

## Andrew J. H. Spence

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CONTACT INFORMATION	Department of Bioengineering College of Engineering, Room 814 Temple University 1947 N. 12th Street, Philadelphia, PA 19122	<i>Cell:</i> +1 215 805 6477 <i>Landline:</i> +1 215 204 3056 <i>E-mail:</i> <a href="mailto:aspence@temple.edu">aspence@temple.edu</a> <i>Website:</i> <a href="http://www.spencelab.com">www.spencelab.com</a>
RESEARCH PROGRAM	Understanding the control and biomechanics of movement, through an integrative and multidisciplinary approach that combines biology, engineering, mathematics, and molecular tools (optogenetics). This is fundamental to biology (how and why do animals move?), medicine (rehabilitation, neuromuscular disease, prosthetics), and technology (bio-inspired robotics).	
CURRENT POSITION	<b>Associate Professor</b> <i>Department of Bioengineering, Temple University, Philadelphia, USA</i>	<b>Nov 2013 - present</b>
PREVIOUS POSITIONS	<b>Lecturer (Associate Professor)</b> <i>Royal Veterinary College, Structure and Motion Laboratory, Hertfordshire, UK</i> Awarded tenure in September 2012.	<b>Sept 2012 - Nov 2013</b>
	<b>RCUK Research Fellow in Biomechanics</b> <i>Royal Veterinary College, Structure and Motion Laboratory, Hertfordshire, UK</i> The RCUK Fellowship is a prestigious 5-year award given to outstanding young investigators that alleviates teaching duties and guarantees a tenured post upon successful completion.	<b>September 2007 - September 2012</b>
	<b>Post-doctoral Research Associate</b> <i>Royal Veterinary College, Structure and Motion Laboratory, Hertfordshire, UK</i> Control and biomechanics of locomotion on compliant surfaces, with Alan Wilson.	<b>September 2006 - September 2007</b>
	<b>Post-doctoral Fellow, Poly-PEDAL and Hebets Labs</b> <i>University of California at Berkeley, Depts. of Integrative Biology and ESPM, Berkeley, CA</i> Control and neuromechanics of fast legged locomotion, with Bob Full, and sensory neurophysiology in arachnids with Eileen Hebets.	<b>January 2004 - August 2006</b>
	<b>Marine Biological Laboratory, Woods Hole, MA</b> MBL Summer course in Computational Neuroscience	<b>June 1999 - August 1999</b>
TEACHING EXPERIENCE	<b>Royal Veterinary College, Dept. of Veterinary Basic Sciences, Hertfordshire, UK</b> <i>Teaching and curriculum development</i> Leader of the <i>Comparative Animal Locomotion</i> course. Further lectures, practicals and workshops for PhD students and postdocs. Inquiry, problem, and research project based teaching model.	<b>September 2006 - present</b>
	<b>Cornell University, School of Applied and Engineering Physics, Ithaca, NY</b> <i>Teaching Assistant</i> A&EP333: Classical Mechanics and A&EP438: Computational Engineering Physics, junior and senior level courses. <i>Guest lecturer</i> , College of Engineering Nanobiotechnology course.	<b>August 1997 - May 1998</b>
EDUCATION	<b>Cornell University, Ithaca, New York</b> Doctor of Philosophy, School of Applied and Engineering Physics, August 2003 <ul style="list-style-type: none"><li>• Dissertation Topic: "Microfabricated devices for fluidic neuroprosthetics and extracellular recording <i>in vitro</i> and <i>in vivo</i>."</li><li>• Advisors: Michael S. Isaacson, Harold G. Craighead, Ronald R. Hoy</li></ul>	
	<b>University of California at Berkeley, Berkeley, California</b> Bachelor of Arts, Physics (Minor: Computer Science), May 1997	

FUNDING  
AWARDED

**Nov 2017: Shriner's hospitals for Children, *Chemogenetic afferent modulation to improve recovery from SCI*. Principal Investigator, \$712,890.**

**Feb 2014: Army Research Office, *NOFALL: Neuromechanics and Optogenetics: Dissecting Fast Legged Locomotion*. Principal Investigator, \$390,662.**

Feb 2014: Microsoft Research – Industrial/Academic PhD Studentship, *Understanding the moving quadruped: computer vision to advance science, medicine, and veterinary care*. Co-Investigator, \$110,000.

Jan 2013: Petplan Charitable Trust (UK), *New methods for non-invasive detection of gait abnormalities: an integrative approach*. Principal Investigator, \$9,100.

**Sept 2012: Biotechnology and Biosciences Research Council (BBSRC), *Foundations of Neuromechanical Systems Biology*. Principal Investigator, £812,000.**

June 2012: Biotechnology and Biosciences Research Council (BBSRC), Research Experience Placement. *Modelling animal gaits to understand stability, make predictions about neural control, and develop new tests for lameness and neuropathy*. Principal Investigator, £2000.

March 2011: Royal Society Research Grant *Closing the loop in running mice: an experimental platform to dissect the neural circuits underlying locomotion*. Principal Investigator, £13,900.

June 2011: Biotechnology and Biosciences Research Council (BBSRC), Research Experience Placement. *Does foot contact timing depend on visual input in mice?*. Principal Investigator, £2000.

**Feb 2010: Engineering and Physical Sciences Research Council (EPSRC), Cross Disciplinary Initiative: *Bioinspired Control Architectures for Multilegged Locomotion*. Principal Investigator, £124,879.**

Feb 2009: Royal Society International Travel Grant *Scientific and technological frontiers in field arboreal biomechanics*. Principal Investigator, £700.

**Sep 2008: BBSrc - Industrial Case PhD Studentship *Assessment of equine locomotor biomechanics during racing using instrumented tags*. Co-Principal Investigator, £80,000.**

## PUBLICATIONS

- 2017 Paul Shamble, Simon Wilshin, Kyle J. Hovey, Ryan Harris, **Andrew J. Spence**, and S. Tonia Hsieh. Limping following limb loss increases locomotor stability. *Journal of Experimental Biology* (2017) *Submitted*.
- Omid Maghsoudi, Annie Vahedipour-Tabrizi, Ben Robertson and **Andrew Spence** (2017). Superpixels Based Marker Tracking vs. Hue Thresholding In Rodent Biomechanics Application. *51st Asilomar Conference on Signals, Systems and Computers*. Pacific Grove, California, IEEE. October 29th, 2017. *Accepted*.
- Simon Wilshin, G. Clark Haynes, Jack Porteous, Daniel Koditschek, Shai Revzen, and **Andrew Spence**. Morphology and the gradient of a symmetric potential predict gait transitions of dogs. (2017) *Biological Cybernetics* 111 (3) 269-277 <http://dx.doi.org/10.1007/s00422-017-0721-2>.
- Simon Wilshin, Michelle Reeve, G. Clark Haynes, Shai Revzen, Daniel Koditschek, and **Andrew Spence**. Longitudinal quasi-static stability predicts changes in dog gait on rough terrain. *Journal of Experimental Biology* (2017) 220 (10) 1864–1874. <http://dx.doi.org/10.1242/jeb.149112>
- 2016 Charles, J.P., O. Cappellari, **A.J. Spence**, J.R. Hutchinson and D.J. Wells. Musculoskeletal Geometry, Muscle Architecture and Functional Specialisations of the Mouse Hindlimb. *PLoS ONE* (2016) 11 (4): e147669. April 26th, 2016. <http://dx.doi.org/10.1371/journal.pone.0147669>.
- Charles, J.P., O. Cappellari, **A.J. Spence**, D.J. Wells and J.R. Hutchinson. Muscle moment arms and sensitivity analysis of a mouse hindlimb musculoskeletal model. *Journal of Anatomy* (2016) 229 (4) 514-535. <http://dx.doi.org/10.1111/joa.12461>
- Haji Maghsoudi, O., A. V. Tabrizi, B. Robertson, P. Shamble and **A. Spence**. A Rodent Paw Tracker Using Support Vector Machine. *IEEE Signal Processing in Medicine and Biology Symposium (SPMB)*, (2016). <http://ieeexplore.ieee.org/document/7846866/>
- 2015 Maghsoudi, O., A. Vahedipour-Tabrizi, B.D. Robertson, P.D. Shamble, and **A.J. Spence**, A Novel Automatic Method to Track the Body and Paws of Running Mice in High Speed Video, in The IEEE Signal Processing in Medicine and Biology Symposium (2015), IEEE: Philadelphia, PA. <http://ieeexplore.ieee.org/document/7405456/>
- Mamuneas, Diamanto, **Spence, Andrew**, Manica, Andrea, King, Andrew. Bolder stickleback fish make faster decisions, but are not less accurate. *Behavioural Ecology* (2015) 26 (1): 91-96. <http://dx.doi.org/10.1093/beheco/aru160>.
- 2013 **A.J. Spence**. Fast horses, robots, and neurotechnologies: Discovering how to go fast on legs. *Science in Parliament* (2013) 70 (3): 23-25. Summer 2013. <http://www.vmine.net/scienceinparliament/sip.asp>.
- A.J. Spence**, G. Nicholson-Thomas, R. Lampe. Closing the loop in legged neuromechanics: an open-source computer vision controlled treadmill. *Journal of Neuroscience Methods* (2013) 215 (2): 164-169. <http://dx.doi.org/10.1016/j.jneumeth.2013.03.009>.
- 2012 **Andrew Spence** and John Hutchinson. A Growing Size Synthesis. *Current Biology* (2012) 22 (9): R309-R314. <http://dx.doi.org/10.1016/j.cub.2012.03.017>
- Andrew Spence**, Andrew Thurman, Michael Maher, and Alan Wilson. Speed, pacing strategy and aerodynamic drafting in Thoroughbred horse racing. *Biology Letters* (2012) 8 (4): 678-681. <http://dx.doi.org/10.1098/rsbl.2011.1120>.
- Zoe Self, **Andrew Spence**, and Alan Wilson. Racehorse speed supports a power constraint to incline running and a force constraint to decline running. *Journal of Applied Physiology* (2012) 113:

602-607. <http://jap.physiology.org/content/113/4/602>.

- 2011 **A.J. Spence**. Control strategies for legged locomotion: a comparative approach. 7th European Nonlinear Dynamics Conference (ENOC 2011), Rome, Italy. <http://w3.uniroma1.it/dsg/enoc2011/proceedings/pdf/spence.pdf>.
- Greg Byrnes and **A. J. Spence**. Ecological and biomechanical insights into the evolution of gliding in mammals (2011) *Integrative and Comparative Biology* **51**(6): 991-1001. <http://dx.doi.org/10.1093/icb/icr069>.
- Greg Byrnes, Thomas Libby, Norman, T.-L. Lim, and **A.J. Spence**. Gliding saves time but not energy in Malayan Colugos. *Journal of Experimental Biology* **214** (2011) p 2690-2696. <http://dx.doi.org/10.1242/jeb.052993>
- Simon Sponberg, **Andrew J. Spence**, Chris H. Mullens, & Robert J. Full. A single muscle's multifunctional control potential of body dynamics for postural control and running *Phil. Trans. Roy. Soc. B* **366** (2011) no. 1570 p. 1592-1605. <http://dx.doi.org/10.1098/rstb.2010.0367>
- G. Byrnes, N. T-L. Lim, C. Yeong, and **A.J. Spence**. Sex differences in the locomotor behavior and ecology of a gliding mammal (*Galeopterus variegatus*) determined from animal-borne inertial sensors. *Journal of Mammology* **92** no. 2, (2011) p 444-451. <http://dx.doi.org/10.1644/10-MAMM-A-048.1>
- K.J. Parsons, **A.J. Spence**, R. Morgan, J.A. Thompson, and A.M. Wilson. High speed field kinematics of foot contact in elite galloping horses in training. *Equine Veterinary Journal Equine Veterinary Journal* **43** no. 2 (2011) p 216-222. <http://dx.doi.org/10.1111/j.2042-3306.2010.00149.x>.
- 2010 **A.J. Spence**, S. Revzen, J. Seipel, C. Mullens, and R.J. Full. Insects running on elastic surfaces. *Journal of Experimental Biology* **213** (2010) p 1907-1920. <http://dx.doi.org/10.1242/jeb.042515>. **Nominated for Faculty of 1000.**
- R.H. Willemart, R.D. Santer, **A.J. Spence**, E.A. Hebets. A sticky situation: Solifugids (Arachnida, Solifugae) use adhesive organs on their pedipalps for prey capture *Journal of Ethology* **29** no. 1 (2010) p 177-180. <http://dx.doi.org/10.1007/s10164-010-0222-4>.
- 2009 T. Pfau, **A.J. Spence**, S. Starke, M. Ferrari, A. Wilson. Modern Riding Style Improves Horse Racing Times. *Science* **325** (2009) p 289. <http://dx.doi.org/10.1126/science.1174605>.
- A.J. Spence**. Scaling in biology. *Current Biology* **19** (2009) R57-R61. <http://dx.doi.org/10.1016/j.cub.2008.10.042>.
- 2008 G. Byrnes, N. T-L. Lim, and **A.J. Spence**. Take-off and landing kinetics of free-ranging Malayan colugos (*Galeopterus variegatus*). *Proceedings of the Royal Society B* (2008). <http://dx.doi.org/10.1098/rspb.2007.1684>.
- A.J. Spence**, H. Tan and A.M. Wilson. Accuracy of the TurfTrax Racing Data System for determination of speed and position. *Equine Veterinary Journal*, 40, (2008) 680-683. <http://dx.doi.org/10.2746/042516408X330338>.
- 2007 **A.J. Spence**, K.B. Neeves, D. Murphy, S. Sponberg, B.R. Land, R.R. Hoy, and M.S. Isaacson, Flexible multielectrodes can resolve multiple muscles in an insect appendage. *Journal of Neuroscience Methods* 159 (2007), 116-124. <http://dx.doi.org/10.1016/j.jneumeth.2006.07.002>.

- 2006 **A.J. Spence** and E.A. Hebets, Anatomy and physiology of giant neurons in the antenniform leg of the amblypygid *Phrynus marginemaculatus*. *Journal of Arachnology* 34 (2006), 566-577. [Available Online](#).
- 2005 L. Spataro, J. Dilgen, S. Retterer, **A.J. Spence**, M. Isaacson, J.N. Turner, W. Shain. Dexamethasone treatment reduces astroglia responses to inserted neuroprosthetic devices in rat neocortex. *Experimental Neurology* 194 (2005), 289-300. <http://dx.doi.org/10.1016/j.expneurol.2004.08.037>.
- 2004 C.D. James, **A.J. Spence**, N. Dowell, R.J. Hussein, K. Smith, H.G. Craighead, M.S. Isaacson, W. Shain, J. Turner. Extracellular Recordings from Constructed Neuronal Networks using Planar Microelectrode Arrays. *IEEE Transactions on Biomedical Engineering* 51 (2004), 1640-1648. <http://dx.doi.org/10.1109/TBME.2004.827252>.
- S.T. Retterer, K.L. Smith, C.S. Bjornsson, K.B. Neeves, **A.J. Spence**, J.N. Turner, W. Shain, and M.S. Isaacson. Model neural prostheses with Integrated Microfluidics: A Potential Intervention Strategy for Controlling Reactive Cell and Tissue Responses. *IEEE Transactions on Biomedical Engineering*, 51 (2004), 2063-2073. <http://dx.doi.org/10.1109/TBME.2004.834288>.
- A.P. Russo, S.T. Retterer, **A.J. Spence**, M.S. Isaacson, L.A. Lepak, M.G. Spencer, D.L. Martin, R. MacColl, J.N. Turner. Direct Casting of Polymeric Membranes into Microfluidic Devices. *Separation Science and Technology* 39 (2004), 2515-2530. <http://dx.doi.org/10.1081/SS-200026706>.
- 2003 A. Surlykke, J.E. Yack, **A.J. Spence**, I. Hasenfuss. Hearing in hooktip moths (Drepanidae: Lepidoptera). *Journal of Experimental Biology* 206 (2003), 2653-2663. <http://dx.doi.org/10.1242/jeb.00469>.
- A.J. Spence**, R.R. Hoy, M. S. Isaacson. A micromachined silicon multielectrode for multiunit recording. *Journal of Neuroscience Methods* 126 (2003), 119-126. [http://dx.doi.org/10.1016/S0165-0270\(03\)00075-X](http://dx.doi.org/10.1016/S0165-0270(03)00075-X).
- D.H. Szarowski, M.D. Andersen, S. Retterer, **A.J. Spence**, M. Isaacson, H.G. Craighead, J.N. Turner, W. Shain. Brain responses to micro-machined silicon devices. *Brain Research* 983 (2003), 23-35. [http://dx.doi.org/10.1016/S0006-8993\(03\)03023-3](http://dx.doi.org/10.1016/S0006-8993(03)03023-3).
- 2002 A.P. Russo, D. Apoga, N. Dowell, W. Shain, A. Turner, H. Craighead, **A.J. Spence**, S.T. Retterer, M.S. Isaacson, H.C. Hoch, J.N. Turner. Microfabricated Plastic Devices from Silicon Using Soft Intermediates. *Biomedical Microdevices* 4 (2002), 277-283. [Available Online](#).

PROFESSIONAL EXPERIENCE **Nion Corporation**, Spherical aberration corrector project, Kirkland, WA  
*Consultant* **May 1997 - August 2001**  
 Developed software for automatic diagnosis of aberrations from STEM images.

MEDIA COVERAGE *Tell Me Something I Don't Know – Episode 26 “Urinetown” – Freakonomics Podcast Philadelphia. Show Contestant and Winner.* 9 May 2017.

*Illuminating Technology.* **The Philadelphia Inquirer.** 14 September 2014.

*See How They Run.* The Daily Telegraph *Seven Magazine.* 18 November 2012.

*Cell Podcast: Interview for Editorial in Size Special Issue.* **Cell Podcast.** 10 May 2012.

*Horse racing: Scientists say secret of success is the pack.* **DiscoveryNews – AFP.** 7 March 2012.

*How to predict a winner.* **The Royal Society.** 7 March 2012.

*How to win a horse race.* **COSMOS.** Achim Eberhart, 7 March 2012.

*Welcome to Robotville, Population: 20.* **New Scientist Culturelab.** Celeste Biever, 1 Dec. 2011.

*Robots set up home at Science Museum.* **BBC News.** Rory Cellan-Jones, 5 Dec. 2011.

*Gliding is quick but hard work.* **Nature Newsblog.** George Wigmore, July 28th, 2011.

*In Picture: Tracking Flying Lemurs.* **BBC Nature.** July 28th, 2011.

*Why do flying lemurs glide?.* **Discover Magazine – Not Exactly Rocket Science.** Ed Yong, July 28th, 2011.

*Flying Mammal Pays Price For Glides.* **Scientific American – 60 Second Science.** Christopher Intagliata, July 28th, 2011.

*ScienceShot: Tree Gliders Are Energy Wasters.* **Science – Science Now.** Yasmin Ogale, July 28th, 2011.

*Camel spiders are sticky killers.* **BBC Earth News.** Matt Walker, July 8th, 2010.

*“Cyber-roach” forces rethink on animal movement.* **Wired.co.uk.** Duncan Geere, May 14th, 2010.

Interview and jockey feature broadcast during The Breeder’s Cup. **ESPN.** Nov 8th, 2009.

*Faster Horses? Study Credits Jockeys.* **The New York Times.** Joe Drape, July 16th, 2009.

*Secrets of Jockeying: Why Horses Go Fast.* **Time.com.** Jeffrey Kluger, July 21st, 2009.

*The Physics of Flesh.* **Discover Magazine Blogs,** The Loom (Carl Zimmer). January 26th, 2009.

Commentary on *Acrobatic geckos steer with their tails* for **New Scientist**, March 17th, 2008.

*Hang gliders.* **Science** Random Samples, February 29th, 2008; 319(5867).

*High-tech backpack helps reveal lemur’s flying secret.* Roger Highfield, **The Daily Telegraph,** February 6th, 2008.

SELECTED TALKS “Gait, posture, pogo-sticks and newfangled neurogenetics: How do many-legged animals control their locomotion?” Departmental of Kinesiology “Action Club.” Penn State University. October

14th, 2016.

“How far are we from genetic neuromechanics? Tantalizing prospects and hard challenges using new molecular tools in movement science.” Biomechanics and Neural Control of Movement (BANCOM) 2016. Deer Creek Lodge, Ohio. 12th June 2016.

“Modeling gait regulation to understand the control of, and constraints shaping, locomotion.” Invited speaker. Frontiers in Applied and Computational Mathematics (FACM) 2016. New Jersey Institute of Technology (NJIT). 4th June 2016.

“Neuromechanics and neurogenetics: old questions and new tools targeted at the control of legged locomotion” Society for Neuroscience (SfN) 2016. Chicago. 17th October 2015.

“Insights into insect-scale running control from experiments in insects, dogs, humans, and robots.” Invited workshop speaker and panelist. RSS Robotics: Science and Systems Conference 2015 Rome. 16th July 2015.

“The Jockey as a tail: How can a jockey influence horse performance?” Invited workshop speaker and participant. RSS Robotics: Science and Systems Conference 2015 Rome. 16th July 2015.

“Neuromechanics and Neurogenetics: Have the tools to precisely dissect the neural and mechanical contributions to locomotion in intact, freely behaving animals arrived?” Invited talk: AMAM 2015 at MIT. Adaptive Motion of Animals and Machines, MIT. 23rd June 2015.

“Gait, posture, pogo-sticks and newfangled neurogenetics: How do many-legged animals control their locomotion?” Departmental of Biology. James Madison University. 24th April 2015.

“Gait, posture, pogo-sticks and newfangled neurogenetics: How do many-legged animals control their locomotion?” Drexel University College of Medicine: Queen Lane. Drexel University. 17th April 2015.

“Gait, posture, pogo-sticks and newfangled neurogenetics: How do many-legged animals control their locomotion?” Departmental of Ecology and Evolutionary Biology. Brown University. 16th September 2014.

“Insects on rubber, dogs on springs, and newfangled neurogenetics in mice: How do many-legged animals control their locomotion?” Departmental of Mechanical Engineering Seminar. Johns Hopkins University. 4th September 2014.

“Insects on rubber, dogs on springs, and switching the brain with light: the dynamic world of discovering how animals move.” Pint of Science Talk, Bourbon Blue Pub. Manuyunk, 19 May 2014.

“Insects on rubber, dogs on springs, and optogenetics in mice: How do many-legged animals control their locomotion?” RCN Neuromechanics Winter Workshop. Princeton University, 30th January 2014.

“Gallopings beasts, bounding robots, and molecules that probe the brain with light: The extraordinary science of discovering how animals move.” British Science Festival 2013 Young Persons' Programme. 9th September 2013.

“Foundations of Neuromechanical Systems Biology. Combining engineering, biology, and mathematics to understand how animals move.” Microsoft Research Cambridge, Cambridge, UK. 6th September 2013.

“Integrative Neuromechanics: Combining biology, engineering, and mathematics to understand how animals move.” Centre for Intelligent Sensing Summer School, Queen Mary University of London, London, UK, 12th June 2013.

“Fast horses... and fast robots, insects and neurotechnologies: How to go fast on legs.” *Invited seminar* for the Parliamentary and Scientific Committee Seminar on *Speed*. National Science and Engineering Week. Portcullis House, Parliament, London, United Kingdom. 21st March 2013.

“Neuromechanics and Optogenetics: Dissecting the neural and musculoskeletal contributions to locomotor control.” *Invited seminar*. Frontiers in Sport and Exercise Science and Medicine Seminar Series, Brunel University, London, 13th March 2013.

“Foundations of Neuromechanical Systems Biology. Combining engineering, biology, and mathematics to understand how we move.” Department of Bioengineering Seminar, Temple University, Philadelphia, USA. 26th February 2013.

*Ibid.*. **Kod\*Lab** Research Group Meeting Seminar. School of Engineering and Applied Sciences, University of Pennsylvania, Philadelphia, USA, 25th February 2013.

“Integrative Neuromechanics: Combining biology, engineering, and mathematics to understand how animals move.” Shriners Hospitals Pediatric Research Center, Temple University, Philadelphia, USA, 1st June 2012.

“Integrative studies of fast locomotor behaviour.” *Invited speaker*. Locomotion Systems Science Workshop: National Science Foundation / Army Research Laboratories (USA), Washington DC, USA, 31st May 2012.

“Insects on rubber, dogs on springs, and robots in a field: An integrative approach to discovering how animals move and making better robots.” Computer Science Department Invited Seminar, Queen Mary University of London, 21st March 2012.

“Insects on rubber, dogs on springs, and robots in a field: An integrative approach to discovering how animals move and making better robots.” Centre for Cognitive Neuroscience and Cognitive Robotics Colloquium, University of Birmingham, Birmingham, UK. 13th March 2012.

“Integrative Neuromechanics: Combining biology, engineering, and mathematics to understand how animals move.” Dept. of Biology Seminar, Temple University, 6th February 2012.

“How is dog gait affected by natural rough terrain?” Society for Integrative and Comparative Biology. Charleston, SC, 3-7 January 2012.

“Mathematical approaches to animal locomotion: past, present, and future.” Veterinary Epidemiology and Public Health Seminar, Royal Veterinary College, 21st November 2011.

“Control strategies for legged locomotion on soft surfaces: a comparative approach” European Non-linear Oscillators Conference, 24-29 July 2011, *Invited*.

“Starting an independent research career.” University College London Neuroscience Early Career Forum, 23rd May 2011, *Invited Speaker*.

“Insects on rubber and dogs on springs: sensing and perturbing animals to understand the mechanics of legged locomotion.” *CFS Seminar*, Dept. of Organismal and Evolutionary Biology, Harvard University, Massachusetts, March 11th, 2011.

*Ibid.* *Boston Action Club*, Dept. of Kinesiology, Northeastern University, Boston, MA, March 10th, 2011.

*Ibid.* *Kod\*Lab Research Group Meeting*, School of Engineering and Applied Science, University of Pennsylvania, Philadelphia, January 14th, 2011.

*Ibid.* *Departmental seminar*, Dept. of Biology, Temple University, Philadelphia, January 13th, 2011.



“Insects running on elastic surfaces: the role of feedforward control.” *European Science Foundation – Functional Neurobiology in Minibrains: from Flies to Robots*. Sant Feliu de Guixols, Spain, October 20th, 2010.

“Equine racing surfaces: How much do they vary, how do they affect hoof impact, and can we measure what the horse will feel?” Racecourse Association Clerks of the Course Seminar, 8th November 2010, London, UK.

“Is virtual leg stiffness a task variable for running that generalizes across posture and leg number?” Society for Experimental Biology Annual Meeting, May 2010, special session *Function and Control of Elastic Systems*. Prague, Czech Republic.

“Insects on rubber and dogs on springs: sensing and perturbing animals to understand the mechanics of legged locomotion.” *Physics Colloquium*, School of Physics and Astronomy, University of Southampton, April 30th, 2010.

“Multi-legged running in the real world: how do cockroaches, dogs, and horses handle different surfaces?” *Department of Zoology Tea Talk*, University of Cambridge, January 2010, Cambridge, United Kingdom.

“Multilegged runners in the real world: insects and horses running on hard and soft surfaces” Laufflabor (Locomotion laboratory) Group Seminar, University of Jena, September 14th, 2009, Jena, Germany.

“Insects running on elastic surfaces: The role of feedforward control” Society for Experimental Biology Annual Meeting, June 2009, Glasgow, Scotland.

“Speed, strategy, drag and drafting in Thoroughbred horse racing” Society for Experimental Biology Annual Meeting, June 2009, Glasgow, Scotland.

“What limits running speed in race horses.” Society for Integrative and Comparative Biology Annual Meeting, January 2008, San Antonio, Texas.

“Effects of substrate properties on equine locomotion.” Society for Experimental Biology Annual Meeting, March 2007, Glasgow, Scotland.

“Insect Running on Compliant Surfaces.” Society for Integrative and Comparative Biology Annual Meeting, January 2007, Phoenix, Arizona.

“Applications of Microfabricated Devices to Neuroscience and Neuromechanics.” Baskin School of Engineering Invited Seminar, January, 2006. Dept. of Electrical Engineering, University of California at Santa Cruz.

“Preliminary neuroethological studies of the whip spider *Phrynus marginemaculatus* (Arachnida, Amblypigi).” International Congress of Arachnology, July 2004, Ghent, Belgium.

“Customizing Multielectrodes for Nerve Cords.” Computation in Biological Systems invited seminar, February 2003, Montana State University, Bozeman, MN.

“Silicon Multielectrodes for In Vivo Multi-neuron Electrophysiology.” National Nanofabrication Users’ Network Annual Meeting, Stanford University, November, 2002, Palo Alto, CA.

#### PROCEEDINGS

Byrnes, G., Spence, A.J., Martino, B., Hilt, M., Wilson, A.M. (2014) The effects of gap distance and substrate compliance on the biomechanics of jumping in gray squirrels (*Sciurus carolinensis*). *Integrative and Comparative Biology* 54:e247.

Reeve, M.A.; Wilshin, S.; Spence, A.J. (2014) Dog gait on rough terrain: When does static stability

matter? *Integrative and Comparative Biology* 54:e337.

Reeve, M.A.; Wilshin, S.; Haynes, G. C.; Revzen, S.; **Spence, A.J.** (2012) Dog gait on rough terrain confirms prediction of a stability inspired dynamical systems model of quadrupedal leg control. *Society of Experimental Biology Annual Conference 2012, Salzburg, Austria*.

Liedtke, A.M., Moore, S., Witte, T., **Spence, A.J.** (2012) How do animals with limited distal limb musculature use sensory feedback during locomotion? *Integrative and Comparative Biology* 52: P111.

Self, Z.t., **Spence, A.J.**, Wilson, A.M. (2012) Jump racing: do horses slow down due to a force limit? *Integrative and Comparative Biology* 52: P161.

Wilshin, S.D.; Haynes, G.C.; Reeve, M., Revzen, S. **Spence, Andrew J.** (2012) How is dog gait affected by natural rough terrain? *Integrative and Comparative Biology* 52: P198.

Wilshin, S.D., Haynes, G.C., Porteous, J., **Spence, A. J.** (2012) Describing gait transitions and the role of symmetry in control. *Integrative and Comparative Biology* 52: P198.

S. Wilshin, C.N. Kelleher, G. Byrnes, J. Seipel, **A.J. Spence** (2011) Dogs on springs: do trotting dogs adjust their virtual leg stiffness on compliant surfaces? *Integrative and Comparative Biology* 51: E152-E152.

**Spence, A.J.**, Seipel, J., Revzen, S., Mullens, C., Yeats, K. and Full, R.J. (2009) Insects running on elastic surfaces: The role of feedforward control. *Annual Meeting of the Society-for-Experimental-Biology*, Glasgow, Scotland. pp S137-S137.

**Spence, A.J.**, Thurman, A., Maher, M. and Wilson, A.M. (2009) Speed, strategy, drag and drafting in thoroughbred horse racing. *Annual Meeting of the Society-for-Experimental-Biology*, Glasgow, Scotland. pp S127-S127.

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