Richard D. Rabbitt

Professor of Biomedical Engineering
Adjunct Professor of Otolaryngology
Faculty, Neuroscience Program
36 South Wasatch Drive, Rm 3100 SMBB
University of Utah, Salt Lake City, UT 84112

Utah Office Ph 801 581-8528. Email **r.rabbitt@utah.edu**
Private Mobile Ph 801 414-1659. Private Email **r.rabbitt@me.com**
BME Profile Web Site: http://www.bioen.utah.edu/faculty/RDR/
Google Scholar: May 2025 (cite: 7557. h-index: 47. i10-index: 85)

Career Goals

To discover and quantify fundamental biophysical and biomechanical mechanisms underlying sensation/transduction of sound, vibration, and unconventional forms of energy by inner ear sensory cells, neurons and other cell types.
To report new findings and commercialize new technologies to advance health and the human condition.
To discover and apply new biomedical technologies to improve diagnosis and treatment of disease.
To promote continued evolution of human knowledge through administrative efforts and the education of students in biomedical engineering, science and medicine.

Active Research Areas

Auditory/vestibular/neuronal sensory physiology. Biophysics of cellular excitability.

Professional Experience:

1976-1979	Engineering Training Program, Eaton Corp., Engine Comp. Div., Battle Creek, MI.
1979-1982	Research and Teaching Assistant, Mech. Eng., Mich. State Univ., East Lansing, MI.
1982-1986	Instructor, Mechanical Engineering, Aero. Engineering and Mechanics, RPI, Troy, NY.
1986-1987	Post-Doctoral Research Associate, Applied Mathematics, RPI, Troy, NY.
1987-1993	Assistant Professor, Mechanical Engineering, Washington University, St. Louis, MO.
1993-2003	Associate Professor, Bioengineering, University of Utah, Salt Lake City, UT.
1998-2004	Director, Bioengineering Graduate Program, Univ. of Utah, Salt Lake City, UT.
1998-2008	Summer Investigator, Marine Biological Laboratory, Woods Hole, MA.
2004-2011	Chair, Bioengineering, University of Utah, Salt Lake City, UT.
2008-2009	Visiting Professor, Marine Biological Laboratory, Woods Hole, MA.
2009-2016	Adjunct Senior Scientist, Marine Biological Laboratory, Woods Hole, MA.
2015	Visiting Professor, University of Newcastle, Newcastle, Australia
1993-date	Director, Bioengineering Otology Laboratory, Univ. of Utah, Salt Lake City, UT.
1995-date	Faculty, Neuroscience Program, Univ. of Utah, Salt Lake City, UT.
2003-date	Professor, Biomedical Engineering, Univ. of Utah, Salt Lake City, UT.
2005-date	Adjunct Professor Otolaryngology, Univ. Utah, Salt Lake City, UT.
2023-date	Editorial Board, Nature Scientific Reports
2022-date	Editorial Board, Frontiers in Physiology
2025-date	Board of Directors, Vestibular Oriented Research Organization (VORO)
2025	VORO President Elect

Education

Asst. Prof. (1994), Electrophysiology, Marine Biological Laboratory, Woods Hole, MA.
Asst. Prof. (1993), Computational Neuroscience, Marine Biological Laboratory, Woods Hole, MA.
Post Doc. (1987), Applied Mathematics, Rensselaer Polytechnic Institute, Troy, NY.
Ph.D. (1986), Applied Mechanics, Rensselaer Polytechnic Institute, Troy, NY.

M.S. (1982), Mechanical Engineering, Michigan State Univ., East Lansing, MI.
B.S. (1980), Mechanical Engineering, Michigan State Univ., East Lansing, MI.

Teaching Experience

University of Utah: (Professor) Biotransport (senior), Bioacoustics (graduate), Biofluid Mechanics (graduate), Biophysics (senior/graduate), Engineering Aspects of Clinical Medicine (senior/graduate), Biophysics Lab, Intro. Biomechanics (graduate), Soft Tissue Biomechanics (graduate), Computational Neuroscience (graduate), Fundamentals of Bioengineering (freshman), Senior Thesis. Lectures in Audiology, Bioengineering, Neuroscience, Mechanical Eng. and Mathematical Biology.

Washington University in St. Louis: (Assistant Professor) Dynamics of Physical Systems, Mechanical Design, Introduction to Control Systems, Vibration Laboratory, Senior Design Project, Theory of Vibrations, Acoustics, Interaction of Sound with Structures.

Rensselaer Polytechnic Institute: (Instructor, Post Doc and PhD Student) Elements of Mechanical Design, Introductory Vector Calculus, Ordinary Differential Equations.

Michigan State University: (TA, Instructor and MS Student) Kinematics of Machines, Thermodynamics, Applied Mathematics for Engineers, Thermodynamics Laboratory, Instrumentation Laboratory.

Professor of the Year - elected by the engineering student body, Washington Univ., 1987-88.

Honors

2014 Hallpike-Nylén Prize and Medal. For research in vestibular neuroscience. Awarded in Buenos Aries, Argentina by the Bárány Society. The Bárány Society is headquartered in Uppsala, Sweden.

2014 Fellowship – International Research Visiting Fellowship, Univ. of Newcastle, Australia.

2011 Featured Research Articles. Editorial highlights featured for two J. Physiology articles. J. Physiol. 589 (6) 1243 and J. Physiol. 589 (6) 1241.

2010 The Scientist Top Ten Innovations. Awarded by the American Association for the Advancement of Science for the Scepter Handheld Automated Cell Counter marketed by EMD Millipore. Developed by ORFLO Technologies (formerly eiSpectra), H.E. Ayliffe Pres. CEO, R. Rabbitt Board.

2004 AIMBE Fellow – American Institute for Medical and Biological Engineering, Honorary Society.

2002 Bárány Society – Member, Honorary Vestibular Sciences Society, 2002.

1993 Fellowship Recipient - Computational Neuroscience Course, Marine Biological Laboratory.

1991 USA-China-Japan Conference on Biomechanics - Young Investigator Fellowship.

1986 Sigma Xi – Member, Honorary Research Society.

1989 Presidential Young Investigator - National Science Foundation, BES Bioengineering.

1980 Graduate Student Awards - research and teaching fellowships at Michigan State University.

Industrial Interactions -- Active

Consultant: Leidos and DEVCOM Army Research Laboratory, Reston, VA
Senior Partner: Vestigo Research, Hailey, ID

Industrial Interactions -- Completed

Board of Directors: ORFLO Technologies, Hailey, ID
Consultant: Haemonetics, Braintree, MA
Consultant: eiSpectra, Woodinville, WA.
Consultant: United States Surgical Corp., North Haven, CT.
Consultant: SONIC Innovations, Salt Lake City, UT.
Consultant: Phonak Corp.
Collaborator: Livermore Software Technology Corp., Livermore, CA.
Small industrial grants and donations: Tektronix, Union Electric; Ford Motor; General Motors; Onan Corp. ; Borg Warner; Du Pont Automotive; Johnson Controls; Siemens Automotive; Silicon Systems; Briggs and Stratton

Grants and Contracts – Active

PI "Biomechanical mechanisms of begin paroxysmal positional vertigo" (04/01/2025-3/31/2030) R01 DC021938. $340,000 DC/yr.

PI (UU) "Sequalae of Vestibular Injury" (11/01/2024-10/31/2027). DEVCON ARL W911NF2520003. S. Rajguru PI U. Miami. Utah Subcontract $147,000 DC/yr.

PI (UU) "Mechanisms of Blast-Induced Vestibular Injury" (11/01/2020-8/31/2025). NIH R01 DC018919. Wu Zhou, Hong Zhu co-PI U. Mississippi. Utah Subcontract $80,000 DC/yr.

Grants and Contracts – Expected

Grants and Contracts – Planned or Under Review

Grants and Contracts – Recent Submissions

PI "Efferent modulation of outer hair cell power output" NIH R21 DC022856. RD Rabbitt PI. Submitted October 2024

PI "Biophysics and biomechanics of the vestibular organs" NIH R01 DC006685. RD Rabbitt PI. Submitted Feb 2023.

PI "Measuring Outer Hair Cell Power Output" NIH R21 DC020332. RD Rabbitt PI. Submitted May 2022.

MPI "Translation of an ultrafast inexpensive instrument to measure wide band reflectance and otoacoustic emissions" (04/01/2022-03/31/2024) NIH R01 DC020489. RD Rabbitt MPI, Submitted Sept. 2021.

PI "Biomechanics and biophysics of the utricle" (05/01/2020-04/30/2025) NIH R21 DC016443. RD Rabbitt PI, Submitted Sept. 2019.

Grants and Contracts – Completed

PI "Biophysics and biomechanics of the semicircular canals" (05/01/2004-06/30/2024). NIH R01 DC006685. RD Rabbitt PI, $250,000 TDC/yr.

PI "Ultrasound stimulation of otolith organs" (07/01/2017-06/30/2019) NIH R21 DC016443. RD Rabbitt PI, $200,000 TDC.

co-I "Sound Evoked Vestibular Responses" (2012-17). NIH R01 DC012060. Subcontract from U. Mississippi, H. Zhu PI, $59,600 TC/yr.

PI "Infrared photoactivation of hair cells" (2011-15) NIH R01 DC011481. RD Rabbitt PI, $308,558 TDC/yr.

PI "Synaptic Determinants of Vestibular Afferent Dynamics" (2009-2015). NIH R01 DC008142-05. S. Highstein original PI (Rabbitt assigned as PI in 2014 after passing of Dr. Highstein) $ 426,826 TDC/yr.

PI. "Micro-Electric Impedance Spectroscopy of Hair Cells" (2005-2010) National Institutes of Health, Bioengineering Research Partnership (NIDCD R01 DC04928), 8/01/05-7/31/10, Total direct costs: $2,356,624.

PI "Biomechanics of the semicircular canals" (2004-2007). National Institutes of Health (NIDCD R01 DC06685). Total direct costs: $1,129,395.

PI. "Micro-Electric Impedance Spectroscopy of Hair Cells" (2001-2005) National Institutes of Health, Bioengineering Research Partnership (NIDCD R01 DC04928), 8/01-7/31/05, Total direct costs $1,675,075.

PI. "Shannon Award" (2004-2006) National Institutes of Health, (NIDCD R55 DC05585), 4/1/04/3/31/06, Total direct costs $80,000.

PI. "A MEMS-Based Platform of Electro-Injection of Single Cells" (2004-2005) University of Utah Research Foundation. Total direct Costs $35,000.

PI "MEMS-based Automated Whole-Blood Cell Counter" (2003-2004) University of Utah Research Foundation. Technology Commercialization Project. 07/01/03-06/31/05, Total direct costs $35,000.

PI. "Neural Mechanisms of Vestibular Function in Fish," (1999-2004), National Institutes of Health (NIDCD P01 DC01837), S. Highstein Program Project Director, R. Rabbitt PI of project 2, Total direct costs project 2: $901,050.

PI. "Directional coding of 3D movements by the semicircular canals." (1999-03) National Science Foundation (IBN 98-16921), 9/99-8/03, Total direct costs $237,146.

PI. "Mechanisms of motion transduction by the semicircular canals." (1998-03); National Institutes of Health (NIDCD R01 DC03658), R. Rabbitt P.I., Total direct costs: $1,016,794. (relinquished in favor of NIDCD PO1 DC01837 listed above).

PI. "Neural Mechanisms of Hearing and Balance in Fish," (1993-98), National Institutes of Health (NIDCD PO1 DC01837), S. Highstein Program Director, R. Rabbitt P.I of project #3, Total DC project 3: $599,704.

PI. "Presidential Young Investigator (PYI)" (1989-94), National Science Foundation, Bioengineering and Research to Aid the Handicapped (8957206), Total DC $450,000.

PI. "Theoretical and Experimental Investigations of the Energy Dissipation and Transmission Characteristics of the Tympanic Membrane," (1987-90) The Whitaker Foundation, Total DC $149,962.

PI. "Research Experiences for Undergraduates: Non-invasive acoustic measurements to monitor lithotripsy progress and sound power absorption by the ear," (1990), NSF-REU Supplement, Biomedical Engineering and Aiding the Disabled, Total DC: $9,949.

PI. "Dynamics of the Middle Ear Ossicles," (1989), National Science Foundation, Bioengineering and Research to Aid the Handicapped, (financial support relinquished in favor of the PYI award during the same time period).

PI. "Scientific Equipment Grant," (1990), Tektronix Corp., $23,953 Eq.

co-PI "Micro-Fabricated Complete Blood Counter." (2006-2008). National Institutes of Health. Phase II SBRI, H.E. Ayliffe PI, eiSpectra LLC, Seattle, Utah subcontract $144,000 (R44 HL076906) .

co-PI "Proof-of-Concept for Card-Based CD4 Cell Counting" (2006-2008). National Institutes of Health, Phase I SBRI, H.E. Ayliffe PI, eiSpectra LLC, Seattle, Utah subcontract $34,000 (R43 MH079695-01).

co-PI "Chemoanatomic bases for peripheral vestibular function" (2004-2009). National Institutes of Health. G. Holstein PI, Mt. Sinai School of Medicine, Total DC: $1,250,000, Utah contract $352,634. (R01 DC006677)

co-PI "Micro-Fabricated Complete Blood Counter" National Institutes of Health, H.E. Ayliffe PI, (NIDCD R43 HL076906)

co-PI. "Reconstructions and Representations of the Cerebral Cortex," (1994-99), National Institutes of Health (NIMH MH DA52158), D. VanEssen P.I. , R. Rabbitt Consortium, Total Consortium DC: $89,700.

co-PI. "Software to Incorporate Image Data in Engineering Analysis," (1996-98), University of Utah Research Foundation (5-21352), R. Rabbitt P.I, J. Weiss Co-P.I., Total DC: $87,340.

co-PI "A Resource for Biomedical Computing" (1993-96), National Institutes of Health, Resource, L. J. Thomas Jr. P.I., R. Rabbitt Utah Consultant, Total DC: $50,000.

Participant. "IGERT Training grant in mathematical biology" (2002-06) National Science Foundation, J. Keener PI (Mathematics, Univ. Utah)

Participant. "IGERT Training grant in micro thermo-fluid systems" (2001-05) National Science Foundation, 01-05, R. Roemer, T. Ameel PI (Mech. Eng., Univ. Utah, NSF DGE-9987616)

Faculty advisor / PI. Undergraduate project. "Compressed Natural Gas Vehicle" (1990-92), Sponsored by: General Motors Corp. , Department of Energy, State of OK, Society of Automotive Engineers Foundation, Essex Corp, Laclede Gas Co.

Faculty advisor / PI. Undergraduate project. "Methanol Powered Vehicle" with T. P. Korakianitis, (1989-90), Sponsored by: General Motors Corp., Department of Energy.

Faculty advisor / PI. Undergraduate project. "Hybrid Electric Vehicle" (1992-94), Sponsored by: Union Electric , Ford Motor, Onan Corp., Borg Warner, Du Pont Automotive, Johnson Controls, Siemens Automotive, Silicon Systems, Briggs and Straton.

Study Sections / Review Panels

NIH CSR AUD Study Section (2025); Leverhulme Trust, United Kingdom (2025); NIH CSR ZRG1-F03B-W Fellowships in Neuroscience and Neurobiology (2025); Sydney Australia, Macquarie University Reputation Review (2025); NIH DP2 New Innovator Review (2023-25); NIH CSR ZRG1-ICN-A-02 Cognitive Neuroscience Panel (2023); American Hearing Research Foundation Reviews (2023); Australia, Macquarie Research Fellowship Review (2021); United Kingdom Medical Research Council (2021); NIH NIDCD CDRC Panel (2019-20, ad-hoc); NIH New Innovator Award NIH-CSR-ZRG1-MOSS (2012-16, 2019-22); NIH CSR AUD Regular Member (2015-16); NIH CSR ZRG1-SBIB-Z02 Surgical Sciences and Bioengineering (2014, ad-hoc); NIH-ZRG1-IFCN-T-03 (2013, ad-hoc); NIH-ZRG1-IFCN-B-03 (2013, ad-hoc); NSF PoLS program (2013, ad-hoc); NIH CSR ZRG1-IFCN-B-02M (2011, ad-hoc); NIH CSR ZDC1 SRB-Y (2011, ad-hoc); NIH CSR AUD (2006-2010, regular study section member); NIH CSR AUD (2005, ad-hoc); NIH ZRG1 IFCN-G 50 Special Emphasis Panel (2005); NIH ZRG1 IFCN-6 Integrative, Functional and Cognitive Neuroscience (2001-2003, 2005); CDRC, NSF IBN Sensory Systems (2001); NSF BES XYZ on a Chip (2000), National Space Biomedical Research Institute (2005); National Research Council NSF Graduate Fellowships; Whitaker Foundation Graduate Fellowships.

Write in / Phone Reviews

National Institutes of Health (routine), National Science Foundation (routine), Whitaker Foundation, National Research Council of Canada, Tinnitus Research Consortium, Swiss National Science Foundation.

Manuscript Reviews

Annals of Biomedical Engineering, Audiology & Neurotology, Biological Cybernetics, Biomechanics and Modeling in Mechanobiology, Biophysical Society, Frontiers in Neurology, J. Assoc. Resh. Otolaryngol., J. Acoust. Soc. Am., J. Fluid Mech., Proc. Natl. Acad. Sci., Trans. on Biomedical. Eng., J. Biomechanical Eng., J. Biomechanics, J. Theoretical Biology, J. Neurophysiology, J. Physical Chemistry ACS, J. Sound and Vibration, J. Vestibular Research., Int. J. Numerical Methods in Fluids, J. Neuroscience Research, Lab on a Chip, Nature, Nature Neuroscience, Nature Communications, Neural Computation, Nature Scientific Reports, Neuron, SIAM Journal of Applied Mathematics, Physical Review Letters, Physical Review E., J. Physiology, J. Microelectromechanical Systems, Structure…

Thesis / Dissertation Reviews

University of Newcastle, Australia; University of Utah, Bioengineering & Neuroscience Salt Lake City UT; Rockefeller University NY NY, Neuroscience; McGill University Canada, Mech. Eng.; Washington University St. Louis MO, Mech Eng.; Rensselaer Polytechnic Institute Troy NY, Mech. Eng. & Mathematical Sciences; University of Newcastle Australia, Anatomy.

FACULTY MENTORING

Active

Alphonsus Ng	Assistant Prof. U. Utah	alphonsus.ng@pharm.utah.edu
Tamara Bodine	Assistant Prof. U. Utah	tamarabidone@sci.utah.edu
Ashley Dalrymple	Assistant Prof. U. Utah	ashley.dalrymple@utah.edu

Complete

A.D. (Chuck) Dorval	Associate Prof., U. Utah	chuck.dorval@utah.edu
Jeff A. Weiss	Professor, U. Utah	jeff.weiss@utah.edu
Amy Lorraine Lenz	Assistant Prof. U. Utah	amy.lenz@utah.edu
Jan Kubanek	Washington Univ.	jan.kubanek@utah.edu

STUDENT MENTORING

Current: Ph.D. Students:

1. Precious Vann. 2025 - ARL Support as PI. Excitability of vestibular organs to pulsed electromagnetic energy. p.vann@utah.edu
2. Nastaran Gholami. 2021- NIH R01 Support as PI. Nonlinear problems in hearing and vestibular mechanics. nastaran.gholami@utah.edu
3. Kaitlin L. Hall. 2025 - ARL Support as PI. PhD advisor C. Furst. Modeling mitochondrial sensitivity to pulsed electromagnetic energy. kaitlin.hall@utah.edu
4. Micah Frerck (on pause). NSF IGERT Nanoscience Fellowship. NIH R01 Support as PI. Development and application of a polarization anisotropy microscope. micah.frerck@utah.edu

Current: M.D. Students:

1. Tanner Frahm. NIH R01 Partial Support as PI. Mount Sinai Medical School. Robotic control of a physical model of the membranous labyrinth demonstrating the OMNI treatment for complex multi-canal BPPV u1117978@umail.utah.edu

Current: M.S. Students:

1. Sanaa Sadiq. 2024 - NIH R01 Support as PI. Finite element model of the semicircular canals. u6019979@utah.edu

Current: B.S. Students:

1. Saloni Madkaikar. NIH R01 Support as PI. Eye and body tracking during BPPV treatment
2. Dhruv Patil. Robotic treatment of BPPV in a model system
3. Kevin Poma. Clinical exam chair with tilt capability for canalith repositioning maneuvers.
4. Aren Naegeli. NIH R01 Support as PI. Device for assisting clinician in canalith repositioning maneuver accuracy.
5. Ethan Pearson. Finite element modeling of the vestibular head impulse test in simplified morphologies.

Current: Thesis Committee Member

1. Leonardo Ferrisi (J. George), UU BME PhD, 2024-
2. Meghan Carter (D. Christensen), UU BME MS, 2025-
3. Chelsea Haddy (K. Takahashi) UU BME PhD, 2024-
4. Tyler Nafzinger (J. Kubanek) UU BME PhD, 2024-
5. Davi Ferrazza Cavinatto (A. Payne) UU BME PhD, 2024-
6. Alana Maluszczak (C. Dorval) UU BME PhD, 2024-
7. Adam Losser (J. Kubanek) UU BME PhD, 2024-
8. Eli Finlinson (J. Kubanek) UU BME PhD, 2024-
9. Brian Keller (A. Lenz) UU BME MS, 2024-
10. Chang Ni (C. Yuan, X Ma), UU BME PhD, 2024-
11. James Kyle Valestrino (A. Dalrymple), UU BME, MS, 2024-
12. Clare Severe (T. Lenzi), UU BME, PhD, 2024-
13. John Morris (J. Heys), UU BME, PhD, 2024-
14. Sumaiya Tabassum Dipty (H. Odeen, A. Payne), UU BME, PhD, 2024-
15. Diego Perez (S. Rahimpour, C. Dorval), UU BME, PhD, 2023-
16. Jérémi Godbout (C. Dorval), UU BME, PhD, 2023-
17. Jared Zollinger (J. George), UU BME, MS 2023-
18. Monika Buczak (J. George), UU BME, PhD 2021-
19. Sam Adams-Tew (A. Payne), UU BME, PhD 2021-
20. Spencer Roberts (F. Solzbacher), UU BME, PhD 2020-
21. Amanda Wood (J. Kramer), UU BME, PhD 2022-
22. Elana (Renae) Lapins (A. Lentz), UU BME, PhD 2022-
23. Sam Clinard (D. Parker, D. Christensen), UU BME, PhD 2021-.
24. Troy Tully (G. Clark), UU BME, PhD 2021-
25. Caleb Thompson (J. George), UU BME, PhD 2021-

Alumni -- Academics

Iversen, Marta	PhD	Resh. Assoc., Univ. Utah	martaiversen@gmail.com
Bowden, Anton E.	PhD	Professor, Brigham Young	abowden@byu.edu
Damiano, Edward R.	MS/PhD	Professor, Boston Univ.	edamiano@bu.edu
Rajguru, Suhrud	PhD	Professor, Univ. Miami	SRajguru@med.miami.edu

Alumni -- Life Science / Medical Device Entrepreneurs

Ayliffe, H. (Ted) E.	PhD	Pres. & CEO, ORFLO, & Coulee	ted@orflo.com
Damiano, Edward R.	MS/PhD	Pres. & CEO, Beta Bionics Inc.	edamiano@betabionics.org
Delmenico, Peter R.	MS	Principal, Planet Innovation	peter@peterdelmenico.com
King, Curtis		Principal, RestorEar	csk1579@gmail.com

Alumni -- Health Care

Ghanem, Tamer A.	MD/PhD	ENT Surgeon, Wayne State	tghanem1@yahoo.com
Kozola-Maas, Kristi	MD/MS	OBGYN, Intermountain	drkoz21@cs.com

Alumni -- Life Science / Medical Device Industry

Ayliffe, H. (Ted) E.	PhD	Pres. & CEO, ORFLO	ted@orflo.com
Clifford, Sarah	MD/FCAP	CMO, LabPartners	sarahclifford@gmail.com
Ifediba, Marytheresa	MS/PhD	VP R&D, Polarity TE	marytheresa.ifediba@hci.utah.edu
Dharia, Sameera	PhD	Engineer, Astute Medical	sameerad@gmail.com
Dittami, Gegory M.	PhD	Engineer, ORFLO Tech.	greg@orflo.com
Dragicevic, Jovo	MS	Manager, Abbott Labs	Jovo.Dragicevic@abbott.com
Farmer-Fedor, Brenda	PhD	Engineer, Bard Access Sys.	Brenda.Fedor@crbard.com
Friedrich, Michael T.	MS/PhD	Engineer, Biotronik DE	michael.friedrich@biotronik.de
Jovic, Tina	BS/MBA	Director, IQVIA, NY	tina.jovic@sloan.mit.edu

Setser, Randolph	MS/DSc	Research Manager, Siemens	randolph.setser@siemens.com
Yamauchi, Angela M.	PhD	Engineer, W.L. Gore Inc.	ayamauchi@wlgore.com

Alumni -- Other

Breneman, Kathryn	PhD	University of Chicago
Ching, Larry	MS	Engineer
Wyrick, Jeff	MS	Engineer

Alumni -- Postdoctoral Students, Research Associates, Visiting Scholars

Poppi, L. (2017) *Efferent evoked intracellular calcium signaling in vestibular hair cells and neurons*.
Brown, S. (2009-10) *Electric impedance spectroscopy of hair cells*.
Veress, A. (1999-2001) *Combining image data with finite element simulations to study strain in coronary arteries (IVUS) and myocardium (MRI)*.
Damiano, E.R. (1993-1994) *Mechanics of the vestibular semicircular canals*.

Alumni -- Lab Rotations

Monika Buczak (2021); Sarah Haslam (2020); Jessica Chen (2016); Lynn Nhi Nguyen (2013); Feliks Furmanov (2011); Matt Streeter (2010); Ben Murphy (2006); James Tucker (2005); Will Nesse (2004); Roy Smeel (1996); Brenda Farmer (1994)

Alumni -- Thesis / Dissertations Accepted:

1. Iversen, Marta M. Ph.D. Biomedical Engineering. *Activation of Vestibular Afferent Neurons by High-frequency Sound and Vibration*. University of Utah, 2020.
2. Dharia, Sameera, Ph.D. Bioengineering. *Monitoring Cell Membrane Electrical Properties Using Radio Frequencies*. University of Utah, 2011.
3. Dittami, Greg *M.,* Ph.D. Bioengineering. *Optical, Electrical and Electrochemical Techniques for Biophysical Studies of Single, Excitable Cells*. University of Utah, 2010.
4. Breneman, Kathryn D., Ph.D. Bioengineering. *Hair cell stereocilia: Their electrical cable properties and membrane flexoelectricity contribution to power generation and bundle motion*. University of Utah. 2010.
5. Rajguru, Suhrud M., Ph.D. Bioengineering. *Biomechanics of benign paroxysmal positional vertigo*. University of Utah, 2006.
6. Ifediba, Marytheresa A., M.S. Bioengineering. *Morphology and Biomechanics of the Human Semicircular Canals*. University of Utah. 2005.
7. Kozola Maas, Kristi, M.E. Bioengineering. *Dynamic displacement of the semicircular canal cupula*. University of Utah. 2005.
8. Bowden, Anton E., Ph.D. Bioengineering. *Tools for deformable template registration*. University of Utah, 2003.
9. Farmer-Fedor, Brenda L., Ph.D. Bioengineering. *Acoustic intensity, impedance and reflection coefficient in human ear canals*. University of Utah, 2003.
10. Pamarthy, K. (Advised with D. Christensen), M.S. Electrical Engineering. *Micro-domain electric impedance spectroscopy of outer hair cells using the finite-difference frequency-domain technique*. University of Utah, 2003.
11. Yamauchi, Angela M., Ph.D. Bioengineering. *Cupular micromechanics and motion sensation in the toadfish vestibular semicircular canals*. University of Utah, 2002.
12. Ghanem, Tamer A., Ph.D. Bioengineering. *Semicircular canal fluid compartment morphology, ionic composition and regulation in the oyster toadfish, Opsanus tau*. University of Utah, 2001.
13. Ingebretsen, David M., M.E. Bioengineering. *Using the ATB model to study expected injury patterns in frontal vehicle accident*. Univ. Utah. 2001.
14. Ayliffe, H. E. (Ted), Ph.D. Bioengineering. *Micro-electric impedance spectroscopy: Biological materials and cells*. University of Utah, 1999.
15. Ching, Larry, M.S. Mech. Eng. *Measurement of the acoustic energy reflection coefficient in slender tubes*. Washington University, 1994.
16. Delmenico, Peter R., M.S. Mech. Eng. *Linear acoustics in a semi-ellipsoidal waveguide with application to electrohydraulic lithotripsy*. Washington University, 1992.
17. Setser, Randolph M., M.S. Mech. Eng. *Inertial and geometrical properties of the human ossicles*. Washington University, 1992.

18. Dragicevic, Jovo, M.S. Mech. Eng. *Determination of the reflection coefficient and sound power using multiple probe microphones in the ear canal*. Washington University, 1991.
19. Damiano, Edward R., M.S. Mech. Eng. *A hydroelastic model of the dynamics in a circular duct and its description of the macromechanics in the vestibular canal*. Washington University, 1989.
20. Friedrich, Michael T., M.S. Mech. Eng. *Ear canal acoustic modes*. Washington University, 1989.

Alumni -- Thesis Committee Member

1. Reza Kolasangiani (T. Bidone), UU BME, PhD 2025
2. Geyu (Brekka) Weng (N. Netegh), UU BME, PhD 2025
3. Jessica Chen (S. Jennings), UU Speech-Lang Pathl Audiol, PhD 2025
4. Carena Cornelssen (K. Wilcox), UU BME, PhD 2024
5. Kyle O'Sullivan (E. Jorgensen), UU BME, PhD. 2023
6. Monika Buczak (J. George), UU BME, MS 2024
7. Elana (Renae) Lapins (A. Lentz), UU BME, MS 2024
8. Jeff Winter (NA), UU BME, MS 2024
9. Sam Adams-Tew (A. Payne), UU BME, MS 2024
10. Juan Botero (F. Solzbacher), UU BME, MS 2023
11. Reza Kolasangiani (T. Bidone), UU BME, MS, 2024
12. Sonia M Osuna (P. West), UU BME, MS, 2024
13. Hanah Khelfa (S. Meek), UU BME, MS 2023
14. Juan Pablo Borero (F. Solzbacher), UU BME, MS 2023
15. David L. Lorincz (R. Lim), External Reviewer, Univ. Newcastle Australia Anatomy, PhD 2023
16. Tyler Page (E. Jorgensen), UU BME, PhD 2023
17. Kyle Patrick O'Sullivan (C. Butson), UU BME, PhD 2023
18. Casia Wardzala (J. Kramer), UU BME, PhD 2023
19. Adam Rauff (J. Weiss), UU BME, PhD 2023
20. Gregory M Boiczyk (K. Monson), UU BME, PhD 2023
21. Tom Riis (J. Kubanek), UU BME, PhD 2023
22. Colin McNabb (D. Warren), UU BME, MS 2023
23. Christopher Pastras (D. Brown, I. Curthoys), External Reviewer, Univ. Sydney Australia Physiology, PhD 2022
24. Arjun Achara (J. Kubanek), UU BME, MS 2021
25. Yan Chen (T. Bidone), UU BME, MS 2021
26. Shana Black, (C. Butson) UU Bioengineering, PhD 2021
27. Jocelyn Todd (J. Weiss), UU Bioengineering, PhD 2021
28. Anil Palaparthi (I. Titze), UU Bioengineering, PhD 2021
29. Evan Ratzan (M. Deans), UU Neuroscience, PhD 2020
30. Anthony Iuso (D. Krizaj), UU Neuroscience, PhD 2018
31. Steven LaBelle (J. Weiss), UU Bioengineering, PhD 2018
32. Marsa Teheri (J. White), UU Bioengineering, PhD 2018
33. Christian Polar (C. Dorval), UU Bioengineering, PhD 2016
34. Abhijit Mondal (A. Moreno), UU Bioengineering, PhD 2016
35. Nichlos Ashton (R. Stewart), UU Bioengineering, PhD 2016
36. Heather Wark (R. Normann), UU Bioengineering, PhD 2014
37. Aaron Swedberg (J. Weiss), MS Bioen UU Bioengineering, MS 2013
38. Sylvana Schister (C. Dorval), UU Bioengineering, MS 2014
39. Chris Gibson (Y. Shiu & D. Li), UU Bioengineering, MD/PhD 2013
40. Jessica Smith (K. Bachus), PhD Bioen UU, 2013
41. Mike Gee (J. White), UU Bioengineering, PhD 2015
42. Collin Anderson (C. Dorval), UU Bioengineering, PhD 2016
43. Nan-Wei Liu (K. Monson), UU Bioengineering, MS 2015
44. Joan (Joey) Jose Martinez (J. White), UU Bioengineering, PhD 2015
45. Daniel Ryskamp (D. Krizaj), UU Neuroscience, PhD 2013
46. Allen Fung (J. Weiss), UU Bioengineering, 2013
47. Michael Harris (J. Weiss), UU Bioengineering, PhD 2013

48. Ashley Kapron (A. Anderson), UU Bioengineering, PhD 2013
49. Janis Deitrick (K. Horch), UU Bioengineering, MS 2009;
50. Trevor Shelton (Y. Shiu), UU Bioengineering, PhD 2008
51. Brad Isaacson (R. Bloebaum), UU Bioengineering, PhD 2008
52. Onur Tasci (B. Gale). UU Bioengineering, PhD 2013
53. Corinne Adams (J. Weiss), UU Bioengineering, PhD 2012
54. Ben Ellis (J. Weiss), UU Bioengineering, PhD 2011
55. Prabhav Saraswat, PhD Bioen UU 2010
56. Carlos Bonifasi-Lista, PhD Bioen UU 2009
57. Santosh Balakrishnan (P. Tresco), PhD Bioen UU 2008
58. Shigaji Shome, PhD Bioen UU 2008
59. Seth Hills, Ph.D. Bioen UU 20xx
60. Jeff Wolchok (P. Tresco), Ph.D. Bioen UU 2009
61. Heath Henninger (J. Weiss), Ph.D. UU 2009
62. Laxmi Krishnan (J. Weiss), Ph.D. Bioen, UU 2008
63. Ephraim Akyuz, Ph.D. Bioen, UU 2006
64. Andy Anderson (J. Weiss), Ph.D. Bioen. UU 2007
65. Seung-Jae Kim, Ph.D. Bioen. UU 2006
66. E. Newren, Ph.D. Mathematics, U. Utah 2006
67. Chad Brokopp M.S. Bioen, UU, 2006
68. Terri Rosenbaum, Ph.D. Bioen. U. Utah, 2006
69. Thomas Rust, Ph.D. Bioen. U. Utah, 2006
70. Bruce Hoppenfeld (R. McLeod), Ph.D. Bioen. U. Utah, 2005
71. Danny Blanchard, Ph.D. M.E. U. Utah, 2005
72. G. Dhillon (K. Horch), Ph.D. Bioen. U. Utah 2006
73. Yunn-Hong Choi (M. Skliar), Ph.D. Chem.Eng. U. Utah 2005
74. DoSik Hwang, Ph.D. Bioen, U. Utah 2005
75. B. Wilbur, Ph.D. Bioen. U. Utah 2005
76. H. Khare, Ph.D. Bioen. U. Utah 2005
77. Roy Smeal (P. Tresco), Ph.D. Bioen. U. Utah 2004
78. Bulent Yilmaz, Ph.D. Bioen. U. Utah, 2004
79. M. Dalton, M.S. Bioen. U. Utah 2004
80. Spencer Perterson, M.S. Mech. Eng. Univ. Utah, 2004
81. Kranti Pamarthy, M.S. Electrical Engineering, U. Utah, 2003
82. R. Das. M.S. Bioen. U. Utah, 2003
83. G. Bal, Ph.D. Bioen. U. Utah 2003
84. Badi Ph.D. Bioen. U. Utah 2003
85. Bonifasi-Lista (J. Weiss) M.S. Bioen. U. Utah 2002
86. Bing Fan Ph.D. Physics, U. Utah 2002
87. J. Gardiner (J. Weiss), Ph.D. Bioen. Univ. Utah 2001
88. R. Hitchcock (P. Tresco), Ph.D. Bioen. U. Utah 2001
89. P. Chamberlain, M.S. Bioen, U. Utah. 1999
90. K. Peterson, M.S. Bioen, U. Utah, 1999
91. R. Kunzler, M.S. Bioen., U. Utah, 1997
92. J. Gardiner, Ph.D. Bioen., U. Utah
93. E. Vaja, Ph.D. Bioen., U. Utah 1997
94. S.J. Biggs, Ph.D. Bioen., U. Utah 1997
95. Ward, M.S. Bioen. U. Utah 1997
96. P. Moulis, Ph.D. Bioen., U. Utah 1997
97. Leicht, M.E. Bioen., U. Utah, 1997
98. J. Smith (K. Bachus) M.E. Bioen., U. Utah, 1996
99. K. Quapp (J. Weiss), M.S. Bioen., U. Utah, 1996
100. Jeff Weiss (K. Bachus) Ph.D. Bioen., U. Utah, 1995
101. Gary Christensen (M. Miller) D.Sc. Elec. Eng., Wash. U., 1994

102. E. Rouhaud (G. Zahalak), D.Sc. Mech. Eng., Wash. U, 1993
103. Ed Damiano (M. Holmes) Ph.D. Applied Mechanics, Rensselaer Polytech. Inst., 1993
104. Wang, J., M.S. Elec. Eng., Wash. U, 1992
105. Pantazopoulos, G.I., D.Sc. Mech. Eng., Wash. U, 1992
106. Zou, Dequan., D.Sc. Mech. Eng., Wash. U, 1992
107. Actis, Ricardo L., D.Sc. Mech. Eng., Wash. U, 1992
108. J. Lammers, M.S. Mech. Eng., Wash. U, 1992
109. Ahn, Kijun, D.Sc. Civil Eng., Wash. U, 1990
110. Harintho, Hidajat, D.Sc. Civil Eng., Wash. U, 1989
111. Robert Watson D.Sc. Mech. Eng., Wash. U, 1990
112. Peddada Rao, D.Sc. Mech. Eng., Wash. U, 1989.

Alumni -- Undergraduate Student Projects

1. Lincoln Hunt – Otoacoustic broad band reflectance, 2021-24
2. Barbara Condori-Teves – Outer hair cell power output, 2021-23
3. Ignacio Kahnlein – Finite element modeling of the middle ear, 2021-23
4. Grace Ojewia – Inner ear calcium imaging, 2021-23
5. Zane Tyler -- Broad band reflectance tympanometry, 2017-20
6. Nish Patel – GCaMP calcium imaging, 1017-20
7. Brandon Pope – Analysis of phase locking vestibular afferents, 2017-19
8. Samira Saeed – Measurement of endolymph viscosity, 2017
9. Nolan Ostberg – Time resolved confocal microscopy analysis, 2013-15
10. Kelsey Chandler – In vitro transfection and culture for imaging studies of IR excitability, 2013-15
11. Marta Iverson – High contrast micro CT of rodent inner ear membranous labyrinth, 2013-16
12. R. Johnson - MatLab program for hearing aid auditory amplitude and frequency compression, 2010-11
13. J. Hanson - MatLab model of semicircular canal mechanics m 2008-9
14. 25 Students -- Hybrid Electric / Ethanol Powered Vehicle. Converted a 1992 Ford Escort wagon to be powered by a hybrid, electric / ethanol plant, 1992-94
15. 10 Students -- Natural Gas Powered Vehicle. Converted a 1990 GMC 1-ton pick-up truck to run on compressed natural gas, 1992-94.
16. 14 Students -- Methanol Powered Vehicle. Converted a Chevrolet Corsica to run on blends of methanol and gasoline (M15 to M85), 1989-91
17. 5 Students -- Society of Automotive Engineers Mini-Baja Vehicle. Served as faculty advisor for the design and construction of three off-road baja vehicle, 1987-92
18. Faculty advisor for approximately 20 senior design projects each year, 1987-93
19. Faculty advisor for approximately 3 independent study design projects each year, 1987-93

SOCIETY AFFILIATIONS

American Institute for Medical and Biological Engineering (AIMBE), Acoustical Society of America (ASA, RA17579), American Association for the Advancement of Science (AAAS, 186348), American Physiological Society (APS, 51031), Association for Research in Otolaryngology (ARO, RRabbitt13121), American Society of Mechanical Engineers (ASME, 989806), American Society of Engineering Education (ASEE, 186348), Bárány Society (RBS), Biomedical Engineering Society (BMES, 6440), Biophysical Society (BioPhys, 26528), IEEE Engineering in Medicine and Biology Society (EMBS, 41513576), International Society for Optical Engineering (SPIE, 00449458), New York Academy of Sciences (NYAS, 00408825), Society for Neuroscience (SN, 000158533), Sigma Xi (XI, 860020282).

ADDITIONAL PROFESSIONAL ACTIVITIES

2024-30	Member, UU Senate Consolidated Hearing Committee
2023-date	Member, BME Curriculum Committee
2022	Alternate Chair, UU Senate Consolidated Hearing Committee, Policy 1-012B
2022	MD/PhD UU Capstone Exam Committee, Corey Shayman
2021	Chair, UU Senate Consolidated Hearing Committee, Policy 1-012B
2020-date	Chair, Neuro-Engineering Track BME Univ. Utah, Salt Lake City, UT.

2020-date Member, UU BME Graduate Admissions Committee
2020-23 Member, Assoc. Resh. Otolaryngology, Awards Committee
2020 Ad hoc Member, COE RPT Committee
2020 Member, Graduate School Review Panel, Neurobiology and Anatomy
2020 Chair, UU Senate Consolidated Hearing Committee, Policy 6-316
2019 Member, COE Tenured Faculty Review Policy
2017 Member, COE Tenured Faculty Review Policy
2017 Member, Scientific Steering Committee of the Neuroscience Initiative
2017-23 Member, UU Senate Consolidated Hearing Committee
2017-date Member, Bioen RPT Committee
2016-date Member, Electron Microscopy Core Facility Advisory Committee
2015-16 Member, Bioen Faculty Search Committee
2015 Member, Bioen Undergraduate Committee
2014-18 Member, UU Senate Consolidated Hearing Committee, Policy 5-210
2015- Member, Bioen RPT
2013-14 Member, UU Committee on Allocation and Use of USTAR Research Space
2012-14 Member, COE RPT Committee
2012-14 Chair, Bioen "Custom" Qualifying Exams
2012 Member, Beyond Center "Cancer Forum" Workshop, March 19-21, ASU, Tempe, AZ.
2011-13 Member, Neuroscience Admissions Committee
2011-14 Member, COE Scholarship Committee
2011-12 Chair, UU Grad School, Pharm Tox Review
2011-12 Member, UU RPT Consolidated Hearing Committee (Academic Senate)
2010-18 Member, UU Entrepreneur Faculty Advisor
2005-11 Member, ABET Committee
2004-11 Member, BMES Council of Chairs
2004-11 Member, AIMBE Academic Council
2008-09 National Committee, IEEE Eng. In Medicine and Biology International Conference, EMCB'09
2006-10 Co-Chair, USTAR "Biomedical Device Innovation" faculty search committee
2006-08 Member, USTAR Neuroscience and Biomedical Technology programming committee.
2005-10 Member, MD PhD Committee, Univ. Utah School of Medicine.
2004-09 Faculty Advisor, Student Section of the Biomedical Engineering Society (BMES)
2003-06 Chair, Faculty Search Committee, Dept of Bioengineering, Univ. Utah.
2007-08 Member, Task Force on the Protection of Faculty, Staff and Students …
2007-08 Member, EOB Biology Task Force.
2005 Project Youth, Univ. Utah Bioengineering Coordinator and Speaker, 4/13/05.
2003-04 College RPT Committee, College of Engineering, Univ. Utah.
2003 Chair, Imaging Ph.D. Qualifying Exam, Dept. of Bioengineering, Univ. Utah.
2001, 03 Chair, Computational Bioengineering Ph.D. Qualifying exam, Dept. of Bioen., Univ. Utah.
1998-04 Chair, Graduate Curriculum Committee, 1998-2004, Dept. of Bioengineering, Univ. Utah.
1994-04 Chair, Biomechanics Ph.D. Qualifying Exam, Dept. of Bioengineering, Univ. Utah.
2000-03 College Representative, Graduate Council, 2000-2003, Graduate School, Univ. Utah.
2002 Moderator, ARO Session on "Inner Ear: Outer Hair Cell Motility and Prestin", Datona Beach, FL.
2002 Alumni Participant, Whitaker Biomedical Engineering Conference.
2000-01 Participant, Faculty Leadership Program, Univ. Utah.
2000 Moderator/Session co-chair, Whitaker Biomedical Engineering Educational Summit.
1996-02 Member, Computing Committee, School of Engineering, Univ. Utah
1996-98 Member, Faculty Search Committee, Dept. of Bioengineering, Univ. Utah.
1998-00 Member, Curriculum Committee, School of Engineering, Univ. Utah
1997-00 Member, Undergraduate Curriculum Committee, Dept. Bioen. U. Utah.
1998-99 Chair, Whitaker Fellowship Committee, Dept. Bioen., U. Utah.
1994-98 Director Graduate Admissions, Dept. of Bioengineering, Univ. Utah.
1993-96 Member, Acoust. Soc. Am. Committee on Tutorials, Chairman.
1996 Member, TA Committee, Dept. of Bioengineering, Univ. Utah.

1995 Chair, Hot Topics in Acoustics Session, Acoust. Soc. Am.
1993 Member, Washington University-SEAS, Advisory Board for Biomedical Engineering
1990-93 Member, National Research Council NSF Graduate Fellowship Evaluation Panel
1990-93 Director, Washington University Measurements/Vibrations Laboratory
1987-93 Executive Committee, St. Louis Section of SAE.
1988-93 Member, Washington University ME Computing Facility Advisory Committee.
1987-93 Advisor, Washington University Student Section of SAE.
1991-93 Advisor, Washington University Hybrid Electric/Ethanol Powered Vehicle Project.
1992 Mentor, George Englemann Mathematics and Science Institute, NSF Young Scholar Program
1987-92 Chair, Drawing Proficiency Committee, WU Dep. of Mech. Engineering.
1991 Member, ASME St. Louis Section Program Committee
1991 Member, School of Engineering Committee on Networks and Computing.
1990 Member, Committee to review student run Course/Professor survey (W. Gillett, Chair).
1988-89 Member, Washington University Engineering School Committee on Undergraduate Teaching.
1988-89 Member, Washington University Teaching Center Committee.
1990-92 Faculty Advisor, Washington University-SAE Compressed Natural Gas Vehicle.
1988-90 Faculty Advisor, Washington University-SAE Methanol Powered Vehicle.
1987-89 Faculty Advisor, Washington University-SAE Mini-Baja Vehicle.
1987-92 Executive Committee, St.Louis section of the SAE.
1987-92 Recording Officer, Washington University Dept. of Mechanical Engineering.
1989 Faculty Advisor, Engineering Week Egg Drop Competition
1987 Faculty Advisor, Washington University-ASME Human Powered Vehicle.
1986-87 Faculty Consultant, RPI-SAE Mini-Baja Design Project.
1985-86 Faculty Advisor, RPI-ASME Human Powered Vehicle.
1984 Faculty Advisor, RPI-AISI Steel Wire Design Competition.
1980-83 Design Team, Chief Engineer, MSU-SAE Super Mileage Vehicle.
1980-83 Design Team, MSU-SAE Mini-Baja Design Project.

PATENT APPLICATONS PENDING

1. Rabbitt RD and Iversen M (2016) Ultrasound Vestibular Analysis. US Patent Application 16/070,218.

PATENTS ISSUED

3. Rabbitt RD and Dharia S (2015). Monitoring Membrane Bound Proteins. US Patent Number 8,968,663.
2. Rabbitt RD and Dharia S (2012). Systems and Methods for Measuring the Electrical Properties of a Microparticle. US Patent Number 8,102,182.
1. Rabbitt RD, Frazier AB and Ayliffe HA (2001) Electrical detector for micro-analysis systems. US Patent Number 6,169,394.

DISCLOSURES

13. Rabbitt RD (2022) U-7569 Microphone array methods for broad-band reflectance and otoacoustic emissions.
12. Holman HH, Rabbitt RD (2016) U-6250 Gad2-IRes-cre Mediated GCaMP5G-rd TOMATO Expression in the Mouse Inner Ear
11. Dittami, G and Rabbitt RD (2013) U-4684 Electrochemical Flow Cytometry. US Patent Application 13/739,800 Feb. 2013.
10. Dharia S, Rabbitt RD (2011) U-5073. Monitoring membrane bound proteins with radio frequency interrogation.
9. Dittami G, Rajguru S and Rabbitt RD (2010) U-4815 IR-optical stimulation of skeletal muscle and stimulation/pacing of cardiac muscle.
8. Dittami G and Rabbitt RD (2009) U-4684. Electrochemical flow cytometry.
6. King C, Ayliffe HA and Rabbitt RD (2006) U-4067. Heat press and alignment system for bonding multi-layer polymer films.
5. Rabbitt RD and King C (2006) U-4066. Optical respiratory flow sensor.
4. King C and Rabbitt RD (2006) U-4036. Liquid crystal based shutter.
2. Rabbitt RD U-3905. Vestibular Amplifier (2005)
1. Dittami GM, Rabbitt RD, Kiser P and Ayliffe HE (2004) U-3825. Hydrogen-Actuated MEMS Impedimetric

Sensor.

MANUSCRIPTS IN PROGRESS

Rabbitt RD (20xx) Asymptotic vs. finite element models of semicircular canal fluid mechanics. In preparation.
Rabbitt RD, Smith C and Helminski J. (20xx) Efficacy of a universal canalith repositioning maneuver examined in silico. In preparation.
Rabbitt RD (20xx) On the role of biophysical constraints in cochlear evolution. In preparation.
Frerck MJ, Rajguru SM, Johnson R, Holman HA, Iversen MA, Chen J and **Rabbitt RD** (20xx) Temperature sensitivity of semicircular canal afferent responses in the toadfish, Opsanus tau. In preparation.
Rabbitt RD, Liu Q, Frerck MJ, Holman HA, Jorgensen EM. (20xx) Synaptic release and the Brownian hammer. In preparation.
Rabbitt RD, Iversen MA, Zhou W and Zhu H. (20xx) Vestibular responses to ultrasound, microwaves and infrared light. In preparation.
Sit C, **Rabbitt RD**, Zhu H and Zhou W (2024) Methods to measure optical torsion in rodents based on pupillary fringe fine structure. In preparation

MANUSCRIPTS IN REVIEW

Rabbitt RD, Pastras CJ, Rajguru SM, Zhu H and Zhou W (2025) Utricular tuning curves estimated in guinea pig, mouse, rat, sheep and human. Submitted JARO.

Primary Literature Publications

1. Subramaniam S, Akay M, ... **Rabbitt RD**, et al. (2024). Grand challenges at the interface of engineering and medicine. Engineering in Medicine and Biology. IEEE Open J. Eng. Med Biol. 5:1. doi: 10.1109/OJEMB.2024.3351717, PMID: 38415197.
2. Joshi O, Skóra T, Yarema A, **Rabbitt RD**, Bidone TC. (2024). Contributions of the individual domains of $\alpha_{IIb}\beta_3$ integrin to its extension: Insights from multiscale modeling. Cytoskeleton. 81(8):393. https://doi.org/10.1002/cm.21865. PMID: 38682753.
3. **Rabbitt RD** and Bidone TC. (2024). On natural selection of outer hair cell electro-mechanical properties. In Nonlinearity and Hearing: Advances in theory and Experiment: Proceedings of the 14th International Mechanics of Hearing Workshop. AIP Conf. Proc. 3062: 020003 https://doi.org/10.1063/5.0189547
4. Pastras CJ, Curthoys IS, McAlpine D, **Rabbitt RD*** and Brown DJ*. (2023). Evidence that ultrafast non-quantal transmission underlies short-latency vestibular evoked potentials. (*co-senior authors) J. Neurosci. 43(43):7149. PMID: 37775302.
5. Kubanek J, Wilson M, **Rabbitt RD**, Armstrong CJ, Farley A, Ullah A, Shcheglovitov O. (2023). Stem cell-derived brain organoids for controlled studies of transcranial neuro- modulation. Helion 9(8): e18482 https://doi.org/10.1016/j.heliyon.2023.e18482.
6. Pastras CJ, Curthoys IS, **Rabbitt RD*** and Brown DJ*. (2023). Using Macular Velocity Measurements to Relate Parameters of Bone Conduction to Vestibular Compound Action Potential responses. (*co-senior authors) Scientific Reports 13:10204, https://www.nature.com/articles/s41598-023-37102-3.
7. Pastras CJ, Gholami N, Jennings S, Zhu H, Zhou W, Brown DJ, Curthoys IS, **Rabbitt RD** (2023). A mathematical model for mechanical activation and compound action potential generation in the utricle in response to sound and vibration. Frontiers in Neurology. 14 DOI.org/10.3389/fneur.2023.1109506.
8. Shen L, Andresen NS, Chari DA, Pogson JM, Lauer AM, **Rabbitt RD**, Carey JP, Santos F and Ward BK (2023) Otolith membrane herniation on histology is associated with decreased caloric response in Méniere's disease. J Assoc Res Otolaryngol. DOI: 10.1007/s10162-022-00883-x PMID: 36539657.
9. **Rabbitt RD** and Bidone TC. (2023). A parametric blueprint for optimum cochlear outer hair cell design. J. Royal Soc. Interface. 20" 20220762 DOI: 10.1098/rsif.2022.0762. PMID: 36789510.
10. **Rabbitt RD** (2022). Analysis of outer hair cell electromechanics reveals power delivery at the upper frequency limits of hearing. J. Royal Soc. Interface. 19: 20220139DOI 19.1098/rsif.2022.0139. https://dx.doi.org/10.1098/rsif.2022.0139. PMID: 35673856.

11. Huang J, Xuehui T, Xu Y, Zhang C, Chen T, Yu Y, Mustain W, Allison J, Iversen MM, **Rabbitt RD**, Zhou W and Zhu H. (2022). Differential Activation of Canal and Otolith Afferents by Acoustic Tone Bursts in Rats. J Assoc Res Otolaryngol DOI 1-.1007/s1062-022-00839-1. PMID: 35378621.
12. **Rabbitt RD** and Holman HA. (2021). ATP and ACh Calcium Transients in Neonatal Mouse Cochlear and Vestibular Sensory Epithelia. Front. Neurosci. 15:710076 doi:10.3389/fnins.2021.710076. PMID: 3466562, PMCID: PMC8455828
13. **Rabbitt RD** (2020). The cochlear outer hair cell speed paradox. Proc Natl Acad Sci. Aug 26; 202003838. DOI: 10.1073/pnas.200383817. PMID: 32848062.
14. Holman HA, Wan Y, **Rabbitt RD** (2020). Developmental GAD2 expression reveals progenitor-like cells with calcium waves in mammalian crista ampullaris. iScience 23, 101407, August 21, 2020. doi: 10.1016/j.isci.2020.101407. PMID: 32771977.
15. Iversen MM and **Rabbitt RD** (2020) Biomechanics of third window syndrome. Frontiers in Neurology. Aug 25, 11:891. PMID 32982922. PMCID: PMC7477384,
16. Perez-Flores MC, Lee JH, Park S, Kang M, Zhang XD, Sihn CR, Ledford HA, Wang W, Kim HJ, Timofeyev V, Yarov-Yarovoy V, Chiamvimonvat N, **Rabbitt RD***, Yamoah EN* (2020). Cooperativity of $K_V7.4$ channels confer ultrafast electro-mechanical sensitivity and emergent properties in cochlear outer hair cells. *co-corresponding authors. Science Advances 6: eaba1104. PMID: 32285007 PMCID: PMC7141818. DOI: 10.1126/sciadv.aba1104. PMID 32285007.
17. von Gerersdorf H, Iversen MM, **Rabbitt RD** (2019), Keeping your eye on the ball. J. Physiology JP-P-2019-279149. doi: 10.113/JP279149. PMID 31859388.
18. Holman HA, Poppi LA, Frerck M and **Rabbitt RD** (2019). Spontaneous and acetylcholine evoked calcium transients in the developing mouse utricle. Front. Cell. Neurosci., 07 May 2019. https://doi.org/10.3389/fncel.2019.00186. PMID 31133810
19. **Rabbitt RD** (2018) Semicircular canal biomechanics in health and disease. (2018) J. Neurophysiol. DOI: 10.1152/jn.00708.2018 PMCID: PMC6520623. PIMD 30565972
20. Iversen MM, Zhu H, Zhou W, Della Santina CC, Carey J, **Rabbitt RD** (2018) Sound abnormally stimulates the vestibular system in canal dehiscence syndrome by generating pathological fluid-mechanical waves. Nature Scientific Reports. 8: 10257. PMID 29980716.
21. Araújo R, Fernandez V, **Rabbitt RD**, Ekdale EG, Antunes MT, Castanhinha R, Fröbisch J and Martins RMS (2017) Endothiodon cf. bathystoma (Synapsida: Dicynodontia) bony labyrinth anatomy, variation and body mass estimates. PLoS ONE 13(3): e0189883. PMID 29538421.
22. Poppi LA, Tabatabaee H, Jobling P, Callister RJ, Migliaccio AA, Jordan PM, Holt JC, **Rabbitt RD**, Lim R, Brichta AM (2017) ACh-induced hyperpolarization and decreased resistance in mammalian type II vestibular hair cells. J. Neurophysiol. doi: 10.1152/jn.00030.2017 PMID 28978760.
23. Iversen MM and **Rabbitt RD** (2017) Wave mechanics of the semicircular canals. Biophysical Journal, 113(5): 1133-1149. PMID 28877495.
24. Iversen MM, Chrsitensen D, Parker DL, Holman HA, Chen J, Frerck M and **Rabbitt RD** (2017) Low-intensity ultrasound activates vestibular otolith organs by acoustic radiation force. J. Acoust. Soc. Am. 141(6): 4209-19. PMID 28618821.
25. Holman HA, Tran VM, Kalita M, Nguyen LN, Arungundram S, Kuberan B, **Rabbitt RD** (2016) BODIPY-conjugated xyloside primes fluorescent glycosaminoglycan production in the inner ear vestibular organs. J Assoc Res Otolaryngol. 2016 Sep 12. PMID: 27619213
26. **Rabbitt RD**, Brichta AM, Tabatabaee H, Boutros PJ, Ahn J, Della Santina CC, Poppi L, Lim R. (2016) Heat pulse excitability of vestibular hair cells and afferent neurons. J Neurophysiol. 116(2):825-43. PMID: 27226448
27. Holman HH, Tran VM, Nguyen LY, Arungundran S, Kalita M, Kuberan B and **Rabbitt RD** (2015) Xyloside primed glycosaminoglycans alter hair bundle micromechanical coupling and synaptic transmission: Pharmacokinetics. In *Mechanics of Hearing: Protein to Perception*, Karavitaki KD, Corey DP (eds). American Institute of Physics, Melville, NY, 1703, 030016. DOI:http://dx.doi.org/10.1063/1.4939331
28. Highstein SM, Mann MA, Holstein GR, and **Rabbitt RD** (2015) The Quantal Component of Synaptic Transmission from Sensory Hair Cells to the Vestibular Calyx. J. Neurophysiol. 113(10): 3827-35. PMID 2587150
29. Liu Q, Frerck MJ, Holman HA, Jorgensen EM and **Rabbitt RD** (2014) Exciting Cell Membranes with a Blustering Heat Shock. Biophys J. 2014 Apr 15;106(8):1570-7. PMID 24739156. PMCID: PMC4008823
30. Highstein SM, Holstein GR, Mann MA and **Rabbitt RD** (2014) Evidence that Protons Act as Neurotransmitters at Vestibular Hair Cell Calyx Afferent Synapses. Proc Natl Acad Sci U S A. 2014 Apr 8;111(14):5421-6. PMID 24706862. PMCID: PMC3986198.

31. Zhu H, Tang X, Wei W, Maklad A, Mustain W, **Rabbitt RD**, Highstein SM, Allison J and Zhou W. (2013) Input-output functions of vestibular afferent responses to air-conducted clicks in rats, JARO Feb 15(1): 73-86. PMID: 24297262
32. Dittami GM, Manju S, **Rabbitt RD** and Ayliffe HE. (2012) Determination of Mammalian Cell Counts, Cell Size and Cell Health Using the Moxi Z Mini Automated Cell Counter, J. Vis. Exp. (64), e3842, doi:19.3791/3842. PMID: 22760092
33. **Rabbitt RD** and Brownell WE (2011) Efferent Modulation of Hair Cell Function. Curr Opin Otolaryngol Head Neck Surg 19:376-81. PMID 22552698
34. Dharia S and **Rabbitt RD** (2011) Monitoring voltage-dependent charge displacement of Shaker B-IR K+ ion channels using radio frequencies. PLoS ONE 6(2): e17363. PMID 21387000
35. Rajguru SM, Richter CP, Matic AI, Holstein GR, Highstein SM, Dittami GM and **Rabbitt RD** (2011) Infrared photostimulation of the crista ampullaris. J. Physiology 589: 1283-1294. PMID 21242259 . Article featured in a Perspective: I. S. Curthoys (2011) *A red thread as a guide in the vestibular labyrinth*. J. Physiol. 589 (6) 1241.
36. Dittami GM, Rajguru SM, Lasher RA, Hitchcock RW and **Rabbitt RD** (2011) Intracelluar calcium transients evoked by pulsed infrared radiation in neonatal cardiomyocytes. J. Physiology 589: 1295-1306. PMID 21242257. Article featured in a Perspective: E. A. Sobie (2011) *Getting heart cells on the same wavelength: infrared triggering of Ca^{2+} transients in cardiac myocytes.* J. Physiol. 589 (6) 1243.
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79. **Rabbitt RD**, Weiss, J., Christensen, G. and Miller, M.I. (1995). Mapping of hyperelastic deformable templates using the finite element method. SPIE V 2573: 252-265.
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84. **Rabbitt RD**, and Friedrich, M. T. (1991). Ear canal cross-sectional acoustic modes: Mathematical analysis and computation. J. Acoust. Soc. Am. 89, 2379-2390.
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86. **Rabbitt RD** (1989). High frequency plane waves in the ear canal: Application of a simple asymptotic theory. J. Acoust. Soc. Am. 84, 2070-2080.
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89. **Rabbitt RD** (1984). Fundamentals of reciprocating engine airflow. Part I: Valve discharge and combustion chamber effects. Soc. Auto. Eng. 840337.
90. **Rabbitt RD**, Nametz, J. G., and Wright, R. N. (1983). Several esoteric considerations in the design of a super mileage vehicle. Soc. Auto. Eng. 830250.

Invited Lectures and Keynotes (since 2000)

1. **Rabbitt RD** (2025). I'm so dizzy: Semicircular canal biomechanics in health and disease. Bioengineering Seminar, Utah State University, Oct. 1st, Logan UT.
2. **Rabbitt RD** (2025). Sensitivity of vestibular organs to sound and vibration: The vestibular speed advantage. Otolaryngology Grand Rounds, University of Southern California, Aug. 2nd, Los Angeles, CA.
3. **Rabbitt RD** (2025). Semicircular canal biomechanics and neural encoding in health and disease. Dizziness Grand Rounds, University of Chicago, July 8, Chicago, IL.
4. **Rabbitt RD**, Frerck MJ, Frahm TS, Helminski JO, Smith SM, Joshi S (2025). Evaluation of a Universal Canalith Repositioning Maneuver to Resolve 3-Canal Ipisilateral BPPV: Physical and Computational Models. Vestibular Oriented Research, J. Vest. Resh. 35(5). https://doi.org/10.1177/09574271251347380, May 19-22, Boulder CO.
5. Helminski JO, Smith C and **Rabbitt RD** (2025). Universal canalith repositioning maneuver (CRM) for BPPV clears all three ipsilateral canals: Development and implementation. Am. Physical Therapy Assoc. CSM Meeting, Feb 13, Houston, TX.
6. **Rabbitt RD** (2024). Semicircular canal biomechanics in health and disease. ARO Midwinter Meeting, Feb. 14, Anaheim, CA.
7. **Rabbitt RD** (2024). Vestibular sensitivity to natural and anthropogenic energy in health and disease. David Zee lecture series. Johns Hopkins School of Medicine, March 29, Baltimore, MD. USA
8. **Rabbitt RD** and Bidone T (2022) On the natural selection of cochlear outer hair cell properties. Mechanics of Hearing Workshop. July 26th, Helsinger. Denmark.
9. **Rabbitt RD** (2022) Activation of the Semicircular Canals and Otolith Organs by Atypical Forms of Energy: Microwaves, Laser Light and Focused Ultrasound. May 7th, Barany Society Symposium, Granada. Spain
10. **Rabbitt RD**, Poppi L, Holman HA (2020) Spontaneous and evoked calcium transients in the postnatal developing mouse utricle and crista. Barany Society Symposium (Cancelled due to Covid-19), Granada, Spain.
11. **Rabbitt RD** (2019) I'm so dizzy. University of Utah, Audiology lecture. April 4. Salt Lake City, UT.
12. **Rabbitt RD** (2019) Unexpected neuronal excitability to the modern techno. March 26, University of Pittsburg and Carnegie Mellon. Neuroscience Auditory/Vestibular Training Program. Pittsburg, PA.
13. **Rabbitt RD** (2018) Biomechanics of BPPV. Am. Physical Therapy Assoc. August 18. Chicago, Il. USA
14. **Rabbitt RD** (2018) I'm so dizzy, my head is spinning. And it's my ear that's making it spin. Jan 18. Osher Lecture. University of Utah, Salt Lake City, UT.
15. **Rabbitt RD** (2017). On the biophysics of heat pulse excitability. Rockefeller Univ. May 4. NY, NY. USA
16. **Rabbitt RD** (2016) The origin of auditory sensation by vestibular organs. Barany Society. June 8. Seoul Korea
17. **Rabbitt RD** (2016) Biomechanical origins of benign paroxysmal positional vertigo. Barany Society. June 6. Seoul Korea
18. **Rabbitt RD** (2015) Stimulating cells with light and the origin of endogenous infrared excitability. National Institutes of

Health, NIDCD Council Meeting, Jan. 30th. Bethesda, MD. USA

19. **Rabbitt RD** (2014) Would you please listen to my ear, there must be something in there, I fear. Keynote Australian Auditory Neuroscience Workshop. Dec. 3rd. Melbourne. Australia
20. **Rabbitt RD** (2014) Synapses tickled pink and the origin of infrared light excitability. University of Newcastle, Nov. 28th, 2014. Newcastle. Australia
21. **Rabbitt RD** (2012) Light, Heat, Excitability and Synaptic Transmission. Marine Biological Laboratory. July 17. Wood Hole, MA. USA
22. **Rabbitt RD** (2012) Pacing neurons with pulsed infrared stimulation. Neural Interfaces Conference. June 18. Salt Lake City, UT. USA
23. **Rabbitt RD** (2012) Infrared pulses modulate excitability, intracellular Ca^{2+} signaling, and synaptic transmission. Eaton Peabody Laboratory, Harvard. June 7. Boston, MA. USA
24. **Rabbitt RD** (2012) Infrared pulses modulate excitability and intracellular Ca^{2+} signaling. Baylor College of Medicine. May 25. Houston, TX. USA
25. **Rabbitt RD** (2012) Infrared neural stimulation. University of Utah. April 6. Salt Lake City, UT. USA
26. **Rabbitt RD** (2012) Some Cells Like it Hot, Briefly. Cancer Forum Workshop on Electromagnetic Properties of Cells as a Window into Cancer. Arizona State University. March 19. Tempe, AZ. USA
27. **Rabbitt RD,** Rajguru SM, Dittami GM, Richter CP, and Highstein SM. (2011) Pulsed infrared stimulation of the vestibular semicircular canal sensory epithelium. Assoc. for Resh. in Otolaryngology. Feb 19. Baltimore, MD. USA
28. Rajguru SM, Dittami GM, Richter CP, Highstein SM and **Rabbitt RD** (2011) Photoactivation of the vestibular crista ampullaris. Assoc. for Resh. in Otolaryngology. Feb 20. Baltimore, MD. USA
29. **Rabbitt RD** (2020) Pulsed infrared excitability of inner-ear hair cells and cardiac myocytes. Boston University. Dept BME, Nov 10. Boston, MA. USA
30. **Rabbitt RD**, Boyle R and Highstein SM (2010) Micromechanical compressive nonlinearity and efferent control in the semicircular canals. Assoc. for Research in Otolaryngology. Feb. 6-10. Anehiem, CA. USA
31. **Rabbitt RD** Introduction to the structure and function of the vestibular system. Biology of the Inner Ear, Marine Biological Laboratory. Aug. 10. Woods Hole, MA. USA
32. **Rabbitt RD** and Breneman, KD. (2009) Piezo- and flexoelectric membrane materials underlie fast biological motors in the ear. Materials Research Society. April 17. SanFrancisco, CA. USA
33. **Rabbitt RD** (2008) Pathological Semicircular Canal Afferent Signals Transmitted to the Brain During Benign Positional Vertigo and their Biomechnical Origins. American Otology Society. May 2. Orlando, FL. USA
34. **Rabbitt RD** (2007) Micro-electric impedance spectroscopy and tomography of isolated living cells. 3M Headquarters. Oct. 18. Minneapolis, MN. USA
35. **Rabbitt RD** (2007) 'Say, can you hear? There must be something in there I fear.' University of Minnesota. Oct. 17, Minneapolis, MN. USA
36. Clifford, S, Brownell, W and **Rabbitt RD** (2005) Electro-mechanical waves in isolated outer hair cells. 9th International Mechanics of Hearing Workshop. July 23-28. Portland, OR. USA
37. **Rabbitt RD** (2005) Dancing in the ear: The outer hair cell piezoelectric wave. Distinguished Scientists in BME Lecture Series. Boston University. Jan. 31. Boston, MA. USA
38. **Rabbitt RD** (2005) Hermann von Helmholtz meets Pierre Currie: Hearing the Piezoelectric Wave. Society of Chemical Engineers, Univ. Utah. Jan. 18. Salt Lake City, UT. USA
39. **Rabbitt RD** (2004) Symposium in honor of George Zahalak. Biomedical Eng. Soc., Oct 13-16. Philadelphia, PA. USA
40. **Rabbitt RD** (2004) Biomedical Engineering and Society. Family and Consumer Studies. Univ. Utah, Nov10. Salt Lake City, UT. USA
41. Clifford, S, Brownell, W and **Rabbitt RD** (2004) The outer hair cell electro-mechanical wave. 28th Mid Winter Meeting of the Assoc. for Resh. In Otolaryngology. Feb 19-24. New Orleans, LA. USA
42. Brownell, WE and **Rabbitt RD** (2004) The piezoelectric outer hair cell: Electro-mechanical coupling in membranes. 5th International Conference on Biological Physics, Aug. 23-27, Gothenbeurg, Sweden.
43. Weiss JA, Veress AI, Gullberg GT, Phatak N, Sun Q., Parker D, **Rabbitt RD** (2004) Strain measurement using deformable image registration , IUTAM Symposium on Mechanics of Biological Tissue. June 27-July 2. Graz, Austria.
44. **Rabbitt RD** (2004) Molecular and Cellular Motors of the Inner Ear. School of Biomedical Engineering and Science, Virginia Tech and Wake Forest University. Winston-Salem, NC. USA
45. **Rabbitt RD** (2004) Mechanics of the Ear: From Fluids to Molecular Motors. Dept of Mech. Eng. University of Utah, Salt Lake City, Jan 16, 2004.
46. **Rabbitt RD** (2004) Biophysics of the Inner Ear. University of Rochester. Jan 20. Rochester, NY. USA

47. **Rabbitt RD** (2004), Ayliffe, H.E., Clifford, S. and Brownell, W. Ultrasonic resonance in isolated cochlear outer hair cells. Biophysical Society. Baltimore, MD. USA
48. **Rabbitt RD,** Bowden, A.E. and Weiss, J.A. (1999) Tracking nonlinear soft tissue strain using 3D medical image data and the finite element method. NIH Biomedical Imaging Symposium, "Visualizing the Future of Biology and Medicine" NIH campus June 25-26. Bethesda, MD. USA
49. **Rabbitt RD**, Yamauchi, Y.M., Highstein, S.M. and Boyle, R. (1999). Transduction of head angular acceleration: role of labyrinthine fluid pressures. Neural Control of Movement. April 16. Princeville, Kauai. USA
50. **Rabbitt RD** (1999) Vertigo: Mechanical substrates of anomalous angular motion sensation. Rice University. May 3. Houston, TX. USA
51. **Rabbitt RD** (1999) Mechanics of angular motion transduction by the semicircular canals. Johns Hopkins School of Medicine. March 25. Baltimore, MD. USA
52.

Seconday literature

1. Holman HA, Poppi LA, Frerck M and **Rabbitt RD** (2020). Spontaneous and acetylcholine evoked calcium transients in the developing mouse utricle. In: Cell Physiology to Emerging Brain Function, Editors Isope, P., Mapelli, L., Uusisaari, M. Y., Tang, A., Lausanne: Frontiers Media SA. DOI: 10.3389/978-2-88966-000-1
2. Dittami GM, Sethi M, Rabbitt RD and Ayliffe HE (2012) Determination of mammalian cell counts, cell size and cell health using the Moxi Z mini automated cell counter. J. Vis. Exp (64), e38942, DOI: 10.3791/3842.
3. Rajguru SM and Rabbitt RD (2011) Pulsed infrared radiation: a potential tool to reveal cellular secrets. Physiology News 84: 25-26.
4. Dittami GM, Rabbitt RD and Ayliffe HE (2011) Moxi Z: Revolution in Cell Counting. Life Science Magazine, 12(26):2-5.
5. **Rabbitt RD** (2021). Outer hair cell electro-mechanical power conversion. bioRxiv/2021/454372
6. Breneman KD and Rabbitt RD (2009) Piezo- and flexoelectric membrane materials underlie fast biological motors in the ear. Proceedings of the Materials Research Society.
7. Clifford S, Brownell WE and Rabbitt RD (2006). Electro-mechanical waves in isolated outer hair cells. In Auditory Mechanisims: Processes and Models. Springer. 146-154.
8. Weiss JA, Veress AI, Gullberg GT, Phatak NS, Sun Q, Parker D, Rabbitt RD (2006) Strain measurement using deformable image registration. In Mechanics of Biological Tissue, eds. Holzapfel GA and Ogden RW, Springer. ISBN: 3-540-25194-4.
9. Clifford, S, Brownell, W and Rabbitt RD (2005) Electro-mechanical waves in isolated outer hair cells. In, Auditory Mechanisms: Processes and Models. Ed. F. Nuttall et al., World Scientific. ISBN 981-256-824-7
10. Merfeld, D.M. and Rabbitt RD (2003) Vestibular Prosthetics. Neural Prosthetics: Theory and Practice. Ed. K. Horch and G. Dhillon. World Scientific Publishing, ISBN 981-238-022-1.
11. Rabbitt RD, Damiano, E.R. and Grant J.W. (2003) Biomechanics of the vestibular semicircular canals and otolith organs. The Vestibular System. Ed. S.M. Highstein, A. Popper, and R. Fay. Springer-Verlag. 153-201.
12. Veress, A.I., Weiss, J.A., Rabbitt RD, Lee, J.N. and Gullberg, G.T. (2001) Measurement of 3D Left Ventricular Strins During Diastole Using Image Warping and Untagged MRI Images. Computers in Cardiology 281: 165-168.
13. Rabbitt RD, 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 N Y Acad Sci. 942:274-86. PMID: 11710469
14. Rabbitt RD, 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. PMID: 11710473.
15. Rabbitt RD, Highstein, S.M. and Boyle, R. (1996) Determinants of response dynamics in fish vestibular semicircular canal primary afferents. , New Directions in Vestibular Research, Ed. S.M. Highstein, B. Cohen and J. A. Büttner-Ennever, New York Acad. Sci., 781:213-243.
16. Rabbitt RD, Weiss, J., Christensen, G. and Miller, M.I. (1995). Mapping of hyperelastic deformable templates using the finite element method. Vision Geometry IV, ed. R. A. Melter, A. Y. Wu, F. L. Bookstein and W. K. K. Green, Proc. SPIE V 2573: 252-265.
17. Christensen, G.E., Rabbitt RD and Miller, M.I. (1993). A deformable neuroanatomy based on viscous fluid mechanics. Proc. 1993 Conf. on Information Sciences and Systems. Ed Prince and Runolfsson, Johns Hopkins: 211-216.
18. Christensen, G. E., Rabbitt RD, Miller, M. I., Joshi, S. C., Grenander, U., Coogan, T., and VanEssen, D. (1995). Topological Properties of Smooth Anatomic Maps. Information Processing in Medical Imaging, Proc. of the 16th International Conference, Lle de Berder, France.

19. Rabbitt RD (1989). On the acoustic coupling of the eardrum. Advances in Bioengineering, Ed. B. Rubinsky, ed. Am. Soc. Mech. Eng., BED V 15: 207-218.
20. Rabbitt RD, and Holmes, M. H. (1986). Formulation and analysis of a dynamic fiber composite continuum model of the tympanic membrane. Peripheral Auditory Mechanisms, Ed. J. B. Allen. et al., Springer-Verlag, Boston.
21. Behnken, R., Hameedi, J, Saxton, J., Schmitt, M., Turner, S., Unrau, E., Marvel, C. and Rabbitt RD (1991) Conversion of a light duty truck to dedicated compressed natural gas operation. appears in Developing Dedicated Natural Gas Vehicle Technology, Soc. Auto. Eng., SP-894: 273-281.
22. Dauer,K.J., Smith, J., Nowakowski, E., Kiefer, S., Marvel, C. and Rabbitt RD (1989) Conversion of a 1988 Chevrolet Corsica for M85 Fuel Use. appears in Methanol Innovation: Technical Details of the 1989 Methanol Marathon, Soc. Auto. Eng., SP-804: 187-193.
23. Rabbitt RD (1986). A fiber composite continuum model of the tympanic membrane coupled to the ear canal and the middle ear. Ph.D. dissertation, Applied Mechanics, Rensselaer Polytechnic Institute, (Troy, NY).
24. Rabbitt RD (1982). On an iterative method to approximate the natural modes of vibration of linear elastic continua. M.S. thesis, Mechanical Engineering, Michigan State University, (East Lansing, MI).

Primary Literature. Partially Funded as Grant PI (not author).

7. Wan Y, Edmond MA, Kitz C, Southern J, Holman HA. (2023) An integrated workflow for 2D and 3D posture analysis during vestibular system testing in mice. Front Neurol. Dec 1;14:1281790. doi: 10.3389/fneur.2023.1281790. PMID: 38107632; PMCID: PMC10722188 (Grant: R01 DC006685).

6. Wan Y, Holman HA, Hansen C. (2023) FluoRender Script: A Case Study of Lingua Franca in Translational Computer Science. Computing in Science & Engineering 24 (6): 60 (Grant: R01 DC006685).

5. Wan Y, Holman HA, Hansen C. (2021). Interactive analysis for large volume data from fluorescence microscopy at cellular precision. Computers and Graphics 98(C): 138-149. PMID 8486154 (Grant: R01 DC006685)

4. Lumbreras V, Bas E, Gupta C and Rajguru S. (2014) Pulsed Infrared Radiation Excites Cultured Neonatal Spiral and Vestibular Ganglion Neurons by Modulating Mitochondrial Calcium Cycling. J. Neurophysiol. 2014 June 11 doi:19.1152/jn.00253.2014. PMID 24920028. (Grants: R01 DC011481, R01 DC011481)
3. Bas E, Van De Water TR, Lumbreras V, Rajguru S, Goss G, Hare JM, and Goldstein BJ. (2014) Adult human nasal mesenchymal-like stem cells restore cochlear spiral ganglion neurons after experimental lesion. *Stem cells and development* 23: 502-514. PMID 24172073 (Grant: R01 DC011481)
2. Shapiro MG, Homma K, Villarreal S, Richter CP and Bezanilla F. (2012) Infrared light excites cells by changing their electrical capacitance. Nat. Commun. 2012 Mar 13(3): 736 doi 19.1038/ncomms1742. PMC3316879 . (Grant: R01 DC011481)
1. Veress, A.I., Phatak, N. and Weiss, J.A. (2004) Deformable image registration with hyperelastic warping. In Handbook of Medical Image Analysis: Advanced Segmentation and Registration Models. Eds. Suri, Wilson and Laxminarayan. (Grant: R01 DC006685)

PRESENTATIONS. Short papers, abstracts, posters, podium.

271. **Rabbitt RD** (2025). I'm so dizzy: Semicircular canal biomechanics in health and disease. Bioengineering Seminar, Utah State University, Oct. 1st, Logan UT.
270. **Rabbitt RD** (2025). Sensitivity of vestibular organs to sound and vibration: The vestibular speed advantage. Otolaryngology Grand Rounds, University of Southern California, Aug. 2nd, Los Angeles, CA.
269. **Rabbitt RD** (2025). Semicircular canal biomechanics and neural encoding in health and disease. Dizziness Grand Rounds, University of Chicago, July 8, Chicago, IL.
268. **Rabbitt RD**, Pastras C (2025). Threshold tuning curves of utricular calyceal afferent neurons in guinea pig, with model extension to mouse, rat, sheep and human. Inner Ear Biology Workshop. Sept. 13-16, Tübingen. Germany.
267. **Rabbitt RD**, Frerck MJ, Frahm TS, Helminski JO, Smith SM, Joshi S (2025). The OMNI canalith repositioning maneuver to resolve 3-canal ipsilateral BPPV. Vestibular Oriented Research Meeting. May 19-22, Boulder CO.
266. Gholami N, Kahnlein I, Motallebzadeh H, Zhu H, Zhou W, Puria S and **Rabbitt RD** (2025). Nonlinear Displacement of the Tympanic Membrane in Response to Static Pressure and Low Frequency Tones: A Computational Study. ARO. Feb. 24, Orlando FL.
265. Holman HA and **Rabbitt RD** (2025). Calcium puncta and dynamics in hair bundles of the mouse crista ampullaris. ARO. Feb. 24, Orlando FL.

264. Frerck MJ, Frahm TS, Helminski JO, Smith CM and **Rabbitt RD** (2025) Evaluation of a universal canalith repositioning maneuver to resolve 3-canal ipsilateral BPPV: Physical and computational models. ARO, Feb. 22, Orlando, FL.
263. **Rabbitt RD**, Pastras CJ, Rajguru SM, Zhu H, Zhou W (2025). Biomechanical activation of the utricle by sound and vibration in mouse, rat, guinea pig, toadfish, sheep and human. ARO, Feb 22. Orlando FL.
262. Pastras CJ, Curthoys I, Mohsen A, McAlpine D, **Rabbitt RD** and Brown D (2025). Vestibular speed advantage: New insights into ultrafast nonquantal synaptic transmission *in vivo*. ARO, Feb. 22, Orlando FL.
261. Helminski JO, Smith C and **Rabbitt RD** (2025). Universal canalith repositioning maneuver (CRM) for BPPV clears all three ipsilateral canals: Development and implementation. APTA CSM Meeting, Feb 13, Houston TX.
260. **Rabbitt RD** and Helminski JO (2024). Simulation of semicircular canal cupulae deflections evoked by head impulse tests and orientation relative to gravity in control and BPPV conditions. ARO Midwinter Meeting, Feb. 14, Anaheim, CA.
259. **Rabbitt RD** and Gholami N (2024). Did constraints imposed by outer hair cell electromechanics drive cochlear evolution? ARO Midwinter Meeting, Feb. 14, Anaheim, CA.
258. **Rabbitt RD** (2024). Semicircular canal biomechanics in health and disease. ARO Midwinter Meeting, Feb. 14, Anaheim, CA.
257. Gholami N, Pastras CJ, Jennings S, Zhu H, Zhou W, Brown DJ, Curthoys IS, **Rabbitt RD** (2023). A simple model for mechanical activation and compound action potential generation by the utricle in response to sound and vibration. ARO Midwinter Meeting, Feb. 14, TU233, Orlando, FL.
256. Hunt L, Jennings S, Ayliffe H(T), McGinnis M, **Rabbitt RD** (2023). The oZE method to measure wide-band reflectance in less than two seconds. ARO Midwinter Meeting, Feb. 11, SA175, Orlando, FL.
255. Kahnlein I, Motallebzadeh H, Tubelli A, Zhu H, Zhou W, Puria S, **Rabbitt RD** (2023). Simulating tympanometry with a nonlinear viscoelastic finite element model of the middle ear. ARO Midwinter Meeting, Feb. 12, Orlando, FL.
254. Pastras CJ, Curthoys IS, Brown DJ, **Rabbitt RD** (2023) Vestibular compound action potential evoked by sound and vibration in the guinea pig. ARO Midwinter Meeting, Feb. 14, TU240, Orlando, FL.
253. **Rabbitt RD** (2023). The MOC efferent system acts as a control parameter for outer hair cell dynamic stability. ARO Midwinter Meeting, M0111, Feb. 11-15, Orlando, FL.
252. ***Rabbitt RD** and Bidone T (2022) On the natural selection of cochlear outer hair cell properties. Mechanics of Hearing Workshop. July 26th, Helsinger, Denmark.
251. ***Rabbitt RD** (2022) Activation of the Semicircular Canals and Otolith Organs by Atypical Forms of Energy: Microwaves, Laser Light and Focused Ultrasound. May 7th, Barany Society Symposium, Granada, Spain
250. **Rabbitt RD** (2022) Impedance Matching Explains the Relationship Between Outer Hair Cell Length, Conductance and Characteristic Frequency in the Cochlea. Assoc. for Resh. In Otolaryngology, San Jose, CA, Feb 6: PD6
249. **Rabbitt RD**, Poppi L, Holman HA (2020) Spontaneous and evoked calcium transients in the postnatal developing mouse utricle and crista. Barany Society Symposium, Granada, Spain. Cancelled due to Covid-19.
248. **Rabbitt RD** (2020) Nonlinear capacitance in voltage-clamp and temperature-clamp. Assoc. for Resh. in Otolaryngology, San Jose, CA, Jan 25, PS 994.
247. Perez-Flores MC, Lee JH, Park, S, Kang M, Zhang XD, Sihn CR, Ledford HA, Wang W, Chiamvimonvat N, **Rabbitt RD**, Yamoah EN (2020) Kv7.4 channel exhibits electromechanical properties in cochlear outer hair cells. Assoc. for Resh. in Otolaryngology, San Jose, CA, Jan 25, PS 995.
246. Holman HA, Rabbitt RD (2020) A novel cell niche in the cristae ampullaris with unprecedented acetylcholine evoked calcium transients in mice. Assoc. for Resh. in Otolaryngology, San Jose, CA, Jan 25, PD 40.
245. Sandhu J, Rabbitt RD, Bidone TC (2020) Effects of voltage and membrane cholesterol on prestin conformation: Insights from molecular dynamics simulations. Assoc. for Resh. in Otolaryngology, San Jose, CA, Jan 25, PD 10.
244. Iversen M, Rabbitt RD (2020) Phase locking of vestibular afferent neurons in the oyster toadfish. Assoc. for Resh. in Otolaryngology, San Jose, CA, Jan 25, PS 1.
243. Rabbitt RD (2019) I'm so dizzy. University of Utah, AuD lecture. April 4.
242. Rabbitt RD (2019) Unexpected neuronal excitability to the modern techno. March 26, University of Pittsburg and Carnegie Mellon. Neuroscience Auditory/Vestibular Training Program.
241. Iversen MM, Pope BR, Rabbitt RD (2019) Ultrasound Activates Vestibular Afferent Neurons Through Acoustic Radiation Force. Biomedical Engineering Society Poster 1864.
240. Iversen MM, Pope BR, Rabbitt RD (2019) Phase-locking of calyx-bearing vestibular afferent neurons and the role of quantal and non-quantal transmission. Society for Neuroscience Poster 5487.

239. Iversen MM, Pope BR, Rabbitt RD Ultrasound Activates Vestibular Afferent Neurons Through Acoustic Radiation Force. Biomedical Engineering Society Poster 1864.
238. Iversen MM, Pope BR, Rabbitt RD (2019) Focused Ultrasound Stimulation Can Preferentially Activate Vestibular Organs. Vestibular-Oriented Research Meeting Poster 21.
237. Iversen MM, Pope BR, Rabbitt RD (2019) The Role of Quantal and Non-quantal Synaptic Transmission in Auditory Frequency Phase-locking of Calyx-bearing Vestibular Afferent Neurons. Association for Research in Otolaryngology Podium 91.
236. Holman HH, Frerck M, Rabbitt RD (2018) GCaMP calcium imaging reveals kinetics and location of MET channels in mammalian semicircular canal hair cells. Biophysical Society. DOI:https://doi.org/10.1016/j.bpj.2017.11.1647.
235. Rabbitt RD (2018) Keynote. Biomechanics of BPPV. APTA. August 18. Chicago, Il.
234. Iversen M, et al. Rabbitt RD (2018) Pulsed ultrasound stimulates vestibular organs and evokes phase locked action potentials, SFN 2018: Nanosymposium 718, Nov 7 1-5, #7670.
233 Holman HH, Poppi L, Fereck M and Rabbitt RD (2018) Acetylcholine evoked calcium modulation in crista hair cells and afferents in a GAD2-Cre GCaMP5G transgenic mouse. 41st Meeting of the Assn Resh. Otolaryngology. PS 546.
232 Holman HH, Almishaal A, Wan Y, Fereck M and Rabbitt RD (2018) Cochlear Hair Cells, Supporting Cells and SEP Nerve Fibers with Cholinergic Evoked Calcium Modulation During Early Development in a GAD2- Cre GCaMP5G Transgenic Mouse. 41st Meeting of the Assn Resh. Otolaryngology. PS 590.
231 Iversen M, Zhu H, Zhou W, Della Santina CC, Carey J, and Rabbitt RD (2018) The biophysical origins of tullio phenomenon. 41st Meeting of the Assn Resh. Otolaryngology. PS 546.
230 Rabbitt RD (2018) I'm so dizzy, my head is spinning. And it's my ear that's making it spin. Osher Lecture. University of Utah, Salt Lake City, UT, Jan 18.
229 Araujo RM, Angielczyk KD, Rabbitt RD, Isem, M, David R, Benoit J, Ekdale E, Martins RM. (2017) Elevated semicircular canal eccentricity in dicynodont therapsids (synapsida): Implications for behavior? Soc Vertebrate Paleontology, 77th Meeting, Calgary, CA, Aug 23-26.
228 Rabbitt RD (2017). On the biophysics of heat pulse excitability. Rockefeller Univ. NY, NY, May 4.
227 Holman HA, Rabbitt RD (2017) GCaMP5g-tdTomato transgenic mice reveal calcium microdomains and modulation in hair cells. Assn. Resh. Otolaryngology #229686, Baltimore, MD, Feb 13.
226 Holman HA, Rabbitt RD (2017) Calcium microdomains and modulation in mechanosensory hair cells. 61st Meeting of the Biophysical Society #1963, New Orleans, Feb 11-15.
225 Kun R, Drury HR, Tadros M, Callister RJ, Rabbitt RD, Brichta AM. (2016) Development of the human vestibular system – When do hair cells become functionally active? Barany Society. Seoul Korea. June 8, 2016.
224 Poppi LA, Tabatabaee H, Callister RJ, Jobling P, Migliccio AA, Holt JC, Jordan PM, Rabbitt RD, Lim R, Brichta AM. (2016) Cholinergic responses in control and alpha-9 subunit knockout mice. Barany Society. Seoul Korea. June 8, 2016.
223 Rabbitt RD (2016) The origin of auditory sensation by vestibular organs. Barany Society. Seoul Korea. June 8, 2016.
222 Rabbitt RD (2016) Biomechanical origins of benign paroxysmal positional vertigo. Barany Society. Seoul Korea. June 6, 2016.
221 Iversen M, Carey J, Della Santina C, Zhou W, Zhu H, Rabbitt RD (2016) Tullio Phenomenon: Pathological Sound-Induced Vertigo BMES 2016 Annual Meeting #1355, Minneapolis, MN.
211 Iversen M, Christensen D, Parker D, Frerck M, Holman H, Rabbitt RD (2016) 5MHz Ultrasound Activates Inner Ear Vestibular Organs BMES 2016 Annual Meeting #1944, Minneapolis, MN.
210 Holstein G, Martinelli GP, Rabbitt RD and Rajguru SM (2016) Pulsed infrared stimulation of vestibular system evokes vestibulo-ocular and vestibulo-sympathetic reflex responses. SFN
209 Jiang W, Holstein G, Martinelli GP, Rabbitt RD, Richter CP and Rajguru SM (2016) Vestibular nuclear neurons of the vestibulo-sympathetic reflex (VSR) activated by pulsed infrared stimulation of vestibular end organs. SFN 95: 12746.
208 Jiang W, Holstein G, Martinelli G, Rabbitt RD and Rajguru S (2015) Vestibulo-ocular and vestibulo-sympathetic reflex responses evoked by infrared stimulation of the vestibular system. BMES, Tampa FL, October 7th, 2015.
207 Rabbitt RD (2015) Stimulating cells with light and the origin of endogenous infrared excitability. National Institutes of Health, NIDCD Council Meeting, Jan. 30th, 2015.
206 Rabbitt RD (2014) Would you please listen to my ear, there must be something in there, I fear. Keynote Australian Auditory Neuroscience Workshop, Melbourne Australia, Dec. 3rd, 2014
205. Rabbitt RD (2014) Synapses tickled pink and the origin of infrared light excitability. University of Newcastle, Australia, Nov. 28th, 2014.
204. Holman HH, Tran VM, Nguyen LY, Arungundran S, Kalita M, Kuberan B and Rabbitt RD (2014) Xyloside primed

glycosaminoglycans alter hair bundle micromechanical coupling and synaptic transmission: Pharmacokinetics. Mechanics of Hearing Workshop, Cape Sounio, Greece, June 25, 2014

203. Iversen M, Zhu H, Zhou W and Rabbitt RD (2014) Acoustic activation of vestibular organs and the origin of VEMPs: Theory vs. experiment. Assoc. for Resh. In Otolaryngology, February, 2015
202. Mann MA, Rabbitt RD and Highstein SM. (2014) Spontaneous and evoked quantal synaptic currents in the vestibular calyx terminal. Assoc. for Resh. in Otolaryngology, February, 2014
201. Highstein SM, Mann MA, Holstein GR and Rabbitt RD (2014) Non-quantal synaptic currents in the vestibular calyx terminal. Assoc. for Resh. in Otolaryngology, February, 2014
201. Rabbitt RD, Liu Q and Jorgensen E. (2014) Optical stimuli reveal competing mechanisms of synaptic vesicle release. Assoc. for Resh. in Otolaryngology, February, 2014
200. Highstein SM, Mann MA, Rabbitt RD Persistent and quantal synaptic currents in the vestibular calyx terminal. Assoc. for Resh. in Otolaryngology, Abs 244 Baltimore MD February, 2013
199. Rajguru SM, Holstein GR, Martinelli G, Frerck M, Highstein SM, Rabbitt RD (2013) Photoactivation and thermal sensitivity of vestibular neuroepithelium. 29th Southern BME Conference.
198. Holman HA, Nguyen LN, Tran VM, Arungundram S, Kuberan B, Rabbitt RD Remodeling and Biosynthesis of Glycosaminoglycans Revealed Using a BODIPY-Xyloside Conjugate in the Vestibular System. Assoc. for Resh. in Otolaryngology, Abs 163 Baltimore MD February, 2013
197. Liu Q, Jorgensen EM, Holman HA, Frerck M and Rabbitt RD Miniature Post Synaptic Currents are Entrained by Infrared Pulses. Assoc. for Resh. in Otolaryngology, Abs 464, Baltimore MD February, 2013
196. Rajguru SM, Holman H, Frerck M, Highsten and Rabbitt RD Sensitivity of semicircular canal afferents to temperature gradients and pulsed infrared radiation. Assoc. for Resh. in Otolaryngology, Abs 254. Baltimore MD February, 2013
195. Highsten SM, Mann MA, Rabbitt RD Spontaneous synaptic events in the vestibular calyx terminal. Assoc. for Resh. in Otolaryngology, Baltimore MD Abs 286, February, 2012
194. Holman HA, Tran VM, Arungundram S, Balagururnathan K, Rabbitt RD, BODIPY conjugated xylosides reveal repair and regeneration of the semicircular canal cupula. Assoc. for Resh in Otolaryngology, Baltimore MD February, Abs 155 2012.
193. Rabbitt RD Light, Heat, Excitability and Synaptic Transmission. Marine Biological Laboratory, Wood Hole, MA, July 17, 2012.
192. Rabbitt RD Pacing neurons with pulsed infrared stimulation. Neural Interfaces Conference, Salt Lake City, UT, June 18, 2012.
191. Rabbitt RD Infrared pulses modulate excitability, intracellular Ca^{2+} signaling, and synaptic transmission. Eaton Peabody Laboratory, Harvard. June 7, 2012.
190. Rabbitt RD Infrared pulses modulate excitability, intracellular Ca^{2+} signaling, and synaptic transmission. Baylor College of Medicine, Houston TX, May 25, 2012.
189. Rabbitt RD Infrared neural stimulation. University of Utah, Salt Lake City, UT, April 6, 2012.
188. Rabbitt RD Some Cells Like it Hot, Briefly. Cancer Forum Workshop on Electromagnetic Properties of Cells as a Window into Cancer. Arizona State University, Tempe AZ, March 19-21, 2012.
187. Zhu H, Tang X, Maklad A, Mustain W, Rabbitt RD, Highstein SM and Zhou W. Relation Between Vestibular Afferents Sound Sensitivity and Peripheral Innervation Patterns in Rat Vestibular End Organs. Assn. Resh. Otolaryngology Abs 46, February 25, 2012.
186. Liu, Q, Jorgensen EM, Holman HA, Rawson R and Rabbitt RD Three Distinct Mechanisms of Neuro-muscular Junction Excitation by Infrared Pulses. Biophysical Soc., February 26, 2012
185. Johnson R, Frereck MJ, Rajguru SM, Holman HA, Highstein SM, Holstein GR and Rabbitt RD Optical and thermal responses of semicircular canal afferent neurons in the oyster toadfish, *Opsanus tau*. Assn. Resh. Otolaryngology Abs 276, February 26, 2012
184. Highsten SM, Mann MA, Rabbitt RD Spontaneous Synaptic Quantal Events in the Vestibular Calyx Terminal. Assoc. for Resh. in Otolaryngology, Baltimore MD Abs 286, February 26, 2012
183. Holman HA, Tran VM, Nguyen LN, Arungundram S, Balagurunathan K and Rabbitt RD, BODIPY Conjugated Xylosides Reveal Repair and Regeneration of the Semicircular Canal Cupula. Assn. Resh. Otolaryngology Abs 155, February 25, 2012.
182. Johnson R, Frereck MJ, Rajguru SM, Holman HA, Highstein SM, Holstein GR and Rabbitt RD Temperature sensitivity of semicircular canal afferent responses in the oyster toadfish, *Opsanus tau*. Society for Neurosci. Abs. 579.11, Nov. 15, 2011.

181. Dittami GM, Spitzer KW, Rajguru SM, Lasher RA, Hitchcock RW and Rabbitt RD Investigations of the mechanisms underlying pulsed infrared stimulation of cardiomyocytes. Biophysical Soc., Baltimore MD March 5-9, 2011.
180. Rabbitt RD, Rajguru SM, Dittami GM, Richter CP, and Highstein SM. Pulsed infrared stimulation of the vestibular semicircular canal sensory epithelium. Assoc. for Resh. in Otolaryngology, Baltimore MD Feb 19-23, 2011.
179. Rajguru SM, Dittami GM, Richter CP, Highstein SM and Rabbitt RD Photoactivation of the vestibular crista ampullaris. Assoc. for Resh. in Otolaryngology, Baltimore MD Feb 19-23, 2011.
178. Rabbitt RD, Souza NN, Miles RN and Siegel JH. Influence of ear canal morphology on measures of reflectance and transmission. Assoc. for Resh. in Otolaryngology, Baltimore MD Feb 19-23, 2011.
177. Rajguru SM, Dittami GM, Richter CP, Highstein SM, and Rabbitt RD Pulsed infrared radiation evokes calcium transients and excitation of inner-ear hair cells and cardiac myocytes. Soc. for Neuroscience Abs 889.12/AAA7 SanDeigo, CA Nov14, 2010.
176. Rabbitt RD Pulsed infrared excitability of inner-ear hair cells and cardiac myocytes. Boston University. Dept BME, Nov. 10, 2010.
175. Dharia S and Rabbitt RD Monitoring voltage-sensitive membrane impedance change using radio frequency interrogation. IEEE Eng. in Medicine and Biology, Buenos Aries, Argentina Sept. 1-4, 2010.
174. Rajguru SM, Richter CP, Highstein SM, Dittami GM and Rabbitt RD Pulsed infrared radiation rapidly modulates hair-cell neurotransmitter release. XXVI Bárány Society Meeting, Reykjavik Iceland Aug 18-21, 2010.
173. Rabbitt RD, Rajguru SM, Richter CP, Dittami GM and Highsten SM. Pulsed infrared laser stimulation of vestibular hair cells and afferent neurons. Bárány Satellite Meeting, Reykholt Borgarfjörour, Aug. 16-17, 2010.
172. Rajguru SM, Dittami G, Rabbitt RD, Richter CP, Highsten, SM. Activation of inner-ear hair cells and afferent neurons by pulsed infrared radiation. Biomed. Eng. Soc., Austin, TX Oct. 6-9, 2010.
171. Rajguru SM, Rabbitt RD, Matic AI, Highstein SM and Richter CP. Inhibitory and excitatory vestibular afferent responses induced by infrared light stimulation of hair cells. Assoc. for Research in Otolaryngology, Anehiem, CA Feb. 6-10, 2010.
170. Rajguru SM, Rabbitt RD, Matic AI, Highstein SM and Richter CP. Selective activation of vestibular hair cells by infrared light. Biophysical Society, SanFrancisco, CA Feb. 20-24, 2010.
169. Dharia S, Dittami G and Rabbitt RD Monitoring ion channel charge displacements using radio frequencies. Biophysical Society, SanFrancisco, CA Feb. 20-24, 2010.
168. Rabbitt RD, Boyle R and Highstein SM Micromechanical compressive nonlinearity and efferent control in the semicircular canals. Assoc. for Research in Otolaryngology, Anehiem, CA Feb. 6-10, 2010.
167. Rabbitt RD 'Will you please look in my ear? There must be something there, I fear.' (Dr. Seuss) Frontiers in Neuroscience, Univ. Utah, Salt Lake City, UT, Nov. 3, 2009.
164. Rabbitt RD Introduction to the structure and function of the vestibular system. Biology of the Inner Ear, Marine Biological Laboratory, Woods Hole, MA, Aug. 10, 2009.
166. Rabbitt RD and Breneman, KD. Piezo- and flexoelectric membrane materials underlie fast biological motors in the ear. Materials Research Society. SanFrancisco, CA, April 17, 2009.
165. Rabbitt RD, Breneman KD and Clifford S. Mechanical power output of outer hair cell somata. Assn Resh Otolaryngology. Baltimore, MD. Feb 18, 2009. Abst 703.
164. Breneman KD, Brownell WE and Rabbitt RD Stereocilium flexoelectricity: Electromechanical motors of the inner ear. Assn Resh Otolaryngology. Baltimore, MD. Feb 18, 2009. Abst 791.
163. Highstein SM, Art JJ, Holstein GR, Rabbitt RD Simultaneous pre- and post-synaptic recordings from the peripheral vestibular calyx and its included type I hair cell. Assn Resh Otolaryngology. Baltimore, MD. Feb 18, 2009. Abst 635.
162. Dittami G, Dharia S, Wyrick J and Rabbitt RD Stimulus-Controlled Neurotrasmitter Release and Quantal Detection on a Microchip. BMES. St. Louis, MO. Oct. 3, 2008. Abst. P3.76.
161. Breneman KD, Brownell W and Rabbitt RD Power Efficiency of Hair Cell Electro-Mehcanical Motors Within the Cochlear Amplifier. BMES, St. Louis, MO, Oct. 2, 2008, Abst. P2.50.
160. Dharia S, Aylife HE, King C, Dittami G, Wyrick J, Pungor A and Rabbitt RD Visualization of Protein Domains on Single Cells Using Micro-Electric Impedance Tomography. BMES, St.Louis, MO Oct. 2, 2008. Abst. 6.
159. Dharia S and Rabbitt RD Imaging the Cell Membrane using Fringe Field Electric Impedance Tomography. Biophysical Society. Long Beach, CA. Feb. 2, 2008, Abst. 2927-Pos.
158. Rabbitt RD, Breneman K and Brownell W. Flexoelectric Electromotility of Inner Ear Hair Cell Stereocilia. Biophysical Society. Long Beach, CA. Feb. 2, 2008, Abst. 2927-Pos.

157. Holstein G, Friedrich VL, Martinelli GP, Highstein SM, Rajguru S, Rabbitt RD Branching Patterns of Physiologically Characterized Semicircular Canal Afferents in the Toadfish, Opsanus tau: Contacts with Two Types of Hair Cells. Assoc. for Research in Otolaryngology. Phoenix, AZ, Feb. 17-21, 2008, Abst. 959.
156. Rabbitt RD, Breneman, K, Brownell, W. Membrane Flexoelectricity and the Power Stroke of Hair Bundle Motility. Assoc. for Research in Otolaryngology. Phoenix, AZ, Feb. 17-21, 2008, Abst. 657.
155. Rabbitt RD Efficiency of Outer Hair Cell Somatic Electromotility. Assoc. for Research in Otolaryngology. Phoenix, AZ, Feb. 17-21, 2008, Abst. 144.
154. Rabbitt RD Pathological Semicircular Canal Afferent Signals Transmitted to the Brain During Benign Positional Vertigo and their Biomechnical Origins. American Otology Society. Orlando, FL. May, 2, 2008.
153. Rabbitt RD Micro-electric impedance spectroscopy and tomography of isolated living cells. 3M Headquarters. Oct. 18, 2007
152. Rabbitt RD 'Say, can you hear? There must be something in there I fear.' University of Minnesota. Oct. 17, 2007.
151. Breneman, KD, Highstein, SM, Boyle R, Rabbitt RD Calcium regulated adaptation in the semicircular canal. Society for Neuroscience 2007.
150. Dittami, GM, Ayliffe, HE, King, CS, Dharia, S, Wyrick, JJ, Pungor, A, Rabbitt RD Single-cell electrophysiology and impedimetric chemical sensing on a chip. BMES 2007.
149. Dharia, S, Ayliffe, HE, King, CS, Dittami, GM, Wyrick, JJ, Pungor, A. Visualizing Excitable Cell Membranes via Micro Electric Impedance Tomography. BMES 2007.
148. Jovic T, King C and Rabbitt RD Demonstration of an Active Model of the Cochlea. Acoustical Society of America. Salt Lake City, UT. June 5, 2007. Abst. 937.
147. King C, Boyle R, Highstein SM and Rabbitt RD What Lower Corner? Micromechanical vs. Afferent Adaptation in the Semicircular Canals *in vivo*. Association for Research in Otolaryngology. Denver, CO. Feb. 13, 2007. Abst. 971.
146. Jovic T, King C and Rabbitt RD A Live Demonstration of an Active Physical Model of the Cochlea. Association for Research in Otolaryngology. Denver, CO. Feb. 13, 2007. Abst. 503.
145. Wyrick JJ, Dittami GM, Dharia S and Rabbitt RD Time Resolved Dielectric Flow Cytometry. Biomedical Engineering Society, Chicago, IL, Oct. 11-14, 2006. 161419
144. Dittami GM, King CS, Ayliffe HE, Dharia S and Rabbitt RD Multilayer MESM Platform for Single Cell Impedance Spectroscopy and Amperometric Glutamate Detection. Biomedical Engineering Society, Chicago, IL, Oct. 11-14, 2006. 162403
143. Dharia,S, Ayliffe HE, Braithwaite J, King CS, Dittami GM, Pungor A, Christensen DA and Rabbitt RD Micro-Domain Single Cell Electrophysiology. Biomedical Engineering Society, Chicago, IL, Oct. 11-14, 2006. 161416
142. Breneman, KD and Rabbitt RD Load-Dependent Capacitance of Micro-Pipettes and the Thevenin Equivalent. Biomedical Engineering Society, Chicago, IL, Oct. 11-14, 2006. 162357
141. Breneman, KD, Highstein, SM, Boyle, R and Rabbitt RD Contribution of Cilia to Hair-Cell Capacitance Modulation During Mechanotransduction. Association for Research in Otolaryngology. Baltimore, MD, Feb. 6, 2006. Abst. 182.
140. Rajguru, S. Ifediba, M and Rabbitt RD Afferent Responses to Experimentally Induced Benign Paroxysmal Positional Vertigo. Association for Research in Otolaryngology. Baltimore, MD, Feb. 6, 2006. Abst. 620.
139. Friedrich, VL, Highstein, SM, Martinelli, G, Tucker, J, Clifford, S, Rabbitt RD and Holstein, GR. Primary Afferent Endings Assocaited with GABAergic and Non-GABAergic Vestibular Hair Cells. Association for Research in Otolaryngology. Baltimore, MD, Feb. 8, 2006. Abst. 854.
138. Rabbitt RD, Farrell, G. and Brownell, W.E. Outer Hair Cell Frequency Dependent Passive Capacitance. Association for Research in Otolaryngology. Baltimore, MD, Feb. 6, 2006. Abst. 1236.
137. Breneman, K.D. and Rabbitt RD Capacitance of Micro-Pipettes and the Thevenin Equivalent. ID 2232, Salt Lake City, UT, Feb. 21, 2006.
136. Clifford, S., Friedrich, VL, Highstein, SM, Martinelli, G, Tucker, J, Rabbitt RD and Holstein, GR. Convergence of Hair-Cell GABA and Glutamate Shapes Semicircular Canal Afferent Responses. ID 1223, Salt Lake City, UT, Feb. 20, 2006.
135. Breneman, KD, Highstein, SM, Boyle, R and Rabbitt RD Contribution of Hair-Cell Cilia to Whole-Cell Capacitance Modulation. Biophysical Society ID 1201, Salt Lake City, UT, Feb. 20, 2006.
134. Dharia, S. Towards Micro-Electric Impedance Tomography. Biophysical Society ID 1411, Salt Lake City, UT, Feb. 20, 2006.
133. Breneman, K., Boyle, R., Highstein, S.M. and Rabbitt RD Contribution of hair cell cilia to whole-cell capacitance modulation during mechanotransduction. Biomedical Eng. Soc. ID:0126, Baltimore, MD, Sept. 29, 2005.
132. Dharia, S. Ayliffe, H.E., Brown, S., Dittami, G., Pungor, A., Christensen, D. and Rabbitt RD Single-cell electrophysiology on a chip. Biomedical Eng. Soc. ID:1389, Baltimore, MD, Oct. 1, 2005.

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