and Brain, Vanderbilt University
2005 fall	Instructor, Vision, Brain, and Consciousness, Vanderbilt University
2006 spring	Instructor, Mind and Brain, Vanderbilt University
2006 fall	Instructor, Social Cognition and Neuroscience, Vanderbilt University
2007 spring	Instructor, Mind and Brain, Vanderbilt University
2008 spring	Instructor, The Visual System, Vanderbilt University
	Instructor, Social Cognition and Neuroscience, Vanderbilt University

Graduate Student Advisees

Stephanie Harrison. Current PhD student, Vanderbilt University.

Rijuta Pandav, Current PhD student, Vanderbilt University.

Thomas McKeeff. Current PhD student, Princeton University.
Thesis proposal title: Temporal limitations of visual object processing.

Ming Meng. PhD received in May 2006, Princeton University.
Thesis title: Neural mechanisms underlying rivalry, perceptual filling-in, and their interactions.

Undergraduate Thesis Advisees

Amy Wong, 2001. Recipient of the *Class of 1943 Senior Thesis Prize in Neuroscience*, Department of Psychology, Princeton University. Thesis title: Human brain activity during attempts to control perception of ambiguous figures: An fMRI study.

Sharon Fox, 2002. Recipient of the *George A. Miller Senior Thesis Prize in Cognitive Science*, Princeton University. Thesis title: Caravaggio in a new light: theories of light in his paintings and the scientific basis for its emotive effects.

David Kim, 2004. Recipient of the *Class of 1943 Senior Thesis Prize in Neuroscience*, Department of Psychology, Princeton University. Thesis title: Classification of subordinate-level objects using distributed representations in human occipital-temporal cortex.