

# CURRICULUM VITAE

(Sep. 2016)

**Edwin W Rubel, Ph.D.**

## Personal Data

Birth Date and location:

May 8, 1942  
Chicago, Illinois

Marital Status:

Married, two children

## Education

Michigan State University East Lansing, Michigan	B.S.	1964
Michigan State University	M.S.	1967
Michigan State University	Ph.D.	1969

## Faculty/Academic Appointments

Virginia Merrill Bloedel Professor of Hearing Science  
University of Washington  
Seattle, Washington

1991-present

Professor

1986-present

Departments of Otolaryngology-Head and Neck Surgery,  
Physiology and Biophysics, and Psychology (Adjunct)  
University of Washington  
Seattle, Washington

Professor

1983-1986

Department of Otolaryngology, and Physiology  
University of Virginia Medical School  
Charlottesville, Virginia

Associate Professor

1977-1983

Department of Otolaryngology, and Physiology  
Director of Research, Otolaryngology  
University of Virginia  
Charlottesville, Virginia

Associate Professor

1974-1977

Department of Psychology  
Yale University  
New Haven, Connecticut

Assistant Professor Department of Psychology Yale University New Haven, Connecticut	1971-1974
NIH Postdoctoral Fellow Department of Psychobiology University of California Irvine, California	1970
Assistant Professor Department of Behavioral Sciences California State College Dominquez Hills, California	
NIH Predoctoral Fellow Michigan State University East Lansing, Michigan	1968-1969
Research Assistant Department of Biophysics Michigan State University East Lansing, Michigan	1966
Teaching Assistant Department of Psychology Michigan State University East Lansing, Michigan	1964-1966

Intramural Responsibilities

Chair of Faculty Council on Research	1994-1995
President's Committee on the State Ethics Law	1997-1998
Physiology and Biophysics Department Teaching Evaluations Committee	1998- 2004
Chair of University Intellectual Property Management Committee (IPMAC)	1998 - 2004
Speech and Hearing Sciences 10-Year Review Committee	2001
Search Committee for Chair of the new UW Biology Department	2001
Neurobiology and Behavior Graduate Program Steering Committee	2001-2005
Chair of Promotions Committee, Department of Neurological Surgery	2001
Research Advisory Board	2002-2005

### Professional Societies

American Association for the Advancement of Science  
Society for Neuroscience  
Society for Neuroethology  
IBRO  
Collegium Oto-rhino-laryngologicum Amicitiae Sacrum  
Association for Research in Otolaryngology

### Editorial Boards

Journal of Experimental Psychology: Animal Behavior Processes	1977-1982
Developmental Psychobiology	1980-1986
Infant Behavior and Development	1980-1985
Hearing Research (Associate Editor) Associate Editor	2006-present 2006 - 2009
Journal of Neuroscience	1987-1990
Journal of Comparative Neurology	1987-Present
Auditory Neuroscience (Associate Editor)	1994-1996
Journal of the Association for Research in Otolaryngology (Associate Editor)	2000-2004

### Honors

NSF Biomedical Sciences Support Grant Fellow	1967
NIH Predoctoral Fellow	1968-1968
NIH Postdoctoral Fellow	1969-1970
Membership Committee, Society for Neuroscience	1975-1978
NIH Career Development Award	1977-1982
Consultant, Clinical Center Grant, Kresge Hearing Research Laboratory of the South, Louisiana State University Medical Center	1979-1983 & 1986-1992
Member, NIH Study Section, Communicative Sciences/Hearing Sciences	1981-1985
College of Pennsylvania/Eastern Pennsylvania Psychiatric Institute Research Review Board	1982-1984
Jacob Javits Neuroscience Investigator Award	1985-1992
Fellow of the American Association for the Advancement of Science	1989-present
Oasi Institute for Research on Mental Retardation and Brain Aging International Prize for Brain Dysfunction Research: Neural Plasticity in Brain Development	1991
Member, Advisory Council for the National Institute of Deafness and Other Communicative Disorders	1991-1995

Member, Psychological and Physiological Acoustics Technical Committee, Acoustical Society of America	1993-1996
Member, Collegium Oto-rhino-laryngologicum Amicitiae Sacrum	1992-present
President-elect, Association for Research in Otolaryngology	1997-1998
President, Association for Research in Otolaryngology	1998-1999
Fellow of the Acoustical Society of America	1998-present
Member, Advisory Board for the Reeve-Irvine Research Center	1999-present
Carhart Memorial Lecture Award, AAS Meeting	2001
Hallowell David Lecture Award, IERASG Symposium	2003
SHBT "Distinguished Lecture," MIT	2004
"Award of Merit", Association for Research in Otolaryngology	2005
Member, Advisory Board for The Center for Structural and Functional Neuroscience, University of Montana	2000-present
Member, Advisory Board for The Center for the Navigation and Communication Sciences (CNCS), University of Rochester	2002-present
Member, Advisory Board for the Comparative and Evolutionary Biology of Hearing (C-CEBH), Univ. of Maryland	2002-present
Ted Evans Lecture; British Society For Audiology	September 2005
Hugh Knowles Center Advisory Board, Northwestern Univ.	2005-present
Keynote Speaker, Widex Meeting on Pediatric Audiology	May, 2008
Keynote Speaker, Beyond Newborn Hearing Screening	June 2008
Keynote Speaker, CNUP Retreat, University of Pittsburgh	Sept, 2009
Keynote Speaker, 7th Australasian Auditory Neuroscience Workshop	Jan, 2010
Guest of Honor, American Otologic Society	May, 2010
Fred Minifie Endowed Lecture, Univ. of Washington	Dec., 2011
Robert Galambos Endowed Lecture, UCSD	Jan., 2013
Roxelyn and Richard Pepper Lecture, Northwestern Univ.	0April, 2015

### Research Interests

Developmental Neurobiology  
Experiential Influences on Brain and Behavior Development  
Ontogeny of Sensory Systems  
Comparative Neurobiology of the Auditory System  
Hair cell regeneration in the inner ear  
Hair cell death and survival

### Research Support

NIH; NINCDS, NIDCD, NINDS  
NSF  
Grant Foundation  
Deafness Research Foundation  
Lions of Virginia Hearing Foundation  
Phillippe Foundation  
National Organization for Hearing Research  
Oberkotter Foundation

### Teaching Experience

Introductory Psychology; Physiological Psychology; Intelligence: Genes and Experience; Brain Mechanisms and Behavior; Mechanisms Underlying Behavioral Plasticity; Seminar in Neurobiology; Topics in Development Psychology; Field Ethology; Comparative Psychology; Neuroembryology; Medical Neuroscience; Histology; Neurophysiology of Sensory Systems.

### Patents (Granted/Pending)

**Rubel, Edwin**, Ou, Henry; Raible, David; Santos, Felipe; Simon, Julian. Drugs to prevent drug-induced hair cell death. Issued 7/31/2012, US Patent No. 8,232,314.

Simon, Julian; Johnson, Graham; **Rubel, Edwin**; Chowdhury, Sarwat; Herr, R. Jason; Jiang, Qin; Chen, Xinchao; Owens, Kelly N; Raible, David. Compounds and methods for preventing, treating and/or protecting against sensory hair cell death. Issued 8/16/2016. Patent # 9,416,141

Simon, Julian, Johnson, Graham; **Rubel, Edwin**, Raible, David, Gonzalez; Mario D., Meltzer, Peter C.; Miao, Weishi. Compounds and methods for preventing or treating sensory hair cell death. Issued 11/15/2016. Patent # 9,493,482.

Ou, Henry; Owens, Kelly; Raible, David; **Rubel, Edwin**; Simon, Julian; Thomas, Andrew. Small molecule inhibitors of cisplatin-induced hair cell death. Pending 2/7/2013, Application No. 61/762,241.

### Publications

Raskin, D.C., Hattle, M., Rubel, E.W. The Effects of Electric Shock Isolation in Serial Learning. Psychonomic Science, 1967, 8:413-414.

Raskin, D.C., Boice, C., Rubel, E.W., Clark, D. Transfer Tests of the Frequency Theory of Verbal Discrimination Learning. Journal of Experimental Psychology, 1968, 76:521-529.

Rubel, E.W. Effects of Early Experience on Fear Behavior of *Coturnix coturnix*. Animal Behavior, 1970, 18:427-433.

Rubel, E.W. Opossum Atlas. Contemporary Psychology, 1970, 15:582.

Rubel, E. W. A Comparison of Somatotopic Organization in Sensory Neocortex of Newborn Kittens and Adult Cats. Journal of Comparative Neurology, 1971, 143:447-480.

Rubel, E.W. Man's Animals. Contemporary Psychology, 1971, 16:502-503.

- Mayers, K.S., Robertson, R.T., Rubel, E.W., Thompson, R.F. Development of Polysensory Responses in Association Cortex of Kitten. Science, 1971, 171:1038-1040.
- Johnson, J.E., Rubel, E.W., Hatton, G.E. Mechanosensory Projections to Cerebral Cortex of Sheep. Journal of Comparative Neurology, 1974, 158:81-108.
- Rubel, E.W., Rosenthal, M. The Ontogeny of Auditory Frequency Generalization in the Chicken. Journal of Experimental Psychology: Animal Behavior, 1975, 1:287-297.
- Rubel, E.W., Parks, T.N. Organization and Development of Brain Stem Auditory Nuclei of the Chicken: Tonotopic Organization of N. magnocellularis and N. laminaris. Journal of Comparative Neurology, 1975, 164:411-434.
- Parks, T.N., Rubel, E.W. Organization and Development of Brain Stem Auditory Nuclei of the Chicken: Organization of Projections from N. magnocellularis to N. laminaris. Journal of Comparative Neurology, 1975, 164:435-448.
- Thompson, R.F., Rubel, E.W. Evolution and Behavior. In: R.F. Thompson, Introduction to Physiological Psychology, Harper and Row: New York, Chapter 1, 1975, pp. 5-30,
- Thompson, R.F., Rubel, E.W. Genetic and Development Bases of Behavior. In: R.F. Thompson, Introduction to Physiological Psychology, Harper and Row: New York, Chapter 2, 1975, pp. 31-64,.
- Rubel, E. W , Smith, D.J., Miller, L.C. Organization and Development of Brain Stem Auditory Nuclei of the Chicken: Ontogeny of N. magnocellularis and N. laminaris. Journal of Comparative Neurology, 1976, 166:469-490.
- Benes, F.M., Parks, T.N., Rubel, E.W. Rapid Dendritic Atrophy Following Deafferentation: An EM Morphometric Analysis. Brain Research, 1977, 122:1-13.
- Rubel, E.W. Ontogeny of Structure and Function in the Vertebrate Auditory System. In: Handbook of Sensory Physiology, Vol. IX, Development of Sensory Systems. M. Jacobson (Ed.), Springer-Verlag, Chapter 5, 1978, pp. 135-237.
- Jackson, H., Rubel, E.W. Ontogeny of Behavioral Responsiveness to Sound in the Chick Embryo as Indicated by Electrical Recordings of Motility. Journal of Comparative & Physiological Psychology, 1978, 92:682-696.
- Parks, T.N., Rubel, E.W. Organization and Development of the Brain Stem Auditory Nuclei of the Chicken: Primary Afferent Projections. Journal of Comparative Neurology, 1978, 180:439-448.
- Parks, T.N., Rubel, E.W. An anatomic "place" model of low-frequency sound localization. Otolaryngology, 1978, 86:ORL-785.

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- Smith, D.J., Rubel, E.W. Organization and Development of Brain Stem Auditory Nuclei of the Chicken: Dendritic Gradients in Nucleus laminaris. Journal of Comparative Neurology, 1979, 186:213-240.
- Jahrsdoerfer, R.S., Feldman, P.S., Rubel, E.W., Guerrant, J.L., Eggleston, P.A., Selden, R.F. Otitis Media and the Immotile Cilia Syndrome. Laryngoscope, 1979, 5:769-777.
- Rubel, E.W., Parks, T.N., Smith, D.J., Jackson, H. Experiential Afferent Influences and Development in the Avian N. magnocellularis and N. laminaris. Proc. XVII International Congress of Ornithology, 1980, 701-709.
- Lippe, W.R., Steward, O., Rubel, E.W. The Effect of Unilateral Basilar Papilla Removal upon Nuclei Laminaris and Magnocellularis of the Chick Examined with [<sup>3</sup>H] 2-Deoxy-D-Glucose Autoradiography. Brain Research, 1980, 196:45-58.
- Rubel, E.W., Smith, Z.D.J., Steward, O. Sprouting in the Avian Brain Stem Auditory Pathway: Dependence on Dendritic Integrity. Journal of Comparative Neurology, 1981, 202:397-414.
- Gray, L., Rubel, E.W. Development of Responsiveness to Suprathreshold Acoustic Stimulation in Chickens. Journal of Comparative & Physiological Psychology, 1981, 95:188-198.
- Rubel, E.W. Pathophysiology of Hearing Loss: Functional Anatomy. In: G. Gates (Ed.), Clinical Auditory Evaluation, American Academy of Otolaryngology: Rochester, Minnesota, 1981, pp. 18-22.
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- Ryals, B.M., Rubel, E.W. Patterns of Hair Cell Loss in Chick Basilar Papilla after Intense Auditory Stimulation: Frequency Organization. Acta Otolaryngol journal, 1982, 93:205-210.
- Rubel, E.W., Ryals, B.M. Patterns of Hair Cell Loss in Chick Basilar Papilla after Intense Auditory Stimulation: Exposure Duration and Survival Time. Acta Otolaryngol Journal, 1982, 93:31-41.
- Hackett, J.T., Jackson, H., Rubel, E.W. Synaptic Excitation of the Second and Third Order Auditory Neurons in the Avian Brain Stem. Neuroscience, 1982, 7:1455-1469.
- Gray, L., Smith, Z., Rubel, E.W. Development and Experiential Changes in Dendritic Symmetry. Brain Research, 1982, 244:360-364.

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- Lippe, W., Rubel, E.W. Development of the Place Principle: Tonotopic Organization. Science, 1983, 219:514-516.
- Smith, Z.D.J., Gray, L., Rubel, E.W. Afferent Influences on Brain Stem Auditory Nuclei of the Chicken: N. laminaris Dendritic Length Following Monaural Conductive Hearing Loss. Journal of Comparative Neurology, 1983, 220:199-205.
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- Rubel, E.W., Lippe, W.R., Ryals, B.M. Development of the Place Principle. Annals of Otology, Rhinology & Laryngology, 1984, 93(6):609-615.



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- Gray, L., Rubel, E.W. Development of Absolute Thresholds in Chickens. Journal of the Acoustical Society of America, 1985, 77:1162-1172.
- Born, D.E., Rubel, E.W. Afferent Influences on Brain Stem Auditory Nuclei of the Chicken: Neuron Number and Size Following Cochlea Removal. Journal of Comparative Neurology, 1985, 231:435-445.
- Durham, D., Rubel, E.W. Afferent Influences on Brain Stem Auditory Nuclei of the Chicken: Changes in Succinate Dehydrogenase Activity Following Cochlea Removal. Journal of Comparative Neurology, 1985, 231:446-456.
- Steward, O., Rubel, E.W. Afferent Influences on Brain Stem Auditory Nuclei of the Chicken: Cessation of Amino Acid Incorporation as an Antecedent to Age-Dependent Transneuronal Degeneration. Journal of Comparative Neurology, 1985, 231:385-395.
- Severns, M., Gray, L., Rubel, E.W. An Avian Vocalization Detector. Physiology & Behavior, 1985, 34:843-845.
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- Lippe, W.R., Rubel, E.W. Ontogeny of Tonotopic Organization of Brain Stem Auditory Nuclei in the Chicken: Implications for Development of the Place Principle. Journal of Comparative Neurology, 1985, 237:273-289.
- Tucci, D.L., Rubel, E.W. Afferent Influences on Brain Stem Auditory Nuclei of the Chicken: Effects of Conductive and Sensorineural Hearing Loss on N. magnocellularis. Journal of Comparative Neurology, 1985, 238:371-381.
- Ryals, B.M., Rubel, E.W. Differential Susceptibility of Avian Hair Cells to Acoustic Trauma. Hearing Research, 1985, 19:73-84.
- Ryals, B.M., Rubel, E.W. Ontogenetic Changes in the Position of Hair Cell Loss after Acoustic Overstimulation in Avian Basilar Papilla. Hearing Research, 1985, 19:135-142.
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- Lippe, W.R., Ryals, B.M., Rubel, E.W. Development of Place Principle. In: R.N. Aslin (Ed.), Advances in Neural and Behavioral Development. Ablex Pub. Co: Norwood, NJ, 1986, 155-203.
- Young, S.R., Rubel, E.W. Embryogenesis of Arborization Pattern and Topography of Individual Axons in N. Laminaris of the Chicken Brain Stem. Journal of Comparative Neurology, 1986, 254:425-459.
- Ruben, R.J., van de Water, T.R., Rubel, E.W. (Eds.): The Biology of Change in Otolaryngology. Excerpta Medica: Amsterdam, Netherlands, 1986.
- Tucci, D.L., Born, D.E., Rubel, E.W. Changes in Spontaneous Activity and CNS Morphology Associated with Conductive and Sensorineural Hearing Loss in Chickens. Annals of Otolaryngology, Rhinology & Laryngology, 1987, 96:343-350.
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- Cruz, R.M., Lambert, P.R., Rubel, E.W. Light Microscopic Evidence of Hair Cell Regeneration after Gentamicin Toxicity in Chick Cochlea. Archives of Otolaryngology- Head & Neck Surgery, 1987, 113:1058-1062.
- Sanes, D.H., Rubel, E.W. The Ontogeny of Inhibition and Excitation in the Gerbil Lateral Superior Olive. Journal of Neuroscience, 1988, 8:682-700.
- Born, D.E., Rubel, E.W. Afferent Influence on Brain Stem Auditory Nuclei of the Chicken: Presynaptic Action Potentials Regulate Protein Synthesis in Nucleus Magnocellularis Neurons. Journal of Neuroscience, 1988, 8:901-919.
- Ryals, B.M., Rubel, E.W. Hair Cell Regeneration after Acoustic Trauma in Adult Coturnix Quail. Science, 1988, 240:1774-1776.
- Rubel, E.W. and Parks, T.N. Organization and Development of the Avian Brain-Stem Auditory System. In: G.M. Edelman, W.E. Gall and W. M. Cowan (Eds.), Auditory Function: Neurobiological Bases of Hearing. John Wiley, 1988, 3-92.
- Flint, P., Duckert, L.G., Dobie R.A., Rubel, E.W. Chronic Perilymphatic Fistula. Otolaryngology- Head & Neck Surgery, 1988, 99:380-388.
- Sanes, D.H., Rubel, E.W. The Development of Stimulus Coding in the Auditory System. In: A.F. Jahn and J.R. Santos-Sacchi (Eds.), Physiology of the Ear. Raven Press, New York, 1988, 431-455.

- Sanes, D.H., Merickel, M., Rubel, E.W. Evidence for an Alteration of the Tonotopic Map in the Gerbil Cochlea During Development. Journal of Comparative Neurology, 1989, 279:436-444.
- Dobie, R.A., Rubel, E.W. The Auditory System: Acoustics, Psychoacoustics and the Periphery. In: H.D. Patton, A.F. Fuchs, B. Hille, A.M. Scher, R. Steiner (Eds.) Textbook of Physiology, W.B. Saunders: Philadelphia, 1989, 365-387.
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- Deitch, J.S., Rubel, E.W. Changes in Neuronal Cell Bodies in N. Laminaris During Deafferentation-Induced Dendritic Atrophy. Journal of Comparative Neurology, 1989, 281:259-268.
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- Code, R.A., Burd, G.D., Rubel, E.W. Development of GABA Immunoreactivity in Brainstem Auditory Nuclei of the Chick: Ontogeny of Gradients in Terminal Staining. Journal of Comparative Neurology, 1989, 284:504-518.
- Von Bartheld, C.S., Rubel, E.W. Transient GABA Immunoreactivity in Cranial Nerves of the Chick Embryo. Journal of Comparative Neurology, 1989, 286:456-471.
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- Von Bartheld, C.S., Code, R.A., Rubel, E.W. GABAergic Neurons in Brainstem Auditory Nuclei of the Chick: Distribution, Morphology, Connectivity. Journal of Comparative Neurology, 1989, 287:470-483.
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- Von Bartheld, C.S., Cunningham, D.E., Rubel, E.W. Neuronal Tracing with Dil: decalcification, cryosectioning, photoconversion for light and electron microscopic analysis. Journal of Histochemistry and Cytochemistry, 1990, 38:725-733.
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- Weisleder, P., Jones, T.A., Rubel, E.W. Peripheral Generators of the Vestibular Evoked Potentials (VsEPs) in the Chick. EEG and Clinical Neurophysiology, 1990, 76:362-369.
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