

BIOGRAPHICAL SKETCH

NAME Fox, Kieran C. R.		POSITION TITLE MD Candidate, School of Medicine, Stanford University	
EDUCATION/TRAINING			
INSTITUTION	DEGREE	MM/YY	FIELD OF STUDY
McGill University	BA	05/08	Psychology/Neuroscience
University of British Columbia	MA	08/12	Cognitive Neuroscience
University of British Columbia	PhD	08/16	Cognitive Neuroscience
Stanford University	Postdoctoral Fellow	08/18	Neurology
Stanford University	MD	06/22	Medicine

A. Personal Statement

My research centers on understanding higher-order cognition (metacognition, cognitive control, introspection), as well as spontaneous thought processes, such as mind-wandering and dreaming, using human intracranial electrophysiology (iEEG/ECoG) and functional magnetic resonance imaging (fMRI). I am very involved in research on meditation and mindfulness: what its benefits might be, how it relates to mind-wandering, and what functional and structural brain changes are associated with its practice. I also ask questions about comparative brain evolution and anatomy, particularly of cetaceans (dolphins and whales): why do some species have such large and complex brains, whereas others do not? What is the relationship between intensive social interaction, cultural transmission of information, and brain complexity? My present work focuses on the effects that intracranial electrical brain stimulation has on subjective experience and mood, as well as understanding large-scale hierarchical gradients in the organization of human neocortex. I am pursuing these various lines of work today as an MD candidate and Medical Scholar at Stanford University's School of Medicine, collaborating primarily with Josef Parvizi (MD/PhD) in the Department of Neurology and Neurological Sciences.

B. Positions and Honors**Positions and Employment**

2018-23 MD Candidate, School of Medicine, Stanford University
 2017-18 Postdoctoral Fellow, Laboratory of Behavioral and Cognitive Neurology, Stanford University
 2011-15 Lab Manager, Cognitive Neuroscience of Thought Lab, University of British Columbia, Canada
 2010-12 Teaching Assistant, University of British Columbia, Canada
 2009 Research Assistant, Cerebral Diagnostics, Ltd., Toronto, Canada
 2008 Research Assistant, Neuropsychology of Pain Laboratory, University of Montreal, Canada
 2007-08 Lab Technician, Center for Advanced Research in Sleep Medicine, Sacré-Coeur Hospital, Montreal

Ad-Hoc Academic Reviewing

Nature Reviews Neuroscience • *Trends in Cognitive Sciences* • *Perspectives on Psychological Science* • *Neuroscience and Biobehavioral Reviews* • *Cerebral Cortex* • *NeuroImage* • *Human Brain Mapping* • *The Journal of Neuroscience* • *Scientific Reports* • *Social Cognitive and Affective Neuroscience* • *European Journal of Neuroscience* • *Mindfulness* • *Journal of Affective Disorders* • *Neuropsychologia* • *Cognitive, Affective, & Behavioral Neuroscience* • *Brain Research* • *Psychological Research* • *Frontiers in Human Neuroscience* • *Neuroscience Letters* • *Philosophical Psychology*

Professional Memberships

Society for Neuroscience • Organization for Human Brain Mapping • Cognitive Neuroscience Society • Mind and Life Institute

Honors, Awards, Fellowships and Grants

- 2019-20 Stanford University School of Medicine Medical Scholars Research Grant
2017-19 NSERC Postdoctoral Fellowship (terminated August 2018 to pursue MD)
2013-16 NSERC Vanier Canada Graduate Scholarship (PhD)
2015 NIMH Summer Institute in Cognitive Neuroscience Fellowship
2013-16 NSERC Canada Graduate Scholarship (PhD) (*declined)
2012-15 Mind and Life Institute Francisco J. Varela Research Award
2012-16 University of British Columbia 4-Year Fellowship (PhD)
2011 R. Howard Webster Foundation Fellowship
2011-12 University of British Columbia Psychology Department Fellowship (MA degree)
2010-11 University of British Columbia First-Year Entrance Fellowship (MA degree)
2008 NSERC Undergraduate Student Research Award (BA degree) (*declined)
2008 Graduated with Distinction, McGill University, Montreal, Canada

C. Peer-reviewed Publications

Journal Articles and Book Chapters Published

- Fox, K.C.R.**, Cahn, B.R. (in press). Meditation and the brain in health and disease. To appear in: *The Oxford Handbook of Meditation* (Farias, Brazier, & Lalljee, Eds.). Oxford University Press.
- Yih, J., Beam, D.E., **Fox, K.C.R.**, Parvizi, J. (2019). Intensity of affective experience is modulated by magnitude of intracranial electrical stimulation in human orbitofrontal, cingulate, and insular cortices. *Social Cognitive and Affective Neuroscience*, 14(4), 339-351.
- Fox, K.C.R.**, Beaty, R.E. (2019). Mind-wandering as creative thinking: Neural, psychological, and theoretical considerations. *Current Opinion in Behavioral Sciences*, 27, 123-130.
- Fox, K.C.R.***, Yih, J.*, Raccach, O., Pendekanti, S.L., Limbach, L.E., Maydan, D.D., Parvizi, J. (2018). Changes in subjective experience elicited by direct stimulation of the human orbitofrontal cortex. *Neurology*, 91(16), 1519-1527.
- Christoff, K., Mills, C. Andrews-Hanna, J.R., Irving, Z.C., Thompson, E., **Fox, K.C.R.**, Kam, J.W.Y. (2018). Mind-wandering as a scientific concept: Cutting through the definitional haze. *Trends in Cognitive Sciences*.
- Fox, K.C.R.***, Andrews-Hanna, J.R.*, Mills, C.S., Dixon, M.L., Markovic, J., Thompson, E., Christoff, K. (2018). Affective neuroscience of self-generated thought. *Annals of the New York Academy of Sciences*, 1426, 25-51. (Special Issue: The Year in Cognitive Neuroscience).
- Fox, K.C.R.**, Girn, M. (2018). Neural correlates of self-generated imagery and cognition throughout the sleep cycle. In: *The Oxford Handbook of Spontaneous Thought* (Fox & Christoff, Editors), Ch. 28, pp. 371-384. Oxford University Press.
- Fox, K.C.R.** (2018). Neural origins of self-generated thought: Insights from intracranial electrical stimulation and recordings in humans. In: *The Oxford Handbook of Spontaneous Thought* (Fox & Christoff, Editors), Ch. 14, pp. 165-179. Oxford University Press.
- Andrews-Hanna, J.R., Irving, Z.C., **Fox, K.C.R.**, Spreng, R.N., Christoff, K. (2018). The neuroscience of spontaneous thought: An evolving, interdisciplinary field. In: *The Oxford Handbook of Spontaneous Thought* (Fox & Christoff, Editors), Ch. 13, pp. 143-164. Oxford University Press.
- Fox, K.C.R.**, Christoff, K. (2018). Introduction: Toward an interdisciplinary science of spontaneous thought. In: *The Oxford Handbook of Spontaneous Thought* (Fox & Christoff, Editors), Ch. 1, pp. 3-8. Oxford University Press.
- Fox, K.C.R.**, Christoff, K. (2018). *The Oxford Handbook of Spontaneous Thought*. Oxford University Press.
- Fox, K.C.R.**, Foster, B.L., Kucyi, A., Daitch, A.L., Parvizi, J. (2018). Intracranial electrophysiology of the human default network. *Trends in Cognitive Sciences*, 22(4), 307-324.
- Fox, K.C.R.**, Girn, M., Parro, C.C., Christoff, K. (2018). Functional neuroimaging of psychedelic experience. In: *The Cambridge Handbook of the Neuroscience of Creativity*. (R.E. Jung & O. Vartanian, Editors), Ch. 6, pp. 92-113. Cambridge University Press.

- Van Dam, N.T., van Vugt, M.K., Vago, D.R., Schmalzl, L., Saron, C.D., Olendzki, A., Meissner, T., Lazar, S.W., Kerr, C.E., Gorchov, J., **Fox, K.C.R.**, Field, B.A., Britton, W.B., Brefczynski-Lewis, J.A., Meyer, D.E. (2018). Reiterated concerns and further challenges for mindfulness and meditation research: A reply to Davidson and Dahl. *Perspectives on Psychological Science*, 13(1), 36-61.
- Van Dam, N.T., van Vugt, M.K., Vago, D.R., Schmalzl, L., Saron, C.D., Olendzki, A., Meissner, T., Lazar, S.W., Kerr, C.E., Gorchov, J., **Fox, K.C.R.**, Field, B.A., Britton, W.B., Brefczynski-Lewis, J.A., Meyer, D.E. (2018). Mind the hype: A critical evaluation and prescriptive agenda for mindfulness and meditation research. *Perspectives on Psychological Science*, 13(1), 66-69.
- Fox, K.C.R.***, Muthukrishna, M.*, Shultz, S. (2017). The social and cultural roots of whale and dolphin brains. *Nature Ecology & Evolution*, 1, 1699-1705.
- Fox, K.C.R.**, Fitz, N.S., Reiner, P.B. (2017). The multiplicity of memory enhancement: Practical and ethical implications of the diverse neural substrates underlying human memory systems. *Neuroethics*, 10(3), 375-388.
- Christoff, K., Irving, Z.C., **Fox, K.C.R.**, Spreng, R.N., Andrews-Hanna, J.R. (2016). Mind-wandering as spontaneous thought: A dynamic framework. *Nature Reviews Neuroscience*, 17, 718-731.
- Fox, K.C.R.**, Andrews-Hanna, J.R., Christoff, K. (2016). The neurobiology of self-generated thought from cells to systems: Integrating evidence from lesion studies, human intracranial electrophysiology, neurochemistry, and neuroendocrinology. *Neuroscience*, 335, 134-150.
- Fox, K.C.R.**, Kang, Y., Lifshitz, M., Christoff, K. (2016). Increasing cognitive-emotional flexibility with meditation and hypnosis: The cognitive neuroscience of de-automatization. In: *Hypnosis and Meditation*, A. Raz and M. Lifshitz (Eds.) Ch. 11, pp. 191-219. Oxford University Press.
- Ellamil, M., **Fox, K.C.R.**, Dixon, M.L., Pritchard, S., Todd, R.M., Thompson, E., Christoff, K. (2016). Dynamics of neural recruitment surrounding the spontaneous arising of thoughts in experienced mindfulness practitioners. *NeuroImage*, 136, 186-196.
- Fox, K.C.R.**, Dixon, M.L., Nijeboer, S., Girn, M., Floman, J.L., Lifshitz, M., Ellamil, M., Sedlmeier, P., Christoff, K. (2016). Functional neuroanatomy of meditation: A review and meta-analysis of 78 functional neuroimaging investigations. *Neuroscience and Biobehavioral Reviews*, 65, 208-228.
- Fox, K.C.R.**, Christoff, K. (2015). Transcranial direct current stimulation to lateral prefrontal cortex could increase meta-awareness of mind-wandering. *Proceedings of the National Academy of Sciences U.S.A.*, 112(19), E2414.
- Fox, K.C.R.**, Spreng, R.N., Ellamil, M., Andrews-Hanna, J.R., Christoff, K. (2015). The wandering brain: Meta-analysis of functional neuroimaging studies of mind-wandering and related spontaneous thought processes. *NeuroImage*, 111, 611-621. *Winner of editors' choice award for 'most significant' paper of the year.
- Domhoff, G.W., **Fox, K.C.R.** (2015). Dreaming and the default network: A review, synthesis, and counterintuitive research proposal. *Consciousness and Cognition*, 33, 342-353.
- Fox, K.C.R.**, Thompson, E., Andrews-Hanna, J.R., Christoff, K. (2014). Is thinking really aversive? Commentary on Wilson et al.'s "Just think: The challenges of the disengaged mind." *Frontiers in Psychology: Cognition*, 5(1427), 1-4.
- Dixon, M.L., **Fox, K.C.R.**, Christoff, K. (2014). A framework for understanding the relationship between externally and internally directed cognition. *Neuropsychologia*, 62, 321-330.
- Dixon, M.L., **Fox, K.C.R.**, Christoff, K. (2014). Evidence for rostro-caudal functional organization in multiple brain areas related to goal-directed behavior. *Brain Research*, 1572, 26-39.
- Solomonova, E., **Fox, K.C.R.**, Nielsen, T.A. (2014). Methodological considerations for the neurophenomenology of dreaming: Commentary on Windt's 'Reporting dream experience.' *Frontiers in Human Neuroscience*, 8(317), 1-3.
- Fox, K.C.R.**, Nijeboer, S., Dixon, M.L., Floman, J.L., Ellamil, M., Rumak, S.P., Sedlmeier, P., Christoff, K. (2014). Is meditation associated with altered brain structure? A systematic review and meta-analysis of morphometric neuroimaging in meditation practitioners. *Neuroscience and Biobehavioral Reviews*, 43, 48-73.
- Fox, K.C.R.**, Christoff, K. (2014). Metacognitive facilitation of spontaneous thought processes: When metacognition helps the wandering mind find its way. In: *The Cognitive Neuroscience of Metacognition*, S.M. Fleming and C.D. Frith (Eds.). Ch. 13, pp. 293-319. New York: Springer.

- Fox, K.C.R.**, Nijeboer, S., Solomonova, E., Domhoff, G.W., Christoff, K. (2013). Dreaming as mind wandering: Evidence from functional neuroimaging and first-person content reports. *Frontiers in Human Neuroscience*, 7(412), 1-18.
- Fox, K.C.R.**, Zakarauskas, P., Dixon, M.L., Ellamil, M., Thompson, E., Christoff, K. (2012). Meditation experience predicts introspective accuracy. *PLoS ONE*, 7(9), e45370, 1-9.
- Stenstrom, P., **Fox, K.C.R.**, Solomonova, E., Nielsen, T.A. (2012). Mentation during sleep onset theta bursts in a trained participant: A role for NREM stage 1 sleep in memory processing? *International Journal of Dream Research*, 5(1), 37-46.

Abstracts Presented / Published (Peer-reviewed)

- Fox, K.C.R.***, Shi, L., Baek, S., Raccah, O., Foster, B.L., Saha, S., Parvizi, J. (2018). 'Silence' following direct electrical stimulation of the human default mode and limbic networks: Linking subjective experience, cortical responsiveness to applied electric currents, and the topographical organization of intrinsic brain networks. *48th Annual Meeting of the Society for Neuroscience*, November 3-7, 2018.
- Fox, K.C.R.***, Dixon, M.L., Girn, M., Sheth, S., Herrerra-Bennett, A., Raffaelli, Q., Christoff, K. (2016). Executive system recruitment is specific to goal-related and intentionally directed mind-wandering: Direct evidence for the functional role of frontoparietal control network in self-generated thought. *46th Annual Meeting of the Society for Neuroscience*, November 12-16, 2016.
- Fox, K.C.R.***, Dixon, M.L., Puertolas, M.L., Ellamil, M., Rauscher, A., Christoff, K. (2014). Mind wandering on the good, the bad, and the useful: Neural correlates of goal-related and positive spontaneous thoughts. *44th Annual Meeting of the Society for Neuroscience*, November 15-19, 2014.
- Fox, K.C.R.***, Andrews-Hanna, J.R., Spreng, R.N., Christoff, K. (2014). The wandering brain: Meta-analysis of functional neuroimaging studies of mind-wandering and other spontaneous thought processes. *11th Annual Mind and Life Summer Research Institute*, June 15-21, 2014.
- Fox, K.C.R.***, Andrews-Hanna, J.R., Spreng, R.N., Christoff, K. (2014). Mind wandering beyond the default mode network: Executive network contributions to spontaneous thought. *21st Annual Meeting of the Cognitive Neuroscience Society (CNS)*, April 5-8, 2014.
- Fox, K.C.R.***, Dixon, M.L., Nijeboer, S., Floman, J.L., Christoff, K. (2013). Diverse meditation practices recruit distinct neural networks: Meta-analytic evidence from functional neuroimaging. *10th Annual Mind and Life Summer Research Institute*, June 15-21, 2013.
- Fox, K.C.R.***, Nijeboer, S., Dixon, M.L., Floman, J.L., Ellamil, M., Rumak, S., Markovic, J., Stansfield, Z., Christoff, K. (2013). The Contemplative Brain: A Systematic Review and Meta-Analysis of Morphometric Neuroimaging of Meditation Practitioners. *20th Annual Meeting of the Cognitive Neuroscience Society*, April 13-16, 2013.
- Fox, K.C.R.***, Ellamil, M., Dixon, M.L., Pritchard, S., Christoff, K. (2012). Meditators Practicing Body Scanning Meditation Show Greater Grey Matter Concentration in Somatosensory Cortex and Insula. *9th Annual Mind and Life Summer Research Institute*, June 16-22, 2012.
- Fox, K.C.R.***, Ellamil, M., Dixon, M.L., Christoff, K. (2012). Altered Default Mode Network Functional Connectivity During the Resting State in Long-Term Meditation Practitioners. *19th Annual Meeting of the Cognitive Neuroscience Society*, March 31-April 4, 2012.
- Fox, K.C.R.***, Zakarauskas, P., Dixon, M.L., Thompson, E., Christoff, K. (2011) Meditation training is associated with improved introspective accuracy. *8th Annual Mind and Life Summer Research Institute*, June 12-18, 2011.
- Fox, K.C.R.***, Zakarauskas, P., Dixon, M.L., Christoff, K. (2011) First-person reports of tactile sensations in experienced meditators predict corresponding area of primary somatosensory cortex. *18th Annual Meeting of the Cognitive Neuroscience Society*, April 1-6, 2011.
- Fox, K.C.R.***, Stenstrom, P., Solomonova, E., Nielsen, T.A. (2008) Temporal distance of memory sources during multiple sleep onset awakenings. *25th Annual International Association for the Study of Dreams (IASD) Conference*, July 8-12, 2008.

Fox, K.C.R.*, Stenstrom, P., Nielsen, T.A., Solomonova, E., Lara-Carrasco, J. (2008) Vestibular imagery during multiple sleep onset awakenings. *25th IASD Conference*.

Abstracts Published (Peer-reviewed)

- Maillet, D.*, Beaty, R.E., **Fox, K.C.R.**, Spreng, R.N. (2019). Age-related differences in the neural correlates of spontaneous thoughts at rest. *Annual Meeting of the Organization for Human Brain Mapping*, June 9-13, 2019.
- Tan, K.M.*, Daitch, A.L., **Fox, K.C.R.**, Parvizi, J., Lieberman, M.D. (2019). Intracranial electrophysiology of mentalizing. *12th Annual Meeting of the Social & Affective Neuroscience Society*, May 2-4, 2019.
- Yih, J.*, Beam, D.E., **Fox, K.C.R.**, Parvizi, J. (2018). Greater intensity of subjective emotional experience with increasing magnitude of electrical stimulation in human cingulate, insular, and orbitofrontal cortices. *48th Annual Meeting of the Society for Neuroscience*, November 3-7, 2018.
- Sheth, S.*, **Fox, K.C.R.**, Jarrett, M.S., Girn, M., Puertolas Lopez, M.L., Dixon, M.L., Rauscher, A., Christoff, K. (2016). The wandering brain: Individual differences in grey and white matter structure predict frequency of goal-related and emotionally positive self-generated thoughts. *46th Annual Meeting of the Society for Neuroscience*, November 12-16, 2016.
- Fox, K.C.R.**, Floman, J.L.*, Dixon, M.L., Nijeboer, S., Christoff, K. (2014). Meta-Analysis of Brain Activity Underlying Loving-Kindness Meditation. *26th Annual Convention of the Association for Psychological Science*, May 22-25, 2014.
- Dixon, M.L.*, **Fox, K.C.R.**, Christoff, K. (2013). Examining the rostro-caudal functional organization of multiple frontal cortex regions related to goal-directed behavior. *20th Annual Meeting of the Cognitive Neuroscience Society (CNS)*, April 13-16, 2013.
- Dixon, M.L.*, Ellamil, M., **Fox, K.C.R.**, Christoff, K. (2012). The Default and Executive Networks Demonstrate Task-Dependent and Task-Independent Patterns of Functional Connectivity. *19th Annual Meeting of the Cognitive Neuroscience Society (CNS)*, March 31-April 4, 2012.
- Stenstrom, P.*, **Fox, K.C.R.**, Nielsen, T.A., Solomonova, E., Lara-Carrasco, J., Godin, I. (2008). Recurring elements in dreams elicited from multiple sleep onset awakenings. *25th Annual IASD Conference*, July 8-12, 2008.
- Nielsen, T.A.*, Popova, A., Levrier, L., Brochu, C., **Fox, K.C.R.**, Godin, I., Ndiaye, A.A., Saucier, S. (2008). Interactivity in a virtual maze task produces day-residue and dream-lag incorporation effects. *The 25th Annual IASD Conference*, July 8-12, 2008.
- Paquette, T.*, Nielsen, T.A., Popova, A., Levrier, K., Brochu, C., **Fox, K.C.R.** (2008). Dreams of adult nightmare sufferers are more anxious and inhibited. *25th Annual IASD Conference*, July 8-12, 2008.
- Popova, A.*, Nielsen, T.A., Paquette, T., Levrier, K., Saucier, S., **Fox, K.C.R.**, Perron, J. (2008). Virtual maze task exposure produces both day-residue and dream-lag effects. *25th Annual IASD Conference*, July 8-12, 2008.

Invited Talks

- *The wandering brain: Daydreaming, creativity, and cognitive flexibility* (2018)
Learning and the Brain: The Science of Innovation
San Francisco, CA, U.S.A.
- *The multiplicity of meditation* (2015)
University of British Columbia Meditation Conference
Vancouver, B.C., Canada
- *Mind-wandering on the good, the bad, and the useful* (2015)
Mental Simulation Preconference, Annual Meeting of the Society for Personality and Social Psychology
Long Beach, CA, U.S.A.

- *The wandering brain* (2014)
Guest lecture, PSYC 309A Cognitive Systems (Professor: Rebecca M. Todd), University of British Columbia
Vancouver, B.C., Canada
- *Dreaming as mind wandering* (2013)
BrainTalks, Vancouver General Hospital
Vancouver, B.C., Canada
- *The brains of whales and dolphins* (2012)
Green College Members' Series, University of British Columbia
Vancouver, B.C., Canada