

## David A. Raichlen Curriculum Vitae

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### Education

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|------|-----------------------------------|---|
| 2004 | The University of Texas at Austin | Ph.D., Anthropology,                      |
| 2000 | The University of Texas at Austin | M.A., Anthropology,                       |
| 1998 | Duke University                   | B.S., Biological Anthropology and Anatomy |

### Professional Appointments

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|---------|---|--|
| 2012-   | <i>Associate Professor</i> , School of Anthropology, University of Arizona            |  |
| 2006-12 | <i>Assistant Professor</i> , School of Anthropology, University of Arizona            |  |
| 2004-06 | <i>Post-doctoral Research Fellow</i> , Department of Anthropology, Harvard University |  |
| 2005    | <i>Instructor</i> , Department of Anthropology, Harvard University Extension          |  |

### Editorial Appointments

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|---------|---|
| 2017-   | <i>Editorial Board</i> , Evolutionary Anthropology                    |
| 2013-   | <i>Associate Editor</i> , American Journal of Physical Anthropology   |
| 2012-17 | <i>Editorial Board</i> , Scientific Reports (Nature Publishing Group) |
| 2009-12 | <i>Associate Editor</i> , Journal of Human Evolution                  |

### Publications (in review)

- in review* **Raichlen, D.A.**, Klimentidis, Y.C., Hsu, C.H., Alexander, G.E. Fractal complexity of daily physical activity patterns differs with age over the lifespan and predicts mortality in older adults. *Journal of Gerontology: Medical Science*
- in review* Sayre, M.K., Pike, I.L., **Raichlen, D.A.** High levels of objectively measured physical activity among the Pokot agro-pastoralists of Kenya across the lifespan with implications for aging in small-scale societies. *American Journal of Human Biology*
- in review* Klimentidis, Y.C., **Raichlen, D.A.**, Bea, J., Garcia, D.O., Mandarino, L.J., Alexander, G.E., Chen, Z., Going, S.B. Genome-wide association study of habitual physical activity in over 277,000 UK Biobank participants identifies multiple variants including CADM2 and APOE. *International Journal of Obesity*

### Publications (in press or published)

- in press* Kozma, E.E., Webb, N.M., Harcourt-Smith, W.E.H., **Raichlen, D.A.**, D'Aout, K., Brown,

- M.H., Finestone, E., Ross, S.R., Aerts, P., Pontzer, H. Mechanics of hip extension characterize arboreal-terrestrial trade-offs in hominin evolution. *Proceedings of the National Academy of Sciences*
- in press* Bustos, D., Jackway, J., Urban, T.M., Holliday, V.T., Fenerty, B., **Raichlen, D.A.**, Budka, M., Reynolds, S.C., Allen, B.D., Love, D.W., Santucci, V.L., Odess, D., Willey, P., McDonal, H.G., Bennett, M.R. Footprints preserve terminal Pleistocene hunt? Human-sloth interaction in North America. *Science Advances*
- in press* Perchalski, B., Placke, A., Sukhdeo, S.M., Shaw, C.N., Gosman, J.H., **Raichlen, D.A.**, Ryan, T.M. Asymmetry in the cortical and trabecular bone of the human humerus during development. *Journal of Anatomy*
- 2017 **Raichlen, D.A.** & Alexander, G.E. Adaptive Capacity: An evolutionary-neuroscience model linking exercise, cognition, and brain health. *Trends in Neurosciences*. 40:408-421.
- 2017 **Raichlen, D.A.** & Gordon, A.D. Interpretation of Footprints from Site S Confirms Human-like Bipedal Biomechanics in Laetoli Hominins. *Journal of Human Evolution*. 107:134-138.
- 2017 Pontzer, H.P., **Raichlen, D.A.**, Basdeo, T., Harris, J.A., Mabulla, A.Z., Wood, B.M. Mechanics of archery among Hadza hunter-gatherers. *Journal of Archaeological Science: Reports*. 16:57-64.
- 2017 **Raichlen, D.A.**, Pontzer, H., Harris, J.A., Mabulla, Z.P., Marlowe, F.W., Snodgrass, J.J., Eick, G., Berbesque, J.C., Sancilio, A., Wood, B.M. Physical activity patterns and biomarkers of cardiovascular disease risk in hunter-gatherers. *American Journal of Human Biology*. 29:e22919.
- 2017 Sparrow, L.M., Yu, S., Pontzer, H., **Raichlen, D.A.**, Rolian, C. Gait changes in a line of mice artificially selected for long limbs. *PeerJ*. 5:e3008.
- 2017 Zeininger, A., Shapiro, L.J., **Raichlen, D.A.** Ontogeny of digitigrade hand and foot postures in infant baboons (*Papio cynocephalus*). *American Journal of Physical Anthropology*. 163:231-241.
- 2016 **Raichlen, D.A.**, Bharadwaj, P.K., Fitzhugh, M.C., Haws, K.A., Torre, G., Trouard, T.P., Alexander, G.E., Differences in resting state functional connectivity between young adult endurance athletes and healthy controls. *Frontiers in Human Neuroscience*. 10:610.
- 2016 Webber, J.T., **Raichlen, D.A.** The role of plantigrady and heel-strike in the mechanics and energetics of human walking with implications for the evolution of the human foot. *Journal of Experimental Biology*. 219:3729-3737.
- 2016 Kuhn, S.L., **Raichlen, D.A.**, Clark, A. What moves us? How mobility and movement are at the center of human evolution. *Evolutionary Anthropology*. 25:86-97.
- 2016 Pontzer, H., Brown, M.H., **Raichlen, D.A.**, Dunsworth, H., Hare, B., Schroepfer-Walker, K., Luke, A., Dugas, L., Durazo-Arvizu, R., Schoeller, D., Plange-Rhule, J., Bovet, P., Forrester, T.E., Lambert, E.V., Thompson, M.E., Grebe, N., Gangstead, S.W., Ross, S.R. Metabolic acceleration and the evolution of human brain size and life history. *Nature*. 533:390-392.
- 2016 Klimentidis, Y., Arora, Y., Chougule, A., Zhou, J., **Raichlen, D.A.** FTO association and interaction with time spent sitting. *International Journal of Obesity*. 40:411-416.

- 2015 Pontzer, H. **Raichlen, D.A.**, Wood, B.M., Emery Thompson, M.E., Racette, S.B., Mabulla, A.Z.P., Marlowe, F.W. Energy expenditure and activity among Hadza hunter-gatherers. *American Journal of Human Biology*. 27:628-637.
- 2015 **Raichlen, D.A.**, Gordon, A.D., Foster, A.D., Webber, J., Sukhdeo, S.M., Scott, R.S., Gosman, J.H., Ryan, T.M. An ontogenetic framework linking locomotion and trabecular bone architecture with applications for reconstructing hominin life history. *Journal of Human Evolution*. 81:1-12.
- 2014 Wood, B.M., Marlowe, F.W., Pontzer, H., **Raichlen, D.A.** Mutualism and manipulation in Hadza-honeyguide interactions. *Evolution and Human Behavior*. 35:540-546.
- 2014 Pontzer, H, Suchman, K., **Raichlen, D.A.**, Wood, B.M., Mabulla, A.Z.P., Marlowe, F.W. Foot strike patterns and hind limb joint angles during running in Hadza hunter-gatherers. *Journal of Sport and Health Science*. 3: 95-191.
- 2014 **Raichlen, D.A.** and Alexander, G.A. Exercise, APOE genotype, and the evolution of the human lifespan. *Trends in Neurosciences*. 37: 247-255.
- 2014 **Raichlen, D.A.**, Wood, B.M., Gordon, A.D., Mabulla, A.X., Marlowe, F.W., Pontzer, H. Evidence of scale-free Lévy walk foraging in human hunter-gatherers. *Proceedings of the National Academy of Sciences*. 111: 728-733.
- 2014 Pontzer, H, **Raichlen, D.A.**, Gordon, A.D., Schroepfer-Walker, K.K., Hare, B., O'Neill, M.C., Muldoon, K.M., Dunsworth, H.M., Wood, B.M., Isler, K., Burkart, J., Irwin, M., Shumaker, R.W., Lonsdorf, E.V., Ross, S.R. Primate energy expenditure and life history. *Proceedings of the National Academy of Sciences*. 111: 1433-1437.
- 2014 Shapiro, L.J., Cole, W.G., Young, J.W., **Raichlen, D.A.**, Robinson, S.R., Adolph, K.E. Human quadrupeds, primate quadrupedalism, and Uner Tan Syndrome. *PLoS ONE*. 9: e101758.
- 2014 Pontzer, H, **Raichlen, D.A.**, Rodman, P.S. Bipedal and quadrupedal locomotion in chimpanzees. *Journal of Human Evolution*. 66: 64-82.
- 2013 Barak, M.M., Lieberman, D.E., **Raichlen, D.A.**, Pontzer, H., Warrener, A.G., Hublin, J.J. Trabecular evidence for a human-like gait in *Australopithecus africanus*. *PLoS ONE*. 8: e77687
- 2013 **Raichlen, D.A.**, Pontzer, H., Shapiro, L.J. A new look at the Dynamic Similarity Hypothesis: the importance of swing phase. *Biology Open*. 2: 1032-1036.
- 2013 Foster, A.D., **Raichlen, D.A.**, Pontzer, H. Muscle force production during bent-knee, bent-hip walking in humans. *Journal of Human Evolution*. 65: 294-302.
- 2013 **Raichlen, D.A.**, Polk, J.D. Linking brains and brawn: Exercise and the evolution of the human brain. *Proceedings of the Royal Society Series B*. 280: 20122250.
- 2013 **Raichlen, D.A.**, Foster, A.D., Seillier, A., Giuffrida, A., Gerdeman, G.L. Exercise-induced endocannabinoid signaling is modulated by intensity. *European Journal of Applied Physiology*. 113: 869-875.
- 2012 Pontzer, H, **Raichlen, D.A.**, Wood, B., Mabulla, A., Racette, S.B., Marlowe, F. Hunter-gatherer energetics and human obesity. *PLoS ONE*. 7: e40503.

- 2012 **Raichlen, D.A.**, Foster, A.D., Gerdeman, G.L., Seillier, A., Giuffrida, A. Wired to run: Exercise-induced endocannabinoid signaling in humans and cursorial mammals with implications for the runner's high. *Journal of Experimental Biology*. 215:1331-1336.
- 2011 **Raichlen, D.A.**, Gordon, A.D. Relationship between exercise capacity and brain size in mammals. *PLoS ONE*. 6: e20601
- 2011 **Raichlen, D.A.**, Gordon, A.D., Sechrest, W. Bioenergetic constraints on primate abundance. *International Journal of Primatology*. 32: 118-133.
- 2011 **Raichlen, D.A.**, Armstrong, H., Lieberman, D.E. Calcaneus length determines running economy: Implications for endurance running performance in modern humans and Neandertals. *Journal of Human Evolution*. 60: 299-308.
- 2010 **Raichlen, D.A.**, Gordon, A.D., Harcourt-Smith, W.E.H., Foster, A.D., Haas, W.R.Jr. Laetoli footprints preserve earliest direct evidence of human-like bipedalism. *PLoS ONE*. 5: e9769
- 2010 Pontzer, H., **Raichlen, D.A.**, Shumaker, R.W., Ocobock, C., Wich, S.A. Extremely low energy expenditure in free living Orangutans. *Proceedings of the National Academy of Sciences*. 107: 14048-14052.
- 2010 **Raichlen, D.A.**, Gordon, A.D., Muchlinksy, M.N., Snodgrass, J.J. Causes and significance of variation in mammalian basal metabolism. *Journal of Comparative Physiology – B*. 180: 301-311.
- 2009 **Raichlen, D.A.**, Shapiro, L.J., Pontzer, H., & Sockol, M.D. Understanding increased hind limb weight support in chimpanzees and the evolution of primate kinetics. *American Journal of Physical Anthropology*. 138: 395-402.
- 2009 Pontzer, H, Holloway, J, **Raichlen, D.A.**, Lieberman, D.E. Control and function of arm swing in human walking and running. *Journal of Experimental Biology*. 212: 523-534
- 2009 Pontzer, H., **Raichlen, D.A.**, Sockol, M.D. The metabolic cost of walking in humans, chimpanzees, and early hominins. *Journal of Human Evolution*. 56: 43-54.
- 2008 **Raichlen, D.A.** Predicting the effects of gravity on human walking using a kinematic model: A new test of the dynamic similarity hypothesis. *Journal of Experimental Biology*. 211: 2767-2772.
- 2008 Keeney, B.K., **Raichlen, D.A.**, Meek, T.H., Wijeratne, R.S., Middleton, K.M., Gerdeman, G.L., Garland, T. Jr. Differential response to a selective cannabinoid receptor antagonist (SR141716: rimonabant) in female mice from lines selectively bred for high voluntary wheel running behavior. *Behavioral Pharmacology*. 19: 812-820.
- 2008 **Raichlen, D.A.**, Pontzer, H., & Sockol, M. The Laetoli footprints and early hominin locomotor kinematics. *Journal of Human Evolution*. 54:112-117.
- 2007 Sockol, M., **Raichlen, D.A.**, & Pontzer, H. Chimpanzee locomotor energetics and the origin of human bipedalism. *Proceedings of the National Academy of Sciences*. 134: 12265-12269.
- 2007 Lieberman, D.E., Bramble, D.M., **Raichlen, D.A.**, & Shea, J.J. Endurance running and the tyranny of ethnography: A reply to Pickering and Bunn. *Journal of Human Evolution*. 53: 434-437.

- 2007 Shapiro, L.J. and **Raichlen, D.A.** Primate gaits and arboreal stability: A response to Cartmill et al. *American Journal of Physical Anthropology*. 133: 825-827.
- 2006 **Raichlen, D.A.** Effects of limb mass distribution on mechanical power outputs during quadrupedalism. *Journal of Experimental Biology*. 209: 633-644.
- 2006 Shapiro, L.J. & **Raichlen, D.A.** The influence of limb proportions on the ontogeny of quadrupedal walking in infant baboons (*Papio cynocephalus*). *Journal of Zoology*. 269: 191-203.
- 2006 Lieberman, D.E., **Raichlen, D.A.**, Pontzer, H., Bramble, D. & Cutright-Smith, E. The human *gluteus maximus* and its role in running. *Journal of Experimental Biology*. 209: 2143-2155.
- 2005 **Raichlen, D.A.** Effects of limb mass distribution on the ontogeny of quadrupedalism in infant baboons (*Papio cynocephalus*) and implications for the evolution of primate quadrupedalism. *Journal of Human Evolution*. 49: 415-431.
- 2005 **Raichlen, D.A.** Ontogeny of limb mass distribution in *Papio cynocephalus*. *Journal of Human Evolution*. 49: 452-467.
- 2005 Shapiro, L.J. and **Raichlen, D.A.** Lateral sequence walking in infant *Papio cynocephalus*: implications for the evolution of diagonal sequence walking in primates. *American Journal of Physical Anthropology*. 126: 205-213.
- 2004 **Raichlen, D.A.** Convergence of forelimb and hind limb natural pendular periods in baboons (*Papio cynocephalus*) and its implication for the evolution of primate quadrupedalism. *Journal of Human Evolution*. 46: 719-738.

### **Book Chapters (peer-reviewed)**

- in press* Gosman, J.H., **Raichlen, D.A.**, Ryan, T.M. Human transitions: current perspectives on skeletal development. In: Beauchesne, P and Agrawal, S.C. (eds) *Children and Childhood in Bioarchaeology*.
- 2017 Ryan, T.M., **Raichlen, D.A.**, Gosman, J.H. Structural and mechanical changes in trabecular bone during early development in the human femur and humerus. In: Richtsmeier, J. and Percival, C. (eds) *Building Bones*. pp. 281-302.
- 2011 Pontzer, H, **Raichlen, D.A.**, Sockol, M.D. From treadmill to tropics: calculating ranging cost in chimpanzees. In: D'Aout, K. and Vereecke, E.E. (eds) *Primate Locomotion: Linking Field and Laboratory Research*. New York, Springer. pp. 289-309.
- 2009 Lieberman, D.E., Bramble, D.M., **Raichlen D.A.**, Shea, J.J. Brains versus brawn and the evolution of *Homo*. In: Grine, F. and Leakey, R.E.F. (eds) *The Origin of Homo*. New York, Plenum. pp.77-92

### **Popular articles and commentaries**

- in press* Raison, C., **Raichlen, D.A.** An evolutionary perspective on nutrition and social decision making. *Proceedings of the National Academy of Sciences*.
- 2017 **Raichlen, D.A.** What hunter-gatherers can teach us about exercise. *Evolution and Medicine Review*. <https://evmedreview.com/author/david-raichlen/>

### **External Research Grants (PI or CO-PI)**

- 2014-18 *Principal Investigator* (leading institution), The National Science Foundation: Collaborative Research: The evolutionary basis of human inactivity physiology. (H. Pontzer, B. Wood, Co-PIs), \$268,953
- 2016-17 *Co-Principal Investigator*, State of Arizona/Banner Health Grant: Risk Factors for Brain Aging & Preclinical Alzheimer's Disease. (G. Alexander, PI), \$200,000
- 2014-15 *Co-Principal Investigator*, The L.S.B. Leakey Foundation Research Grant: Stone tools as digging implements: Archaeological, energetic, and biomechanical implications. (B. Wood, PI), \$14,584
- 2015-16 *Co-Principal Investigator*, State of Arizona/Banner Health Grant: Risk Factors for Brain Aging & Preclinical Alzheimer's Disease. (G. Alexander, PI), \$153,000
- 2010-13 *Principal Investigator*, The National Science Foundation: Collaborative Research: Trabecular bone ontogeny and locomotor development in humans and non-human primates. (T. Ryan, lead institution) \$578,657
- 2008-13 *Principal Investigator*, The National Science Foundation: Born to run? The evolution of the runner's high in humans and cursorial mammals (G. Gerdeman & A. Giuffrida, Co-PIs), \$224,800
- 2005 *Principal Investigator*, The L.S.B. Leakey Foundation Research Grant: Energetics and the evolution of bipedalism: Insights from chimpanzee biomechanics. (H. Pontzer & D.E. Lieberman, Co-PIs), \$19,781.00
- 2003 *Co-Principal Investigator*, The National Science Foundation Doctoral Dissertation Improvement Grant: The relationship between limb shape and locomotor mechanics and energetics. (L.J. Shapiro, PI), \$9,800.00
- 2002 *Principal Investigator*, The L.S.B. Leakey Foundation Research Grant: The relationship between limb shape and locomotor mechanics and energetics. (L.J. Shapiro, Co-PI), \$5,000.00
- 1996 *Co-Principal Investigator*, Explorer's Club of New York: Eocene Mammals of the Bighorn Basin. (Elwyn Simons, PI), \$1,000.00

### **Internal Research Grants (PI or Co-PI)**

- 2016 *Co-Principal Investigator*, Tech Launch Arizona Proof of Concept Program: Clinical trial of the Aerobic and Cognitive Training System (ACTS), \$46,404 (G. Alexander, Co-PI)
- 2015 *Co-Principal Investigator*, Tech Launch Arizona Proof of Concept Program: Clinical trial of the Aerobic and Cognitive Training System (ACTS), \$59,296 (G. Alexander, Co-PI)
- 2012-13 *Principal Investigator*, University of Arizona Faculty Seed Grant: Exercise and the evolution of human longevity. (G. Alexander, Co-PI), \$10,000
- 2007 University of Arizona Faculty International Travel Grant, \$700.00
- 2000 *Principal Investigator*, Liberal Arts Graduate Research Fellowship, University of Texas at Austin: Convergence of the forelimb and hind limb natural pendular periods in primates and its implication for the evolution of primate limb shape, \$2,000.00

- 1999 *Principal Investigator*, Liberal Arts Graduate Research Fellowship, The University of Texas at Austin: The function of the arms during human walking, \$2,000.00
- 1997 *Co-Principal Investigator*, Undergraduate Research Fellowship, Duke University: Toothwear Patterns on Great Ape Post-canine Dentition. (Elwyn Simons, PI), \$1000.00

### **Teaching Grants**

- 2012-13 *Principal Investigator*, University of Arizona Office of Instructional Assessment: Development of hybrid course in human evolution (ANTH 265), \$10,000

### **Patent Applications**

- Pending* US Patent Application No. 62/050,679 for *Method and system for aerobic and cognitive training* (G. Alexander & D. Raichlen). Submitted 9/15/2015
- Pending* US Provisional Patent Application No. 62/551,094 for *Fractal analysis linking physical activity patterns, health, and mortality* (D. Raichlen, G. Alexander, & Y. Klimentidis). Submitted 8/28/2017

### **Awards and Fellowships**

- 2015 1885 Society Distinguished Scholar, University of Arizona, \$10,000
- 2015 Bio5 Fellowship to Develop Collaborative Life Science Projects, University of Arizona, \$15,000
- 2013 College of Social and Behavioral Sciences Downtown Fellow, University of Arizona, \$1000
- 2010 Wenner-Gren Foundation Hunt Fellowship: \$40,000
- 2002 Sherwood L. Washburn Student Prize at the Meetings of the American Association of Physical Anthropologists for paper entitled: "Swing phase and the use of diagonal sequence gait in primates": \$250
- 2002 Maurice T. Galpert award for graduate student achievement: \$1000
- 1999-02 Professional Development Award, Department of Anthropology, University of Texas at Austin: \$250

### **Invited Lectures**

- 2017 Interpretation of Footprints from Site S Confirms Human-like Bipedal Biomechanics in Laetoli Hominins, University of Cologne, Cologne, Germany, May, 2017
- 2017 An evolutionary medicine approach to human physical activity and inactivity. Department of Biology Colloquium, UC Riverside, May, 2017
- 2017 An evolutionary medicine approach to human physical activity and inactivity. Center for Human Evolutionary Studies, Rutgers University, February, 2017.
- 2017 An evolutionary medicine approach to human physical activity and inactivity. Healthy Living Seminar, Arizona State University, February, 2017.
- 2017 An evolutionary medicine approach to human physical activity and inactivity. Biomedical Engineering Seminar Series, University of Arizona, February, 2017.
- 2016 An evolutionary medicine approach to human physical activity and inactivity.

- Endocrinology Grand Rounds, Department of Medicine, University of Arizona, November, 2016.
- 2016 Exercise and endocannabinoids signaling in humans. American Physiological Society Intersociety Meeting: Integrative Biology of Exercise, Phoenix, AZ, November, 2016
- 2016 Exercise, APOE genotype, and the evolution of the human lifespan. Evolution of Cognition and Longevity Symposium, GDRI Physiology and Genetics of Aging, Paris, France, October, 2016
- 2016 Can technology enhance healthy lifestyles and brain fitness (with Gene Alexander)? Annual Conference on Successful Aging, Tucson, AZ February, 2016
- 2016 The evolutionary effects of exercise on human neurobiology. University of Arizona College of Medicine Phoenix, January, 2016
- 2015 The evolutionary effects of exercise on the human brain. Cognitive Science Colloquium Series, University of Arizona, February, 2015
- 2015 Balance exercise and fitness to prevent injuries and cognitive decline. Annual Conference on Successful Aging, Tucson, AZ February, 2015
- 2014 Evolutionary links between exercise and human neurobiology, physiology, and life history. Department of Anatomy and Neurobiology, NEOMED, October, 2014
- 2014 Evolutionary links between exercise and human neurobiology, physiology, and life history. Department of Anthropology, University of Texas at Austin, April, 2014
- 2014 Evolutionary links between exercise and the brain. PERFORM Centre Concordia University, Montreal, CA, May, 2014
- 2014 The evolutionary links between exercise and happiness. Arizona Senior Academy, Tucson, AZ, February, 2014
- 2014 Physical activity and energy expenditure during human evolution. Department of Endocrinology, University of Arizona, February, 2014
- 2013 The evolutionary links between exercise and happiness. The Downtown Lecture Series, Tucson, AZ, November, 2013
- 2013 Physical activity and energy expenditure during human evolution. Department of Nutritional Sciences, University of Arizona, November, 2013
- 2013 *Homo athleticus*: Linking exercise to neurobiology, physiology, and life history in humans. University at Albany, March, 2013
- 2013 The surprising links between exercise and brain aging. Annual Conference on Successful Aging, University of Arizona, January, 2013
- 2012 *Homo athleticus*: Linking exercise to neurobiology, physiology, and life history in humans. Penn State University, November 2012
- 2011 Did exercise play a role in the evolution of the human brain? Master Seminar, Cognitive Science Program, University of Arizona, October 2011
- 2010 Ecological influences on total daily energy expenditure in nonhuman primates. Plenary Lecture for the Comparative Nutrition Society Eighth Biennial Symposium, Tucson, AZ, August, 2010
- 2010 Linking Brains and Brawn: Neurobiology and the evolution of human running. Tucson Orthopedic Institute, Tucson, AZ, August, 2010
- 2010 Walking before we ran: A natural history of human locomotion. CLAS Distinguished Lecture Series, University of Arizona, Tucson, AZ, February, 2010



- 2010 Walking before we ran: The evolution of human locomotion. University Animal Care Lecture Series, University of Arizona, Tucson, March, 2010.
- 2009 Linking brains and brawn: Neurobiology and the evolution of human running. University of California, San Diego, October, 2009.
- 2009 Comparative biomechanics and the evolution of human walking and running. Eckerd College, St. Petersburg, FL, April, 2009.
- 2009 Lucy's locomotion. Arizona State Museum, Tucson, AZ, March 2009
- 2008 Are two legs better than four? The evolution of human bipedalism. Oberlin College, Oberlin, OH, March, 2008
- 2008 The evolution of bipedal walking and running. Green Valley Forum, Green Valley, AZ, January, 2008.
- 2007 Are two legs better than four? New approaches to studying human locomotor evolution. Santa Clara University, October, 2007
- 2007 Are two legs better than four? New approaches to studying human locomotor evolution. University of California, Santa Cruz, October, 2007
- 2007 Are two legs better than four? New approaches to studying human locomotor evolution. Arizona State University, September, 2007
- 2007 The evolutionary compromises of human bipedalism. Keynote Address for the Gait and Clinical Movement Analysis Society, March 2007
- 2006 Linking anatomy and motion: What drives visual aspects of locomotion? Walt Disney Imagineering, August, 2006

### **Conference Presentations**

- 2017 Raichlen, D.A., Gordon, A.D. Interpretation of footprints from Site S confirms human-like bipedal biomechanics in Laetoli hominins. *European Society for Human Evolution*
- 2017 Raichlen, D.A., Pontzer, H., Harris, J.A., Zderic, T.W., Hamilton, M.T., Wood, B.M., Objectively measured physical activity in a hunting and gathering population. Abstract in *American Journal of Physical Anthropology Suppl.* 64
- 2017 Sayre, M., Raichlen, D.A., Bunkley, E.N., Odera, D.A., Reeves, C.A., Pike, I.L., Objectively measured physical activity among the Pokot agro-pastoralists of Kenya. Abstract in *American Journal of Physical Anthropology Suppl.* 64
- 2017 Webber, J.T., Raichlen, D.A. The effects of high speed and weighted walking on head pitch and knee forces. Abstract in *American Journal of Physical Anthropology Suppl.* 64
- 2017 Lieberman, D.E., Barak, M.M., Rolian, C.P., Raichlen, D.A., Pontzer, H. Testing hypotheses about hominin locomotor evolution using models not analogies. Abstract in *American Journal of Physical Anthropology Suppl.* 64
- 2017 Kozma, E.E., Webb, N.M., Harcourt-Smith, W.E., Raichlen, D.A., D'Aout, K., Brown, M.H., Finestone, E., Ross, S.R., Aerts, P., Pontzer, H. Mechanics of hip extension characterize arboreal-terrestrial trade-offs in hominin evolution. Abstract in *American Journal of Physical Anthropology Suppl.* 64
- 2016 Raichlen, D.A., Pontzer, H., Harris, J.A., Zderic, T.W., Hamilton, M.T., Wood, B.M. Sitting, squatting, and the evolution of human inactivity. Abstract in *American Journal of Physical Anthropology Suppl.* 62: 261-262
- 2016 Webber, J.T., Foster, A.D., Raichlen, D.A. Gait ontogeny and the avoidance of impact forces.

- Abstract in *American Journal of Physical Anthropology Suppl.* 62: 331
- 2016 Pontzer, H., Raichlen, D.A., Harris, J.A., Wood, B.M. Energetics and economics of foraging in humans and other apes. Abstract in *American Journal of Physical Anthropology Suppl.* 62: 255
- 2016 Kozma, E.E., Raichlen, D.A., Wood, B.M., Pontzer, H. Energetics and muscle use of human climbing. Abstract in *American Journal of Physical Anthropology Suppl.* 62: 196
- 2015 Jelenc, K.E., Raichlen, D.A. Resting postures in human evolution: squatting, sitting, and the biomechanics of back pain. AAPA annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 60: 178-179
- 2015 Perchalski, B., Placke, A., Sukhdeo, S.M., Shaw, C.N., Gosman, J.H., Raichlen, D.A., Ryan, T.M. Asymmetry in the cortical and trabecular bone of the human humerus during development. AAPA annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 60: 250
- 2015 Conner, B. Sukhdeo, A., Perchalski, B., Raichlen, D.A., Gosman, J.H., Ryan, T.M. Trabecular bone at the knee reflects changes in load orientation during ontogeny. AAPA annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 60: 108-109
- 2015 Ryan, T.M., Sukhdeo, S., Perchalski, B., Hubbell, Z.R., Raichlen, D.A., Gosman, J.H. Ontogenetic development of trabecular bone in the human postcranial skeleton. AAPA annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 60: 273-274
- 2014 Darr, M.R., Pontzer, H., Raichlen, D.A. A comparison of mediolateral ground forces in humans and chimpanzees. AAPA annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 58: 102.
- 2014 Pontzer, H., Raichlen, D.A., Wood, B.M., Racette, S.B., Delany, J.P., Mabulla, A.Z., Marlowe, F.W., Isler, K., Dunsworth, H.M., Schroepfer, K.K., Hare, B., Shumaker, R.W., Lonsdorf, E.V. Ross, S.R. Daily water turn over in humans, apes, and fossil hominins. AAPA annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 58: 210.
- 2014 Raichlen, D.A., Gordon, A.D., Scott, R.S., Webber, J., Foster, A.D., Sukhdeo, S.M., Gosman, J.H., Ryan, T.M. An ontogenetic framework linking locomotion and trabecular bone architecture with applications for reconstructing hominin life history. AAPA annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 58: 215.
- 2014 Raichlen, D.A., Wood, B.M., Gordon, A.D., Marlowe, F.W., Pontzer, H. Scale-free foraging in human hunter-gatherers: Levy walks are a fundamental feature of human mobility. SAA annual meeting.
- 2014 Wallace, I., Copes, L., Raichlen, D.A., Garland, T. Mobility as a nexus of biological organization. SAA annual meeting.
- 2013 Webber, J.T., Raichlen, D.A. Heel-strike and impact transient during bipedal walking: Implications for the acquisition of a habitual bipedal gait. AAPA annual meeting.
- 2013 Pontzer, H., Raichlen, D.A., Gordon, A.D., Schroepfer, K.K., Hare, B., Dunsworth, H.M., Wood, B.M., Irwing, M.T., Shumaker, R.W., Lonsdorf, E.V., Ross, S.R. Primate energy expenditure and life history. AAPA annual meeting.
- 2013 Ryan, T.M., Raichlen, D.A., Hubbell, Z.R., Sukhdeo, S.M., Gosman, J.H. Human walking and developmental bone morphology: An integrated functional perspective. AAPA annual meeting.
- 2013 Raichlen, D.A., Foster, A.D., Webber, J.T., Pontzer, H. Contributions of morphology and posture to the evolution of energetically economical hominin bipedalism. Paleoanthropology Society Meetings.
- 2013 Gosman, J., Raichlen, D.A., Ryan, T.M. Current perspectives on structural change in bone

- during development. SAA meetings.
- 2012 Gosman, J., Raichlen, D.A., Hubbell, Z., Sukhdeo, S., Souza, L., Ryan, T. Stepping out: Developmental changes in tibial trabecular bone microarchitecture and kinematics of early human walking. American Society for Bone and Mineral Research annual meeting.
- 2012 Hefter, E.M., Raichlen, D.A., Kuhn, S. Working hard or hardly working? A preliminary study of the metabolic costs of stone knapping. American Anthropological Association annual meeting.
- 2012 Raichlen, D.A., Pontzer, H., Wood, B.M., Mabulla, A.Z., Marlowe, F.W. Aerobic activity in the Hadza hunter-foragers of Tanzania. American Association of Physical Anthropologists (AAPA) annual meeting, April, 2011 Abstract in *American Journal of Physical Anthropology Suppl.* 54: 243.
- 2011 Wood, B.M., Raichlen, D.A., Pontzer, H., Jones, J.H., Mabulla, A.Z., Marlowe, F.W. Keeping their friends close? Contrasting models of social organization in Hadza hunter-gatherers. AAPA annual meeting, April, 2011 Abstract in *American Journal of Physical Anthropology Suppl.* 52: 314
- 2011 Raichlen, D.A., Wood, B.M., Pontzer, H., Mabulla, A.Z., Marlowe, F.W. Levy walks in hunter-gatherers: when are random walks an optimal search strategy?. AAPA annual meeting, April, 2011 Abstract in *American Journal of Physical Anthropology Suppl.* 52: 246.
- 2011 Pontzer, H., Raichlen, D.A., Wood, B.M., Mabulla, A.Z., Marlowe, F.W. Hadza forager energetics and the evolution of the human metabolic strategy. AAPA annual meeting, April, 2011 Abstract in *American Journal of Physical Anthropology Suppl.* 52: 242.
- 2010 Raichlen, D.A., Giuffrida, A., Gerdeman, G.L., Foster, A.D. Neurobiological rewards and the evolution of the runner's high in humans and cursorial mammals. AAPA annual meeting, April, 2010 Abstract in *American Journal of Physical Anthropology Suppl.* 50: 238.
- 2010 Westaway, M.C., Johnston, H., Raichlen, D.A., Cupper, M.L., Graham, I. Interpreting late Pleistocene footprints at the Willandra Lakes, southeastern Australia. AAPA annual meeting, April, 2010 Abstract in *American Journal of Physical Anthropology Suppl.* 50: 318.
- 2010 Pontzer, H., Raichlen, D.A., Wood, B.M. Hominoid daily energy expenditure and the human paradox. AAPA annual meeting, April, 2010 Abstract in *American Journal of Physical Anthropology Suppl.* 50: 234.
- 2010 Foster, A.D., Edmonds, H.M., Raichlen, D.A. Body size and maneuverability in human evolution. AAPA annual meeting, April, 2010 Abstract in *American Journal of Physical Anthropology Suppl.* 50: 92.
- 2009 Raichlen, D.A., Gordon, A.D., Muchlinski, M., Snodgrass, J.J. Variation in primate basal metabolism: explanations and ecological implications. AAPA annual meeting, April, 2009 Abstract in *American Journal of Physical Anthropology Suppl.* 48: 305.
- 2009 Zeininger, A., Shapiro, L.J., Raichlen, D.A. The effects of digitigrades cheiridial postures on speed and gait in infant baboons. AAPA annual meeting, April, 2009 Abstract in *American Journal of Physical Anthropology Suppl.* 48: 406-407.
- 2009 Pontzer, H., Ocobock, C., Shumaker, R.W., Raichlen, D.A. Daily energy expenditure in orangutans measured using doubly labeled water. AAPA annual meeting, April, 2009 Abstract in *American Journal of Physical Anthropology Suppl.* 48: 299-300.
- 2009 Foster, A.D., Raichlen, D.A., Pontzer, H., Sockol, M.D. Muscle force production during bent-knee, bent-hip walking in humans. AAPA annual meeting, April, 2009 Abstract in *American Journal of Physical Anthropology Suppl.* 48: 163-164.
- 2009 Bezanson, M., Raichlen, D.A. A field study of kinematics during quadrupedal walking in *Cebus capucinus*. AAPA annual meeting, April, 2009 Abstract in *American Journal of*

- Physical Anthropology Suppl.* 48: 101-102.
- 2008 Raichlen, D.A. Are two legs better than four? Comparative biomechanics and the evolution of human walking and running. American Association of Anatomy Meetings.
- 2008 Raichlen, D.A., Keeney, B.K., Gerdeman, G., Meek, T.H., Wijeratne, R.S., Garland, T. Jr. Wired to run? The evolution of novel locomotor behaviors in hominins. AAPA annual meeting, April, 2008. Abstract in *American Journal of Physical Anthropology Suppl.* 46: 176.
- 2008 Whitcome, K.K., Lieberman, D.E., Bramble, D.M., Raichlen, D.A., Sloan, C. Head roll stabilization and muscle mitigation mechanism in human distance running. AAPA Annual meeting, April, 2008. Abstract in *American Journal of Physical Anthropology Suppl.* 46: 222.
- 2008 Pontzer, H., Raichlen, D.A., Sockol, M.D. Endurance versus efficiency in humans and chimpanzees: a new look at the old problem of becoming bipedal. AAPA Annual meeting, April, 2008. Abstract in *American Journal of Physical Anthropology Suppl.* 46: 173.
- 2008 Lieberman, D.E., Bramble, D.M., Raichlen, D.A., Whitcome, K.W. Functional, developmental and morphological integration: the case of the head and the forelimb in bipedal hominins. AAPA Annual meeting, April, 2008. Abstract in *American Journal of Physical Anthropology Suppl.* 46: 140.
- 2008 Keeney, B.K., Raichlen, D.A., Meek, T.H., Wijeratne, R.S., Gerdeman, G.L., Garland, T. Jr. Differential response to a selective cannabinoid receptor antagonist in mice bred for high voluntary wheel-running behavior. The Society for Integrative and Comparative Biology Annual meeting.
- 2008 Zeininger, A., Shapiro, L.J., Raichlen, D.A. The effects of digitigrades cheiridial postures on speed and gait in infant baboons. The Society for Integrative and Comparative Biology Annual meeting.
- 2007 Raichlen, D.A., Shapiro, L.J. and Pontzer, H. The evolution of mammalian locomotor biomechanics: Adaptations or spandrels? International Congress of Vertebrate Morphology Meeting, July, 2007.
- 2007 Raichlen, D.A., Pontzer, H., and Sockol, M.D. Joint kinetics in chimpanzees and other mammals: Are large bodied primates unique? American Association of Physical Anthropologists (AAPA) Annual meeting, March, 2007. Abstract in *American Journal of Physical Anthropology Suppl.* 44: 194.
- 2007 Pontzer, H., Raichlen, D.A., and Sockol, M.D. Contributions of muscular and skeletal morphology to locomotor performance: How much can bones tell us about locomotion? AAPA Annual meeting, March, 2007. Abstract in *American Journal of Physical Anthropology Suppl.* 44: 191.
- 2007 Shapiro, L.J. and Raichlen, D.A. Center of mass position, quadrupedalism, and stability: Where do primates fall? AAPA Annual meeting, March, 2007. Abstract in *American Journal of Physical Anthropology Suppl.* 44: 215.
- 2007 Zeininger, A., Shapiro, L.J., and Raichlen, D.A. Ontogeny of digitigrade hand and foot postures in infant baboons (*Papio cynocephalus*). AAPA Annual meeting, March, 2007. Abstract in *American Journal of Physical Anthropology Suppl.* 44: 255.
- 2007 Raichlen, D.A., Pontzer, H., and Sockol, M.D. The energetics of quadrupedal and bipedal locomotion in chimpanzees. The Society for Integrative and Comparative Biology Annual meeting
- 2007 Pontzer, H., Raichlen, D.A., and Lieberman, D.E. Is arm swing active or passive during human walking and running? The Society for Integrative and Comparative Biology Annual meeting

- 2007 Lieberman, D.E., Bramble, D.M., and Raichlen, D.A. Humans use a unique mechanism to stabilize the head during running. The Society for Integrative and Comparative Biology Annual meeting.
- 2006 Raichlen, D.A., Pontzer, H., and Sockol, M. Chimpanzee locomotor biomechanics and the evolution of hominid bipedalism. Paleoanthropology Society Annual meeting.
- 2006 Raichlen, D.A., Pontzer, H., and Sockol, M. Energetics of chimpanzee locomotion: Force production during bipedal and quadrupedal walking. AAPA Annual meeting, March, 2006. Abstract in *American Journal of Physical Anthropology Suppl.* 42: 150.
- 2005 Raichlen, D.A., Pontzer, H., and Sockol, M. Muscular force production during chimpanzee bipedal and quadrupedal walking. Division of Vertebrate Morphology, Society of Integrative and Comparative Biology Northeast Regional Meeting, September, 2005.
- 2005 Raichlen, D.A. Relationships among limb mass distribution, kinematics, and mechanical power in primates compared to non-primate quadrupeds. AAPA Annual meeting, April, 2005. Abstract in *American Journal of Physical Anthropology Suppl.* 40: 175-176.
- 2005 Lieberman, D.E., Ponzter, H., Cutright-Smith, E. & Raichlen, D. Why is the human gluteus so maximus. AAPA annual meeting, April, 2005. Abstract in *American Journal of Physical Anthropology Suppl.* 40: 142-143.
- 2004 Raichlen, D.A. The effects of distally distributed limb mass on quadrupedal locomotion. The Society for Integrative and Comparative Biology Annual meeting, Jan 2004. Abstract in *Integrative and Comparative Biology.* p. 286
- 2004 Raichlen, D.A. The effects of limb mass distribution on primate quadrupedalism. AAPA Annual meeting, April 2004. Abstract in *American Journal of Physical Anthropology Suppl.* 38: 164
- 2003 Raichlen, D.A. A strategy for the reduction of mechanical internal work in primates. AAPA Annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 36: 173
- 2003 Shapiro, L.J. and Raichlen, D.A. Locomotor development and the uniqueness of primate quadrupedalism. AAPA Annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 36: 189-190.
- 2002 Raichlen, D.A. and Shapiro, L.J. Swing phase and the use of diagonal sequence gait in primates. AAPA Annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 34:128-129
- 2001 Raichlen, D.A. The effect of restricted arm swing on human walking. AAPA Annual Meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 32:122.
- 2001 Shapiro, L.J. and Raichlen, D.A. Ontogeny of gait in *Papio Cynocephalus*. AAPA Annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 32:135.
- 2000 Raichlen, D.A. Application of a predictive model of segment inertial properties to the study of primate quadrupedalism. AAPA Annual meeting. Abstract in *American Journal of Physical Anthropology Suppl.* 30:258.

### **Professional Service**

- 2016 Panel Member, NSF Major Research Instrumentation Grant Review, University of Arizona
- 2016 Program Committee Member, American Association of Physical Anthropologists
- 2015-present Vice-Chair, Institutional Review Board, University of Arizona
- 2014 Hosted and Organized the 2<sup>nd</sup> Annual Meeting of the Southwest Association of

	Biological Anthropologists
2013-present	Co-Founder and Executive Committee Member, Southwest Association of Biological Anthropologists (SWABA)
2013	Panel member, Faculty Seed Grant Competition, University of Arizona
2007	Co-organizer, Principles of Primate Locomotion Symposium, Meetings of the American Association of Physical Anthropology (with M. O'Neil and H. Pontzer)
2002-04	Chair, <i>Liberal Arts Graduate Research Fellowship Committee, University of Texas Austin</i> (responsible for awarding \$50,000.00 in grants per year to graduate students)
2001	Member, <i>Liberal Arts Graduate Research Fellowship Committee, University of Texas Austin</i>

Journal Reviewer for:

*American Journal of Physical Anthropology, American Journal of Primatology, Anatomical Record, Behavioral Processes, Biological Journal of the Linnaean Society, Current Anthropology, Current Biology, Evolutionary Anthropology, Folia Primatologica, Journal of Archaeological Sciences, Journal of African Earth Sciences, Journal of Anatomy, Journal of Experimental Biology, Journal of Human Evolution, Journal of Mammology, Journal of the Royal Society Interface, Journal of Theoretical Biology, Naturwissenschaften, Oxford University Press, PLoS ONE, Quaternary International, Scientific Reports, Springer Press, Yearbook of Physical Anthropology, Physiological and Biochemical Zoology, Evolution, Medicine, and Public Health, PLoS Biology, Journal of Biomechanics, Medicine and Science in Sports and Exercise*

Grant reviewer for:

L.S.B. Leakey Foundation  
National Science Foundation

**Professional Membership**

American Association of Physical Anthropologists  
Paleoanthropology Society  
European Society for the study of Human Evolution

**Public Outreach (selected examples)**

2016	Featured Research, The New York Times <i>Born to move</i> , by Gretchen Reynolds
2016	Featured Research, Wall Street Journal <i>The elusive runner's high has prehistoric roots</i> , by Matt Wilkinson
2015	Panel discussant and speaker, The Annual Conference on Successful Aging, University of Arizona Topic: Exercise and fall risk in the elderly
2014	Featured Research, New York Times <i>Navigating our world like birds and bees</i> , by Gretchen Reynolds
2014	Featured Research, Scientific American <i>Exercise counteracts genetic risk of Alzheimer's</i> , by Emilie Reas
2014	Featured Research, Runner's World Magazine <i>How to achieve a runner's high</i> , by K. Aleisha Fetters
2013	Featured Research, New York Times <i>What works for sharks and honeybees...</i> by Sindya Bhanoo
2013	Featured Research, Washington Post

- Hunter-gatherer humans join insects, sharks, and other animals in doing the Levy walk*,  
by Meeri Kim
- 2013 Featured research, New York Times
- Exercise and the ever-smarter human brain* by Gretchen Reynolds
- 2013 Panel discussant and speaker, The Annual Conference on Successful Aging, University of Arizona
- Topic: Exercise and the aging brain
- 2012 Featured research, New York Times
- The evolution of the runner's high* by Gretchen Reynolds
- 2012 Featured research, NPR Morning Edition
- 'Wired to run': *Runner's high may have been evolutionary advantage* by Christopher Joyce
- 2010 Featured research, The Washington Post
- Bipedalism takes a big step backward* by Margaret Shapiro
- 2008 Public lecture, Green Valley Forum Senior Citizen Group
- The evolution of bipedal walking in humans
- 2007 Featured research, BBC
- Energy use 'drove human walking'*
- 2006 Featured research, National Geographic Magazine
- Downside of being upright* by Jennifer Ackerman

**Courses Taught at the University of Arizona (500-level courses are taught at the graduate level)**

- ANTH 265 Human Evolution (Introduction to Biological Anthropology)
- ANTH 324 The Human Machine: Evolutionary Anatomy, Biomechanics, and Physiology
- ANTH 461/561 The Primate Skeleton
- ANTH 466/566 Paleoanthropology
- ANTH 497/597 Experimental Methods in Biological Anthropology
- ANTH 560 Introduction to Graduate Human Evolutionary Biology
- ANTH 595 Why Human Evolution Matters
- ANTH 595 The Biomechanics of Language and Gesture

**Graduate Students Advised (Committee Chair):**

- James Webber, Ph.D. student (*current*), Anthropology (Bio Anth), University of Arizona
- Rebecca Mountain, Ph.D. student (*current, Co-Chair*), Anthropology (Archaeology), University of Arizona
- Margaret Katie Sayre, Ph.D. student (*current*), Anthropology (Bio Anth), University of Arizona
- Adam Foster, Ph.D. student (graduated 2014), Anthropology (Bio Anth), University of Arizona

**Graduate Students Advised (Committee Member):**

- Emma Bunkley, Ph.D. student (*current*), Anthropology (Bio Anth), University of Arizona
- Laura Diakew, Ph.D. student (*current*), Anthropology (Bio Anth), University of Arizona
- Britt Singletary, Ph.D. student (*current*), Anthropology (Bio Anth), University of Arizona
- Rachael Byrd, Ph.D. student (*current*), Anthropology (Archaeology), University of Arizona
- Eric Hefter, M.A. student (2013), Anthropology (Archaeology), University of Arizona

**Graduate Advisors Ph.D.**

**Supervisor:**

Dr. Liza Shapiro, Department of Anthropology, University of Texas at Austin

**Ph.D. Committee Members:**

Dr. John Kappelman, Department of Anthropology, University of Texas at Austin

Dr. Susan Larson, Department of Anatomical Sciences, SUNY at Stony Brook

Dr. Deborah Overdorff, Department of Anthropology, University of Texas at Austin

Dr. Marcus Pandy, Department of Biomedical Engineering, University of Texas at Austin