

## BIOGRAPHICAL SKETCH

### Roy E. Ritzmann - Professor

**BIRTHDATE:** November 24, 1947

**PLACE OF BIRTH:** Chicago, Illinois

#### EDUCATION:

B.A., 1969, Zoology, University of Iowa, Iowa City, Iowa

Ph.D., 1974, Biology, University of Virginia, Charlottesville, Virginia

Post-doc., 1974 -77, Neurophysiology, Cornell University, Ithaca, New York

**MAJOR RESEARCH INTEREST:** Behavioral Neurobiology

#### EMPLOYMENT:

Postdoctoral Research Assistant in laboratory of J.M. Camhi, 1974 - 1977

NIH Postdoctoral Fellow, 1976 - 1977

Assistant Professor, Department of Biology, Case Western Reserve University (CWRU), Cleveland, Ohio,  
1977 - 1983

Associate Professor, Department of Biology, CWRU, Cleveland, Ohio, 1983 - 1992

Adjunct Associate Professor, Department of Neuroscience, CWRU, Cleveland, Ohio, 1989 - 1992

Full Professor, Department of Biology, CWRU, Cleveland, Ohio, 1992 - Present

Adjunct Full Professor, Department of Neuroscience, CWRU, Cleveland, Ohio, 1992 – Present

Director of NSF sponsored IGERT Graduate Training Program in Neuromechanics at CWRU, 1999 – 2006

Directed task force for adaption of SAGES undergraduate curriculum reform that replaced standard general education requirement with seminar based program throughout undergraduate curriculum. Plan adapted by Case faculty in Spring 2004, 2003 - 2004.

## **HONORS**

Recipient of NIH Postdoctoral Fellowship, 9/75

Grass Traveling Lecturer, Marshall University, 5/91

Diekhoff award for Graduate Teaching, 5/97

Robot III: Finalist for Discover Magazine's 9th Annual Technology Award, 6/98

Elected Fellow of AAAS, 9/00

Invited to give Keynote Address at Singapore Robot Olympic Games (with Roger D. Quinn), 5/01

Winner of Best Video Award – 2005 IEEE International Conference on Robotics and Automation

Invited to give Kenneth Roeder Memorial Lecture, 4/06/2006, Tufts University, Medford, MA.

Poster developed by students in Biorobotics Team Research Course won 1<sup>st</sup> place in Natural Sciences Poster Competition of 2006 Case SOURCES Undergraduate Symposium.

Invited to give Dupont Lectures, 4/2008, University of Arizona, Tucson, AZ.

Invited to join Editorial Advisory Board for the Journal of Comparative Physiology, A., 7/29/2008

Invited to join the “Virtual Faculty” of the "Cognitive Interaction Technology" (CITEC) based in Bielefeld, Germany 01/28/2009.

## **PROFESSIONAL SOCIETIES:**

Society for Neurosciences, 1978 - Present

International Society for Neuroethology, 1985 - Present

AAAS, 1989 - Present

## **PROFESSIONAL SERVICE:**

Panel Member, NSF Instrumentation and Instrument Development Panel (1988-91)

Panel Member, NSF Undergraduate Laboratory Panel (1991)

NIH Site Visit Team - San Juan, PR. (1992)

Ad hoc reviewer for NSF and USDA

Referee for J. Comp. Physiol, J. Exp. Biol., J. Neurobiol., J. Insect Phys. J. Neurophys.

Lead Organizer 4<sup>th</sup> meeting of Adaptive Motion of Animals and Machines, 2008 held at Case Western Reserve University, Cleveland, OH June 1-6, 2008.

Member of Editorial Advisory Board of the Journal of Comparative Physiology A. (2008-Present)

**STUDENTS TRAINED:**

<b>Name</b>	<b>Predoc/ Postdoc</b>	<b>Training Period</b>	<b>Grad. Degree</b>	<b>Year Granted</b>	<b>Current Position</b>
<b><u>Past Graduate Students</u></b>					
Tobias, M.L.	Pre	78-83	Ph.D.	1983	Sr. Research Sci, Columbia Univ.
Murrain, M.P.	Pre	81-87	Ph.D.	1987	Owens Computer Network Co.
Dieckman, L.J.	Pre	81-85	M.S.	1985	unknown
Nye, S.W.	Pre	88-91	M.S.	1991	Physician
Casagrand, J.L.	Pre	85-91	Ph.D.	1991	Out of science
Songhai Chai	Pre	90- 95	Ph.D.	1995	Res. Assoc. Cleveland State Univ.
Tryba, Andrew	Pre	93-99	Ph.D.	1999	Asst. Prof, Medical College of Wisconsin, Physiology Dept.
Dan Greenblatt	Pre	99	M.S.	2000	Physician
Paul Schaefer	Pre	93-01	Ph.D.	2001	Medical School – Univ. of Toledo
Blythe Alexander	Pre	02 - 04	M.S.	2004	Graduate School – Univ. of Kansas
Laiyong Mu	Pre	01-07	Ph.D.	2007	Postdoc with N. Strausfeld, U. Arizona
<b><u>Past Postdoctoral</u></b>					
James Watson	Post	91- 00	Ph.D.	1989	H.S. Teacher – Cleveland Schools
Angela Ridgel	Post	01-06	Ph.D.	2000	Asst. Prof., Kent State University
<b><u>Current Post-Graduate Students</u></b>					
Cynthia Harley	Pre	03 -	.		
Nicholas Kathman	Pre	06 -			
Peiyuan Guo	Pre	08-			
<b><u>Current Postdoctoral</u></b>					
John Bender	Post	007 -	Ph.D.	2007	
<b><u>Undergraduate Researchers</u></b>					
Amy Csorba	Undgr				
Sue Hudson	Undgr				
Veruni Kondagunta	Undgr				
Paul Schaefer	Undgr				

Timothy Tufel	Undgr	
David Gondenswager	Undgr	
J. Mark Saunders	Undgr	
Abel Donka	Undgr	
Ryan Edel	Undgr	
David Mills	Undgr	1999 – 2000
Rob Kollmorgen	Undgr	1999 – 2000
Katherine Otto	Undgr	2000, 2001
Cynthia Rice	Undgr	2001
Lyndsey Benson	Undgr	2002
Dave Howard	Undgr	2003, 2004-5
Jeff Archinal	Undgr	2003 – 2004
Katherine Moore	Undgr	2004
Yidi Xu	Undgr	2005
Anna Booth	Undgr	2005
Genevieve Criss	Undgr	2005 – 2006
Robert Pollack	Undgr	2006
Brittany English	Undgr	2006-2007
Elaine Simpson	Undgr	2007-Present
Solomon J. Awe	Undgr	2008-Present
Nicholas Korsantia	Undgr	2008-Present

## **COURSES TAUGHT**

Human Physiology  
Invertebrate Biology  
Neurobiology Laboratory  
Neurobiology of Behavior  
Organismal Biology  
Organisms and Ecosystems  
Physiology Laboratory  
Biorobotics Team Research

**RESEARCH SUPPORT (over \$10 million total):**

**CURRENT SUPPORT**

**NSF Grant** “Processing in the Insect Brain to Deal with Barriers to Legged Locomotion”

03/2009 – 02/2011

PI/PD – R.E. Ritzmann

Total Budget - \$ 398,946

**AFOSR Grant FA9550-07-1-0149** “Hierarchical Control of Maneuverability in Walking and Flying Insects: A Neurobiological and Hardware Model Approach”

02/15/2007 – 2/14/2010

PI/PD – R. E. Ritzmann

Total Budget - \$673,140

**PREVIOUS SUPPORT**

**NSF Grant IOB-0516587** “Role of Brain Circuits in Legged Locomotion in Insects”

09/2005 – 03/2009

PI/PD – R.E. Ritzmann

Total Budget - \$545,000

**AFOSR** “Support for the 4th International Meeting of Adaptive Movement of Animals and Machines”

PI/PD – R. E. Ritzmann

Total Budget - \$12,000

**ONR International** “Support for the 4th Int. Meeting of Adaptive Motion of Animals and Machines”

PI/PD – R. Vaidyanathan

Total Budget - \$8,800

**NSF** “2008 International Symposium on Adaptive Motion of Animals and Machines”

PI/PD – Mark A. Willis

Total Budget - \$12,000

**NSF IGERT Training Grant DGE 9972747** “Training Program in Neuro-mechanical Systems”

09/99 – 08/06

PI/PD – R.E. Ritzmann

Total Budget - \$3,123,565

**Eglin AFB F08630-03-1-0003** “Adaptive Control Responses to Behavioral Perturbation Based Upon Insect Systems” 03/27/03– 03/26/06

PI/PD – R.E. Ritzmann

Total Budget: \$ 842,618

**ONR Grant N0014-99-1-0378: “A Hexapod Robot Based upon Dynamically Scaled Cockroach Mechanics and a Hierarchical, Modular Control Architecture “**

1/99-12/01.

PI/PD – R.D. Quinn

Total Budget: \$750,000

**Eglin AFB F08630-01-C-0023 “A Climbing Robot for Penetrating Deeply Buried Facilities and Barricaded Positions”**

03/01 – 02/03

PI/PD - R.D. Quinn

Total Budget - \$299,988

**DARPA Contract DAAN02-98-C-4027 “Biology Inspired Micro-Robots for Military Applications”**

06/98-5/01

PI/PD – R.D. Quinn

Total Budget: \$1,995,128

**NSF/LIS Grant DMI97-20309 “Agile Procedural Learning Systems”**

9/97-8/00

PI/PD – R.D. Beer

Total Budget \$775,000

**ONR Grant N00014-90-J1545-1545 “A Cockroach-Like Robot for Natural Terrain Locomotion”**

1/90-12/98 (Title changed in each of three funding periods, but grant number the same)

PI/PD – R.D. Beer

Total Budget (in last funding period): \$600,000

**Whitehall Foundation Grant “Connection Patterns Between Thoracic Neurons That Control Escape Turns in Cockroaches”**

9/95-9/99

PI/PD – R.E. Ritzmann

Total Budget: \$120,000

**NSF Grant DIR 89-50404 “Instrumentation for a Modern Undergraduate Neurobiology Laboratory”**

9/89-1/91

PI/PD – R.E. Ritzmann

Annual Direct Costs: \$74,788

**NIH Grant NS 17411 “Control of Patterned Motor Activity”**

9/01/81 – 3/31/95

PI/PD – R.E. Ritzmann

Annual Direct Budget (last funding period): \$91,324

**NSF Grant BNS-80-40293 “Control of Motor Pathways in Insects”**

8/15/78 – 1/31/82

PI/PD – R.E. Ritzmann

Annual Direct Budget: \$29,487

## PUBLICATIONS:

1. Ritzmann, R. (1973) Snapping behavior of the Shrimp *Alpheus californiensis*, *Science* **181**:459-460.
2. Ritzmann, R. E. (1974) Mechanisms for the snapping behavior of two alpheid shrimp, *Alpheus californiensis* and *Alpheus heterochelis*. *J. Comp. Physiol.* **95**:217-236.
3. Ritzmann, R. E., Camhi, J. M. (1978) Excitation of leg motor neurons by giant interneurons in the cockroach *Periplaneta americana*. *J. Comp. Physiol.* **125**:305-316.
4. Ritzmann, R. E., Tobias, M. L., Fournier, C. R. (1980) Flight activity initiated via giant interneurons in the cockroach: Evidence for bifunctional trigger interneurons. *Science* **210**:443-445.
5. Ritzmann, R. E. (1981) Motor responses to paired stimulation of giant interneurons in the cockroach *Periplaneta americana*. II. The ventral giant interneurons. *J. Comp. Physiol.* **143**:61-70.
6. Ritzmann, R. E., Pollack, A. J. (1981) Motor responses to paired stimulation of giant interneurons in the cockroach *Periplaneta americana*. I. The dorsal giant interneurons. *J. Comp. Physiol.* **143**:61-70.
7. Ritzmann, R. E., Pollack, A. J., Tobias, M. L. (1982) Flight activity mediated by intracellular stimulation of dorsal giant interneurons of the cockroach *Periplaneta americana*. *J. Comp. Physiol.* **147**:313-322.
8. Westin, J., Ritzmann, R. E. (1982) The effect of single giant interneuron lesions on wind-evoked motor responses in the cockroach *Periplaneta americana*. *J. Neurobiol.* **13**:127-139.
9. Ritzmann, R. E., Fournier, C. R., Pollack, A. J. (1983) Morphological and physiological identification of motor neurons innervating flight musculature in the cockroach *Periplaneta americana*. *J. Exp. Zool.* **225**:347-356.
10. Tobias, M. L., R. E. Ritzmann (1984) Responses of mesothoracic motor neurons to giant interneuron stimulation in the cockroach. *J. Comp. Physiol.* **154**:633-640.
11. Tobias, M. L., R. E. Ritzmann (1984) Effect of metathoracic leg ablation upon mesothoracic motor responses to giant interneuron stimulation. *J. Comp. Physiol.* **154**:641-647.
12. Ritzmann, R.E., A.J. Pollack (1986) Identification of thoracic interneurons that mediate giant interneuron-to-motor pathways in the cockroach. *J. Comp. Physiol.* **159**:639-654.
13. Simpson, B.S., R. E. Ritzmann, A.J. Pollack (1986) A comparison of the escape behaviors of the cockroaches *Blaberus craniifer* and *Periplaneta americana*. *J. Neurobiol.* **17**:405-415.
14. Dieckman, L.J., R.E. Ritzmann (1987) The effect of temperature on development of flight behavior in the cockroach, *Periplaneta americana*. *J. Neurobiol.* **18**: 487-496.
15. Murrain, M., R.E. Ritzmann (1988) Analysis of proprioceptive inputs to DPG interneurons in the cockroach. *J. Neurobiol.* **19**:552-570.
16. Pollack, A.J., R.E. Ritzmann, J. Westin (1988) Activation of DUM cell interneurons by ventral giant interneurons in the cockroach, *Periplaneta americana*. *J. Neurobiol.* **19**:489-497.
17. Ritzmann, R.E., A.J. Pollack (1988) Wind activated thoracic interneurons of the cockroach: II. Patterns of connection from ventral giant interneurons. *J. Neurobiol.* **19**:589-611.
18. Westin, J., R.E. Ritzmann, D.J. Goddard (1988) Wind activated thoracic interneurons of the cockroach: I. Responses to controlled wind stimulation. *J. Neurobiol.* **19**:573-588.

19. Ritzmann, R.E., A.J. Pollack (1990) Parallel motor pathways from thoracic interneurons of the ventral giant interneuron system of the cockroach, *Periplaneta americana*. *J. Neurobiol.* **21**:1219-1235
20. Casagrand, J.L., R.E. Ritzmann (1991) Localization of ventral giant interneuron connections to VM branch of thoracic interneurons in the cockroach. *J. Neurobiol.* **22**:643-658.
21. Ritzmann, R.E., A.J. Pollack, S.E. Hudson, A. Hyvonen (1991) Convergence of multi-modal sensory signals at thoracic interneurons of the escape system of the cockroach, *Periplaneta americana*. *Brain Res.* **563**:175-183
22. Nye, S.W and R.E. Ritzmann (1992) Motion analysis of leg joints associated with escape turns of the cockroach, *Periplaneta americana*. *J. Comp. Physiol. A* **177**:183-194.
23. Casagrand, J.L. and R.E. Ritzmann (1992) Evidence that synaptic transmission between giant interneurons and identified thoracic interneurons in the cockroach is cholinergic. *J. Neurobiol.* **23**:627-643.
24. Casagrand, J.L. and R.E. Ritzmann (1992) Biogenic amines modulate synaptic transmission between identified giant interneurons and thoracic interneurons in the escape system of the cockroach. *J. Neurobiol.* **23**:644-655.
25. Ritzmann, R.E. and A.J. Pollack (1994) Responses of thoracic interneurons to tactile stimulation in the cockroach, *Periplaneta americana*. *J. Neurobiol.* **25**:1113-1128.
26. Schaefer, P.L., G.V. Kondagunta and R. E. Ritzmann (1994) Motion analysis of escape movements evoked by tactile stimulation in the cockroach, *Periplaneta americana*. *J. exp. Biol.* **190**:287-294.
27. Watson, J.T. and R. E. Ritzmann (1994) The escape response versus the quiescent response of the American cockroach: Behavioural choice mediated by physiological state. *Anim. Behav.* **48**:476-478.
28. Pollack, A.J. , R.E. Ritzmann, J.T. Watson (1995) Dual pathways for tactile sensory information to thoracic interneurons in the cockroach. *J. Neurobiol* **26**:33-46.
29. Watson, J. T. and R. E. Ritzmann (1995). Combined intracellular stimulation and high speed video motion analysis of motor control neurons in the cockroach. *J. Neurosci. Meth.* **61**:151-157.
30. Beer, R.D., Quinn, R.D., Chiel, H.J., Ritzmann, R.E. (1997) Biologically inspired approaches to robotics: What can we learn from insects? *CACM* **40** (3) 30-38.
31. Chen, C. T., Quinn, R. D., Ritzmann, R.E. (1997) A Crash Avoidance System Based Upon the Cockroach Escape Response Circuit. Proceedings of the 1997 IEEE International Conference on Robotics and Automation (ICRA '97), Albuquerque, NM, April 22-24, 1997.
32. Nelson, G. M., Quinn, R. D., Bachmann, Flannigan, W. C., Ritzmann, R. E., Watson, J. T. (1997) Design and Simulation of a Cockroach-like Hexapod Robot. Proceedings of the 1997 IEEE International Conference on Robotics and Automation (ICRA '97), Albuquerque, NM, April 22-24, 1997.
33. Nelson, G. M., Bachmann, R. J. Quinn, R. D., Watson, J. T., A. K., Tryba, Ritzmann, R. E., "A Cockroach-like Robot," 1998 IEEE International Conference on Robotics and Automation (ICRA'98) Video Proceedings, presented May 1998, Leuven, Belgium.
34. Ritzmann, R.E. and Pollack, A.J. (1998) Characterization of Tactile Sensitive Interneurons in the Abdominal Ganglia of the Cockroach, *Periplaneta americana*. *J. Neurobiol.* **34**:227-241.
35. Watson, J.T. and R.E. Ritzmann (1998) Leg kinematics and muscle activity during treadmill running in the cockroach, *Blaberus discoidalis*: I. Slow running. *J. Comp. Physiol A.* **182**:11-22.

36. Watson, J.T. and R.E. Ritzmann (1998) Leg kinematics and muscle activity during treadmill running in the cockroach, *Blaberus discoidalis*: II. Fast running. *J. Comp. Physiol. A.* **182**:23-33.
37. Beer, R.D., H.J. Chiel, R.D. Quinn and R.E. Ritzmann (1998) Biorobotic Approaches to the Study of Motor Systems. *Cur. Op. Neuobiol.* **8**:777-782.
38. Quinn, R.D. and R.E. Ritzmann (1998) Construction of a Hexapod Robot with Cockroach Kinematics Benefits both Robotics and Biology. *Connection Sci.* **10**: 239-254.
39. Birch, M.C., Quinn, R.D., Hahm, G., Phillips, S., Drennan, B., Fife, A., Verma, H., Beer, R.D., "Design of a cricket microrobot," IEEE Conf. on Robotics and Automation, April 2000, San Francisco, CA.
40. Ritzmann, R.E., R.D. Quinn, J.T. Watson, S.N. Zill (2000) Insect walking and biorobotics: A relationship with mutual benefits. *Bioscience* **50**:23-33.
41. Laksanacharoen, S., Pollack, A.J., Nelson, G.M., Quinn, R.D., and Ritzmann, R.E. (2000) Biomechanics and simulation of cricket for microrobot design. *Proc. of the 2000 IEEE Int. Conf. on Robot. and Automat.*, San Francisco.
42. Tryba, A.K. and R.E. Ritzmann (2000) Multi-joint coordination during walking and foothold searching in the *Blaberus* cockroach. I. Kinematics and electromyograms. *J. Neurophysiol.* **83**:3323-3336.
43. Tryba, A.K. and R.E. Ritzmann (2000) Multi-joint coordination during walking and foothold searching in the *Blaberus* cockroach.II. Extensor motor pattern. *J. Neurophysiol.* **83**:3337-3350 .
44. Schaefer, P.L. and R.E. Ritzmann (2001) Descending influences on escape behavior and motor pattern in the cockroach. *J. Neurobiol.* **49**:9-28.
45. Kaliyamoorthy, S., Zill, S.N., Quinn, R.D., Ritzmann, R.E., Choi, J. (2001) Finite element analysis of strains in a *Blaberus* cockroach leg during climbing, Int. Conf. on Intelligent Robots and Systems (IROS), Maui, HI. pp. 833-838.
46. Birch, M.C., Quinn, R.D., Hahm, G., Phillips, S.M., Drennan, B., Fife, A., Beer, R.D., Yu, X., Garverick, S.L., Laksanacharoen, S., Pollack, A.J., Ritzmann, R.E., (2001) A Miniature Hybrid Robot Propelled by Legs, Int. Conf. on Intelligent Robots and Systems (IROS), Maui, HI. pp. 845-851.
47. Vaidyanathan, R., Quinn, R.D., Ritzmann, R.E., Prince, T.S., (2001) An Insect Inspired Endgame Targeting Reflex for Autonomous Munitions. Int. Conf. on Intelligent Robots and Systems. Int. Conf. on Intelligent Robots and Systems (IROS), Maui, HI. pp. 1609-1615.
48. Quinn, R. D. Nelson, G.M., Bachmann, R.J., Kingsley, D.A., Offi, J. and Ritzmann, R. E. (2001). Insect Designs for Improved Robot Mobility. In Proc. of Climbing and Walking Robots (CLAWAR01) Conference, Karlsruhe, Germany.
49. Quinn, R.D., Nelson, G.M., Bachmann, R.J., and Ritzmann, R.E. (2001) Toward Mission Capable Legged Robots through Biological Inspiration. *Autonomous Robots*, 11 (3), 215-220.
50. Birch, M.C., Quinn, R.D., Hahm, G., Phillips, S.M., Drennan, B.T., Fife, A.J., Beer, R.D., Yu, X., Garverick, G., Laksanacharoen, S., Pollack, A.J., Ritzmann, R.E., (2002) "A Miniature Hybrid Robot Propelled by Legs," *IEEE Robotic & Automation Magazine*, Vol. 10, Dec. 2002.
51. Fife, A., Laksanacharoen, S., Quinn, R.D., Beer, R.D. and Ritzmann, R.E. (2002). The evolution of neural network controllers for the targeted swing of a cockroach-like robot. In Proceedings of the IEEE World Congress on Computational Intelligence, Honolulu, HI, May 12-17, 2002.

52. Quinn, R.D., Kingsley, D.A., Offi, J. and Ritzmann, R.E., (2002), Improved Mobility Through Abstracted Biological Principles, IEEE Int. Conf. On Intelligent Robots and Systems (IROS'02), Lausanne, Switzerland.
53. Watson, J.T, Ritzmann, R.E., Zill, S.N. and Pollack, A.J. (2002) Control of Obstacle Climbing in the Cockroach, *Blaberus discoidalis* I. Kinematics. *J.Comp. Physiol. A.* **188**:39-53.
54. Watson, J.T, Ritzmann, R.E., and Pollack, A.J. (2002) Control of Obstacle Climbing in the Cockroach, *Blaberus discoidalis* II. Motor Activities Associated with Joint Movement. *J. Comp. Physiol. A.* **188**:55-69.
55. Birch, M.C., Quinn, R.D., Hahm, G., Phillips, S.M., Drennan, B.T., Fife, A.J., Beer, R.D., Yu, X.Y., Garverick, S.L., Laksanacharoen, S., Pollack, A.J. and Ritzmann, R.E. (2002). Cricket- based robots. *IEEE Robotics and Automation Magazine* **9**(4) pp. 20-30.
56. Quinn, R.D., Nelson, G.M., Ritzmann, R.E., Bachmann, R.J., Kingsley, D.A., Offi, J.T. and Allen, T.J. (2003), Parallel Strategies For Implementing Biological Principles Into Mobile Robots. *Int. Journal of Robotics Research* **22**: 169-186.
57. Ridgel, A.L., R.E. Ritzmann and P.L. Schaefer (2003) Effects of aging on behavior and leg kinematics during locomotion in two species of cockroach. *J. exp. Biol.* **206**(24):4453-4465.
58. Boggess, M.J., Schroer, R.T., Quinn, R.D., Ritzmann, R.E. (2004) Mechanized Cockroach Footpaths Enable Cockroach-like Mobility, IEEE International Conference on Robotics and Automation (ICRA'04), New Orleans.
59. Ritzmann, R.E., R.D. Quinn and M.S. Fischer (2004) Convergent Evolution and Locomotion through Complex Terrain by Insects, Vertebrates and Robots. *Arth. Struct. Dev.* **33**(3):361-379.
60. Ritzmann, R.E., R.D. Quinn and M.S. Fischer (2004) Arthropod locomotion systems: from biological materials and systems to robotics - Editorial. *Arth. Struct. Dev.* **33**(3):183-185.
61. Schroer, R.T, Boggess, M.J., Bachmann, R.J., Quinn, R.D., and Ritzmann, R.E. (2004) Comparing Cockroach and Whegs Robot Body Motions, IEEE International Conference on Robotics and Automation (ICRA'04), New Orleans.
62. Wei, T.E., Quinn, R.D., and Ritzmann, R.E. (2004) "A CLAWAR That Benefits From Abstracted Cockroach Locomotion Principles," In Proc. of Climbing and Walking Robots Conference (CLAWAR04), Madrid.
63. Daltorio, K.A., Horchler, A.D., Gorb, S., Ritzmann, R.E., Quinn, R.D. (2005) A small wall walking robot with compliant adhesive feet, 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS05), Edmonton, Canada.
64. Lewinger, W.A., C.M. Harley, R.E. Ritzmann, M.S. Branicky, and R.D. Quinn. "Insect-like Antennal Sensing for Climbing and Tunneling Behavior in a Biologically-inspired Mobile Robot," IEEE International Conference on Robotics and Automation (ICRA'05) Proceedings, Barcelona, Spain, April 18-22, 2005.
65. Mu, L., R.E. Ritzmann (2005) Kinematics and motor activity during tethered walking and turning in the cockroach, *Blaberus discoidalis*. *J. Comp. Physiol. A.* **191**:1037-1054.
66. Ridgel, A.L. and R.E. Ritzmann (2005) Insights into age-related locomotor declines from studies of insects. *Aging Res Rev* **4**:23-39.

67. Ridgel, A.L. and R.E. Ritzmann (2005) Effects of neck and circumoesophageal connective lesions on posture and locomotion in the cockroach *J. Comp. Physiol. A*. **191**:559-73.
68. Ritzmann, R.E., A.J. Pollack, J. Archinal, A.L. Ridgel, and R.D. Quinn, (2005) Descending Control of Body Attitude in the Cockroach, *Blaberus discoidalis* and Its Role in Incline Climbing. *J. Comp. Physiol. A*. **191**:253-264.
69. Kingsley, D.A., Quinn, R.D., Ritzmann, R.E. (2006) A cockroach inspired robot with artificial muscles, IEEE IROS'06, Beijing
70. Daltorio, K.A., Gorb, S., Peressadko, A., Horchler, A.D., Wei, T.E., Ritzmann, R.E., Quinn, R.D. "Micro-structured polymer adhesive feet for robot climbing."MRS (Materials Research Society) Bulletin. vol. 32, no. 6, pp. 504-508, June 2007.
71. Daltorio, K.A., T.E. Wei, S.N. Gorb, R.E. Ritzmann, R.D. Quinn. (2007) "Passive Foot Design and Contact Area Analysis for Climbing Mini-Whegs™." International Conference on Robotics and Automation (ICRA '07). Rome, Italy. April 10-14, 2007.
72. Ridgel, A.L., Alexander, B.E. and Ritzmann, R.E. (2007) Descending control of turning behavior in the cockroach, *Blaberus discoidalis*. *J. Comp. Physiol. A*. **193**:385–402.
73. Rutter, B.L., Mu, L., Ritzmann, R.E., Quinn, R.D. (2007) Transforming Insect Electromyograms into Pneumatic Muscle Control. International Conference on Robotics and Automation (ICRA '07). Rome, Italy. April 10-14, 2007.
74. Ritzmann, R.E., Büschges, A. (2007) Adaptive Motor Behavior in Insects. *Curr. Opin. Neurobiol.* **17**:629-636.
75. Daltorio, K.A., T. Witushynsky, G. Wile, L. Palmer, A. Malek, M.R. Ahmad, L. Southard, S.N. Gorb, R.E. Ritzmann, R.D. Quinn (2008) A Body Joint Improves Vertical to Horizontal Transitions of a Wall-Climbing Robot. International Conference on Robotics and Automation (ICRA'08), Pasadena. In press.
76. Mu, L., R.E. Ritzmann (2008) Interaction between descending input and local thoracic reflexes for joint coordination in cockroach turning: I. Descending influence on thoracic sensory reflexes. *J. Comp. Physiol. A* **194**:283-298.
77. Mu, L., R.E. Ritzmann (2008) Interaction between descending input and local thoracic reflexes for joint coordination in cockroach turning: II. Comparative studies on tethered turning and searching. *J. Comp. Physiol. A* **194**:299-312.
78. Ritzmann R.E., Ridgel A, Pollack AJ: (2008) Multi-unit recording of antennal mechano-sensitive units in the central complex of the cockroach, *Blaberus discoidalis*. *J. Comp. Physiol. A* **194**:341–360.
79. Ritzmann, R.E. and Zill, S.N. (2009) "Walking and Jumping" in Encyclopedia of Insects edited by V.H. Rush and R.T. Carde, Academic Press. Accepted for Publication.
80. Wile, G.D. Daltorio, K.A., Diller, E.D., Palmer, L.R., Gorb, S.N., Ritzmann, R.E. and Quinn, R.D. (2008) Screenbot: Walking inverted using distributed inward gripping, Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'08), Nice, France.
81. Harley, C.M., English, B. and Ritzmann, R.E. (2009) Characterization of obstacle negotiation behaviors in the cockroach, *Blaberus discoidalis*. *J. Exp. Biol.* (in press).

## ABSTRACTS:

1. Ritzmann, R. E., J. M. Camhi (1976) Responses of leg motor neurons to electrical stimulation of giant axons in the cockroach *Periplaneta americana*. *Soc. Neurosci. Abstr.* **2**:333.
2. Ritzmann, R. E. (1979) Effect of paired stimulation of giant interneurons in the cockroach *Periplaneta americana*. *Soc. Neurosci. Abstr.* **5**:260.
3. Westin, J., Ritzmann, R. E. (1979) Motor output to a cockroach leg in response to wind from different directions. *Soc. Neurosci. Abstr.* **5**:265.
4. Ritzmann, R. E., C. R. Fournier, M. L. Tobias (1980) Flight activity evoked by intracellular stimulation of giant interneurons in the cockroach *Periplaneta americana*. *Soc. Neurosci. Abstr.* **6**:27.
5. Ritzmann, R. E., C. R. Fournier, A. J. Pollack (1981) Identification of flight neurons in the cockroach *Periplaneta americana*. *Soc. Neurosci. Abstr.* **7**:410.
6. Tobias, M. L., Ritzmann, R. E. (1982) Motor response of the cockroach mesothoracic ganglion to giant interneuron stimulation. *Soc. Neurosci. Abstr.* **8**:737.
7. Ritzmann, R. E., Pollack, A. J. (1983) Identification of wind sensitive interganglionic interneurons in the cockroach. *Soc. Neurosci. Abstr.* **9**:381.
8. Ritzmann, R. E., Pollack, A. J. (1984) Thoracic interneurons post-synaptic to giant interneurons of the cockroach. *Midwest Neurobiol.*
9. Murrain, M. P., Ritzmann, R. E. (1984) Leg sensory sensitive intersegmental interneurons in the cockroach. *Midwest Neurobiol.*
10. Ritzmann, R. E., Pollack, A. J. (1984) Thoracic interneurons excited by giant interneurons of the cockroach. *Soc. Neurosci. Abstr.* **10**:624.
11. Murrain, M. P., Ritzmann, R. E. (1984) Intersegmental interneurons sensitive to leg sensory structures in the cockroach. *Soc. Neurosci. Abstr.* **10**:625.
12. Simpson, B., Ritzmann, R. E. (1984) A comparison of the escape behavior of the cockroaches *Blaberus craniifer* and *Periplaneta americana*. *Soc. Neurosci. Abstr.* **10**:396.
13. Westin, J., Ritzmann, R. E. (1984) Responses of thoracic interneurons to wind puffs of different directions. *Soc. Neurosci. Abstr.* **10**:625.
14. Pollack, A. J., Ritzmann, R. E. (1985) Morphological and physiological examination of a paired dorsal group of interneurons in the thoracic ganglia of the cockroach. *Soc. Neurosci. Abstr.* **11**:164.
15. Murrain, M., Ritzmann, R. E. (1985) Characterization of thoracic interneurons in the cockroach: physiological and morphological analysis. *Soc. Neurosci. Abstr.* **11**:164.
16. Ritzmann, R. E. (1986) Polysynaptic pathways for escape in the cockroach. *Cong. of Neuroethol. Abstr.* **1**:81.
17. Murrain, M., Ritzmann, R. E. (1986) Characterization of proprioceptive inputs to DPG interneurons in the cockroach. *Soc. Neurosci. Abstr.* **12**:858.
18. Westin, J., Pollack, A. J., Ritzmann, R. E., and Wiblin, R. T (1986) Directional properties of thoracic interneurons in cockroach giant interneuron pathways. *Soc. Neurosci. Abstr.* **12**:858.
19. Pollack, A. J., Ritzmann, R. E. (1987) DUM interneurons are excited by ventral giant interneurons of the cockroach. *Soc. Neurosci. Abstr.* **13**:141.

20. Ritzmann, R.E., A.J. Pollack , J. Westin (1987) Integration of directional wind field information in thoracic interneurons of the cockroach. *Soc. Neurosci. Abstr.* **13**:140.
21. Casagrand, J.L., R.E. Ritzmann (1988) Morphological analysis of connectivity between giant interneurons and thoracic interneurons. *Soc. Neurosci. Abstr.* **14**:378.
22. Pollack, A.J., R.E. Ritzmann (1988) Interganglionic motor activation from thoracic interneurons in the vGI system of the cockroach. *Soc. Neurosci. Abstr.* **14**:1000.
23. Westin, J., R.E. Ritzmann (1988) Timing of action potentials in giant interneurons of the cockroach. *Soc. Neurosci. Abstr.* **14**:378.
24. Casagrand, J.L., R.E. Ritzmann (1989) Morphological and developmental analyses of connectivity between giant interneurons and thoracic interneurons. *Midwest Neurobiol.* **12**:18.
25. Casagrand, J.L., R.E. Ritzmann (1989) Connections between ventral giant interneurons and thoracic interneurons of the cockroach occur specifically on the ventral median branch of TIs. *Soc. Neurosci. Abstr.* **15**:1287.
26. Pollack, A.J., R.E. Ritzmann (1989) Thoracic interneurons in the cockroach demonstrate ascending excitation and descending inhibition in patterns of connection. *Midwest Neurobiol.* **12**:13.
27. Pollack, A.J., R.E. Ritzmann (1989) Thoracic interneurons of the ventral giant system excite leg motor neurons of multiple ganglia directly and via local interneurons. *Soc. Neurosci. Abstr.* **15**:1287.
28. Ritzmann, R.E., A.J. Pollack (1989) Motor pathways from thoracic interneurons in the wind mediated escape system of the cockroach. *Cong. of Neuroethol. Abstr.* **2**:24.
29. Beer, R.D., G.J. Kacmarcik, R.E. Ritzmann, H.J. Chiel (1990) A computer model for escape in the cockroach. *Soc. Neurosci. Abstr.* **16**:759.
30. Casagrand, J.L., R.E. Ritzmann (1990) Ventral giant interneuron synapses to thoracic interneurons in the cockroach are chemical and cholinergic. *Soc. Neurosci. Abstr.* **18**:551.
31. Nye, S.W., R.E. Ritzmann (1990) Videotape motion analysis of leg joint angles during escape turns of the cockroach. *Soc. Neurosci. Abstr.* **16**:759.
32. Beer, R.D., G.J. Kacmarcik, S.Chai, R.E. Ritzmann, H.J. Chiel (1991) Ventral giant interneuron wind fields in the cockroach modeled with constrained back-propagation. *Soc. Neurosci. Abstr.* **17**:1245.
33. Casagrand, J.L., R.E. Ritzmann (1991) Biogenic amines modulate synaptic transmission between ventral giant interneurons and thoracic interneurons in the escape system of the cockroach. *Soc. Neurosci. Abstr.* **17**:276.
34. Ritzmann, R.E., A.J. Pollack, S.E. Hudson (1991) Influence of non-giant sensory inputs on the escape response of the cockroach. *Soc. Neurosci. Abstr.* **17**:1245.
35. Pollack, A.J. , R.E. Ritzmann (1992) Convergence of antennal and wind inputs on the escape system of the cockroach. *Proc. Int. Cong. Neuroethol.* **3**:251.
36. Watson, J.T. , R.E. Ritzmann (1992) Effects of physiological state on escape behavior and its neural correlates. *Proc. Int. Cong. Neuroethol.* **3**:252.
37. Watson, J.T. , R.E. Ritzmann (1993) Motion analysis of local circuits for the control of leg movements in the cockroach. *Midwest Neurobiol. Meeting* **16**:6.
38. Pollack, A.J. , R.E. Ritzmann (1993) Tactile fields for thoracic interneurons of the escape system of the cockroach. *Soc. Neurosci. Abstr.* **19**:339.

39. Watson, J.T. , R.E. Ritzmann (1993) Analysis of leg movements evoked by intracellular stimulation of neurons in the cockroach. *Soc. Neurosci. Abstr.* **19**:1601.
40. Beer, R.D., W.J. Marx, G.M. Nelson, K.S. Espenschied, R.D. Quinn, J.T. Watson, R.E. Ritzmann, H.J. Chiel. (1994) Contributions of peripheral properties to insect and robot locomotion. *Soc. Neurosci. Abstr.* **20**:1594.
41. Pollack, A.J. , R.E. Ritzmann (1994) Tactile sensory pathways leading to escape circuitry in the cockroach. *Soc. Neurosci. Abstr.* **20**:1594.
42. Watson, J.T. , R.E. Ritzmann (1994) Kinematic and EMG analysis of fast and slow running in the cockroach. *Soc. Neurosci. Abstr.* **20**:777.
43. Pollack, A.J. , R.E. Ritzmann (1995) Tactile interneurons in the abdominal ganglion of the cockroach. *Soc. Neurosci. Abstr.* **21**:409.
44. Watson, J.T. , R.E. Ritzmann (1995) Kinematic analysis of locomotion in the cockroach. *Soc. Neurosci. Abstr.* **21**:427.
45. Chen, C. T., Quinn, R. D., Ritzmann, R. E., "A Crash Avoidance System Based on the Cockroach Escape Response," Proceedings of the Tenth VPI&SU/AIAA Symposium on Dynamics and Control of Large Structures, May 8-10, 1995.
46. Nelson, G.M., R.D. Quinn, J.T. Watson, A.K. Tryba, R.E. Ritzmann, H.J. Chiel, R.D. Beer (1996) Simulated Dynamics of Walking and Climbing in the Cockroach *Soc. Neurosci. Abstr.***22**: 1077.
47. Schaefer, P.L. ,R.E. Ritzmann (1996) Influence of Higher Centers on Thoracic Circuits of the Escape System in Cockroach *Soc. Neurosci. Abstr.***22**: 1143.
48. Watson , J.T. , A.K. Tryba, R.E. Ritzmann (1996) Analysis of Prothoracic Leg Movement During Walking and Climbing in the Cockroach *Soc. Neurosci. Abstr.***22**: 1077.
49. Bachmann, R.J., G.M. Nelson, R.D. Quinn, J.T. Watson, R.E. Ritzmann, (1997) Development of a Cockroach-like Robot for Climbing and Running. *Soc. Neurosci. Abstr.***23**: 767.
50. Schaefer, P.L. , A.J. Pollack, R.E. Ritzmann (1997) Analysis of Descending Influences on Motor Control of Cockroach Escape. *Soc. Neurosci. Abstr.***23**: 1570.
51. Watson , J.T. , A.K. Tryba, R.E. Ritzmann, S.N. Zill. (1997) Coordination of Leg Joints During Complex Locomotion in the Cockroach. *Soc. Neurosci. Abstr.***23**: 767.
52. Bachmann, R. J., Nelson, G. M., Quinn, R. D., Watson, J., Ritzmann, R. E. "Design of a Cockroach-like Robot, Proceedings of the 11<sup>th</sup> VPI&SU Symposium on Structural Dynamics and Control, May 12-14, 1997.
53. Bachmann, R. J., Nelson, G. M., Quinn, R. D., Watson, J., Tryba, A. K , Ritzmann, R. E. "Construction of a Cockroach-like Hexapod Robot," Sixth IASTED International Conference on Robotics and Automation, Banff, Canada, July 26-29, 1998.
54. Birch, M. C., Quinn, R. D., Zill, S. N., Ritzmann, R. E. (1998) "A Model Cockroach Leg for Sensorimotor Studies," *The Fifth International Congress of Neuroethology*, August 23-28, 1998.
55. Nelson , G. M., Quinn, R. D., Bachmann, R. J., Watson, J. T., Tryba, A. K., Ritzmann, R. E. (1998) Posture Control of a Robot with Cockroach Mechanics, *The Fifth International Congress of Neuroethology*, August 23-28, 1998.

56. Quinn, R. D., Ritzmann, R. E. (1998) A Hexapod Robot based upon Cockroach Mechanics, *The Fifth International Congress of Neuroethology*, August 23-28, 1998.
57. Schaefer, P.L., R.E. Ritzmann (1998) Supraoesophageal influence on the thoracic circuitry of cockroach escape *The Fifth International Congress of Neuroethology*, August 23-28, 1998.
58. Tryba, A.K., R.E. Ritzmann, (1998) A robust and reversible preparation for examining the neural architecture underlying searching and walking in the cockroach, *Blaberus discoidalis*. *The Fifth International Congress of Neuroethology*, August 23-28, 1998.
59. Watson , J.T. , A.J. Pollack, S.N. Zill, R.E. Ritzmann, (1998) Kinematics and leg muscle activity in cockroaches climbing over obstacles. *The Fifth International Congress of Neuroethology*, August 23-28, 1998.
60. Birch, M.C., S. Laksanacharoen, R.D. Quinn, A.J. Pollack and R.E. Ritzmann (1999) Development of a micro-robot based on cricket biomechanics. *Soc. Neurosci. Abstr.***25**: 363.
61. Nelson, G.M. , J.T. Watson, R.J. Bachmann, R.D. Quinn, and R.E. Ritzmann (1999) Importance of load sensing in animal climbing and robotic design. *Soc. Neurosci. Abstr.***25**: 363.
62. Schaefer, P.L., A.J. Pollack, R.E. Ritzmann (1999) The role of nerve 4 innervated muscle in iescape and walking in the cockroach. *Soc. Neurosci. Abstr.***25**: 366.
63. Tryba, A.K. , R.E. Ritzmann (1999) Multi-joint coordination of two extensor motorneurons during searching for a foothold and walking in the cockroach, *Blaberus discoidalis*. *Soc. Neurosci. Abstr.***25**: 365.
64. Watson, J.T., J.M. Saunders, S. Laksanacharoen, R.E. Ritzmann, G.M. Nelson, and R.D. Quinn (1999) Surmounting obstacles on six legs: biological and biorobotic approaches. *Soc. Neurosci. Abstr.***25**: 363.
65. Pollack, A.J, R.E. Ritzmann, D. Greenblatt (2000) How does perturbation of leg structures affect locomotor behaviors in the cockroach? *Soc. Neurosci. Abstr.***26**: 1723
66. Bachmann, R.J., M.C. Birch, S. Laksanacharoen, G.M. Nelson, R.D. Quinn, A.J. Pollack, J.T. Watson, R.E. Ritzmann, S.N. Zill (2000) Development of hexapod robots based upon insect leg design and dynamics. *Soc. Neurosci. Abstr.* **26**: 1724
67. Nelson, G.M., R.D. Quinn, J.T. Watson, R.E. Ritzmann (2000) A numerical solution to inverste kinematics for the control of robotic leg movement. *Soc. Neurosci. Abstr.* **26**: 1723
68. Choi, J., G.M. Nelson, R.E. Ritzmann, R.D. Quinn (2000) Virtual vs. real locomotion over obstacles. *Soc. Neurosci. Abstr.* **26**: 1723
69. Kaliyamoorthy, S., S. Zill, R. Ritzmann, J. Choi and R. Quinn (2001) Finite element analysis of exoskeletal strains and discharges of force receptors during walking and climbing. *Soc. Neurosci. Abstr.* **27**: program no. 518.12.
70. Ritzmann, R.E., C.M. Rice, A.J. Pollack, A.L. Ridgel, D.A. Kingsley, and R.D. Quinn (2001) Roles of Descending Control in Locomotion through Complex Terrain. *The Sixth International Congress of Neuroethology*, July 29-August 3, 2001 vol. 6, p. 234.
71. Birch, M.C., Quinn, R.D., Ritzmann, R.E. Pollack, A.J., Phillips, S.M. (2002), Micro-robots inspired by crickets. Proceedings of Climbing and Walking Robots Conference (CLAWAR02), Paris, France.
72. Bachmann, R.J., Kingsley, D.A., Quinn, R.D., Ritzmann, R.D. (2002), A Cockroach Robot with Artificial Muscles. Proceedings of Climbing and Walking Robots Conference (CLAWAR02), Paris, France.

73. Choi, J., Watson, J.T., Nelson, G.M., Ritzmann, R.E., Quinn, R.D., (2002) Virtual versus real locomotion over obstacles. 5<sup>th</sup> Int. Conf. On Dynamics and Control of Systems and Structures in Space, Cambridge, England, July 14-18.
74. Quinn, R.D., T.J. Allen, A.D. Horchler, A.J. Pollack, M.C. Birch, B.L. Rutter, L. Mu, R.J. Bachmann, R.E. Ritzmann (2002) Two distinct but complementary strategies for biorobotic development. *Soc. Neurosci. Abstr. CD ROM 28*: Prog Numb. 465.3.
75. Pollack, A.J, R.E. Ritzmann, R.D. Quinn, T.E. Wei. (2002) Role of higher centers of insect CNS in climbing and incline running. *Soc. Neurosci. Abstr. CD ROM 28*: Prog Numb. 465.2.
76. Ridgel, A.L., B.E. Alexander, L. Mu, R.E. Ritzmann, N. Strausfeld (2002) Roles Of Descending Control In Insect Turning. *Soc. Neurosci. Abstr. CD ROM 28*: Prog Numb. 465.4.
77. Vaidyanathan, R., Williams, C., Prince, T.S., Ritzmann, R.E., Quinn, R.D., (2002), "An Insect-Inspired Targeting/Evasion Reflex for Autonomous Air Vehicles," 2002 Digital Avionics Conference.
78. Kingsley, D.A., Quinn, R.D., Ritzmann, R.E., (2003) "A cockroach inspired robot with artificial muscles," Int. Symposium on Adaptive Motion of Animals and Machines (AMAM), Kyoto, Japan.
79. Vaidyanathan, R., Williams, C., Prince, T.S., Ritzmann, R.E., Quinn, R.D., (2002), "An Insect-Inspired Targeting/Evasion Reflex for Autonomous Air Vehicles," 2002 Digital Avionics Conference (Won best paper in session award).
80. Quinn, R.D., T.J. Allen, A.D. Horchler, J.M. Morrey, B. Lambrecht, A.J. Pollack, M.C. Birch, B.L. Rutter, L. Mu, R.J. Bachmann, R.E. Ritzmann (2003) Two distinct but complementary strategies for biorobotic development. *CWRU ShowCase, April 4*.
81. Ritzmann, R.E., A.L. Ridgel, B.E. Alexander, L. Mu, A.J. Pollack (2003) Descending control in insect locomotion over and around barriers *CWRU ShowCase, April 4*
82. Allen, T.J., Quinn, R.D., Bachmann, R.J., and Ritzmann, (2003) Abstracted Biological Principles Applied with Reduced Actuation Improve Mobility of Legged Vehicles. IEEE Int. Conf. On Intelligent Robots and Systems (IROS'03), Las Vegas, Nevada.
83. Morrey, J.M., Lambrecht, B., Horchler, A.D., Ritzmann, R.E., and Quinn, R.D., (2003) Highly Mobile and Robust Small Quadruped Robots. IEEE Int. Conf. On Intelligent Robots and Systems (IROS'03), Las Vegas, Nevada.
84. Mu, L. A.L. Ridgel, , B.E. Alexander, R.E. Ritzmann (2003) The role of brain neuropils during turning in the cockroach. *Soc. Neurosci. Abstr. CD ROM 29*: Prog Numb. 606.4.
85. Pollack, A.J., R.E. Ritzmann, A.L. Ridgel, J. Archinal (2003). Incline climbing behaviors in cockroach require intact connections from brain. *Soc.. Neurosci. Abstr. CD ROM 29*: Prog Numb. 606.5.
86. Ridgel, A.L., R.E. Ritzmann, P.L. Schaefer (2003). Effects of aging on behavior and leg kinematics in the cockroach. *Soc. Neurosci. Abstr. CD ROM 29*: Prog Numb. 606.2.
87. Kingsley, D.A., Quinn, R.D., Ritzmann, R.E., (2003) "A cockroach inspired robot with artificial muscles," Int. Symposium on Adaptive Motion of Animals and Machines (AMAM'03), Kyoto, Japan.
88. Kingsley, D.A., Quinn, R.D., Ritzmann, R.E., (2003) "A cockroach inspired robot with artificial muscles," Int. Symposium on Adaptive Motion of Animals and Machines (AMAM'03), Kyoto, Japan.
89. Quinn, R.D., Kauer, J.S., Willis, M.A., Ritzmann, R.E., Young, D., White, J. (2004) A Biologically Inspired System For Demining, UXO Site Remediation, And National Security Missions. 2004 Mine Warfare Conference (MINWARA), Naval Post Graduate School, Monterey, CA.

90. Horchler, A.D., Reeve, R.E., Webb, B.H., Quinn, R.D., Ritzmann, R.E., (2004) Investigating Conflicting Orientation Systems Using A Robot. *ShowCASE*, April 2.
91. Horchler, A.D., Reeve, R.E., Webb, B.H., Quinn, R.D., Ritzmann, R.E., (2004) Investigating Conflicting Orientation Systems Using A Robot. *ShowCASE*, April 2.
92. Choi, J., Rutter, B.L., Kingsley, D.A., Ritzmann, R.E., Quinn, R.D. (2005) A Robot with Cockroach Inspired Actuation and Control. *Advanced Intelligent Mechatronics Proceedings, 2005 IEEE/ASME International Conference*, Monterey, CA, pp. 1569 – 1574.
93. Daltorio, K.A., Funt, J.M., Horchler, A.D., Gorb, S.M., Ritzmann, R.E., Quinn, R.D., (2005) Insect-inspired attachment mechanisms enable a small robot to climb glass walls. *Soc. Neurosci. Abstr. CD ROM 31*: 176.7.
94. Daltorio, K.A., Horchler, A.D., Gorb, S., Ritzmann, R.E., Quinn, R.D. (2005) A small wall walking robot with compliant adhesive feet, *Proceedings of Climbing and Walking Robots Conference (CLAWAR'05)*, London, U.K., September, 2005.
95. Harley, C.M., Lewinger, W.A., Ritzmann, R.E., Quinn, R.D., (2005) Characterization of obstacle avoidance behaviors in the cockroach *Blaberus discoidalis* and implementation in a semi-autonomous robot. *Soc. Neurosci. Abstr. CD ROM 31*: 176.10.
96. Mu, L., Ritzmann, R.E., (2005) Alteration of Coordinated Joint Movement Demonstrated by Turning and Searching Behaviors in the Cockroach, *Blaberus discoidalis*. *Soc. Neurosci. Abstr. CD ROM 31*: 176.8.
97. Ridgel, A.L., Pollack, A.J., Partusch, M., Ritzmann, R.E., Daly, K.C., (2005) Role of brain circuits during transitional locomotion in the cockroach. *Soc. Neurosci. Abstr. CD ROM 31*: 176.9.
98. Rutter, B.L., Mu, L., Ritzmann, R.E., Quinn, R.D., (2005) A model that transforms insect electromyograms into pneumatic muscle control. *Soc. Neurosci. Abstr. CD ROM 31*: 176.12.
99. Daltorio, K., Gorb, S., Peressadko, A., Horchler, A.D., Ritzmann, R.E., Quinn, R.D., (2006) A Biologically Inspired, Vertical-Surface Climbing Robot, *ShowCASE*, Cleveland, Ohio Apr. 6, 2006.
100. Daltorio, Kathryn A., Terence E. Wei, Stanislav N. Gorb, Jason M. Funt, Roy E. Ritzmann and Roger D. Quinn. “Enhancing Robotic Mobility Through Insect Strategies” *International Symposium for Biologically-Inspired Design and Engineering*. Atlanta, Georgia. May 10-12, 2006.
101. Daltorio, K.A., Wei, T.E., Gorb, S.N., Ritzmann, R.E., Quinn, R.D. (2006) Insect-inspired foot geometry for rotating legs on a climbing robot. *Soc. Neurosci. Abstr. CD ROM 32*: 449.14.
102. Harley, C.M., Lewinger, W.A., Ritzmann, R.E., Quinn, R.D., (2006) Characterization of obstacle avoidance behaviors in the cockroach *Blaberus discoidalis* and implementation in a semi-autonomous robot. *Research ShowCASE*, Cleveland, OH April 6.
103. Harley, C.M., Predina, J.D., Ritzmann, R.E. (2006) Responses to incomplete sensory information in cockroach climbing behavior. *Soc. Neurosci. Abstr. CD ROM 32*: 449.12.
104. Harley, C.M. and R.E. Ritzmann (2006) Complex Decisions about Simple Obstacles: Cockroach Climbing and Tunneling, *East Coast Nerve Net*. Woods Hole, Ma. April 1, 2006.
105. Mu, L., Ritzmann, R.E., (2006) Neural control mechanism for motor pattern change in cockroach turning behavior. *Research ShowCASE*, Cleveland, OH April 6.
106. Mu, L., Taylor, B.K., Rutter, B.L., Ritzmann, R.E. (2006) Altered joint reflexes in the cockroach may lead to directional changes in leg extension. *Soc. Neurosci. Abstr. CD ROM 32*: 449.11.

107. Pollack, A.J., Ridgel, A.L., Ritzmann, R.E. (2006) Multi-unit recording in cockroach brain associated with antennal mediated turning. *Soc. Neurosci. Abstr. CD ROM 32*: 449.10.
108. Quinn, R.D., Gorb, S. and Ritzmann, R.E. (2006) Nature holds solutions for mobile robots. *US Industry Today*, Volume 9, Issue 4, pp 6-7.
109. Ridgel, A.L., Pollack, A.J., Partusch, M., Ritzmann, R.E., Daly, K.C., (2006) Role of brain circuits during transitional locomotion in the cockroach. *Research ShowCASE*, Cleveland, OH April 6.
110. Rutter, B.L., Lewinger, W., Taylor, B., Wilson, M., Blümel, M., Ekeberg, Ö., Büschges, A., Ritzmann, R.E., Quinn, R.D. (2006) Neurally-based robot control for neuromechanical modeling of insect stepping. *Soc. Neurosci. Abstr. CD ROM 32*: 449.13.
111. Rutter, B., L. Mu, B. Taylor, R.D. Quinn, R.E. Ritzmann (2006) A Model that Transforms Insect Electromyograms into Pneumatic Muscle Control. *Research ShowCASE*, Cleveland, OH April 6
112. Rutter, B., L. Mu, R.D. Quinn, and R.E. Ritzmann. (2006) A Model that Transforms Insect Electromyograms into Pneumatic Muscle Control. International Symposium for Biologically-inspired Design and Engineering. Atlanta, GA: Center for Biologically Inspired Design. Online
113. Rutter, B., L. Mu, R.E. Ritzmann, R. Quinn (2006) Transforming Insect Electromyograms into Pneumatic Muscle Control. Proceedings of SPIE 6230 "Unmanned Systems Technology VIII" June 2006. Online.
114. Wei, T.E. K.A. Daltorio, S.N. Gorb, J.M. Funt, R.E. Ritzmann and Roger D. Quinn. "Enhancing Robotic Mobility Through Insect Strategies" *Intelligence Community Postdoctoral Fellowship Colloquium*. Washington DC. April 17-19, 2006.
115. Wei, T.E., K.A. Daltorio, S. N. Gorb, L. Southard, R.E. Ritzmann, and R.D. Quinn "A Small Climbing Robot with Compliant Ankles and Multiple Attachment Mechanisms," *Int. Conf. on Climbing and Walking Robots (CLAWAR '06)*, Brussels, Belgium. September 12-14, 2006.
116. Xu, Y., (2006) Role of the Central Complex on Transitional Behaviors of *Blaberus discoidalis*, Proceedings of National Conference on Undergraduate Research (NCUR'06), Asheville, NC, April 6-8, 2006. (Undergraduate student who worked in our lab during 2005 SPUR program presented her work at this undergraduate conference).
117. Daltorio, K.A., S. Gorb, A. Peressadko, A. Horschler, R.E. Ritzmann, and R.D.. Quinn. "A Robot that Climbs Walls Using Micro-Structured Polymer Adhesive." *Proceedings of the 30<sup>th</sup> Annual Meeting of the Adhesion Society*. Tampa, Florida. February 18-21, 2007.
118. Daltorio, K.A., T.E. Wei, G.D. Wile, S.N. Gorb, R.E. Ritzmann, R.D. Quinn. "Insect-Inspired Foot Geometry for Rotating Legs on a Climbing Robot." *Research ShowCASE*, April 12, 2007.
119. Harley, C.M., Pollack, A.J., Ritzmann, R.E. (2007) Discrete lesions within the cockroach brain and their effect on negotiation of barriers. Eighth Cong. Neuroethol. **8:P052**, July 22-27, Vancouver, BC, Canada
120. Ritzmann, R.E., Pollack, A.J., Ridgel, A.L. (2007) Extracellular recordings in the central body complex of the cockroach *Blaberus discoidalis*. Eighth Cong. Neuroethol. **8:P053**, July 22-27, Vancouver, BC, Canada.
121. Mu, L., Ritzmann, R.E. (2007) Interaction between descending input and local thoracic reflexes for joint coordination, Eighth Cong. Neuroethol. **8:P0230**, July 22-27, Vancouver, BC, Canada.
122. Rutter, B.L. W.A. Lewinger, B.K. Taylor, M. Wilson, M. Blümel, Ö. Ekeberg, A. Büschges, R.E. Ritzmann, R.D. Quinn. "Neurally-based robot control for neuromechanical modeling of insect stepping,"

- Research ShowCASE, Case Western Reserve University, April 11-12, 2007. (Awarded Honorable Mention)
123. Rutter, B.L., Taylor, B.L., Mu, L. Ritzmann, R.E. (2007) A functional kinematic model of the cockroach mesothoracic leg. *Neuroethol.* **8:P0232**, July 22-27, Vancouver, BC, Canada.
  124. Bender, J.A., B.L. Rutter, E.M. Simpson, T. Papay, D.Parker, B.K. Taylor, R.D. Quinn, R.E. Ritzmann. (2008) Robotic control based on cockroach 3D leg kinematics. 4<sup>th</sup> meeting of AMAM, June 1-6, 2008, Cleveland, OH. **4:200**
  125. Bender, J.A., E.M. Simpson, R.E. Ritzmann (2008) Increased Stereotypy of Leg Movement Patterns with Increased Walking Speed in the Cockroach. *Soc. Neurosci. Abstr. CD ROM* **34:198.6**.
  126. Daltorio, K.A. Boxerbaum, A.S., Witushynsky, T.C., Wile, G.D., Palmer, L.R., Malek, A.A., Ahmad, M.R. Southard, Stanislav N. Gorb, L.S., Ritzmann, R.E, Quinn, R.D. (2008) The Effect of a Body Joint on Performance of Whegs™ overRough Terrain. 4<sup>th</sup> meeting of AMAM, June 1-6, 2008, Cleveland, OH. **4:192**.
  127. Harley, C., English, B., Ritzmann, R.E. (2008) Using Your Head: The Involvement of the Cockroach Brain and Head Sensors in Obstacle Negotiation. 4<sup>th</sup> meeting of AMAM, June 1-6, 2008, Cleveland, OH. **4:135**
  128. Harley, C.M., S.J. Awe, R.E. Ritzmann (2008) Discrete lesions within the cockroach brain effect obstacle negotiation behaviors. *Soc. Neurosci. Abstr. CD ROM* **34:198.1**.
  129. Pollack, A.J. Kathmann, N.D. Ritzmann, R.E. (2008) Characterization of the Cockroach Brain Central Complex Utilizing Extracellular Multi-Unit Techniques. 4<sup>th</sup> meeting of AMAM, June 1-6, 2008, Cleveland, OH. **4:133**
  130. Ritzmann, R.E., N.D. Kathman, A.J. Pollack (2008) Extracellular responses in units recorded in the cockroach brain central complex. *Soc. Neurosci. Abstr. CD ROM* **34:198.9**.
  131. Rutter, B.L., Bender, J.A., Papay, T., Parker, D.A., Taylor, B.K., Ritzmann, R.E., Quinn, R.D. (2008) Neuromechanically Based Robotic Models for Biological Experimentation. 4<sup>th</sup> meeting of AMAM, June 1-6, 2008. Cleveland, **4:243**.
  132. Rutter, B.L. W.A. Lewinger, B.K. Taylor, M. Wilson, M. Blümel, Ö. Ekeberg, A. Büschges, R.E. Ritzmann, R.D. Quinn. (2008) Neurally-based robot control for neuromechanical modeling of insect stepping. 4<sup>th</sup> meeting of AMAM, Cleveland (OH), USA, June 1-6, 2008.
  133. Rutter, B.L., J.A. Bender, B.K. Taylor, R.E. Ritzmann, R.D. Quinn (2008) Experiments in locomotion with neuromechanically based robotic insect models. *Soc. Neurosci. Abstr. CD ROM* **34:198.7**.
  134. Wile, G.D. Daltorio, K.A., Palmer, L.R., Gorb, S.N., Ritzmann, R.E., Quinn, R.D. (2008) Screenbot: Traversing Screens Using Opposing Spines. 4<sup>th</sup> meeting of AMAM, June 1-6, 2008, Cleveland, OH.
  135. Wile, G.D., Daltorio, K.D., Diller, E.D., Palmer, L.R., Gorb, S.N., Ritzmann, R.E., Quinn, R.D. (2008) Screenbot: Traversing Screens Using Opposing Spines. *Soc. Neurosci. Abstr.*

## VIDEO PROCEEDINGS:

1. Quinn, R.D., Kingsley, D.A., Offi, J. and Ritzmann, R.E., "Its got whegs" 2002 IEEE International Conference on Robotics and Automation (ICRA'02) Video Proceedings, Washington, D.C., May, 2002.

2. Morrey, J.M., Horchler, A.D., Didona, N., Lambrecht, B., Ritzmann, R.E. and Quinn, R.D. (2003) Increasing Small Robot Mobility Via Biological Inspiration, 2003 IEEE International Conference on Robotics and Automation (ICRA'03) Video Proceedings, Taiwan. (Runner up for Best Video Award).
3. Lewinger, W.A., C.M. Harley, R.E. Ritzmann, M.S. Branicky, R.D. Quinn (2005) Insect-like Antennal Sensing for Climbing and Tunneling Behavior in a Biologically-inspired Mobile Robot, 2005 IEEE International Conference on Robotics and Automation, Barcelona, Spain - Awarded Best Video.
4. Daltorio, K.A., Gorb, S., Peressadko, A., Horchler, A.D., Ritzmann, R.E., Quinn, R.D. (2006) Wall-Climbing Mini-Whigs™. IEEE International Conference on Robotics and Automation (ICRA '06) Video Proceedings, Orlando
5. Daltorio, K.A., Wei, T.E., Wile, G.D., Southard, L., Gorb, S., Ritzmann, R.E., Quinn, R.D. (2007) Mini-Whigs™ climbing steep surfaces with insect inspired attachment mechanisms, Video Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'07), San Diego, October 29 – November 2.
6. Wile, G.D., Daltorio, K.D., Palmer, L., Witushynsky, T., Southard, L., Ahmad, M.R., Malek, A., Gorb, S.N., Boxerbaum, A., Ritzmann, R.E., Quinn, R.D. (2008) Making Orthogonal Transitions with Climbing Mini-Whigs™, IEEE International Conference on Robotics and Automation (ICRA '08) Video Proceedings, Pasadena.

## BOOK CHAPTERS:

1. Ritzmann, R. E. (1984) The cockroach escape response. In: Neural Mechanisms in Startle Behavior. Eaton, R. C., ed., Plenum Press, New York, pp. 93-131.
2. Beer, R.D., G.J. Kacmarcik, R.E. Ritzmann, H.J. Chiel (1990) A model of distributed sensorimotor control in the cockroach escape turn. in Advances in Neural Information Processing Systems 3. R.P Lippmann, J. Moody and D.S. Touretzky eds. Morgan Kaufmann Publishers.
3. Ritzmann, R.E. (1993) The neural organization of cockroach escape and its role in context-dependent orientation. In Biological Neural Networks in Invertebrate Neuroethology and Robotics. R.D. Beer, R.E. Ritzmann and T. McKenna eds. Academic Press, pp. 113-137.
4. Beer, R.D., R.E. Ritzmann, H.J. Chiel (1995) Models of the neural basis of insect behavior. In An Introduction to Neural and Electronic Networks 2nd edition. S. Zornetzer, J. Davis, C. Lau eds. Academic Press, pp. 165-184.
5. Ritzmann, R.E. and R.C. Eaton (1997) Neural substrates for initiation of startle responses. in Neurons, Networks, And Motor Behavior eds. Paul S.G. Stein, Sten Grillner, Allen I. Selverston, and Douglas G. Stuart, MIT Press. Pp 33-44.
6. Chen, C. T., Quinn, R. D., and Ritzmann, R. E., (1998) “The Cockroach Escape Response Circuit Provides An Excellent Basis For A Crash Avoidance System,” Soft Computing in Robotics, Springer, edited by Prof. K.Hirota and Prof. T. Fukuda.
7. R.D. Quinn and R.E. Ritzmann (2001) Construction of a hexapod robot with cockroach kinematics benefits both robotics and biology. In Biorobotics eds. B. Webb and Consi. MIT press, pp 87-105..
8. Quinn, R.D., Colbrunn, R.W., Nelson, G.M., Kingsley, D.A., Bachmann R.J., Ritzmann, R.E., (2001) McKibben Artificial Muscles for Insect Inspired Robots, in Biomechanical Modeling, edited by M.D. Grabiner.

9. Quinn, R.D., Nelson, G.M. and Ritzmann, R.E. (2002) "Toward the Development of Agile and Mission Capable Legged Robots" in Neurotechnology for Biomimetic Robots, edited by J. Ayers, J. Davis, and A. Rudolph, MIT Press, MA, pp 401-418.
10. Ritzmann, R.E. and Zill, S.N. (2003) "Walking and Jumping" in Encyclopedia of Insects edited by V.H. Rush and R.T. Carde, Academic Press. pp 1174-1179.
11. Ritzmann, R.E and Quinn, R.D. (2004) "Locomotion in Complex Terrain" in Walking: Biological and Technological Aspects edited by F. Pfeiffer and T. Zielinska. Springer, Wien and New York pp 31-49
12. Quinn, R.D. and Ritzmann, R.E. (2006) "Biologically Inspired Robotics" in McGraw-Hill Yearbook of Science and Technology McGraw-Hill Press, NY.
13. Ritzmann, R.E. and Büschges, A. (2007) "Insect Walking: From Reduced Preparations to Natural Terrain." in Invertebrate Neurobiology eds. G. North and R. Greenspan. Cold Spring Harbor Press, Cold Spring Harbor, NY. 229-250.

### **BOOKS EDITED:**

1. Beer, R.D. , R.E. Ritzmann and T. McKenna (1993) Biological Neural Networks in Invertebrate Neuroethology and Robotics. Academic Press, NY.

### **INVITED PRESENTATIONS:**

1. Ritzmann, R.E. (1981) Giant axons of the cockroach as bifunctional interneurons capable of initiating running or flying. Presented in a symposium on Neuroethology of Systems with Large Caliber Axons that Mediate Rapid Escape Responses. at the 1981 meeting of the Society for Neurosciences.
2. Ritzmann, R.E. (1984) Neural organization of wind-mediated escape responses in the cockroach. Presented in a symposium on Neuroethology of Prey-Predator Systems at the 1984 meeting of the Midwest Animal Behavior Society.
3. Ritzmann, R.E. (1986) The giant interneuron system of the cockroach as a model for sensory processing and behavior. First International Congress of Neuroethology, Tokyo, Japan.
4. Ritzmann, R.E. (1989) Control of escape orientation by a population of interneurons in the cockroach. Symposium on Motor Control in Arthropods, Invited Speaker, Tutzing, W. Germany.
5. Ritzmann, R.E. (1989) Seminar at University of Colorado, Boulder, CO.
6. Ritzmann, R.E. (1990) Seminar at Northern Arizona University, Flagstaff, AZ.
7. Ritzmann, R.E. (1991) Seminar at Marshall University, Huntington, WV.
8. Ritzmann, R.E. (1992) Seminar at Duquesne University, Pittsburgh, PA.
9. Ritzmann, R.E. (1992) Seminar at University of Connecticut, Storrs, CO.
10. Ritzmann, R.E. (1993) Seminar at Calvin College, Grand Rapids, Michigan "Control of Orientation and Locomotion Movements in an Insect"
11. Ritzmann, R.E. (1994) Seminar at Ohio State University, Columbus, OH "Control of Orientation and Locomotion Movements in an Insect"

12. Ritzmann, R.E. (1994) Seminar at Columbia University, New York, NY "Control of Orientation and Locomotion Movements in an Insect"
13. Ritzmann, R.E. (1995) Seminar at University of Michigan at Dearborn, Dearborn, MI "Neuroethology: Orientation and Locomotion in Cockroaches, Real and Robotic"
14. Ritzmann, R.E. (1995) Neural Substrates For Initiation Of Startle Responses In Invertebrates. Invited talk in Conference: Neurons, Networks, And Motor Behavior held in Tucson, AZ, Nov. 8-11, 1995.
15. Ritzmann, R.E. (1996) How can Multiple Robots be organized to perform tasks collaboratively? ISAT meeting on "Cost-Effective, Capable, and Configurable Multiple Robots" Pittsburgh, PA. 6/23/96.
16. Ritzmann, R.E. (1996) Presentation on research to Undergraduate Research Program at Ohio University. 6/25/96.
17. Ritzmann, R.E. (1997) Seminar at Vanderbilt University, Nashville, TN "Orientation and Locomotion Movements in Cockroach, Real and Robotic." March 28, 1997.
18. Ritzmann, R.E. (1997) Lecture at the Cleveland Museum of Natural History, Cleveland, OH. "The Use of Insects in Neurobiology and Robotics." April 9, 1997.
19. Ritzmann, R.E. (1997) Seminar in Workshop on Legged Locomotion. "Neuromuscular Activity and Kinematics of Walking and Climbing in Insects." May 29-31, 1997.
20. Ritzmann, R.E. (1997) Presentation on research to Undergraduate Research Program at Ohio University. 7/19/97.
21. Ritzmann, R.E. (1997) Seminar to "Engineering Awareness for High School Teachers" program at CWRU. "Biorobotics at CWRU: Better Robots through Biology and Better Biology through Robotics" December 9, 1997.
22. Ritzmann, R.E. (1998) Seminar to "Young Scholars Grand Symposium" at CWRU. "Science-Engineering Interface: Biologically-Inspired Robots" January 17, 1998.
23. Ritzmann, R.E. (1998) Seminar to Biology Department at CWRU. "Biorobotics at CWRU: Better Robots through Biology and Better Biology through Robotics" January 22, 1998.
24. Ritzmann, R.E. (1998) Seminar to the Kirtlandia Society of Cleveland. "Biologically Inspired Control Systems in Robots" March 14, 1998.
25. Ritzmann, R.E. (1998) "Insect Locomotion and Modification for Complex Terrain Problems" ONR Legged Locomotion – Muscle-Like Actuators Wrokshop, Indian Head, MD, May 20, 1998.
26. Ritzmann, R.E. (1998) Seminar at Ohio University. "Biorobotics: Better Robots Through Biology and Better Biology Through Robotics" May 27, 1998
27. Ritzmann, R.E. (1998) Presentation on research to Undergraduate Research Program at Ohio University. 7/11/98.
28. Quinn, R. D., Ritzmann, R. E. (1998) A Hexapod Robot based upon Cockroach Mechanics, *The Fifth International Congress of Neuroethology*, August 23-28, 1998.
29. Ritzmann, R.E. (1999) Seminar at Akron University "Legged Robotic Design Based upon Insect Anatomy and Movement: Benefits to Both Robotics and Biology", April 1, 1999
30. Ritzmann, R.E. and R.D. Quinn (1999) Robotic Design Based upon Insect Anatomy and Movement: Benefits to Both Robotics and Biology, *15<sup>th</sup> National Meeting of the British Neuroscience Association*, Harrogate, England, April 11-14, 1999.

31. Ritzmann, R.E. and R.D. Quinn (1999) A hexapod robot based upon dynamically scaled cockroach mechanics and a hierarchical, modular control architecture. ONR Legged Locomotion Conference, Panama City, Florida, May 4-5, 1999.
32. Ritzmann, R.E. (1999) "Biology as Default" – Construction of Insect-like Walking Machines. Conference on Perspectives in the Neurobiology of Movement Control – From Systems to Subcellular level. Blaubeuren, Germany, July 23-26, 1999.
33. Ritzmann, R.E. (1999) Discussion leader in session on Sensory and Motor Control: From Animals to Robots in the Gordon Research Conference on Neuroethology: Behavior, Evolution And Neurobiology. Oxford, England, August 29 – Sept. 3, 1999
34. Ritzmann, R.E. (1999) Seminar at Ohio State University "Insect Locomotion in Complex Terrain: A Neurobiological and Robotics Approach", Oct. 19, 1999.
35. Ritzmann, R.E. and R.D. Quinn (1999) "Insect Locomotion in Complex Terrain: A Neurobiological and Robotics Approach" in The 15th International Symposium in Conjunction with Award of the International Prize for Biology - Frontiers of Animal Physiology, Dec. 1-2, 1999, Nagoya, Japan.
36. Ritzmann, R.E. (1999) Seminar at University of Tsukuba, Tsukuba - Science City, Japan "Insect Locomotion in Complex Terrain: A Neurobiological and Robotics Approach", Dec. 3, 1999.
37. Ritzmann, R.E. (1999) Seminar in the Rammelkamp Research Conference series at the MetroHealth Medical Center, Cleveland, OH "Insect Locomotion in Complex Terrain: A Neurobiological and Robotics Approach", January 4, 2000.
38. Ritzmann, R.E. (2000) Seminar at Smith College, Northampton, Massachusetts. "Insect Locomotion in Complex Terrain: A Neurobiological and Robotics Approach", April 17, 2000.
39. Ritzmann, R.E. (2000) Invited Speaker in Workshop on "Biological Approaches to Control System Problems" preceding American Controls Conference, June 27, 2000, Chicago, IL.
40. Ritzmann, R.E. and R.D. Quinn (2000) Presentation of "Biological Approaches to Robotic Problems" at Eglin Air Force Base, Florida, July 11, 2000.
41. Ritzmann, R.E. (2000) "Insect Locomotion in Complex Terrain: A Neurobiological and Robotics Approach" Invited talk at the Applied Neural Control Research Day Workshop, Chicago, IL. September 8, 2000.
42. Ritzmann, R.E. (2000) Seminar at University of Illinois at Chicago, Chicago, IL. "Biological Approaches to Robotic Problems", December 1, 2000.
43. Ritzmann, R.E. and R.D. Quinn (2001) Insect Neuromechanical Designs for Improved Robotic Mobility", CWRU College of Engineering Seminars, February 9, 2001.
44. Ritzmann, R.E. and R.D. Quinn (2001) "Insect Neuromechanical Designs for Improved Robotic Mobility", Great Lakes Science Center, Cleveland, OH, March 10, 2001 and April 7, 2001.
45. Ritzmann, R.E. (2001) Seminar at Andrews University, Berrien Springs, MI. "Insect Locomotion in Complex Terrain: A Neuroethological and Robotics Approach" April 19, 2001.
46. Quinn, R.D. and R.E. Ritzmann (2001) "Insect Designs for Improved Robot Mobility". Keynote address at Singapore Robotic Games, May 17, 2001.
47. Quinn, R.D. and R.E. Ritzmann (2001) "Biologically-Inspired Robotics" Full Day Workshop at Singapore Robotic Games, May 18, 2001.

48. Quinn and Ritzmann (2001). Presented “Climbing Robots for Defeating Hard and Buried Targets,” Eglin AFB, Fort Walton Beach, June 5, 2001.
49. Quinn, R.D. and R.E. Ritzmann (2001) “Insect Designs for Improved Robot Mobility”. Ohio Aerospace Institute Seminar, June 8, 2001.
50. Quinn and Ritzmann (2001). Presented “Improved Mobility through Insect Designs,” ONR Workshop on Biorobotics, Arlington, VA, July 12, 2001.
51. Quinn, R.D. and R.E. Ritzmann (2001) “Insect Designs for Improved Robot Mobility”. CWRU Freshman Forum, August 20, 2001.
52. Ritzmann, R.E. (2001) “Interaction between higher centers and thoracic circuits for locomotion in complex terrain” International Symposium on “Neuronal Organization and Plasticity in the Microbrain System”, Tsukuba, Japan, October 13-14, 2001.
53. Ritzmann, R.E. (2002) “Hexapod walking in unpredictable terrain”, International Symposium on “A Systems Approach to Motor Behaviour: From Physiology to Biomimetic Models”, Bielefeld, Germany, June 25 - 27, 2002
54. Ritzmann, R.E. (2002) “Solutions to Moving over Complex Terrain Found in Cockroach Locomotion” Workshop on “Robotics as Theoretical Biology”, Edinburgh, UK, August 10, 2002.
55. Quinn, R.D. and R.E. Ritzmann (2002) “Insect Designs for Improved Robot Mobility”. CWRU Freshman Forum, August 20, 2002.
56. Quinn, R.D. and Ritzmann, R.E. (2003), “Biologically Inspired Robots: Running, Jumping, Crawling and Flying”, Strongsville High School Physics Club, February (Presented by R.D. Quinn).
57. Ritzmann, R.E. (2003) “Getting Around on a Flat Surface: Walking and Turning in the cockroach *Blaberus discoidalis*”. Florida State University, Rushton Lectures March 8, 2003.
58. Ritzmann, R.E. and R.D. Quinn (2003) “Get Over It! Dealing with Barriers to Insect and Robotic Locomotion”. Florida State University, Rushton Lectures March 8, 2003. (Presented by R.E. Ritzmann)
59. Ritzmann, R.E. and R.D. Quinn (2003) “Control of Legged Locomotion Over Complex Terrain By Cockroaches and Robots” IGERT Research Symposium at Carnegie Mellon University, Pittsburgh, PA June 27-29, 2003.
60. Ritzmann, R.E. (2003) “Control of Legged Locomotion Over Complex Terrain By Cockroaches and Robots” American Behavior Society symposium. “Mechanisms of Behavioral Switching”, Boise State University, Boise, Idaho, July 20, 2003.
61. Ritzmann, R.E. (2003) Participation (four lectures) in a course entitled “Walking-Biological and Technological Aspects” at the International Centre for Mechanical Sciences, Udine Italy, September 8-12, 2003.
62. Ritzmann, R.E. and R.D. Quinn (2003) “Control of legged locomotion over complex terrain by cockroaches and robots” at 4<sup>th</sup> Shanghai Roundtable: Nature as Engineer and Teacher: Learning for Technology from Biological Systems, Shanghai Institute for Advanced Studies, Shanghai, China, October 8-11, 2003.
63. Ritzmann, R.E. (2004) “Interaction Between Brain Centers and Local Circuits in Movement Control” Systems Engineering Working Group – DARPA, Ann Arbor, MI, June 29, 2004.
64. Ritzmann, R.E. (2004) “Interfacing Neuroethology and Biorobotics: Hints from Convergent Evolution” Workshop on Neuromorphic Engineering, Telluride, CO, July 12, 2004

65. Ritzmann, R.E. (2004) "Control of Legged Locomotion Over Complex Terrain by Cockroaches and Robots" Workshop on Insect Sensors and Robotics, Brisbane, Australia, August 23-26, 2004..
66. Ritzmann, R.E. (2005) "It takes Brains for Insects or Robots to Walk over Complex, Unpredictable Terrain" Case Western Reserve University, Department of Neuroscience, Cleveland, OH, 02/03/2005.
67. Ritzmann, R.E. (2005) "It takes Brains for Insects or Robots to Walk over Complex, Unpredictable Terrain" Case Western Reserve University, Department of Biology, Cleveland, OH, 02/17/2005.
68. Ritzmann, R.E. (2005) "It takes Brains for Insects or Robots to Walk over Complex, Unpredictable Terrain" Department of Neuroscience, Tufts University School of Medicine, 03/30 /2005.
69. Ritzmann, R.E. (2005) "Movement Through Complex Terrain: Robots and Insects" Neuromorphic Engineering Workshop, June 28,2005, Telluride, CO.
70. Ritzmann, R.E. (2005) "The Mechanical Roach: Interaction between Descending and Local Control" Gordon Conference "Neuroethology, Behavior, Evolution and Neurobiology" August 11, 2005, Oxford, UK.
71. Ritzmann, R.E. (2005) "Movement through Complex Terrain: Robots and Insects" seminar at University of Indiana. September 16, 2005, Bloomington, ID.
72. Ritzmann, R.E. (2005) " Movement Through Complex Terrain: From Animals To Robots And Back" 3rd International Symposium on Adaptive Motion in Animals and Machines - AMAM 2005 (keynote address). Technische Universität Ilmenau, Germany, September 26, 2005.
73. Ritzmann, R.E. (2005) "Movement through Complex Terrain: Robots and Insects" seminar at W. M.Keck Center for Behavioral Biology, North Carolina State University. November 28, 2005.
74. Ritzmann, R.E. (2006) "Movement through Complex Terrain: Robots and Insects" Kenneth Roeder Memorial Lecture at Tufts University. April 6, 2006.
75. Ritzmann, R.E. (2006) "Movement through Complex Terrain: Robots and Insects" Symposium "Bugs Did It First, Insect-Inspired Technology," at meeting of American Entomological Society, December 13, 2006, Indianapolis, IN.
76. Ritzmann, R.E. (2007) "Dealing with Barriers in Unpredictable Terrain" in conference entitled "Insect Behavior: Small Brains, Big functions" HHMI Janelia Farm Research Campus, March 13 – 15, 2007.
77. Ritzmann, R.E. (2007) "Movement Through Complex Terrain in Insects and Robots" in conjunction with full day workshop on Biomimetic Robotics at the ICRA 2007conference, Rome, Italy, April 14, 2007
78. Ritzmann, R.E. (2007) "Movement Through Complex Terrain by Insects and Robots" presented as part of a symposium entitled "Grappling with complexity: re-emergence of "simple" systems" organized by J. Gray for the 8<sup>th</sup> Intl. Cong. of Neuroethol., Vancouver, BC, Canada, July 24, 2007.
79. Ritzmann, R.E. (2007) "Movement Through Complex Terrain in Insects and Robots" plenary lecture for the Annual Meeting of the Entomological Society of Canada, Saskatoon, Saskatchewan September 30, 2007.
80. Ritzmann, R.E. (2007) "Dealing with Barriers in Unpredictable Terrain with Brain Centers and Local Control Circuits of Insects and Robots" in conference entitled "Insect Brain and Control of Behaviour" organized by M. Heisenberg at the Evangelische Akademie Tutzing, Germany. Oct 12, 2007.
81. Ritzmann, R.E. (2007) "How do Insects and Insect Inspired Robots Deal with Barriers?" Dept. of Cognitive Science, Case Western Reserve University. Nov. 15, 2007.

82. Ritzmann, R.E. (2008) "How do Insects and Insect Inspired Robots Deal with Barriers?" Dept. of Biology, West Virginia University. Feb. 04, 2008.
83. Ritzmann, R.E. (2008) "How do Insects Re-direct Leg Movements to Deal with Barriers?" MBI Workshop on Neuromechanics of Locomotion, Ohio State University (3/31/2008 – 4/4/2008).
84. Ritzmann, R.E. (2008) DuPont Lectures (2), University of Arizona (4/07 – 4/09/2008).
85. Ritzmann, R.E. (2008) "How do Insects and Insect Inspired Robots Deal with Barriers?" Dept. of Entomology, University of Illinois, April 28, 2008.
86. Ritzmann, R.E. (2008) "Dealing with Barriers: Behavioral Choice, Local Changes and Multi-sensory Responses in the Central Complex" in conference entitled "Functional Anatomy of the Arthropod Central Complex and Motor System" HHMI Janelia Farm Research Campus, May 11-14. 2008.
87. Ritzmann, R.E. (2008) "Dealing with Barriers: Behavioral Choice, Local Changes and Multi-sensory Responses in the Central Complex" Georgia State University "Brains & Behavior Distinguished Lecturer" series. October 14, 2008.
88. Ritzmann, R.E. (2009) "Negotiating Complex Terrain: Insect Behavior, Brains and Robots" Case Western Reserve University, Department of Biology, Clevelandm, OH. January 22, 2009
89. Ritzmann, R.E. (2009) "Negotiating Complex Terrain: Insect Behavior, Brains and Robots". Bowling Green State University, Bowling Green, OH. February 19, 2009.
90. Ritzmann, R.E. (2009) "Negotiating Complex Terrain: Insect Behavior, Brains and Robots". Brock University, St. Catherines, Ont. Canada March 6, 2009.
91. Ritzmann, R.E. (2009) "Negotiating Complex Terrain: Insect Behavior, Brains and Robots" in seminar entitled "The arthropod central complex: Evolutionary, developmental, genetic & functional aspects" *To be presented* in the German Neuroscience Meeting, Göttingen, Germany, March 25-29, 2009.
92. Ritzmann, R.E. (2009) "Negotiating Complex Terrain: Insect Behavior, Brains and Robots". University of Akron, Akron, OH *To be presented* April 9, 2009.

## Coverage of Research in Popular Press and Other Popular Venues

1. Article in *Cleveland Plain Dealer* (1997)
2. Article in *Columbus Dispatch* (1999)
3. Featured in television show "Natural Born Robots" on Scientific American Frontiers November 2, 1999
4. Interviewed by April Baer for Cleveland Public Radio (included in National Syndicated show) November 16, 1999
5. Participation in Press Conference on "Recovery from Spinal Cord Injury" organized by V.R. Edgerton at Society of Neuroscience Meeting in Miami Beach. FL, October 1999.
6. Featured in article in *Science* by Gary Taubes. "Biologists and Engineers Create a New Generation of Robots that Imitate Life" *Science* **288**: 80-83
7. Presented talk to the Greater Cleveland PC Users Club entitled "Insect Locomotion in Complex Terrain: A Neurobiological and Robotics Approach". 10/24/2000
8. Featured in a popular book "Robo sapiens, Evolution of a New Species" by Peter Menzel and Faith D'Aluisio, (MIT Press).

9. Featured in article in *Akron Beacon Journal* “Robot Roaches Creep up Technology Chain” by Jim Carney, 6/29/2001.
10. Featured in article in *Nature* on High-speed Video: Dalton, R (2002) “Caught on Camera” *Nature*: 418:721-722.
11. Article in Plain Dealer by Brian Albrecht (4/3/2003)
12. Featured in article in *The New York Times* by James Gorman “What Really Happens When Fruit Flies Fly” 06/10/2003.
13. Featured in Discovery Channel Television Show “Ultimate Impact” shown in Canada and France, 2003.
14. Article in *The Sydney Morning Herald*, Sydney, Australia by Gary Barker “Cockroach Inspires Future Vehicles”, August 25, 2004.
15. Article in “Times for Kids” by “Robots that look as if they crawled out from under a rock may one day work for you”, Kathy Satterfield, March 4, 2005.
16. Featured in Animal Planet Show “Buggin’ with Ruud” episode entitled “Bug Superheroes” aired November 27, 2005.
17. Featured in article by Alison Abbott in *Nature* “Working Out the Bugs” *Nature*: 445:250-253 which appeared January 18, 2007.
18. Featured in “Super Cockroach” a film by Pascal Cuissot and Benjamin Turquet that was broadcast on Science Channel, Nov. 2007.
19. Interviewed by Jim McIntyre, WDOK regarding AMAM 2008. May 25, 2008.

## **Patents**

1. R.D. Quinn, D.A. Kingsley, J.T. Offi, R.E. Ritzmann (2005), Vehicle with Compliant Drive Train, 6,964,309. (Issued November 15, 2005, submitted May 1, 2002).