

Anne C. Bekoff

Curriculum Vitae

01/30/16

Department of Integrative Physiology
University of Colorado, Boulder, CO 80309-0273
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Present Position: Professor, Integrative Physiology and Associate Faculty Director,
Preprofessional Advising

Educational Experience

Postdoc 1975-1976 Physiology Dept., University of Colorado Health Sciences Center
Ph.D. 1974 Washington University, St. Louis, MO
Field: Developmental Neurobiology
B.A. 1969 Smith College, Northampton, MA Major: Biology

Employment & Professional Experience

2003-2015 Associate Faculty Director, Preprofessional Advising, University of Colorado
2000-2003 Prehealth Advisor, Preprofessional Advising, University of Colorado
2000-present Professor, Integrative Physiology, University of Colorado
1989-2000 Professor, EPO Biology, University of Colorado
1982-1989 Associate Professor, EPO Biology, Univ. of Colorado
1976-1982 Assistant Professor, EPO Biology, Univ. of Colorado

Current Professional Memberships

American Association for the Advancement of Science, Fellow
National Association of Advisors for Health Professions
Society for Neuroscience
Western Association of Advisors for Health Professions

Honors

1997 Mortar Board Senior Honor Society Teaching Award
1988 Boulder Faculty Assembly Teaching Award
1987 Elected Fellow of AAAS
1983-1984 John Simon Guggenheim Memorial Foundation Fellowship
1979-1981 Alfred P. Sloan Foundation Research Fellowship
1971-1974 National Defense Education Act Title IV Predoctoral Fellowship

Professional Service

2016- Manuscript reviewer for Developmental Psychobiology
2014-2015 Member Planning Committee WAAHP San Diego meeting
2010-2011 Member Planning Committee WAAHP Palo Alto meeting
2008-2009 Program Chair WAAHP Santa Fe meeting
2006-2007 Member Planning Committee WAAHP Asilomar meeting
2005-2009 Western Association of Advisors for Health Professions (WAAHP), At-Large rep
2000 NASA Workshop on Mammalian Developmental Biology Experiments for the Space Station
1999, 2000 panel member, Hughes Graduate Fellowship Program, Neuroscience
1999 panel member, NSF Graduate Fellowship Program, Physiology, Microbiology and Neuroscience
1995 NSF Committee of Visitors to review Neuroscience Cluster
1994-1996 member, Animal Behavior Society Research Grants Committee
1994-1996 member, Committee to award Young Investigator Prize for International Society for Neuroethology
1992-1996 member, NIH Psychobiology, Behavior and Neuroscience Study Section
1992 Young Investigator Awards panel for NSF
1991, 1992 panel member, NSF Minority Graduate Fellowships
1991 participant, NASA Workshop to specify science requirements for development of biological habitats in the space shuttle
1990-1995 elected member, Council for International Society for Neuroethology
1990 member, NIH Ad Hoc Neurological Sciences Study Section
1986-1998 member, Rocky Mountain Region Neuroscience Group planning committee
1987-1996 Consulting Editor, *Developmental Psychobiology*
1990-2000 Grant proposal reviewer for March of Dimes, National Science Foundation, National Research Council, Human Frontiers Science Program
1990-2000 Manuscript reviewer for a variety of journals including Neuroscience, Journal of Experimental Zoology, Animal Behavior, Behavioral Neuroscience, Journal of Neurophysiology, Developmental Brain Research, Journal of Neurobiology, Developmental Psychobiology, Brain Research Bulletin, Journal of Comparative Psychology
1981 Society for Developmental Biology, Local Host Committee
1980-1982 Animal Behavior Society, Education Committee

Publications (lifetime list)

- Sharp, A.A. and Bekoff, A. 2015. Pyridoxine Treatment Alters Embryonic Motility in Chicks: Implications for the Role of Proprioception. **Developmental Psychobiology**, 57 (in Press February issue)
- Bekoff, A. 2004. Behavior of embryos. In: **Encyclopedia of Animal Behavior**, M. Bekoff, ed., Greenwood Press. 4pp.
- Sharp, A.A and Bekoff, A. 2001. Sensory-motor experience during the development of motility in chick embryos. In: Cope, T.C. (ed.) *Motor Neurobiology of the Spinal Cord*. **CRC Press**, NY. pp. 171-191.
- Bekoff, A. (2001) Spontaneous embryonic motility: an enduring legacy. **Intl. J. Devel. Neurobiol.** 19: 55-60.

- Bekoff, A. (2000) Development of motor patterns in avian embryos: Control of hatching behaviour. In: Adams, N.J. and Slotow, R.H. (eds.) **Proc. 22nd Int. Ornithol. Congr.**, Durban, University of Natal.
- Bekoff, A. (2001) Development of motor behaviour in chick embryos. In: Kalverboer, A.F. and Gramsbergen, A., (eds.) **Handbook on Brain and Behaviour in Human Development**. Kluwer, The Netherlands. pp. 429-446.
- Sharp, A.A., Ma, E. and Bekoff, A. (1999) Developmental changes in leg coordination of the chick at embryonic days 9, 11 and 13: uncoupling of ankle movements. **J. Neurophysiol.** 82: 2406-2414.
- Bekoff, A. (1998) Embryo research. In **Encyclopedia of Animal Rights and Animal Welfare**, ed. M. Bekoff. Greenwood Press, Westport, Connecticut. pp. 152-153.
- Johnston, R.M. and A. Bekoff. (1996) Patterns of muscle activity during different behaviors in chicks: implications for neural control. **J. Comp. Physiol.** 179: 169-184.
- Bekoff, A. (1995) Development of motor behavior in chick embryos. In: **Fetal Development: A Psychobiological Perspective**. P. Lecanuet and W. Fifer, N.A. Krasnegor, Smotherman, W.P., eds. Erlbaum, Hillsdale, NJ, pp. 191-204.
- Bekoff, A. (1994) Neuroembryology of motor behavior in birds. In: **Perception and Motor Control in Birds: An Ecological Approach**. Davies, M.N.O. and P.R. Green, eds. Springer-Verlag, Berlin. pp.125-134.
- Bradley, N.S. and A. Bekoff. (1992) Development of coordinated movement in chicks: II. Temporal analysis of hindlimb muscle synergies at embryonic day 10 in embryos with spinal gap transections. **J. Neurobiol.** 23: 420-432.
- Johnston, R.M. and A. Bekoff. (1992) Constrained and flexible features of rhythmical hindlimb movements in chicks: Kinematic profiles of walking, swimming and airstepping. **J. Exp. Biol.** 23: 43-66.
- Bekoff, A. (1992) Neuroethological approaches to the study of motor development in chicks: Achievements and challenges. **J. Neurobiol.** 23: 1486-1505.
- Bekoff, A. (1992) Development of locomotion: patterns and trends. In: **Posture and Gait: Control Mechanisms**. eds. M. Woolacott and F. Horak. University of Oregon Press. pp. 325-329.
- Watson, S.J. and A. Bekoff. (1990) A kinematic analysis of hindlimb motility in 9- and 10-day old chick embryos. **J. Neurobiol.** 21: 651-660.
- Bradley, N.S. and A. Bekoff. (1990) Development of coordinated movement in chicks: I. Temporal analysis of hindlimb muscle synergies at embryonic days 9 and 10. **Devel. Psychobiol.** 23: 763-782.
- Bekoff, A., J.A. Kauer, A. Fulstone and T.R. Summers. (1989) Neural control of limb coordination. II. Comparison of walking and hatching motor output patterns in the absence of input from the brain. **Exp. Brain Res.** 74: 609-617.
- Bradley, N.S. and A. Bekoff. (1989) Development of locomotion: Animal models. In: **The Development of Posture and Gait across the Lifespan**. M. Woolacott and A. Shumway-Cook, eds. University of South Carolina Press, pp. 48-73.
- Bekoff, A. (1989) Continuity of pattern generating mechanisms in embryonic and posthatching chicks. In: **Neurobiology of Infant Behaviour**. C. von Euler, H. Forssberg, C. von Hofsten, H. Lagerkranz and R. Zetterstrom, eds. Macmillan Press, Hampshire, England, pp. 79-86.

- Carey, C., R.L. Marsh, A. Bekoff, R.M. Johnston and A. M. Olin. (1989) Enzyme activities in muscles of seasonally acclimatized house finches. In: **Physiology of Cold Adaptation in Birds**. Reinertsen, R.E. and C. Bech, eds. Plenum Press, NY. pp. 95-104.
- Bekoff, A. (1988) Embryonic motor output and movement patterns: Relationship to postnatal behavior. In: **Behavior of the Fetus**. W.P. Smotherman and S.R. Robinson, eds. Telford Press, New Caldwell, NJ. pp.191-206.
- Bekoff, A. and A.L. Sabichi (1987) Sensory control of the initiation of hatching in chicks: effects of a local anesthetic injected into the neck. **Devel. Psychobiol.** 20: 489-495.
- Bekoff, A., M.P. Nusbaum, A.L. Sabichi and M. Clifford (1987) Neural control of limb coordination. I. Comparison of hatching and walking motor output patterns in normal and deafferented chicks. **J. Neurosci.** 7: 2320-2330.
- Bekoff, A. (1986) Ontogeny of chicken motor behaviors: Evidence for multi-use pattern generating circuitry. In: **Neurobiology of Vertebrate Locomotion**. S. Grillner, P.S.G. Stein, D.G. Stuart, H. Forssberg, R.M. Herman and P. Wallen, eds. Macmillan, Hampshire, England. pp. 433-453.
- Bekoff, A. (1985) Development of locomotion in vertebrates: A comparative perspective. In: **Comparative Development of Adaptive Skills: Evolutionary Implications**. G. Gollin, ed. Erlbaum, Hillsdale, NJ. pp. 57-94.
- Bekoff, A. and J.A. Kauer (1984) Neural control of hatching: fate of the pattern generator for the leg movements of hatching in post-hatching chicks. **J. Neurosci.** 4: 2659-2666.
- Bekoff, A. and J.A. Kauer (1982) Neural control of hatching: role of neck position in turning on hatching leg movements in post-hatching chicks. **J. Comp. Physiol.** 145: 497-504.
- Bekoff, A. (1981) Embryonic development of motor behavior in chicks. **Trends Neurosci.** 4: 181-184.
- Bekoff, A. (1981) Embryonic development of the neural circuitry underlying motor coordination. In: **Topics in Developmental Neurobiology. Essays in Honor of Viktor Hamburger**. W.M. Cowan, ed. Oxford University Press, NY. pp. 134-170.
- Bekoff, A. (1981) Behavioral embryology in birds and mammals: Neuroembryological studies of the development of motor behavior. In: **Behavioral Development**. K. Immelmann, G. Barlow, L. Petrinovitch and M. Mains, eds. Cambridge University Press, NY. pp. 152-163.
- Byers and A. Bekoff (1980) Prenatal motility and postnatal play: functional continuity? **Develop. Psychobiol.** 13: 225-228.
- Bekoff, A. and B. Lau (1980) Interlimb coordination in 20-day old rat fetuses. **J. Exp. Zool.** 214: 173-175.
- Bekoff, A. and W. Trainer (1979) The development of interlimb coordination during swimming in postnatal rats. **J. Exp. Biol.** 83: 1-11.
- Bekoff, M., J.A. Bekoff, A. (1978) A neuroethological approach to the study of the ontogeny of coordinated behavior. In: G. Burghardt and M. Bekoff, eds. **The Development of Behavior: Comparative and Evolutionary Aspects**. Garland, NY. pp. 19-41.
- Bekoff, M., D. Ainley and A. Bekoff (1978) The ontogeny and organization of comfort behavior in Adelie penguins. **Wilson Bull.** 91: 255-270.
- Bekoff, A. and W.J. Betz (1977) Physiological properties of dissociated muscle fibres obtained from innervated and denervated adult rat muscle. **J. Physiol.** 271: 25-40.

- Bekoff, A. and W.J. Betz (1977) Properties of isolated adult rat muscle fibres maintained in tissue culture. **J. Physiol.** 271: 537-547.
- Bekoff, A. (1976) Ontogeny of leg motor output in the chick embryo: a neural analysis. **Brain Research** 106: 271-291.
- Bekoff, A. and W.J. Betz (1976) Acetylcholine hot spots: development on myotubes cultured from aneural limb buds. **Science** 193: 915-917.
- Bekoff, A., P.S.G. Stein and V. Hamburger (1975) Coordinated motor output in the hindlimb of the 7-day chick embryo. **Proc. Natl. Acad. Sci.** 72: 1245-1248.
- Muller-Schwarze, D., R. Butler, P. Belanger, M. Bekoff and A. Bekoff (1975) Feeding territories of South Polar skuas at Cape Crozier. **Antarctic J.** 10: 121-122.

Extramural Support (lifetime list)

- 1996-2000 National Science Foundation grant: *Development of behavior in chicks*. \$250,000.
- 1991-1996 National Institutes of Health grant: *Perinatal transitions in behavior*. \$580,000.
- 1988-1991 National Institutes of Health grant: *Neural basis for the development of coordinated behaviors*. \$313,000.
- 1988-1989 National Institutes of Health Small Instrumentation Program grant: *3D analysis module*. \$15,800.
- 1985-1990 National Institutes of Health Training Grant: *Developmental Psychobiology* (one of 12 faculty participants). \$400,000.
- 1983-1987 National Institutes of Health grant: *Neural basis for the development of coordinated behaviors*. \$201,000.
- 1979-1982 National Science Foundation grant: *Neural basis for the development of coordinated behaviors*. \$135,000.
- 1979-1980 National Science Foundation Multi-user Equipment Grant: *Computer-graphics system for the optical analysis of behavioral and ecological data*. (with R. Eaton, P.I. and M. Bekoff). \$35,325.
- 1976-1979 National Science Foundation grant: *Development of motoneuron connectivity*. \$40,000.

Published Abstracts (Career Total = 48)

- Sharp, A.A. and Bekoff, A. 2002. Embryonic administration of pyridoxine selectively kills trkC immunoreactive neurons in the DRG of chicks. Program No. 166.4. 2002 Abstract Viewer and Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online
- Hurtt, B.C. and Bekoff, A. 2002. Comparison of EMG-kinematic synchronization in two different loading paradigms across two different behaviors in chicks. Program No. 365.12. 2002 Abstract Viewer and Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online
- Hurtt, B.C. and Bekoff, A. 2001. The role of sensory input in modulating rhythmic, coordinated behaviors in chicks: EMG-kinematic synchronization. Society for Neuroscience Abstracts 27:315

- Hurtt, B.C., Bekoff, A and Krieger, J. (2000) Effects of removal of leg weights on walking motor patterns in chicks. **Soc. Neurosci. Abstr.** 26: 2216.
- Bekoff, A., Sharp, A.A., Koster, M., Tahja, S. (2000) Embryonic motility of cultured chicks. **Soc. Neurosci. Abstr.** 26: 454.
- Jansiewicz, J., Sharp, A.A., Bekoff, A. and Woollacott, M.H. (1999) Effects of sensory neuropathy induced by pyridoxine (Vitamin B6) injection on chick postural balance. **Posture and Gait** 9 (suppl.1): S5.
- Sharp, A.A., Jansiewicz, J., Woollacott, M.H. and Bekoff, A. (1999) Pre-hatch injection of pyridoxine (vitamin B6) alters post-hatch walking in chicks. **Posture and Gait** 9 (suppl. 1): S5.
- Sharp, A.A. and Bekoff, A. (1999). High doses of pyridoxine administered during embryogenesis alter embryonic motility and walking in chicks. **Posture and Gait** 9 (suppl. 1): S16.
- Bekoff, A., Hurtt, B.C. and Ryan, J.L. (1999) Effect of adding leg weights on walking motor patterns in chicks. **Soc. Neurosci. Abstr.** 25: 1905.
- Jasiewicz, J.M., Sharp, A.A., Woollacott, M.H. and Bekoff, A. (1999) Pre-hatch injection of pyridoxine (vitamin B6) causes postural instability in post-hatch chicks. **Soc. Neurosci. Abstr.** 25: 2182.
- Cornwall, G.J., Spencer, R.L. and A. Bekoff. (1998) Fetal corticosterone appears to be involved in the initiation of hatching in the domestic chicken. **Soc. Neurosci. Abstr.** 24: 118.
- Edmiston, A.S., Gallagher, A., Fisher, S. and A. Bekoff. (1998) Preventing domestic chicks from hatching: A kinematic analysis of effects on post-embryonic walking. **Abstr. Int. Neuroethol. Congr.** p.274.
- Hurtt, B.C. and A. Bekoff. (1998) The effects of varying sensory input on swimming motor behavior in chicks. **Soc. Neurosci. Abstr.** 24: 1890.
- Sharp, A.A., Boyle, C.A. and A. Bekoff. (1998) Pyridoxine induced proprioceptive neuronal loss during embryogenesis alters both embryonic and post-hatch motility. **Soc. Neurosci. Abstr.** 24: 1666.
- Sharp, A.A., Boyle, C.A. and A. Bekoff. (1998) The role of proprioception during the ontogeny of embryonic and post-hatch motility in chick. **Abstr. Int. Neuroethol. Congr.** p. 273.
- Jansiewicz, J. M.H. Woolacott, N. Kato, A. Bekoff and B. Hurtt (1997) Chick posture control: An electromyographic analysis. **International Symposium on Posture and Gait.** Paris, France
- Bekoff, A and C. Fust. (1997) Effect of removing weight support on development of walking in chicks. **Soc. Neurosci. Abstr.** 23: 636.
- Sharp, A.A., E. Ma and A. Bekoff. (1997) Kinematic analysis of embryonic motility in 11-day chick embryos. **Soc. Neurosci. Abstr.** 23: 636.
- Edmiston, A.S., T.D. Hernandez, and A. Bekoff. (1997) What is the role of neck muscles (complexus and spinalis cervicus) in hatching of domestic chicks. **Soc. Neurosci. Abstr.** 23: 2136.
- Hurtt, B. C., J. L. Ryan, G.R. Lynch and A. Bekoff. (1997) Effect of loading on extension vs flexion during swimming and walking in chicks. **Soc. Neurosci. Abstr.** 23: 762.
- Bekoff, A., Hurtt, B. C. and J. R. Ryan. (1996) Effect of increasing resistance on motor patterns during swimming in chicks. **Soc. Neurosci. Abstr.** 22: 1641.
- Sharp, A.A. and A. Bekoff. (1996) Effect of sensory input during rhythmic embryonic motility.

- Soc. Neurosci. Abstr.** 22: 1641.
- Johnston, R.M. and A. Bekoff (1992) Flexible motor patterns in chicks. **Int. Congress Neuroethol.** 3: 310.
- Bekoff, A. and D.L. Nicholl (1992) Timing vs. pattern in cyclic motor patterns in chicks. **Soc. Neurosci. Abstr.** 18: 1278.
- Johnston, R.M. and A. Bekoff (1992) Flexible motor patterns in chicks: bi- and triphasic elements. **Soc. Neurosci. Abstr.** 18: 1278.
- Johnston, R.M., S.M. Woolley, M.B. Smith and A. Bekoff (1991) Discriminating among rhythmical behaviors in chicks. **Soc. Neurosci. Abstr.** 17: 1576.
- Bekoff, A. (1990) Analyses of multiple motor patterns in chicks. **Soc. Neurosci. Abstr.** 16: 1091.
- Smith, M.B. and A. Bekoff (1990) Proprioceptive modulation of head scratching in chicks. **Soc. Neurosci. Abstr.** 16: 118.
- Woolley, S.M., N.S. Bradley and A. Bekoff (1990) An EMG study comparing foot shaking and walking in chicks. **Soc. Neurosci. Abstr.** 16: 118.

Symposia Organized

- 1998 International Society for Neuroethology, Neuronal Development and the Emergence of Behavior (co-organizer with A. Mercer)
- 1997 Gordon Conference on Neural Plasticity, Neural Plasticity, Henniker, NH
- 1989 International Society for Neuroethology, The development of behavior: neuroethological approaches. West Berlin, Germany.

Symposium Presentations (Career Total = 26)

- 2002 Embryonic Administration of Pyridoxine Selectively Kills trkC Immunoreactive Neurons in the DRG of Chicks. Butcher Symposium on Genomics and Biotechnology (Bekoff, A., A.Sharp, et al.) Boulder, CO
- 2002 Effects of embryonic pyridoxine administration in chick: selective removal of proprioceptive sensory neurons. Short Communication in Viktor Hamburger Symposium I-Ontogeny of the Motor System: from Neurogenesis to behaviour. (Sharp, A.A. and Bekoff, A.) Orlando FL
- 2002 Development of behaviour in the chick embryo. Invited talk in Viktor Hamburger Symposium I-Ontogeny of the Motor System: from Neurogenesis to behaviour. Orlando FL
- 2002 Motor control mechanisms in the chick. Invited talk. In Spinal Cord and Head Injury Research Symposium, Lexington, KY
- 2001 Ontogeny of chick motor behavior. Invited symposium talk in Mechanisms of Patter-Generating Brain Networks: From Egg to Action. American Speech, Hearing and Language Association Annual Meeting, New Orleans, LA
- 2000 Modulation of motor patterns in developing chicks. Satellite symposium on Motor Control associated with Neural Control of Movement meetings. Key West, FL.
- 2000 Plasticity in chick motor patterns: Role of sensory modulation. Rocky Mountain Region Neuroscience Group Symposium on Plasticity. Health Sciences

- Center, University of Colorado, Denver CO
- 1998 Development of motor patterns in avian embryos, Symposium on Developmental and Ecological Perspectives on Growth and Differentiation of Avian Embryos, International Ornithological Congress, Durban, South Africa (talk read by R. Ricklefs)
 - 1998 Emergence of behaviors in developing chicks, Symposium on Neuronal Development and the Emergence of Behavior (co-organizer with A. Mercer), International Neuroethological Congress, San Diego, CA
 - 1997 Role of sensory experience during development of motor behaviors in chicks, Symposium on Model Systems in Neuroethology, Midwest Nerve Net Meetings, Minneapolis, MN
 - 1997 Introduction, Gordon Conference on Circuit Plasticity, session chair for Neural Plasticity, Henniker, NH
 - 1994 Continuity and discontinuity in the development of motor behaviors in chick embryos. Symposium talk at Fourth International Congress of Vertebrate Morphology, Chicago, Illinois
 - 1993 Development of motor patterns in chick embryos and newly hatched chickens: continuities and transitions. Workshop on Dynamical control of stability and flexibility in the nervous system, Santa Fe Institute, Santa Fe, New Mexico
 - 1992 Panel on Mechanisms of action in multifunctional circuits; Invited participant. Winter Conference on Brain Research. Steamboat Springs, Colorado
 - 1992 Ontogeny of muscle activation patterns in embryos: Conservation, modulation and function. Symposium on Development of skeletal muscle function at American Association of Anatomists meeting. New York, New York
 - 1992 Development of locomotion: Patterns and trends. Overview talk for session on Development at XIth International Symposium on Posture and Gait. Portland, Oregon
 - 1992 Development of motor behavior in chick embryos. Conference on Fetal Development: A Psychobiological Perspective, Paris, France
 - 1991 Workshop on Stereotypic limb actions: ontogeny, central circuits and modulation; Invited participant. Conference on Neural Control of Movement, Marco Island, Florida.
 - 1991 Embryonic motor patterns in chicks: relationship to later behaviors. Invited plenary speaker for North American Society for the Psychology of Sport and Physical Activity (NASPSPA) convention. Asilomar, California.
 - 1990 Organization of motor development in chicks. Workshop on Cognitive Neuroscience of Development, Institute of Cognitive and Decision Sciences, University of Oregon, Eugene.

Institutional Presentations (Career Total = 20)

- 2013 Individual Letters of Recommendation and Committee Letters, CREATE Faculty PreHealth Advisors' Meeting, June, Aschutz campus
- 2010 Instilling Professionalism in Communication for Prehealth students, NAAHP poster session, Chicago.
- 2004 IT Resources for Perhealth Advising, Advisors' Fair presentation, NAAHP meeting.

- 2000 Enter egg, exit chicken: Neural basis for the development of motor behaviors in chicks. Biology Department, University of Northern Colorado, Greeley, CO
- 1999 Neuroethological studies of hatching in chicks. Department of Biology, University of Colorado, Denver, CO.
- 1999 Neural and endocrine control of hatching. Department of Biology. Denver University, Denver, CO.
- 1996 Development of motor behavior in chick embryos. Kinesiology Department, University of Colorado, Boulder
- 1996 Development of coordinated behaviors in chick embryos. Developmental Psychobiology Research Group, University of Colorado Health Sciences Center
- 1995 Development of coordinated motor behavior in chick embryos. Duke University, Durham, NC
- 1997 Speaker in Boulder Campus Phi Beta Kappa Symposium on the Cloning of Dolly
- 1992 Development of motor patterns in chicks: evidence for multifunctional pattern generating circuitry. Neurobiology Research Center, University of Alabama, Birmingham.
- 1991 Development of chick motor behaviors: modulation of a basic pattern? University of Indiana, Bloomington.
- 1991 Development of embryonic motor patterns. Developmental Psychobiology Group, Health Sciences Center, Denver, Colorado.

Graduate and Postdoctoral Advisors

- William J. Betz, 1975-1976, Department of Physiology, University of Colorado Health Sciences Center
- Paul S.G. Stein, 1970-1974, Department of Biology, Washington University, St. Louis MO
- Viktor Hamburger, 1970-1974, Department of Biology, Washington University, St. Louis MO

Academic Departmental Service

- IPHY Inclusive Excellence Committee, chair, 2016
- EPO Biology Executive Committee, 1989-1990; 1991-1992, 1995-1996, 1998-1999; 1999-2000
- EPO Biology Associate Chair for Undergraduate Studies, 1999-2000
- EPO Biology Graduate Committee, 1993-1995
- EPO Biology Self Study Committee, chair, 1996-1997
- EPO Biology Undergraduate Curriculum Committee, 1997-1998
- EPOB Biomedical Research Support Grant Committee, 1991

Graduate Committees (Career total = 78; missing data from 1989; 1992; 1993)

- Graham Cummins, Ph.D., 1998-2001, EPOB
- Elena Lopez, M.A., 2000-2008, EPOB
- John Gill, Ph.D., 2000-2005, EPOB

Jason Cavolino, Ph.D., 1998-2000, EPOB
 Shuvo Alam, M.A., 1998-2000, EPOB
 Barbekka Hurtt, Ph.D., 1997-2002, EPOB
 Jennifer Curtis, Ph.D., 1997, MCDB
 John Foskett, Ph.D., 1997-1999, EPOB
 Bob Hermanson, Ph.D., 1997-1999, EPOB
 Jan Jansiewicz, Ph.D., 1997-1999, University of Oregon
 Christy Carello, Ph.D., 1996-1999, EPOB
 Georgina Cornwall, Ph.D., 1996-2000, EPOB
 Amanda Edmiston, 1995-2000, EPOB
 Tim Carl, Ph.D., 1995-2000, EPOB
 Maya Entschwiller, Ph.D., 1995-1996, EPOB
 Charles A. Ferguson, Ph.D. 1994-1997.(co-advisor Gerald Audesirk, University of
 Colorado, Denver)
 Tammy Maldonado, M.A., 1994-2000, EPOB
 Ruth Graun, Ph.D., 1994-1998, Psych
 Greta Rosen, Ph.D., 1994-1998, EPOB
 Lisa Maas, Ph.D., 1994-1995, Psych
 Anne Bertholas, Ph.D., 1994, MCDB
 Lorraine Sutton, Ph.D., 1994-1995, Psych
 Stephanie J. Gates, M.B.S. 1993-1996, EPOB
 David Shook, Ph.D., 1993-1995, EPOB
 Cynthia Church, Ph.D. 1988-1991
 Erica Wagner, Ph.D. 1991-1995 , EPOB
 David Jennings, Ph.D., 1991-1996, EPOB
 Marcia B. Smith, Ph.D. 1990-1997, EPOB
 Dan Seufert, Ph.D., 1990-1994, EPOB
 Maura Carew, Ph.D., 1990 PSYCH
 Joe Simmons, Ph.D. 1989-1990, CHEM
 Jeryl Hassel, M.A., 1988-1991, EPOB
 Rebecca M. Johnston, Ph.D., 1987-1992, EPOB
 Mark Foreman, Ph.D., 1986-1991, EPOB
 Margaret Dussault, Ph.D., 1985-1990, EPOB

College Service

- 2014 The New MCAT, Associate Deans and Directors Meeting, with Penny Bennett, November
- 2012 Medical School and Science Curriculum: The New MCAT, STEM Education Research Group Meeting, January

Program Development:

Committee Letter Process, 2003-2015

Established Medical Scholars Program, 2005-present, a cooperative initiative among all three CU undergraduate campuses and the CU Medical School. This is an 'early assurance' program for 5-6 sophomores each year. Scholars are assured that they will be accepted to

CU Medical School when they graduate as long as they meet the continued requirements of the program.

Workshop series established, 2003-2015- Essay Writing, Interview Strategies, MCAT Preparation, Application

Committees:

Prelaw Advisor Search, 2012

Prehealth Advisor Search Committees, 2002, 2004, 2007, 2011, 2012

Prehealth Advisory Committee, chair, 2002-2015

Faculty Fellow, Baker Hall, 2003-2004

Faculty Advisory Board, Biological Sciences Initiative, 2003-2010

PreVet Club advisor, 2002-2008

Neuroscience Steering Committee 1999- 2000

Prehealth Advising, Head, 1999-2015

Participated in Area Teaching Scholars Program for the Natural Sciences panel on Classroom teaching and FCQs for new science professors, organized by John Cary, 1999

Head, Section of Integrative Physiology and Neurobiology, EPO Biology Dept., 1998-1999

Women's Advisory Team, 1998-2000

Admissions Office, hosted prespective students in class and participated in telephone calling program to contact highly qualified applicants, 1998

Advisory Committee for Academic Media Center film/video library, 1997-2008

Faculty Associate for Vice Chancellor for Academic Affairs, 1996

Internal Review Team member, evaluation of Psychology, 1996-1997

Search Committee, Associate Vice Chancellor for Academic Affairs, 1996

Search Committee for Associate Vice Chancellor for Undergraduate Education, 1996

Internal Review Team member, evaluation of IBG, 1994-1995

Pre-Veterinary Medicine Advisor for Boulder campus, 1993-1998

Tenure Committee for David Sherwood, Kinesiology, 1991-1992

Search Committee for Exercise Physiology, Kinesiology, 1991-1992

Kinesiology Search Committee for Biomechanics position, 1990

University Service (outside of Preprofessional Advising)

Elizabeth Gee Awards Committee, 9/94-6/96

President's Academic Advisory Committee, 9/90-6/91

Community Service (outside of Preprofessional Advising)

Science Discovery Program, Boulder campus, programs to demonstrate chick embryo development to children, 1990-2000

University Museum, Boulder campus, provided eggs and chicks for "Egg Day," 1990

Taught half-day session of summer course in Physiology for high school teachers, supported by Hughes Foundation, 1996

Mentor to high school student Amy BelCastro, completed IB project on chick imprinting, fall 1999

Teaching (recent)

IPHY 3430, Human Physiology for non-majors, Spring 2016

Applied Clinical Research course. IPHY 3500, Organize this course, which has been taught by faculty at Denver Health, 2005-2012. Requires working with clinical faculty at UCHSC, completing Affiliation Agreements with Denver Health, University of Colorado Hospital and The Children's Hospital and maintaining procedures for criminal background checks required by hospitals.

Graduate Students Trained and Current Positions

Barbekka Hurtt, Ph.D., 2002, Teaching Assistant Professor, Biological Sciences, University of Denver
Amanda Edmiston, Ph.D. 2000, Online Credit Program, University of Colorado, Boulder
Georgina Cornwall, Ph.D., 2000, unknown
Cynthia Church (co-advisor), Ph.D., 1997, unknown
Stephanie Gates-Bjerke, M.B.S., 1996, Douglas County schools
Marcia B. Smith, Ph.D., 1992, Professor, Physical Therapy Dept., Regis University
Charles A. Ferguson (co-advisor), Ph.D., 1992, Associate Professor, Biology Department, University of Colorado, Denver
Rebecca Johnston, Ph.D., 1988, Friday Harbor Labs (resigned tenure track position at Colby College for health reasons)
Tangi Anderson Summers, M.A., 1988, Research Associate, University of South Dakota
Sandra Watson, M.A., 1987, Physician, London, England
William Ervin, M.A., 1981, Artist, Boulder

Undergraduate Students Trained (Career total = 73; 14 honors; missing data from 1989; 1992, 1993)

Charles Gerck, 2000-2001, Honors, summa cum laude, URAP, UROP; University of Colorado Medical School
Morgan Ruskay, 1997-1999, Honors, magna cum laude, SURF, UROP; University of Colorado Physician Assistant Program
Edna Ma, 1996-1998, Honors, magna cum laude, URAP, SMART; University of Colorado Medical School
Jaime Ryan, 1995-1997, Honors, magna cum laude, UROP, SURF; University of Colorado Medical School
Julie Young, 1995-1996, Honors, magna cum laude; St. Louis University Medical School
Laura Reed, 1994-1996, Honors, cum laude
Thomas Li, 1994-1996, Honors, cum laude; University of Colorado Medical School
Christine Fust 1994-1997, Honors, magna cum laude, SURF '1996, Van Ek Award, 1996; Western College of Osteopathic Medicine
Laura Caton 1994 (co-advisor for honors work with Al Collins in IBG), summa cum laude, Medical School
Sarah M. Woolley, 1988-1991 Honors project, magna cum laude, University of Washington, Ph.D., 1997; Associate Professor and Psychology Dept Chair, Columbia University
Heather Irmiger, 1999-2000, URAP; professional mountain bike racer, national and world champion

Rebecca Prull, 1999-2000, URAP; CSU Veterinary Medical School
Tiffany Klein, 1998-1999, URAP; Medical School
Michael Koster, 1998-1999, UROP
Elizabeth White, 1998-1999, UROP, Independent Research
Chelsea Boyle, 1998-2000, UROP, SURF, Independent Research
Rana Abdul-Khalek, 1997-1998, UROP, Independent Research
Michael Graves, 1997-1998, SURF, Independent Research
Sandra Herrera, 1991-1994, UROP
Jennifer Paananen 1990 UROP
Blue Bradley, 1990-1991 UROP

Daran Schiller, 2016, Independent Research
Jaime Walford, 1999-2000, Independent Research
Brenna Davis, 1999, Independent Research
Diana Hoover, 1999, Independent Research
Mary Drago, 1998-1999, Independent Research
Kristin Williford, 1997, Independent Research
Erica Deam, 1997, Independent Research
Anne Gallagher, 1997-1998, Independent Research
Shannon Fisher, 1997, Independent Research
Nicole Archuleta, 1996-1998, Independent Research
Georgina Cornwall, 1995, Independent Research
Barbekka Hurtt 1994-1995, Independent Research
Cory Preisser 1994, Independent Research
Jason DeLong 1994 Independent Research
Thomas Richman 1994, (co-advised Dr. A. Repka) Independent Research
Steven Ainbinder 1991, Independent Research
Brian Collins 1990 (MCDB), Independent Research
Susan Storch 1990-1991, Independent Research

Kevin Kang, 2015, Internship
Kristen Gacek, 1997, Internship
Rita Hamilton, 1997, Internship