Curriculum Vitae

h-index: 23

Google Scholar Website: http://scholar.google.com/citations?user=KvOkV30AAAAJ&hl=en
U of Utah Website: https://faculty.utah.edu/u0034547-DAVID_J_WARREN/research/index.hml
Biomedical Engineering Website: http://www.bioen.utah.edu/directory/profile.php?userID=198

Present Position

Research Associate Professor
University of Utah
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Positions and Employment

2016-present	Research Associate Professor, Department of Biomedical Engineering, University of Utah, Salt Lake City, UT
2017-present	Research Associate Professor, Department of Electrical and Computer Engineering, University of Utah, Salt Lake City, UT
2016-2017	Research Assistant Professor, Department of Electrical and Computer Engineering, University of Utah, Salt Lake City, UT
2011-2016	Research Assistant Professor, Department of Bioengineering, University of Utah, Salt Lake City, UT
2010-2011	Research Associate, University of Utah, Salt Lake City, UT
2009	Co-Instructor for Undergraduate Level Biophysics, University of Utah, Salt Lake City, UT
2006-present	Instructor for Undergraduate Level Physiology, University of Utah, Salt Lake City, UT
2006-2010	Postdoctoral Fellow, University of Utah, Salt Lake City, UT
2003-2004	Instructor for Undergraduate Level Bioinstrumentation, University of Utah, Salt Lake City, UT
1994-2006	Research Assistant and/or Teaching Assistant, University of Utah, Salt Lake City, UT
1978-1996	Control Systems Research Staff, The Boeing Company, Seattle. WA

Educational Experience

Doctor of Philosophy 2006

Department of Bioengineering
University of Utah
Salt Lake City, UT, USA

Master of Science 1982

Department of Electrical Engineering
University of Washington
Seattle, WA, USA

Bachelor of Science 1979

Department of Electrical Engineering
Washington State University
Pullman, WA, USA

Teaching Experience

University of Utah

Co-Instructor and Lab Instructor for junior-level Physiology for Engineers course, 2006 to present. This course instructs a quantitative understanding of cell-level and system-level physiology. Principal responsibilities are to lecture, direct performance of lab experiences, act as a mentor to teaching assistants, grade exams and laboratory reports, and submit final grades.

Co-Instructor for graduate level Electrophysiology and Bioelectricity of Tissues course, 2019 to present. This course provides an intermediate-level overview of electrophysiology and bioelectricity at the tissue level to graduate students with a special interest in cardiology and neurosciences. Principal responsibilities are to lecture on the nervous system.

Lab Co-instructor for junior-level Biophysics course 2010. This course instructs a quantitative understanding of biophysical processes in natural and engineered molecules, membranes, tissues, and organs. Principal responsibilities were to direct the performance of lab experiences, grade laboratory reports, and submit final grades.

Lab Instructor for mixed Graduate & Undergraduate Level Bioinstrumentation 2004, 2003. This course instructs a quantitative understanding of biological signals, sensors related to the measurement of biological signals, analog signal conditioning (amplification, frequency-band filtering, basic circuit elements), and digital signal processing (data conversion, data encoding, digital filters, spectral methods). Principal responsibilities were to lecture, direct performance of lab experiences, act as a mentor to teaching assistants, grade exams and laboratory reports, and submit final grades.

Teaching Assistant for junior-level Physiology 2004. This course instructs a quantitative understanding of cell-level and system-level physiology. Principal responsibilities were to assist in the performance of lab experiences and grade exams and laboratory reports.

Co-instructor for mixed Graduate & Undergraduate Level Bioinstrumentation 2002. This course instructs a quantitative understanding of biological signals, sensors related to the measurement of biological signals, analog signal conditioning (amplification, frequency-band filtering, basic circuit elements), and digital signal processing (data conversion, data encoding, digital filters, spectral methods). Principal responsibilities were to lecture, direct performance of lab experiences, act as a mentor to teaching assistants, grade exams and laboratory reports, and submit final grades.

Teaching Assistant for Graduate Level Neural Interfaces Laboratory 2001, 2000, 1999. This lab-based course introduced advanced graduate students to methods of recording and stimulating neuronal tissue and analytical methods to interpret the results. Principal responsibilities were to assist in the performance of lab experiences and grade exams and laboratory reports.

Teaching Assistant for freshman-level Level Fundamentals of Bioengineering 1999-2000. This course teaches fundamental engineering skills via examination of basic physical laws (e.g., Ohm's Law). Principal responsibilities were to assist in the performance of lab experiences and grade exams and laboratory reports.

Teaching Assistant for Graduate Level Bioinstrumentation 1997, 1996, 1995. This course instructs a quantitative understanding of biological signals, sensors related to the measurement of biological signals, analog signal conditioning (amplification, frequency-band filtering, basic circuit elements), and digital signal processing (data conversion, data encoding, digital filters, spectral methods). Principal responsibilities were to assist in the performance of lab experiences and grade exams and laboratory reports.

University of Washington

Teaching Assistant for junior-level Level Linear System Course 1979-1980. This course instructs an understanding of basic linear system theory and analysis. Principal responsibilities were to perform weekly review sessions and grade homework.

Industrial Experience

Boeing Defense and Space Group 1978 to 1995

Chief Test Engineer for precision pointing experiments with Advanced Space Structure Technology Research Experiment (ASTREX) air bearing test bed at Edwards Air Base. This system simulated an Earth orbit satellite that could precisely control its focus point by actively damping mechanical vibrations of its structure. As Chief Test Engineer and in concert with Air Force personnel, I designed, performed, and evaluated tests of the system's ability to change and precisely hold its focus position.

Design and installation of all electronics and software for ASTREX air bearing test bed at Edwards Air Base. Principal responsibilities were the specification, procurement, integration, and installation of all electronics systems associated with the ASTREX system and the specification, procurement, and software development of a real-time control system.

Laboratory Manager for Dynamics and Controls Laboratory. Principal responsibilities were the performance of unique controls experiment proposed by the control system design and analysis central staff and maintenance of controls hardware, computers, and software in the lab.

Member of control system design and analysis central staff. This group was the controls research group for Boeing Defense and Space Group and provided troubleshooting support to ongoing programs. My specialty in the group was hardware interfaces and computer interfacing.

Lead Engineer of control system design and analysis group for the Wind Energy program. This program designed and installed a wind turbine on the north shore of Oahu, HI. Principal responsibilities were to perform and analyze all tests of the turbine's control systems, both on the bench and in the field.

Lead Engineer and member of the technical staff of the control system design and analysis group for the Automated Transit Systems program. This program designed an automated, small-group people mover on a dedicated track, and it was an outgrowth of the Morgantown Personal Rapid Transit system that

connects the three Morgantown campuses of West Virginia University. Principal responsibilities were to design and analyze the performance of vehicle velocity control systems.

Control System Analyst for numerous other projects and proposals.

Honors

University of Utah Graduate Research Supplemental Travel Award for 2005 Society for Neuroscience Annual Meeting

University of Utah Graduate Research Supplemental Travel Award for 2001 Society for Neuroscience Annual Meeting

University of Utah Department of Bioengineering Whitaker Fellowship 1994-1995, 1995-1996

Publications

Theses and Dissertations

Warren, D. J. (2006). Examination of the Organization and Plasticity of Primary Visual Cortex with Multielectrode Arrays. Bioengineering. Salt Lake City, UT, University of Utah. **Doctor of Philosophy:** 187.

Warren, D. J. (1982). A Model of a Pressurized Water Nuclear Reactor Pressurizer for Use with an Instrumentation Failure Detection System. Electrical Engineering. Seattle, WA, University of Washington. **Master of Science, Electrical Engineering:** 236.

Patents

[1] S. Wendelken *et al.*, "Signal processing for decoding intended movements from electromyographic signals," USA Patent 11596346B2, 2023.

[2] D. T. Kluger, D. J. Warren, G. A. Clark, and K. N. Bachus, "Osseointegrated mount for prosthetic limb and peripheral nerve interface," US Patent 9,308,103, 2016.

[3] G. A. Clark, D. J. Warren, and N. M. Ledbetter, "System and method for electrically shielding a microelectrode array in a physiological pathway from electrical noise," US Patent 8,855,737, 2014. [Online]. Available: http://www.google.com/patents/US20140114164

[4] G. A. Clark, D. J. Warren, N. M. Ledbetter, M. Lloyd, and R. A. Normann, "Microelectrode Array System With Integrated Reference Microelectrodes To Reduce Detected Electrical Noise And Improve Selectivity Of Activation," US Patent 8,359,083, 2009. [Online]. Available: http://www.google.com/patents/US20090283425

Book Chapters

[1] D. J. Warren and R. A. Normann, "Visual Prosthesis," in *Handbook of Neuroprosthetic Methods*, W. E. Finn and P. G. LoPresti Eds., (Biomedical Engineering Series, no. 7), M. Neuman, Ed. Boca Raton, FL: CRC Press, 2019, ch. 11, p. 456.

[2] D. J. Warren, R. A. Normann, and A. Koulakov, "Imaging of Two Dimensional Neural Activity Patterns in Cat Visual Cortex using a Multielectrode Array," in *Toward Replacement Parts for the Brain*, T. W.

Berger and D. L. Glanzman Eds. Cambridge, MA: MIT Press, 2005, ch. 3, p. 480.

Peer-Reviewed Articles

[1] W. M. Thomas *et al.*, "Development of a feline model for preclinical research of a new translabyrinthine auditory nerve implant," *Frontiers in Neuroscience,* vol. 18, 06 Feb 2024 2024, doi: 10.3389/fnins.2024.1308663.

[2] A. W. Morales *et al.*, "Machine learning enables non-Gaussian investigation of changes to peripheral nerves related to electrical stimulation," *Sci Rep,* vol. 14, no. 1, p. 2795, Feb 2 2024, doi: 10.1038/s41598-024-53284-w.

[3] J. Du *et al.*, "Electrical Stimulation Induced Current Distribution in Peripheral Nerves Varies Significantly with the Extent of Nerve Damage: A Computational Study Utilizing Convolutional Neural Network and Realistic Nerve Models," *International Journal of Neural Systems,* vol. 33, no. 04, p. 2350022, 2023/04/01 2023, doi: 10.1142/S0129065723500223.

[4] T. Lenarz *et al.*, "Development and translation of a novel electrical hearing prosthesis for direct stimulation within the auditory nerve: the Auditory Nerve Implant (ANI)," (in De), *Laryngorhinootologie,* vol. 101, no. S 02, 2022/05/24 2022, doi: 10.1055/s-0042-1746785.

[5] H. Dantas, T. C. Hansen, D. J. Warren, and V. J. Mathews, "Interpreting Volitional Movement Intent From Biological Signals: A Review," (in English), *Ieee Signal Proc Mag,* vol. 38, no. 4, pp. 23-33, Jul 2021, doi: 10.1109/msp.2021.3074778.

[6] H. Dantas, T. C. Hansen, D. J. Warren, and V. J. Mathews, "Shared Prosthetic Control Based on Multiple Movement Intent Decoders," (in eng), *IEEE transactions on bio-medical engineering,* Research Support, U.S. Gov't, Non-P.H.S. vol. 68, no. 5, pp. 1547-1556, May 2021, doi: 10.1109/TBME.2020.3045351.

[7] J. Nieveen, M. Brinton, D. J. Warren, and V. J. Mathews, "A Nonlinear Latching Filter to Remove Jitter From Movement Estimates for Prostheses," (in eng), *IEEE transactions on neural systems and rehabilitation engineering,* Research Support, U.S. Gov't, Non-P.H.S. vol. 28, no. 12, pp. 2849-2858, Dec 2020, doi: 10.1109/TNSRE.2020.3038706.

[8] P. Kosta, J. Mize, D. J. Warren, and G. Lazzi, "Simulation-Based Optimization of Figure-of-Eight Coil Designs and Orientations for Magnetic Stimulation of Peripheral Nerve," *IEEE Transactions on Neural Systems and Rehabilitation Engineering,* vol. 28, no. 12, pp. 2901-2913, 2020, doi: 10.1109/TNSRE.2020.3038406.

[9] P. Kosta, D. J. Warren, and G. Lazzi, "Selective stimulation of rat sciatic nerve using an array of mm-size magnetic coils: a simulation study," *Healthc Technol Lett,* vol. 6, no. 3, pp. 70-75, Jun 2019, doi: 10.1049/htl.2018.5020.

[10] Z. B. Kagan, J. T. Mize, P. Kosta, G. Lazzi, R. A. Normann, and D. J. Warren, "Reduced Heat Generation During Magnetic Stimulation of Rat Sciatic Nerve Using Current Waveform Truncation," *IEEE Trans Neural*

Syst Rehabil Eng, vol. 27, no. 5, pp. 937-946, May 2019, doi: 10.1109/TNSRE.2019.2911054.

[11] C. C. Duncan *et al.*, "Selective Decrease in Allodynia With High-Frequency Neuromodulation via High-Electrode-Count Intrafascicular Peripheral Nerve Interface After Brachial Plexus Injury," (in eng), *Neuromodulation,* vol. 22, no. 5, pp. 597-606, Jul 2019, doi: 10.1111/ner.12802.

[12] H. Dantas, D. J. Warren, S. M. Wendelken, T. S. Davis, G. A. Clark, and V. J. Mathews, "Deep Learning Movement Intent Decoders Trained With Dataset Aggregation for Prosthetic Limb Control," *IEEE Trans Biomed Eng,* vol. 66, no. 11, pp. 3192-3203, Nov 2019, doi: 10.1109/TBME.2019.2901882.

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[14] A. T. Gardner, H. J. Strathman, D. J. Warren, and R. M. Walker, "Impedance and Noise Characterizations of Utah and Microwire Electrode Arrays," *IEEE Journal of Electromagnetics, RF and Microwaves in Medicine and Biology,* vol. 2, no. 4, pp. 234-241, 2018, doi: 10.1109/jerm.2018.2862417.

[15] S. Wendelken *et al.*, "Restoration of motor control and proprioceptive and cutaneous sensation in humans with prior upper-limb amputation via multiple Utah Slanted Electrode Arrays (USEAs) implanted in residual peripheral arm nerves," *J Neuroeng Rehabil,* vol. 14, no. 1, pp. 121-137, Nov 25 2017, doi: 10.1186/s12984-017-0320-4.

[16] M. M. H. Shandhi, M. Leber, A. Hogan, D. J. Warren, R. Bhandari, and S. Negi, "Reusable High Aspect Ratio 3-D Nickel Shadow Mask," *J Microelectromech Syst,* vol. 26, no. 2, pp. 376-384, Apr 2017, doi: 10.1109/JMEMS.2017.2654126.

[17] M. Leber *et al.*, "Long term performance of porous platinum coated neural electrodes," *Biomed Microdevices,* vol. 19, no. 3, p. 62, Sep 2017, doi: 10.1007/s10544-017-0201-4.

[18] D. J. Warren *et al.*, "Recording and Decoding for Neural Prostheses," *Proceedings of the IEEE,* vol. 104, no. 2, pp. 374-391, 2016, doi: 10.1109/JPROC.2015.2507180.

[19] Z. B. Kagan, A. K. RamRakhyani, G. Lazzi, R. A. Normann, and D. J. Warren, "In Vivo Magnetic Stimulation of Rat Sciatic Nerve With Centimeter- and Millimeter-Scale Solenoid Coils," *IEEE Transactions on Neural Systems and Rehabilitation Engineering,* vol. 24, no. 11, pp. 1138-1147, 2016, doi: 10.1109/TNSRE.2016.2544247.

[20] T. S. Davis *et al.*, "Restoring motor control and sensory feedback in people with upper extremity amputations using arrays of 96 microelectrodes implanted in the median and ulnar nerves," (in eng), *Journal of neural engineering,* vol. 13, no. 3, p. 036001, Jun 2016, doi: 10.1088/1741-2560/13/3/036001.

[21] A. K. RamRakhyani, Z. B. Kagan, D. J. Warren, R. A. Normann, and G. Lazzi, "A um-Scale Computational Model of Magnetic Neural Stimulation in Multifascicular Peripheral Nerves," *Biomedical Engineering, IEEE Transactions on,* vol. 62, no. 12, pp. 2837-2849, 2015, doi: 10.1109/TBME.2015.2446761.

[22] A. K. Ramrakhyani, Z. B. Kagan, F. Khan, D. J. Warren, R. A. Normann, and G. Lazzi, "Numerical modeling of transverse electric field magnetic neural stimulation," *Neuromodulation,* vol. 17, no. 5, p. e126, 2014.

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[29] K. Gunalan, D. J. Warren, J. D. Perry, R. A. Normann, and G. A. Clark, "An automated system for measuring tip impedance and among-electrode shunting in high-electrode count microelectrode arrays," (in eng), *J Neurosci Methods,* vol. 178, no. 2, pp. 263-9, Apr 15 2009, doi: S0165-0270(08)00710-3 [pii] 10.1016/j.jneumeth.2008.12.020.

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[31] S.-J. Kim, S. C. Manyam, D. J. Warren, and R. A. Normann, "Electrophysiological Mapping of Cat Primary Auditory Cortex with Multielectrode Arrays," *Annals of Biomedical Engineering,* vol. 34, no. 2, pp. 300-309, 2006, doi: 10.1007/s10439-005-9037-9.

[32] D. Warren and R. Normann, "Functional reorganization of primary visual cortex induced by electrical stimulation in the cat," *Vision Research,* vol. 45, no. 5, pp. 551-565, 2005, doi: 10.1016/j.visres.2004.09.021.

[33] D. J. Warren, A. Koulakov, and R. A. Normann, "Spatiotemporal encoding of a bar's direction of motion by neural ensembles in cat primary visual cortex," *Ann Biomed Eng,* vol. 32, no. 9, pp. 1265-75, Sep 2004. [Online]. Available: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15493513

[34] D. J. Warren, E. Fernandez, and R. A. Normann, "High-resolution two-dimensional spatial mapping of cat striate cortex using a 100-microelectrode array," *Neuroscience,* vol. 105, no. 1, pp. 19-31, 2001. [Online]. Available: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11483297.

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Abstracts and Proceedings (Peer-reviewed)

[1] W. M. Thomas, R. K. Gurgel, and D. J. Warren, "Pilot Performance of a Chronic Intraneural Auditory Neuroprosthesis in Felines," presented at the 2023 11th International IEEE/EMBS Conference on Neural Engineering (NER), 24-27 April 2023, 2023.

[2] W. M. Thomas, M. Leber, J. Crew, and D. J. Warren, "Evaluation of Pneumatic Insertion Stability of Utah Slanted Electrode Arrays in Rat Sciatic Nerve," presented at the 2022 Engineering in Medicine and Biology Conference, Glasgow, Scotland, 15 July 2022, 2022.
[3] T. C. Hansen, M. A. Trout, J. L. Segil, D. J. Warren, and J. A. George, "A Bionic Hand for Semi-Autonomous Fragile Object Manipulation via Proximity and Pressure Sensors," presented at the 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Virual, Oct 31 - Nov 4 2021, 2021.
[4] H. Dantas, V. J. Mathews, and D. Warren, "Semi-Supervised Adaptive Learning for Decoding Movement Intent from Electromyograms," presented at the 2019 27th European Signal Processing Conference (EUSIPCO), 2-6 Sept. 2019, 2019. [Online]. Available: https://ieeexplore.ieee.org/document/8902698/.
[5] A. T. Gardner, R. M. Walker, H. J. Strathman, and D. J. Warren, "Signal and Noise Sources from Microwire Arrays Implanted in Rodent Cortex," presented at the 2018 IEEE Life Sciences Conference (LSC), 28-30 Oct. 2018, 2018.
[6] H. Dantas *et al.*, "Shared Human-Machine Control for Self-Aware Prostheses," presented at the 2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Calgary, Alberta, Canada, 17 April 2018, 2018.
[7] Y. Zhang *et al.*, "Individual hand movement detection and classification using peripheral nerve signals," presented at the IEEE EMBS Conference on Neural Engineering, Shanghai, China, 25-28 May 2017, 2017.
[8] M. G. Street, R. Caldwell, D. J. Warren, L. Rieth, and P. A. Takmakov, "Automated and High-Throughput Reactive Accelerated Aging System to Evaluate Performance of Neural Implants," presented at the The Electrochemical Society Meeting Abstracts, National Harbor, Maryland, October 4, 2017, 2017. [Online]. Available: http://ma.ecsdl.org/content/MA2017-02/55/2320.abstract.
[9] J. G. Nieveen *et al.*, "Polynomial Kalman Filter for Myoelectric Prosthetics Using Efficient Kernel Ridge Regression," presented at the 2017 8th International IEEE/EMBS Conference on Neural Engineering (NER), Shanghai, China, 25-28 May 2017, 2017.
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[11] H. Dantas, V. J. Mathews, S. Wendelken, T. S. Davis, G. A. Clark, and D. J. Warren, "Neural decoding systems using Markov Decision Processes," presented at the 2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), New Orleans, 08-Mar-2017, 2017.
[12] Z. B. Kagan *et al.*, "Linear methods for reducing EMG contamination in peripheral nerve motor decodes," presented at the 2016 38th Annual

International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 18 Aug. 2016, 2016.

[13] A. K. RamRakhyani, Z. B. Kagan, F. Khan, D. J. Warren, R. A. Normann, and G. Lazzi, "A μm-resolution heterogeneous tissue model for the magnetic stimulation of multifascicular sciatic nerve," presented at the Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE, 2014.

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[15] G. A. Clark *et al.*, "Using Multiple High-Count Electrode Arrays in Human Median and Ulnar Nerves to Restore Sensorimotor Function after Previous Transradial Amputation of the Hand," presented at the EMBC 2014, Chicago, IL, Aug 28 2014, 2014.

[16] A. K. RamRakhyani, Z. B. Kagan, F. Khan, D. J. Warren, R. A. Normann, and G. Lazzi, "Effect of Surrounding Conditions on In-Vitro Magnetic Neural Stimulation," presented at the IEEE Neural Engineering Conference, San Diego, CA, 2013.

[17] G. A. Clark, N. M. Ledbetter, D. J. Warren, and R. R. Harrison, "Recording Sensory and Motor Information from Peripheral Nerves with Utah Slanted Electrode Arrays," presented at the 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Boston, MA, 2011.

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Abstracts and Proceedings (not Google Scholar listed)

[1] L. Rieth *et al.*, "Pre-clinical testing of a penetrating auditory nerve interface," in *Society for Neuroscience Annual Meeting*, Washington, D. C., 14 Nov 2023 2023.

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Grants and Other Support

ACTIVE SUPPORT

RA 10065369 (PI: David Warren) 08/01/2022 – 2/28/2024
Role: PI
4.0 Calendar months
Blackrock $80,820 TDC/yr. to Utah

LARGE ANIMAL MODEL DEVELOPMENT AND TESTBED FOR AUDITORY NERVE IMPLANTS

In the first year (Phase 1), we will complete the development of the chronic cat model for auditory nerve implants. By the end of Phase 1 (Year 1), the UofU will demonstrate chronic implantation of percutaneous ANI arrays in the auditory nerve of at least 3 cats with each cat implanted for at least 3 months. This is being done as part of a milestone for 1UG3NS107688-01. An additional aspect of Phase 1 will be an animal study to compare manually inserted and pneumatically inserted AN-USEA devices in rat sciatic nerve.

1UG3NS107688-01 (PI: Hubert Lim) 09/30/2018 – 07/31/2024
Role: Subaward
1.0 to 4.0 Calendar months
NIH $82,880 TDC/yr. to Utah

DEVELOPMENT AND TRANSLATION OF AN INTRACRANIAL AUDITORY NERVE IMPLANT.

The proposed project will build and evaluate the safety and design needs of a new type of intracranial auditory prosthesis that targets the auditory nerve between the cochlea and the brainstem (auditory nerve implant, ANI) in order to substantially improve hearing performance over the current standard of care, the cochlear implant (CI).

1R44 DC018757-01 (PI: Rajmohan Bhandari) 06/30/2020 – 07/31/2024
Role: Co-PI for Subaward
1.0 Calendar months
NIH $6,007 TDC/yr. to Utah

DEVELOPMENT OF AN AMF ORION/BLACKROCK HD-USEA BASED 60/128 CHANNEL IMPLANTABLE WIRELESS SIMULATOR SYSTEM FOR HUMAN AUDITORY NERVE IMPLANTS

The proposed project aims to develop and translate a novel clinical high (60) channel implantable programmable stimulator (IPS) for use in Cochlear (CI) and auditory nerve (ANI) implants to expand the useable parameter space (electrode count, tonal range, lower stimulation threshold) far beyond current limits.
