Curriculum Vitae

**Jon Fewell Harrison**

School of Life Sciences

Arizona State University

Tempe, AZ 85287-4501

[j.harrison@asu.edu](mailto:j.harrison@asu.edu)

**Education**

1982-1987 Ph.D. Environmental, Population and Organismal Biology

University of Colorado, Boulder

Thesis Advisor: Dr. Todd T. Gleeson

1978 University of Pittsburgh, School of Medicine: Medicine

1976-1978 B.S. Biology

University of Toronto

1973-1975 Biology

University of Virginia

**Major Research Interests**

Respiratory physiology: evolution and mechanisms

Metabolic and nutritional physiology: evolution and mechanisms

Effects of body size (scaling): evolution and mechanisms

Social insect physiology and behavior

Effects of environmental change on coupled human and natural systems, including climate, agricultural practices, urbanization and environmental toxicology

**Professional experience**

**Arizona State University**

2012 - 2013 Assistant Vice-President, Research Infrastructure & Facilities

Office of Knowledge Enterprise Development

2010 - 2013 Director of Research Infrastructure & Facilities

Office of Knowledge Enterprise Development

2011-2013 University Research Integrity Officer

Arizona State University

2011-2013 Institutional Official for Animal Care

Arizona State University

2005 - 2009 Associate Director of Facilities

School of Life Sciences

2002 - Present Professor

School of Life Sciences

1997 - 2002 Associate Professor

Department of Biology

1991 – 1997 Assistant Professor

Department of Zoology

**University of British Columbia**

1988-1990 Postdoctoral Fellow, Department of Zoology

Postdoctoral supervisor: Dr. John E. Phillips

**Memberships in scientific societies**

American Association for Advancement of Science

American Physiological Society

Entomological Society of America

Genetics Society of America

International Union for the Study of Social Insects

Society for Integrative and Comparative Biology

**Honors**

2018 Nominated for Zebulon Pearce Distinguished Teaching Award, College of Liberal Arts and Sciences Teaching Award

Elected, President, Arizona Physiological Society

2017 Kjell Johansen Lecture 2017, Aarhus, Denmark.

2016 August Krogh Plenary Lecture, American Physiological Society

2015 ASU Faculty Women’s Association Mentor Award

2010 ASU Parent’s Professor of the Year: Special Recognition

2010 ASU Graduate Mentor of the Year

2009 Selected member of Faculty of 1000 in Biology

(Physiological Ecology)

2005 Elected Fellow of the American Association for the

Advancement of Science

2005 Nominated for “Last Lecture Series” for outstanding teaching by

ASU students (Co-Curricular Programs)

2002 Nominated for Dean’s Distinguished Teaching Award

College of Liberal Arts and Sciences, Arizona State University

1998 Nominated for Outstanding Advising Award

College of Liberal Arts and Sciences, Arizona State University

1990 The Scholander Award (Best paper by a young investigator)

American Physiological Society, Orlando, FL

1989-90 Izaak Walton Killam Postdoctoral Fellowship

1988-89 National Science Foundation (NATO) Postdoctoral Fellowship

**National/International Scientific Offices & Services**

Member, USDA NIFA Competitive Grants Award Panel Fall, 2019

Editorial Board Committee member, Annual Review of Entomology (2019-23)

President, Arizona Physiological Society (2018-19)

Co-organizer (with Leslie Buck) symposium on Comparative Insights into Animal Responses to Hypoxia and Anoxia” American Physiological Society Intersociety Meeting in Comparative Physiology (held October, 2018, New Orleans).

Steering Committee Member/Convener, XXV International Congress of Entomology (2016)

Steering Committee Member, APS International Congress in Comparative

Physiology (2014)

Co-Organizer (with Kendra Greenlee) American Society for Physiology symposium at Experimental Biology, Boston, 2015 on “Effect of Changing Climate on Insect Respiration”

Co-Organizer (with Sherry Tamone) Society for Integrative and Comparative Biology 2015 symposium and workshop on “Physiology of the Pancrustaceae”

Organizer - XXIV International Congress of Entomology Symposium:

“Mechanisms of regulation of growth rate, size and shape in insects”

Daegu, Korea, 2012

Program Officer - Society for Integrative and Comparative Biology:

2011-2013

Organizer and Leader - NSF-Funded Workshops:

“Variable Atmosphere Laboratory (VAL) for Climate Change Research”

February, 2008 and August, 2009

Leader - Collaborative Development Team, Advanced X-ray Imaging Facility:

Argonne National Labs

2008-2010

Chair, Organizing Committee - American Physiological Society Intersociety

Meeting: Comparative and Evolutionary Physiology

2007-2010

Associate Editor - Physiological and Biochemical Zoology

2007 – Present

Chair - Scholander Award Selection Committee:

American Physiological Society

2006

Program Officer - Comparative and Evolutionary Physiology

American Physiological Society

2006-2009

Organizing Committee - International Congress in Comparative Physiology

American Physiological Society

2004-2005

Panel Member - Integrative Animal Biology

National Science Foundation

2005

Co-Organizer (with S. Hetz & T. Bradley) - International Congress in Entomology

Symposium “O2 uptake, H2O loss and oxygen radical production: finding balance”

Brisbane, Australia, 2004

Co-Organizer (with R. Sterner) - Society for Integrative and Comparative Biology

Cross-Society Symposium “Integrated research challenges: Biological stoichiometry

from genes to ecosystems”

Toronto, 2003

Panel Member - Environmental and Evolutionary Physiology

National Science Foundation,

2000, 2005

Program Officer - Division of Comparative Physiology and Biochemistry

Society for Integrative and Comparative Biology

2000-2003

Editorial Board - Physiological and Biochemical Zoology

1999-2007

Best Student Paper Judge - Division of Comparative Physiology and Biochemistry

Society for Integrative and Comparative Biology

Chicago, 2000

Scholander Award Competition Judge - Division of Comparative Physiology

American Physiological Society

San Diego, 2000

Organizer - 21st International Entomological Congress Symposium “Spiracular

mechanisms: ultrastructure and physiology”

Brazil, 2000

Biology symposium "Responses of terrestrial invertebrates to variation in

temperature and water availability: molecular, organismal, and evolutionary

approaches"

Albuquerque, 1996

Guest-Editor - *Physiological Zoology*, volume 67

Symposium "Respiratory and ionic aspects of insect acid-base regulation"

1994

Co-Organizer (with J. E. Phillips) - American Society of Zoologists symposium

"Insect Acid-Base Regulation"

Vancouver, 1992

Nominating Committee - Division of Comparative Physiology and Biochemistry

American Society of Zoologists

1990-91

**Reviewer For**

Human Frontiers Science Program

National Science Foundation

National Institute of Health

NSERC

Israeli Academy of Sciences

South African Academy of Sciences

South African Science Foundation

Acta Mechanica

Aging Cell

American Journal of Physiology

American Naturalist

Arthropod Structure & Development

Behavioral Ecology and Sociobiology

Bioletters

Bioscience

Canadian Entomologist

Comparative Biochemistry & Physiology

Current Biology

Developmental Biology

Ecology

Ecology and Evolution

Ecosphere

Environmental Monitoring & Assessment

Evolution

Experientia

Functional Ecology

Geobiology

Heredity

Insectes Sociaux

Journal of Applied Physiology

Journal of Comparative Physiology

Journal of Experimental Biology

Journal of Experimental Zoology

Journal of Evolutionary Biology

Journal of Insect Behavior

Journal of Insect Physiology

Journal of Heredity

Insect Molecular Biology

Insectes Sociaux

International Journal of Insect Morphology

Integrative and Comparative Biology

Metabolomics

Nature

Naturwissenshaften

Physiological and Biochemical Zoology

Oecologica

PLOS Biology

PLOS Genetics

PLOS One

Proceedings of the National Academy of Sciences USA

Proceedings of the Royal Society of London B

Respiratory Biology and Neurobiology

Science

Scientific Reports

Trends in Ecology and Evolution

**Grants and Awards** ($13.5M total**)**

2019-2020 Defense Advance Research Projects Agency (DARPA).

Energy-efficient neuromorphic computing in light of the structural and functional evolution of multiscale insect brains. PI: Brian Smith, Co-PI’s: Ted Pavlic, Kevin Cao, Maxim Bazhenov. Phase I and II: $1,000,000.

2018-2020 National Science Foundation.

Testing macronutrient imbalance as a key factor limiting range expansion in herbivores. Co-PI: Arianne Cease. IOS-1826848. $120,000

2017-20120 USDA. Evaluation of the dose-response of honey bees to carboximide and strobilurine fungicides: from cellular mechanism to integrated management. USDA 2017-68004-26322. Co-PI’s: Jennifer Fewell, Brian Smith, Osman Kaftangolu, Gloria DeGrandi-Hoffman. $932,284.

2016-19 National Science Foundation.

Social scaling: allometry of work and metabolism in ant colonies. Co-I’s: Jennifer H. Fewell and Y. Kang. NSF IOS 1558127. $500,000

2016-19 National Science Foundation

The mechanical linkage of respiration, circulation and digestion in beetles. Co-I’s: John Jake Socha and Laura Miller. NSF IOS 1558052. Total budget: $910,00, ASU budget $287,146.

2015 National Science Foundation award to the Society for Integrative and Comparative Biology. PIs: Jon Harrison and Sherry Tamone. Breaking Boundaries for Evolutionary Synthesis: An Interactive and Integrative Symposium Linking Crustacean and Insect Physiology- West Palm Beach, Florida; January, 2015. NSF IOS 1507854. $9,900.

2013-2015 HHS-NIH-NIGMS Integrating physiological and genetic mechanisms of body size regulation. Postdoc fellowship to Dr. Viviane Callier. $98,418 (declined)

2013-2017 National Science Foundation

SEES Fellowship: Living with locusts. Postdoc fellowship to Dr. Arianne Cease. $339,921

2013-2018 National Science Foundation

CNH: Living with locusts: linking livestock markets and grazing practices with the nutritional ecology of grasses and locusts under alternative property rights regimes. Co-I’s: Arianne Cease, James Elser, Eli Fenechel, Brian Robinson, Joleen Hadrich

NSF DEB 13033608 - $955,569

2013-2017 National Science Foundation

Collaborative research: Is hypoxia a critical cue for molting? Co-I: Alexander Shingleton

NSF IOS 1256745 and 1446302 - $554,991

2012-2013 National Science Foundation

Research Experiences for Undergraduates

Supplement to IOS 1122157 - $5,750

2012-2013 National Science Foundation

Research Experiences for Teachers

Supplement to IOS 1122157 - $6,125

2012-2013 National Science Foundation

Research Experiences for High School Students

Supplement to IOS 1122157 - $18,150

2011-2014 National Science Foundation

Structural and functional scaling of the respiratory system of flying

Beetles; IOS 1122157 - $625,308

2011-2012 National Science Foundation

Dissertation Research: Metabolic and behavioral integration in social insect colonies. James S. Waters and Jon F. Harrison.

IOS 1110796 - $14,078

2010-2012 National Science Foundation

International DDEP: Grasshopper migration in the Asian steppe:

Investigating diet as a cue for developmental polyphenism.

Arianne J. Cease, James J. Elser and Jon F. Harrison.

OISE 1026182 - $14,988

2010-2014 National Science Foundation

EFRI BSBA: Complex microsystem networks inspired by internal

insect physiology NSF 0938047 - $1,992,607 Jake Socha (VA Tech)

Jon Harrison (ASU) portion of budget: $390,51

2009-2010 National Science Foundation

Workshop: Variable Atmosphere Laboratory 2

IOS-0929344 - $28,840

2008-2010 NASA Cooperative Agreement

Improved prediction of Africanized honeybee abundance,

distribution, and migration in the US and honeybee climate

responses using satellite-derived land-cover type phonological data

NNX08AO88G - $87,737

2007-2008 National Science Foundation

Workshop to evaluate and design a variable atmosphere laboratory

IOS 0748882 - $13,076

2009-2011 National Science Foundation

REU supplement to NSF

EAR 0746352 - $30,000

2008-2011 National Science Foundation

Atmospheric oxygen effects on the body size of fossil modern

insects

EAR 0746352 - $500,000

2006-2011 DARPA

Synthetic vertebral implant for cyborg insects

(Subcontract from University of Michigan)

DOD 3000654843 - $295,133

2004-2009 National Science Foundation

Atmospheric oxygen effects on insect body size and tracheal

function

IBN 0419704 -$633,725

2003-2004 National Science Foundation

Research Experience for Undergraduates

Supplement to IBN 0419704 - $14,000

2002 Deutscher Akademischer Austausch Dient

Humbold Universität

$5,000

2002-2004 Doctoral Dissertation Improvement Grant

Kendra Greenlee and Jon F. Harrison

Effects of body size and development on gas exchange,

IBN-0206678 - $9,951.

2001-2003 Beckman Scholars Program, Beckman Foundation

(this award funds undergraduate research in Biology, Chemistry &

Biochemistry at ASU)

$106,500

2001-2003 National Science Foundation

Doctoral Dissertation Improvement Grant

Scott Kirkton and Jon F. Harrison

Mechanisms and significance of ontogenetic changes in respiratory

function during insect locomotion

IBN-0104959 - $10,000

2001-2005 National Science Foundation

Genotypic and phenotypic variation in foraging behavior of African

and European honey bees, Co-PI: J.H. Fewell

IBN 0093410 - $435,000,

2001 National Science Foundation

Research Experience for Undergraduates

Supplement to IBN 9985857 - $10,000

2000-2004 National Science Foundation

Body size and tracheal function

IBN 9985857 - $405,000

1999-2003 National Science Foundation

IRCEB Biological stoichiometry from genes to ecosystems

ASU Co-PIs: J.J. Elser, W.F. Fagan

DEB 9977047 - $2,842,162.

1998-2000 National Science Foundation

Integrative Animal Biology panel: “Body size and tracheal function

in insects”

IBN 9728444 - $150,000

1999 Arizona State University CLAS Travel Award

Travel to International Union of Social Insects Meeting

Adelaide, Australia - $900

1998-1999 National Science Foundation

Research Experience for Undergraduates

Supplement to IBN 9728444 - $20,000

1994-1998 National Science Foundation

Research Experience for Undergraduates

Supplement to IBN 9317784 - $35,325

1997 - 99 United States Dept of Agriculture Competitive Research Award

“Mechanisms of colony growth and reproduction in African and

European honey bees”

Co-PI: Jennifer H. Fewell

97-35302-4395 - $95,000

1996 National Science Foundation Symposium Funding:

"Responses of terrestrial invertebrates to variation in temperature

and water availability: molecular, organismal, and evolutionary

approaches"

Albuquerque, New Mexico - $5,985

1994-98 National Science Foundation

Integrative Animal Biology panel: Insect acid-base regulation

IBN 9317784 - $304,000

1995-97 National Science Foundation

Dissertation Improvement Grant

Stephen P. Roberts and Jon F. Harrison

IBN-9521543 - $9,960

1991-94 National Science Foundation

Physiological Processes panel: Insect acid-base regulation

DCB-9020284 - $180,519

1994 Arizona State University CLAS Travel Award

International Union of Social Insects meeting

Paris, France - $500

1992-1993 National Science Foundation

Research Experience for Undergraduates

Supplement to DCB-9020284 - $8,000

1992 Arizona State University Faculty Grant-in-Aid

Genetic variation in the metabolic capacity of African, European

and hybrid honey bees - $5,350

1992 National Science Foundation Symposium Support

"Respiratory and ionic aspects of acid-base regulation in insects

Vancouver, British Columbia" - $6,000

1992 National Science Foundation

Analytical Laboratory for Research in Environmental Biology

with N.B. Grimm, J.J. Elser, J.H. Fewell, S.G. Fisher, T.M. Markow,

M.C. Moore, G. Walsberg:

$170,000

**Invited Lectures and symposia presentations (86 total)**

2019 Penn State, Department of Entomology. Challenges in assessing and interpreting insect responses to environmental stress

2018 Barrett College-School of Mathematical and Natural Sciences, Arizona State University West Colloquia: Why are insects small? Aka Why can’t Mothra eat Glendale?

Hamilton College workshop on the Scaling of Defenses. Why does aerobic metabolic rate scale hypometrically?

International Union for the Study of Social Insects symposium on Social Insect Ecophysiology: Effects of body size and air temperature on the flight physiology of stingless bees.

Roy Weber symposium, Sandbjerg, Denmark. Why does aerobic metabolic rate scale hypometrically?

2017 Colloquia: Fakultät für Mathematik, Informatik und Naturwissenschaften, Universität Hamburg. “Do performance-safety trade-offs cause hypometric scaling of metabolic rate?”

Kjell Johansen Lecture, Aarhus University, Aarhus, Denmark. “Comparative physiology of insect tracheal systems”

2016 Spirit of the Hive Symposium, Tempe, AZ. Invited speaker. “Size-biased adaptations of ATP demand, not supply, cause hypometric scaling of energy use in metazoans”

International Congress of Entomology, Orlando, FL. Invited speaker for symposium on “The Limits of Respiratory Function: External and Internal Constraints on the Insect Gas Exchange”

The Krogh Lecture (Plenary). Experimental Biology, San Diego, CA.

2015 Society for Integrative and Comparative Biology, West Palm Beach, FL.

Invited speaker for symposium “Breaking boundaries for evolutionary synthesis: An interactive and integrative symposium linking crustacean and insect physiology”

Colloquia: Dept. of Zoology, Univ. of British Columbia

Colloquia: US Arid Lands Agricultural Research Center, Maricopa, AZ

Colloquia: Max Planck Institute for Biology of Aging, Cologne, Germany

2014 The International Union for the Study of Social Insects: International Congress, Cairns, Australia.

Invited speaker for symposium on “Integrative Analyses of Division of Labor”

Colloquia: Institute of Zoology, Chinese Academy of Sciences, Beijing

Invited symposium speaker, Dept. of Biology, Langzhou University, China

Colloquia: School of Mathematical and Natural Sciences, ASU West

2013 Colloquia: Midwestern University, Dept. of Physiology

Invited speaker: Arizona Physiological Society

Colloquia: Texas A&M University, Dept. of Entomology

2012 Entomological Society of America, Knoxville, TN

Invited speaker for symposium “Global patterns of insect morphometrics”

Entomological Society of America. Knoxville, TN. Invited speaker for symposium on “Foraging, energetics and life history-the grand connection”

International Congress of Entomology, Daegu, Korea

Invited speaker for symposium “Mechanisms of regulation of growth, size and shape in insects”

Colloquia: Dept. of Engineering Science, Virginia Tech

2011 International Hypoxia Symposium, Lake Louise, Canada.

Invited speaker

Cornell University, Patton Lecture

Colloquia: Colorado State University, Department of Biology

2010 Colloquia: University of California, Riverside, Department of Biology

Colloquia: University of Montana, Missoula, Department of Biology

APS Intersociety Meeting, Westminster, CO

Invited speaker for symposium “Environmental adaptations of respiratory systems”

2009 SICB, Boston, MA.

Invited speaker for symposium “Insect evolution”

Colloquia: Chinese Academy of Sciences, Beijing

Western Physiological Ecology meeting, Bishop, CA

Plenary Speaker

Colloquia: Virginia Polytechnic University

Department of Engineering Science and Biomechanics

2008 Argonne National Laboratory

Invited speaker for Argonne User’s Week Science Symposium

Colloquia: Brown University, Providence, RI

Department of Ecology and Evolutionary Biology

Colloquia: University of Arizona State University

Department of Entomology

Colloquia: University of New Mexico, Albuquerque, NM

Department of Biology

Colloquia: University of San Diego, San Diego, CA

Dept. of Biology

2007 Geological Society of American, Denver, CO

Invited speaker for symposium “Phanerozoic oxygen”

2006 Society for Integrative and Comparative Biology, Orlando, FL

Invited speaker for the symposium “Ecophysiology and conservation: the contribution of energetics”

2005 Earth Systems Processes 2, Calgary, Alberta

Invited speaker for symposium “Phanerozoic O2: Animals, plants and fires”

Colloquia: University of Arizona

Department of Entomology

2004 The Abbey, Fontana, WI

Organized by Argonne National Laboratories

Invited speaker for workshop “Emerging scientific opportunities using x-ray imaging”

Wuerzburg, Germany

Invited speaker for workshop “Sociocomplexity and genomics in social insects”

International Congress of Entomology, Brisbane, Australia

Invited speaker for symposium “Oxygen, water and oxygen radicals in insects: Understanding the balance”

Society for Integrative and Comparative Biology, New Orleans, LA

Invited speaker for symposium “Ontogeny of physiological regulatory mechanisms”

Colloquia: University of Nevada, Las Vegas

Department of Biology

2003 Colloquia: University of Nebraska

Department of Biology

Colloquia: University of North Texas

U Department of Biology

Colloquia: University of Arizona

Department of Entomology

Sixth International Congress of Comparative Physiology and Biochemistry, Mt. Buller, Australia

Invited speaker for symposium “Physiological gas exchange: strategies for tracheal systems”

2002 Society for Integrative and Comparative Biology, Toronto, Canada.

Invited speaker for symposium entitled “Biological stoichiometry from genes to ecosystems”

Comparative Developmental Physiology Workshop, Glen Rose, TX. Greenlee, K. and J.F. Harrison.

Ontogeny of the hypoxia response in insects

Colloquia: Dept. of Animal Physiology, Universitat Humboldt, Berlin

2001 University of Würtzburg

Department Zoologie

Center for Insect Science Hexapodium

Plenary Presentation

Society for Experimental Biology, Canturbury, U.K

Invited speaker for symposium "Locomotion and energetics of animals"

Colloquia: University of California, Riverside

Department of Entomology

American Physiological Society, San Diego

Invited speaker for symposium "Teaching physiology in the 21st century”

2000 Society for Integrative and Comparative Biology

Invited speaker for symposium "Epithelial transport in insects"

International Congress of Entomology, Iguazzu Falls, Brazil

Invited speaker for symposium “Insect flight”

International Congress of Entomology, Iguazzu Falls, Brazil

Invited speaker for symposium “Spiracular mechanisms: Ultrastructure and physiology”

1999 Arizona State University, West

Dept. of Life Sciences

1998 University of Kansas

Department of Entomology

University of Arizona

Department of Ecology and Evolutionary Biology

1997 University of Arizona

Department of Entomology

Penn State University

Department of Biology

Ohio University

Department of Biology

1996 University of New Mexico, Albuquerque NM

Department of Biology

University of California, Irvine

Department of Ecology and Evolutionary Biology

Society for Integrative and Comparative Biology, Albuquerque, NM

Invited speaker for symposium “Responses of terrestrial invertebrates to variation in temperature and water availability: molecular, organismal and evolutionary approaches”

1995 Comparative Section, American Physiological Society,

Experimental Biology, Atlanta, GA.

The "Scholander Lecture"

American Society of Zoologists, Washington, DC

Invited speaker for symposium "Comparative aspects of control of arterial blood gases: Ventilatory and cardiovascular perspectives"

1994 USDA W-180 African Honeybee Conference, Tucson, AZ

1993 University of Montana, Missoula, MT

1992 University of Arizona School of Medicine,

Department of Physiology

Dartmouth College Hanover, NH

American Society of Zoologists, Vancouver, B.C.

Invited speaker for symposium “Insect acid-base regulation”

1991 Center for Insect Science, Tucson, AZ

1990 Arizona State University, Tempe, AZ

San Diego State University, San Diego, CA

Cleveland State University, Cleveland, OH

1989 University of Utah, Salt Lake City, UT

University of North Carolina, Charlotte, NC

1988 University of British Columbia, Vancouver, BC1987 Colorado State University, Fort Collins, Co

University of California, Irvine, CA

University of British Columbia, Vancouver, BC

Wright State University, School of Medicine, Dayton, OH

**Meeting Presentations (227 total)**

2018 Entomological Society of America, Vancouver, B.C. Hypermetric scaling of the tracheal system in the leg suggests leg-specific constraints on body size in scarab beetles. Harrison, J.F., M.E. Duell, C.J. Klok, J. Wagner, J. Vandenbrooks, J. Ciarlariello, J.J. Socha.

Entomological Society of America, Vancouver, B.C. The effect of a widely used fungicide on honey bee health. Fisher, A. II, Cogley, T., Johnson, M., Beans, A., Kalamachi, D., Kerman, K., Fewell, J., Kaftanoglu, O., Smith, B., DeGrandi-Hoffman, G. and J.F. Harrison.

Arizona Physiological Society, Tempe, AZ. *Aedes aegypti* eggs likely require protected microclimates to survive southwest desert winters. Fox, T. and Harrison, J.F.

American Physiological Society Intersociety Meeting on Comparative Physiology: Complexity and Integration. New Orleans, LA. Defying the temperature size rule in flight: Bigger bees perform better at higher temperatures. Duell, M.E. and Harrison, J.F.

American Physiological Society Intersociety Meeting on Comparative Physiology: Complexity and Integration. New Orleans, LA. A legged limitation on insect size? Scaling of tracheal systems in scarab beetles. Harrison, J.F., M.E. Duell, J.M. Wagner, J. Ciarlariello, C.J. Klok, J.M. Vandenbrooksand J.J. Socha..

American Physiological Society Intersociety Meeting on Comparative Physiology: Complexity and Integration. New Orleans, LA. Non-conventional anoxia tolerance: adult *Drosophila melanogaster* survive despite minimal ATP and a disrupted ionic imbalance. Campbell, J.B. and Harrison, J.F.

Experimental Biology, San Diego. Paralytic hypo-energetic state facilitates anoxia tolerance despite ionic imbalance in adult *Drosophila melanogaster.* Campbell, J.B., Andersen, M.K., Overgaard, J., Harrison, J.F.

Experimental Biology, San Diego. Paralytic hypo-energetic state facilitates anoxia tolerance despite ionic imbalance in adult *Drosophila melanogaster*. Harrison, J.F., Campbell, J.B., Lindquist,T., Callier, V., Cogley,T., Fox, T., and Greenlee, K.

Experimental Biology, San Diego. Accumulation of gut bacteria contributes to the age-related decline in anoxia tolerance in adult *Drosophila melanogaster*. Sargent, J., Campbell, J.B. and Harrison, J.F.

Society for Integrative and Comparative Biology, San Francisco, CA. Gravity effects on hemolymph and air distribution in the grasshopper, Schistocerca americana. Harrison, J.F., A. Kassi, K. Adjerid, J. Aviles, C.J. Klok, J.M. Vandenbrooks, M.E. Duell, J.B. Campbell, E. Alanis, C. Abdo, H. Pendar and J.J. Socha.

Society for Integrative and Comparative Biology, San Francisco, CA. Accumulation of gut bacteria may cause the age-related decline of anoxia tolerance in adult *Drosophila melanogaster*. Sargent, J.C., J.B. Campbell and J.F. Harrison.

Society for Integrative and Comparative Biology, San Francisco, CA. Respiration is a one-way street: abdominal pumping induces unidirectional flow in beetles. Fox, T.P. and J.F. Harrison.

Society for Integrative and Comparative Biology, San Francisco, CA. Non-conventional anoxia tolerance: adult Drosophila outlive larvae despite inferior ATP and hemolymph [K+] maintenance. Campbell, J.B., M.K. Anderson, J. Overgaard, and J.F. Harrison.

Society for Integrative and Comparative Biology, San Francisco, CA. Life history traits affect the response of insects to variation in atmospheric oxygen. Vandenbrooks, J.M., G. Parker, A. Zaffino, and J.F. Harrison.

2017 Arizona Physiological Society, Flagstaff, AZ. Functional hypoxia and HIF-signaling pre-moulting in *Drosophila*. Harrison, J.,F. J. Campbell, T. Lindquist, T. Cogley, T. Fox and K. Greenlee.

Arizona Physiological Society, Flagstaff, AZ. Ventilation is mostly a one-way street in beetles. Fox, T. and J.F. Harrison.

Arizona Physiological Society, Flagstaff, AZ. Non-conventional anoxia tolerance: adult *Drosophila* outlive larvae despite inferior ATP and hemolymph K+ maintenance. Campbell, J. and J.F. Harrison.

Arizona Physiological Society, Flagstaff, AZ. Accumulation of gut bacteria may cause the age-related decline of anoxia tolerance in adult *Drosophila* *melanogaster*. Sargent, J. and J.F. Harrison

Society for Integrative and Comparative Biology, New Orleans, LA. Metabolic allometry and the scaling of interaction patterns with ant colony size. Waters, J.S., Toth, J., Harrison, J.F., and J.H. Fewell.

Society for Integrative and Comparative Biology, New Orleans, LA. Thermal tolerance varies with body size in orchid bees. Beans, A.L., Duell, M.E. and J.F. Harrison.

Society for Integrative and Comparative Biology, New Orleans, LA. Variation in anoxia tolerance is not explained by the maintenance of ATP in *Drosophila melanogaster*. Campbell, J.B. and J.F. Harrison.

Society for Integrative and Comparative Biology, New Orleans, LA. Sensible, non-suicidal nest defense by guards of a stingless bee. Glass, J.R., Duell, M.E. and J.F. Harrison.

Society for Integrative and Comparative Biology, New Orleans, LA. Hypermetric scaling of spiracles in some scarab beetles. Wagner, J.M. and J.F. Harrison.

Society for Integrative and Comparative Biology, New Orleans, LA. Age-related decline in anoxia-tolerance in adult *Drosophila melanogaster*. Sargent, J.C., Campbell, J.B. and J.F. Harrison.

Society for Integrative and Comparative Biology, New Orleans, LA. Some don’t like it hot: variation in stingless bee flight performance as a function of air temperature. Duell, M.E. and J.F. Harrison.

Society for Integrative and Comparative Biology, New Orleans, LA. Hypometric scaling of metabolic rate arises from size-dependent natural selection on ATP demand. J.F. Harrison

2016 XXV International Congress of Entomology, Orlando, FL. New methods for understanding flow production in the dorsal vessel. Socha, J., Giarra, M., Harrison, J.F., Kenny, M., Miller, L., Goergen, C. and P. Vlachos.

XXV International Congress of Entomology, Orlando, FL. Breath control: The hormonal regulation of growth in response to hypoxia in Drosophila. Shingleton, A.W., Zhu, Y., Broeker, H., Tank, P., Petranek, P. and J.F. Harrison.

XXV International Congress of Entomology, Orlando, FL. Locust migration in coupled natural human systems: connecting soil nitrogen, outbreaks, livelihoods and livestock markets. A. Cease, J. Elser, J. Hadrich, B. Robinson, E. Fenichel and J.F. Harrison.

XXV International Congress of Entomology, Orlando, FL. Metabolic and genetic implications of survival in anoxic Drosophila. Campbell, J. and J.F. Harrison.

XXV International Congress of Entomology. Orlando, FL. Carbohydrate-based diets may improve performance in arid environments. Farington, R.H., Diaz, M., Campbell, J.B., Rogers, S., Harrison, J.F. and A.J. Cease.

North American Section of the International Union for the Study of Social Insects, Orlando, FL. Trunk trail maintenance in leafcutter ants: Caste involvement and effects of obstacle type and size on path clearing in *Atta cephalotes.* Cevallos-Dupuis, E. and J.F. Harrison.

Experimental Biology, San Diego, CA. The age-related decline of anoxia tolerance in adult Drosophila melanogaster. Sargent, J., Campbell, J. and J.F. Harrison.

Experimental Biology Meeting. San Diego, CA. Metabolic and genetic implications of survival in anoxia. Campbell, J.B. and J.F. Harrison.

2015 Society for Integrative and Comparative Biology, Palm Beach, FL. The costs of aggressivity and the benefits of cooperation. Fox, T., C.J. Klok, J.H. Fewell and J.F. Harrison.

Society for Integrative and Comparative Biology, Palm Beach, FL. Functional compartmentalization in the hemocoel of a locust. Adjerid, K., H. Pendar, J.F. Harrison and J.J. Socha.

Society for Integrative and Comparative Biology, Palm Beach, FL. Using respiratory water vapor release rates to investigate tracheal ventilation during oxygen challenges in small and giant insects. C.J. Klok, J. Campbell and J.F. Harrison.

Society for Integrative and Comparative Biology, Palm Beach, FL. Miniaturization is associated with novel scaling of flight parameters in stingless bees. Duell, M. and J.F. Harrison

Experimental Biology, Boston, MA. Do late third instar Drosophila larvae experience functional oxygen limitation? J.F. Harrison

Experimental Biology, Boston, MA. Do late instar Drosophila larvae experience functional oxygen limitation? Callier, V., J. Campbell, H. Smith, A. Brantley, K. Greenlee and J.F. Harrison.

Arizona Physiological Society meeting, Glendale, AZ. Gravity effects on hemolymph and air distribution in the grasshopper, Schistocerca americana. Harrison, J.F., C.J. Klok, J.M. Vandenbrooks, M.E. Duell, J. E. Campbell, S. Jirjies and J.J. Socha.

Arizona Physiological Society meeting, Glendale, AZ. Age-related decline in oxygen tolerance in adult Drosophila melanogaster. Sargent, J.S., J. E. Campbell and J.F. Harrison.

Arizona Physiological Society meeting, Glendale, AZ. Metabolic and genetic implications of survival in anoxia. J.E. Campbell and J.F. Harrison.

Arizona Physiological Society meeting, Glendale, AZ. Hypermetric tracheal scaling as a factor in insect gigantism. Wagner, J., M.E. Duell, J. Ciarlariello, C.J. Klok and J.F. Harrison

ASU-Wuerzburg colloquium: Interactions between oxygen, growth, metabolism and size in insects. J.F. Harrisons

56th Annual Drosophila Research Conference, Chicago, IL. Age and gender effects on anoxia tolerance in Drosophila melanogaster mirror patterns in mammals. Sargent, J.C., J.B. Campbell and J.F. Harrison

56th Annual Drosophila Research Conference, Chicago, IL. Metabolic and genetic implications of survival in anoxia. J. Campbell and J.F. Harrison.

2014 APS Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology, San Diego, CA. Metabolism and locomotion of anoxic Drosophila. Campbell, J.B., V. Callier, S. Hand and J.F. Harrison

APS Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology, San Diego, CA. Combining x-ray synchrotron imaging of amber fossils with body size changes in the fossil record to elucidate the effect of atmospheric oxygen on paleophysiology. VandenBrooks, J. and J.F. Harrison

APS Intersociety Meeting: Comparative Approaches to Grand Challenges in Physiology, San Diego, CA. Do Drosophila larvae experience functional oxygen limitation late in the instar? Callier, V., K. Greenlee and J.F. Harrison.

Drosophila Genetics: 55th Annual Drosophila Research Conference, San Diego, CA. Hypoxia effects on survival, fecundity and media of *Drosophila*. Harrison, J.F., Schlessinger, S., Biddulph, T., Ramsey, K., Heinrich, S. and Holden, N.

Drosophila Genetics: 55th Annual Drosophila Research Conference, San Diego, CA. Campbell, J., Callier, V., Hand, S. and Harrison, J.F. Metabolism and locomotion of anoxic *Drosophila*.

Society for Integrative and Comparative Biology, Austin, TX. Using impression fossils and 3D tomography to investigate the role of oxygen in insect evolution. VandenBrooks, J.M. and Harrison, J.F.

Society for Integrative and Comparative Biology, Austin, TX. Critical oxygen partial pressures during rest and flight in giant scarabaeoid beetles. Klok, C.J., Campbell, J., Duell, M. and Harrison, J.F.

Society for Integrative and Comparative Biology, Austin, TX. A volumetric analysis of the tracheal system of the grasshopper *Schistocerca americana* using µCT. Sieve, J., Aviles, J., Harrison, J.F. and Socha, J.J.

Society for Integrative and Comparative Biology, Austin, TX. Is there a price of being giant? Body systems scaling in scarabaeid beetles illustrated by high resolution µCT. Duell, M., Ciarlariello, J., Klok, C.J., VandenBrooks, J.M. and Harrison, J.F.

Society for Integrative and Comparative Biology, Austin, TX. A test of functional compartmentalization in the grasshopper *Schistocerca americana* using internal pressure recordings. Adjerid, K., Kenny, M., Pendar, H., Harrison, J.F. and Socha, J.J.

Society for Integrative and Comparative Biology, Austin, TX. Oxygen modulates density effects on body size in *Drosophila melanogaster*. Biddulph, T.A. and Harrison, J.F.

Society for Integrative and Comparative Biology, Austin, TX. Grasshoppers defy gravity? Body position effects on hemolymph and air distribution in *Schistocerca americana*. Harrison, J.F., Klok, C.J., VandenBrooks, J.M., Duell, M.E., Campbell, J.B., Jirjies, S. and Socha, J.J.

Society for Integrative and Comparative Biology, Austin, TX. Dietary phosphate strongly and nonlinearly affects performance of an omnivorous herbivore. Cease, A.J., Fay, M., Elser, J.J. and Harrison, J.F.

Society for Integrative and Comparative Biology, Austin, TX. Correlates of miniaturization: scaling of morphology and behavioral repetoires of Neotropical stingless bees. Duell, M.E., Roubik, D., Wcislo, W., Harrison, J.F. and Smith, B.H.

Society for Integrative and Comparative Biology, Austin, TX. Scaling of water loss, diffusion and ventilation in Scarab beetles at rest and during hypoxia. Campbell, J.C., Duell, M.E., Klok, C.J. and Harrison, J.F.

2013 Arizona Physiological Society, Phoenix, AZ. Escape or tolerate: different mechanisms to survive anoxia in *Drosophila melanogaster*. Callier, V., Campbell, J.B., Hand, S.J. and Harrison, J.F.

Drosophila Genetics: 54th Annual Drosophila Research Conference, Washington, D.C. Is oxygen limitation a cue for initiation of molting in Drosophila? Callier, V., Brent, C., Kim, J., Ghosh, S.M., Shingleton, A.W. and Harrison, J.F.

Drosophila Genetics: 54th Annual Drosophila Research Conference, Washington, D.C. Effects if rearing oxygen level on the structure of the adult tracheal system in Drosophila melanogaster. Harrison, J.F., Waters, J., Heinrich, S., Biddulph, T., Kovacevic, S.

Society for Integrative and Comparative Biology, San Francisco, CA. Low plant nitrogen content and high population density enhance migratory characters in a polyphenic locust. Cease, A.J., Elser, J.J., Hao, S., Harrison, J.F.

Society for Integrative and Comparative Biology, San Francisco, CA. How hoppers breath. Harrison, J.F., Water, J.S., Cease, A.J., Vandenbrooks, J.M., Callier, V., Klok, C.J., Shaffer, K., Socha, J.J.

Society for Integrative and Comparative Biology, San Francisco, CA. Interactions between temperature and oxygen and the evolution of body size in invertebrates Klok, C.J. and Harrison, J.F.

Society for Integrative and Comparative Biology, San Francisco, CA. Metabolic and behavioral variation with colony size and age: a manipulative test of the size-dependence theory of metabolic Allometry. Waters, J.S., Harrison, J.F.

Society for Integrative and Comparative Biology, San Francisco, CA. Effects of the larval oxygen environment on the three-dimensional branching structure of insect flight muscle tracheae. Kovasevic, A.\*, Biddulph, T.A., Waters, J.S., Harrison, J.F.

Society for Integrative and Comparative Biology, San Francisco, CA. Fluctuations in historical oxygen levels impacted insect body size and physiology. Vandenbrooks, J.M., Munoz, E.E., Weed, M.D., Harrison, J.F.

Society for Integrative and Comparative Biology, San Francisco, CA. Trachea and flight muscle volumes of adult *Drosophila melanogaster* reared in hypoxia, normoxia, and hyperoxia using synchrotron x-ray phase contrast microtomography. Biddulph, T.A., Kovacevic, A., Waters, J.S., Harrison, J.F.

Society for Integrative and Comparative Biology, San Francisco, CA. Water loss, respiration, and critical PO2 in Cetoniinae. Campbell, J.B., Duell, M.E., Klok, C.J., Harrison, J.F.

2012 Society for Integrative and Comparative Biology, Charleston, S.C. The use of SR-µCT for 3D visualization of insect tracheal systems. Miller, L.\*; Waters, J.S.; Harrison, J.F.; Vandenbrooks, J.M.; Yager, D.D.; Xiao, X.; De Carlo, F.; Socha, J.J.

Society for Integrative and Comparative Biology, Charleston, S.C. Developmental and fossil evidence that changes in atmospheric oxygen drove historical patterns in insect body size. Vandenbrooks, J.M. \*; Munoz, E.E.; Weed, M.D; Harrison, J.F.

Society for Integrative and Comparative Biology, Charleston, S.C.Effects of rearing oxygen level on the anatomy of the adult tracheal system in *Drosophila.* Harrison, J.F.\*; Waters, J.S.; Heinrich, S.M.; Socha, J.J.

2011 Society for Integrative and Comparative Biology, Salt Lake City, Utah. Anatomy of the tracheole system supplying *Drosophila* flight muscle. Waters, J.S; Heinrich, S.M.\*; Harrison, J.F.

Society for Integrative and Comparative Biology, Salt Lake City, Utah. The effect of hypoxia and hyperoxia on dragonfly development: a link between Paleozoic oxygen levels and insect gigantism. Weed, M.D.\*; Munoz, E.E.; Harrison, J.F.; Vandenbrooks, J.M.

Society for Integrative and Comparative Biology, Salt Lake City, Utah. Locusts prefer nitrogen-poor plants in overgrazed pastures. Cease, A,\*; Elser, J.; Hao, S.; Kang, L.; Harrison, J.F.

Society for Integrative and Comparative Biology, Salt Lake City, Utah. Metabolic and behavioral integration in social insect colonies. Waters, J.S.\*; Fewell, J.H.; Harrison, J.F.

Society for Integrative and Comparative Biology, Salt Lake City, Utah. HIF-mediated growth suppression in *Drosophila melanogaster* reared in moderate hypoxia. Harrison, J.F.\*; Ramsey, K.A.; Dohwenrend, S.; Heinrich, S; Farzin, M.; Greenlee, K.J.

Society for Integrative and Comparative Biology, Salt Lake City, Utah. The Role of Atmospheric Oxygen in the Evolution of Insect Body Size. Vandenbrooks, J.M.\*; Munoz, E.E.; Weed, M.D.; Harrison, J.F.

Society for Integrative and Comparative Biology, Salt Lake City, Utah. Interspecific allometry of cockroach tracheal systems and the impact of oxygen on their tracheal development. Munoz, E.E.\*; Weed, M.; Harrison, J.F.; Vandenbrooks, J.M.

2010 Society for Integrative and Comparative Biology. Seattle, WA. Mechanisms of hypoxia effects on body size of Drosophila melanogaster. E. Heinrich, C.J. Klok, J.F. Harrison, M. Farzin and B. McKinley.

Society for Integrative and Comparative Biology. Seattle, WA. Effects of atmospheric oxygen on body size, development time, growth rate and tracheal systems in *Blatella germanica*, the German cockroach. E.E. Munoz, J.M. Vandenbrooks, J.A. Hale and J.F. Harrison.

Society for Integrative and Comparative Biology. Seattle, WA. Atmospheric oxygen influences on the size of modern and fossil insects. J.M. Vandenbrooks and J.F. Harrison.

Society for Integrative and Comparative Biology. Seattle, WA. A proposal for a National Variable Atmosphere Laboratory (VAL) for climate change research. J.F. Harrison and J.M. Vandenbrooks.

Society for Integrative and Comparative Biology. Seattle, WA. Geometric characterization and phenotypic plasticity in the tracheal networks supplying insect flight muscle. J.S. Waters and J.F. Harrison.

American Physiological Society Intersociety Meeting. Westminister, CO. The mechanisms of oxygen effects on the fruit fly Drosophila melanogaster. E. Heinrich and J.F. Harrison.

American Physiological Society Intersociety Meeting. Westminister, CO.A proposed national facility for the study of global climate change – the Variable Atmosphere Laboratory (VAL). J. VandenBrooks and J.F. Harrison.

American Physiological Society Intersociety Meeting. Westminister, CO. A new tool or insect flight metabolic rate studies: electrostimulation of flight in goliath beetles. C.J. Klok, A. Kaiser, J.F. Harrison, H. Sato and M.M. Maharbiz.

American Physiological Society Intersociety Meeting. Westminister, CO. Scaling of metabolism, growth and network organization in colonies of the seed harvester ant, Pogonomyrmex californicus. J. Waters and J.F. Harrison.

American Physiological Society Intersociety Meeting. Westminister, CO. Atmospheric oxygen level and the evolution of insect size. J. Vandenbrooks, A. Kaiser and J.F. Harrison.

American Physiological Society Intersociety Meeting. Westminister, CO. The effect of Paleozoic oxygen levels on the development of the tracheal system in *Blatella germanica*, the German cockroach. E. Munoz, J. Weed, J. VandenBrooks and J.F. Harrison.

2009 Society for Integrative and Comparative Biology. Boston, MA. [High density and high nitrogen: A dual stressor for grasshoppers?](http://www.sicb.org/meetings/2009/schedule/abstractdetails.php3?id=1341) Cease, A., S. Hao, J. Elser, L. Kang and J. Harrison.

Society for Integrative and Comparative Biology. Boston, MA. [Phenotypic placticity of body size in response to atmospheric oxygen in *Drosophila melanogaster*](http://www.sicb.org/meetings/2009/schedule/abstractdetails.php3?id=1321). Hubb, A.J., C.J. Klok and J.F. Harrison.

Society for Integrative and Comparative Biology. Boston, MA. Parabolic Effects of Atmospheric Oxygen on Body Size, Development Time, and Growth Rate in *Zophobas morio*, the Giant Mealworm. Ford, C.F., J. VandenBrooks and J.F. Harrison.

Society for Integrative and Comparative Biology. Boston, MA. Tracheal systems and the evolution of insects. J.M. VandenBrooks, A. Kaiser and J.F. Harrison.

Society for Integrative and Comparative Biology. Boston, MA. Critical periods for oxygen effects on adult size in Drosophila melanogaster. E.C. Heinrich and J.F. Harrison.

Society for Integrative and Comparative Biology. Boston, MA. The scaling of critical PO2 in Coleoptera. Lease, H.M., C.J. Klok, A. Kaiser and J.F. Harrison.

Society for Integrative and Comparative Biology. Boston, MA. Allometric scaling of whole colony metabolic rate in *Pogonomyrmex californicus*. Waters, J.S., C.T. Holbrook, J.H. Fewell and J.F. Harrison

Experimental Biology, San Diego, CA. Gasping grasshoppers prefer hypobaric hypoxia. J.F. Harrison and A. Bruce.

Beckman Scholars Summer Research Symposium. Irvine, CA. Key factors in the hypoxic response of *Drosophila melanogaster*.  Heinrich, E.C. and J.F. Harrison.  
  
Western Physiological Ecology Meeting. Bishop, CA. How does hypoxia decrease the adult size of *Drosophila melanogaster?* Heinrich, E.C. and J.F. Harrison.

Western Physiological Ecology Meeting. Bishop, CA. Allometric scaling of whole colony metabolic rate in *Pogonomyrmex californicus*. J.S. Waters, C.T. Holbrook, J.H. Fewell and J.F. Harrison

2008 International Congress of Entomology. Durban, South Africa. Critical oxygen responses in *Drosophila melanogaster* reared in hypoxia or hyperoxia. C.J. Klok and J.F. Harrison.

International Congress in African for Comparative Physiology and Biochemistry. Massai Mara, Kenya. Diffusion and convection in the American locust, *Schistocerca americana*. J.F. Harrison.

Gordon-Kenan Research Conference on the Metabolic Basis to Ecology, Biddeford, MA. Allometric scaling of  metabolic rate with colony size in *Pogonomyrmex californicus*. J.S. Waters, C.T. Holbrook and J.F. Harrison.

Society for Integrative and Comparative Biology. San Antonio, TX. The effects of varying oxygen levels on size, growth, and development rate in the tobacco hornworm. Cease, A., T. Albert, J. VandenBrooks, G. Davidowitz and J. Harrison.

Experimental Biology. San Diego, CA. Moderate hypoxia extends lifespan in adult but not juvenile exposure in the fruitfly, *Drosophila melanogaster*. B. Rascón and J.F. Harrison.

International Congress of Entomology. Durban, South Africa. Does atmospheric oxygen limit insect size? Effects of oxygen on insect growth and tracheal morphology. J.F. Harrison and C.J. Klok.

1. Society for Integrative and Comparative Biology (SICB) Annual Meeting,

Phoenix Convention Center, Phoenix, AZ. Rascón B. and Harrison J.F.  Death by oxygen.

Society for Integrative and Comparative Biology, Phoenix, AZ. Blatch, S.A. and J. Harrison. 2007. Oral Presentation Folic Acid Physiology in *Drosophila melanogaster*.

Society for Integrative and Comparative Biology, Phoenix, AZ**.** Farzin, M., S.A. Blatch and J.F. Harrison. Effects of atmospheric hypoxia on cell size in adult *Drosophila melanogaster*.

Society for Integrative and Comparative Biology, Phoenix, AZ**.** Albert, T.W., N. Pierce, C.J. Klok and J.F. Harrison. Normoxic *Drosophila* larvae like it deeper.

Society for Integrative and Comparative Biology, Phoenix, AZ**.** Klok, C.J., A. Kaiser, W.K. Lee, J.J. Socha and J.F. Harrison. Single- and multi-generational effects of atmospheric oxygen level on body size and tracheal dimensions in *Drosophila melanogaster.*

Society for Integrative and Comparative Biology, Phoenix, AZ**.** Henry, J. R. and J.F. Harrison. Does body size affect the safety margin for oxygen delivery in flying dragonflies?

Society for Integrative and Comparative Biology, Phoenix, AZ. Grayson, D.L., J.H. Fewell and J.F. Harrison. Why do Africanized honey bees have higher metabolic capacities than Europeans?

Entomological Society of America, San Diego, CA. Klok, C.J. and J.F. Harrison.

Experimental Biology. Washington, D.C. Effects of multi-generational exposure to varied atmospheric oxygen levels on body size and tracheal dimensions of fruitflies. Jon F. Harrison1, C Jaco Klok1, Alexander Kaiser2, Wah-Keat Lee3, Jake Socha3.

Experimental Biology. Washington, D.C. Morphological and biochemical jumping adaptations in smaller grasshoppers. S. D. Kirkton and Jon F. Harrison

Geological Society of America. Denver, CO. Variable responses of insect size to atmospheric oxygen level across species and populations. Jon F. Harrison

1. Society for Integrative and Comparative Biology, Orlando, FL. Grayson, D.L., J.F. Harrison and J.H. Fewell. 2005. Foraging effort and metabolism in European and African honey bees. Integrative and Comparative Biology

Society for Integrative and Comparative Biology, Orlando, FL. Rascón, B. J.R. Henry, J.F. Harrison, K. Fezzaa, W-K Lee, J.J. Socha. Peering inside the insect thorax: an examination of thoracic autoventilation in live insects using synchrotron x-rays.

Society for Integrative and Comparative Biology, Orlando, FL. Kaiser, A., C.M. Klok, J. Socha, W.-K Lee, K. Fezzaa, M.C. Quinlan and J.F. Harrison. Structure, function, and allometry of the tracheal system of darkling beetles (Tenebrionidae).

Society for Integrative and Comparative Biology, Orlando, FL. Socha, J.J., J.F. Harrison, W.-K. Lee and M.W. Westneat. Tubes squeeze and air flows out: correlated patterns of CO2 emission and tracheal compression in the beetle *Patynus decentis*.

Society for Integrative and Comparative Biology, Orlando, FL. Klok, C.J., A. Kaiser, B. McKinley, B. Rascón, J. Henry, W.K. Lee, J. Socha and J.F. Harrison. Plastic and evolutionary responses of body size and tracheal dimensions to atmospheric oxygen concentration in fruitflies.

Experimental Biology Meeting, San Francisco, CA. Blatch, S. and J.F. Harrison. Physiological consequences of a methylation diet in the fruitfly, *Drosophila melanogaster*.

Experimental Biology Meeting, San Francisco, CA. Harrison, J.F., K. Greenlee, J. Henry, S. Kirkton, M. Westneat, J. Socha and W.K. Lee. Hyper-development of the tracheal system in larger insects.

Experimental Biology Meeting, Moscone Convention Center, San Francisco, CA. Rascón B., Henry J.R., Harrison J.F., Fezzaa K., Lee W-K., Socha J.J. [Peering inside the insect thorax: an examination of thoracic autoventilation in live insects using synchrotron x-rays](https://exchange.asu.edu/exchweb/bin/redir.asp?URL=http://www.sicb.org/meetings/2006/schedule/abstractdetails.php3?id=304).

NSF Division of Human Resource Development Joint Annual Meeting, Washington D.C. Rascón B., Henry J.R., Harrison J.F., Fezzaa K., Lee W-K., Socha J.J. [Peering inside the insect thorax: an examination of thoracic autoventilation in live insects using synchrotron x-rays](https://exchange.asu.edu/exchweb/bin/redir.asp?URL=http://www.sicb.org/meetings/2006/schedule/abstractdetails.php3?id=304).

FASEB Folic Acid and Vitamin B-12 Conference, Palm Springs, CA, Blatch, S. and J.F. Harrison. Physiological consequences of a methylation diet in the fruitfly, *Drosophila melanogaster*.

International Union for the Study of Social Insects, Washiington, D.C. Grayson, D., J.F. Harrison and J.H. Fewell. Size alone does not account for differences in metabolic rates between Africanized and European honey bees.

Comparative Physiology 2006: Integrating Diversity (American Physiological Society Intersocietal Meeting, Virginia Beach, VA.  Kaiser, A., Klok, C.J., Socha, J.J., Lee, W.K., Quinlan, M.C., Harrison, J.F. No giants today: tracheal oxygen supply to the leg limits beetle size.

Comparative Physiology 2006: Integrating Diversity (American Physiological Society Intersocietal Meeting, Virginia Beach, VA.  Klok, C.J., A. Kaiser, W.K. Lee, J. Sochae and J.F. Harrison. Physiological constraints of atmospheric oxygen levels on insect size.

Comparative Physiology 2006: Integrating Diversity (American Physiological Society Intersocietal Meeting, Virginia Beach, VA.  Blatch, S. and J.F. Harrison. Physiological consequences of methylation diets and folic acid in the fruitfly, *Drosophila melanogaster*.

Comparative Physiology 2006: Integrating Diversity (American Physiological Society Intersocietal Meeting, Virginia Beach, VA.  Harrison, J.F., C.J. Klok and B. McKinley. Both larval and pupal hypoxia affect adult size in the fruitfly.

1st International Congress for Respiratory Biology, Bonn, Germany. Klok, C.J. A. Kaiser, W.K. Lee, J. Socha and J.F. Harrison. Physiological constraints of atmospheric oxygen levels on insect body size, tracheal structure and function.

2005 Society for Integrative and Comparative Biology, San Diego, CA. Kirkton, S.D and J.F. Harrison. Within instar development reduces locomotory performance but not oxygen delivery to the jumping muscle in the American locust

Society for Integrative and Comparative Biology, San Diego, CA. Lease, H.M.; Wolf, B.O. and Harrison, J. F.; Ontogeny of Tracheal Volume in Schistocerca Americana

Society for Integrative and Comparative Biology, San Diego, CA. Rascón, B, and Harrison, J.F. Atmospheric oxygen effects on metabolic rate and behavior of tethered flying locusts

Society for Integrative and Comparative Biology, San Diego, CA. Greenlee, K.J., Harrison, J.F., Henry, J.R., Westneat, M., Kirkton, S.D. and Lee, W.-K. An analysis of grasshopper tracheal morphology across instars using synchrotron x-ray imaging.

2004 Society for Integrative and Comparative Biology, New Orleans, LA. Henry, J.R. and Harrison, J.F. Plastic and evolved responses of tracheal dimensions to varying atmospheric oxygen content in Drosophila melanogaster.

Society for Integrative and Comparative Biology, New Orleans, LA. Lee, W.K., Harrison, J.F., Greenlee, K., Betz, O. and Westneat, M. Biomechanics of insect respiration and feeding using synchrotron x-ray imaging.

2002 Society for Integrative and Comparative Biology, Anaheim, CA.

Woods, H.A., Hobbie, S.E., Makino, W., Cotner, J., Harrison, J.F. and Elser, J.J. Temperature shifts cause systematic changes in biochemical composition of poikilothermic organisms.

Society for Integrative and Comparative Biology, Anaheim, CA.

Roberts, S.P., Frazier, M.R., Kirkton, S.D. and Harrison, J.F. Temperature sensitivity of Drosophila flight and flight performance.

Society for Integrative and Comparative Biology, Anaheim, CA.

Harrison, J.F., LaFreniere, J., Hartung, D.A., Greenlee, K. and Kirkton, S.D. Ontogeny effects on the diffusive and convective conductance of abdominal and leg trachea in *Schistocerca americana* gasshoppers.

Society for Integrative and Comparative Biology, Anaheim, CA.

Kirkton, S.D. and J.F. Harrison. Effects of body size changes on jumping performance in the American locust.

Experimental Biology, New Orleans, LA.

Greenlee, K. and J.F. Harrison. Ontogeny of the hyoxia response in insects.

Experimental Biology, New Orleans, LA

Kirkton, S.D. and J.F. Harrison. Effects of body size change on jumping performance in the American locust.

Experimental Biology, New Orleans, LA

Hartung, D.K. and J.F. Harrison. Developmental variation in the jumping leg of the American locust.

The Power of Comparative Physiology: Evolution, Integration and Applied, San Diego, CA

Harrison, J.F., Okoroh, E., Feurbacher, E., Fewell, J.H. and Roberts, S.P. Effects of load type and air temperature on the energetics of load carriage in the honeybee, *Apis mellifera*

The Power of Comparative Physiology: Evolution, Integration and Applied, San Diego, CA. Greenlee, K. and J.F.Harrison. Variation in oxygen sensitivity in insects of different size and age.

The Power of Comparative Physiology: Evolution, Integration and Applied, San Diego, CA. Kirkton, S.D., Harrison, J.F., Timmins, G. and Nsika, J. Oxygen delivery problems may reduce jumping performance in larger locusts.

Society for Integrative and Comparative Biology, Toronto, Ontario.

Kirkton, S.D. and J.F. Harrison. Developmental and interspecific body size effects on grasshopper jumping performance.

Sixth International Congress of Comparative Physiology and Biochemistry, Mt. Buller, Australia. Greenlee, K., J.F. Harrison and K. Egbert. Developmental changes in safety margins for gas exchange in caterpillars and grasshoppers.

Sixth International Congress of Comparative Physiology and Biochemistry, Mt. Buller, Australia. Kirkton, S.D. and J.F. Harrison. Do larger grasshoppers have more problems with oxygen delivery during jumping?

German International Union for the Study of Social Insects. Weidenmuller, A., J. Fewell and J.Harrison. Energetic costs of thermoregulatory behavior in bumblebees: linking individual differences in metabolic rates to division of labor?

Physiological Ecology Meeting, Bishop, CA.

Greenlee, K. and J. Harrison. Ontogeny of gas exchange in insects.

Physiological Ecology Meeting, Bishop, CA.

Kirkton, S.D. and J. Harrison. Jumping to conclusions: body size and oxygen delivery in grasshoppers.

Physiological Ecology Meeting, Bishop, CA.

Fay, M. and J. Harrison. Effects of dietary phosphorous on grasshopper growth and behavior.

Physiological Ecology Meeting, Bishop, CA.

La Moure, D., J. Henry and J. Harrison. Do higher atmospheric oxygen levels allow for evolution of larger flies?

Physiological Ecology Meeting, Bishop, CA.

Rascón, B. and J. Harrison. The effect of oxygen on the metabolic capacity of *Schistocerca americana* during flight.

2001 Society for Integrative and Comparative Biology, Chicago, IL

Kirkton, S. D. and Harrison, J. F. Effects of allometric growth on oxygen sensitivity and jumping performance in the American locust.

Society for Integrative and Comparative Biology, Chicago, IL

Greenlee, K. J., Harrison, J. F., and Egbert, K. How does the respiratory

response to hypoxia change throughout ontogeny in a grasshopper and a caterpillar?

Center for Insect Science Poster Hexapodium, Tucson, AZ

Hartung, D., Kirkton, S.D. and Harrison, J.F. Developmental variation in the ultrastructure of the jumping muscle from the American locust.

2000 Society for Integrative and Comparative Biology, Atlanta, GA

Woods, H.A. and J.F. Harrison. Comparison of acclimatory and evolutionary changes in water balance physiology of larval *Manduca sexta*.

Society for Integrative and Comparative Biology, Atlanta, GA

Harrison, J.F., J.J. Lafrenie, K.J. Greenlee. Body size effects on gas exchange capacities of primary trachea of the American locust.

Center for Insect Science Poster Hexapodium, Tucson, AZ

Woods, A.H. and Harrison, J.F. Gene flow, acclimation, and the evolution of water balance physiology in North American *Manduca sexta*.

Experimental Biology, San Diego, CA

Kirkton, S. D., Petrie, N. and Harrison, J. F. Effects of body size on the oxygen sensitivity of grasshopper jumping.

Experimental Biology, San Diego, CA

Greenlee, K. J. and Harrison, J. F. Developmental effects on

gas exchange in the American locust, *Schistocerca americana*.

XXI International Congress of Entomology, Foz do Iguassu, Brazil

Frazier, M. R., Harrison, J. F. and Woods, H. A. Interaction of oxygen tension and temperature on insect development.

XXI International Congress of Entomology, Foz do Iguassu, Brazil

Kirkton, S. D. and Harrison, J. F. Effects of ontogeny of the oxygen sensitivity of jumping performance in the American locust, *Schistocerca americana*.

XXI International Congress of Entomology, Foz do Iguassu, Brazil

Greenlee, K.J. and Harrison J.F. Respiratory changes throughout ontogeny in the American locust, *Schistocerca americana*.

XXI International Congress of Entomology, Foz do Iguassu, Brazil

McCoy, L. M., Fewell, J. H. and Harrison, J. F. Genetic mechanisms contributing to differences in colony growth rates between African and European honey bees.

Physiological Ecology Meeting, Bishop, CA.

Perkins, M. C., H. A. Woods and J. F. Harrison. Effects of phosphorus on growth in larval *Manduca sexta*.

Entomological Society of America, Montreal, Canada.

Perkins, M. C., H. A. Woods and J. F. Harrison. Effects of dietary phosphorus on growth of larval *Manduca sexta*on on both an artificial and natural diet.

Pacific Branch of the Entomological Society of America, Costa Mesa, CA.

Perkins, M. C., H. A. Woods and J. F. Harrison. Effects of dietary phosphorus on growth of larval *Manduca sexta*.

1999 Society for Integrative and Comparative Biology, Denver, CO

Greenlee, K.J., J.F. Harrison, and J.H. Fewell. Ontogeny of resting and flight metabolic rates in African and European honey bees.

Experimental Biology, Washington, D.C.

Espinosa, KA. and J.F. Harrison. Renal modulation of acid-base excretion in response to diet in the American locust.

Experimental Biology, Washington, D.C.

Lafreniere, J.J., J.F. Harrison and K.J. Greenlee. Ontogenetic development of gas exchange capacities of the primary trachea of the American locust.

Experimental Biology, Washington, D.C.

Kirkton, S.D. and J.F. Harrison. Oxygen sensitivity of jumping performance in the grasshopper *Schistocerca Americana*

Animal Behavior Society, Bucknell University, PA.

Fewell, J.H. and J.F. Harrison. Behavioral and Physiological variation between African and European honey bees.

1998 Experimental Biology, San Francisco

Harrison, J.F, K. Greenlee and J.R.B. Lighton. Safety margins and the hypoxia sensitivity of insects.

Entomological Society of America, Las Vegas, NV.

Harrison, J.F. and U.I. S. Liao-Troth. Measuring fluid and solid flows in locusts: implications for digestive function and pH regulation.

Entomological Society of America, Las Vegas, NV.

Frazier, M.R. and J.F. Harrison. Dietary acid-base loading in grasshoppers.

Entomological Society of America, Las Vegas, NV.

McCoy, L.M., J.H. Fewell and J.F. Harrison. Behavioral and physiological differences between African and European honey bee workers.

13th International Congress of the International Union for the Study of Social Insects, Adelaide, Australia.

Harrison, J.F., S. Roberts, E. Feuerbacher, J. Fewell, and K. Greenlee. Environmental and genetic effects on the cost of foraging in honey bees: implications for foraging models.

1997 Experimental Biology, New Orleans, LA

Roberts, S.P., J.F. Harrison and R. Dudley. Mass scaling of kinematics and power during normal and maximal hovering flight performance in the bee Xylocopa varipuncta.

Experimental Biology, New Orleans, LA

Feuerbacher, E., J.H. Fewell and J.F. Harrison. Flight metabolism and kinematics of pollen and nectar load carriage in honey bees.

Experimental Biology, New Orleans, LA

Greenlee, K. and J.F. Harrison. How do grasshoppers maintain metabolic rates with reduced oxygen availability?

Experimental Biology, New Orleans, LA

Harrison, J.F., U.I.S. Liao, X. Lui and S.P. Roberts. Localization and quantification of sites of acid-base regulation in the grasshopper.

1996 Physiological Ecology Conclave, Bishop, CA.

Harrison, J.F. Oxygen-sensitive flight metabolism in a dragonfly: implications for the evolution of maximal insect body size.

Society for Integrative and Comparative Biology, Albuquerque, N.M.

Harrison, J.F, K. Greenlee and K. Krolikowski. Mechanisms for variation in gas exchange of grasshoppers.

Society for Integrative and Comparative Biology, Albuquerque, N.M.

Liao, U.I.S., X. Lui, and J.F. Harrison. Renal regulation of acid-base status in the American locust, *Schistocerca Americana*.

Society for Integrative and Comparative Biology, Albuquerque, N.M.

Feuerbacher, E.N., J.H. Fewell and J.F. Harrison. Metabolic costs of pollen and nectar load carriage. American Zoologist.

1995 Entomological Society of America, Las Vegas, NV.

Harrison, J.F. Tracheal gas levels, hemolymph pH, and the control of ventilation in grasshoppers.

1994 XXII International Meeting of International Union for the Study of Social Insects. Paris, France. Harrison, J.F., D. Nielsen, and R.E. Page.

American Physiological Society Intersociety Meeting. San Diego, CA.

Harrison, J.F., P. Waclawski, S. Gulinson, and K. Krolikowski. Control of ventilation in locusts.

American Physiological Society Intersociety Meeting. San Diego, CA.

Weinsten, R., J.F. Harrison, and R.J. Full. Intracellular pH recovers rapidly in ghost crabs following exhaustion.

American Society of Zoologists, St. Louis, MO.

Roberts, S.P., N.F. Hadley and J.F. Harrison. Water loss and metabolic rate during flight in the bees *Centris pallida* and *Apis mellifera*.

(\*Best student poster award, Division of Comparative Physiology and Biochemistry)

American Society of Zoologists, St. Louis, MO.

Harrison, J.F., D.I. Nielson, and R.E. Page. Thermal and MDH phenotype effects on the flight metabolism of honey bees.

American Society of Zoologists, St. Louis, MO.

Gulinson, S.L. and J.F. Harrison. Control of resting ventilation in grasshoppers.

American Society of Zoologists, St. Louis, MO.

Krolikowski, K.A. and J.F. Harrison. Feedback-independent elevation of post-exercise ventilation rate in grasshoppers.

1993 American Society of Zoologists. Los Angeles, CA.

Krolikowski, K.A., S.L. Gulinson, and J.F. Harrison. Hemolymph acid-base status and the control of ventilation in grasshoppers.

American Society of Zoologists. Los Angeles, CA.

Harrison, J.F. and J.H. Fewell. High Q10's for feeding and gut passage in a stenothermic grasshopper.

1992 Physiological Ecology Conclave, Bishop, CA.

Harrison, J.F. and H.G. Hall. Activity metabolism of African, European, and hybrid honey bees.

American Society of Zoologists. Vancouver, B.C.

Harrison, J.F. and H.G. Hall. Temperature, size, and metabolic influences on the metabolic capacity of African, European, and hybrid honeybees.

1991 Physiological Ecology Conclave, Bishop, CA.

Harrison, J.F. Acid-base regulation in insects.

Entomological Society of America, Reno, NV.

Harrison, J.F. and J.E. Phillips. Acid and nitrogen excretion in locusts.

1990 Canadian Society of Zoologists. Burnaby, B.C.

Harrison, J.F., C.J.H. Wong, and J.E. Phillips. Buffering and recovery from hemolymph acid loads in locusts.

Canadian Society of Zoologists. Burnaby, B.C.

Stagg, A.P., J.F. Harrison, and J.E. Phillips. Role of the Malpighian tubules in recovery from acidosis in locusts.

American Physiological Society. Orlando, FL.

Harrison, J.F., A.P. Stagg, and J.E. Phillips. Ammonium, total urate, and t itratible acid excretion in acid-loaded locusts.

1989 American Society of Zoologists. Boston, MA.

Harrison, J.F., T.T. Gleeson, and J.E. Phillips. Gas exchange in jumping grasshoppers.

American Society of Zoologists. Boston, MA.

Wong, C.J.H., J.F. Harrison, and J.E. Phillips. Buffering and recovery from hemolymph acidosis in locusts.

American Society of Zoologists. Boston, MA.

Fewell, J.H., J.F. Harrison, T.M. Stiller, and M.D. Breed. Variable recruitment strategies in the giant tropical ant, *Paraponera clavat*a.

1988 Second International Congress of Comparative Physiology and

Biochemistry. Baton Rouge, LA. Harrison, J.F. Lactate production and hemolymph acid-base status during hopping in grasshoppers.

1987 American Society of Zoologists. Denver, CO.

Harrison, J.M. Respiratory and acid-base responses to hypercapnia in the American locust, Schistocerca nitens.

1986 Entomological Society of America. Reno, Nv.

Harrison, J.M. Temperature effects on acid-base changes in *Melanoplus bivittatus*.

American Society of Zoologists. Nashville, Tn.

Harrison, J.M. Hemolymph acid-base changes with temperature in *Melanoplus bivittatus*.

1985 Guild of Rocky Mountain Population Biologists. Ogden, Ut.

Harrison, J.M. and M.D. Breed. Time dependent responses of *Paraponera clavata* workers to nectar sources.

Guild of Rocky Mountain Population Biologists. Ogden, Ut.

Breed, M.D. and J.M. Harrison. Individual odor trails in the giant tropical ant.

American Society of Zoologists. Baltimore, Md.

Harrison, J.M. Temperature effects on hemolymph pH in locusts.

1984 Entomological Society of America. San Antonio, Tx.

Harrison, J.M. Physiological parameters related to flight capacity in worker honeybees as a function of age.

American Society of Zoologists. Denver, Co.

Harrison, J.M. Physiological changes which increase flight capacity in the foraging caste of honeybees

**classroom and online teaching**

2019, Fall Online Bio 360, Animal Physiology, 3 credits, enrollment 94

2019, Spring Online Bio 360, Animal Physiology, 3 credits, enrollment 73

2019, Summer Online Bio 361, Animal Physiology Lab, 2 credits, enrollment 90

Bio 494, Tropical Biology in Panama, 4 credits, enrollment 15

2018 Developed online Bio 360, Animal Physiology, 3 credits, and online Bio 361, Animal Physiology Lab, 2 credits for rollout in 2019.

2018, Fall Bio 494, Insect Physiology, 3 credits, enrollment 10

2018, Summer Bio 494, Tropical Biology in Panama, 4 credits, enrollment 8

2017, Fall Bio 385, Invertebrate Zoology, 4 credits, enrollment 46

Bio 602, Current Issues in Behavior, 1 credit, enrollment 4

Bio 189, Mentor Seminar, recitation, enrollment 19

2017, Spring Bio 360, Animal Physiology, 3 credits, enrollment 234

Bio 361, Animal Physiology lab, 2 credits, enrollment 64

Bio 394, Honor’s section for Bio 360, 1 credit, enrollment 16

2016, Spring Bio 385, Invertebrate Zoology, 4 credits (with lab), enrollment 68

2016, Summer Bio 494, Tropical Biology in Panama, 6 credits, enrollment 12

2015, Fall Bio 460 – Comparative Physiology, enrollment 77

Bio 591 – Insect Physiology, enrollment 10

Bio 189 – Life Science Career Paths, enrollment 20

2015, Summer Bio 494, Tropical Biology in Panama, enrollment 16

2014, Fall Bio 460 Comparative Physiology, enrollment 32

Bio 591, Environmental Life Sciences, enrollment 7

2014, Spring Bio 460 – Comparative Physiology, enrollment 30

Bio 591-Seminar in Evolutionary Physiology, enrollment 12

2013, Fall Bio 591 – Insect Physiology, enrollment 10

2012, Fall ANB 602 -Animal Behavior Seminar, enrollment 9

2011, Fall Biology 189 - Life Science Career Paths, enrollment 17

2010, Fall Biology 461 - Comparative Animal Physiology, enrollment 34

200l, Spring Biology 181 - General Biology (with J. Wilson-Rawls)

Approximate Enrollment 380 (supervised 8 TAs)

2008, Fall Biology 202 - Human Anatomy and Physiology

Approximate Enrollment 280 (supervised 7 TA’s)

2008, Fall Biology 591 - Seminar in Environmental Life Sciences

Enrollment 20

2007, Fall Biology 361 - Animal Physiology Lab

Approximate enrollment 32, supervised 2 TA’s

2006, Spring Bio 591 - Seminar in Ecological/Evolutionary Physiology of Insects enrollment 8

2006, Fall Biology 560 -Comparative Animal Physiology, enrollment 8

Biology 360 - Animal Physiology

Approximate enrollment 170

2005, Spring Biology 360 - Animal Physiology, enrollment 100

Bio 361 - Animal Physiology Lab: enrollment 64

Bio 591 - Seminar in Insect Physiology: enrollment 9

2004, Spring Bio 360 - Animal Physiology, enrollment 160

Bio 361 - Animal Physiology Lab, enrollment 32 (supervised 2 TA’s)

2004, Fall Bio 591 - Oxygen Radicals and Oxidative Stress, enrollment 7

2003, Spring Bio 188 - General Biology (with J. Wilson-Rawls)

Approximate enrollment 350 (supervised 8 TAs)

2003, Fall Bio 560 - Comparative Physiology, enrollment 13

2002, Spring Bio 360 - Animal Physiology, eenrollment: 112

Bio 494 - Writing Seminar for Beckman Fellows

Enrollment 6

2001, Fall Bio 360 - Animal Physiology (with M. Moore)

Approximate enrollment: 70 (supervised 4 TAs)

2001, Fall Bio 591 - Seminar in Comparative Animal Physiology

Enrollment: 6

2000, Spring Bio 182 - General Biology (with Dr. Fewell)

Approximate enrollment: 250 (supervised 5 TAs)

2000, Spring Bio 598 - Cellular and Organismal Responses to Stress

(with Drs. Orchinik and Deviche)

Approximate enrollment: 12

2000, Fall Bio 201 - Human Anatomy & Physiology (with R. Satterlie)

Approximate enrollment: 150, supervised 3 TAs

1999, Spring Biology 182 - General Biology (co-taught with J. Fewell)

Approximate enrollment: 250 (supervised 6 TAs)

Zoology 591 - Seminar in Animal Design and Function

1999, Fall Bio 360 - Animal Physiology

Approximate enrollment: 120 (supervised 4 TAs)

Bio 591 - Seminar in Biochemical Adaptation

Bio 591 - Seminar in Animal Design and Function

1998, Spring Zoology 598 - Comparative and Environmental Physiology

(co-taught with G. Walsberg)

Approximate enrollment: 10

Zoology 591 - Seminar in Animal Design and Function

1998, Fall Biology 360 - Basic Physiology

Approximate enrollment: 120 (supervised 4 TAs)

Zoology 591 - Seminar in Animal Design and Function

1997, Spring Zoology 560 -Comparative Physiology

Approximate enrollment: 12

1997, Fall Zoology 202 - Human Anatomy and Physiology

Approximate enrollment: 150 (supervised 3 TAs)

Zoology 494 - Advanced Human Anatomy and Physiology

Zoology 591 - Seminar in Organismal Biology (with J. Fewell)

1996, Fall Zoology 202 - Human Anatomy and Physiology

Zoology 494 - Advanced Human Anatomy and Physiology

1995, Fall Zoology 360 - General Physiology

Zoology 591 - General Principles and Current Topics

in Insect Physiology

1994, Spring Zoology 202 - Human Anatomy and Physiology

Zoology 494 - Advanced Human Anatomy and Physiology

1994, Fall Zoology 560 - Comparative Physiology

1993, Spring Zoology 202 - Human Anatomy and Physiology

Zoology 494 - Advanced Human Anatomy and Physiology

1993, Fall Zoology 202 - Human Anatomy and Physiology

Zoology 494 - Advanced Human Anatomy and Physiology

Seminar: Zoology 591 - Elements in Individuals and Ecosystems

1992, Spring Zoology 202 - Human Anatomy and Physiology

1992, Summer Zoology 202 - Human Anatomy and Physiology

1992, Fall Zoology 560 - Comparative Physiology

Zoology 494 - Advanced Human Anatomy and Physiology

1991, Spring Zoology 202 - Human Anatomy and Physiology

1991, Summer Zoology 202 - Human Anatomy and Physiology

**Department and University Services**

2019-2020 Chair, STRI-ASU Initiative

Member, SOLS Biology Graduate Program Committee

Member, SOLS Undergraduate Programs Committee

2018-19 Chair, STRI-ASU Initiative

Member, SOLS Undergraduate Programs Committee

Member, SOLS Biospine Committee

2017-18 SOLS Director Search Committee

University Research and Creative Activities Committee

University Faculty Mentoring Award Selection Committee

2015-18 Chair, ASU-STRI Cooperative Initiative

Biology graduate program committee

2015-16 ASU Research and Creative Activities committee

2014-15 Chair, Search Committee for SOLS Director

SOLS Research and Training Initiative Committee

Biology graduate program committee

2011-2013 Director of Research Facilities and Infrastructure, Office of Knowledge Enterprise Development, ASU (75% appointment)

Assistant Vice-President for Research, Office of Knowledge

Enterprise Development (OKED, 75% appointment)

Institutional Official for Animal Care

Co-Chair of EH&S Policy Committee

Research Integrity Officer

Faculty Participant, Federal Demonstration Project

2010-2011 Director of Research Facilities and Infrastructure, Office of Knowledge Enterprise Development, ASU (50% appointment)

2009-2010 Sabbatical

2008-2009 Associate Director for Facilities, School of Life Sciences

Safety committee (member, supervisor)

Insect Science Center Executive Committee

Organizing Committee, Environmental Life Sciences Ph.D. program

* 1. Associate Director for Facilities, School of Life Sciences

Safety committee (member)

Insect Science Center Executive Committee

* 1. Associate Director for Facilities, School of Life Sciences

Safety Committee (chair during fall, 2006, member in spring 07)

Chair, Graduate Programs Associate Director Search Committee

Insect Science Center Executive Committee

* 1. Associate Director for Facilities, School of Life Sciences

Safety Committee (ex-officio)

AP Personnel committee

Physiology Curriculum Committee

Insect Science Center Executive Committee

2004-2005 Insect Science Center Executive Committee

Initiative Programs Committee Member, elected

Chair, Honey Bee Reproductive Physiology Search Committee

ISTB-1 Ad Hoc Building Committee

OISB Hiring Proposal Ad-Hoc Committee

2003-2004 Insect Science Center Executive Committee

Initiative Programs Committee Member

Elected Evolutionary and Systems Biology committee Member

SOLS Director Search Committee Member

Elected, Affirmative Action Officer

Physiology Lecturer Search Committee Member

2002-2003 Sabbatical

Exercise Science Executive Committee

Insect Science Center Executive Committee

Chair, Search Committee for Anatomy and Physiology Lab Coordinator

2001-2002 Chair, Search Committee for Director of Interdisciplinary Ph.D.

Program in Exercise Science

Exercise Science Executive Committee

Insect Science Center Executive Committee

Chair, Beckman Scholar Steering Committee

Life Sciences Reorganization Committee

2000-2001 Advisory Committee (elected)

Graduate Committee

Exercise Science Executive Committee

Insect Science Center Executive Committee

Wrote Beckman Foundation grant for undergraduate research

Chair, Beckman Scholar Steering Committee

1999-2000 Advisory Committee (elected)

Exercise Science Executive Committee

Insect Science Center Executive Committee

Chair, Biology Department Seminar Committee

wrote Beckman Foundation grant for undergraduate research

1998-99 Personnel Committee (elected)

Exercise Science Executive Committee

wrote Beckman Foundation grant for undergraduate research

(grant declined)

1997-1998 Chair, Search Committee, Environmental or Evolutionary

Physiologist

Advisory Committee (elected)

1996-1997 Advisory Committee (elected)

Graduate Committee

1995-1996 Advisory Committee (elected)

Graduate Committee

Search Committee, Theoretical Ecologist (affirmative action officer)

1994-1995 Advisory Committee (elected)

Graduate Committee

Search Committee, Integrative Biologist (affirmative action officer)

1993-1994 Advisory Committee (elected)

Graduate Committee

1992-1993 Advisory Committee (elected)

Graduate Committee

Organizer: Physiology Discussion Group, Spring 1992

1991 Co-Chair, Seminar Committee

**Mentoring**

**Past Postdoctoral Fellows:**

Megan Garlapow (Ph.D., 2015, North Carolina State University, currently Principal and Owner, The Line Medical Communications, LLC).

C. Jaco Klok (Ph.D., 1999, University of Pretoria). Currently Senior Research and Applications Scientists at Sable Systems International.

Viviane Callier, Ph.D. 2011, Duke University, currently freelance science journalist, https://vivianecallier.wordpress.com/about/.

John VandenBrooks, Ph.D. 2006, Yale University, currently Assistant Professor at Midwestern University.

H. Arthur Woods, Ph.D., 1998, Univ. of Washington, currently Associate Professor with a NSF CAREER award at Univ. of Montana, Missoula.

Patricia Ashby, Ph.D. 1987, Univ. of New Mexico, currently Associate Professor, Scottsdale Community College (Summer 1997)

**Current Postdoctoral Fellows:**

Adrian Fisher II. Ph.D. 2017, Texas A&M University

Stav Talal. Ph.D. 2018. Tel Aviv University (BARD fellowship).

**Matriculated Graduate Students:**

Jacob Campbell, Ph.D. August 2018. Currently CDC/USDA postdoctoral fellow at North Dakota State University.

Meghan Duell, Ph.D. December 2018. Currently postdoctoral fellow at Western Ontario University.

Arianne Cease, Ph.D. May 2012, NSF DDEP award, postdoctoral fellowship at the University of Sidney, currently Assistant Professor, School of Sustainability, ASU (Popular Science Brilliant 10, 2015)

James S. Waters, Ph.D. Dec., 2012, NSF, Predoctoral Fellowship Award, NSF Doctoral Dissertation Improvement Grant, James S. McDonnell Postdoctoral Fellow in Complexity Science at Princeton University; currently Assistant Professor at Providence College.

Joanna Henry, M.Sc. August 2011, currently lab coordinator, School of Life Sciences, ASU.

Manoush Farzin, M.Sc. 2010, DDS from Midwestern University School of Dentistry, Chicago, 2018.

Sydella Blatch, Ph.D. May 2008, NSF Predoctoral Award, PDF at NIH, Bethesda; currently Diversity and Professional Development Manager, American Society for Cell Biology.

Brenda Rascón, M.Sc. Dec. 2007, Regulatory Affairs Manager, Cinfa Biotech, Biosimilars.

Kendra Greenlee, Ph.D. May 2004, NSF Doctoral Dissertation Improvement Grant, EPA Star Award, currently Professor and chair, North Dakota State, Fargo with a NSF Career Award

Scott Kirkton, Ph.D. May 2004, NSF Doctoral Dissertation Improvement Grant, Best Student Paper, Society for Experimental Biology 2002, Best Student Paper, SICB 2003; NIH PDF at Scripps Research Institute, San Diego, currently Associate Professor, Union College

Marc Perkins, M.Sc. 2001, currently Associate Professor, Orange County Community College

Melanie Frazier, M.Sc. 2000, Staff Scientist at the National Center for Ecological Analysis and Synthesis (Ocean Health Index), Santa Barbara, CA.

Steven Roberts, Ph.D. May, 1998, Outstanding Graduate of the College of Liberal Arts and Sciences, currently Vice-Provost, Dean and Professor, Missouri University of Science and Technology, Rolla.

**Current Ph.D. Students**:

Trevor Fox, Jordan Glass, Meredith Johnson

**Current M.Sc. students:** Theodore Cogley, James Sargent

**Graduate Committee Service**: Student in the Dept. of Zoology/Biology or School of Life Sciences, Arizona State University unless otherwise indicated:

**Past (59 total):**

Kirk Anderson, Patricia Ashby (Univ. of New Mexico), Susan Bertram, Jason Borchert, Jake Brashears, Chris Breitmeyer, Michael Bizeau, Michael Black, Christina Burden, Rebecca Clark, Michael Crowley (Exercise Science), Courtney Currier, Dean R. Dobberfuhl, Jennifer Edmonds, G. Ian Gallicano, Martin Gerrits, Josh Gibson, Chris Goforth (Univ. Arizona), Ti Eriksson, Dina Grayson, Tamar Helmy, Ty Hoffman, Carter Holbrook, Richard Howlett (Exercise Science), Kate Ihle, Matt Jackman (Exercise Science), Chris Jerrnigan, Glennis Julian, Michael Kennedy, Rosemary Knapp, Sarah Kuzmiak, Eva Lacy, Israel Leinbach, Marion Le Gall (Texas A&M), Nikos Lessios, Neil Mackay, James Maino (Univ. Melbourne), Chris Mallery (Univ. North Texas), Devin Martin, Susan McKinley, Justin Merry, Este Miranda, Lee McCoy, Nathan Morehouse, John Olson (Utah State Univ.), Dale Pasino, Randi Papke, John Robertson, Michael Quinlan, Darleen Sandoval (Exercise Science), Zachary Stahlschmidt, Randy Tracy, Tina Traustidottir (Exercise Science), James Watts, Todd Weaver, Todd McWhorter (Univ. of Arizona), Adrienne Williams (Univ. of California, Irvine), Blair Wolf, Mark Wooden, Christian Wright, Mathew Wright, Kasey Yturralde, John Zehmer

**Current graduate committee service:**

Khalid Adjerid (Virginia Tech), Salvatore Anzaldo, Andrew Burchill, Andrew Janzen, Tyler Murdock, Brian Reilly, Nathan Smith, Sara Wilmsen (Univ North Texas), Guo Xiao, Deanna Zembruzski

**Undergraduate Researchers Supervised:**

**Past:**

Christopher Abdo

Todd Albert (currently staff at ASU)

Diana Almendarez (WAESO-funded)

Brandon Balsino (honor’s thesis, currently in medical school)

Taylor Biddolph (in Ph.D. program in Pathology)

Joshua Borup (working, applying for medical school)

Jacque Bruce

Christopher Bowman (switched to Anthropology at ASU)

Alexandra Brantley (currently research technician, UC Denver)

Aaron Bruce (M.D., Midwestern University)

Greg Burnett (M.D. program, Univ. of Arizona)

TimaSue Cantu (Gates Scholar, currently a nurse)

Jillian Ciarlariello

Patricia Coulter (unknown)

Kelsey Cooper (currently working as a vet tech)

Margaret Creswell (Ph.D., Univ. Texas, Austin, Biology),

Tyler Davis (working, applying for medical school)

Seth Dobrin (Ph.D., A.S.U., Microbiology),

Saundra Dohwenrend (Barrett honor’s thesis, currently in Ph.D. program in Biology at Univ. Washington)

Pirouz Ebadi

Kristina Egbert (unknown)

Jennifer Esman (unknown)

Kyra Espinosa (B.Sc., Bioengineering, A.S.U.)

Ruth Farrington

Erica Feuerbacher (currently in Ph.D. program, Cornell Univ.),

Colleen Ford (B.Sc., working as high school biology teacher)

Trevor Fox (currently in Ph.D. program at ASU)

Melanie Frazier (Ph.D., University of Washington, EPA scientist)

James Gerace (M.D., DePaul Univ. Medical School),

Nicholas Gonzalez (M.D., Univ. Wisconsin Medical School),

Preyanka Govender

Austin Gil

John Gransee (B.A. in Psychology from ASU, currently a counselor)

Kendra Greenlee (currently Assistant Professor, North Dakota State)

Joy Gur-Lavi (M.D., Emory Univ. Medical School),

Olivera Grubisha (unknown)

Scotti Gulinson (DVM, Univ. Calif. Veterinary School, Davis),

Runlong Guo (applying to dental schools)

Steve Hammet (M.D., Univ. of Arizona)

DeeAnn Hartung, 2000-2002, (Ph.D., 2009, Univ. of California, Santa Barbara, currently biologist Univ. Colorado, Denver)

Erica Heinrich (Ph.D. program, Univ. California, Irvine)

Stephanie Heinrich (current ASU undergrad)

Joanna Henry (lab coordinator at ASU)

Nicole Holden (currently in Ph.D. program at Univ. British Columbia)

Adam House

Alexander Hubb (M.D. and researcher, Univ. of Iowa)

Ramzi Ibrahim

Saman Jirjies (currently in M.Sc. program in Bioinfomatics, ASU)

Sabrina Jones

Ami Joshi

Anna Kuznetsova

Anelia Kassi (currently in medical school at Univ. Miami)

Alexander Keyel Ph.D. student at Tufts University)

Jinkyu Kim (currently in M.S. program in teaching education at ASU)

Sakina Kino (B.Sc., Biochemistry degree at ASU, unknown)

Katie Krolikowski (Ph.D., Harvard Univ., Biology, Associate. Professor, Contra Costa College),

Nemanja Kuzmanovic

Jesse LaFrenier (architect)

Dillon LaMoure unknown)

Kyle Meyer (medical school, Univ OK)

Ben McKinley (currently in medical school, Univ. Minnesota)

Elyse Munoz, (PhD, Biology, Penn State, currently healthcare analyst at IQVIA)

Subhiksha Muregesh

Uio Sara Liao (currently software consultant),

Xu Lui (Ph.D., Purdue Univ., Biochemistry),

Danielle Niren (working as a biochemist)

Ekwutosi Ohuro (M.D., Tufts University)

Choognam Onoe

Rekha Nair (unknown)

Christina Nebeker

Elana Niren

Jared Nsika (currently in M.D./Ph.D. program at U.C., San Diego)

Teja Peela

Nicholas Pierce (technician at Sun Health)

Andrew Rael (biotechnology technician)

Katrina Ramsey (Barrett honor’s thesis, currently in Pharmacy School, Midwestern Univ.)

Brenda Rascon (PhD, Biology, Univ. Norway, currently Senior Consultant, Biopharma Excellence)

Anam Saed,

Yasir Salih (currently working as a community organizer)

Uri Segal

Hunter Smith

Sean Smith

Jennifer Stewart (Ph.D., Colorado State Univ., Immunotoxicologist, SNBL),

Julian Wagner (in Biology Ph.D. program at Cal Tech)

Michael Weed (staff at ASU)

Eric Wilkinson (M.D., Stanford Medical School)

**Current Undergraduates in Lab:**

Vahan Aivazian, Aurora Beans, Daniel Karstetter, Kenyan Kerman, Paula Overby, Simon Werkhoven, Marcellina Wiertek

**High School Students Mentored in Lab:**

Gabrielle Wightman (2012), Elizabeth Palos (2012), Ruth Farington (2014), Jinoh Lee (2014), Joseph Park (2014), Farin Shiehzadegan (2014, Science Fair prize)

**High School Teacher Mentored in Lab:**

Shoshanna Kroeger (2012)

**ACADEMIC/PROFESSIONAL DEVELOPMENT**

March 2018 Mastering Online Teaching

Feb 2018 Copywrite and Fair Use Webinar for Instructors

Jan 2018 The Basics of Planning a Successful Online Course

Nov 2017 CLAS Natural Sciences Teach Online Showcase

Nov 2017 Shindig Lunch and Learn

Jan 2013 Federal Demonstration Project, ASU faculty representative

Jan 2012 Federal Demonstration Project, ASU faculty representative

Sept 2009 Project Science Management workshop

Summer 2002 General Biology Workshop (1 week)

Spring 1994 "Fast Plants" teaching workshop by Paul Williams (1 day)

Summer 1993 Hughes Teaching Strategies Workshop (1 month)

**PUBLIC SERVICE/OUTREACH**

2019

<https://asunow.asu.edu/20190503-discoveries-tiny-bee-brains-could-reveal-solutions-miniaturizing-artificial-intelligence>

**2017**

KJZZ/NPR interview with Lauren Gilger (The Show)

<http://theshow.kjzz.org/content/446430/asu-research-studying-reasons-bee-population-decline>

Arizona Republic coverage of ASU honey bee research (including our lab):

<http://www.azcentral.com/story/sponsor-story/arizona-state-university/2017/02/23/asu-honeybee-decline-threat-to-global-food-supply/98301512/>

NPR coverage of my lab’s research into the potential role of fungicides on declining pollinators (imminent).

**2016**

Created the Beetle Dissection tool on Ask A Biologist website

https://askabiologist.asu.edu/beetle-dissection

This site is a network of 54 high-quality photographic and x-ray images that students can click through to see and identify more than 40 structures in unprecedented detail. The site also includes student activities and teacher guidance materials, and is written in HTML5, and so is compatible with tablets and phones, greatly facilitating student-use. We worked closely with educators to ensure that the educational goals aligned with Arizona and Common Core standards.

**2015**

Featured on the blog “Noticing” by Robert Krulwich and Aatish Bhatia. <http://noticing.co/how-insects-breathe/>

Featured in article in Science on SICB Pancrustacean symposium (http://www.sciencemagazinedigital.org/sciencemagazine/16\_january\_2015?folio=220#pg12).

**2014**

Manduca website on Ask-A-Biologist (https://askabiologist.asu.edu/experiments/manduca)

This is an educational website, aimed at middle-high school students, designed to teach core principle related to insect development and effects of temperature on growth and size. It has been highly successful, over 10,000 reads as of mid-2016, with over 20 min average time on the page according to Google Analytics.

**2013**

Featured on BBC film: Insect Dissection: How Insects Work

**2012**

ScienceNow with slide show [[link](http://news.sciencemag.org/sciencenow/2012/01/slideshow-low-quality-plants-pow.html?ref=hp)]  
This Week in SCIENCE [[link](http://ariannecease.com/wp-content/uploads/2012/01/ThisWeekinSCIENCE_fullpdf.pdf)]  
AAAS News [[link](http://www.aaas.org/news/releases/2012/0126sp_locust.shtml)]  
Science Magazine Podcast [[link](http://podcasts.aaas.org/science_podcast/SciencePodcast_120127.mp3)]  
NSF Science360 – Breaking Story [[link](http://news.science360.gov/obj/story/92cdc36b-78c8-47c9-9372-31084c73010b)]  
NSF.gov News [[link](http://nsf.gov/news/news_summ.jsp?cntn_id=122983&org=NSF&from=news)]  
BBC World Service (min 50:00) [[link](http://www.bbc.co.uk/programmes/p00n0f3j)]  
Science and Development Network [[link](http://www.scidev.net/en/agriculture-and-environment/news/nitrogen-fertiliser-could-prevent-locust-swarms-.html)]  
Voice of America  
Le Figaro [[link](http://www.lefigaro.fr/sciences/2012/01/27/01008-20120127ARTFIG00388-quand-les-hommes-favorisent-la-pullulation-de-criquets.php)]  
AllAfrica.com [[link](http://allafrica.com/stories/201201271544.html)]  
io9.com [[link](http://io9.com/5878952/why-locust-swarms-seem-to-hit-those-who-are-already-suffering-the-most)]  
Radio New Zealand [[link](http://www.radionz.co.nz/news/world/96952/scientists-put-forward-theory-on-locust-swarms)]  
France24 [[link](http://www.france24.com/en/20120126-overgrazed-fields-could-promote-locust-swarms-study)]  
AFP – Agence France-Presse [[link](http://www.google.com/hostednews/afp/article/ALeqM5iYDWwcy0pSOld9L7BQPauHz_JmoA?docId=CNG.daee7fd5cc7dc1ee1653519904dd6c51.3f1)]  
PhysOrg [[link](http://www.physorg.com/news/2012-01-overgrazed-grasslands-tied-locust-outbreaks.html)]  
ScienceCodex [[link](http://www.sciencecodex.com/read/overgrazed_grasslands_tied_to_locust_outbreaks-84976)]  
ScienceDaily [[link](http://www.sciencedaily.com/releases/2012/01/120126152127.htm)]  
labspaces [[link](http://www.labspaces.net/117125/Overgrazed_grasslands_tied_to_locust_outbreaks)]  
White Mountain Conservation League [[link](http://azwmcl.org/blog/general/overgrazed-grasslands-tied-to-locust-outbreaks)]  
Brunei Times [[link](http://www.bt.com.bn/features/2012/01/28/overgrazed-fields-could-promote-locust-swarms)]

SciShow interview with Hank Green: <http://www.youtube.com/watch?v=l79FuGuk1qE&feature=player_embedded>

Trained Phoenix Bioscience High School students (Gabrielle Wightman and Elizabeth Palos) and teacher (Shoshanna Kroeger) in a summer research program (2012)

**2010**

Coverage by Silobreaker:

<http://www.silobreaker.com/high-oxygen-levels-spawn-monster-dragonflies-5_2263838725144313856>

Coverage by Motherboard:

<http://www.motherboard.tv/2010/11/1/scientists-are-breeding-giant-dragonflies--2>

Coverage by TrueAuthority.com: <http://www.trueauthority.com/dinosaurs/death2.htm>

Coverage by Softpedia:

<http://news.softpedia.com/news/Massive-Dragonflies-Roamed-the-Ancient-Earth-164467.shtml>

Coverage by Everything Dinosaur: <http://blog.everythingdinosaur.co.uk/blog/_archives/2010/11/3/4671836.html>

Coverage by Geeky Gadgets:

<http://www.geeky-gadgets.com/arizona-state-university-raising-giant-insects-to-solve-evolution-mystery-30-10-2010/>

**2007**

Coverage by TrueAuthority.com

<http://www.trueauthority.com/dinosaurs/death2.htm>

**2006**

Dagmar Röhrlich, German Public Radio: Deutschlandfunk

Multiple science demonstrations at Waggoner Elementary School

Living on Earth Radio Interview (<http://www.loe.org/shows/segments.htm?programID=06-P13-00042&segmentID=8>)

American Physiological Society News Release

<http://www.the-aps.org/press/conference/vabeach/11.htm>

Coverage by PHYSORG.COM 16:51, Oct. 2006

<http://www.physorg.com/news79804314.html>

Coverage by EurekaAlert.com:

<http://www.eurekalert.org/pub_releases/2006-10/aps-gim100706.php>

Inside JEB:

<http://jeb.biologists.org/cgi/reprint/207/3/387>

<http://www.livescience.com/animalworld/061011_giant_insects.html>

Coverage by ScienceAgogo: “Bow to Your Insect Overlords”

<http://www.scienceagogo.com/news/insects_climate.shtml>

Coverage by Softpedia, Article by Stefan Anitei

<http://news.softpedia.com/news/More-Oxygen-Would-Mean-Giant-Insects-37643.shtml>

Coverage by What’s Next in Science and Technology

<http://www.whatsnextnetwork.com/technology/index.php/2006/10/11/more_oxygen_in_atmosphere_produced_giant>

Coverage by UnExplainedMysteries.Com

<http://www.unexplained-mysteries.com/viewnews.php?id=80269>

Coverage by Jennifer Vegas, Discovery News

<http://dsc.discovery.com/news/2006/10/11/giantbug_ani.html?category=dinosaurs&guid=20061011140030>

Coverage by Mongabay.Com

<http://news.mongabay.com/2006/1010-insects.html>

ABC News: Dye Hard Science

<http://abcnews.go.com/Technology/DyeHard/story?id=2578773&page=1>

Coverage by Tribe.net

<http://tribes.tribe.net/strangephenomena/thread/90bb6cc9-fb5f-4bca-be8e-1c83c3bd1920>

Coverage by CreationontheWeb.com

<http://www.creationontheweb.com/content/view/4686/>

Coverage by NSF

<http://www.nsf.gov/news/mmg/mmg_disp.cfm?med_id=51729&from=googlebot(at)googlebot.com>

**2005**

Larry Hanlon, Discovery Magazine (<http://dsc.discovery.com/news/briefs/20050815/megainsect.html>)

Science News Dec. 17, 2005 by Sid Perkins:

<http://www.findarticles.com/p/articles/mi_m1200/is_25_168/ai_n16029291>

**2004** New York Times interview: Front page article regarding giant insects

**2003** Several science demonstrations, Waggoner Elementary

**2002** Interviewed by John Doyle, British channel 6

Monthly science demonstrations, Waggoner Elementary

Biology career day: Kyrene Middle School

Desert Botanical Gardens Presentation: “Hoppin’ Hoppers”

**2001** Interviewed by Annie Bates, BBC

**2000** Interviewed for Raven & Johnson’s Biology “Real People Doing

Real Science” feature

**1999** Featured on KAET (Channel 8): ASU Research

**1998** ASU Insight and ASU Research articles re giant insects

http://researchmag.asu.edu/stories/bugs.html

<http://researchmag.asu.edu/stories/test.html>

**1997** Channel 3 Halloween interview re edible insects

**1996** Interview, CNN (Bailey Barash)

Interview, BBC World News Service (Ruth Linton), phone interview broadcast world-wide on “Programme Science”, Oct. 4 and 5

Interview, German News Service (Gisela Ostwald)

Interview, Washington Post (Kurt Supple)

Interview, New Scientist Magazine (Ben Crystal)

Interview, Tribune Newspapers

**1995** Interview, Channel 12, Phoenix

Inerview, Tribune Newspapers

**1993** Interview, NBC radio

**1991-1996** Judge, Broadmoor Science Fair

**1995-1996** Monthly science demonstrations, Waggonner Elementary School

**Publications**

**BOOKS:**

Harrison, J.F., H. Arthur Woods and Stephen P. Roberts. *Ecological and Environmental Physiology of Insects*. 2012. ISBN:978-0-19-922594-1; 978-0-19-922595-8. Oxford Press. 392 pages.

**BOOK CHAPTERS:**

Harrison, J. and Wasserthal, L. (2012) Gaseous exchange, in *R.F. Chapman’s The Insects: Structure and Function* (eds S.J. Simpson and A.E. Douglas) Cambridge University Press.

J.S. Waters and J.F. Harrison. 2012. Insect metabolic rates. in Metabolic Ecology: A Scaling Approach. Editors: J. Brown, R. Sibly and A. Brown. John Wiley & Sons. ISBN: 978-0-470-67153-5.

**COMMENTARIES, LETTERS:**

Harrison, J.F. 2015. Evolvability and nonevolvability of allometric slopes. Proceedings of the National Academy of Sciences, USA. 112:13426-13427. DOI: 10.1073/pnas.1517621112. Web: <http://www.pnas.org/content/112/44/13426.short>

Harrison, J.F. 2018. Reply to Glazier. Trends in Ecology and Evolution 33(4):238-239. DOI: [10.1016/j.tree.2018.01.004](http://dx.doi.org/10.1016/j.tree.2018.01.004)

Harrison, J.F. 2019. Physiology: The highs and lows of bird flight. eLife 2019; 8:e50626 DOI: [10.7554/eLife.50626](https://doi.org/10.7554/eLife.50626)

**REVIEWED PUBLICATIONS:**

(138 Reviewed Publications total)

Campbell, J.B., P. Overby, A. Gray, H. Smith and J.F. Harrison. 2019. Genome-wide association analysis of anoxia tolerance in *Drosophila melanogaster*. G3: Genes|Genomes|Genetics. *https://doi.org/10.1534/g3.119.400421*

Campbell, J.B, S. Werkhoven and J.F. Harrison. 2019. Metabolomic variation in anoxia tolerance of *Drosophila melanogaster*: evidence against substrate limitation and for roles of protective metabolites and paralytic hypometabolism. American Journal of Physiology. [*https://doi.org/10.1152/ajpregu.00389.2018*](https://doi.org/10.1152/ajpregu.00389.2018)

Ravn, M.V., J.B. Campbell, L.C.L. Gerber, J.F. Harrison and J. Overgaard. 2019. Effects of anoxia on ATP, water, ion and pH balance in an insect (*Locusta migratoria)*. Journal of Experimental Biology. 222:jeb190850. DOI: 10.1242/jeb.190850.

Downs, C.J., L.A. Schoenle, B.A. Han, J.F. Harrison and L.B. Martin. 2019. Scaling of host competence. Trends in Parasitology. 35(3): 189-192. DOI:<https://doi.org/10.1016/j.pt.2018.12.002>.

Harrison, J.F. 2018. Approaches for testing hypotheses for the hypometric scaling of aerobic metabolic rate in animals. American Journal of Physiology: Regulatory, Integrative and Comparative Physiology. 315:R879-894. D.O.I: 10.1152/ajpregu.00165.2018

Campbell, J.B, M.A. Anderson, J. Overgaard and J.F. Harrison. 2018. Paralytic hypo-energetic state facilitates anoxia tolerance despite ionic imbalance in adult *Drosophila melanogaster*. Journal of Experimental Biology 221: jeb177147. DOI: 10.1242/jeb.177147.

Harrison, J.F., James S. Waters, Taylor Biddulph, Aleksandra Kovacevic, C. Jaco Klok and John J. Socha . 2018. Developmental plasticity and stability in the tracheal networks supplying *Drosophila* flight muscle in response to rearing oxygen level. Journal of Insect Physiology 106:189-198. DOI: [10.1016/j.jinsphys.2017.09.006](http://dx.doi.org/10.1016/j.jinsphys.2017.09.006)

Harrison, J.F., Kendra J. Greenlee and Wilco C.E.P. Verberk. 2018. Functional Hypoxia in Insects: Definition, Assessment, and Consequences for Physiology, Ecology, and Evolution. Annual Review of Entomology 63:303-325. [10.1146/annurev-ento-020117-043145](https://doi.org/10.1146/annurev-ento-020117-043145)

Harrison, J.F. 2017. Do performance-safety tradeoffs cause hypometric metabolic scaling in animals? Trends in Ecology and Evolution. 32(9):653-664. DOI: 10.1016/j.tree.2017.05.008

Cease, A., J. Harrison, S. Hao, G. Niren, G. Zhang, L. Kang, J. Elser. 2017. Nutritional imbalances suppress migratory phenotypes of the Mongolian locust (*Oedaleus asiaticus*) Royal Society Open Science 4: 161039. http://dx.doi.org/10.1098/rsos.161039.

Waters, J.S., A. Ochs, J.H. Fewell and J.F. Harrison. 2017. Differentiating causality and correlation in allometric scaling: ant colony size drive metabolic hypometry. Proceedings of the Royal Society B. 284:20162582. http://dx.doi.org/10.1098/rspb.2016.2582

Cevallos-Dupuis, E.K. and J.F. Harrison. 2016. Trunk trail maintenance in leafcutter ants: Caste involvement and effects of obstacle type and size on path clearing in *Atta cephalotes.* Insectes Sociaux*.* doi:10.1007/s00040-016-0530-y

Fewell, J.H. and J.F. Harrison. 2016. Scaling of work and energy use in social insect colonies. Behavioral Ecology and Sociobiology. 70:1047-1061.

Wang, Y., J. Campbell, O. Kaftanoglu, R.E. Page, G.V. Amdam and J.F. Harrison. 2016. Larval starvation improves metabolic response to adult starvation in honey bees (*Apis mellifera*). Journal of Experimental Biology. 219:960-968.

Cease, A.J., M. Fay, J.J. Elser and J.F. Harrison. 2016. Dietary phosphate affects food selection, post-ingestive P fate, and performance of a polyphagous herbivore. Journal of Experimental Biology 219:64-72. DOI: 10.1242/jeb126847. Web: http://jeb.biologists.org/content/219/1/64.

Campbell, J.B., R. Nath, J. Gadau, T. Fox, G. DeGrandi-Hoffman and J.F. Harrison. 2016. The fungicide Pristine™ inhibits mitochondrial function in vitro but not flight metabolic rates in honey bees. Journal of Insect Physiology 86:11-16. doi:10.1016/j.jinsphys.2015.12.003. Web: http://www.sciencedirect.com/science/article/pii/S0022191015300123

C. Jaco Klok, Alexander Kaiser, Jake J. Socha, Wah-Keat Lee and Jon F. Harrison. 2016. Multigenerational effects of rearing atmospheric oxygen level on the tracheal dimensions and diffusing capacities of pupal and adult Drosophila melanogaster. Advances in Experimental Biology and Medicine 903: 285-300.

Harrison, J.F., M. Manoucheh, C.J. Klok and J.B. Campbell. 2015. Temperature and the ventilatory response to hypoxia in *Gromphadorhiina portentosa* (Schaum). Environmental Entomology 2015:1-5. DOI: 0.1093/ee/nvv217.

Blatch, S.A., S.P. Stabler and J.F. Harrison. 2015. The effects of folate intake on DNA and single-carbon pathway metabolism in *Drosophila melanogaster* compared to mammals. Comparative Biochemistry and Physiology, Part B. 189:34-39. Web: http://www.sciencedirect.com/science/article/pii/S109649591500127X

Callier, V., S.C. Hand, J. Campbell, T. Biddulph and J.F. Harrison. 2015. Developmental changes in hypoxic exposure and responses to anoxia in *Drosophila* *melanogaster*. Journal of Experimental Biology 218:2927-2934. DOI: 10.1242/jeb.125849. Web: http://jeb.biologists.org/content/218/18/2927

Harrison, J.F., A.W. Shingleton and V. Callier. 2015. Invited Perspective: Stunted by developing in hypoxia: linking comparative and model organism studies. Physiological and Biochemical Zoology 88(5):455-470. DOI: 10.1086/682216. Web: http://www.journals.uchicago.edu/doi/abs/10.1086/682216

Harrison, J.F. 2015. Handling and use of oxygen by pancrustaceans: conserved patterns and the evolution of respiratory structures. Integrative and Comparative Biology 55(5):802-815. Doi:10.1093/icb/icv055. Web: http://www.ncbi.nlm.nih.gov/pubmed/26002563

Tamone, S. and J. Harrison. 2015. Linking insects with crustacean: Physiology of the Pancrustacea: Introduction to the symposium. Integrative and Comparative Biology 55(5):765-770. Doi:10.1093/icb/icv093. Web: http://icb.oxfordjournals.org/content/early/2015/08/05/icb.icv093.full

Cease, A.J., J. Elser, E. Fenichel, J. Hadrich, J. Harrison and B. Robinson. 2015. Living with locusts: connecting soil nitrogen, locust outbreaks, livelihoods and livestock markets. Bioscience 65:515-558. doi:10.1093/biosci/biv048. Web: http://bioscience.oxfordjournals.org/content/65/6/551.abstract

Harrison, J.F., C.J. Klok and J.S. Waters. 2014. Critical PO2 is size-independent in insects: implications for the metabolic theory of ecology. Current Opinion in Insect Science 4:54-59. 10.1016/j.cois.2014.08.012

Farzin, M., T. Albert, N. Pierce, J.M. VandenBrooks, T. Dodge and J.F. Harrison. 2014. Acute and chronic effects of atmospheric oxygen on the feeding behavior of *Drosophila melanogaster* larvae. Journal of Insect Physiology. 68:23-29. DOI:10.1016/j.jinsphys.2014.06.017.

Henry, J. and J.F. Harrison. 2014. Body size effects on the oxygen-sensitivity of dragonfly flight. Journal of Experimental Biology 217:3447-3456 doi:10.1242/jeb.095828.

Dejian Zhao, Zhenyu Zhang, Arianne Cease, Jon Harrison, and Le Kang.

2013. Efficient utilization of aerobic metabolism helps Tibetan locusts conquer

hypoxia. BMC Genomics 14:631 doi:10.1186/1471-2164-14-631.

Callier, V., Shingleton, A.W., Brent, C.S., Ghosh, S.M., Kim, J. and J.F. Harrison. 2013. The role of reduced oxygen in the developmental physiology of growth and metamorphosis initiation in *Drosophila*. Journal of Experimental Biology 216:4334-4340. DOI: 10.1242/jeb.093120

Harrison, J.F., Cease, A.J., VandenBrooks, J.M., Albert, T. and G. Davidowitz. 2013. Caterpillars selected for large body size and short development time are more susceptible to oxygen-related stress. Ecology and Evolution 3:1305-1316. DOI: 10.1002/ece3.551.

Klok, C.J. and J.F. Harrison. 2013. The temperature-size rule in arthropods: independent of macro-scale environmental variables but size-dependent. Integrative and Comparative Biology 53:557-570. DOI: 10.1093/icb/ict075.

Harrison, J.F., Waters, J.S., Cease, A.J., VandenBrooks, J.M., Callier, V., Klok, C.J., Shaffer, K. and J.J. Socha. 2013. How locusts breathe. Physiology 28:18-27.

Zhao, D.J., Z.Y. Zhang, J. Harrison and L. Kang. 2012. Genome-wide analysis of transcriptional changes in the thoracic muscle of the migratory locust, *Locusta migratoria*, exposed to hyobaric hypoxia. Journal of Insect Physiology 58:1424-1431.

Lease, H., C.J. Klok, A. Kaiser and J.F. Harrison. 2012. Body size is not critical for critical PO2 in scarabaeid and tenebrionid beetles. Journal of Experimental Biology 215:2524-2533.

Cease, A.J., J.J. Elser, C.F. Ford, S. Hao, L. Kang and J.F. Harrison. 2012. Heavy livestock grazing promotes locust outbreaks by lowering plant nitrogen content. Science 335:467-469.

Vandenbrooks, J.M., E.E. Munoz, M.D. Weed, C.F. Ford, M.A. Harrison and J.F. Harrison. 2012. Impacts of paleo-oxygen levels on the size, development, reproduction, and tracheal systems of *Blatella germanica*. Journal of Evolutionary Biology 39:83-93.

Heinrich, E.C., M. Farzin, C.J. Klok and J.F. Harrison. 2011. The effect of developmental stage on the sensitivity of cell and body size to hypoxia in *Drosophila melanogaster*. Journal of Experimental Biology. 214:1429-1427.

Schilman, P.E., J.S. Waters, J.F. Harrison and J.R.B. Lighton. 2011. Effects of temperature on responses to anoxia and oxygen reperfusion in the fruitfly, *Drosophila melanogaster*. Journal of Experimental Biology 214:1271-1275.

Harrison, J.F. and G.G. Haddad. 2011. Effects of oxygen on growth and size: synthesis of molecular, organismal and evolutionary studies with *Drosophila* melanogaster. Annual Review of Physiology 73:13.1-13.9.

Blatch, S.A., K.W. Meyer and J.F. Harrison. 2010. Effects of dietary folic acid level and symbiotic folate production on fitness and development in the fruit fly *Drosophila melanogaster*. Fly 4:1-8.

Rascón, B. and J.F. Harrison. 2010. Lifespan and oxidative stress show a non-linear response to atmospheric oxygen in *Drosophila*. Journal of Experimental Biology 213:3441-3448.

Waters, J.S., C.T. Holbrook, J.H. Fewell and J.F. Harrison. 2010. Allometric scaling of metabolism, growth and activity of whole colonies of the seed harvester ant, *Pogonomyrmex californicus*. American Naturalist 176:501-510.

Cease, A.J., S. Hao, L. Kang, J.J. Elser and J.F. Harrison. 2010. Are color or high rearing density related to migratory polyphenism in the band-winged grasshopper, *Oedaleus asiaticus*? Journal of Insect Physiology 56:926-936.

Klok, C.J., A. Kaiser, J.R.B. Lighton and Harrison, J.F. 2010. Critical oxygen partial pressures and maximal tracheal conductances for *Drosophila melanogaster* reared for multiple generations in hypoxia or hyperoxia. Journal of Insect Physiology 56:461-469.

Harrison, J.F., A. Kaiser and J.M. VandenBrooks. 2010. Atmospheric oxygen level and the evolution of insect size. Proceedings of the Royal Society of London B. 277:1937-1946. doi:10.1098/rspb.2010.0001.

Sato, H., C.W. Berry, Y. Peeri, E. Baghoomian, B.E. Casey, G. Lavella, J.M. VandenBrooks, J.F. Harrison and M.M. Maharbiz. 2009. Remote radio control of insect flight. Frontiers in Integrative Neuroscience 3:24. doi:10.3389/neuro.07.024.2009

Greenlee, K.J., J.R. Henry, S.D. Kirkton, M.W. Westneat, K. Fezzaa, W.K. Lee and J.F. Harrison. 2009. Synchrotron imaging of the grasshopper tracheal system: morphological components of tracheal hypermetry and the effect of age and stage on abdominal air sac volumes and convection. American Journal of Physiology: Comparative, Regulatory and Integrative Physiology 297:1343-1350.

Klok, C.J., A.J. Hubb and J.F. Harrison. 2009. Single and multigenerational responses of body mass to atmospheric oxygen concentration in Drosophila melanogaster: evidence for roles of plasticity and evolution. Journal of Evolutionary Biology 22: 2496-2504.

Bradley, T.J., A.D. Briscoe, S.G. Brady, H.L. Contreras, B.N. Danforth, R. Dudley, D. Grimaldi, J.F. Harrison, A. Kaiser, C. Merlin, S.M. Reppert, J.M. VandenBrooks and S.P. Yanoviak. 2009. Episodes in insect evolution. Integrative and Comparative Biology 49(5):590-606.

Harrison, J.F. 2009. Respiratory System. Pages 889-895 in: “Encyclopedia of Insects, 2nd ed.”. Editors, V.H. Resh and R. Carde, Elsevier, San Diego.

Klok, C.J. and J.F. Harrison. 2009. Atmospheric hypoxia limits selection for large body size in insects. PLoS ONE 4(1): e3876. doi:10.1371/journal.pone.0003876.

Harrison, J.F., A. Kaiser and J. Vandenbrooks. 2008. Mysteries of oxygen and insect size. 4th CPB Meeting in Africa: Mara 2008. “Molecules to migration: The pressures of life” (Ed S. Morris & A. Vosloo). Medimond Publishing Co, via Maserati 6/2, 40124 Bologna, Italy. Pages 293-302.

Socha, J.J., W.K. Lee, J.F. Harrison, J.S. Waters, K. Fezzaa and M.W. Westneat. 2008. Correlated patterns of tracheal compression and convective gas exchange in a carabid beetle. Journal of Experimental Biology 211:3409-3420.

Frazier, M.R., J.F. Harrison, S.D. Kirkton and S.P. Roberts. 2008. Cold rearing improves cold flight performance in *Drosophila* via changes in wing morphology. Journal of Experimental Biology 211:2116-2122.

Alexander Kaiser, C. Jaco Klok, J. Jake Socha, Wah-Keat Lee, Michael C. Quinlan, Jon F. Harrison. 2007. Increase in tracheal investment with beetle size supports hypothesis of oxygen limitation on insect gigantism. Proceedings of the National Academy of Sciences USA 104:13198-13203.

Greenlee, K.J., C. Nebeker and J.F. Harrison. 2007. Body size-independent safety margins for gas exchange across grasshopper species. Journal of Experimental Biology 210:1288-1296.

Socha, J.J., Westneat, M.W., Harrison, J.F., Waters, J.S., and Lee, W.K. 2007. Real-time phase-contrast x-ray imaging, a new technique for the study of animal form and function. BMC Biology 5:6.

Badman, J., J.F. Harrison and M.P. McGarry. 2007. Grasshoppers for research and education: care for maintenance and production colonies. Lab Animal Science 36(3):27-31.

Harrison, J.F., M.R. Frazier, J.R. Henry, A. Kaiser, C.J. Klok, B. Rascón. 2006. Responses of terrestrial insects to hypoxia or hyperoxia. Respiratory Physiology and Neurobiology 154:4-17.

Harrison, J.F., Jennifer Fewell, Kirk E. Anderson, and Gerald M. Loper. 2006. Environmental physiology of the invasion of the Americas by Africanized honey bees. Integrative and Comparative Biology 46:1110-1122.

Lease, H.M., Wolf, B.O. and J.F. Harrison. 2006. Intraspecific variation in tracheal volume in the American locust, *Schistocerca americana*, measured by a new inert gas method. Journal of Experimental Biology 209:3476-3483.

Kirkton, S.D. and J.F. Harrison. 2006. Ontogeny of locomotory behaviour in the American locust, *Schistocerca americana*: from marathoner to broad jumper. Animal Behaviour 71:925-931.

Blatch, S.A. and J.F. Harrison. 2005. An up-dated chemically-defined medium for *Drosophila melanogaster*. Drosophila Information Services 88:126-127.

Rascón, B. and J.F. Harrison. 2005. Atmospheric oxygen effects on metabolic rate and lift production of tethered flying locusts. Journal of Insect Physiology 51:1193-1199.

Kirkton, S.D., Nsika, J. and J.F. Harrison. 2005. Ontogenetic effects on aerobic and anaerobic metabolism during jumping in the American locust, *Schistocerca americana*. Journal of Experimental Biology 208:3003-3012.

Harrison, J.F., J.J. LaFreniere, K.J. Greenlee. 2005. Ontogeny of tracheal dimensions and gas exchange capacities in the grasshopper, *Schistocerca americana*. Comparative Biochemistry and Physiology 141:372-380.

Greenlee, J.F and J.F. Harrison. 2005. Respiratory changes throughout ontogeny in the tobacco hornworm caterpillar, *Manduca sexta*. Journal of Experimental Biology 208:1385-1392.

Harrison, J.F., O.R. Taylor and H.G. Hall. 2005. The flight physiology of reproductives of Africanized, European and hybrid honey bees (*Apis mellifera*). Physiological and Biochemical Zoology 78:153-162.

Hartung, D.K., S.D. Kirkton and J.F. Harrison. 2004. Ontogeny of tracheal system structure: a light and electron-microscopy study of the metathoracic femur of the American locust, *Schistocerca americana*. J. Morphology 262:800-812.

Harrison, J.F. and R.K. Suarez. 2004. JEB Classic: Krogh, A. and Weis-Fogh, T. The respiratory exchange ratio of the desert locust (*Schistocerca gregaria*) before, during and after flight. Journal of Experimental Biology 207:3251-3252.

Henry, J.R. and J.F. Harrison. 2004. Plastic and evolved responses of tracheal dimensions to varied atmospheric oxygen content in *Drosophila melanogaster*. J. Exp. Biol. 207:3559-3567.

Schmitz, A. and J.F. Harrison. 2004. Hypoxic tolerance in air-breathing invertebrates. Respiratory Physiology and Neurobiology 141:229-242.

Perkins, M., A.H. Woods, J.F. Harrison and J.E. Elser. 2004. Dietary phosphorus affects the growth of larval Manduca sexta. Archives of Insect Biochemistry and Physiology 55:153-168 .

Roberts, S.P., J.F. Harrison and R. Dudley. 2004. Allometry of kinematics and energetics in carpenter bees (*Xylocopa veripuncta*) hovering in variable density gases. J. Exp. Biology 207: 993-1004.

Greenlee, K. and J.F. Harrison. 2004. Development of respiratory function in the American locust, *Schistocerca americana*. II. Within-instar effects. Journal of Experimental Biology 207:509-517.

Greenlee, K. and J.F. Harrison. 2004. Development of respiratory function in the American locust, *Schistocerca americana*. I. Across-instar effects. Journal of Experimental Biology 207: 497-508.

Woods, H.A., W.F. Fagan, J.J. Elser and J.F. Harrison. 2004. Allometric and phylogenetic variation in insect phosphorus content. Functional Ecology 18:103-109.

Sullivan, J.P., S.E. Fahrbach, J.F. Harrison, E.A. Capaldi, J.H. Fewell and G.E. Robinson. 2003. Juvenile hormone and division of labor in honey bee colonies: effects of allatectomy on flight behavior and metabolism. Journal of Experimental Biology 206: 2287-2296

Woods, H.A., W. Makino, J.B. Cotner, S.E. Hobbe, J.F. Harrison, K Acharya and J.J. Elser. 2003. Temperature and the chemical composition of poikilothermic organisms. Functional Ecology 17: 237-245.

Fuerbacher, E., J.F. Harrison, J.H. Fewell, S.P. Roberts, and E. F. Smith. 2003. Effects of load type (pollen or nectar) and load mass on hovering metabolic rate and mechanical power output in the honey bee, *Apis mellifera*. J. Experimental Biology 206:1855-1865.

Harrison, J.F. 2003. Tracheal System. Pages 1142-1145 in: “Encyclopedia of Insects”. Editors, V.H. Resh and R. Carde, Academic Press, San Diego.

Harrison, J.F. 2003. Respiratory System. Pages 1002-1007 in: “Encyclopedia of Insects”. Editors, V.H. Resh and R. Carde, Academic Press, San Diego.

Woods, H.A., M.C. Perkins, J.J. Elser and J.F. Harrison. 2002. Absorption and storage of phosphorus by larval Manduca sexta. J. Insect Physiology 48: 555-564.

Fewell. J.H. and J.F. Harrison. 2002. Variation in foraging phenotypes between African and European honey bee workers. Pages 3-15 in: R.E. Page and E. Erickson, Eds., Proceedings of the 2nd International Congress on Africanized Honey Bees and Bee Mites. A.I. Root, New York.

Woods, H.A. and J.F. Harrison. 2002. Interpreting rejections of the beneficial acclimation hypothesis: when is physiological plasticity adaptive? Evolution 56(9): 1863-1866.

Bustami, H.P., J.F. Harrison and R. Hustert. 2002. Evidence for oxygen and carbon dioxide receptors in the CNS of insects which influence ventilation. Comparative Biochemistry and Physiology A 133 (3): 595-604.

Harrison, J.F. and J.H. Fewell. 2002. Environmental and genetic influences on flight metabolic rate in the honey bee, *Apis mellifera*. Comparative Biochemistry and Physiology A 133(2): 323-333.

Harrison, J.F., A.C. Whitmer and J. Nichols. 2001. Evaluating the impact of physical renovation, computerization, and use of an inquiry approach in an undergraduate, allied health human anatomy and physiology lab. Advances in Physiology Education 25: 202-210.

Frazier, M.R., H.A. Woods and J.F. Harrison. 2001. Interactive effects of rearing temperature and oxygen on the development of *Drosophila melanogaster*. Physiological and Biochemical Zoology 74 (5): 641-650.

Woods, H. A., Sorenson, C. E., Stephenson, A. and Harrison, J. F. 2001. A simple allozyme method for distinguishing all life stages of *Manduca sexta* and M. quinquemaculata. Entomologia Experimentalis et Applicata. 98(1): 109-113.

Harrison, J. F., Camazine, S., Marden, J. H., Kirkton, S. D., Rozo, A. and Yang, X. 2001. Mite not make it home: effects of tracheal mites on the flight metabolic capacity of honey bees. Journal of Experimental Biology 204(4) 805-814.

Woods, H.A. and J.F. Harrison. 2001. The beneficial acclimation hypothesis versus acclimation of specific traits: physiological change in water-stressed *Manduca sexta* caterpillars. Physiological and Biochemical Zoology 74:32-44.

Harrison, J.F. Insect acid-base physiology. 2001. Annual Review of Entomology 46:221-250.

Frazier, M.R., J.F. Harrison and S. Behmer. 2000. Effects of diet on titratable acid-base excretion in grasshoppers. Physiological and Biochemical Zoology 73:66-76.

Harrison, J.F. and S.P. Roberts. Flight respiration and energetics. 2000. Annual Review of Physiology 62:179-205.

Elser, J. J., Sterner, R. W., Gorokhova, E. Fagan, W. F., Markow, T. A., Cotner, J. B., Harrison, J. F., Hobbie, S. E., Odell, G. M. and Weider, L. J. 2000. Biological stoichiometry from genes to ecosystems. Ecology Letters, 3: 540-550.

Roberts, S.P. and J.F. Harrison. 1999. Mechanisms of thermal stability during flight in the honey bee Apis mellifera. Journal of Experimental Biology 202:1523-1533.

Greenlee, K.J, and J.F. Harrison. 1998. Acid-base and respiratory responses to hypoxia in the grasshopper *Schistocerca americana*. Journal of Experimental Biology 201:2843-2855.

Roberts, S.P., J.F. Harrison and N.F. Hadley. 1998. Mechanisms of thermal balance in flying *Centris pallida* (Hymenoptera:Anthoporidae). Journal of Experimental Biology 201:2321-2331.

Harrison, J.H. and J.R. Lighton. 1998. Oxygen sensitive flight metabolism in the dragonfly, *Erythemis simplicicollis*. Journal of Experimental Biology 201:1739-1744.

Roberts, S.P. and J.F. Harrison. 1998. Mechanisms of thermoregulation in flying bees. American Zoologist 38:492-502.

Harrison, J.F. 1998. An introduction to “Responses of terrestrial arthropods to variation in the thermal and hydric environment: molecular, organismal and evolutionary approaches” American Zoologist 38:413-417.

Joos, B., J.R.B. Lighton, J.F. Harrison, R.K. Suarez and S.P. Roberts. 1997. Effects of ambient oxygen tension on flight performance, metabolism and water loss of the honeybee. Physiological Zoology 70:167-174.

Harrison, J.F., J.H. Fewell, S.P. Roberts, and H.G. Hall. 1997. Letter: Honeybee thermoregulation. Science 276:1016-1017.

Harrison, J.F. 1997. Ventilatory mechanism and control in grasshoppers. American Zoologist 37:73

Suarez, R.K., J.R.B. Lighton, B. Joos, S.P. Robert and J.F. Harrison. 1996. Energy metabolism, enzymatic flux capacities and metabolic flux rates in flying bees. Proceedings of the National Academy of Science 93:12616-12620.

Harrison, J.F., J.H. Fewell, S.P. Roberts, and H.G. Hall. 1996. Achievement of thermal stability by varying metabolic heat production in flying honeybees. Science. 274:88-90.

Fewell, J.H., J.R.B. Lighton, J.F. Harrison, T.M. Stiller, and M.D. Breed. 1996. Energetics of foraging in the giant tropical ant, *Paraponera clavata*. Oecologia 105:419-427.

Harrison, J.F., D. Neilson, and R.E. Page. 1996. Malate dehydrogenase genotype, temperature and colony effects on flight metabolic rate in the honey bee, Apis mellifera. Functional Ecology 10:81-88.

Krolikowski, K.A. and J.F. Harrison. 1996. Haemolymph acid-base status, tracheal gas levels, and the control of post-exercise ventilation rate in grasshoppers. Journal of Experimental Biology 199:391-399.

Gulinson, S.L. and J.F. Harrison. 1996. Control of resting ventilation in grasshoppers. Journal of Experimental Biology 199:379-389.

Harrison, J.F., N.F. Hadley, and M.C. Quinlan. 1995. Acid-base status and spiracular control during discontinuous ventilation in grasshoppers. Journal of Experimental Biology. 198:1755-1763.

Harrison, J.F. 1995. Nitrogen metabolism and excretion in locusts. In: Nitrogen Metabolism and Excretion (eds: Walsh, P.J. and P.A. Wright). CRC Press.

Harrison, J.F. and J.H. Fewell. 1995. Thermal effects on feeding behavior and net energy intake in a grasshopper experiencing large diurnal fluctuations in body temperature. Physiological Zoology. 68:453-473.

Harrison, J.F. 1994. Respiratory and ionic aspects of acid-base regulation in insects. An introduction. Physiological Zoology. 67:1-6.

Harrison, J.F. and M.L. Kennedy. 1994. In vivo studies of the acid-base physiology of grasshoppers: the effect of feeding state on acid-base and nitrogen excretion. Physiological Zoology. 67:120-141.

Harrison, J.F. and G. Hall. 1993. African-European hybrid honeybees have low nonintermediate metabolic capacities. Nature 363:258-260.

Fewell, J.H., Harrison, J.F., Stiller, T.M., and M.D. Breed. 1992. Distance effects on resource profitability and recruitment in the giant tropical ant, Paraponera clavata. Oecologia. 92:542-547.

Harrison, J.F. and J.E. Phillips. 1992. Recovery from acute haemolymph acidosis in locusts: II. Role of ammonium and titratible acid excretion. Journal of Experimental Biology 165:97-110.

Harrison, J.F., C.J.H. Wong, and J.E. Phillips. 1992. Recovery from acute haemolymph acidosis in locusts: I. Acid transfer to the alimentary lumen is the dominant mechanism. Journal of Experimental Biology 165:85-96.

Breed, M.D., T.M. Stiller, J.H. Fewell, and J.F. Harrison. 1991. Intercolonial interactions and nestmate recognition in the giant tropical ant, Paraponera clavata. Biotropica 23:301-306.

Stagg, A.P., J.F. Harrison, and J.E. Phillips. 1991. Acid-base parameters in Malpighian tubule secretion and response to acidosis. Journal of Experimental Biology 159:433-447.

Fewell, J.H. and J.F. Harrison. 1991. Flexible seed selection by the western harvester ant, Pogonomyrmex occidentalis. Behavioral Ecology and Sociobiology. 28:377-384.

Harrison, J.F., J.E. Phillips and T.T. Gleeson. 1991. Activity physiology of the two-striped grasshopper, Melanoplus bivittatus: gas exchange, hemolymph acid-base status, lactate production, and the effect of temperature. Physiological Zoology. 64:451-472.

Harrison, J.F., C.J.H. Wong and J.E. Phillips. 1990. Haemolymph buffering in the locust Schistocerca gregaria. Journal of Experimental Biology 154:573-579.

Harrison, J.F. 1989. Ventilatory frequency and haemolymph acid-base status during short-term hypercapnia in the locust, Schistocerca nitens. Journal of Insect Physiology 35:809-814.

Breed, M.D. and J.M. Harrison. 1989. Arboreal nesting in the giant tropical ant, Paraponera clavata (Hymenoptera: Formicidae). Journal of the Kansas Entomological Society 62:133-135.

Harrison, J.M. 1989. Temperature effects on intra- and extracellular acid-base status in the American locust, *Schistocerca nitens*. Journal of Comparative Physiology B 15:763-770.

Harrison, J.F., J.H. Fewell, T.M. Stiller, and M.D. Breed. 1989. Effects of experience on utilization of orientation cues in the giant tropical ant. Animal Behavior 37:869-871.

Harrison, J.M. 1988. Temperature effects on haemolymph acid-base status in vivo and in vitro in the two-striped grasshopper, *Melanoplus biviattus*. Journal of Experimental Biology 140:421-435.

Breed M.D., and J.M. Harrison. 1988. Worker size, ovary development and division of labor in the giant tropical ant, *Paraponera clavata*. (Hymenoptera: Formicidae). Journal of the Kansas Entomological Society. 61:285-291.

Gleeson, T.T. and J.M. Harrison. 1988. Muscle composition and its relation to sprint running in the lizard Dipsosaurus dorsalis. American Journal of Physiology 255:R470-R477.

Breed M.D., and J.M. Harrison. 1988. Individually discriminable recruitment trails a Ponerine ant. Insectes Sociaux 34:222-226.

Harrison J.M., and M.D. Breed. 1987. Temporal learning in the giant tropical ant, Paraponera clavata. Physiological Entomology 12:317-320.

Harrison J.M. 1987. Roles of individual honeybee workers and drones in colonial thermogenesis. Journal of Experimental Biology 129:53-61.

Gleeson T.T., and J.M. Harrison. 1986. Reptilian skeletal muscle: fiber type composition and enzymatic profile in the lizard Iguana iguana. Copeia 1986:324-332.

Harrison J.M. 1986. Caste-specific changes in the flight capacity of honeybees. Physiological Zoology 59(2):175-187.

**NON-REVIEWED PAPERS, PUBLIC OUTREACH:**

Harrison, J.F. 1998. The tale of the vanished giants. Dragonfly: A Magazine for Young Investigators. March/April 18-20.

Harrison, J.F. 2015. How I became an insect evolutionary physiologist. SICB Spring Newsletter.

**SUBMITTED or REVISION CYCLE MANUSCRIPTS:**

Welch, L., K.M. Baudier and J.F. Harrison. Warmer temperatures increase leaf intake by increasing forager speed and success in *Atta colombica* during the rainy season. In review at Insectes Sociaux.

Fisher, A. II, N. Desjardines, G. DeGrandi-Hoffman, B. Smith, M. Johnson, O. Kaftanoglu, T. Cogley, J.H. Fewell and J.F. Harrison. Delayed lethality: the effect of a widely used fungicide on honey bee (*Apis mellifera*) colony growth and survival. Submitted to Nature:Ecology and Evolution.

Harrison, J.F., K. Adjerid, A. Kassi, C.J. Klok, J.M. Vandenbrooks, M.E. Duell, J.B. Campbell, S. Talal, C.D. Abdo, H. Pendar and J.J. Socha. Physiological responses to gravity in an insect. In revision for PNAS.