

## LUCIA F. JACOBS

### AFFILIATION

Department of Psychology  
University of California  
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### EDUCATION

1978 - B.S., Neurobiology and Behavior, Biological Sciences, Cornell University, Ithaca, NY.  
(1976) Neuroscience and Ethology, Zoological Institute, University of Vienna, Austria.  
1983 – M.A., Department of Biology, Princeton University, Princeton, NJ.  
1987 – Ph.D., Department of Biology (Ecology & Evolution), Princeton University, Princeton, NJ.

### PROFESSIONAL POSITIONS

1987-89 Postdoctoral Fellow, Department of Psychology, University of Toronto  
1989-90 Postdoctoral Fellow, Department of Anthropology, University of Pittsburgh  
1990-93 Research Assistant Professor, Depts. Biology and Psychology, University of Utah  
1993-00 Assistant Professor, Department of Psychology, University of California, Berkeley  
2000-12 Associate Professor, Department of Psychology, UC Berkeley  
2007-12 Associate Professor, Helen Wills Neuroscience Institute, UC Berkeley  
2012-23 Professor, Department of Psychology and Helen Wills Neuroscience Institute, UCB  
2023- Professor Emerita, Department of Psychology and Helen Wills Neuroscience Institute, UCB

### HONORS & AWARDS

1982 University Fellowship, Princeton University  
1987 NATO Postdoctoral Fellowship, Department of Psychology, University of Toronto  
1988 NIH NRSA Postdoctoral Fellowship, Department of Psychology, University of Toronto  
1989 NSF Postdoctoral Fellowship, Department of Anthropology, University of Pittsburgh  
1993 NSF CAREER Award  
1995 Herbert Spencer Lecture, University of Oxford  
1995 Hellman Junior Faculty Research Award  
1996 Junior Faculty Career Development Award, University of California, Berkeley  
1999 Prytanean Faculty Award, University of California  
2003 Santa Fe Public Lecture, Santa Fe Institute  
2006 Mary Rennie Epilepsy Award, University of California, Berkeley  
2013 Distinguished Lecturer in Cognitive Science, Michigan State University  
2018-19 Grass Radcliffe Fellow, Radcliffe Institute for Advanced Study, Harvard University

### PROFESSIONAL ACTIVITIES

#### Editorial and reviewing

Member, Working Group in Phylogenetic Psychology (2008-2011), National Evolutionary Synthesis Center, Duke University.  
Member, Scientific Advisory Board, Stanford Behavioral and Functional Neuroscience Lab (2010-11).  
Editorial board member, *Zoology* (2000-2003); Associate Editor, *Frontiers in Behavioral Neurosciences* (2010-present), Associate Editor, *Movement Ecology* (2012-2018), Consulting Editor, *Learning & Behavior* (January, 2015 begin).

*Ad hoc* Journal reviews: *Animal Behaviour*, *Animal Cognition*, *Behavioral Brain Sciences*, *Behavioral Brain Research*, *Biology Letters*, *Brain Behavior and Evolution*, *Cerebral Cortex*, *Frontiers in Neuroanatomy*, *Journal of Experimental Biology*, *Journal of Mammalogy*, *Hippocampus*, *Marine Biology*, *Nature Neuroscience*, *PNAS*, *PLoS ONE*, *Psychological Science*.

*Ad hoc* Grant reviewing: National Science Foundation, European Research Council, Biotechnology and Biological Sciences Research Council.

Book proposal reviewing: Oxford University Press, Palgrave, MIT Press, Psychology Press.

### Organizing symposia, workshops and conferences

Invited chair of symposium, "Neural Representation of Spatial Information", 4th International Congress, Society for Neuroethology, 3-7 September, 1995, Cambridge, UK.

Organizer, faculty retreat, "The evolution of cognition" (May 2006) Institute for Cognitive and Brain Sciences, UC Berkeley  
Organizer, faculty retreat, "The evolution of communication" (January 2010), Institute for Cognitive and Brain Sciences, UC Berkeley

Co-founder and director, *The Philosophical Club of San Francisco* (1999-present)

Chair, Department Lectureship Committee, Department of Psychology (2013-present). Organized *The Man and the Maze: The Legacy of Edward Chase Tolman*, November 10<sup>th</sup> 2014, UC Berkeley, with keynote address by Nobel Laureate Edvard Moser.

### Professional societies

Animal Behavior Society (1981)

International Society for Behavioral Ecology (1990)

Society for Neuroscience (1991)

Society for Neuroethology (1995)

Cognitive Neuroscience Society (1996)

Society for Comparative Cognition (2003)

Association for Chemoreceptive Science (2013)

### GRANTS AND FUNDING

#### External Funding

- 2018-24 Army Research Office 2018 Multidisciplinary Research Program of the University Research Initiative (MURI): "*Science of Embodied Innovation, Learning and Control.*" Co-PIs: D. E. Koditschek (Univ Penn), S. Yang (Univ Penn), J. Knierim (Johns Hopkins), N. Cowan (Johns Hopkins), R. J. Full (Berkeley), Y. Baryshnikov, (Univ Illinois), (\$6,250,000; Jacobs \$780,000).
- 2015-21 NSF Ideas Lab Collaborative Grant. "*Collaborative Research: Olfactory Navigation: Dynamic Computing in the Natural Environment.*" Co-PIs: John Crimaldi (Univ. Colorado); Bard Ermentrout (Univ. Pittsburgh); Katherine Nagel (NYU Medical); Nathan Urban (Univ. Pittsburgh), Justus Verhagen (JB Pierce Laboratory, Yale), Jonathan Victor (Weill Cornell Med College). (\$6.4M; Jacobs \$780,932).
- 2015-17 NSF Doctoral Dissertation Improvement Grant, to Mikel Delgado, Ph.D. candidate: "*The consequences of food assessment and cache placement on social competition and cache pilfering in a scatter boarding tree squirrel.*" (\$20,390).
- 2014-15 Peder Sather Center Grant. *Evolution and Emotion: How Adaptive Patterns of Emotion Lead to Emergent Properties of Cognition and Behavior.* Co-PI: Jarl Giske (University of Bergen). (\$15,000).
- 2010-15 NSF Cyber-enabled Discovery and Innovation. "Cyber-Amplified Bioinspiration in Robotics". Co-PIs: Daniel E. Koditschek, Robert J. Full, C.J. Taylor. (\$1,425,000; Jacobs \$356,250).
- 2003-07 Larry L. Hillblom Foundation Network Grant, Consortium for "Synaptic plasticity and function in Down Syndrome", Stanford University; PI: William Mobley. (\$240,000).
- 2000-03 JD French Alzheimer's Foundation, "The longitudinal analysis of progressive cognitive impairment in animal models of neurodegenerative disease ." (\$281, 397).
- 2000-01 JD French Alzheimer's Foundation, "Spatial cognition in dementia." (\$18,000)
- 1999-01 Northern California Alzheimer Center, "Experimental neuropsychology of spatial cognition," (\$44,000)
- 1995-96 National Institute of Mental Health, PI, B/START Award: "The seasonal modulation of cognitive sex differences." (\$25,000)
- 1994-98 Training Grant (National Science Foundation), Stephen Palmer, PI: "Cognitive science: an integrated approach to spatial cognition."
- 1995-99 Training Grant (National Institutes of Health), Carla Shatz, PI: "Training program in neurobiology."
- 1993-95 National Science Foundation Career Advancement Award, "Comparative studies of spatial and nonspatial memory in mammals." (\$50,000)

- 1990-93 National Institute of Mental Health, PI, R03 Grant: "Spatial memory and hippocampal anatomy: natural patterns." (\$53,267)
- 1989-91 Environmental Sciences Postdoctoral Fellowship (National Science Foundation), University of Pittsburgh.
- 1988-89 Individual National Research Service Award (National Institute of Mental Health), University of Toronto.
- 1987-88 NATO Postdoctoral Fellowship (National Science Foundation), University of Toronto.
- 1985 Bache Fund, National Academy of Sciences
- 1983-84 Grants-in-Aid from Sigma Xi Society

#### Internal funding

- 2014-15 Abigail Hodgen Publication Grant, *Publication Costs: "Locating an odorant in time and space: the evolution of the accessory olfactory system"*. (\$3,500).
- 2014 URAP Summer Fellowship (Laura Agee). Undergraduate Research Apprentice Program. (\$3,000).
- 2012-14 Institute for Cognitive and Brain Sciences Grant: "Risk-taking and discounting behavior in a food-storing task for humans". M. Delgado, J. Arter and P.J. Slattery. (\$1,400) Graduate student; Undergraduate student
- 2014-17 Berkeley Excellence Accounts for Research (\$4,000 per annum).
- 2000-2010 Committee on Research (\$10,000)
- 2000-01 Multi-campus Research Incentive Fund (\$7,500)
- 1999-00 Prytanean Faculty Award (\$15,000)
- 1998-99 Faculty Research Grant (\$6,150).
- 1995-96 Hellman Junior Faculty Research Award, University of California (\$5,000).
- 1994-95 Faculty Research Grant (\$3,000).
- 1994-95 Mentor Grant (\$1,000).
- 1994-95 Junior Faculty Research Grant (\$3,000).
- 1994 Regents Junior Faculty Fellowship (\$4,000).
- 1993-2010 Committee on Research (\$1000 per annum)
- 1992-93 University of Utah, Research Grant (\$2,000).

## PUBLICATIONS

### Journal Articles

1. Sengelaub, D.R., **Jacobs, L.F.**, and Finlay, B.L. (1985). Regional differences in normally occurring cell death in the developing hamster lateral geniculate nuclei. *Neuroscience Letters* *55*, 103-108.
2. Daly, M., Wilson, M., Behrends, P.R., and **Jacobs, L.F.** (1990). Characteristics of kangaroo rats, *Dipodomys merriami*, associated with differential predation risk. *Animal Behaviour* *40*, 380-389.
3. **Jacobs, L.F.**, Gaulin, S.J.C., Sherry, D.F., and Hoffman, G.E. (1990). Evolution of spatial cognition: Sex-specific patterns of spatial behavior predict hippocampal size. *Proceedings of the National Academy of Sciences, USA* *87*, 6349-6352.
4. **Jacobs, L.F.**, and Liman, E.R. (1991). Grey squirrels remember the locations of buried nuts. *Animal Behaviour* *41*, 103-110.
5. **Jacobs, L. F.** (1992). Memory for cache locations in Merriam's kangaroo rats. *Animal Behaviour*, *43*(4), 585-593.
6. Daly, M., **Jacobs, L.F.**, and Wilson, M.I. (1992). Scatter-hoarding by kangaroo rats (*Dipodomys merriami*) and pilferage from their caches. *Behavioral Ecology* *3*, 102-111.
7. Daly, M., Behrends, P., Wilson, M., & **Jacobs, L. F.** (1992). Behavioural modulation of predation risk: moonlight avoidance and crepuscular compensation in a nocturnal desert rodent, *Dipodomys merriami*. *Animal Behaviour*, *44*(1), 1-9.
8. Daly, M., Wilson, M.I., Behrends, P.R., and **Jacobs, L.F.** (1992). Sexually differentiated effects of radiotransmitters on predation risk and behaviour in kangaroo rats, *Dipodomys merriami*. *Canadian Journal of Zoology* *70*, 1851-1855.
9. **Jacobs, L.F.** (1992). The effect of handling time on the decision to cache by grey squirrels. *Animal Behaviour* *43*, 522-524.
10. Sherry, D.F., **Jacobs, L.F.**, and Gaulin, S.J.C. (1992). Adaptive specialization of the hippocampus. *Trends in Neurosciences* *15*, 298-303.
11. **Jacobs, L.F.**, and Spencer, W.D. (1994). Natural space-use patterns and hippocampal size in kangaroo rats. *Brain Behavior and Evolution* *44*, 125-132.

12. Feener, D.H., **Jacobs, L.F.**, and Schmidt, J.O. (1996). Specialized parasitoid attracted to a pheromone of ants. *Animal Behaviour* *51*, 61-66.
13. **Jacobs, L.F.** (1996a). The economy of winter: Phenotypic plasticity in behavior and brain structure. *Biological Bulletin* *191*, 92-100.
14. **Jacobs, L.F.** (1996b). Sexual selection and the brain. *Trends in Ecology and Evolution* *11*, 82-86.
15. Barkley, C.L., and **Jacobs, L.F.** (1998). Visual environment and delay affect cache retrieval accuracy in a food-storing rodent. *Animal Learning & Behavior* *26*, 439-447.
16. Lavenex, P., Shiflett, M., Lee, R., & **Jacobs, L.F.** (1998). Spatial versus nonspatial relational learning in free-ranging fox squirrels (*Sciurus niger*). *Journal of Comparative Psychology*, *112*(2), 127-136.
17. **Jacobs, L.F.**, and Shiflett, M.W. (1999). Spatial orientation on a vertical maze in free-ranging fox squirrels (*Sciurus niger*). *Journal of Comparative Psychology* *113*, 116-127.
18. Lavenex, P., Steele, M.A., and **Jacobs, L.F.** (2000). Sex differences, but no seasonal variations in the hippocampus of food-caching squirrels: A stereological study. *Journal of Comparative Neurology* *425*, 152-166.
19. Lavenex, P., Steele, M.A., and **Jacobs, L.F.** (2000). The seasonal pattern of cell proliferation and neuron number in the dentate gyrus of wild adult eastern grey squirrels. *European Journal of Neuroscience* *12*, 643-648.
20. Preston, S.D., and **Jacobs, L.F.** (2001). Conspecific pilferage but not presence affects Merriam's kangaroo rat cache strategy. *Behavioral Ecology* *12*, 517-523.
21. **Jacobs, L.F.** (2003). The evolution of the cognitive map. *Brain, Behavior & Evolution* *62*, 128-139.
22. **Jacobs, L.F.**, and Schenk, F. (2003). Unpacking the cognitive map: the parallel map theory of hippocampal function. *Psychological Review* *110*, 285-315.
23. Hermes, G.L., **Jacobs, L.F.**, and McClintock, M.K. (2005). The sectorized foraging field: a novel design to quantify spatial strategies, learning, memory, and emotion. *Neurobiology of Learning & Memory* *84*, 69-73.
24. Preston, S.D., and **Jacobs, L.F.** (2005). Cache decision making: the effects of competition on cache decisions in Merriam's kangaroo rat (*Dipodomys merriami*). *Journal of Comparative Psychology* *119*, 187-196.
25. **Jacobs, L.F.** (2006). From movement to transitivity: the role of hippocampal parallel maps in configural learning. *Reviews in Neuroscience* *17*, 99-109.
26. Barkley, C.L., and **Jacobs, L.F.** (2007). Sex and species differences in spatial memory in food-storing kangaroo rats. *Animal Behaviour* *73*, 321-329.
27. Gibbs, S.E.B., Lea, S.E.A., and **Jacobs, L.F.** (2007). Flexible use of spatial cues in the southern flying squirrel (*Glaucomys volans*). *Animal Cognition* *10*, 203-209.
28. Waisman, A.S., and **Jacobs, L.F.** (2008). Flexibility of cue use in the fox squirrel (*Sciurus niger*). *Animal Cognition* *11*, 625-636.
29. Bettis, T.J., and **Jacobs, L.F.** (2009). Sex-specific strategies in spatial orientation in C57BL/6J mice. *Behavioural Processes* *82*, 249-255.
30. Chai, X.J., and **Jacobs, L.F.** (2009). Sex differences in directional cue use in a virtual landscape. *Behavioral Neuroscience* *123*, 276-283.
31. Preston, S.D., and **Jacobs, L.F.** (2009). Mechanisms of cache decision making in fox squirrels (*Sciurus niger*). *Journal of Mammalogy* *90*, 787-795.
32. Chai, X.J., and **Jacobs, L.F.** (2010). Effects of cue types on sex differences in human spatial memory. *Behavioural Brain Research* *208*, 336-342.
33. Chai, X.J., Ofen, N., **Jacobs, L.F.**, and Gabrieli, J.D. (2010). Scene complexity: influence on perception, memory, and development in the medial temporal lobe. *Frontiers in Human Neuroscience* *4*, 21 (21-10).
34. Bettis, T., & **Jacobs, L.F.** (2012). Sex differences in object recognition are modulated by object similarity. *Behavioural brain research*, *233*(2), 288-292.
35. MacLean, E.L., Matthews, L.J., Hare, B.A., Nunn, C.L., Anderson, R.C., Aureli, F., Brannon, E.M., Call, J., Drea, C.M., Emery, N.J., Haun, D.B., Herrmann, E., **Jacobs, L.F.**, Platt, M.L., Rosati, A.G., Sandel, A.A., Schroepfer, K.K., Seed, A.M., Tan, J., van

- Schaik, C.P., and Wobber, V. (2012). How does cognition evolve? Phylogenetic comparative psychology. *Animal Cognition* 15, 223-238.
36. Chai, X., and **Jacobs, L.F.** 2012. Digit ratio predicts sense of direction in women. *PLoS ONE* 7, 2 (e32816).
37. **Jacobs, L. F.** (2012). From chemotaxis to the cognitive map: the function of olfaction. *Proceedings of the National Academy of Sciences*, 109, 10693–10700.
38. Kleschevnikov, A. M., Belichenko, P. V., Faizi, M., **Jacobs, L. F.**, Htun, K., Shamloo, M., & Mobley, W. C. (2012). Deficits in cognition and synaptic plasticity in a mouse model of Down Syndrome ameliorated by GABA<sub>B</sub> receptor antagonists. *Journal of Neuroscience*, 32(27), 9217–9227.
39. Waismeyer, A. S., & **Jacobs, L. F.** (2013). The emergence of flexible spatial strategies in young children. *Developmental Psychology*, 49(2), 232–242.
40. Bettis, T. J., & **Jacobs, L. F.** (2013). Sex differences in memory for landmark arrays in C57BL/J6 mice. *Animal Cognition*, 16(6), 873–882
41. Cook, A., Arter, J., & **Jacobs, L. F.** (2013). My owner, right or wrong: the effect of familiarity on the domestic dog's behavior in a food-choice task. *Animal Cognition*. doi:10.1007/s10071-013-0677-0.
42. **Jacobs, L. F.**, & Menzel, R. (2014) Navigation outside the box: what the lab can learn from the field and what the field can learn from the lab. *Movement Ecology* 2, 3. doi 10.1186/10.1186/2051-3933-2-3.
43. Delgado, M. M., Nicholas, M., Petrie, D. J., & **Jacobs, L. F.** (2014). Fox squirrels match food assessment and cache effort to value and scarcity. *PLoS ONE*, 9(3), e92892. doi:10.1371/journal.pone.0092892.s003
44. Evan L. MacLean, Brian A. Hare, Charles L. Nunn, Elsa Addessi, Federica Amici, Rindy C. Anderson, Filippo Aureli, Joseph M. Baker, Amanda E. Bania, Allison M. Barnard, Neeltje J. Boogert, Elizabeth M. Brannon, Emily E. Bray, Joel Bray, Lauren J. N. Brent, Judith M. Burkart, Josep Call, Jessica F. Cantlon, Lucy G. Cheke, Nicola S. Clayton, **Mikel M. Delgado**, Louis J. DiVincenti, Kazuo Fujita, Chihiro Hiramatsu, **Lucia F. Jacobs**, Kerry E. Jordan, Jennifer R. Laude, Kristin L. Leimgruber, Emily J. E. Messer, Antonio C. de A. Moura, Ljerka Ostojić, Alejandra Picard, Michael L. Platt, Joshua M. Plotnik, Friederike Range, Simon M. Reader, Rachna B. Reddy, Aaron A. Sandel, Laurie R. Santos, Katrin Schumann, Amanda M. Seed, Kendra B. Sewall, Rachael C. Shaw, Katie E. Slocombe, Yanjie Su, Ayaka Takimoto, Jingzhi Tan, Ruoting Tao, Carel P. van Schaik, Zsófia Virányi, Elisabetta Visalberghi, Jordan C. Wade, Arii Watanabe, Jane Widness, Thomas R. Zentall, Yini Zhao. (2014) The evolution of self-control. *Proceedings of the National Academy of Sciences*, 111(20), E2140–8. doi:10.1073/pnas.1323533111.
45. **Jacobs, L. F.**, Arter, J., Cook, A., & Sulloway, F. J. (2015). Olfactory orientation and navigation in humans. *PLoS ONE*, 10(6), e0129387. doi:10.1371/journal.pone.0129387.s001
46. Delgado, M.M. and **Jacobs, L.F.** (2016). Inaccessibility of reinforcement increases persistence and signaling behavior in the fox squirrel, *Sciurus niger*. *Journal of Comparative Psychology*. 130(2): 128-137.
47. Delgado, M.M. and **Jacobs, L.F.** (2017) Caching for what and where: evidence for a mnemonic strategy in a scatter-hoarder. *Royal Society Open Science*. 4: 170958. <http://dx.doi.org/10.1098/rsos.170958>
48. **Jacobs LF** (2019) The navigational nose: a new hypothesis for the function of the human external pyramid. *Journal of Experimental Biology* 1–12. <https://doi.org/10.1242/jeb.186924>
49. Jinn J, Connor EG, **Jacobs LF** (2020) How ambient environment influences olfactory orientation in search and rescue dogs. *Chemical Senses* 45:625–634. <https://doi.org/10.1093/chemse/bjaa060>
50. Hunt NH, Jinn J, **Jacobs LF**, Full RJ (2021) Acrobatic squirrels learn to leap and land on tree branches without falling. *Science* 373:697–700. <https://doi.org/10.1126/science.abe5753>
51. **Jacobs LF** (2022) How the evolution of air breathing shaped hippocampal function. *Philosophical Transactions Royal Soc B* 377:20200532. <https://doi.org/10.1098/rstb.2020>. Special issue on evolution and neuroscience, Ed. Paul Cisek.
52. Robin AN, **Jacobs LF** (2022) The socioeconomics of food hoarding in wild squirrels. *Current Opinion Behavioral Science* 45:101139. <https://doi.org/10.1016/j.cobeha.2022.101139> Special issue on cognition in the wild, Ed. Alexandra Rosati.

53. **Jacobs LF** (2023) The PROUST hypothesis: the embodiment of olfactory cognition. *Animal Cognition* 26:59–72. <https://doi.org/10.1007/s10071-022-01734-1>. 25<sup>th</sup> Anniversary Issue.
54. Bratman, G. N., Bembibre, C., Daily, G. C., Doty, R. L., Hummel, T., **Jacobs, L. F.**, Kahn Jr., P. H., Lashus, C., Majid, A., Miller, J. D., Oleszkiewicz, A., Olvera-Alvarez, H., Parma, V., Riederer, A. M., Sieber, N. L., Williams, J., Xiao, J., Yu, C.-P., & Spengler, J. D. (2024). Nature and human well-being: The olfactory pathway. *Science Advances*, 10(20), eadn3028. <https://doi.org/10.1126/sciadv.adn3028>

#### Other Peer-reviewed Publications

55. **Jacobs, L.F.** (1995). The ecology of spatial cognition: adaptive patterns of hippocampal size and space use in wild rodents. In: *Behavioural Brain Research in Naturalistic and Semi-Naturalistic Settings*, E. Alleva, A. Fasolo, H.-P. Lipp, L. Nadel and L. Ricceri, eds. (Dordrecht, Kluwer Academic Publishers), pp. 301-322.
56. **Jacobs, L.F.** (2000). Sexual differentiation and cognitive function. In: *Gender and Society: the 1995 Herbert Spencer Lectures*, S. Iversen, ed. (Oxford, UK, Oxford University Press).
57. Adams-Hunt, M.M., and **Jacobs, L.F.** (2007). Learning to forage. In: *Foraging: Behavior and Ecology*, D.W. Stephens, J.S. Brown, and R.C. Ydenberg, eds. (Chicago, IL, University of Chicago), p. 576.
58. **Jacobs, L.F.** (2009). The role of social selection in the evolution of hippocampal specialization. In: *Cognitive Biology: Evolutionary and Developmental Perspectives on Mind, Brain and Behavior*, L. Tomassi, L. Nadel, and M. Peterson, eds. (Cambridge, MA, MIT Press).
59. Wiener, J., Shettleworth, S., Bingman, V.P., Cheng, K., Healy, S., **Jacobs, L.F.**, Jeffery, K.J., Mallot, H.A., Menzel, R., and Newcombe, N.S. (2011). Animal Navigation – A Synthesis. In *Animal Thinking: Contemporary Issues in Comparative Cognition*, R. Menzel, and J. Fischer, eds. (Cambridge, MA, MIT Press).
60. Waisman, A.S., Lucas, C.G., Griffiths, T., and **Jacobs, L.F.** (2011). A Bayesian model of navigation in squirrels. *Proceedings of the 33rd Annual Conference of the Cognitive Science Society*.

#### Other Publications

- Jacobs, L.F.** (1989). The cache economy of the gray squirrel. *Natural History* 10, 40-47.
- Jacobs, L.F.** (1991). Review of "Food Hoarding in Animals" by S.B. Vander Wall (Univ. Chicago Press). *Animal Behaviour* 41, 920-921.
- Sherry, D.F., **Jacobs, L.F.**, and Gaulin, S.J.C. (1993). The hippocampus and spatial memory (Reply). *Trends in Neurosciences* 16, 56-57.
- Hrdy, S.B., Rodman, P., Charnov, E.L., Seger, J., Hawkes, K., Emlen, S.T., Foster, S.A., Gowaty, P.A., Haig, D., Hauser, M., **Jacobs, L.F.**, and Smuts, B.B. (1996). Sociobiology's successes. *Science* 274, 162-163.
- Jacobs, L.F.** (2003). Spatial Memory In: *Encyclopedia of the Neurological Sciences*, M. Aminoff, and R. Daroff, eds. (San Diego, CA, Academic Press), pp. 86-90.
- Jacobs, L. F.** (2012). Do Squirrels Remember Where They Bury Their Nuts? In M. Lamothe, J. Rothman, & J. Volvovski, *The Where, the Why and the How: 75 Artists Illustrate the Wondrous Mysteries of Science*. San Francisco: Chronicle Books.
- Jacobs, L. F.** (2012). What do Honeybees Say When they Dance? In M. Lamothe, J. Rothman, & J. Volvovski, *The Where, the Why and the How: 75 Artists Illustrate Wondrous Mysteries of Science*. San Francisco: Chronicle Books.
- Jacobs, L. F.** (2012). What Does "Chickadee" Mean to a Chickadee? In M. Lamothe, J. Rothman, & J. Volvovski, *The Where, The Why and the How: 75 Artists Illustrate Wondrous Mysteries of Science*. San Francisco: Chronicle Books.



**Jacobs, L. F.** (2013). From Chemotaxis to the Cognitive Map: The Function of Olfaction. In G. F. Striedter, J. C. Avise, & F. J. Ayala, *In the Light of Evolution: Volume VI: Brain and Behavior* (pp. 211–228). Washington (DC): National Academies Press (US).

**Jacobs, L. F.** (2017). Of space and smell: the strange evolution of the human nose. *The 2017 ACM/IEEE International Conference* (pp. 350–351). New York, New York, USA: ACM. <http://doi.org/10.1145/2909824.3020259>

Delgado MM, **Jacobs LF** (2019) How squirrels protect their caches: Location, conspicuousness during caching, and proximity to kin influence cache lifespan. *bioRxiv* 6:338–45. <https://doi.org/10.1101/738237>

## PRESENTATIONS

### Invited Talks

1. Department of Psychology, Johns Hopkins University, 1992
2. Group in Neuroscience, Rockefeller University, 1993
3. Department of Organismal Biology, Harvard University, 1993
4. Department of Psychology, UC Berkeley, 1993
5. NSF Workshop in Animal Behavior, UC Davis, 1993
6. McDonnell Summer Institute for Cognitive Neuroscience, UC Davis, 1994
7. Institute for Cognitive Science, UC Berkeley, 1994
8. NATO Advanced Studies Institute, Maratea, Italy (H.-P. Lipp & Lynn Nadel, organizers), 1994
9. Department of Psychology, UCLA, 1994
10. Herbert Spencer Lecture, Oxford University, November 1995
11. Vincent Dethier Symposium, Department of Biology, Univ. Massachusetts at Amherst, 1995
12. Society for Neuroethology, Cambridge University, Symposium Chair; 1995
13. Center for Neuroscience, UC Davis, 1995
14. Department of Psychology, UC Santa Cruz, 1995
15. Department of Biology, University of Northern Arizona, Flagstaff, AZ, 1996
16. Cold Spring Harbor Laboratory, NY 1996
17. Bodega Marine Laboratory, 1997
18. Centre for Neuroscience, University of Edinburgh, 1999
19. Santa Fe Institute, “Integrated Themes” workshop, 1999
20. Neyman Seminar, Department of Statistics, UC Berkeley 2000
21. Wonderfest 2000: “Darwin and Psychology”, 2000
22. Seminar in Computational Sciences, University of Chicago, 2001
23. Department of Psychology, University of Chicago, 2001
24. Santa Fe Institute, “Robustness” workshop, 2001
25. Karger Symposium, “Evolutionary Perspectives in Cognition”, Orlando, FL, 2002
26. Department of Integrative Biology, UC Berkeley, 2002
27. Department of Psychiatry, UC San Francisco, 2002
28. Memory Disorders Research Society, San Francisco, 2002
29. Santa Fe Public Lecture, Santa Fe, New Mexico, 2003
30. Max Planck Institute for Ornithology, Seewiesen, Germany, 2003
31. International Graduate School for Neuroscience, Bochum, Germany, 2003
32. Headland Center for the Arts, Sausalito, California, 2003
33. Keio University, Tokyo, Japan, September 2004
34. Department of Neurology, Stanford University, 2004
35. Plenary, Annual meeting of Computational Neuroscience. Madison, WI, 2005
36. Konrad Lorenz Institute, Altenberg, Austria, 2006
37. Institute for Cognitive and Brain Sciences, UC Berkeley, 2006
38. Townsend Center for Philosophy of Mind, UC Berkeley, 2007
39. Department of Cognitive Science, UC San Diego, 2008
40. Department of Neurology, Stanford University, 2008
41. University of Konstanz, Germany, 2008
42. Santa Fe Institute, Santa Fe, New Mexico, 2008
43. Department of Psychology, University of Michigan, Ann Arbor, 2009

44. Department of Brain and Cognitive Sciences, MIT, Cambridge, 2009
45. Graduate Group in Animal Behavior, UC Davis, 2010
46. Jacobs, L. F. (2012). *The evolution of a cognitive trait: from chemotaxis to associative learning*. Presented at: *In the Light of Evolution VI: Brain and Behavior*, National Academy of Sciences, Irvine, CA.
47. Jacobs, L. F. (2012). *The evolution of spatial navigation*. Presented at the virtual conference NASA Astrobiology Institute “What Don't We Understand About Intelligence?,” organized by Lori Marino, Berkeley, CA.
48. Jacobs, L. F. (2012). *How cognitive functions converge: the case of the cognitive map*. Presented at *CogEvo 2012*, organized by E. S. Spelke & G. Vallortigara. Rovereto, Italy.
49. Jacobs, L. F. (2012). *How cognitive functions converge: the case of the cognitive map*. Presented at the Institute for Neurobiology, Freie University, Berlin.
50. Jacobs, L. F. (2012). *Chemosensory cognition and the evolution of spatial navigation*. Presented as a BBS Distinguished Lecture, Department of Psychology, Cornell University.
51. Jacobs, L. F. (2012). *Chemosensory cognition and the evolution of olfaction*. Presented at the Department of Neurophysiology, Ruhr University Bochum, Bochum, Germany.
52. Jacobs, L. F. (2012). *Chemosensory cognition and the evolution of spatial navigation*. Presented at the Institute for Research on Cognitive Systems, Univ Pennsylvania, Philadelphia, PA.
53. Jacobs, L. F. (2012). Panel Discussant: “*How the Mind Works: Complexity and Pattern Recognition*”. Organized by V. Gray, *Adventures of the Mind*, New York, NY.
54. Jacobs, L. F. (2013). *Chemosensory cognition and the evolution of spatial navigation*. Presented at the Center for Behavior, Evolution and Culture, UCLA.
55. Jacobs, L. F. (2013). *Locating an odor in time and space: the evolution of navigation and chemosensory cognition*. Series: *Distinguished Lectures in Cognitive Science*, Michigan State University.
56. Jacobs, L. F. (2013). *Locating an odor in time and space: the evolution of navigation and chemosensory cognition*. Presented at Dept. Electrical & Systems Engineering, Univ Penn, Philadelphia, PA.
57. Jacobs, L. F. (2013). *Locating an odor in time and space: the evolution of navigation and chemosensory cognition*. Presented at the Department of Ecology and Evolutionary Biology, Princeton University.
58. Jacobs, L. F. (2013). *The evolution of navigation*. Presented at Dept Cognitive Science, UCSD.
59. Jacobs, L. F. (2014). *How the brain evolved from a nose*. Leonardo Art Science Evening Rendezvous. UC Berkeley, Berkeley, CA. April 3.
60. Jacobs, L. F. (2014). *Navigating to odors (or how the brain evolved from a nose)*. Presented at UCSF, Department of Neurology, Grand Rounds, Memory and Aging Center.
61. Jacobs, L. F. (2015). *How the brain evolved from a nose*. Leonardo Art Science Evening Rendezvous, Stanford University, Palo Alto, CA February 13.
62. Jacobs, L. F. (2015). *Olfactory navigation*. Invited participant at workshop, “Deconstructing the Sense of Smell”, Kavli Institute for Theoretical Physics. Organized by M. Bazhenov, A. Koulakov, V. N. Murthy, & C. Stevens. UC Santa Barbara, CA.
63. Jacobs, L. F. (2015). *The PROUST hypothesis: the evolution of the olfactory and vomeronasal systems and their complementary functions in tracking odors across space and time*. KITP Conference on *Olfaction*, organized by Anne-Marie Oswald and Pandeep Datta. KITP, UC Santa Barbara, July 7.
64. Jacobs, L. F. (2015). *Olfactory orientation: using odors to orient in space and time*. Presented at the NYU Medical Center, New York, NY, August.
65. Jacobs, L. F. (2015). *Smells like home: the evolutionary psychology of olfaction and space*. Presented at the American Institute of Architects, Next Conference, San Francisco, November 13.
66. Jacobs, L. F. (2015). *Smells like home: the evolutionary psychology of olfaction and space*. Presented at the Architecture Panel, College of Environmental Design, Berkeley, CA, November 12.
67. Jacobs, L. F. (2015). *The evolution and ecology of olfactory navigation*. Presented at *ThinkSpatial*, Center for Spatial Studies, UC Santa Barbara, CA, December.
68. Jacobs, L. F. (2015). *The evolution and ecology of olfactory navigation*. Presented at the John B. Pierce Laboratory, Yale University, New Haven, CT, October.
69. Jacobs, L. F. (2015). *The evolution of autonomy*. Presented at the *Foundations of Intelligent Sensing, Action and Learning Workshop*, University of Pennsylvania, Philadelphia, PA, October.
70. Jacobs, L.F. (2016) *The Nature of Place*. Arts+Design@Berkeley lecture series, organized by Nicholas de Monchaux and Shannon Jackson, Berkeley Art Museum, UC Berkeley, March 30.
71. Jacobs, L.F. (2016) Keynote address: *Disruptive innovation in nature: how inventing a nose led to innovation in cognition*. Robotics Systems and Science 2016, Ann Arbor, MI. June 20.
72. Jacobs, L. F. (2016) *The PROUST hypothesis: how two vertebrate olfactory systems map the meaning of odors across space and time*. Dart Neuroscience Seminar Series, The Temporal Dynamics of Learning Center. UC San Diego. Oct. 26.
73. Jacobs, L.F. (2016) Plenary address: *From chemotaxis to the spatial maps of squirrels: the relationship between olfaction, space and memory*.



- The Association for the Study of Animal Behaviour, UK. Zoological Society, London. Dec 1-2.
74. Jacobs, L.F. (2016) *The evolution of memory*. Presentation in symposium, organized by Manahan-Vaughan, D., Kesner, R. P., & Jacobs, L. F. (2016) *Learning to learn: how the brain creates memory*. The German Center for Research and Innovation. New York, NY. Dec. 5.
  75. Jacobs, L. F. (2016). *The evolution of navigation*. “Insect Navigation”, organized by L. F. Abbott, M. A. R. Koehl, & D. Eisenbud, co-sponsored by MSRI and HHMI, Janelia Farm, Dec 6-9.
  76. Jacobs, L.F. (2017). Keynote, “*Follow your nose: understanding olfactory navigation*”. California Rescue Dog Association, Annual Meeting, Dublin, CA, January 14.
  77. Jacobs, L. F. (2017). Invited seminar, “*Of space and smell: the strange evolution of the human nose*”. Human Evolution Research Center, University of California, Berkeley. February 24.
  78. Jacobs, L. F. (2017). Keynote, “*Of space and smell: the strange evolution of the human nose*”. Human Robotic Interaction 2017. Vienna, Austria. March 6-9.
  79. Jacobs, L.F. (2017) Colloquium, “*The PROUST hypothesis: the evolution of olfactory systems to map the meaning of odors across space and time*”, Harvard University, Center for Brain Science. April 11.
  80. Jacobs, L.F. (2017) Invited talk, “*Of space and smell: the strange evolution of the human nose.*” Harvard University, Mahadevan group, Paulson School of Engineering and Applied Sciences, July 21.
  81. Jacobs, L.F. (2017) “*How phylogenetic constraints shape the evolution of vertebrate olfactory systems*”, Invited speaker in workshop, “The Evo-devo of Living Machines,” organized by Tony Prescott and Leah Krubitzer, Living Machines 2017, Stanford University, July 26.
  82. Jacobs, L.F. (2017). “Why the mind evolved: the evolution of navigation in real landscapes”. In: NIPS Symposium, “*Kinds of Intelligence: Type, Tests and Meeting the Needs of Society*”, organized by Adrian Weller, José Hernández-Oralio, Matthew Crosby, Tomaso Poggio and Zoubin Ghahramani. NIPS (Neural Information Processing Systems) 2017, Long Beach, CA. December 7. <http://kindsofintelligence.org/>
  83. Jacobs, L.F. (2018). Invited speaker, “*Constraints on cognition: how olfaction shaped vertebrate navigation*. The Journal of Experimental Biology Symposium, “Linking Brain And Behavior in Animal Navigation” Organized by Almut Kelber, Barbara Webb and Basil el Jundi, Plaka Likochora, Greece, March 24-27.
  84. Jacobs, L.F. (2018). Invited speaker, **iNAV** (2<sup>nd</sup> Interdisciplinary Navigation Symposium). “*Rhinencephalon redux: the role of allocentric olfaction in navigation*” Organized by David Dickman, Kate Jeffery, Mayank Mehta, Laure Rondi-Reig, Jeffrey Taube and Thomas Wolbers. Mont Tremblant, Quebec, June 25th-29th.
  85. Jacobs, L.F. (2019). “The navigational nose”. Invited talk in symposium, “In Focus: Cracking the Chemosensory Code”, organized by Matt Wachowiak and Patricia DiLorenzo. AChems 2019, Bonita Springs, FL. April 15.
  86. Jacobs, L.F. (2019) “The evolution of human olfactory cognition”. Colloquium, Department of Psychology, Harvard University, Feb 7.
  87. Jacobs, L.F. (2019). “The navigational nose: proposing an olfactory function for the human external pyramid”. Invited talk in symposium, “In Focus: Cracking the Chemosensory Code”, organized by Matt Wachowiak and Patricia DiLorenzo. AChems 2019, Bonita Springs, FL. April 15.
  88. Jacobs, L.F. (2019) “The adaptive geometry of a chemosensor: the origin and function of the vertebrate nose”. Workshop speaker, *Invariance and Geometry in Sensation, Action, and Cognition*, organized by L. Mahadevan, Department of Physics and Applied Mathematics, Harvard University, April 17.
  89. Jacobs, L.F. (2019) “The navigational nose: proposing an olfactory function for the human external pyramid”. Colloquium, Department of Human Evolutionary Biology, Harvard University, June 7.
  90. Jacobs, L.F. (2020). “The evolution of the olfactory mind.” Invited symposium talk, Southern Society for Psychology and Philosophy, Dec 4.
  91. Jacobs, L.F. (2021). “A squirrel goes shopping: the behavioral economics of shopping for now and later”. Grabango.com, monthly colloquium, March 19.
  92. Jacobs, L.F. (2021). “Of noses and space: the adaptive radiation of directional olfaction in vertebrates” QED Seminar, Harvard University, April 15.
  93. Jacobs, L.F. (2021). “The PROUST hypothesis: how the evolution of air breathing shaped hippocampal function”. Faculty Research Lecture 2021, Department of Psychology, Berkeley. Nov 17.

### Conference Presentations

*Supervised co-presenters as:* <sup>U</sup>Undergraduate student <sup>G</sup>Graduate student <sup>P</sup>Postdoc

1. **Jacobs, L.F.** and Spencer, W. (1991). Patterns of natural spatial behavior predict hippocampal size in kangaroo rats. Soc Neurosci Abstr 21, 134.

2. **Jacobs, L.F.**, Schenk, F., and Nadel, L. (1995). The evolution of hippocampal function. *Nervous Systems and Behaviour: Proceedings of the Fourth International Congress of Neuroethology* (Cambridge University, England, Georg Thieme Verlag).
3. **Jacobs, L.F.**, K.M. Grady<sup>U</sup>, K. Onstott<sup>U</sup>, F. Marouf<sup>U</sup>, K. Allen<sup>U</sup> and T.M. Lee. 1996. A hippocampus for all seasons: photoperiodic modulation of hippocampal volume in meadow voles. Society for Neuroscience, Washington, DC (Soc. Neurosci. Abstr. 22: 1133).
4. P. Lavenex<sup>P</sup>, V.M. Bajo-Lorenzana, and L.F. Jacobs. 1996. Vestibular information defines a directional reference necessary to elaborate a spatial representation. Society for Neuroscience, Washington, DC ( Soc. Neurosci. Abstr. 22: 446).
5. **Jacobs, L.F.**, C. Barkley<sup>G</sup>, K. Chen<sup>U</sup>, M. Earle<sup>U</sup>, S. Chin<sup>U</sup> and E. Bejik<sup>U</sup>. 1996. Testing cache mnemonic theories with fox squirrels. Animal Behavior Society, Northern Arizona State University, Flagstaff, AZ.
6. Barkley, C.<sup>G</sup> J. Gasway<sup>U</sup> and **L.F. Jacobs**. 1996. Effects of environmental complexity and delay on spatial memory for caches in a food-storing rodent. Animal Behavior Society, Northern Arizona State University, Flagstaff, AZ.
7. **L.F. Jacobs** and M. Shiflett<sup>U</sup>. 1998. Spatial orientation on a vertical maze in free-ranging fox squirrels. Society for Neuroscience, Los Angeles, CA (Soc. Neurosci. Abstr. 24).
8. Lavenex, P.<sup>P</sup>, M. A. Steele and **L. F. Jacobs**. 1998. Seasonal variation in the size of the CA1 field of the hippocampus in the gray squirrel. 5th International Congress of Neuroethology, San Diego, CA.
9. **L.F. Jacobs** and M. Shiflett<sup>U</sup>. 1998. Memory in an arboreal environment: spatial orientation on a vertical maze. 7th International Behavioural Ecology Conference, Asilomar, CA.
10. C. Barkley<sup>G</sup> and **L.F. Jacobs**. Visual environment affects spatial memory of kangaroo rats in a cache memory and a one-trial associative memory task. 1998. 7th International Behavioural Ecology Congress, Asilomar, CA
11. S. Preston<sup>G</sup> and **L.F. Jacobs**. 1998. Social selection and caching behavior in Merriam's kangaroo rat. 7th International Behavioural Ecology Congress, Asilomar, CA.
12. C. Barkley<sup>G</sup> and **L.F. Jacobs**. 1998. Caching and spatial categorization in the kangaroo rat. Foraging 98, Univ. Calif., Santa Cruz, CA.
13. S. Preston<sup>G</sup> and **L.F. Jacobs**. 1998. Experimental analysis of the cache decision in the fox squirrel. Foraging 98, Univ. Calif. Santa Cruz, CA.
14. **L.F. Jacobs** and F. Schenk. 2000. The hippocampus as a dual cognitive map. Society for Neuroscience, New Orleans, LA (Soc. Neurosci. Abstr. 26).
15. M.M. Adams<sup>G</sup> and **L.F. Jacobs**. 2001. Human cognitive sex differences predicted by the dual map model of hippocampal function. Society for Neuroscience, San Diego, CA (Soc. Neurosci. Abstr. 27).
16. Schenk, F., **Jacobs, L.F.**, Rossier, J. and M. Kiraly. 2001. Steps in the development of spatial cognition in rats : evidence for a dual mapping system. Society for Neuroscience, San Diego, CA (Soc. Neurosci. Abstr. 27).
17. Schenk, F., and **Jacobs, L.F.** (2001). The evolution of spatial navigation as a dual process. *Advances in Ethology*, 58.
18. Preston, S.D.<sup>G</sup>, Raber, J., and **Jacobs, L.F.** (2001). A stress-based mechanism for food-storing decisions in Merriam's kangaroo rats. *Society for Behavioral Neuroendocrinology Annual Meeting Abstracts* (Hormones and Behavior).
19. **Jacobs, L. F.** 2005. The evolution of spatial orientation and hippocampal function. 10th Annual Meeting of the Cognitive Science Association for Interdisciplinary Learning. Hood River, OR.
20. Bettis, T.<sup>G</sup> and **L.F. Jacobs**. 2006. Sex differences in spatial cognition in mice. Annual Conference on Comparative Cognition. Melbourne, FL.
21. Chai, X.J.<sup>G</sup> and **L.F. Jacobs**. 2006. Sex differences in the construction of the cognitive map: A spatial navigation study in virtual environments. Annual Conference on Comparative Cognition. Melbourne, FL.
22. Waisman, A.<sup>G</sup> and **L.F. Jacobs**. 2006. Flexible spatial cue use in a food-storing mammal. Annual Conference on Comparative Cognition. Melbourne, FL.
23. Cook, A.<sup>G</sup>, Waisman, A. S.<sup>G</sup>, Gopnik, A. & **Jacobs, L. F.** 2007. Causal Inference in the domestic dog (*Canis lupus familiaris*). American Psychological Association Annual Convention. San Francisco, CA.
24. Waisman, A. S.<sup>G</sup> & **Jacobs, L. F.** 2007. Plasticity of cue use strategy in the fox squirrel (*Sciurus niger*). American Psychological Association Annual Convention. San Francisco, CA.
25. Chai, X. J.<sup>G</sup>, **Jacobs, L. F.** & Gabrieli, J. D. E. 2008. Neural correlates of spatial navigation under directional and positional cue conditions. Annual Meeting, Cognitive Neuroscience Society. San Francisco
26. Chai, X. J.<sup>G</sup>, Ofen, N., **Jacobs, L. F.** & Gabrieli, J. D. E. 2008. Developmental changes of the encoding of indoor versus outdoor scenes. Society for Neurosciences. Washington, DC.
27. **Jacobs, L. F.** & Chai, X. J.<sup>G</sup> 2008. Sex differences in the encoding of environmental cues. Society for Neurosciences. Washington, DC.
28. Waisman, A. S.<sup>G</sup> & **Jacobs, L. F.** 2008. Flexibility of cue use in the fox squirrel (*Sciurus niger*). In: *Integrative Biology of Scatter Hoarding: Ecology, Psychology and Neuroscience*. Cornell University, Ithaca, NY.
29. **Jacobs, L. F.** 2008. The evolution of hippocampal specialization in scatter hoarding birds and mammals. *Integrative Biology of Scatter Hoarding: Ecology, Psychology and Neuroscience*. Cornell University, Ithaca, NY.

30. **Jacobs, L.F.** 2008. Why Squirrels Don't Believe in God. *Santa Fe Institute Soapbox series* (Santa Fe, NM).
31. **Jacobs, L.F.** 2008. Cache Economics. *Santa Fe Institute Finance Week* (Santa Fe, NM).
32. Waisman, A.S.<sup>G</sup>, Cook, A.<sup>G</sup>, Gopnik, A., and **Jacobs, L.F.** 2010. Causal Inference in the domestic dog (*Canis familiaris*) and in preschool-age children. Annual Meeting of the Cognitive Development Society (San Antonio, TX).
33. Waisman, A.S.<sup>G</sup>, Lucas, C.G., Griffiths, T., and **Jacobs, L.F.** 2011. A Bayesian model of navigation in squirrels. Paper presented at: 33rd Annual Conference of the Cognitive Science Society (Boston). July.
34. Delgado, M.M.<sup>G</sup>, and **Jacobs, L.F.** 2011. The behavioral correlates of frustration in the fox squirrel, *Sciurus niger*. Behavior 2011 (Bloomington, IN, Animal Behavior Society). July.
35. **Jacobs, L.F.**, Waisman, A.S.<sup>G</sup>, Nicholas, M.<sup>U</sup>, and Delgado, M.M.<sup>G</sup> 2011. How to encode the world: integrating multiple frames of reference. Behavior 2011 (Bloomington, IN, Animal Behavior Society). July.
36. A. Waisman<sup>G</sup>, A. Gopnik, & **L.F. Jacobs** (2011). Causal inference in dogs and toddlers. Paper presented at the Cognitive Development Society Meeting, Philadelphia, Pennsylvania, October.
37. Arter, J.<sup>G</sup>, Lee, E.<sup>U</sup>, Park, M.<sup>U</sup>, Partida, J.<sup>U</sup>, Vu, N. X.<sup>U</sup>, & **Jacobs, L. F.** (2012). Individual differences in friendship strategy. Presented at the Society of Personality and Social Psychology, San Diego, CA. January.
38. Lai, W.<sup>U</sup>, Schellenbach, A.<sup>U</sup>, Slaughter, C.<sup>U</sup>, Park, M.<sup>U</sup>, Arter, J.<sup>G</sup>, & **Jacobs, L. F.** (2012). Effect of attachment style on performance in paired tasks. Presented at the Association for Psychological Science, Chicago, IL. May.
39. Park, M.<sup>U</sup>, Arter, J.<sup>G</sup>, Lai, W.<sup>U</sup>, Schellenbach, A.<sup>U</sup>, Slaughter, C.<sup>U</sup>, & **Jacobs, L. F.** (2012). Do you lead or do you follow? Gender differences in team dynamics. Presented at the Association for Psychological Science, Chicago, IL. May.
40. Delgado, M. M.<sup>G</sup>, Nicholas, M.<sup>U</sup>, Petric, D.<sup>U</sup>, & **Jacobs, L. F.** (2012). The hyper-rational squirrel: investing in assessment and cache protection behaviors. Presented at the Animal Behavior Society, Albuquerque. June.
41. **Jacobs, L. F.** (2012). How cognitive functions converge: the case of the cognitive map. A talk presented at the Animal Behavior Society. June.
42. Slattery, P. J.<sup>U</sup>, Delgado, M. M.<sup>G</sup>, & **Jacobs, L. F.** (2012). Scatter-hoarding strategies in free-ranging humans. A poster presented at the Animal Behavior Society, Albuquerque, NM. June.
43. **Jacobs, L. F.** (2012). How cognitive functions converge: the case of the cognitive map. A talk presented at the Comparative Cognition Society, New Orleans, LA. October.
44. **Jacobs, L. F.** (2012). How the cognitive map evolved from chemotaxis: the evolution and function of olfaction. A poster presented at the Society for Neuroscience, New Orleans, LA. October.
45. Delgado, M. M.<sup>G</sup>, & **Jacobs, L. F.** (2013). The systematic squirrel: cache organization and implications for memory. A talk presented at the 20th Annual International Conference on Comparative Cognition, Melbourne, FL. March.
46. Delgado, M. M.<sup>G</sup>, & **Jacobs, L. F.** (2013). The systematic squirrel: cache organization and implications for memory. A talk presented at the 50th Annual Meeting of the Animal Behavior Society, Boulder, CO. July.
47. **Jacobs, L. F.**, Arter, J.<sup>G</sup>, & Cook, A.<sup>G</sup> (2014). Olfactory navigation in humans: Spatial orientation within an odor landscape. Presented at the 36th Annual Meeting of the Association for Chemoreception Sciences. Bonita Springs, FL. April.
48. Delgado, M. M.<sup>G</sup>, & **Jacobs, L. F.** (2014). Where to bury a nut: do squirrels have hierarchical rules for cache organization? Presented at the International Society for Behavioral Ecology, New York, NY. August.
49. Jinn, J.<sup>G</sup>, Nirody<sup>G</sup>, J., Libby<sup>G</sup>, T., **Jacobs, L. F.**, & Full, R. J. (2014). How to walk on water: novel locomotion in a general forager, the house gecko. Presented at the Animal Behavior Society, Princeton, NJ. August.
50. **Jacobs, L. F.**, Arter, J.<sup>G</sup>, & Cook, A.<sup>G</sup> (2014). Olfactory navigation in humans: implications for the homology of navigation in birds and mammals. Presented at the Animal Behavior Society, Princeton, NJ. August.
51. Jinn, J.<sup>G</sup>, Nirody<sup>G</sup>, J., Jusufi<sup>U</sup>, A., **Jacobs, L. F.**, & Full, R. J. (2015). Quadrupedal locomotion on the water's surface by geckos. Presented at the Society for Integrative and Comparative Biology, West Palm Beach, FL. January.
52. Hunt<sup>G</sup>, N., Jinn, J.<sup>G</sup>, Libby<sup>G</sup>, T., **Jacobs, L. F.**, & Full, R. J. (2015). Learning to launch: targeted leaping from a dynamic obstacle in squirrels. Presented at the Society for Integrative and Comparative Biology, West Palm Beach, FL. January.
53. Delgado<sup>G</sup>, M., Arbilly, M. & **Jacobs, L.F.** (2016) Pilfering may impose limits on food cachers' long term memory. Presented at Comparative Cognition Society Annual Meeting, Melbourne, FL.
54. Robin<sup>U</sup>, A. N., Jinn<sup>G</sup>, J., Delgado<sup>G</sup>, M. M., & **Jacobs, L. F.** (2016). To Save or Spend? The Cache Decision in Fox Squirrels. Presented at the Comparative Cognition Society, Melbourne, FL.
55. Robin<sup>U</sup>, A. N., Jinn<sup>G</sup>, J., Delgado<sup>G</sup>, M. M., & **Jacobs, L. F.** (2016). To Save or Spend? The Cache Decision in Fox Squirrels. Presented at the 8th Annual California Cognitive Science Conference: Decision Making. UC Berkeley, CA.
56. Arbilly<sup>P</sup>, M., Delgado<sup>G</sup>, M., & **Jacobs, L.F.** (2016) Pilfering may impose limits on food cachers' long term memory. Presented at the International Society for Behavioural Ecology, Exeter, England.
57. Hunt<sup>G</sup>, N., Frenberg-Mates<sup>U</sup>, E., Jinn<sup>G</sup>, J., Robin<sup>U</sup>, A. N., **Jacobs, L. F.**, & Full, R. J. (2017). Squirrels running on compliant branches: When to leap? Presented at the Society for Integrative and Comparative Biology, New Orleans, LA.
58. Delgado<sup>G</sup>, M., & **Jacobs, L.F.** (2017) The longevity of a fox squirrel's cache is related to cache effort and concealment. Annual Meeting, Comparative Cognition Society, Melbourne, FL, April 19-22.

59. Jacobs, L.F. (2017) Poster, “The PROUST hypothesis: the evolution of olfactory systems to map the meaning of odors across space and time”, AChems XXXIX. April 24-29.
60. Delgado <sup>G</sup>, M., & **Jacobs, L.F.** (2018) Cache life: Factors related to how long caches stay where squirrels buried them. Annual Meeting, Animal Behavior Society, Toronto, ON, June 12-16.
61. Jinn <sup>G</sup>, J., Connor, E., Crimaldi, J. & **Jacobs, L.F.** (2018). Invited Lecture: “*Making Sense of Scents?*”. California Rescue Dog Association, Annual Meeting, San Luis Obispo, CA, July 14.
62. Jinn <sup>G</sup>, J., Connor, E., Crimaldi, J. & **Jacobs, L.F.** (2018). Invited symposium, “*Olfactory Navigation in Trained Search Dogs: How Natural Meteorological Conditions Influence Search Strategy.*” 126<sup>th</sup> Annual Meeting of the American Psychological Association, San Francisco, August 10.
63. Jacobs, L.F. (2023) Invited seminar. “The evolution of the olfactory mind.” Monell Chemical Senses Center, Philadelphia, Oct. 3
64. Jacobs, L.F. (2024) Invited symposium speaker: “The PROUST hypothesis: the evolution of the olfactory mind”. 15<sup>th</sup> International Congress of Neuroethology, Berlin, July 30.

### TEACHING (Berkeley: 1993-2023)

#### Undergraduate

##### Lecture classes

- Animal Behavior* (Psych 115B, co-taught with Integrative Biology, 4 units)
- Animal Cognition* (Psych 121, 3 units)
- Brain Evolution* (Psych 192, 3 units)
- Evolution of Human Behavior* (Psych 124, 3 units)

##### Seminars

- Cognition and Foraging* (co-taught with Environmental Sciences, 2 units)
- Behavior at Berkeley* (co-taught with Integrative Biology, 2 units)
- Squirrels at Berkeley: Cognition in the Wild* (Freshman Seminar, 2 units)

#### Graduate

- Proseminar in Behavioral Neuroscience* (lecturer in Psych 210B, 3 units)
- Proseminar in Memory* (lecturer in Psych 210E, 3 units)
- Proseminar in Learning* (lecturer in Psych 210D, 3 units)
- Colloquium in Evolution and Development* (Psych 292, 2 units)
- Colloquium in Cognition* (Psych 229A, 2 units)
- Colloquium in Cognitive Neuroscience* (Psych 229B, 2 units)
- Current Topics in Animal Behavior* (co-taught with Integrative Biology, IDS 204, 1 unit)
- Current Topics in Cognitive Evolution* (Psych 290B, 2 units)