

# Daniel Palanker

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## **Professional Interests**

Optical and electronic technologies for diagnostic, therapeutic, surgical and prosthetic applications, primarily in ophthalmology:

- Laser-Tissue Interactions: Non-damaging retinal laser therapy; Ultrafast laser surgery; Retinal plasticity;
- Electro-Neural interfaces: Photovoltaic Restoration of Sight; Electronic Control of Organs - vasculature and secretory glands.
- Optical imaging and spectroscopy: Interferometric detection of neural signaling.

## **Education**

- 1996 - 1998: **Postdoctoral fellowship** at Picosecond Free Electron Laser Center, Stanford University, CA, USA. "Photo-induced transient optical elements for near-field IR microscopy"
- 1989 - 1995: **Ph.D.** in Physics (with highest honors), the Hebrew University of Jerusalem, Israel. Dissertation Title: "Photoablation of Soft Tissues Using Lensless Optics and its Applications to Medicine and Biology".
- 1979 - 1984: **M.Sc.** in Physics, Yerevan State University, USSR. Thesis: "Scattering of X-rays on Crystals with Deformations"

## **Academic career**

- 2016 - *Director*, Hansen Experimental Physics Laboratory, Stanford University.
- 2016 - Department of Electrical Engineering, Stanford University.  
*Professor by courtesy*
- 2014 - Department of Ophthalmology, School of Medicine, and Hansen Experimental Physics Laboratory, Stanford University.  
*Professor*
- 2007 - 2014 Department of Ophthalmology, School of Medicine, and Hansen Experimental Physics Laboratory, Stanford University.  
*Associate Professor (Research)*
- 2001 - 2007 Department of Ophthalmology, School of Medicine, and Hansen Experimental Physics Laboratory, Stanford University.  
*Assistant Professor (Research)*
- 1998 - 2000 Department of Ophthalmology and Hansen Experimental Physics Laboratory,

- Stanford University.  
*Senior Research Scientist*
- 1998 Picosecond Free Electron Laser Center, Stanford University.  
*Research Associate*
- 1996 - 1997 Hansen Experimental Physics Laboratory, Stanford University.  
*Post Doctoral Research Fellow*
- 1994 - 1996 Laser Center of The Hadassah Hebrew University Hospital, Jerusalem.  
*Research Scientist*
- 1988 - 1994 Applied Physics Division, The Hebrew University of Jerusalem.  
*Research Assistant*
- 1984 - 1987 Institute of Applied Physics, Academy of Sciences, Yerevan, USSR.  
*Research Assistant*

### ***Affiliations***

**APS** - American Physical Society, **SPIE** - The International Society for Optical Engineering, **OSA** – Optical Society of America, **ARVO** - Association for Research in Vision and Ophthalmology, **AAAS** - American Association for the Advancement of Science.

### ***Honors and Awards***

- 2016 Scientific Achievement Award, by Alcon Research Institute.
- 2016 Bressler Prize in Vision Science, by Lighthouse Guild.
- 2014 SPIE Translational Research Award for development of the Non-damaging Retinal Laser Therapy. (SPIE - International Society for Optics and Photonics)
- 2012 R&D 100 award for invention and development of the OCT-Guided Femtosecond Laser System for Cataract Surgery, with OptiMedica Inc.
- 2009 Medical Design Excellence Award for invention and development of the Pulsed Electron Avalanche Knife (PEAK), with PEAK Surgical Inc.
- 2007 R&D 100 award for invention and development of the Pattern Scanning Laser Photocoagulator (PASCAL), with M. Blumenkranz and OptiMedica Inc.
- 2004 Pascal Rol award for the best paper on *Ophthalmic Technologies Conference*, SPIE meeting BIOS 2004 (Photonics West 2004).
- 2001 Winner of the *Collegiate Inventors Competition* of the *US National Inventors Hall of Fame* (advisor of D. Fletcher).
- 2000 First Place Award in *Instrumentation, Pharmaceuticals and Devices*, US Vitreous Society. Awarded for "New Plasma-based Cutting Instrument for Vitreoretinal Surgery" (with M.S. Blumenkranz and S. Sanislo).
- 1995 Dr. Shlomiuk award from the board of The Hebrew University of Jerusalem for outstanding Ph.D. Research.
- 1992 Wolf Foundation scholarship for outstanding doctoral students.
- 1991 Prof. Rabau award of the Israel Society for Fertility Research for the application of the ArF excimer laser to In Vitro Fertilization.

### ***Teaching***

- Brain-Machine Interfaces (lectures on Mechanisms of Electrical Stimulation and Inhibition of Neurons and on Restoration of Sight)
- Basic Science Course in Ophthalmology (lectures on Ophthalmic Lasers and Retinal Prosthetics)
- Lasers in Medicine – 3 units course for undergraduate students.
- Making Sense of Human Senses (lectures related to restoration of sight through biotechnology)

## **Technology Transfer**

More 50 issued patents and other inventions have been successfully transferred to industrial development and manufacturing. Several technologies are in clinical practice world-wide:

- Pulsed Electron Avalanche Knife ([PEAK PlasmaBlade](#)),
- Patterned Scanning Laser Photocoagulator ([PASCAL](#)),
- OCT-guided Laser System for Cataract Surgery ([Catalys](#)).
- Neural stimulation for enhanced tear secretion ([TrueTear](#), Allergan);

Several others are in clinical trials:

- Gene therapy of the retinal pigment epithelium ([Ocular BioFactory](#), Avalanche Biotech Inc);
- Smartphone-based ophthalmic diagnostics and monitoring ([DigiSight Inc.](#))
- Photovoltaic Retinal Prosthesis ([PRIMA](#), Pixium Vision).

## **Other Experience**

2014 – present	Member of the Editorial Board, <i>Scientific Reports</i> (Nature Publishing Group).
2012 – present	Member of the Editorial Board, <i>Translational Vision Science &amp; Technology</i> .
2010 – present	Member of the Editorial Board, <i>Clinical &amp; Experimental Ophthalmology</i> .
2004 – present	Member of the Editorial Board, <i>Expert Review of Medical Devices</i> .
2004 – present	Organizing Committee Member, Ophthalmic Technologies Conference, SPIE.
2004 – present	NIH Scientific Review Panels.
2004 – 2011	Department of Veterans Affairs, Scientific Merit Review Advisory Board.

## **List of publications (in reversed chronological order)**

### **Book Chapters:**

Non-damaging Photothermal Therapy of the Retina using Endpoint Management. D. Lavinsky , D. Palanker. Chapter 37 in: Henriques J, Duarte A, Quintão T. (eds.) *LASER Manual in Ophthalmology - fundamentals and laser clinical practice*. Lisbon: SPILM Portuguese Medical Laser Society Publishing; p.193-6, 2017

High Resolution Photovoltaic Subretinal Prosthesis for Restoration of Sight. H. Lorach and D. Palanker. Chapter 9 in "[Artificial Vision: a Clinical Guide](#)". P. Gabel (Editor). Springer International Publishing, 2016.

Restoring Vision to the Blind: Advancements in Vision Aids for the Visually Impaired. The Lasker/IRRF Initiative for Innovation in Vision Science, Chapter 7. F. Werblin and D. Palanker, *Translational Vision Science and Technology*. Vol. 3, No. 7, pp 54-62, 2014

Optoelectronic Retinal Prostheses. D. Palanker et.al., Chapter in the *Encyclopedia of Computational Neuroscience*, D. Jaeger, R. Jung (Eds.). Springer, New York, 2014.

Photovoltaic Retinal Prosthesis for Restoring Sight to the Blind. D. Palanker, et.al. Chapter 24 in *Handbook of Bioelectronics: Directly interfacing electronics and biological systems*. S. Carrara and K. Iniewski (Eds). Cambridge University Press, 2014.

Retinal Laser Therapy: Biophysical Basis and Applications. D. Palanker, M.S. Blumenkranz; Chapter 39 in *RETINA*, 5th edition, Ryan, Schachat, Wilkinson, Hinton, Sadda, Wiedemann (Eds), vol. 3, Mosby Inc., St. Louis, 2012.

Imaging Systems and Image-guided Surgery. S.D. Klyce, D. Palanker, K.H. Edwards, R.R. Krueger. Chapter 5 in *Textbook of Refractive Laser Assisted Cataract Surgery (ReLACS)*; by Krueger RR, Talamo JH, Lindstrom RL (Eds). Springer, New York, NY, 2012.

Delivery of Information and Power to the Implant, Integration of the Electrode Array with the Retina, and Safety of Chronic Stimulation. J. Loudin, A. Butterwick, P. Huie, and D. Palanker. , Chapter 7 in VISUAL PROSTHETICS: Physiology, Bioengineering, Rehabilitation. G. Dagnelie (Editor), Springer 2010.

High-Resolution Electronic Retinal Prosthesis: Physical Limitations and Design. D. Palanker, A. Vankov, P. Huie, A. Butterwick, I. Chan, M.F. Marmor and M.S. Blumenkranz; Chapter 14 in ARTIFICIAL SIGHT: BASIC RESEARCH, BIOMEDICAL ENGINEERING, AND CLINICAL ADVANCES; M.S. Humayun, J.D. Weiland, G. Chader, E. Greenbaum (Eds.), Springer Series: Biological and Medical Physics, Biomedical Engineering, New York, 2007.

Retinal Laser Therapy: Biophysical Basis and Applications, D. Palanker, M.S. Blumenkranz, J.J. Weiter; Chapter 22 in RETINA, 4th edition, Ed. S.J. Ryan, vol. 3, Mosby, Inc., St. Louis, MI, 2005.

### **Online Teaching Materials:**

Ophthalmic Laser Therapy: Mechanisms and Applications. Daniel Palanker. Global Optometry Resource Platform, Brien Holden Vision Institute. University of New South Wales, Sydney, Australia. <http://education.brienholdenvision.org>.

[Basics of Lasers](#) and [Laser-Tissue Interactions](#). D. Palanker, Online course on Ophthalmic Lasers. American Academy of Ophthalmology.

### **Refereed Articles:**

1. Spatio-temporal Characteristics of Retinal Response to Network-Mediated Photovoltaic Stimulation. E. Ho, R. Smith, G. Goetz, X. Lei, L. Galambos, T.I. Kamins, J. Harris, K. Mathieson, D. Palanker, A. Sher. *Journal of Neurophysiology*. **In print**. (2017).
2. [Optophysiology of Cardiomyocytes: Characterizing Cellular Motion with Quantitative Phase Imaging](#). C. Cordeiro, O.J. Abilez, G. Goetz, T. Gupta, Y. Zhuge, O. Solgaard, and D. Palanker. *Biomedical Optics Express* **8**(10): 4652-4662 (2017). Supplemental materials: [Video 1](#), [Video 2](#).
3. [Comparison of Continuous-Wave and Micropulse Modulation in Retinal Laser Therapy](#). J. Wang, R. Dalal, and D. Palanker. *Investigative Ophthalmology and Visual Science* **58**: 4722–4732 (2017). Supplemental Materials: [Video 1](#), [Video 2](#), [Video 3](#), [Video 4](#), [Video 5](#), [Video 6](#), [Figures](#), [Methods](#)
4. [Enhanced Tearing by Electrical Stimulation of the Anterior Ethmoid Nerve](#). M. Brinton; A.L. Kossler; Z.M. Patel; J. Loudin; M. Franke; C.N. Ta; D. Palanker . *Investigative Ophthalmology and Visual Science* **58**(4): 2341-2348 (2017).
5. [Deafferented Adult Rod Bipolar Cells Create New Synapses with Photoreceptors to Restore Vision](#). C. Beier, A. Hovhannisyan, S. Weiser, J. Kung, S. Lee, D.Y. Lee, P. Huie, R. Dalal, D. Palanker, A. Sher. *Journal of Neuroscience* **37**(17): 4635-4644 (2017).
6. [Nondamaging Retinal Laser Therapy for Treatment of Central Serous Chorioretinopathy: What is the Evidence?](#) E.H. Wood, P.A. Karth, S.R. Sanislo, D.M. Moshfeghi, D. Palanker. *Retina* **37**(6):1021-1033 (2017).
7. [Evolution of Concepts and Technologies in Ophthalmic Laser Therapy](#). D. Palanker. *Annual Review of Vision Science* **2**:295-319 (2016).
8. [Electronic Approaches to Restoration of Sight](#). G. Goetz and D. Palanker. *Reports on Progress in Physics* **79**: 096701 (29pp) (2016).

9. [SiC protective coating for photovoltaic retinal prosthesis](#). X. Lei, S. Kane, S. Cogan, H. Lorach, L. Galambos, P. Huie, K. Mathieson, T. Kamins, J. Harris and D. Palanker. *Journal of Neural Engineering* 13: 046016 (12pp) (2016).
10. [Non-Damaging Retinal Laser Therapy: Rationale and Applications to the Macula](#). D. Lavinsky; J. Wang; P. Huie; R. Dalal; S.J. Lee; D.Y. Lee; D. Palanker. *Investigative Ophthalmology and Visual Science* 57 (6): 2488-2500 (2016). [Supplementary Figures](#)
11. [Optimization of Return Electrodes in Neurostimulating Arrays](#). T. Flores, G. Goetz, X. Lei, and D. Palanker. *Journal of Neural Engineering* 13: 036010 (11pp) (2016).
12. [Implantation of Modular Photovoltaic Subretinal Prosthesis](#). D.Y. Lee, H. Lorach, P. Huie, D. Palanker. *Ophthalmic Surgery, Lasers and Imaging Retina*. 47: 171-174 (2016).
13. [Photovoltaic Pixels for Neural Stimulation: Circuit Models and Performance](#). D. Boinagrov, X. Lei, G. Goetz, T.I. Kamins, K. Mathieson, L. Galambos, J.S. Harris, and D. Palanker. *IEEE Trans. Biomed. Circuits and Systems* 10(1): 85-97 (2016).
14. [Electronic Enhancement of Tear Secretion](#). M. Brinton, J.L. Chung, A. Kossler, K.H. Kook, J. Loudin, M. Franke and D. Palanker. *Journal of Neural Engineering* 13: 016006 (8pp) (2016).
15. [Finesse of Transparent Tissue Cutting by Ultrafast Lasers at Various Wavelengths](#). J. Wang, G. Schuele, D. Palanker. *Journal of Biomedical Optics* 20(12): 125004 (2015).
16. [Retinal Safety of Near Infrared Radiation in Photovoltaic Restoration of Sight](#). H. Lorach, J. Wang, D.Y. Lee, R. Dalal, P. Huie, D. Palanker. *Biomedical Optics Express* 7(1): 13-21 (2015).
17. [Interactions of Prosthetic and Natural Vision in Animals With Local Retinal Degeneration](#). H. Lorach; X. Lei; L. Galambos; T. Kamins; K. Mathieson; R. Dalal; P. Huie; J. Harris; D. Palanker. *Investigative Ophthalmology and Visual Science* 56: 7444-7450 (2015).
18. [Contrast Sensitivity with a Subretinal Prosthesis and Implications for Efficient Delivery of Visual Information](#). G. Goetz, R. Smith, Xin Lei, L. Galambos, T. Kamins, K. Mathieson, A. Sher, and D. Palanker. *Investigative Ophthalmology and Visual Science* 56: 7186–7194 (2015).
19. [Safety of Cornea and Iris in Ocular Surgery with 355-nm Lasers](#). J. Wang, J.L. Chung, G. Schuele, A. Vankov, R. Dalal, M. Wiltberger, D. Palanker. *Journal of Biomedical Optics* 20(9), 095005 (2015)
20. [Development of Animal Models of Local Retinal Degeneration](#). Henri Lorach, Jennifer Kung, Corinne Beier, Yossi Mandel, Roopa Dalal, Philip Huie, Jenny Wang, Seungjun Lee, Alexander Sher, Bryan William Jones, and Daniel Palanker. *Investigative Ophthalmology and Visual Science* 56(8): 4644-4652 (2015).
21. [Photovoltaic Restoration of Sight with High Visual Acuity](#). H. Lorach, G. Goetz, R. Smith, X. Lei, Y. Mandel, T. Kamins, K. Mathieson, P. Huie, J. Harris, A. Sher, and D. Palanker. *Nature Medicine*, 21:476–482 (2015).
22. [Performance of Photovoltaic Arrays in-vivo and Characteristics of Prosthetic Vision in Animals with Retinal Degeneration](#). H. Lorach, G. Goetz, Y. Mandel, X. Lei, T. Kamins, K. Mathieson, P. Huie, R. Dalal, J.S. Harris, D. Palanker. *Vision Research* 111(Pt B):142-8 (2015).
23. [NonDamaging Photothermal Therapy for the Retina: Initial Clinical Experience With Chronic Central Serous Retinopathy](#). D. Lavinsky, D. Palanker. *Retina* 35(2): 213-22 (2015).
24. [Inner Retinal Preservation in Rat Models of Retinal Degeneration Implanted with Subretinal Photovoltaic Arrays](#). J.G. Light, J.W. Fransen, A.N. Adekunle, A. Adkins, G. Pageni, J. Loudin, K. Mathieson, D.V. Palanker, M.A. McCall, M.T. Pardue. *Exp. Eye Research* 128: 34-42 (2014).
25. [Miniature Electrical Stimulator for Hemorrhage Control](#). M.R. Brinton, Y. Mandel, R. Dalal, D. Palanker, *IEEE Transactions on BioMedical Engineering*, 61(6):1765-1771 (2014).

26. [Selectivity of Direct and Network-mediated Stimulation of the Retinal Ganglion Cells with Epi-, Sub- and Intra-Retinal Electrodes](#). D. Boinagrov, S. Pangratz-Fuehrer, G. Goetz, D. Palanker. *Journal of Neural Engineering*, **11**: 026008 (11pp) (2014).
27. [Subvisible Retinal Laser Therapy: Titration Algorithm and Tissue Response](#). D. Lavinsky, C. Sramek, J. Wang, P. Huie, R. Dalal, Y. Mandel, D. Palanker. *Retina* **34** (1): 87-97 (2014).
28. [Holographic Display System for Restoration of Sight to the Blind](#). G.A. Goetz, Y. Mandel, R. Manivanh, D. Palanker, T. Cizmar. *Journal of Neural Engineering* **10**: 056021 (13pp) (2013).
29. [Vasoconstriction by Electrical Stimulation: New Approach to Control of Non-Compressible Hemorrhage](#). Y. Mandel, R. Manivanh, R. Dalal, P. Huie, J. Wang, M. Brinton, D. Palanker. *Scientific Reports (Nature group)* **3**: 2111-8 (2013).
30. [Cortical Responses Elicited by Photovoltaic Subretinal Prostheses Exhibit Similarities to Visually Evoked Potentials](#). Y. Mandel, G. Goetz, D. Lavinsky, P. Huie, K. Mathieson, L. Wang, T. Kamins, L. Galambos, R. Manivanh, J. Harris, D. Palanker. *Nature Communications* **4**: 1980- (2013).
31. [Restoration of Retinal Structure and Function after Selective Photocoagulation](#). A. Sher, B.W. Jones, P. Huie, Y.M. Paulus, D. Lavinsky, L.S. Leung, H. Nomoto, C. Beier, R.E. Marc, and D. Palanker. *The Journal of Neuroscience* **33**(16): 6800 – 6808 (2013).
32. [Restoration of retinal morphology and residual scarring after photocoagulation](#). Lavinsky D, Cardillo JA, Mandel Y, Huie P, Melo LA, Farah ME, Belfort R, Palanker D. *Acta Ophthalmol.* 91(4): e315–e323 ( 2013).
33. [Optical Patient Interface in Femtosecond Laser-Assisted Cataract Surgery: Contact Corneal Appanation versus Liquid Immersion](#). J.H.Talamo, P. Gooding, D. Angeley, W.W. Culbertson, G. Schuele, D. Andersen, G. Marcellino, E. Essock-Burns, J. Batlle, R. Feliz, N.J. Friedman, D. Palanker. *Journal of Cataract and Refractive Surgery*, **39** (4): 501-510 (2013).
34. [Modulation of Transgene Expression in Retinal Gene Therapy by Selective Laser Treatment](#). D. Lavinsky, T.W. Chalberg, Y. Mandel, P. Huie, R. Dalal, M. Marmor, D. Palanker. *Investigative Ophthalmology and Visual Science*, **54**:1873-1880 (2013).
35. [Upper Threshold of Extracellular Neural Stimulation](#). D. Boinagrov, S. Pangratz-Fuehrer, B. Suh, K. Mathieson, N. Naik, D. Palanker. *Journal of Neurophysiology*, **108**: 3233-3238 (2012).
36. [Effect of Intravitreal Triamcinolone Acetonide on Healing of Retinal Photocoagulation Lesions](#). H. Nomoto, D. Lavinsky, Y.M. Paulus, L.S. Leung, R. Dalal, M.S. Blumenkranz, D. Palanker, *Retina*, **33**(1):63-70 (2013).
37. [Femtosecond plasma mediated laser ablation has advantages over mechanical osteotomy of cranial bone](#). Lo DD, Mackanos MA, Chung MT, Hyun JS, Montoro DT, Grova M, Liu C, Wang J, Palanker D, Connolly AJ, Longaker MT, Contag CH, Wan DC. *Lasers Surg Med*, **44**(10):805-14 (2012).
38. [Retinal Safety of Near-Infrared Lasers in Cataract Surgery](#). J. Wang, C. Sramek, Y.M. Paulus, D. Lavinsky, G. Schuele, D. Anderson, D. Dewey, D. Palanker. *Journal of Biomedical Optics*, **17**(9), 095001 (2012).
39. [Photovoltaic retinal prosthesis: implant fabrication and performance](#). L Wang, K Mathieson, T I Kamins, J D Loudin, L Galambos, G Goetz, A Sher, Y Mandel, P Huie, D Lavinsky, J S Harris and D V Palanker. *Journal of Neural Engineering* **9**: 046014 (11pp) (2012)
40. [Photovoltaic Retinal Prosthesis with High Pixel Density](#). K. Mathieson, J. Loudin, G. Goetz, P. Huie, L. Wang, T.I. Kamins, L. Galambos, R. Smith, J.S. Harris, A. Sher, D. Palanker. *Nature Photonics*, **6**(6): 391–397 (2012).

41. [Therapeutic Window of Retinal Photocoagulation With Green \(532-nm\) and Yellow \(577-nm\) Lasers](#). Sramek CK, Leung LS, Paulus YM, Palanker DV. *Ophthalmic Surg Lasers Imaging*, **43(4)**: 341-347 (2012).
42. [Long-Term Safety, High-Resolution Imaging, and Tissue Temperature Modeling of Subvisible Diode Micropulse Photocoagulation for Retinovascular Macular Edema](#). Luttrull, J.K; Sramek, C.; Palanker, D.; Spink, C.J; Musch, D.C. *Retina*, **32(2)**: 375–386 (2012).
43. [Fifty Years of Ophthalmic Laser Therapy](#). D.V. Palanker, M.S. Blumenkranz, M.F. Marmor. *Archives of Ophthalmology* **129 (12)**: 1613-1619 (2011)
44. [Femtosecond laser capsulotomy](#). Friedman NJ, Palanker DV, Schuele G, Andersen D, Marcellino G, Seibel BS, Batlle J, Feliz R, Talamo JH, Blumenkranz MS, Culbertson WW . *J Cataract Refract Surg* **37(7)**: 1189-98 (2011).
45. [Photodiode Circuits for Retinal Prostheses](#). J.D. Loudin, S.F. Cogan, K. Mathieson, A. Sher, and D.V. Palanker. *IEEE Transactions on Biomedical Circuits and Systems*, 1932-4545 (2011)
46. [The Impact of Pulse Duration and Burn Grade on Size of Retinal Photocoagulation Lesion: Implications for Pattern Density](#). D. Palanker, D. Lavinsky, M.S. Blumenkranz, G. Marcellino. *RETINA* **31(8)**: 1664-1669 (2011)
47. [New Horizons in Retinal Laser Treatment: Sublethal Laser Therapy](#). Y. M. Paulus, C. Sramek, M.S. Blumenkranz, D. Palanker, *Retinal Physician* **March**, (2011)
48. [Improving the Therapeutic Window of Retinal Photocoagulation by Spatial and Temporal Modulation of the Laser Beam](#). C. Sramek; D. L.S. Leung; T. Leng; Y.M. Paulus; J. Brown; G. Schuele; D. Palanker. *Journal of Biomedical Optics* **16(02)**: 028004; (2011).
49. [Non-damaging Retinal Phototherapy: Dynamic Range of Heat Shock Protein Expression](#). C. Sramek, M. Mackanos, R. Spitler, L.S. Leung, H. Nomoto, C. Contag, D. Palanker. *Invest. Ophthalmol. Vis. Sci.* **52(3)**:1780-7 (2011).
50. [Femtosecond Laser–Assisted Cataract Surgery with Integrated Optical Coherence Tomography](#). D. V. Palanker, M. S. Blumenkranz, D. Andersen, M. Wiltberger, G. Marcellino, P. Gooding, D. Angeley, G. Schuele, B. Woodley, M. Simoneau, N. J. Friedman, B. Seibel, J. Batlle, R. Feliz, J. Talamo, W. Culbertson., *Science Translational Medicine* **2 (58)**: 1-9, 58ra85 (2010).
51. [Optical breakdown in transparent media with adjustable axial length and location](#). I. Toytman; D. Simanovski; D. Palanker. *Optics Express*. **18(24)**: 24688-24698 (2010).
52. [Multi-Focal Laser Surgery: Cutting Enhancement by Hydrodynamic Interactions Between Cavitation Bubbles](#). I. Toytman, A. Silbergleit, D. Simanovski, D. Palanker. *Physical Review E* (2010)
53. [Selective Retinal Therapy with Microsecond Exposures Using a Continuous Line Scanning Laser](#). Y. M. Paulus, ATul Jain, H. Nomoto, C. Sramek, R. F. Gariano, D. Andersen, G. Schuele, L.S. Leung, T. Leng, D Palanker. *Retina* **31(2)**: 380-388 (2011).
54. [Strength-duration relationship for extracellular neural stimulation: numerical and analytical models](#). D. Boinagrov, J. Loudin, D. Palanker. *Journal of Neurophysiology*. **104**: 2236 - 2248. (2010)
55. [Patterned Laser Trabeculoplasty](#) . M. Turati, F. Gil-Carrasco, A. Morales, H. Quiroz-Mercado, D. Andersen, G. Marcellino, G. Schuele, D. Palanker. *Ophthalmic Surgery Lasers and Imaging*, **41**:538-545 (2010).
56. [Short-pulse Laser Treatment: Redefining Retinal Therapy](#). Y. Paulus, D. Palanker, M.S. Blumenkranz. *Retinal Physician*, **7(1)**: 54-59 (2010).
57. [Anterior Capsulotomy with a Pulsed Electron Avalanche Knife \(PEAK\)](#). D. Palanker, H. Nomoto, P. Huie, A. Vankov, D.F. Chang. *Journal of Cataract and Refractive Surgery*, **36(1)**: 127-132 (2010)

58. [Comparative Healing of Surgical Incisions Created by the PEAK PlasmaBlade, Conventional Electrosurgery, and a Scalpel](#). S.A. Loh, G.A. Carlson, E.I. Chang, E. Huang, D. Palanker, G.C. Gurtner. *Plastic and Reconstructive Surgery*, **124** (6): 1849-1859 (2009).
59. [Dynamics of Retinal Photocoagulation and Rupture](#). C. Sramek, Y. Paulus, H. Nomoto, P. Huie, J. Brown, D. Palanker. *J. Biomedical Optics*, **14**(3), 034007 (2009).
60. [On Illumination Schemes for Wide-Field CARS Microscopy](#). I. Toytman, D. Simanovskii, and D. Palanker, *Optics Express*, **17**(9): 7339-7347 (2009). Reprinted in *The Virtual Journal for Biomedical Optics*. **4** (6) May 26, 2009
61. [Effect of shape and coating of a subretinal prosthesis on its integration with the retina](#). A. Butterwick, P. Huie, B.W. Jones, R.E. Marc, M. Marmor, D. Palanker. *Experimental Eye Research*; **88** (1): 22—29 (2009).
62. [On Mechanisms of Interaction in Electrosurgery](#). D. Palanker, A. Vankov, P. Jayaraman. *New Journal of Physics*. **10**: 123022 (15pp) (2008).
63. [Healing of Retinal Photocoagulation Lesions](#). Y.M. Paulus, A. Jain, R.F. Gariano, B.V. Stanzel, M.F. Marmor, M.S. Blumenkranz, and D.V. Palanker. *Investigative Ophthalmology and Visual Science*; **49**(12): 5540-5545 (2008).
64. [Electrosurgery with Cellular Precision](#). D. Palanker, A. Vankov, P. Huie. *IEEE Transactions on Biomedical Engineering*, **55**(2): 838-841 (2008).
65. [Effect of Pulse Duration on Size and Character of the Lesion in Retinal Photocoagulation](#). A. Jain, M.S. Blumenkranz, Y. Paulus, M.W. Wiltberger, D.E. Andersen, P. Huie, D. Palanker. *Archives of Ophthalmology* **126** (1): 78-85 (2008).
66. [Pulsed electrical stimulation for control of vasculature: Temporary vasoconstriction and permanent thrombosis](#). D. Palanker, A. Vankov, Y. Freyvert, P.Huie, *Bioelectromagnetics*, **29**:100-107 (2008).
67. [Tissue damage by pulsed electrical stimulation](#). A. Butterwick, A. Vankov, P. Huie, Y. Freyvert, D. Palanker. *IEEE Transactions on Biomedical Engineering*, **54**(12): 2261-2267 (2007).
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### **Issued US Patents:**

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|------------------------------|--|
| US <a href="#">9,750,640</a> | <a href="#">Apparatus for patterned plasma-mediated laser ophthalmic surgery</a>                               |
| US <a href="#">9,693,905</a> | <a href="#">Apparatus for patterned plasma-mediated laser ophthalmic surgery</a>                               |
| US <a href="#">9,693,904</a> | <a href="#">Apparatus for patterned plasma-mediated laser ophthalmic surgery</a>                               |
| US <a href="#">9,693,903</a> | <a href="#">Apparatus for patterned plasma-mediated laser ophthalmic surgery</a>                               |
| US <a href="#">9,572,484</a> | <a href="#">System and method for providing analysis of visual function using a mobile device with display</a> |

US [9,498,295](#) [Optimization of laser therapy](#)

US [9,271,870](#) [Apparatus for patterned plasma-mediated laser ophthalmic surgery](#)

US [9,254,168](#) [Electro-thermotherapy of tissue using penetrating microelectrode array](#)

US [9,192,518](#) [System for treating ophthalmic target tissue using a treatment pattern of lesions](#)

US [8,918,181](#) [Systems and methods for treatment of dry eye](#)

US [8,709,001](#) [Method and apparatus for patterned plasma-mediated laser trephination of the lens capsule and three dimensional phaco-segmentation](#)

US [8,690,862](#) [Apparatus for patterned plasma-mediated laser trephination of the lens capsule and three dimensional phaco-segmentation](#)

US [8,616,216](#) [Patterned laser treatment](#)

US [8,591,501](#) [Coherent fiber bundle system and method for ophthalmic intervention](#)

US [8,568,393](#) [Computer guided patterned laser trabeculoplasty](#)

US [8,500,724](#) [Method and apparatus for patterned plasma-mediated laser trephination of the lens capsule and three dimensional phaco-segmentation](#)

US [8,496,650](#) [Method and apparatus for photothermal therapy with adjustable spatial and/or temporal beam profile](#)

US [8,425,497](#) [Method and apparatus for patterned plasma-mediated laser trephination of the lens capsule and three dimensional phaco-segmentation](#)

US [8,414,572](#) [Electrosurgery apparatus with partially insulated electrode and exposed edge](#)

US [8,409,180](#) [Patterned laser treatment](#)

US [8,403,921](#) [Method and apparatus for patterned plasma-mediated laser trephination of the lens capsule and three dimensional phaco-segmentation](#)

US [8,394,084](#) [Apparatus for patterned plasma-mediated laser trephination of the lens capsule and three dimensional phaco-segmentation](#)

US [8,336,555](#) [System and method for determining dosimetry in ophthalmic photomedicine](#)

US [8,323,276](#) [Method for plasma-mediated thermo-electrical ablation with low temperature electrode](#)

US [8,283,171](#) [Method and apparatus for avalanche-mediated transfer of agents into cells](#)

US [8,177,783](#) [Electric plasma-mediated cutting and coagulation of tissue and surgical apparatus](#)

US [8,105,324](#) [Methods and devices for the non-thermal, electrically-induced closure of blood vessels](#)

US [8,101,169](#) [Ocular gene therapy using avalanche-mediated transfection](#)

US [8,043,286](#) [Method and apparatus for plasma-mediated thermo-electrical ablation](#)

US [7,923,251](#) [Method and apparatus for avalanche-mediated transfer of agents into cells](#)

US [7,789,879](#) [System for plasma-mediated thermo-electrical surgery](#)

US [7,766,903](#) [Patterned Laser Treatment of the Retina](#)

US [7,736,361](#) [Electrosurgical system with uniformly enhanced electric field and minimal collateral damage](#)

US [7,556,621](#) [Optically controlled microfluidic chip](#)

US [7,447,547](#) [Neural prosthesis based on photomechanical deflectors and tactile sensory cells](#)

US [7,357,802](#) [Electrosurgical system with uniformly enhanced electric field and minimal collateral](#)

	<a href="#">damage</a>
US <a href="#">7,238,185</a>	<a href="#">Method and apparatus for plasma-mediated thermo-electrical ablation</a>
EU 1079754	Method and apparatus for pulsed plasma-mediated electrosurgery in liquid media
US <a href="#">7,058,455</a>	<a href="#">Interface for making spatially resolved electrical contact to neural cells in a biological neural network</a>
US <a href="#">7,047,080</a>	<a href="#">Self-sufficient retinal prosthesis powered by intraocular photovoltaic cells</a>
US <a href="#">6,939,378</a>	<a href="#">Microfabricated tissue as a substrate for pigment epithelium transplantation</a>
US <a href="#">6,913,605</a>	<a href="#">Microfluidic devices and methods for producing pulsed microfluidic jets in a liquid environment</a>
US <a href="#">6,780,178</a>	<a href="#">Method and apparatus for plasma-mediated thermo-electrical ablation</a>
US <a href="#">6,730,075</a>	<a href="#">Surgical probe for use in liquid media</a>
US <a href="#">6,352,535</a>	<a href="#">Method and a device for electro microsurgery in a physiological liquid environment</a>
US <a href="#">6,135,998</a>	<a href="#">Method and apparatus for pulsed plasma-mediated electrosurgery in liquid media</a>
US <a href="#">6,039,726</a>	<a href="#">Method and apparatus for concentrating laser beams</a>
US <a href="#">5,288,288</a>	<a href="#">Method and a device for cold laser microsurgery with highly localized tissue removal</a>

### **Recent Invited Talks (last 5 years):**

Distinguished Lecturer on Medical Engineering, Jet Propulsion Laboratory, Pasadena, CA, July 2017  
Invited Lecture: "Electronic Augmentation of Body Functions: progress in electro-neural interfaces"

ETH, Zurich, June 2017.

Invited Lecture: "Electro-neural Interfaces in Ophthalmology: from retinal prosthetics to dry eye therapy"

Winter School of Bioelectronics, Kirchberg, Austria, March 2017.

Invited Tutorial: "Photovoltaic Restoration of Sight with High Visual Acuity"

Department of Ophthalmology, University of Munich, Germany. March 2017

"Photovoltaic Restoration of Sight in Rodents with Retinal Degeneration"

"Non-Damaging Retinal Laser Therapy: Rational and Applications to the Macula"

Symposium of the Stanford Center for Mind, Brain, and Computation,

Invited talk: "Restoration of sight with subretinal photovoltaic arrays".

Vanderbilt Biophotonics Seminar, Nashville, December 2016.

"Photovoltaic Restoration of Sight in Rodents with Retinal Degeneration"

Robert and Gerry Ligon Lectureship lecture at Vision Research Center, Kresge Eye Institute, Detroit.  
May 2016

"Photovoltaic Restoration of Sight in Rodents with Retinal Degeneration"

"Non-Damaging Retinal Laser Therapy: Rational and Applications to the Macula"

Annual Meeting of the Israeli Society for Vision and Eye Research. Ramat Gan, March 2016

Keynote talks: “Non-damaging laser therapy of the macula: mechanisms and applications”  
“Photovoltaic restoration of sight in animals with retinal degeneration”.

Annual Meeting on Angiogenesis, Exudation and Degeneration. Miami, February 2016.

Invited Talk: “Non-Damaging Laser Therapy of the Macula: Mechanisms and Applications”

20<sup>th</sup> Anniversary of the Institute of Photonics, University of Strathclyde, Glasgow, UK, November 2015.

Keynote speaker: “OptoElectronic Restoration of Sight to the Blind”.

Swedish Society for Bioengineering, Annual meeting, Uppsala, October 2015.

Invited plenary talk: “Optical and Electronic Approaches to Restoration of Sight”.

15<sup>th</sup> Euretina Congress, Nice, September 2015.

Invited talk: “Prosthetic Restoration of Sight: Subretinal Approach”.

Diabetic Retinopathy – Battling the global epidemic. ARVO Conference. NIH, Bethesda, August 2015.

Invited Talk: “New Approaches to Laser Therapy in Diabetic Retinopathy: Minimally-Traumatic and Non-Damaging”.

Imaging and Applied Optics Congress of the Optical Society of America. Washington DC, June 2015.

Invited Talk: “Optical and Electronic Approaches to Restoration of Sight”.

Masachusetts Eye and Ear Infirmary, Boston, MA, June 2015.

Grand Rounds: “Non-Damaging Retinal Laser Therapy: mechanisms and applications”

Schepens Eye Research Institute, Harvard School of Medicine, Boston, June 2015.

Title of the Talk: Photovoltaic Restoration of Sight with High Visual Acuity.

International Winterschool on Bioelectronics, Kirchberg in Tirol, Austria, March 2015.

Title of the Talk: Photovoltaic Restoration of Sight in Rats Blinded by Retinal Degeneration

American Association for Advancement of Science, Annual Meeting. San Jose, CA, February 2015.

Title of the Talk: Restoration of Sight with Photovoltaic Subretinal Prosthesis

Beckman Initiative for Macular Research, Irvine, CA, January 2015.

Title of the talk: Non-damaging Retinal Laser Therapy.

14<sup>th</sup> Euretina Congress, London, September 2014.

Title of the talk: Restoration of Sight with High Resolution Photovoltaic Subretinal Prosthesis.

Bernstein Conference on Computational Neuroscience, Gottingen, Germany, September 2014

Title of the Talk: Restoration of Sight with Photovoltaic Subretinal Prosthesis.

Friedrich Miescher Institute for Biomedical Research, Basel, Switzerland. May 2014

Title of the Talk: Restoration of Sight with Subretinal Photovoltaic Arrays.

Vision Science Center, University of Rochester, NY. May 2014.

Title of the Talk: Restoration of Sight with Subretinal Photovoltaic Arrays.



McKnight Vision Research Seminar at Bascom Palmer Eye Institute, Miami, FL. May 2014  
Title of the talk: Photothermal Stimulation of the Retina: Initial Clinical Experience with Central Serous Retinopathy

Lasker Foundation and the International Retinal Research Foundation. Initiative on Restoring Vision to the Blind. Janelia Farm, Washington DC, March 2014.  
Title of the Talk: Video Goggles for Restoration of Sight to the Blind.

Natural and Medical Sciences Institute, University of Tuebingen, Germany. November 2013.  
Title of the talk: "Restoration of Visual Functions with Photovoltaic Retinal Prosthesis"

Annual Meeting of the Dutch Society for Biophysics and Biomedical Technologies, Amsterdam, November 2013  
Title of the talk: "Optical and Electronic Technologies for Restoration of Sight"

School of Optometry at UC Berkeley. Colloquium, November 2013  
Title of the Talk: "Femtosecond Laser-Assisted Cataract Surgery with Integrated Optical Coherence Tomography".

Frontiers in Optics. Annual Meeting of the Optical Society of America. Orlando, FL. October 2013.  
Invited Tutorial: "Optical and Electronic Approaches to Restoration of Sight to the Blind"

Lasker Foundation and the International Retinal Research Foundation Initiative for Innovation in Vision Science. Focus group meeting: Restoring Vision. Cape Cod, MA. July 2013.  
Title of the Talk: "Photovoltaic Approach to Restoration of Sight to the Blind".

Annual Congress of the American Society for Cataract and Refractive Surgery, San Francisco, April 2013. *Innovators Session*.  
Title of the Talk: "Photovoltaic Retinal Prosthesis for Restoring Sight to the Blind: Performance With Normal and Degenerate Retina"

Annual "Save Sight" event of the Foundation Fighting Blindness. UCSF, November 2012.  
Title of the talk: "Photovoltaic Retinal Prosthesis for Restoring Sight to the Blind"

Biennial International Congress on Artificial Vision: The Eye and The Chip  
Detroit, MI, September 2012.  
Title of the talk: "Photovoltaic Retinal Prosthesis: Performance with Normal and Degenerate Retina"

Gordon Research Conference "Lasers in Medicine and Biology", New Hampshire, July 2012  
Title of the talk: "Restoration of Sight with Photovoltaic Retinal Prosthesis"

Stanford-Scotland Annual Symposium on Photonics (SU2P)  
Glasgow, Scotland, April 2012.  
Title of the talk: "Photovoltaic Retinal Prosthesis for Restoring Sight to the Blind"

Annual Symposium of the Scottish Physics Society  
Edinburgh, Scotland, April 2012

Keynote talk: “Cataract Surgery with OCT-guided Femtosecond Laser”

International Conference “Glaucoma Today”

Tel Aviv, Israel, March 2012.

Titles of the talks:

Patterned Laser Trabeculoplasty

Femtosecond Laser Cataract Surgery: Potential Benefits and Limitations for Glaucoma Patients

Colloquium, Department of Physics, Weizman Institute of Science, Rehovot, Israel.

March 2012

Title of the talk: “Photovoltaic Retial Prosthesis for Restoring Sight to the Blind”

Colloquium, Department of Biomedical Engineering, Technion, Haifa, Israel.

March 2012

Title of the talk: “High Resolution Photovoltaic Retial Prosthesis”

SPIE Annual Meeting “Photonics West”, Hot Topics Session:

San Francisco, January 2012

Title of the talk: “Photovoltaic Retinal Prosthesis for Restoring Sight to the Blind”

Brazilian Congress of Ophthalmology, Porto Alegre, Brazil. September 2011.

Titles of the talks:

Restorative laser therapy based on retinal plasticity

Cataract surgery with OCT-guided femtosecond laser

Photovoltaic retinal prosthesis for restoring sight to the blind

Neural response to subretinal photovoltaic stimulation in normal and degenerate retinas

Bay Area Vision Research Day, Berkeley, August 2011

Title of the talk: “Optoelectronic Retinal Prosthesis for Restoring Sight”.

International Conference on Femtosecond Lasers in Ophthalmology

Monarch Beach, California, June 2011

Titles of the talks:

Cataract Surgery with OCT-guided fs Laser: Precision and Safety

Advanced Beam Geometries for Accelerated Laser Cutting in Cataract Surgery

Optical Society of America. Optics and Photonic Congress, Monterey, April 2011.

Title of the talk: Cataract Surgery with OCT-guided Femtosecond Laser.

Asia Pacific Academy of Ophthalmology Congress. Sydney, March 2011.

Title of the talk: “How precise and how reproducible is laser-assisted cataract surgery?”

Colloquium in Post-Graduate Naval School, Monterey. March 2011.

Title of the talk: “Optoelectronic Retinal Prosthesis for Restoring Sight to the Blind”.

Department of Ophthalmology at UCSF, San Francisco, January 2011.

Title of the talk: “Advances in ophthalmic lasers: restorative retinal phototherapy, patterned laser trabeculoplasty and femtosecond cataract surgery”

World Congress on Artificial Vision, Detroit, MI. June 2010.

Title of the talk: “Electrophysiological Evaluation of the Photovoltaic Retinal Prosthesis”.

Institute of Biomedical Optics, University of Luebeck, Germany. June 2010

Title of the talk: “Restorative Retinal Phototherapy”

Title of the talk: “Cataract Surgery with OCT-guided fs laser”

Department of Neuroscience, University Bar Ilan, Israel. June 2010.

Title of the talk: “Optoelectronic Retinal Prosthesis for Restoring Sight to the Blind”.

World Ophthalmology Congress, Berlin, Germany. June 2010.

Title of the talk: “Effect of ocular steroids on retinal wound healing following photocoagulation”

Neural Interfaces Conference, Long Beach, June 2010.

Title of the Talk: “Subretinal Stimulation with a Photovoltaic Array”

Latin America Congress of Ophthalmology, Sao Paulo, Brazil. March 2010.

Title of the talk: “Mechanisms of Photocoagulation and Healing of the Retinal Lesions”

Title of the talk: “Computer-guided Laser Therapy: Pattern Laser Trabeculoplasty and Computer-guided treatment for Macular Edema”.

## **Research Support**

### **Ongoing Research Support**

1 R01 EY0277860 (PI) 07/01/2017– 04/30/2022

NIH (National Eye Institute)

Title: “Photovoltaic Subretinal Prosthesis with High Pixel Density”

Development of the photovoltaic subretinal prosthesis with pixel sizes down to 40um, and testing its function in rodent models of retinal degeneration.

FA9550-17-1-0237 (PI) 04/01/2017– 03/31/2020

Air Force Office of Scientific Research

Title: “Transplantation of Photoreceptors for Restoration of Sight”

The goal of this project is to transplant sheets of photoreceptors into subretinal space of rats with retinal degeneration and study their integration with the host retina.

U01 EY025501

A. Roorda (PI)

5/1/2015 – 30/4/2020

Title: “Interferometric Optophysiology of the Human Retina”.

The goal of this project is to develop interferometric system for optical monitoring of neural activity in the retina.

Role: Co-Investigator

4 R01 EY018608

D. Palanker (PI)

7/1/2013 – 6/30/2018

Title: "High Resolution Photovoltaic Retinal Prosthesis".

The goal of this BRP grant is the development of the high-resolution photovoltaic retinal prosthesis for restoration of sight, and testing its performance in animal models of retinal degeneration.

W81XWH-15-1-0009 (DoD) D. Palanker (PI) 02/01/2015 – 01/31/2018

Title: "Photovoltaic Retinal Prosthesis for Restoring Sight to Patients Blinded by Retinal Injury or Degeneration".

This project is focused on verification of biocompatibility and safety of the photovoltaic retinal prosthesis for its transfer into clinical testing. It also includes studies of the associated image processing.

5 R01 EY023020 A. Sher (PI) 1/1/2013 – 12/31/2017

Title: "Restoration of retinal structure and function after selective photocoagulation of photoreceptors".

Focus of this project is in structural and functional studies of the retinal plasticity following retinal injury. In particular, we study rewiring of the photoreceptors shifting into the damage area.

1 R01 EY0277860 D. Palanker (PI) 7/1/2017– 4/30/2018

Title: "Photovoltaic Subretinal Prosthesis with High Pixel Density"

Development of the photovoltaic subretinal prosthesis with pixel sizes down to 40um, and testing its functions in rodent models of retinal degeneration.

Stanford Photonics Research Center. Role: PI 1/1/2007 – unrestricted

Title: "Laser-Tissue Interactions in Ophthalmic Applications"

### **Completed Research Support**

FA9550-10-10503 (AFOSR) D. Palanker (PI) 5/1/2014 – 4/30/2017

Title: "Electronic Control of Hemorrhage in Non-compressible Wounds".

The goal of this project is the development and testing of the microstimulator for vasoconstriction of arteries and veins in animal models of vascular injury.

5 R01 EY023259 D. Palanker (PI) 4/1/2013 – 3/31/2017

Title: "Electronic Stimulator of Lacrimal Gland".

The goal of this project is to study response of the lacrimal gland to electrical stimulation of the afferent and efferent neurons innervating the lacrimal system, and development of microstimulator for treatment of Dry Eye disease.

W81XWH-12-10575 (DoD) D. Palanker (PI) 10/1/2012 – 3/31/2014

Title: "Restoration of the Retinal Structure and Function after Injury".

The goal of this grant was establishment of the animal models of retinal injury resulting in local selective loss of photoreceptors, and assessment of the maximum extent of their migration into the lesion.

5 R01 EY018608 D. Palanker (PI) 7/1/2009 – 6/30/2013

Title: "High Resolution Optoelectronic Retinal Prosthesis".

The goal of this BRP grant was the development of the high-resolution photovoltaic retinal prosthesis and testing its performance in-vitro.

2 R01 EY12888 D. Palanker (PI) 1/1/2001 – 12/31/2007

Title: "Pulsed Electron Avalanche Knife for Intraocular Microsurgery".

Development and in-vivo testing of the Pulsed Electron Avalanche Knife for ocular surgery.

Air Force Office of Scientific Research. A. Schwettman (PI) 1/1/2003 – 12/31/2010

Title: "Stanford Picosecond Free Electron Laser Center"

This grant provided operational support for FEL. Studies were focused on interactions of picosecond infrared and visible lasers with biological and polymer materials and applications to imaging and ablation.

Role: Co-Investigator

RG-03-0042 (Whitaker Foundation) D. Palanker (PI) 9/1/2003 – 8/31/2006

Title: "Plasma Scalpel for Microsurgery"

Development of electrical techniques for tissue dissection and manipulation in microsurgical applications.

Bio-X Research Grant, Stanford. Role: PI 10/1/2008 – 9/31/2010

Title: "Optoelectronic Retinal Prosthesis"

Development of the optoelectronic retinal prosthetic system for restoring sight in patients with retinal degeneration.

Optobionics Research Grant. Role: PI 6/1/2006 – 5/31/2007

Title: "Electronic Retinal Prosthesis"

Development and testing of the optoelectronic retinal prosthetic system for restoring sight in patients with retinal degeneration.

Whitaker Foundation Biomedical Engineering Grant Role: PI

RG-03-0042. 9/1/2003 – 8/31/2006

Title: "Plasma Scalpel for Microsurgery"

Development of the electronic techniques for tissue dissection and manipulation for microsurgical applications.

NIH R01 grant (NEI) Role: PI

R01 EY12888 1/1/2001 – 12/31/2003

Title: "Pulsed Electron Avalanche Knife for Intraocular Microsurgery".

Development and in-vivo testing of the Pulsed Electron Avalanche Knife for ocular surgery.

Bio-X grant: Stanford University Role: PI 1/1/2003 – 7/30/2004

Title: "Optical Thermometry"

Development of optical technique for non-invasive monitoring of cellular thermal stress in the retina during hyperthermal laser treatments.

Carl Zeiss GmbH Research Grant Role:PI 4/1/2000-3/1/2003

Title: "Evaluation of Commercial Prototype of PEAK Technology"

Evaluation of the surgical performance of a commercial prototype of the Pulsed Electron Avalanche Knife produced by Carl Zeiss.

Stanford Incentive Fund Role: PI 1/1/1999 – 12/31/1999

Title: "Electric Alternative to Lasers for Vitreoretinal Surgery".

This study was an initial testing phase (pilot study) of the idea of the nanosecond pulsed plasma-mediated high voltage discharge on microelectrode as a replacement of pulsed lasers in vitreoretinal surgery.

National Science Foundation Role: co- PI

DBI-989778 2/1/1999 – 12/31/2002

Title: "Fast Infrared Imaging with sub-wavelength Resolution using a Transient Near-Field Probe

Development and study of the tipless near-field infrared microscope for "chemical" imaging of biological samples using the mid-infrared part of the spectrum. The near-field probe was generated optically by picosecond pulses of visible laser using effect of photo-induced reflectivity in semiconductors.