Curriculum Vitae

Neal W. Woodbury, Ph.D.
Updated August 2022
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Education:

University of California at Davis. B.S., Biochemistry	1979
University of Washington. Ph.D., Biochemistry	1986
Carnegie Institute of Washington, Postdoc, Plant Biology	1987
Stanford University, Postdoc, Chemistry	1988

Professional Experience:

Vice President & Chief Science and Technology Officer, ASU	2022 – present
Vice President of Research – Knowledge Enterprise	2021 – 2021
Interim Executive Vice President – Knowledge Enterprise	2020 – 2020
Chief Executive Officer, Science Foundation Arizona	2020 – 2020
Chief Science and Technology Officer, ASU	2019 – present
Special Advisor to the Executive VP for Research and Innovation	2018 – 2019
Director, School of Molecular Sciences	2016 – 2019
Faculty, Center for Innovations in Medicine, Biodesign Institute	2016 – present
Faculty, Global Security Initiative	2016 – present
Member of Directorate of the Biodesign Institute	2011 – 2016
Co-Director of the Center for Innovations in Medicine Biodesign Institute at ASU	2010 – 2016
Senior Sustainability Scientist, Global Institute of Sustainability at ASU	2010 – present
Chief Scientific Officer, Biodesign Institute at ASU	2010 – 2011
Faculty Associate, Center for Single Molecule Biophysics, Biodesign Institute at ASU	2010 – present
Deputy Director, Biodesign Institute at ASU	2008 – 2009
Director, Center for BioOptical Nanotechnology, Biodesign Institute at ASU	2004 – 2010
Director, NSF IGERT Biomolecular Nanotechnology	2000 – 2009
Arizona State University, Prof. School of Molecular Sciences	1998 – present
Director, NSF RTG Optical Biomolecular Dev. Program	1996 – 2002
Director, Photosynthesis Center	1997 – 2000
Assoc. Prof. Chemistry and Biochemistry, ASU	1994 – 1998
Asst. Prof. Chemistry and Biochemistry, ASU	1987 – 1994
Stanford University, NSF Postdoctoral Fellow with S. Boxer	1987 – 1988
Carnegie Inst. of Washington, Dept. of Plant Biology, NSF Postdoctoral fellow with W. Thompson	1986 – 1987
Univ. of Washington, Graduate Research with W. Parson	1979 – 1986

Honors, Awards, and Service to the Profession:

Science Foundation of Arizona, CEO	2020 – 2021
NSF BIO postdoctoral fellowship panel member	2014 – 2015
NSF MCB Panel Member	2013 – present
NSF CBET panel member	2012 – 2014
NSF Physics of Life Panel Member	2010 – present
Senior Sustainability Scientist, Global Institute of Sustainability	2010 – present
Gary Krahenbuhl Difference Maker Award, recipient	2008

Professor of the Year, nominee	2008
Professor of the Year, nominee	2007
NSF MPS-MCB Joint Review Panel member	2004 – 2013
Chemical Imaging Committee Member	2005 – 2005
National Academy of Science Workshop	2005
American Chemical Society Panel Member	2004 – 2005
Outstanding Supervisor Award	2004
Photochemistry and Photobiology, Associate Editor	2002 – 2009
NSF IGERT Panel member	2002 – 2006
NSF Biophysics Panel Member	1997 – 1999
NSF Bio. Inst. Dev. Panel Member	1998
NSF Presidential Young Investigator Award	1991
NSF Postdoctoral Fellowship in Plant Molecular Biology	1985

Professional Memberships

National academy of Inventors	2021 – present

Current Graduate Students in Woodbury Laboratory:

Varun Maher

Graduate Theses Mentored

Weizhong Xiao, 1994, Energy and electron transfer in Rhodobacter capsulatus, Citibank

Dennis Gallo, 1994, Chimeric mutagenesis of the Rb. capsulatus reaction center: an exploration of the structure/function relationship, Senior Manager at Abbott Diagnostics

Jeffrey Peloquin, 1994, Time-resolved spectroscopic studies of photosynthetic reaction centers from Rhodobacter sphaeroides, deceased (previously Professor at Boise State University, Department of Chemistry & Biochemistry)

Martin Thompson, 2000, Synthesis and characterization of the photophysical and photochemical properties of sequence specific DNA-binding probes, Associate Professor, Michigan Technological University

Elizabeth Eastman, 2000, Large scale mutagenesis of the Rhodobacter capsulatus reaction center : kinetic and spectral aspects graduated, last known profession- high school teacher

Evaldas Katilius, 2002, B-side electron transfer investigations in the Rhodobacter sphaeroides reaction center, Scientist at SomaLogic in Denver, CO

Arlene Haffa, 2002, Energetics and mechanism in primary electron transfer of bacterial photosynthesis Assistant Professor at University of Wisconsin at Oshkosh, recently offered an Assistant Professorship in Microbiologyat Cal State University Monterey Bay

Jonathan Jackson, 2003, Conformational heterogeneity and energy transfer in photoactive proteins, Product Engineering Group Leader at Microchip Technology, Chandler, AZ

Ben Bowen, 2003, Single-molecule spectroscopy of fluorescent biomolecules, Research Scientist, Lawrence Berkeley National Laboratory, BPBowen@lbl.gov, (510)486-5138

Zivile Katiliene, 2004, Investigations of energy trapping in photosynthesis and of DNA looping by endonuclease, Quality Assurance Manager & Clinical Research Database Manager at the University of Colorado Cancer Center Clinical Investigational Core; University of Colorado Hospital

Trent Northen, 2005, Light-directed synthesis and in situ MALDI-MS characterization of complex bioheteropolymer microarrays, Scientist at Lawrence Berkeley National Laboratory

Allan Scruggs, 2004, Optical selection in directed evolution and lifetime mutants of green fluorescent protein, General Chemistry Lecturer at ASU

Teresa Murray, 2009, Shedding light on nicotinic acetylcholine receptors: creation and use of fluorescently tagged receptors, Postdoctoral Associate, Yale University

Jason Lappe, 2009, Photoreactivation and Positive Cell Selection for the Directed Evolution of Proteins, Research Scientist, Moregate Biotech, Brisbane, Australia

Matt Greving, 2009, Creating High-Affinity Ligands on Surfaces and in Solution, Research Associate - Center for Metabolomics and Mass Spectrometry at The Scripps Research Institute, Chief Scientific Officer at Nextval Inc.

Jinglin Fu, 2010, Exploring Peptide Space for Enzyme Modulation, Center for Single Molecule Biophysics & Center for Innovations in Medicine, Rutgers Faculty

Jack S. Emery, 2010, Computational Modeling of Peptide-Protein Binding, Patent Attorney at Private Patent Law Practice

Zhi Gou, 2012, The role of protein dielectric relaxation in modulating the electron transfer process in photosynthetic reaction centers, Notre Dame

Pallav Kumar, 2013, Development of Chip-Based Electrochemically and Light Directed Peptide Microarray Synthesis, Community College faculty

Wei Wang, 2014, Exploring the Nature of Protein-Peptide Interactions on Surfaces, ASU East teaching faculty

Robayet Chowdhury, 2021, Prediction of Linear Epitopes by a Machine learning Algorithm Developed Using the Immunosignature Technology, Kriya Therapeutics, Richland, WA

Simon Levenberg, 2021, Biophysical characterization of Aptamer-protein Molecular Interactions Through Machine Learning and DNA Microarrays as an Alternative to NGS for Simultaneous Monitoring of Informative Species in an Enriched Library of Oligonucleotides, Caris Life Sciences, Phoenix, AZ

Akanksha Singh, 2021, Functional Studies of Interactions in Proteins, Prellis Biologics, Inc., Fremont, CA

Kirstie Swindle, 2022, Understanding and Utilizing protein interactions in diverse environments, Robust Diagnostics, Phoenix, AZ

Pritha Bisarad, 2022, Exploring the Sequence vs. Binding Relationships for Monoclonal Antibodies and Other Proteins, Phoenix Children's Hospital (Postdoc advisor: Dr. Michael Kruer), Phoenix, AZ

Postdoctoral Fellows Sponsored:

Arlene Haffa, Assistant Professor University of Wisconsin at Oshkosh

Douglas Daniel, Assistant Research Professional, ASU

Zivile Katiliene, Database Manager at the University of Colorado Health Sciences Center

Kou Timpmann, Sr. Research Fellow at the Inst. of Physics in Estonia

Evaldas Katilius, Scientist at SomaLogic in Denver, CO

Heather Murchison, Group Manager, OCG Localization at Microsoft Corporation

Arman Ghodousi, lieutenant and scientist in the Materials Branch of the Chemistry Division at the Naval Research Laboratory

Hadi Tabbara, Scientist, UT system

Laimonas Kelbauskas, Associate Research Scientist, Center for Biosignatures Discovery Automation, Biodesign Institute at ASU

Haiyu Wang, Assistant Professor, State Key Laboratory on Integrated Optoelectronics, Jilin University, China

Allan Scruggs, Lecturer at Washington State University

Jie Pan, Senior Scientist, University of Michigan

Jinglin Fu, Professor, Rutgers University

Alessio Andreoni, NIH, research scientist

Anne-Marie Carey, Instructor, Tokyo

Sarthak Mandal, Professor, National Institute of Technology, Tiruchirappalli, India
Bartholomew Legutki, InVitro Cell Research, LLC, New York City, NY

Collaborators and Co-Editors

Arizona State University: James Allen, Yi Chen, Nicholas Colaneri; Stephen Johnston, Joshua LaBaer, Su Lin, Stuart Lindsay, Yan Liu, Dmitry Matyushov; Deirdre Meldrum; Jose Menendez, Ana Moore, Thomas Moore, George Poste, Bruce Rittman, Phillip Stafford, Kathryn Sykes; Nongjian Tao, Trevor Thornton, Shaopeng Wang, JoAnn Williams, Hao Yan, Zhan-Gong Zhao, Don Seo

Other: Thomas Beatty (U of British Columbia); Stephen Casalnuovo, SNL; Harry Frank, Univ. of Connecticut; Arvi Freiberg, Inst. of Physics, Estonia; Matthew Greving, Scripps Research Institute; Evaldas Katilius, *SomaLogic*, CO; Ron Lukas, Barrows Neurological; Gabriel A. Montaño, Ctr for Integrated Nanotechnologies; Robert A. Niederman, Rutgers Univ.; Trent Northen, Lawrence Berkeley National Laboratory; Tom Slezak, LLNL;

Google Scholar https://scholar.google.com/citations?user=gD8pyCUAAAAJ&hl=en
As of 8/16/2022

Citations	8820
h-index	50
i10-index	132

Patents

Patent / Serial No.	**Name**	**Status**
US 11,205,139	Computation Analysis to Predict Molecular Recognition Space of Monoclonal Antibodies Through Random-Sequence Peptide Arrays	Issued Dec. 21, 2021
US 11,067,582	Peptide array quality control	Issued July 20, 2021
US 6,348,317 B1	Fluorescent and DNA Cleavage Properties of Peptide/Dye Conjugates	Issued Feb. 19, 2002
US 7,193,706 B2	Computer Interfaced Scanning Fluorescence Lifetime Microscope Applied to Directed Evolution	Issued Mar. 20, 2007
US 9,863,938 B2	Synthetic Antibodies	Issued Jan. 9, 2018
US 9,970,932 B2 *Licensed*	Non-Covalent Patterned Chemical Features and Use Thereof in Maldi-based Quality Control	Issued May 15, 2018
US 10,006,919 B2 *Licensed*	Peptide Array Quality Control	Issued Jun. 26, 2018
US 10,046,293 *Licensed*	In Situ Chemical Patterning	Issued Aug 14, 2018
US 10,427,125 *Licensed*	Methods for Performing Patterned Chemistry	Issued Oct. 1, 2019
14/014,168 *Licensed*	Immunosignaturing: A Path to Early Diagnoses and Health Monitoring	Pending
15/264,426	Conditioned Surfaces for in situ Molecular Array Synthesis	Pending
16/489,099	Heated Device for Array Synthesis	Pending
16/603,338	Integrated Diagnostic Devices Having Embedded Biomolecular Computing Systems and Uses Thereof	Pending

PCT/US19/44980	Computation Analysis to Comprehensively Predict and Design Molecular Recognition Between Peptides and Proteins	Pending
PCT/US19/16540	Methods, Systems, and Media for Predicting Functions of Molecular Sequences	Pending
62/804,029	Systems, Methods, and Media for Molecule Design	Pending
16/057,040	Enhanced Applications of Molecular Libraries Based on Structure/Function Analysis	Pending
16/112,238	Incorporating Competitive Binding Information Into Molecular Array Analysis to Generate Function Networks of Interactions	Pending
16/029,965	Prediction of Binding From Binding Data in Peptide and Other Molecular Arrays	Pending
15/649,351 *Optioned*	Nanocaged Enzymes with Enhanced Catalytic Activity and Increased Stability	Pending
16/043,780	Method for Improved Arrays or Libraries Using Normalization Strategies Based on Molecular Structure	Pending
16/489,099	Heated Device for Array Synthesis	Pending
62/470,835	Improved spin-coating device and method for producing molecular arrays	Pending
61/094,250	Selecting for Cooperatively Interacting Molecules	Pending
61/094,262	Screening Method to Identify Molecules Having the Ability to Modulate the Activity of a Catalyst	Pending
61/004,042	Highly Diverse Patterned Surface Chemistries	Pending
12/667,944	Detection and Identification via Bioparticulates	Pending
60/958,643	System and Method for Automated Bioparticle Recognition	Pending
60/897,222	Porous Acrylate Copolymer Films Optimized for in situ Synthesis and Analyte Detection	Pending
60/833,019	High Throughput Ligand Binding Assays and Reagents	Pending
60/784,496	Aptamer-Enriched Oligonucleotide Libraries and Method for Making	Pending
PCT/US06/23344	Three Dimensional Microdomains and MicroArrays, Methods of Making and Using Thereof	Pending
60/691,308	Direct Maldi-MS Characterization of Polymer Arrays on Hight Site Density Substrates	Pending
PCT/US05/39852	Novel Methodology to Create Fluorescent Biosensors Using Aptamers with Fluorescent Base Analogs	Pending
60/625,247	Novel Methodology to Create Fluorescent Biosensors Using Aptamers with Fluorescent DNA or RNA Base Analogs	Pending
PCT/US05/39852	Microarray of Three-Dimensional Heteropolymer Microsturcures and Method Therefor	Pending
60/569,370	Light Directed Solid Phase Synthesis on Patterned Polymers	Pending
PCT/US01/24365	Computer Interfaced Scanning Fluorescence Lifetime Microscope Applied to Directed Evolution	Pending
60/222,691	Computer Interfaced Scanning Fluroescence Lifetime Microscope	Pending

Scholarship and Publications

Journal Articles

Zhou, X., Liu, H., Djutanta, F., Satyabola, D., Jiang, S., Qi, X., Yu, L., Lin, S., Hariadi, R.F., Liu, Y. & Woodbury, N.W., (2022). DNA-templated programmable excitonic wires for micron-scale exciton transport. *Chem*.

…Singh, A., Mandal, S., Chen, S., Liu, M., Gisriel, C. J., Carey, A.-M., … Woodbury, N. W. (2021). Interfacing Photosystem I Reaction Centers with a Porous Antimony-Doped Tin Oxide Electrode to Perform Light-Driven Redox Chemistry. *ACS Applied Electronic Materials*, *3*(5), 2087–2096.

Taguchi, A. T., Boyd, J., Diehnelt, C. W., Legutki, J. B., Zhao, Z.-G., & Woodbury, N. W. (2020). Comprehensive Prediction of Molecular Recognition in a Combinatorial Chemical Space Using Machine Learning. *ACS Combinatorial Science*, *22*(10), 500–508.

Mandal, S., Zhou, X. u., Lin, S. u., Yan, H., & Woodbury, N. (2019). Directed energy transfer through DNA-templated J-aggregates. *Bioconjugate Chemistry*, *30*(7), 1870–1879.

Singh, A., Mandal, S., Carey, A.-M., Liu, M., Chen, S., Seo, D.-K., … Woodbury, N. (2019). Interfacing Photosystem I Reaction Centers with a Porous Antimony-Doped Tin Oxide Electrode to Perform Light Driven Redox Chemistry. *Biophysical Journal*, *116*(3), 443a.

Singh, A., Mandal, S., Carey, A.-M., Liu, M., Chen, S., Seo, D.-K., … Woodbury, N. (2019). Interfacing Photosystem I Reaction Centers with a Porous Antimony-Doped Tin Oxide Electrode to Perform Light Driven Redox Chemistry. *Biophysical Journal*, *116*(3), 443a.

Mandal, S., Zhou, X. u., Lin, S. u., Yan, H., & Woodbury, N. (2019). Directed energy transfer through DNA-templated J-aggregates. *Bioconjugate Chemistry*, *30*(7), 1870–1879.

Zhou, X. u., Mandal, S., Jiang, S., Lin, S. u., Yang, J., Liu, Y., … Yan, H. (2019). Efficient long-range, directional energy transfer through DNA-templated dye aggregates. *Journal of the American Chemical Society*, *141*(21), 8473–8481.

Boulais, 'Etienne, Sawaya, N. P., Veneziano, R. 'emi, Andreoni, A., Banal, J. L., Kondo, T., … others. (2018). Programmed coherent coupling in a synthetic DNA-based excitonic circuit. *Nature Materials*, *17*(2), 159–166.

Mandal, S., Espiritu, E., Akram, N., Lin, S. u., Williams, J. C., Allen, J. P., & Woodbury, N. W. (2018). Influence of the electrochemical properties of the bacteriochlorophyll dimer on triplet energy-transfer dynamics in bacterial reaction centers. *The Journal of Physical Chemistry B*, *122*(44), 10097–10107.

Mandal, S., Zhou, X. u., Fahmi, N. E., Lin, S. u., Yan, H., & Woodbury, N. (2018). Quantum Dot-based Fluorescence Resonance Energy Transfer through Exciton Dynamics in DNA-Templated J-Aggregates. *Biophysical Journal*, *114*(3), 523a.

Mieritz, D., Liang, R., Zhang, H., Carey, A.-M., Chen, S., Volosin, A., … Seo, D.-K. (2018). Thickness-Dependent Bioelectrochemical and Energy Applications of Thickness-Controlled Meso-Macroporous Antimony-Doped Tin Oxide. *Coatings*, *8*(4), 128.

Mieritz, D., Liang, R., Zhang, H., Carey, A.-M., Chen, S., Volosin, A., … Seo, D.-K. (2018). Thickness-Dependent Bioelectrochemical and Energy Applications of Thickness-Controlled Meso-Macroporous Antimony-Doped Tin Oxide. *Coatings*, *8*(4), 128.

Zhang, H., Carey, A.-M., Jeon, K.-W., Liu, M., Murrell, T. D., Locsin, J., … Seo, D.-K. (2017). A highly stable and scalable photosynthetic reaction center--graphene hybrid

electrode system for biomimetic solar energy transduction. *Journal of Materials Chemistry A*, *5*(13), 6038–6041.
Mandal, S., Carey, A.-M., Locsin, J., Gao, B.-R., Williams, J. C., Allen, J. P., … Woodbury, N. W. (2017). Mechanism of triplet energy transfer in photosynthetic bacterial reaction centers. *The Journal of Physical Chemistry B*, *121*(27), 6499–6510.
Carey, A.-M., Zhang, H., Liu, M., Sharaf, D., Akram, N., Yan, H., … Seo, D.-K. (2017). Enhancing Photocurrent Generation in Photosynthetic Reaction Center-Based Photoelectrochemical Cells with Biomimetic DNA Antenna. *ChemSusChem*, *10*(22), 4457–4460.
Zhao, Z.-G., Cordovez, L. A., Johnston, S. A., & Woodbury, N. (2017). Peptide sequencing directly on solid surfaces using MALDI mass spectrometry. *Scientific Reports*, *7*(1), 1–8.
Andreoni, A., Lin, S. u., Liu, H., Blankenship, R. E., Yan, H., & Woodbury, N. W. (2017). Orange Carotenoid Protein as a control element in an antenna system based on a DNA nanostructure. *Nano Letters*, *17*(2), 1174–1180.
Carey, A.-M., Zhang, H., Mieritz, D., Volosin, A., Gardiner, A. T., Cogdell, R. J., … Woodbury, N. W. (2016). Photocurrent generation by photosynthetic purple bacterial reaction centers interfaced with a porous antimony-doped tin oxide (ATO) electrode. *ACS Applied Materials & Interfaces*, *8*(38), 25104–25110.
Liu, M., Fu, J., Qi, X., Wootten, S., Woodbury, N. W., Liu, Y., & Yan, H. (2016). Inside Cover: A Three-Enzyme Pathway with an Optimised Geometric Arrangement to Facilitate Substrate Transfer (ChemBioChem 12/2016). *ChemBioChem*, *17*(12), 1045–1045.
Sun, C., Carey, A.-M., Gao, B.-R., Wraight, C. A., Woodbury, N. W., & Lin, S. u. (2016). Ultrafast electron transfer kinetics in the LM dimer of bacterial photosynthetic reaction center from Rhodobacter sphaeroides. *The Journal of Physical Chemistry B*, *120*(24), 5395–5404.
Boulais, E., Sawaya, N., Veneziano, R. 'emi, Andreoni, A., Lin, S. u., Woodbury, N., … Bathe, M. (2016). A DNA-Based Building Block for Designer Excitonic Circuits. *Biophysical Journal*, *110*(3), 313a.
Pan, J., Saer, R., Lin, S. u., Beatty, J. T., & Woodbury, N. W. (2016). Electron transfer in bacterial reaction centers with the photoactive bacteriopheophytin replaced by a bacteriochlorophyll through coordinating ligand substitution. *Biochemistry*, *55*(35), 4909–4918.
Andreoni, A., Lin, S. u., Liu, H., Yan, H., Blankenship, R. E., & Woodbury, N. W. (2016). Light-Activated Photo Protection in an Artificial Antenna System. *Biophysical Journal*, *110*(3), 198a–199a.
Zhao, Z., Fu, J., Dhakal, S., Johnson-Buck, A., Liu, M., Zhang, T., … Yan, H. (2016). Nanocaged enzymes with enhanced catalytic activity and increased stability against protease digestion. *Nature Communications*, *7*(1), 1–9.
Wang, W., & Woodbury, N. W. (2015). Unstructured interactions between peptides and proteins: exploring the role of sequence motifs in affinity and specificity. *Acta Biomaterialia*, *11*, 88–95.
Legutki, J. B., Zhao, Z.-G., Greving, M., Woodbury, N., Johnston, S. A., & Stafford, P. (2014). Scalable high-density peptide arrays for comprehensive health monitoring. *Nature Communications*, *5*(1), 1–7.
Driscoll, B., Lunceford, C., Lin, S. u., Woronowicz, K., Niederman, R. A., & Woodbury, N. W. (2014). Energy transfer properties of Rhodobacter sphaeroides chromatophores during adaptation to low light intensity. *Physical Chemistry Chemical Physics*, *16*(32), 17133–17141.

Dutta, P. K., Levenberg, S., Loskutov, A., Jun, D., Saer, R., Beatty, J. T., … Yan, H. (2014). A DNA-directed light-harvesting/reaction center system. *Journal of the American Chemical Society*, *136*(47), 16618–16625.

Fu, J., Yang, Y. R., Johnson-Buck, A., Liu, M., Liu, Y., Walter, N. G., … Yan, H. (2014). Multi-enzyme complexes on DNA scaffolds capable of substrate channelling with an artificial swinging arm. *Nature Nanotechnology*, *9*(7), 531–536.

Dutta, P. K., Lin, S. u., Loskutov, A., Levenberg, S., Jun, D., Saer, R., … Woodbury, N. W. (2014). Reengineering the optical absorption cross-section of photosynthetic reaction centers. *Journal of the American Chemical Society*, *136*(12), 4599–4604.

Saer, R. G., Pan, J., Hardjasa, A., Lin, S. u., Rosell, F., Mauk, A. G., … Beatty, J. T. (2014). Structural and kinetic properties of Rhodobacter sphaeroides photosynthetic reaction centers containing exclusively Zn-coordinated bacteriochlorophyll as bacteriochlorin cofactors. *Biochimica et Biophysica Acta (BBA)-Bioenergetics*, *1837*(3), 366–374.

Navalkar, K. A., Johnston, S. A., Woodbury, N., Galgiani, J. N., Magee, D. M., Chicacz, Z., & Stafford, P. (2014). Application of immunosignatures for diagnosis of valley fever. *Clinical and Vaccine Immunology*, *21*(8), 1169–1177.

Wang, W., & Woodbury, N. W. (2014). Selective protein--peptide interactions at surfaces. *Acta Biomaterialia*, *10*(2), 761–768.

Stafford, P., Cichacz, Z., Woodbury, N. W., & Johnston, S. A. (2014). Immunosignature system for diagnosis of cancer. *Proceedings of the National Academy of Sciences*, *111*(30), E3072–E3080.

Guo, Z., Lin, S. u., & Woodbury, N. W. (2013). Utilizing the dynamic Stark shift as a probe for dielectric relaxation in photosynthetic reaction centers during charge separation. *The Journal of Physical Chemistry B*, *117*(38), 11383–11390.

Liu, M., Fu, J., Hejesen, C., Yang, Y., Woodbury, N. W., Gothelf, K., … Yan, H. (2013). A DNA tweezer-actuated enzyme nanoreactor. *Nature Communications*, *4*(1), 1–5.

LeBard, D. N., Martin, D. R., Lin, S. u., Woodbury, N. W., & Matyushov, D. V. (2013). Protein dynamics to optimize and control bacterial photosynthesis. *Chemical Science*, *4*(11), 4127–4136.

Pan, J., Saer, R. G., Lin, S. u., Guo, Z., Beatty, J. T., & Woodbury, N. W. (2013). The protein environment of the bacteriopheophytin anion modulates charge separation and charge recombination in bacterial reaction centers. *The Journal of Physical Chemistry B*, *117*(24), 7179–7189.

Fu, J., Liu, M., Liu, Y., Woodbury, N. W., & Yan, H. (2012). Interenzyme substrate diffusion for an enzyme cascade organized on spatially addressable DNA nanostructures. *Journal of the American Chemical Society*, *134*(12), 5516–5519.

Fisher, E., Boenink, M., Van, D., & Woodbury, N. (2012). Responsible healthcare innovation: anticipatory governance of nanodiagnostics for theranostics medicine. *Expert Review of Molecular Diagnostics*, *12*(8), 857–870.

Pan, J., Lin, S. u., & Woodbury, N. W. (2012). Bacteriochlorophyll excited-state quenching pathways in bacterial reaction centers with the primary donor oxidized. *The Journal of Physical Chemistry B*, *116*(6), 2014–2022.

Wang, H., Hao, Y., Jiang, Y., Lin, S. u., & Woodbury, N. W. (2012). Role of protein dynamics in guiding electron-transfer pathways in reaction centers from rhodobacter sphaeroides. *The Journal of Physical Chemistry B*, *116*(1), 711–717.

Guo, Z., Woodbury, N. W., Pan, J., & Lin, S. u. (2012). Protein dielectric environment modulates the electron-transfer pathway in photosynthetic reaction centers. *Biophysical Journal*, *103*(9), 1979–1988.

Fu, J., Reinhold, J., & Woodbury, N. W. (2011). Peptide-modified surfaces for enzyme immobilization. *PloS One*, *6*(4), e18692.
Pan, J., Lin, S. u., Allen, J. P., Williams, J. C., Frank, H. A., & Woodbury, N. W. (2011). Carotenoid excited-state properties in photosynthetic purple bacterial reaction centers: effects of the protein environment. *The Journal of Physical Chemistry B*, *115*(21), 7058–7068.
Fu, J., Reinhold, J., & Woodbury, N. W. (2011). Peptide-modified surfaces for enzyme immobilization. *PloS One*, *6*(4), e18692.
Guo, Z., Lin, S. u., Xin, Y., Wang, H., Blankenship, R. E., & Woodbury, N. W. (2011). Comparing the temperature dependence of photosynthetic electron transfer in Chloroflexus aurantiacus and Rhodobactor sphaeroides reaction centers. *The Journal of Physical Chemistry B*, *115*(38), 11230–11238.
Greving, M. P., Belcher, P. E., Diehnelt, C. W., Gonzalez-Moa, M. J., Emery, J., Fu, J., … Woodbury, N. W. (2010). Thermodynamic additivity of sequence variations: an algorithm for creating high affinity peptides without large libraries or structural information. *PLoS One*, *5*(11), e15432.
Greving, M. P., Belcher, P. E., Cox, C. D., Daniel, D., Diehnelt, C. W., & Woodbury, N. W. (2010). High-throughput screening in two dimensions: Binding intensity and off-rate on a peptide microarray. *Analytical Biochemistry*, *402*(1), 93–95.
Greving, M. P., Kumar, P., Zhao, Z.-G., & Woodbury, N. W. (2010). Feature-level MALDI-MS characterization of in situ-synthesized peptide microarrays. *Langmuir*, *26*(3), 1456–1459.
Fu, J., Cai, K., Johnston, S. A., & Woodbury, N. W. (2010). Exploring peptide space for enzyme modulators. *Journal of the American Chemical Society*, *132*(18), 6419–6424.
Williams, B. A., Diehnelt, C. W., Belcher, P., Greving, M., Woodbury, N. W., Johnston, S. A., & Chaput, J. C. (2009). Creating protein affinity reagents by combining peptide ligands on synthetic DNA scaffolds. *Journal of the American Chemical Society*, *131*(47), 17233–17241.
Kelbauskas, L., Yodh, J., Woodbury, N., & Lohr, D. (2009). Intrinsic promoter nucleosome stability/dynamics variations support a novel targeting mechanism. *Biochemistry*, *48*(20), 4217–4219.
Woodbury, N., Northen, T., Laws, G., Thornton, T., Williams, J., & Allen, J. (2009). Development of Water Splitting Catalysts Using a Novel Molecular Evolution Approach.
Allen, J. P., Cordova, J. M., Jolley, C. C., Murray, T. A., Schneider, J. W., Woodbury, N. W., … others. (2009). EPR, ENDOR, and Special TRIPLE measurements of P?+ in wild type and modified reaction centers from Rb. sphaeroides. *Photosynthesis Research*, *99*(1), 1–10.
Lin, S. u., Jaschke, P. R., Wang, H., Paddock, M., Tufts, A., Allen, J. P., … others. (2009). Kinetics and energetics of electron transfer reactions in a photosynthetic bacterial reaction center assembled with zinc bacteriochlorophylls. *Biophysical Journal*, *96*(3), 239a.
Kelbauskas, L., Woodbury, N., & Lohr, D. (2009). DNA sequence-dependent variation in nucleosome structure, stability, and dynamics detected by a FRET-based analysis. *Biochemistry and Cell Biology*, *87*(1), 323–335.
Wang, H., Lin, S. u., Katilius, E., Laser, C., Allen, J. P., Williams, J. C., & Woodbury, N. W. (2009). Unusual temperature dependence of photosynthetic electron transfer due to protein dynamics. *The Journal of Physical Chemistry B*, *113*(3), 818–824.
Lin, S. u., Jaschke, P. R., Wang, H., Paddock, M., Tufts, A., Allen, J. P., … Beatty, J. T. (2009). Electron transfer in the Rhodobacter sphaeroides reaction center assembled with

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Sponsored Projects / Grants

Funded - Current

Dignity MMSA Year 6, Funded by Dignity Health dba St. Joseph's Hospital and Medical Center (January 1, 2022 - June 21, 2023), awarded October 19, 2021 ($7,915,000.00), Funded - In Progress, Spring 2022, PI Neal Woodbury (100%)

PEDIATRIC AFFILIATION AND RESEARCH COLLABORATION - Year 4, Funded by Phoenix Children's Hospital (June 1, 2021 - May 31, 2023), awarded October 20, 2021 ($10,000,000.00), Funded - In Progress, Summer 2021, PI Neal Woodbury (100%)

Dignity MMSA Year 5, Funded by Dignity Health dba St. Joseph's Hospital and Medical Center (January 1, 2021 - June 21, 2022), awarded February 10, 2021 ($11,550,000.00), Funded - In Progress, Spring 2021, PI Neal Woodbury (100%)

UIA – University Innovation Alliance (Nielsen Foundation), Funded by Arizona State University Foundation (ASUF) (December 16, 2020 - December 15, 2021), awarded January 29, 2021 ($50,000.00), Funded - In Progress, Fall 2020, Other Neal Woodbury (100%)

Student-Cohort Studies of SARS-CoV-2 Infection and Immunology, Funded by Arizona Department of Health Services (October 14, 2020 - May 15, 2022), awarded October 16, 2020 ($2,000,000.00), Funded - In Progress, Fall 2020, PI Neal Woodbury (100%)

PEDIATRIC AFFILIATION AND RESEARCH COLLABORATION - Year 3, Funded by Phoenix Children's Hospital (June 1, 2020 - May 31, 2023), awarded October 30, 2020 ($10,000,000.00), Funded - In Progress, Summer 2020, PI Neal Woodbury (100%)

Project 1: Development of Luminex Beads and Project 2: Microarray Assay and Data Analysis - immunological understanding, Funded by Arizona State University Foundation (ASUF) (April 1, 2020 - March 31, 2022), awarded May 8, 2020 ($326,849.00), Funded -

In Progress, Spring 2020, PI Neal Woodbury (50%) with Other Joseph Legutki (25%), Other Laimonas Kelbauskas (25%)

Direct electrical measurement of enzyme activity and the functional and conformational fluctuations of proteins., Funded by Recognition Analytix (April 1, 2020 - December 31, 2021), awarded July 17, 2020 ($184,189.00), Funded - In Progress, Spring 2020, PI Neal Woodbury (100%)

DNA Nanostructure Directed Designer Excitonic Networks, Funded by DOE: Office of Science (OS) (August 15, 2016 - June 14, 2022) ($524,700.00), Funded - In Progress, Summer 2016, Other Neal Woodbury (30%) with PI Hao Yan (40%), Other Yan Liu (30%)

NNCI: Nanotechnology Collaborative Infrastructure Southwest (NCI-SW), Funded by National Science Foundation (NSF) (September 15, 2015 - August 31, 2022) ($400,000.00), Funded - In Progress, Fall 2015, Other Neal Woodbury (10%) with PI Trevor Thornton (50%), Other Thomas Sharp (10%), Other Jameson Wetmore (10%), Other Stuart Bowden (10%)

Completed

Identification of Immunogenic Epitopes For Lyme Disease Using Machine Learning-Based Comprehensive Reactivity Profiling of Patients Antibodies, Funded by DOD-ARMY: Army Medical Research Acquisition Activity (USAMRAA) (April 1, 2022 - March 31, 2024) ($938,112.00), Completed, Fall 2021, PI Neal Woodbury (50%) with Other Laimonas Kelbauskas (50%)

Dignity MMSA Year 6, Funded by Dignity Health dba St. Joseph's Hospital and Medical Center (January 1, 2022 - December 31, 2022) ($7,915,001.00), Completed, Fall 2021, PI Neal Woodbury (100%)

PIPP Phase I: Computational foundations for bio-social modeling of unseen pandemics, Funded by National Science Foundation (NSF) (March 1, 2022 - September 1, 2023) ($1,323,466.00), Completed, Fall 2021, Other Neal Woodbury (3%) with PI Pavan Turaga (10%), Other Erik Johnston (8%), Other Ni Trieu (3%), Other Michael Simeone (3%), Other Gautam Dasarathy (8%), Other Lalitha Sankar (5%), Other WenWen Li (3%), Other Visar Berisha (8%), Other Efrem Lim (3%), Other Matthew Buman (3%), Other Laimonas Kelbauskas (8%), Other Daniel Rivera (8%), Other Rolf Halden (3%), Other Giulia Pedrielli (8%), Other Patricia Solis (8%)

Direct electrical measurement of enzyme activity and the functional and conformat, Funded by Recognition Analytix (January 1, 2022 - December 31, 2022) ($201,048.00), Completed, Fall 2021, PI Neal Woodbury (100%)

Biomimetic Light Harvesting Complexes Based on Self-Assembled Dye-DNA Nanostructures, Funded by DOE: Office of Science (OS) (June 1, 2022 - May 31, 2025) ($999,559.00), Completed, Fall 2021, Other Neal Woodbury (30%) with Other Su Lin (30%), PI Hao Yan (40%)

Microarray Assay and Data Analysis - Revision 2, Funded by Arizona State University Foundation (ASUF) (August 31, 2021 - November 30, 2021) ($80,000.00), Completed, Fall 2021, PI Neal Woodbury (67%) with Other Laimonas Kelbauskas (33%)

PEDIATRIC AFFILIATION AND RESEARCH COLLABORATION - Year 4, Funded by Phoenix Children's Hospital (June 1, 2021 - May 31, 2023) ($10,000,000.00), Completed, Fall 2021, PI Neal Woodbury (100%)

UIA: Maintain Momentum: Supporting Postsecondary Education Membership Organizations and Networks, Funded by Arizona State University Foundation (ASUF) (November 1, 2020 - October 31, 2021), awarded December 30, 2020 ($436,250.00), Completed, Fall 2021, Other Neal Woodbury (100%)

High-Throughput Rapid and Epitope-Specific Quantification of Neutralizing Antibodies Using Digital Nanoparticle Sensors, Funded by HHS: National Institutes of Health (NIH) (April 1, 2022 - March 31, 2024) ($418,253.00), Completed, Summer 2021, Other Neal Woodbury (45%) with PI Chao Wang (55%)

Dignity MMSA Year 5, Funded by Dignity Health dba St. Joseph's Hospital and Medical Center (January 1, 2021 - June 21, 2022) ($11,550,000.00), Completed, Spring 2021, PI Neal Woodbury (100%)

Direct electrical measurement of enzyme activity and the functional and conformat - Renewal - 1, Funded by Recognition Analytix (January 1, 2021 - December 31, 2021) ($2,842.00), Completed, Spring 2021, PI Neal Woodbury (100%)

High-Throughput Rapid and Epitope-Specific Quantification of Neutralizing Antibodies Using Nanoparticle Sensors in a Well Plate, Funded by HHS: National Institutes of Health (NIH) (September 1, 2021 - August 31, 2023) ($604,445.00), Completed, Spring 2021, Other Neal Woodbury (45%) with PI Chao Wang (55%)

Project 3: Algorithm Validation, Funded by Arizona State University Foundation (ASUF) (March 1, 2021 - August 31, 2021) ($256,505.00), Completed, Spring 2021, PI Neal Woodbury (50%) with Other Laimonas Kelbauskas (25%), Other Joseph Legutki (25%)

UIA: Maintain Momentum: Supporting Postsecondary Education Membership Organizations and Networks, Funded by Arizona State University Foundation (ASUF) (November 1, 2020 - October 31, 2021) ($436,250.00), Completed, Fall 2020, Other Neal Woodbury (100%)

Direct electrical measurement of enzyme activity and the functional and conformat - Renewal - 1, Funded by Recognition Analytix (October 1, 2020 - September 30, 2021) ($201,968.00), Completed, Fall 2020, PI Neal Woodbury (100%)

PEDIATRIC AFFILIATION AND RESEARCH COLLABORATION - Year 3, Funded by Phoenix Children's Hospital (June 1, 2020 - May 31, 2023) ($10,000,000.00), Completed, Fall 2020, PI Neal Woodbury (100%)

UIA – University Innovation Alliance (Nielsen Foundation), Funded by Arizona State University Foundation (ASUF) (July 1, 2021 - June 30, 2023) ($49,999.00), Completed, Fall 2020, Other Neal Woodbury (100%)

Student-Cohort Studies of SARS-CoV-2 Infection and Immunology, Funded by Arizona Department of Health Services (October 31, 2020 - January 30, 2022) ($3,500,001.00), Completed, Fall 2020, PI Neal Woodbury (100%)

Project 1: Development of Luminex Beads through preparation of purified protein and protein selection to develop & test diagnostic tools and immunological understanding for

combating Lyme disease., Funded by Arizona State University Foundation (ASUF) (April 1, 2020 - March 31, 2022) ($191,263.00), Completed, Spring 2020, PI Neal Woodbury (50%) with Other Laimonas Kelbauskas (25%), Other Joseph Legutki (25%)

Project 2: Microarray Assay and Data Analysis - immunological understanding for combating Lyme disease, Funded by Arizona State University Foundation (ASUF) (April 1, 2020 - March 31, 2022) ($161,931.00), Completed, Spring 2020, PI Neal Woodbury (50%) with Other Laimonas Kelbauskas (25%), Other Joseph Legutki (25%)

Direct electrical measurement of enzyme activity and the functional and conformational fluctuations of proteins., Funded by Recognition Analytix (April 1, 2020 - March 31, 2021) ($160,000.00), Completed, Spring 2020, PI Neal Woodbury (100%)

Applications of Recognition Tunneling in Proteomics and Glycomics and direct elec, Funded by Recognition Analytix (July 1, 2018 - March 31, 2020), awarded July 17, 2018 ($162,500.00), Completed, Spring 2020, PI Neal Woodbury (100%)

Immunosignatures - A Platform for Detecting and Identifying Multiple Infectious Diseases, Funded by US Department of Homeland Security (DHS) (May 1, 2015 - September 30, 2019) ($1,211,547.25), Completed, Fall 2019, Other Neal Woodbury (25%) with Other Joseph Legutki (25%), PI Stephen Johnston (25%)

Supplement: MURI: Translating Biochemical Pathways to Non-Cellular Environment, Funded by DOD-ARMY-ARL: Army Research Office (ARO) (January 1, 2018 - August 19, 2019) ($437,499.75), Completed, Fall 2019, Other Neal Woodbury (25%) with Other Su Lin (15%), Other Dong Kyun Seo (25%), PI Hao Yan (35%)

Applications of Recognition Tunneling in Proteomics and Glycomics, Funded by Recognition Analytix (January 30, 2015 - April 30, 2019) ($136,893.00), Completed, Spring 2019, PI Neal Woodbury (100%)

MURI: Translating Biochemical Pathways to Non-Cellular Environment, Funded by DOD-NAVY: Office of Naval Research (ONR) (August 20, 2012 - August 19, 2018) ($562,500.00), Completed, Fall 2018, Other Neal Woodbury (9%) with Other Su Lin (14%), Other Dong Kyun Seo (23%), PI Hao Yan (27%), Other Yan Liu (27%)

VOID Services Agreement, Funded by Caris Science, Inc. (August 30, 2018 - August 31, 2018), awarded March 29, 2019 ($1.00), Completed, Fall 2018, PI Neal Woodbury (100%)

Applications of Recognition Tunneling in Proteomics and Glycomics and direct electrical measurement of enzyme activity and the functional and conformational fluctuations of proteins, Funded by Recognition Analytix (July 1, 2018 - June 30, 2019) ($162,499.00), Completed, Summer 2018, PI Neal Woodbury (100%)

Task 9: Feasibility Study Creating Reduced Peptide Set for a Simple Diagnostic Device, Funded by US Department of Homeland Security (DHS) (June 1, 2018 - December 31, 2018) ($151,566.00), Completed, Summer 2018, Other Neal Woodbury (25%) with PI Stephen Johnston (25%)

Services Agreement, Funded by Caris Life Sciences (August 1, 2018 - July 31, 2019) ($159,680.00), Completed, Summer 2018, PI Neal Woodbury (100%)

Supplement: MURI: Translating Biochemical Pathways to Non-Cellular Environment, Funded by DOD-ARMY-ARL: Army Research Office (ARO) (September 1,

2018 - August 31, 2019) ($1,250,000.00), Completed, Summer 2018, Other Neal Woodbury (25%) with PI Hao Yan (35%), Other Dong Kyun Seo (25%), Other Su Lin (15%)

Protein Dynamics in Electron Transfer, Funded by NSF: Directorate for Biological Sciences (BIO) (March 1, 2012 - February 28, 2018) ($246,805.00), Completed, Spring 2018, PI Neal Woodbury (25%) with Other Dmitry Matyushov (25%), Other Su Lin (50%)

Supplement: MURI: Translating Biochemical Pathways to Non-Cellular Environment, Funded by DOD-ARMY-ARL: Army Research Office (ARO) (January 1, 2018 - June 30, 2018) ($499,999.00), Completed, Fall 2017, Other Neal Woodbury (25%) with Other Dong Kyun Seo (25%), Other Su Lin (15%), PI Hao Yan (35%)

A Kinetic Analysis of Antibody Binding to Peptide Arrays, Funded by HealthTell, Inc. (May 15, 2017 - August 15, 2017) ($24,691.00), Completed, Summer 2017, Other Neal Woodbury (100%)

A Simple System for Early Detection of Breast Cancer, Funded by DOD-ARMY-MRMC: Congressionally Directed Medical Research Program (CDMRP) (July 1, 2014 - June 30, 2017) ($998,786.91), Completed, Summer 2017, Other Neal Woodbury (33%) with PI Stephen Johnston (34%)

A Kinetic Analysis of Antibody Binding to Peptide Arrays, Funded by HealthTell, Inc. (May 15, 2017 - August 15, 2017) ($24,691.00), Completed, Spring 2017, Other Neal Woodbury (100%)

Peptide Array Core Track System, Funded by Arizona Board of Regents (July 1, 2015 - December 31, 2016) ($200,000.00), Completed, Fall 2016, PI Neal Woodbury (50%) with Other Stephen Johnston (50%)

Thermodynamic Model Aimed at Data Reduction for Antibody Binding to Peptide Array, Funded by HealthTell, Inc. (June 10, 2016 - December 8, 2016) ($21,718.00), Completed, Fall 2016, Other Neal Woodbury (100%)

Thermodynamic Model Aimed at Data Reduction for Antibody Binding to Peptide Arrays, Funded by HealthTell, Inc. (June 10, 2016 - September 9, 2016) ($21,717.00), Completed, Summer 2016, Other Neal Woodbury (100%)

Center for Membrane Proteins in Infectious Diseases (MPID), Funded by HHS-NIH: National Institute of General Medical Sciences (NIGMS) (July 1, 2011 - June 30, 2016) ($440,298.80), Completed, Summer 2016, Other Neal Woodbury (8%) with Other Giovanna Ghirlanda (8%), Other Sefika Ozkan (8%), Other Stephen Johnston (8%), Other James Allen (8%), Other Rebekka Wachter (8%), PI Petra Fromme (20%), Other Joshua LaBaer (8%), Other Tsafrir Leket-Mor (8%), Other Brenda Hogue (8%)

INSPIRE: Mimicking the Functional Complexity of Biology with Man-Made Systems, Funded by NSF: Directorate for Biological Sciences (BIO) (July 15, 2012 - June 30, 2016) ($299,971.20), Completed, Summer 2016, Other Neal Woodbury (30%) with PI George Poste (16%), Other Hao Yan (12%), Other Zhan-Gong Zhao (12%), Other Stephen Johnston (12%), Other Stuart Lindsay (6%)

DNA nanostructure directed designer excitonic networks, Funded by DOE: Office of Science (OS) (August 1, 2016 - July 31, 2019) ($899,684.00), Completed, Spring 2016, Other Neal Woodbury (30%) with Other Yan Liu (30%), PI Hao Yan (40%)

The Assembly of Photosynthetic Light-Harvesting Complexes in Whole Cells, Funded by National Science Foundation (NSF) (September 15, 2011 - August 31, 2015) ($75,000.00), Completed, Fall 2015, PI Neal Woodbury (25%) with Other Su Lin (75%)

Prevalence of Immune Response for Ebola in the Endemic Populations, Funded by NSF: Directorate for Biological Sciences (BIO) (December 15, 2014 - November 30, 2015) ($67,988.44), Completed, Fall 2015, PI Neal Woodbury (100%) with Other Stephen Johnston (33%)

Peptide Array Core Track System, Funded by Arizona Board of Regents (July 1, 2015 - December 31, 2016) ($400,000.00), Completed, Spring 2015, PI Neal Woodbury (50%) with Other Stephen Johnston (50%)

NNCI: A Southwest Coordinated Infrastructure for Nanotechnology Education and Entrepreneurship, Funded by National Science Foundation (NSF) (October 1, 2015 - September 30, 2020) ($7,908,268.00), Completed, Spring 2015, Other Neal Woodbury (10%) with Other Jameson Wetmore (10%), PI Trevor Thornton (50%), Other Thomas Sharp (10%), Other Stuart Bowden (10%)

Prevalence of Immune Response for Ebola in the Endemic Populations, Funded by National Science Foundation (NSF) (January 1, 2015 - June 30, 2015) ($199,966.00), Completed, Fall 2014, PI Neal Woodbury (34%) with Other Stephen Johnston (33%)

Applications of Recognition Tunneling in Proteomics and Glycomics, Funded by Recognition Analytix (January 30, 2015 - January 29, 2016) ($41,348.00), Completed, Fall 2014, PI Neal Woodbury (100%)

Immunosignatures: A Platform for Detecting and Identifying Multiple Infectious Diseases, Funded by US Department of Homeland Security (DHS) (September 1, 2014 - August 31, 2015) ($3,045,759.00), Completed, Summer 2014, Other Neal Woodbury (25%) with Other Joseph Legutki (25%), PI Stephen Johnston (25%)

Detection of changes in health status and source of any infection using peptide array chips Technical PI: Stephen Johnston, Funded by DOD: Defense Threat Reduction Agency (DTRA) (April 24, 2012 - December 31, 2013) ($3,207,382.50), Completed, Fall 2013, Other Neal Woodbury (30%) with PI Stephen Johnston (30%), Other George Poste (10%), Other Antonia Papandreou-Suppappola (15%)

Enzymology of multi-enzyme systems on self-assembled surfaces, Funded by National Science Foundation (NSF) (December 1, 2010 - November 30, 2013) ($203,103.00), Completed, Fall 2013, PI Neal Woodbury (50%) with Other Hao Yan (50%)

A Simple System for Early Detection of Breast Cancer, Funded by DOD-ARMY-MRMC: Congressionally Directed Med Res Prog (CDMRP) (April 1, 2014 - March 31, 2016) ($3,034,099.00), Completed, Fall 2013, Other Neal Woodbury (33%) with PI Stephen Johnston (34%)

EESE Collaborative Research: Energy Ethics in Science and Engineering Education, Funded by NSF-BIO: Division of Biological Infrastructure (DBI) (January 1, 2011 - December 31, 2013) ($6,246.55), Completed, Fall 2013, Other Neal Woodbury (5%) with PI Clark Miller (37%), Other Erik Fisher (8%), Other Cynthia Selin (8%), Other Stephen Goodnick (5%), Other Martin Pasqualetti (8%)

Optimization of Chemistry and Development of Patterned Synthesis and Processing Methods for Peptide Arrays produced by Photolithography continuation, Funded by HealthTell, Inc (March 1, 2013 - September 30, 2013) ($240,172.00), Completed, Summer 2013, Other Neal Woodbury (16%) with Other Joseph Legutki (17%), Other Stephen Johnston (16%), Other Douglas Daniel (17%)

Protein Control of Electron Transfer Pathways in Photosynthesis, Funded by NSF: Directorate for Biological Sciences (BIO) (April 1, 2007 - March 31, 2013) ($585,646.00), Completed, Spring 2013, PI Neal Woodbury (50%) with Other Su Lin (50%)

Protein Dynamics in Electron Transfer (REU Supplement), Funded by National Science Foundation (NSF) (April 1, 2013 - March 31, 2014) ($7,000.00), Completed, Spring 2013, PI Neal Woodbury (25%) with Other Dmitry Matyushov (25%), Other Su Lin (50%)

YR 1: Center for Membrane Proteins in Infectious Diseases (MPID), Funded by HHS-NIH: National Institute of General Medical Sciences (NIGMS) (September 30, 2010 - June 30, 2012) ($97,079.68), Completed, Summer 2012, Other Neal Woodbury (5%) with Other Bertram Jacobs (7%), Other Rebekka Wachter (7%), Other Giovanna Ghirlanda (8%), Other Joshua LaBaer (8%), Other Brenda Hogue (5%), Other Tsafrir Leket-Mor (7%), Other Sefika Ozkan (7%), Other Michael Thorpe (5%), Other James Allen (7%), PI Petra Fromme (18%)

Mimicking the Functional Complexity of Biology with Man-Made Systems, Funded by National Science Foundation (NSF) (November 1, 2012 - October 31, 2015) ($999,904.00), Completed, Spring 2012, Other Neal Woodbury (30%) with Other Stuart Lindsay (6%), Other Stephen Johnston (12%), Other Hao Yan (12%), PI George Poste (16%)

Translating Biochemical Pathways to Non-Cellular Environment, Funded by DOD-NAVY: Office of Naval Research (ONR) (June 1, 2012 - May 31, 2017) ($7,500,000.00), Completed, Fall 2011, Other Neal Woodbury (9%) with Other Dong Kyun Seo (23%), Other Su Lin (14%), Other Yan Liu (27%), PI Hao Yan (27%)

Protein Dynamics in Electron Transfer, Funded by National Science Foundation (NSF) (March 1, 2012 - February 28, 2017) ($1,184,825.00), Completed, Fall 2011, PI Neal Woodbury (25%) with Other Su Lin (50%), Other Dmitry Matyushov (25%)

Detection of changes in health status and source of any infection using peptide array chips Technical PI: Stephen Johnston, Funded by DOD: Defense Threat Reduction Agency (DTRA) (July 1, 2011 - June 30, 2015) ($30,718,054.00), Completed, Fall 2010, Other Neal Woodbury (35%) with PI George Poste (10%), Other Stephen Johnston (35%)

DUPLICATE OF NJS0024 ---The Topology of Peptide/Protein Interaction Space, Funded by NSF: Directorate for Biological Sciences (BIO) (August 1, 2009 - July 31, 2010) ($150,000.00), Completed, Summer 2010, PI Neal Woodbury (50%)

The Topology of Peptide/Protein Interaction Space, Funded by NSF: Directorate for Biological Sciences (BIO) (August 1, 2009 - July 31, 2010) ($150,000.00), Completed, Summer 2010, PI Neal Woodbury (50%)

Assembly of photosynthetic light-harvesting complexes in whole cells, Funded by National Science Foundation (NSF) (January 1, 2011 - December 31, 2013) ($595,036.00), Completed, Summer 2010, PI Neal Woodbury (25%) with Other Su Lin (75%)

Collaborative Research: Energy Ethics in Science and Engineering Education (collaborative proposal with the National Academy of Engineering as the lea, Funded by National Science Foundation (NSF) (October 1, 2010 - September 30, 2013) ($124,931.00), Completed, Spring 2010, Other Neal Woodbury (5%) with PI Clark Miller (24%), Other Erik Fisher (8%), Other Stephen Goodnick (5%), Other Martin Pasqualetti (8%), Other Cynthia Selin (8%)

Enzymology of multi-enzyme systems on self-assembled surfaces, Funded by National Science Foundation (NSF) (December 1, 2010 - December 1, 2013) ($447,437.00), Completed, Spring 2010, PI Neal Woodbury (50%) with Other Hao Yan (50%)

Excitation Energy Transfer in Photosystem I, Funded by US Department of Energy (DOE) (September 15, 1999 - September 14, 2009) ($57,000.00), Completed, Fall 2009, Other Neal Woodbury (50%) with PI Andrew Webber (50%)

Combinational Development of Water Splitting Catalysts Based on the Oxygen Evolving Complex of Photosystem II, Funded by DOE: Golden Field Office (July 1, 2005 - December 31, 2009) ($408,000.00), Completed, Fall 2009, PI Neal Woodbury (34%) with Other James Allen (16%), Other Trevor Thornton (33%), Other Joann Williams (17%)

Center for Membrane Proteins in Infectious Diseases MPID, Funded by HHS-NIH: National Inst of General Medical Sciences (NIGMS) (July 1, 2010 - June 30, 2015) ($24,985,956.00), Completed, Fall 2009, Other Neal Woodbury (5%) with Other Bertram Jacobs (7%), Other Joshua LaBaer (5%), Other Sefika Ozkan (7%), PI Petra Fromme (18%), Other Brenda Hogue (5%), Other Tsafrir Leket-Mor (7%), Other James Allen (7%), Other Giovanna Ghirlanda (5%)

High throughput NAPPA-proteoimmunomics and V. cholerae vaccine development, Funded by Massachusetts General Hospital (June 1, 2009 - May 31, 2013) ($893,370.00), Completed, Summer 2009, PI Neal Woodbury (100%)

The Topology of Peptide/Protein Interaction Space, Funded by National Science Foundation (NSF) (August 1, 2009 - July 31, 2010) ($300,000.00), Completed, Summer 2009, PI Neal Woodbury (50%)

Structure-Based Directed Evolution of Fast-Maturing GFPs, Funded by HHS: National Institutes of Health (NIH) (July 1, 2007 - June 30, 2009) ($14,733.20), Completed, Summer 2009, Other Neal Woodbury (10%) with PI Rebekka Wachter (90%)

Purchase of an Instrument for Ultrafast Multidimensional Fluorescence Detection and Imaging, Funded by National Science Foundation (NSF) (February 15, 2006 - January 31, 2009), Completed, Spring 2009, Other Neal Woodbury (25%) with Other Petra Fromme (3%), Other Robert Roberson (3%), Other Yung Chang (3%), Other Douglas Daniel (3%), Other Hao Yan (3%), Other Su Lin (25%), Other Willem Vermaas (3%), Other Ana Moore (3%), PI William Petuskey (3%), Other Andrew Webber (3%), Other Ian Gould (3%), Other Thomas Moore (3%), Other Rebekka Wachter (3%), Other Yan Liu (3%)

Multi-Scale Complex Systems Transdisciplinary Analysis of Response to Therapy (MC-START), Funded by University of Southern California (September 1, 2009 - August 30, 2014) ($1,521,468.00), Completed, Spring 2009, PI Neal Woodbury (100%)

IGERT: OPTICAL BIOMOLECULAR DEVICES: FROM NATURAL PARADIGMS TO PRACTICAL APPLICATIONS, Funded by National Science Foundation (NSF) (September 15, 2001 - August 31, 2008), Completed, Fall 2008, PI Neal Woodbury (7%) with Other Willem Vermaas (3%), Other Gregory Raupp (3%), Other Trevor Thornton (3%), Other Stuart Lindsay (3%), Other Stephen Massia (3%), Other Ian Gould (3%), Other Nongjian Tao (3%), Other Patrick Phelan (3%), Other Wayne Frasch (3%), Other Mark Hayes (3%), Other Bruce Towe (3%), Other Su Lin (3%), Other Antonio Garcia (3%), Other Thomas Moore (3%), Other Joann Williams (3%), Other Michael Kozicki (3%), Other Vincent Pizziconi (3%), Other Ana Moore (3%), Other Scott Bingham (3%), Other Andrew Webber (3%), Other James Allen (3%)

CAA: Factor Binding Dynamics on Promoters, Funded by Science Foundation of Arizona (March 30, 2007 - September 30, 2008) ($79,654.86), Completed, Fall 2008, PI Neal Woodbury (34%) with Other Stuart Lindsay (33%)

CONTROLLING THE PATHWAY OF ELECTRON TRANSFER IN BACTERIAL REACTION CENTERS, Funded by NSF: Directorate for Biological Sciences (BIO) (March 1, 2002 - February 28, 2007) ($127,750.00), Completed, Spring 2007, PI Neal Woodbury (40%) with Other Su Lin (30%)

CHARACTERIZATION OF DNAPROTEIN INTERACTIONS AT THE SINGLE MOLECULE LEVEL, Funded by National Science Foundation (NSF) (July 1, 2003 - June 30, 2006) ($64,277.60), Completed, Summer 2006, PI Neal Woodbury (40%)

Protein Control of Electron Transfer Pathways in Photosynthesis, Funded by NSF-BIO-MCB: Division of Molecular Biosciences (DMB) (April 1, 2007 - March 31, 2012) ($1,171,292.00), Completed, Summer 2006, PI Neal Woodbury (50%) with Other Su Lin (50%)

Purchase of an Instrument for Ultrafast Multidemensional Fluorescence Detection and Imaging, Funded by National Science Foundation (NSF) (February 1, 2006 - January 31, 2009) ($500,000.00), Completed, Summer 2005, Other Neal Woodbury (25%) with Other Ana Moore (3%), Other Petra Fromme (3%), Other Hao Yan (3%), Other Su Lin (25%), Other Yan Liu (3%), Other Ian Gould (3%), PI William Petuskey (3%), Other Andrew Webber (3%), Other Thomas Moore (3%), Other Robert Roberson (3%), Other Willem Vermaas (3%), Other Douglas Daniel (3%), Other Yung Chang (3%)

CONTROLLING THE PATHWAY OF ELECTRON TRANSFER IN BACTERIAL REACTION CENTERS, Funded by NSF: Directorate for Biological Sciences (BIO) (March 1, 2002 - April 30, 2005) ($400,625.00), Completed, Spring 2005, PI Neal Woodbury (100%)