CURRICULUM VITAE

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EDUCATION

B.A. -1973 University of Colorado, Boulder; (bio) Psychology (distinction)
M.Sc.-1978 McGill University, Montréal, Québec; Faculty of Medicine: Physiology
Ph.D.-1981 Scuola Normale Superiore, Pisa, Italy; Biological Sciences

FELLOWSHIPS AND PROFESSIONAL EXPERIENCE

1971-1973 Research Asst., Dept. of Psychology, Univ. of Colorado, Boulder; behavioral plasticity experiments of the acoustic startle response, with Prof. P.M. Groves, Ph.D.

1972-1973 Tutor for physiological psychology, Depts. of Black, Hispanic, and Asian Studies; and 2 lectures in neuroanatomy and neurophysiology (historical perspectives), Dept. of Engin. (IEEE), Prof. Igor Gamov, Univ. of Colorado.

1974-1976 Demonstrator of electrophysiological and cardiovascular recording techniques, baro- and chemoreceptor mechanisms, respiratory physiology, and neuropharmacology (Faculty of Medicine); assistant in two undergraduate physiology courses, McGill University, Montréal, Québec, Canada.

1974-1976 Medical Council of Canada Trainee. Dept. of Physiology, McGill University.

1977 Research Associate of Canadian Heart Association, McGill University; pharmacology of carotid sinus control of sympathetic preganglionic neurons, in collaboration with Prof. C Polosa, M.D., Ph.D.

1978 Fellow of International Brain Research Organization (IBRO/UNESCO). Institute of Human Physiology, Università di Pisa, Italy; neck proprioceptive input to the cerebellum, in collaboration with Prof. O. Pompeiano, M.D.

1978-1981 Awarded the Fellowship in Biological Sciences, Scuola Normale Superiore, Pisa.

1980-1981 Visiting Researcher of the Consiglio Nazionale della Ricerche (CNR), Rome, Italy; physiology of hindlimb muscle afferents in body posture control.

1982-1984 Fellow of Alexander von Humboldt-Stiftung, Bonn. Depts. Neurology and Biocybernetics, Universität Düsseldorf, Germany; optokinetic mechanisms in the alert primate, in collaboration with Prof. U. Büttner, M.D.

1984-1986 National Institutes of Health Individual Postdoctoral Award. Dept. of Otolaryngology and Anatomy & Neurobiology, Washington University School of Medicine, St. Louis, MO; efferent control of vestibular afferents, in collaboration with Prof. S.M. Highstein, M.D., Ph.D.

1985-1986 Teaching/Lab assistant in Systems Neuroscience and Neuroanatomy courses, Washington Univ. Sch. Med., St. Louis, MO.

1986-1992 Assistant Professor of Otolaryngology/Head-Neck Surgery and Physiology, Oregon

	Health Sciences University (OHSU), Portland, OR.
1991-	Adjunct Senior Scientist, R.S. Dow Neurological Sciences Institute, Good Samaritan Medical Center, Portland, OR (now part of OHSU).
1995-2000	Associate Professor of Otolaryngology/Head-Neck Surgery and Physiology, OHSU
2000-	Director, BioVIS Technology Center, Ames Research Center, National Aeronautics and Space Administration, Moffett Field, CA
2000-	Associate Professor (by courtesy), Dept. of Functional Restoration, Stanford University Medical School, Palo Alto, CA
2001-	Fellow, National Research Council (USA)
2002-	Editorial Board, Archives Italiennes de Biologie
2004-	NASA Ames Science and Technology Council (12 members within and outside Ames)
2004-08	Space Act Agreement between Dept. Diagnostic Radiation of Salinas Valley Memorial Hospital and NASA Ames BioVIS Technology Center
2005	Steering Committee, Area Chair, and Volume editor of *Lecture Notes in Computer Science. Advances in Visual Computing.* Editors: George Bebis, **Richard Boyle**, Darko Koracin, Bahram Parvin; Springer-Verlag GmbH.
2005-6	NASA Science Lead on the US/Russian Foton M-2 unmanned orbital mission June 2005. Member of the Joint Working Group in the discussions of NASA's participation of the BioCosmos research program.
2006-07	NASA Science Lead on the US/Russian Foton M-3 unmanned orbital mission September 2007. Member of the Joint Working Group in the discussions of NASA's participation of the BioCosmos research program.
2007-10	NASA Science Manager for the BION M-1 unmanned biology orbital Russian mission.
2009	Topic Team member of Human Hypergravity Habitat of the European Space Agency; ESTEC, Noordwijk, The Netherlands.
2008--09	NASA Science Manager of Mouse Immunology study and Biospecimen Sharing Program for the 15-day orbital mission of STS-131 to the International Space Station.
2010-11	NASA Science Manager of Mouse Immunology II study and possible Biospecimen Sharing Program for the orbital mission of STS-134 to the International Space Station.

NASA Ames Bio-Visualization, Imaging and Simulation Technology Center (BioVIS): Dedicated to biology research and development of advanced visualization, imaging and simulation/computation technologies to support the objectives of NASA Life Sciences and Fundamental Space Biology Programs. Our Center's activities include: experimental studies of sensorimotor structure and function in vertebrate models; vestibular readaptation following altered gravity conditions; high resolution transmission and scanning electron microscopy facilities, including educational outreach (remote SEM); the use of immersive, virtual reality and human-computer interactive techniques to advance astronaut training on experimental procedures and surgical simulations; spatial orientation and stabilization of robotic explorers using biologically inspired control systems; multi-modality medical imaging data fusion and segmentation techniques and physiological modeling; and others.

MEMBERSHIPS

IBRO/Unesco (1979-), European Neuroscience Association (1980-84), European Brain and Behavior Society (1981-84), Society for Neuroscience (1988-), American Physiological Society (1991-), Honorary Member of Vestibular Disorders Assoc. (1991-), New York Academy of Sciences (1993-),

Bárány Society (Stockholm, 1993-), Federation of American Societies for Experimental Biology, and American Society for Gravitational and Space Biology (2003-).

NASA TECHNICAL MONITOR

1. University of Nevada NASA Award Experimental Program to Stimulate Competitive Research (EPSCoR) in Computer Vision; 2001-present.
2. "Spaceflight and Bone Metabolism: Age Effects and the Development of an Animal Model for Adult Human Bone Loss". The Principle Investigator is Bernard P. Halloran, UCSF; 2003-2008.

NASA SPACE ACT AGREEMENT

SAA2-401750: Non-Reimbursable Space Act Agreement between the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AMES RESEARCH CENTER and SALINAS VALLEY MEMORIAL HOSPITAL for *ADVANCED 3D DIGITAL IMAGE PROCESSING AND MODELING*; July 2004-2008.

NASA Patent Application

"Accurate Display, Simulation and Interaction in a Desktop Virtual Environment": JD Smith, X Twombly, and R. Boyle (April 2004)

SELECTED INVITED EVENTS

1991 Organizer, Panel on "Synergies, Integration and Transformation of Signals Controlling Head Movement", 1st Symposium on Neural Control of Movement; Marco Island, FL

1995 Panelist, lecture "Canal/otolith responses of vestibulospinal neurons in squirrel monkeys." *New Directions in Vestibular Research* Conference, New York Academy of Sciences, Rockefeller Univ., June 1995.

1995 Chair, "Spatial Orientation", *New Directions in Vestibular Research* Conference, New York Academy of Sciences, Rockefeller Univ., June 1995.

1998 Satellite Meeting of the XXth Bárány Society on "The Contributions of the Vestibular System to Oculo-motor, Skeleto-motor and Perceptual Functions"; in Honor of Ottavio Pompeiano and Victor Wilson; Freiburg, Germany, September 17-20.

1999 CME Workshop on Vestibular Labyrinth in Health and Disease. "Function of vestibulospinal neurons in head fixed and head free animals"; St. Louis, MO; November 16-18.

2000 Bárány Society, Uppsala, Sweden; June 5-7. Invited speaker in special session on microgravity research.

2000 Johns Hopkins Symposium "Synaptic Function in Hearing and Balance"; June 8-10, 2000.

2000 Inspection 2000 technology fair at Johnson Space Center, Houston. Hands-on demonstration of computer simulation of human soft tissue surgery in collaboration with Center for Biocomputation, Stanford Univ.

2001 Presentations (3) of inner ear and NASA science missions in support of the DANA Foundation Decade of the Brain, Walter Reed Medical Museum, Washington DC.

2002 6th Symposium on "The Role of the Vestibular Organs in the Exploration of Space", Portland, OR. Sponsored by NIH/NIDCD and NASA. Boyle served as an Organizing Board Member and was one of 4 Keynote Speakers.

2002 Symposium in Honor of Professor emeritus Ottavio Pompeiano. Keynote and invited speaker. Pisa, Italy.

2003 Joint NIH/NASA conference of Ecology and Remote Sensing, Asilomar CA

2004 Symposium: “Vestibular Development and Adaptation During Spaceflight”, ARO 2004 Meeting, Invited speaker, Daytona FL.

2004 NIH/NSF/NASA conference and working group on “Image Guided Intervention”, Bethesda MD

2004 Workshop, Society for Neurosciences, “remote Scanning Electron Microscopy as a Research and Teaching Tool”, San Diego, October 2004.

2004 Technical Interchange Meeting, Revolutionary Aerospace Systems Concepts, "Preparing for the Human Exploration of Mars: Developing the Measurement Database Needed to Ensure the Safety of Humans Exploring and Living on Mars", Williamsburg VA.

2005 Keynote Speaker, California State University at Sacramento Conference on Pre-medicine Education and Training, Sacramento, CA; Feb. 2005.

2005 Institute of Higher Nervous Activity and Neurophysiology (IHNAN), Russian Academy of Sciences, Moscow, Russia.

2005 Steering Committee and Area Chair of Virtual Reality Panel and Presentations, International Symposium of Visual Computing (ISVC 2005), Lake Tahoe, Nevada; 5-7 Dec. 2005

2006 Keynote Speaker: “From Space to Medical Innovation”, Medical Devices Technology 2006, Birmingham, England; February 15-17, 2006.

2006 Royal Botanical Gardens, KEW, London England; Feb. 20.

2006 Scientific Presenter at special symposium of the 27th Annual International Gravitational Physiology meeting, Osaka Japan; 23-28 April 2006.

2006 Co-chair and Rapporteur "Cellular and Molecular Mechanisms Underlying Spaceflight Responses" scientific session, International Aeronautical Conference, Valencia, Spain.

2006 Keynote Speaker: “Surgery in Space,” 22nd Academy of Experimental Surgery, Scottsdale, AZ; September 21-23.

2006 Invited Presenter: "Neural readaptation to Earth's 1 g following exposure to microgravity aboard manned and unmanned spacecrafts" at Space Exploration Symposium, University of Alberta, Edmonton; September 27-28.

2006 Keynote Lecture: “The challenge of human exploration” at the Telus World of Science, Edmonton, Alberta; September 29.

2006 Keynote Lecture: “Human Exploration and Science Missions” at the Northern Prairie Starfest, Black Nugget Lake, Alberta, Canada; September 29-31.

2006 International Symposium on Visual Computing 2006 (ISVC06) Steering Committee, Lake Tahoe, CA; November 6-8.

2006 Organizer, ISVC06 Special Track: “Understanding and imitating nature: analysis, interpretation, rendering and inspiration of biological forms,” Lake Tahoe, CA; November 6-8.

2007 Keynote Lecture: “The Challenge of Human Exploration and Research in Space”, Michigan State University-Kalamazoo Center for Medical Sciences and Western Michigan University, Research Day, April 11.

2007 Keynote Lecture: “The Challenges of Human Exploration and Research on Erath and in Space”. N. Ty Smith Lecture. Society for Technology in Anesthesia. San Francisco, CA; 13 October.

2008 Special invited lecturer: 3 seminars 1) Human Exploration, 2) Neurovestibular Adaptation to Gravity Changes, and 3) Vestibulospinal Control of Posture and Locomotion. University of Crete, May 28-June 6, Greece.

2009 Lecture, Smith-Kettlewell Eye Research Institute of San Francisco; April 23.

2009 Invited Public Speaker, The Sacramento Valley Astronomical Society at California State University, Sacramento; 19 June.

2009 Invitation of oral presentation at the 17th IAA Humans in Space Symposium by Anatoly I. Grigoriev, Vice-President of the Russian Academy of Sciences; June 7-11; Moscow, Russia.

"Neurovestibular adaptation in the vertebrate and invertebrate gravi-sensing organs following micro- and hyper-gravity exposure and re-adaptation to 1G."

2009 Invited Participant by the European Space Agency to the Human Hypergravity Habitat (H3) Topical Team Workshop, Noordwijk, The Netherlands, March 26-27.

2010 Invited Speaker, Department of Otolaryngology, Shinshu University Medical Center "Space Flight Influences on Gravity-Sensing Neural Systems"; 21 September 2010, Matsumoto Japan.

2010 Invited Speaker, General Audience, Shinshu University Medical Center "The Challenge of Human Exploration and Research in Space"; 22 September 2010, Matsumoto Japan.

2011 Next Generation Suborbital Researchers Conference 2011. "Suborbital Experiment Designed to Address Key Neural Function: Neural Response to Acceleration and Gravity Transitions in Suborbital Flights." Orlando FL; February 2011. Abstract submitted.

SELECTED BioVIS CONFERENCE PROCEEDINGS/PAPERS

1. Bruyns C, Senger S, Montgomery K, Wildermuth S, and **Boyle R** (2001) Real-time Interactive Cutting Using Virtual Surgical Instruments, In: Niessen, W. et. al. (Eds.) MICCAI 2001, LNCS 2208, Springer, Berlin; pp.1349-1351.
2. Smith JD, Twombly IA, Bruyns C, **Boyle R** (2001) NASA Virtual GloveboX (VGX): Training and Simulation for Biology Research Aboard the International Space Station. *AIAA Conference on International Space Station Utilization*, Kennedy Space Center, FL, (AIAA paper 2001-5105).
3. Bruyns C, Senger S, Menon A, Montgomery K, Wildermuth S, and **Boyle R** (2002) A survey of interactive mesh cutting techniques and a new method for implementing generalized interactive mesh cutting using virtual tools. J Visualization and Computer Animation 13: 21-42.
4. Smith JD, Gore BF, Datal KM, **Boyle R** (2002) Optimizing biology research tasks in space using human performance modeling and virtual reality simulation systems here on Earth. *AIAA Conference on International Space Station Utilization*, Kennedy Space Center, FL, (AIAA paper 2001-2500).
5. O. Kubushyna, L.E. Teruel, E. A. Yfantis, C. J. Hwang, P. A. Stubberud. G. Bebis, and **R. Boyle**, "Motion Recognition and Finger Detection for Gesture Recognition and HCI", *Intelligent and Adaptive Systems and Software Engineering*, San Francisco, CA, July 9-11, 2003, pp. 71-74.
6. L. E. Teruel, O. Kubushyna, E. A. Yfantis, P. A. Stubberud, C. J. Hwang, G. Bebis, and **R. Boyle**, "Hand Gesture Recognition, A Stochastic Approach", *Intelligent and Adaptive Systems and Software Engineering*, San Francisco, CA, July 9-11, 2003, pp. 140-143.
7. L. E. Teruel, O. Kubushyna, E. A. Yfantis, P. A. Stubberud, C. J. Hwang, G. Bebis, and **R. Boyle**, "On Hand Motion Extraction for Gesture Recognition", *Intelligent and Adaptive Systems and Software Engineering*, San Francisco, CA, July 9-11, 2003, pp. 144-148.
8. O. Kubushyna, L.E. Teruel, E. A. Yfantis, C. J. Hwang, P. A. Stubberud. G. Bebis, and **R. Boyle**, "Interactive 3D Hand Model with Constraints", *Intelligent and Adaptive Systems and Software Engineering*, San Francisco, CA, July 9-11, 2003, pp. 162-165.
9. A. Erol, G. Bebis, **R. Boyle** and M. Nicolescu, "Visual Hull Construction Using Adaptive Sampling", IEEE Workshop on Applications of Computer Vision, Breckenridge, CO, January 5-7, 2005.
10. A. Erol, G. Bebis, M. Nicolescu, **R.D. Boyle** and A. Twombly "A review on vision-based DOF hand motion estimation". IEEE Workshop on Vision for Human-Computer Interaction (V4HCI), June 20-26, 2005.
11. J. Martinez, A. Erol, G. Bebis, **R. Boyle**, and X. Twombly "Perceptual LOD Based on Vision Based Head Tracking and Pose Estimation". *International Symposium on Visual Computing, 2005.*

12. J. Martinez, A. Erol, G. Bebis, **R. Boyle**, and X. Twombly, "Rendering Optimizations Guided by Head-Pose Estimates and their Uncertainty", International Symposium on Visual Computing, (LNCS, vol 3804), Lake Tahoe, NV, December 2005.
13. A.V. Kondrachuk and **R.D. Boyle** "The role of possible feedback mechanisms in the effects of altered gravity on formation and function of gravireceptors of mollusks and fish". European Space Agency (ESA) and the 25th Annual Meeting of International Society of Gravitational Physiology (ISGP), Cologne, Germany, 2005.
14. J. Usabiaga, A. Erol, G. Bebis, **R. Boyle** and X. Twombly "Global Hand Pose Estimation by Multiple Camera Ellipse Tracking", presentation and conference paper to British Machine Vision Conference, BMVC'06, Edinburgh, Scotland; 4-7 September 2006.

PUBLICATIONS

1. Groves PM, Wilson CJ, and **Boyle RD** (1974) Brainstem pathways, cortical modulation, and habituation of the acoustic startle response. *Behav. Biol.* 10: 391-418.
2. Groves PM, **Boyle RD**, Welker RL, and Miller SW (1974) On the mechanism of prepulse inhibition. *Physiol. Behav.* 12: 367-375.
3. **Boyle R** (1978) Analysis on the effects of monoamine precursors on the background activity of sympathetic preganglionic neurones. *M.Sc. Thesis*, McGill University, Montréal, Canada.
4. **Boyle R** and Pompeiano O (1979) Sensitivity of interpositus neurons to neck afferent stimulation. *Brain Res.* 168: 180-185.
5. **Boyle R** and Pompeiano O (1979) Reciprocal responses to tilt of neurones within the fore- and hindlimb regions of Deiters' nucleus. Pflügers Arch. 381: 179-183.
6. **Boyle R** and Pompeiano O (1979) Risposte reciproche allo stimulo maculare di neuroni localizzati nella regione dell'arto anteriore e dell'arto posteriore del nucleo di Deiters. *Boll.Soc.Ital.Biol.Sper.* 55: 2057-2062.
7. **Boyle R** and Pompeiano O (1979) Frequency response characteristics of vestibulospinal neurons during sinusoidal neck rotation. *Brain Res.* 173: 344-349.
8. **Boyle R** and Pompeiano O (1980) Response characteristics of cerebellar interpositus and intermediate cortex neurons to stimulation of neck and macular labyrinth receptors. *Neuroscience* 5: 357-372.
9. **Boyle R** and Pompeiano O (1980) Reciprocal responses to sinusoidal tilt of neurons in Deiters' nucleus and their dynamic charactersitics. *Arch. Ital. Biol.* 118: 1-32.
10. **Boyle R** and Pompeiano O (1980) Responses of vestibulospinal neurons to sinusoidal rotation of the neck. J. *Neurophysiol.* 44: 633-649.
11. **Boyle R** and Pompeiano O (1981) Convergence and interaction of neck and macular vestibular inputs on vestibulospinal neurons. *J. Neurophysiol.* 45: 852-868.
12. **Boyle R** (1981) Response characteristics of vestibulospinal neurons to sinusoidal stimulation of neck and macular vestibular receptors. *Ph.D. Thesis*, Scuola Normale Superiore, Pisa, Italy.
13. **Boyle R** and Pompeiano O (1981) Cerebellar influences on gain and phase angle of responses of vestibulospinal neurons to sinusoidal neck rotation. Boll. Soc. It. Biol. Sper. 62: 95-97.
14. **Boyle R** and Pompeiano O (1981) Responses of vestibulospinal neurons to neck and macular vestibular inputs in the presence or absence of paleocerebellum. *Ann. N.Y. Acad. Sci.* 374: 373-394.
15. **Boyle R** and Pompeiano O (1981) Relation between cell size and response characteristics of vuestibulospinal neurons to labyrinth and neck inputs. *J. Neuroscience* 1: 1052-1066.
16. **Boyle R** and Pompeiano O (1981) Cerebellar influences on response characteristics of vestibulospinal neurons to sinusoidal tilt. *Arch. Ital. Biol.* 119: 208-225.

17. **Boyle R** and Pompeiano O (1984) Discharge activity of spindle afferents from the gastrocnemius-soleus muscle during head rotation in the decerebrate cat. *Pflügers Arch*. (Eur. J. Physiol.) 400: 140-150.
18. **Boyle R** and Highstein SM (1984) Effects of behavioral activation of the efferent vestibular system on the response dynamics of primary afferents of the horizontal semicircular canal in the toadfish, *Opsanus tau*. *Biol. Bull*. 167: 523.
19. **Boyle R** and Highstein SM (1985) Effects of activation of the efferent vestibular system upon the response dynamics of the primary afferents of the horizontal semicircular canal in the toadfish, *Opsanus tau*. *Biol. Bull*. 169: 547.
20. **Boyle R**, Büttner U, and Markert G (1985) Vestibular nuclei activity and eye movements in the alert monkey during sinusoidal optokinetic stimulation. *Exp. Brain Res*. 57: 362-369.
21. Büttner U, **Boyle R**, and Markert G (1986) Cerebellar control of eye movements. *Prog. Brain Res*. 64: 225-233.
22. Markert G, Büttner U, Straube A, and **Boyle R** (1988) Neuronal activity in the flocculus of the alert monkey during sinusoidal optokinetic stimulation. *Exp. Brain Res*. 70: 134-144.
23. **Boyle R** and Highstein SM (1990) Resting discharge and response dynamics of horizontal semicircular afferents of the toadfish, *Opsanus tau*. *J. Neuroscience* 10: 1557-1569.
24. **Boyle R** and Highstein SM (1990) Efferent vestibular system in the toadfish: action upon horizontal semicircular afferents. *J. Neuroscience* 10: 1570-1582.
25. **Boyle R** and Highstein SM (1991) Responses of horizontal semicircular canal afferents to rotatory and mechanical stimulation. Biol. Bull. 181: 319.
26. **Boyle R**, Carey JP, and Highstein SM (1991) Morphological correlates of response dynamics and efferent stimulation in horizontal semicircular canal afferents of the toadfish, *Opsanus tau*. *J. Neurophysiol*. 66: 1504-1521.
27. **Boyle R**, Goldberg JM, and Highstein SM (1992) Vestibular-nerve inputs to vestibulospinal and vestibulo-ocular neurons of the squirrel monkey. In: *Head-Neck Sensory Motor System*, A. Berthoz, W. Graf, and P.P. Vidal (Eds.), Oxford Univ. Press, p. 255-258.
28. **Boyle R**, Goldberg JM, and Highstein SM (1992) Inputs from regularly and irregularly discharging vestibular nerve afferents to secondary neurons in the vestibular nuclei of the squirrel monkey. III. Correlation with vestibulospinal and vestibuloocular output pathways. *J. Neurophysiol*. 68: 471-484.
29. **Boyle R** (1993) Activity of medial vestibulospinal tract cells during rotation and ocular movement in the alert squirrel monkey. *J. Neurophysiol*. 70: 2176-2180.
30. Rabbitt RD, **Boyle R** and Highstein SM (1994) Sensory transduction of head velocity and acceleration in the toadfish horizontal semicircular canal. *J. Neurophysiol*. 72: 1041-1048.
31. Büttner U and **Boyle R** (1995) Optokinetic nystagmus and its underlying mechanisms. In: *Proc. Intern. Neuroophtalmol*., A. Neetens (Ed.).
32. Wilson VJ, **Boyle R**, Fukushima K, Rose PK, Shinoda Y, and Sugiuchi Y (1995) The vestibulocollic reflex. *J. Vest. Res*.5: 147-170.
33. Rabbitt RD, **Boyle R** and Highstein SM (1995) Mechanical indentation of the vestibular labyrinth and its relationship to head rotation in the toadfish, *Opsanus tau*. *J. Neurophysiol*. 73: 2237-2260.
34. Highstein SM, Rabbitt RD and **Boyle R** (1996) Determinants of semicircular canal afferent response dynamics in the toadfish, Opsanus tau. *J. Neurophysiol*. 75: 575-596.
35. Rabbitt RD, Highstein SM and **Boyle R** (1996) Determinants of semicircular canal afferent response dynamics in fish. *Ann. N.Y. Acad. Sci*. 781:213-243.

36. **Boyle R**, Belton T and McCrea RA (1996) Responses of identified vestibulospinal neurons to voluntary and reflex eye and head movements in the alert squirrel monkey. *Ann. N.Y. Acad. Sci.* 781: 244-263.
37. Mensinger AF, Carey JP, **Boyle R**, and Highstein SM (1997) Differential central projections of physiologically characterized horizontal semicircular canal vestibular afferents in the toadfish, *Opsanus tau. J. Comp. Neurol.,* 384: 71-85.
38. McCrea RA, Gdowski G, **Boyle R** and Belton T (1999) Firing behavior of vestibular nucleus neurons during active and passive head movements. II. Vestibulo-spinal and other non-eye-movement related neurons. *J. Neurophysiol.,* 82: 416-428.
39. Rabbitt RD, **Boyle R**, and Highstein SM (1999) The influence of surgical plugging on semicircular canal mechanics and afferent response dynamics. *J. Neurophysiol.*, 82:1033-1053.
40. Holly JE, McCollum, G, and **Boyle R** (1999) Identification of head motions by central vestibular neurons receiving linear and angular input. *Biol. Cybern.,* 81: 177-188.
41. Gdowski G, **Boyle R** and McCrea RA (2000) Sensory processing in the vestibular nuclei during active head movements. *Arch ital. biol.*, 138: 15-28.
42. **Boyle R** (2000) Morphology of lumbar-projecting lateral vestibulospinal neurons in the brainstem and cervical spinal cord in the squirrel monkey. *Arch ital biol.,* 138: 107-122.
43. McGillum G and **Boyle R**. (2001) Conditional transitions in gaze dynamics: role of vestibular nuclei in eye-only and eye/head gaze behaviors. *Biol. Cybern.* 85*:* 423-36.
44. **Boyle R** (2001) Vestibulospinal control of reflex and voluntary head movement. Ann. NY Acad Sci*, Ann N Y Acad Sci* 942: 364-80.
45. **Boyle R**, Mensinger AF, Yoshida K, Usui S, Intravaia A, Tricas T, and Highstein SM. (2001) Neural readaptation to 1G following return from space. *J. Neurophysiol.,* 86: 2118-2122.
46. Yamauchi A, Rabbitt RD, **Boyle R** and Highstein SM (2001) The relationship between inner-ear fluid pressure and semicircular canal afferent nerve discharge. JARO 3: 26-44.
47. Rabbitt, R.D., **Boyle, R**. and Highstein, S.M. (2001) Physiology of the semicircular canals after surgical plugging. Vestibular Labyrinth in Health and Disease, Ed. J. Goebel and S.M. Highstein, Ann NY Acad Sci. 942: 274-86.
48. Rabbitt, R.D., Yamauchi, A.Y. **Boyle, R.** and Highstein, S.M.(2001) How endolymph pressure modulates semicircular canal primary afferent discharge. Vestibular Labyrinth in Health and Disease, Ed. J. Goebel and S.M. Highstein, Ann N Y Acad Sci. 942:313-21.
49. **Boyle R**, Highstein SM, Carey JP, and Xu J. (2002) Functional recovery of anterior semicircular canal afferents following hair cell regeneration in birds. JARO 3: 149-166.
50. Peterson BW and **Boyle R**. (2003) The vestibulo-collic and vestibulo-spinal reflexes. In: *Springer Handbook of Auditory Research. Anatomy and Physiology of the Central and Peripheral Vestibular System*, A. N. Popper and R. R. Fay (Eds.), Springer-Verlag, New York.
51. Lewis RF, Gong W, Ramsey W, Minor L, **Boyle R** and Merfeld DM (2003) Vestibular Adaptation studied with a Prosthetic Semicircular Canal. *J. Vest. Res.* 12: 87-94.
52. **Boyle R** and Johanson C (2003) Morphological properties of vestibulospinal neurons in primates. In: The Ocular Motor and Vestibular System: Its Functions and Disorders, *Annals of the New York Academy of Sciences, Vol. 1004;* edited by Thomas Brandt, Bernard Cohen, and C. Siebold; pp. 183-195.
53. Holstein G, Martinelli G, **Boyle R**, Rabbitt R, and Highstein S (2004) Ultrastructural observations of the efferent innervation of the crista ampullaris in the toadfish, *Opsanus tau*. Exp Brain Res 155: 265-273.
54. Rabbitt RD, **Boyle R**, Holstein GR, and Highstein SM (2005) Hair-cell versus afferent adaptation in the semicircular canals. *J. Neurophysiol.* 93: 424-36.

55. McGillum G and **Boyle R**. (2004) Rotations in a vertebrate setting: evaluation of the symmetry group of the disynaptic canal-neck project. *Biol. Cybern*. 90: 203-217.
56. Boyle R, Bush G, and Ehsanian R (2004) Input/output properties of the lateral vestibular nucleus. Arch ital Biol. (Italian J. Neuroscience), *142:* 133-153.
57. Holstein G, Rabbitt R, Martinelli GP, Friedrich VL, **Boyle R**, and Highstein SM (2004) Convergence of excitatory and inhibitory hair cell transmitters shapes vestibular afferent responses. *Proc. Nat. Acad. Sci.* (PNAS) 101: 15766-15771.
58. Teruel MB, Kubushyna O, Elkhater RW, Yfantis EA, and Boyle R (2004) On Estimation Of 3D Hand Position Using Stereo Vision. *Computers and Their Applications* (ISCA) 2004: 47-50.
59. Highstein SM, Rabbitt RD, Holstein GR and **Boyle RD** (2005) Determinants of spatial and temporal coding by semicircular canal afferents. *J. Neurophysiol*. 93: 2359-70.
60. Erol A, Bebis G, Nicolescu M, **Boyle R**, and Twombly X (2007) Vision-Based Hand Pose Estimation: A Review. *Computer Vision and Image Understanding* (special issue on "*vision for human-computer interaction*"), vol. 108, no. 1-2, pp. 52-73.
61. Erol A, Bebis G, **Boyle R**, and Nicolescu M (2005) Visual Hull Construction using Adaptively Sampling. WACV-MOTION '05 Proceedings of the Seventh IEEE Workshops on Application of Computer Vision (WACV/MOTION'05) 1: 234-241.
62. Ehsanian R, Varelas J, Cheng R, Chang P, Twombly A, Hardy S, and Boyle R Utilization of Remote Scanning Election Microscopy (rSEM) as a Neuroscience Teaching Tool for High School Students. Submitted to *Cell Biology Education*.
63. Kondrachuk A and **Boyle R** (2006) Feedback hypothesis and the effects of altered gravity on formation and function of gravireceptors of mollusks and fish. Arch ital Biol. (Italian J. Neuroscience) 144: 75-87.
64. Kondrachuk AV, Shipov AA, Astacova TG and **Boyle R** (2006) Modeling of structure and function of otoliths. Aviaspace and Environmental Medicine (in Russian) 40: 5-21.
65. Martinez JE, Erol A, Bebis G, **Boyle R** and Twombly X. (2005) Rendering Optimizations Guided by Head-Pose Estimates and Their Uncertainty. In, *Lecture Notes in Computer Science. Advances in Visual Computing: First International Symposium, Volume 3804;* Editors: G Bebis, **R Boyle**, D Koracin, B Parvin, pp. 253 – 262; Springer-Verlag GmbH, Berlin-Heidelberg.
66. Kondrachuk AV and **Boyle RD** (2005) The role of possible feedback mechanisms in the effects of altered gravity on formation and function of gravireceptors of mollusks and fish. *J. Grav. Physiol.* 12: 79-80.
67. Balaban PM, Malyshev AY, Zakharov IS, Aseev NA, Bravarenko NI, Ierusalimsky VN, Samarova AI, Vorontzov DD, Popova Y and **Boyle R** (2006) Structure and function of the snail statocyst system after a 16-day flight on Foton M-2. *J Grav. Physiol.*13*:* P201-P204.
68. Usabiaga J, Erol A, Bebis G, **Boyle R** and Twombly X (2006) Global Hand Pose Estimation by Multiple Camera Ellipse Tracking. In, *Lecture Notes in Computer Science. Advances in Visual Computing. Volume 4291;* Editors: G Bebis, **R Boyle**, D Koracin, B Parvin, pp. 122– 132 (Part 1); Springer-Verlag GmbH, Berlin-Heidelberg.
69. Twombly X, **Boyle R**, and Colombano S (2006) Active Stabilization of Images Acquired on a Walking Robotic Platform. In, *Lecture Notes in Computer Science. Advances in Visual Computing. Volume 4292;* Editors: G Bebis, **R Boyle**, D Koracin, B Parvin, pp. 1767 – 1776; Springer-Verlag GmbH, Berlin-Heidelberg.
70. Kondrachuk AV, Sirenko SP and **Boyle R** (2007) The model of cupular dynamics in the case of the difference of the cupula and endolymph densities. *J Grav Physiol* 14: P73-74.

71. Kondrachuk AV, Shipov AA, Astakhova TG, and **Boyle R** (2009) Modern lines of development of mathematical modeling of semicircular canals function. *Aviaspace and Environmental Medicine* (*Aviakosm Ekolog Med* in Russian) 43: 5-12.
72. Erol A, Bebis G, Nicolescu M, **Boyle** R, and Twombly X (2007) Vision-Based Hand Pose Estimation: A Review. *Computer Vision and Image Understanding* (special issue on "*vision for human-computer interaction*"), vol. 108, no. 1-2, pp. 52-73.
73. Kondrachuk AV and **Boyle** R (2009) Intralabyrinthine pressure and function of cupula-endolymphatic system. *J. Grav. Physiol.* 15: P33-34.
74. **Boyle R**, Popova Y, Varelas J, Mofrad A, Kondrachuk A (2009) Neurovestibular adaptation in the utricular otolith following extended periods of 3G exposure and re-adaptation to 1G. *J. Grav. Physiol.* 15: P37-38.
75. Balaban PM, Malyshev AY, Ierusalimsky VN, Aseev NA, Korshunova TA, Bravarenko NI, Lemak MS, Roschin MV, Zakharov IS, Popova Y, and **Boyle** R (2009) Structure and function of the snail statocyst system after orbital missions on Foton M-2 and M3. *J. Grav. Physiol 15: P273-276.*
76. Breneman KD, Highstein SM, **Boyle** RD and Rabbitt RD (2009) The passive cable properties of hair cell stereocilia and their contribution to somatic capacitance measurements. *J. Biophys*. 96: 1-8.
77. Skidmore MG, **Boyle** RD, and Souza KA (2008) US participation in the Russian Bion-M1 mission: an overview. *J. Grav. Physiol.* 21: 19-20.
78. Kondrachuk AV, Sirenko SP and **Boyle R** (2008) Effect of difference of the cupula and endolymph densities on dynamics of semicircular canal. *J. Vest. Res*. 18: 69-88.
79. **Boyle R**, Rabbitt RD, and Highstein SM Efferent (2009) Control of Hair Cell and Afferent Responses in the Semicircular Canals. *J. Neurophysiol.,* 102: 1513-1525.
80. Rabbitt RD, Breneman KD, King C, Yamauchi AM, **Boyle R**, and Highstein SM (2009) Dynamic Displacement of Normal and Detached Semicircular Canal Cupula. *Journal of the Association for Research in Otolaryngology* (*JARO*) 10: 497-509.
81. Martinez J, Erol A, Bebis G, **Boyle** R, and Twombly X (2009) Integrating Perceptual Level of Detail with Head Pose Estimates and their Uncertainty. *Machine Vision and Applications* 21: 69-83.
82. Usabiaga J, Erol A, Bebis G, **Boyle** R, and Twombly X (2009) Global Hand Pose Estimation by Multiple Camera Ellipse Tracking. *Machine Vision and Applications* 21: 1-15, 2009.
83. Kondrachuk AV and **Boyle** R (2010) The density difference of cupula and endolymph changes the mechanics of semicircular canals. ELGRA, *under review*.
84. Rabbitt RD, **Boyle** R, Highstein SM (2010) Mechanical amplification by hair cells in the semicircular canals. *Proc Natl Acad Sci U S A* 2010 Feb 23;107(8):3864-9. Epub 2010 Feb 4. PubMed PMID: 20133682.
85. Balaban PM, Malyshev AY, Ierusalimsky VN, Aseev NA, Korshunova TA, Bravarenko NI, Lemak MS, Roschin MV, Zakharov IS, Popova Y, and **Boyle** R (2011) Functional Changes in the Snail Statocyst System Elicited by Microgravity. *PLoS One* 6 (3): 1-13.

Books

1. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin (eds) (2005) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 3804, Springer-Verlag GmbH, Berlin-Heidelberg. 1-755 pages.
2. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin (eds) (2006) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 4291, Springer-Verlag GmbH, Berlin-Heidelberg. 1-916 pages.

3. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin (eds) (2006) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol.4292, Springer-Verlag GmbH, Berlin-Heidelberg. 1-906 pages.
4. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin (eds) (2007) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 4841, Springer-Verlag GmbH, Berlin-Heidelberg. 1-831 pages.
5. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin (eds) (2007) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 4842, Springer-Verlag GmbH, Berlin-Heidelberg. 1-827 pages.
6. G. Bebis, **R. Boyle**, B. Parvin, D. Koracin, P. Remagnino, F. Porikli, J. Peters, J. Klosowski, L. Arns, YK Chun, T.-M. Rhyne, and L. Monroe (eds) (2008) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 5358, Springer-Verlag GmbH, Berlin-Heidelberg. 1-1203 pages.
7. G. Bebis, **R. Boyle**, B. Parvin, D. Koracin, P. Remagnino, F. Porikli, J. Peters, J. Klosowski, L. Arns, YK Chun, T.-M. Rhyne, and L. Monroe (eds) (2008) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 5359, Springer-Verlag GmbH, Berlin-Heidelberg. 1-1173 pages.
8. G. Bebis, **R. Boyle**, B. Parvin, D. Koracin, …(eds) (2009) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 5875, Springer-Verlag GmbH, Berlin-Heidelberg. 1-1117 pages.
9. G. Bebis, **R. Boyle**, B. Parvin, D. Koracin, …(eds) (2009) "Advances in Visual Computing", Lecture Notes in Computer Science (LNCS), Vol. 5876, Springer-Verlag GmbH, Berlin-Heidelberg. 1-1197 pages.
10. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin, ...et al (eds) (2010) "Advances in Visual Computing, Part I", Lecture Notes in Computer Science (LNCS), Vol. 6453, Springer-Verlag GmbH, Berlin-Heidelberg. 1-766.
11. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin, ...et al (eds) (2010) "Advances in Visual Computing, Part II", Lecture Notes in Computer Science (LNCS), Vol. 6454, Springer-Verlag GmbH, Berlin-Heidelberg. 1-762.
12. G. Bebis, **R. Boyle**, B. Parvin, and D. Koracin, ...et al (eds) (2010) "Advances in Visual Computing, Part III", Lecture Notes in Computer Science (LNCS), Vol. 6455, Springer-Verlag GmbH, Berlin-Heidelberg. 1-650.

The three volume set LNCS 6453, LNCS 6454, and LNCS 6455 constitutes the refereed proceedings of the 6th International Symposium on Visual Computing, ISVC 2010, held in Las Vegas, NV, USA, in November/December 2010. The 93 revised full papers and 73 poster papers presented together with 44 full and 6 poster papers of 7 special tracks were carefully reviewed and selected from more than 300 submissions. The papers of part I (LNCS 6453) are organized in computational bioimaging, computer graphics, behavior detection and modeling, low-level color image processing, feature extraction and matching, visualization, motion and tracking, unconstrained biometrics: advances and trends, 3D mapping, modeling and surface reconstruction, and virtual reality. Part II (LNCS 6454) comprises topics such as calibration, pose estimation, and reconstruction, segmentation, stereo, registration, medical imaging, low cost virtual reality: expanding horizons, best practices in teaching visual computing, applications, and video analysis and event recognition. Part III (LNCS 6455) mainly contains papers of the poster session and concludes with contributions addressing visualization, as well as motion and tracking.

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