RATNESH LAL

Professor of Bioengineering,
Professor of Mechanical engineering, and
Professor of Materials Science
Co-Director, Center of Excellence in Nanomedicine and Engineering
University of California, San Diego
9500 Gilman Drive, #0412; PFBH Room 217
La Jolla, CA 92093-0412
Tel: 858-822-0384
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Web: http://lal.eng.ucsd.edu/

EDUCATION:

Ph.D. (Neurobiology)
University of Alabama at Birmingham, Alabama
1987

M. Phil. (Biophysics)
Jawahar Lal Nehru University (J.N.U.), New Delhi, India
1981

M.Sc. (Physics)
J.N.U., New Delhi, India
1978

B.Sc. (Physics Honors)
Patna University, Patna, India
1976

ACADEMIC APPOINTMENTS:

Professor of Mechanical engineering, Bioengineering, and Materials Science and Engineering
Departments of Mechanical and Aerospace Engineering, and Bioengineering
University of California, San Diego
2010 - Present

Co-Director
Center for Excellence in Nanomedicine and Engineering
University of California, San Diego
2013 – Present

Visiting Professor
Chinese Academy of Sciences
Shanghai Institute of Applied Physics (host)
Shanghai, China
2014 – 2015

Guest Professor
Shanghai Institute of Applied Physics
Shanghai, China
2013 –
Co-Director

Center for Multiscale Imaging of Living Systems
University of California, San Diego
2011 – 2013

Professor and Director
Center for Nanomedicine and Department of Medicine
University of Chicago
2006 – 2009

Professor
Graduate Program in Biophysical Sciences
University of Chicago
2007 – 2009

Professor
Committee on Cell Physiology
University of Chicago
2008 – 2009

Research Scientist (Professor)
Neuroscience Research Institute, University of California, Santa Barbara
2004 – 2006

UTS Invited Professor
University of Technology, Sydney, Australia
2002 –2003

Associate Research Scientist (Associated Professor)
Neuroscience Research Institute, University of California, Santa Barbara
1996 - 2004

Assistant Research Scientist (Assistant Professor)
Neuroscience Research Institute, University of California
1994 – 1996

Assistant Professor
Department of Medicine, University of Chicago
1989 - 1994

Visiting Assistant Research Physicist
Department of Physics, University of California, Santa Barbara
1993

Research Fellow in Biology
California Institute of Technology, Pasadena, California
1987 - 1989

Teaching Assistant in Physics
Portland State University, Portland, Oregon
1981 – 1982

KEY PROFESSIONAL DUTIES

Associate Editor - Nanomedicine: Nanotechnology, Biology and Medicine; 2010 – Present

Co-Director Center for Excellence in Nanomedicine and Engineering; 2013 - Present

Co-Director Center for Multiscale Imaging of Living Systems; 2011- 2013

Chartered Member - Nano Study Section, NIH, 2009-2113
Member UCSD Academic Senate; 2011- 2013

Scientific Advisor - RC-Nano Corporation, Chicago; 2005 - Present

Scientific Advisor - Be Green Packaging, LLC, Santa Barbara; 2009 - Present

PROFESSIONAL RECOGNITIONS, AWARDS, HONORS and Major INVITED LECTURES:

Plenary Speaker — Turkey Nano 10 (TRNano10), Istanbul, 2014

Distinguished Lecturer — Hyderabad University, India, 2013

Plenary Speaker — International Conference on Nanomedicine, Trichy, India, 2013

Plenary Speaker — ICONN (International Conference on Nanoscience and Technology), Nadiad, India, 2013

Plenary Speaker — Controlled Release Society 13th International Meeting, Mumbay, 2013

AAAS Fellow — American Association for the Advancement of Science, 2012

Distinguished Lecturer — University of South Florida Distinguished Nano Lecture Series, USF, Tampa, Florida, 2011

Invited Speaker — Aegean Conference on Pathways, Networks and Systems Medicine, Rhodes Island, Greece, 2010

Nano Think tank Panelist — National Academy of Sciences-Beckman Initiative for Macular research, Irvine, CA, 2009-2012

Invited Speaker — 41st North American Federation Congress of the International College of Surgeons, Montreal, Quebec, Canada, 2009

Chair BIOT, *2008* Annual meeting, *Devices and Predictive Diagnostics track*

Invited Speaker 2006 International Conference on Nanoscience and Nanotechnology (ICONN 2006), Brisbane, Australia

Invited Panelist *J – Bpse Amkn lw Umpigle Epmsn Kccrgle kcpga l Lcspmnew Assoc Annual meeting, San Diego, 2006*

Invited Panelist *ALS Associ rgml – L rgml J btma aw B w l b Ns ga Nmgaw Conference, Washington, DC, 2006*

Invited Panelist OzNano2Life Network 4th Workshop, National Europe Center at ANU, Canberra, Australia, 2006

Keynote Speaker Amyotrophic Lateral Sclerosis (ALS) Fund Raiser, Long Island, NY, 2006

Invited Panelist Alzheimer's Research Forum for Discussion on Amyloid Channel hypothesis, June, 2005

Invited Speaker 20th Biennial Conference of the International Society for Neurochemistry and the European Society for Neurochemistry, Innsbruck, Austria, 2005.

Co-Chair *Nanoscaled Systems: New Frontier in High Throughput Drug Discovery panel*; Converging Technologies track, *BIO2005* Conference, 2005

Expert Evaluator ***MacArthur Fellows Program,* 2005**

Invited Panelist *Making BioSystems Talk to Microelectronics panel*, Combination Products-Converging Sciences track, BIO2004 Conference, San Francisco, 2004

Co-chair/Invited Panelist *Nanotechnology of Membrane: Novel Applications*; Nanotechnology Initiative track, *BIO2003* Conference, Washington DC, 2003.

UTS Invited Professorship; University of Technology, Sydney, Australia, 2002 2003

Invited Speaker International Conference of the 3rd European Light Microscopy Initiative and EMBL Workshop, Barcelona, Spain, 2003

Plenary Speaker Australian Biophysical Soc Annual meeting, Melbourne, 2002.

Consultant Industrial Research Organization of New Zealand, 2002 - 2007

Co-Chair Can Scanning Probe Microscopes do Microanalysis session, MSA-MAS Annual meeting, Long Beach, California, 2001.

Member Program Committee, MSA-MAS meetings, 1999 - 2001.

Co-Chair Advances in Imaging Techniques for Biomaterials session, MSA-MAS Annual meeting, Philadelphia, 2000.

Keynote Speaker Biannual Conference of the Microscopy Soc of New Zealand, 1999.

Keynote Speaker SPM II - AMAS V Joint Conference, (Australasian SPM society and Australian Microbeam Analysis Society), Sidney, Australia, 1999.

Co-Chair Bio-SPM session, Microscopy Society of America (MSA) & Microbeam Analysis Society (MAS) Annual meeting, Portland, 1999.

Chair Biological SPM session. AMAS-SPM Annual meeting, Sydney, 1999

***Visiting National Scientist*; New Zealand Govt International Sci Linkage Fund; FRST; 1996**

Santa Barbara Cottage Hospital - Digital Instruments *Joint Special Research Award*; 1995

Co-Chair Session on "Biological applications of Scanning Probe Microscopy," Biomedical Engineering Society annual meeting, Tempe, 1994.

Medical Center Graduate Fellowship; University of Alabama at Birmingham, 1982-1987

Junior Research Fellowship; Council for Scientific and Industrial Research, India, 1979-1981

University Academic Scholarship; Jawahar Lal Nehru University, 1976-1979

National Merit Scholarship; Government of India, 1971-1976

Gold Medals (two); State School Board, Bihar, India, 1971

PROFESSIONAL RESPONSIBILITIES and AFFILIATIONS:

Grant applications - Study Section Member/ Invited Reviewer (Partial List) -:

NIH, Nano study section: Chartered Full Member 2009-13
NIH Nanomedicine Centers, 2010
NIH, NCI, CCNE Special Emphasis Panel - 2010
NIH, HOPT 29, Postdoctoral Training panel, 2007
NIH, MDCN-M 02 Special Emphasis Panel, 2007
NIH, NHLBI, PPG study section – 2005, 2006
NIH, NCCR, Mass Spectroscopy Center Review Panel – 2006
NIH/CDC, PPG on Prion protein Study Section - 2007
NIH, NCI, CCNE Special Emphasis Panel - 2005
NIH, Nano study section – CHAIR (2005), Ad hoc Member 2005 –;
NIH, NHLBI, Program Project proposals – 2004-2005
NIH, Neuroengineering Study Section - 2004
NIH, MDCN (3) Special Panel – 2005 - 2007
NIH, BDCN-E SBIR/STTR Study Section 2000 – present
NIH, Predoctoral Fellowships - 2004-present
NIH, Dev Biol Study Section - 2004
NIH, NIA Neuroinformatics Grants Review panel -2003
NIH, NIA Alzheimer Disease Res Center (ADRC) Grants Review Panel – 1998-2003
NIH, NIA Alzheimer Disease Program Project Grants Review Panel – 2000- 2003
NIH/CDC, PPG on Prion protein Study Section - 2007
NIH, BBCB Study Section – 1999-2001

National Science Foundation: External reviewer for various Programs 1996- 2005
Sensory Physiology and Perception;

Cell biology;
Developmental Neuroscience;
Biological Instrumentation and Resources;
Division of Chemical and Transport Systems

National Research Council, Collaboration in Basic Science & Eng Visiting Faculty program

Department of Veterans Affairs, Office of External Reviews, Merit Review Program
Alzheimer's Association of America - 2000 -2006

Catalan Agency for Health Technology Assessment and Research (CAHETA), Barcelona, Spain, International reviewer for Neurosciences - 2006

NHMRH, Australian Council of Medical Research Awards – 2002 - 2004

BioSTAR Program, Univ of California academic-university biotech initiative 2000-03

Syntex Scholar Program

Research Corporation, Cottrell College Science Award Program

North Carolina Biotechnology Center, Institutional Development Grants Program

Keck Foundation External Grant program

Manuscripts:

Associate Editor

- ***Nanomedicine: Nanotechnology, Biology and Medicine 2009 - Present***

Editorial Board Member

- ***Journal of Biological Chemistry* - 2005 (resigned due to policy differences)**

Ad-hoc Reviewer- a partial list
Science
Proceedings of the National Academy of Sciences
EMBO J
Journal of Biological Chemistry
Biochemistry
FASEB J
American Journal of Physiology
Circulation Research
Biophysical Journal
Journal of Membrane Biology
Journal of Microscopy
Journal of Neuroscience
Journal of Vacuum Science and Technology
Scanning Microscopy
International Journal of Imaging Systems and Technology
Amyloid
Journal of Neurochemistry
Kidney Internationals

Annals of Biomedical Engineering
Peptide
New Journal of Physics
- Book: "SCHRODINGER'S MACHINES: THE QUANTUM TECHNOLOGY RESHAPING EVERYDAY LIFE" By Gerald J. Milburn. W. H. Freeman & Company.
- Book: "ATOMIC FORCE MICROSCOPY IN CELL BIOLOGY" by B.P. Jena and J.K.H. Horber. Academic Press.
- Book "BIONANOTECHNOLOGY" by David S Goodsell, Wiley-Liss press

Member of Professional Societies:

American Association for the Advancement of Science – 2012-

Biophysical Society – 1997 - present

American Society for Cell Biologists - 1994 -1996

Association for Research in Vision and Ophthalmology - 1982-1987

Society for Neuroscience -1983 -1994

Recognition in popular magazines:

Time, December, 1991.

Chronicles, University of Chicago weekly publication, 1991.
The Sciences, New York Academy of Sciences, 1992.

The University of Chicago Magazine, 1992.

Medicine at Midway, University of Chicago Alumina Association Magazine, 1992.

NZ Science Monthly, New Zealand, 1996.

C&E News magazine, Aug 12, 2002.

UTS News, Oct 7, 2002.

Santa Barbara News Press, Aug 27, 2002.

, 2004

Santa Barbara News Press and July 12, 2005

Science Today, UC, Jan 10, 2006

News Day, New York, Jan 12, 2006

UPI Newswire, July 2005; Aug 2007

UPI Newswire, Aug 2007

The Scientist, April 2010

PATENT (US) GRANTED

1. Devices, Systems and Methods to Detect Endothelialization of Intraluminal Implants
   US Patent US 8,478,378 B2
   Inventors: **R. Lal**, N. Jolly, J Raman, S. Jin

2. Petroleum Viscosity Measurement and Communication System and Method
   US Patent 8,191,403, 2012
   Inventors: **R. Lal**, A Quist, Gregory P. Liesen, Sunil K Srivastava

PATENT (US PROVISIONAL and INTERNATIONAL) GRANTED to the University of California

1. Nanoscale structures for magnetically-guided theranostics
Inventors: **R. Lal**, PB Landon, A Mo

2. DNA Zippersomes, Actuators and Telomerase complex for drug delivery and therapy
Inventors: **R. Lal**, P Landon, R. Srinivasan

3. Molecular Zipper, tweezers and spring devices
Inventors: **R. Lal**, PB Landon, S. Ramachandran

4. Gold/Silica Wiffle Balls for Magnetically Guided Theranostic Delivery
Inventors: **R. Lal**, PB Landon, A Mo

5. Nano-sensors for single-nucleotide resolution nucleic acid detection and discrimination
Inventors: **R. Lal,** G. Glinskii, PB Landon, A. Mo, MT Hwang, S. Ramachandran, J. Lee, B Meckes

6. Large Scale parallel Immuno-Based Allergy Test and Device for Evanescent Field Excitation of Fluorescence
Inventors: **R Lal,** D Cohen, H Lin, A Quist, S Ramachandran

7. Amyloid Beta Protein Channel Structure and Uses Thereof Identifying Potential Drug Molecules for Neurodegnerative Diseases.
Inventors: **R Lal**, H Lin, A. Quist, S. Jin

8. Piezoresistive Cantilever Based Nanoflow and Viscosity Sensor for Microchannels.
Inventors: **R Lal**, A Chand, A Quist, D Cohen

9. Sunlight reflecting materials and methods of fabrication
Inventors: S. Jin, C. Choi, J Moon, TK Kim, **R. Lal**

10. Improved Nanotube-based Nanoprobe Structure and Method for Making the Same.
Inventors: S Jin, **R Lal**

PATENT DISCLOSURE Submitted to the University of California

1. Microfabricated SPM Probes with Integrated Carbon Nanotube Cantilever and Tip
Inventors: **R Lal**, A Chand, S Jin, A Quist

2. Tunable optical cladding for imaging and biological applications
Inventors: S. Varghese, R. Srinivasan, **R. Lal**

3. Microscopy methods and devices with integrated fluorescence and scanning probe microscopy
   Inventors: **R. Lal**, S Ramachandran, S Jin

PATENT DISCLOSURE Submitted to the University of Chicago

1. Nanoscale and Nanotube-Based Diagnostics and Therapeutic Devices
   Inventors: **R lal**, S Jin, R. Srinivasan, P Landon

2. Nanofluidics arrays for designing therapeutics
   Inventors: **R Lal,** S. Ramachandran, Sungho Jin

3. Photo-Activated Nanoparticles for Varicose Veins
   Inventors: **R Lal**, J. Raman, G. Piano, P. Landon

4. Cordless Pacemaker
   Inventors: **R. Lal**, N. Jolly, J Raman, S. Jin

5. Devices, Systems and Methods to Detect Edema
   Inventors: **R. Lal**, N. Jolly, J Raman, S. Jin

GRANTS:

Active/To be funded

1. NIH, RO1, Amyloid channels to design therapeutics for neurodegenerative diseases
   Principal Investigator
   03-01-2013 – 02-28-2018

2. NIH; RO1 grant; Imaging molecular structure & activity of gap junctions;
   Principal Investigator
   04-01-2008 – 03-31-2015

3. NIH; RO1 grant; Designing an Integrated Nanoscale System for Ion Channel Structure-Function Study
   Principal Investigator
   07-01-2008 – 06-30-2013

4. NIH; RO1; Amyloid channels to design therapeutics for neurodegenerative diseases
   Principal Investigator
   09-15-06 – 06-30-12

5. NIH, Program Project; Cytopskeletal regulation of lung endothelial pathobiology
   02-01-2008 – 01-31-2013
   Principal Investigator for the Nanobiophysics Core D.
   Overall PI: Skip Garcia

6. Australian Res Council; Discovery Grant; Analysis of Aging Biomineralized Tissue
   Partner Investigator; PI: NL Fazzalari, Flinders University, Adelaide, Australia
   03-01-2008 – 02-28-2011

7. NIH; RO1; An Improved Atomic Force Microscope for Biomed Application: Fast, Low Noise, and Easy to Use
Co-Investigator; Principal Investigator: Dr. Paul Hansma, UCSB
07-01-06 – 06-30-11

8. Australian Res Council; Diatom Frustules: nanostructures at the base of ocean food webs,
Partner investigator; PI: Jim Mitchell, Flinders University, Adelaide, Australia
2009-2011

9. Australian Res Council; Motility as a means to understand prokaryotic function in the biosphere,
Partner investigator; PI: Jim Mitchell, Flinders University, Adelaide, Australia
2010-2012

10. NIH; Program Project; Interdisciplinary Approach to Drug Discovery-Project 2;
Co-PI; PI: Jorge Ghiso, NYU

11. NIH; RO1; Apolipoproteins and Aβ clearance;
Collaborator; PI: Jorge Ghiso, NYU

12. AHAF (American Health Assistant Foundation); Amyloid Assembly and Cerebral Endothelial Cells Response.
Collaborator; P.I.: Agueda Rostagno, NYU

13. NIH; NIA; Renewal RO1 AG08721; Amyloid angiopathy, early plaques and aging
Collaborator; PI: Jorge Ghiso, NYU

14. ARC (Australia Research Council) Linkage Grant, Combining the soft with the hard: The assembly of artificial cell membranes on porous semiconductors
PI: Nico Voelker, Flinders University, Adelaide
Oversees Partner Investigator (Co-PI equivalent)

15. ARC (Australia Research Council) Discovery Grant; Diatom frustules: nanostructures at the base of ocean food webs
PI: Jim Mitchell, Flinders University
Partner Investigator

Submitted

1. NSF, OIA - SCI & TECH CTRS grant; Implantable Nanomedical Devices Science and Technology Center
Co-Director, Director: Mark Schultz, University of Cincinnati

2. Ride For Life; Ion channel paradigm of SOD1 in ALS pathophysiology: Atomic force microscopy and channel conductance study of native and mutant SOD1
Principal Investigator

3. NIH; RO1 grant; Multimodality Nanosensors with Wireless Detectors for Edema in Tissues and Organs
Principal Investigator

4. NIH; New RO1 application; Cerebrovascular Amyloidosis, Stroke and Dementia
   Consultant; PI: Agueda Rostagno, NYU

5. NIH, SBIR; Nano Delivery systems for Platinum Based Anticancer Drugs
   Sub-Contract, Collaborator; PI: Sashi Kumar, RC Corp, Chicago

6. NIH, RO1 (MPI): Tumor-Penetrating Delivery of Cancer Drugs with Remotely On-Off Switchable NanoCa
   Multiple Co-PI

7. NIH, R21, AFM-based TIRF, FRET and scanning force microscopy for apical cell membrane study
   Principal Investigator

8. NIH, DP, Probing ion channel structure-activity polymorphism by multimodal, multiprobe AFM
   Principal Investigator

Previous Fundings

1. NIH; RO1 grant; Imaging molecular structure & activity of gap junctions;
   08-01-02 - 12-31-08;
   Principal Investigator

2. Philip Morris External Research Program; Smoking-altered gap junction hemichannel structure and activity modulate cell physiology and viability
   07-01-05 – 11-30-10
   Principal Investigator

3. Ride For Life; Defining Structure of mutant SOD1 in ALS pathophysiology: Atomic force microscopy of various SOD1 mutants
   Principal Investigator
   01-01-08 – 12-31-08

4. Ride For Life; Role of Neuronal Communication with its Surrounding and with Support Cells in Oxidative Stress-induced ALS Pathophysiology and Neuronal Degeneration
   03-01-07 – 02-28-08
   Principal Investigator

5. Philip Morris External Research Program; Smoking-induced reactive oxygen species modulate gap junctional hemichannel activity;
   05-01-01 - 11-30-05;
   Principal Investigator

6. California Department of Health, Alzheimer's Disease Res Program; Amyloid beta ion-channel provides a direct mechanism for Alzheimer’s disease pathophysiology;
   09-01-04 - 08-31-07;

7. Australian Research Council; Discovery-Projects; Interdisciplinary Engineering; Nanoscale Particle Control by Rigid Biomineralized Surfaces;
   12-01-2003 – 11-30-2006
   International PI; PIs: Drs. Mitchell, Voelker, Rosengarten, Flinders University, Australia

8. Alzheimer's Association of America; Molecular mechanisms of Alzheimer's disease;
09-01-00 - 08-31-04;
Principal Investigator

9. NSF; Nanotechnology-SGER; Development of a technique for Nanoscale Resolution Fluid Velocity Fields with Emphasis on Flows over Cell-Surface Nanostructures;
04-01-02 – 03-31-04
Co-Principal Investigator

10. University of California, BioSTAR matching grant; Brain Machine Interface: Microfabricated Cell Membrane Electrophysiological Recording Arrays;
08-2000 – 07-2005 (on Hold, would be activated shortly)
Co-PI; Joint grant with Dr. Luke Lee from UC Berkeley

11. Alzheimer's Association of America;
09-01-2004 – 08-31-2007
Collaborator; P.I.: Agueda Rostagno, NYU

12. NZ Foundation for Research Science and Technology; Nanoactive Surfaces in Microfabricated Devices
12-01-2003 – 11-30-2007
Collaborator; Principal Investigator: Prof Jeff Talon

13. NIH; RO1 grant; Imaging molecular structure & activity of gap junctions;
09-01-97 - 08-14-02; (funded jointly by NIA & NIGMS);
Principal Investigator

14. NSF; SGER Program; Div of Chem & Transport Systems; Development of molecular - resolution imaging of cell-surface nanostructures in their native hydrated state;
08-01-99 - 01-31-01;
Co-Principal Investigator

15. NSF; NSF-NATO Fellowship Program; Multimodal AFM of biomaterials;
08-01-01 - 07-31-02;
Principal Investigator to host Dr. Adam Mechler from Hungary

16. Alzheimer's Dis Program, Department of Health, California; Multimodal imaging of real-time amyloid beta toxicity & underlying mechanisms in hippocampal neurons;
01-01-99 - 12-31-01;
Principal Investigator

17. Genetic Therapy Inc, a subsidiary of Novartis Pharmaceuticals; Atomic force microscopy of non-

19. NutraSweet-Kelco, a subsidiary of Monsanto Lifesciences; atomic force microscopy of protein macromolecules;
Principal Investigator

20. Alzheimer's Disease Program, Department of Health, California; Imaging molecular structure & ligand-induced conformations of ion channels formed by amyloid-peptide; 10-01-95 - 09-30-98;
Principal Investigator

21. American Heart Association; Structure-function correlation of heart gap junctions;
07-01-97 - 06-30-99;
Principal Investigator

22. Foundation for Research, Science and Technology, New Zealand; 3D molecular imaging of structure & function of fibers by atomic force microscopy;
03-01-97 - 07-30-99;
Principal Investigator

23. Molecular Imaging Corporation, Arizona; Instrumentation development for "in situ" SPM, including magnetically-excited atomic force microscopy;
07-01-98 - 09-30-99;
Principal Investigator

24. Cottage Hospital Research Program; Molecular structure of vascular endothelial growth factor (VEGF) receptor-ligand complex;
12-01-96 - 11-30-98;
Principal Investigator

25. Swedish Research Council for Engineering Sciences; Application of multimodal atomic force microscopy in molecular biophysics of membrane macromolecules;
01-01-98 - 12-31-98;
Principal Investigator to host the postdoctoral Fellow

26. Cottage Hospital-Digital Instruments Joint Award; Structure of gap junctions in breast cells;
07/01/95 - 06/30/96;
Principal Investigator

27. SCOR in Atherosclerosis grant; P. Davies, program director; sub-project: Flow sensing mechanism of vascular endothelium; P Davies, P.I.;
12/1/91-11/30/96;
Co-Investigator

28. NIH, RO3 grant; Atomic force imaging of molecular motor unit activity;
08/01/94-07/31/95;
Co-Principal Investigator

29. Whitaker Foundation Biomedical Engineering Research Grants; Study of molecular structure of ion channels with the Atomic Force & Scanning Tunneling Microscopes;
12/1/91 - 11/30/94;
Principal Investigator

30. Digestive Center Grant, NIH; Pilot Award; AFM of Liver Gap Junction;
1/1/1992-12/31/92;
Principal Investigator

31. National Society to Prevent Blindness; Eye-position and movement signals gate retino-geniculate signal transfer;
1/1/1984-12/31/1987;
Principal Investigator

CURRENT PROJECTS IN OUR GROUP: Partial list

1) Structure-function correlation of gap junctions in heart, breast, liver, retina using AFM, electrophysiological, immunological, biochemical and molecular expression techniques.

2) Molecular structure and ligand-induced conformations of ion channels formed by misfolded proteins and mechanisms of channel-induced cellular degeneration: AFM, TIRF, FRET, Deconvolution microscopy and electrophysiological studies.

3) nanomechanical properties, cytoskeletal reorganization and growth of neurons and non-neuronal cells using multimodal AFM, fluorescence microscopy and Cell Biological techniques.

4) 3D molecular Structure-function study of molecular motors, extracellular matrix proteins, and DNA-liposome complexes examined with atomic force microscope.

5) Designing multimodal "SMART AFM" including AFM, TIRF, FRET, Optical Tweezers, electrical recording, and confocal microscopy.

6) Nanodevices and BioMEMs for microarray-based screening of drug compounds and neural tissue engineering.

7) Nanosensors for heart/lung diagnostics,edema and monitoring therapeutics' role

8) Nanodevices for heart therapeutics

9) DNA Zipperosomes for drug delivery

PUBLICATIONS (in chronological order):

1. Alfonta L, Meckes B, Amir L, Schlesinger O, Ramachandran S, **Lal R.** "Measuring Localized Redox Enzyme Electron Transfer in a Live Cell with Conducting Atomic Force Microscopy" ***Anal. Chem.***, published online 2014. DOI: 10.1021/ac5015645

2. Landon, PB, Mo, AH, Zhang, C., Emerson, CD, Printz, AD, Gomez, AL, DeLa Torre, CJ, Colburn, DAM, Anzenberg, P., Eliceiri, M., O'Connell, C. **Lal, R**. Designing hollow nano gold golf balls. ***ACS Applied Materials & Interfaces***. 2014. DOI: 10.1021/am502519x

3. Kwok J, Grogan S, Meckes B, Arce F, **Lal R**, D'Lima D. Atomic force microscopy reveals age-dependent changes in nanomechanical properties of the extracellular matrix of native human menisci: Implications for joint degeneration and osteoarthritis. ***Nanomedicine***:NBM. Published online 2014. doi: 10.1016/j.nano.2014.06.010

4. Mo, AH, Landon, PB, Meckes B, Yang M, Glinsky GV, **Lal R**, On-demand Four-way Junction DNAzyme Nanoswitch Driven by Inosine-Based Partial Strand Displacement. ***Nanoscale***. 6, 1462 – 1466, 2014

5. Ramachandran S, Arce FT, Patel NR, Quist AP, Cohen DA, **Lal R**. Structure and Permeability of Ion-channels by Integrated AFM and Waveguide TIRF Microscopy. ***Sci Rep***. 4:4424, 2014. doi: 10.1038/srep04424.

6. Meckes B, Arce FT, Connelly LS, **Lal R**. Insulated Conducting Cantilevered Nanotips and Two-Chamber Recording System for High Resolution IonSensing AFM. ***Sci Rep.*** 4:4454, 2014. doi: 10.1038/srep04454.

7. Connelly LS, Meckes B, Larkin J, Gillman AL, Wanunu M, **Lal R**. "Graphene Nanopore Support System for Simultaneous High-Resolution AFM Imaging and ConductanceMeasurements." ***ACS Appl Mater Interfaces***. 2014, Article ASAP DOI: 10.1021/am500639q

8. Jang, H., Teran Arce, F., Ramachandran, S., Kagan, BL, **Lal, R**, Nussinov, R. Disordered amyloidogenic peptides may insert into the membrane and assemble into common cyclic structural motifs. ***Chem Soc Rev***, 2014. DOI: 10.1039/C3CS60459D

9. Jang H, Connelly L, Arce FT, Ramachandran S, Kagan BL, **Lal R**, Nussinov R. Mechanisms for the Insertion of Toxic, Fibril-like β-Amyloid Oligomers into the Membrane. ***J Chem Theory Comput***. 8:822-833, 2013.

10. Mitchell JG, Seuront L, Doubell MJ, Losic D, Voelcker NH, Seymour J, **Lal R**. The role of diatom nanostructures in biasing diffusion to improve uptake in a patchy nutrient environment." PLoS One. 2013 May 7;8(5)

11. Jang H, Connelly L, Arce FT, Ramachandran S, **Lal R**, Kagan BL, Nussinov R . Alzheimer's disease: which type of amyloid-preventing drug agents to employ? ***Phys Chem Chem Phys***. 15(23):8868-77, 2013. doi: 10.1039/c3cp00017f

12. Arce FT, Meckes B, Camp SM, Garcia JG, Dudek SM, **Lal R.** Heterogenous elastic response of human lung microvascular endothelial cells to barrier modulating stimuli. ***Nanomedicine:NBM***. 9:875-84, 2013. doi: 10.1016/j.nano.2013.03.006

13. Ramachandran S, Cohen DA, Quist AP, **Lal R**. "High performance, LED powered,waveguide based total internal reflection microscopy." ***Sci Rep.*** 2013 Jul 4;3:2133. doi: 10.1038/srep0213

14. Jang H, Teran Arce F, Ramachandran S, Kagan BL, **Lal R**, Nussinov R. Familial Alzheimer's Disease Osaka Mutant (ΔE22) β-Barrels Suggest an Explanation for the Different Aβ1-40/42 Preferred Conformational States Observed by Experiment. ***J Phys Chem*** B. 2013.

15. Landon, PB, Mo, AH, Ramos CT, Guiterrez JJ, Lal R. "Facile, Green Synthesis of Large Single Crystal Copper Micro and Nanoparticles with Ascorbic Acid and Gum Arabic." ***Open Journal of Applied Science*** 3 (5). 332-336, 2013

16. Jang, H, L. Connelly, F.T. Arce, S. Ramachandran, B.L. Kagan, **R. Lal**, R. Nussinov. Mechanisms for the Insertion of Toxic, Fibril-like β-Amyloid Oligomers into the Membrane. ***J. Chem. Theory Comput***., published online December 5, 2012

17. Kong, S.D., J. Lee, S. Ramachandran, B.P. Eliceiri, V.I. Shubayev, **R. Lal**, S. Jin. Magnetic targeting of nanoparticles across the intact blood-brain barrier. ***J Control Release*** , published online, Oct 10, 2012

18. Quist, A.P., **R. Lal**. Characterization of nanoscale biological systems: Multimodal Atomic Force microscopy for Nanoimaging, nanomechanics and biomolecular interactions. ***Nanotechnology for Biology and Medicine: Fundamental Biomedical Technologies*** 2: 45-68, 2012

19. Connelly L, Jang H, Teran Arce F, Ramachandran S, Kagan BL, Nussinov R, Lal R. Effects of Point Substitutions on the Structure of Toxic Alzheimer's β-Amyloid Channels: Atomic Force Microscopy and Molecular Dynamics Simulations. ***Biochemistry***. 51: 3031-3038, 2012

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Invited Chapters

1. **R. Lal.** "Scanning probe techniques" in ***The Encyclopedia of Molecular Biology***, T.E. Creighton, Ed, John Wiley & Sons, NY, 1999.

2. **R. Lal** "Atomic force microscopy of reconstituted ion channels" in ***Ion Channel Localization Methods & Protocols***, Humana Press, 2002.

3. **R. Lal** "Scanning probe microscopy interactions at the cellular and sub-cellular level" In ***At the Building Block Level: Nanotechnology for Biology and Medicine,*** G. A. Silva, Ed, Science of Knowledge Press, in press, 2011.

4. Rostagno A, **R. Lal**, J. Ghiso. "Protein misfolding, aggregation and fibril formation: Common features of cerebral and non-cerebral amyloidosis". *In* ***Neurobiology of Alzheimers Disease*.** D. Dawbarn (ed), 3rd Edition, pp-133-160, 2007.

5. Hafner, J., EI Chen, **R Lal**, S. Jin. "General and Special Probes in Scanning Microscopies" In ***Handbook of Nanotechnology.*** B.Bhushan (ed), Springer, 2008

6. Raman, J., N. Jolly, S. Jin. **R. Lal**. Nanoimaging and in-body nanostructrued devices for diagnostics and therapeutics. In ***Nanomedicine: Design of Particle***

Ph.D. Dissertation:

10. Lichtenegger, H.C., J. Thimm, **R. Lal**, J.H. Waite, G.D. Stucky. Protein and metal: lightweight cutting materials in invertebrate jaws., 2002

11. Quist, A.P., **R. Lal**. Porous vycor glass as a model system for biodevices: an AFM study of properties of water in confined geometries. Microscopy and Microanalysis 2001, Long Beach, CA. *Microsc. Micro*anal. **7** (suppl 2): 118, 2001.

12. Bhatnagar, R., S. B. Nicoll, J.J. Qian, **R. Lal**. Tractional Coupling of Cells to Substrates Modified with a Collagen Analogue: A Model for Biological Mechanotransduction Leading to Cell Differentiation and Matrix Organization. *ASME SYMPOSIUM - MECHANICS IN BIOLOGY*, 2000, Orlando, Florida

13. Almqvist, N., A.P. Quist, **R. Lal**. Elastic properties of living cells studied by multimodal atomic force microscopy. Nordic-Baltic SPM Workshop 2000, Marstrand.

14. Morgan, J., **R. Lal**, L. Cohen. A tissue culture model of ventricular fibrillation? ***J. Mol. Cell. Cardiol.* 22**: (suppl. 1) s17, 1990.

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INVITED SPEAKER: (partial list of invited past & future seminars till 2012; not including job seminars). List for 2013-14 will be updated with additional 29 seminars

1. Chinese Academy of Sciences, Shanghai Institute of Applied Physics, Shanghai, 2012
2. Jiao Tong University, Shanghai, 2012
3. Normal University, Shanghai, 2012
4. Zhejiang University, Hangzhou, China, 2012
5. Max Planck Institute for Biophysical Chemistry, Gottingen, Germany, 2012
6. EPFL, Institute for Bioengineering, Lausanne, Switzerland, 2012
7. Pavia University, Institute for Advanced Studies, Pavia, Italy, 2012
8. CNRS, CRBM, Montpellier, France, 2012
9. Northeastern University, Physics and IGERT Program, Boston, 2012
10. Boston university, Physics and Biomedical Engineering, Boston, 2012
11. Nano-Bio International Collaborative Conference, Tampa, 2012
12.

6.

23. University of South Florida, School of Engineering, Distinguished Nano Lecturer, USF, Tampa, Florida, 2011

24. Aegean Conference on Pathways, Networks & Systems Medicine, Crete, Greece, 2011 (not attended due to conflict with NIH Nano Study section meeting)

25. National Symposium on Microwave Field Measurement, Biological effects and application in Nanoscience, Delhi, India, 2011

26. Aegean Conference on Pathways, Networks & Systems Medicine, Rhodes Island, Greece, 2010

27. Center for Cellular and Molecular Biology (CCMB), Hyderabad, India, 2010

28. USF NanoBio Collaborative 2010, Tampa, Florida, 2010

29. North Dakota State University, Pharmaceutical Sciences, Fargo, ND, 2010

30. UCLA, Bioengineering Department, Los Angeles, 2010

31. USC, Zilka Institute of Neurological Sciences, Los Angeles, 2009

32. National Institute of Drug Abuse Symposium on Emerging Technology for Drug Discovery, 2008

33. Alzheimer's Association Think Tank meeting for Nanoimaging and Nano drug delivery, Las Vegas, 2008

34. BIO 2008 International meeting, San Diego, 2008

35. Michigan Bio conference, 2008

36. Princeton University, 2008

37. Microscopy Society of America Annual Meeting, San Antonio, TX 2008

38. Harvard University, Brigham and Women's Hospital and the VA Boston Healthcare System, April 2007 (Two seminars)

39. Conference on Coupled Nonlinear Oscillators & Applications in Nanosystems, UCSB, 2007

40. Caltech, Pasadena. Panel Speaker, Symposium honoring Jean-Paul Revel, June, 2007

41. ASCTS (Australasian Society of Cardiac and Thoracic Surgeons) Annual Meeting, Noosa, Australia, Invited Panel Speaker, October, 2007

42. American Academy of Nanomedicine 3rd Annual Meeting, San Diego, CA 2007

43. National Cancer Institute, Frederick, MD, 2007

44. Philip Morris External Grant Program Symposia, Lansdowne, VA, 2006

45. Univ of California at Santa Barbara, KITP, Cardiac Dynamics Mini-Program, 2006

46. Emory University, Department of Cell Biology, Atlanta, 2006

47. New York University, Department of Pathology, 2006

48. Australian National University, Australia, 2006

49. Sydney University, Sydney, Australia, 2006

50. Flinders University, School of Physical & Chemical Sciences, Adelaide, Australia, 2006

51. Flinders University, School of Biological Sciences, Adelaide, Australia, 2006

52. Flinders University, Medical School and Hospitals, Adelaide, Australia, 2006

53. Flinders University, *Frontier Seminar* Series, Adelaide, Adelaide, Australia, 2006

54. Monash University, Melbourne, Australia, 2006

55. University of Technology Sydney, Australia, 2006

56. 2006 International Conference on Nanoscience and Nanotechnology (ICONN 2006), Brisbane, Australia

57. ALS Association's National ALS Advocacy Day and Public Policy Conference, Washington, DC, 2006

58. ALSA's Drug Company Working Group Meeting, American Neurology Assoc Annual meeting, San Diego, 2006

59. ALSA Fundraiser meeting, Oheka Castle, Long Island, NY, 2006

60. University of Chicago, Cellular and Molecular Physiology Seminar Series, Chicago, 2005

61. 20th Biennial Joint Meeting of the International Society of Neurochemists and European Society of Neurochemists, Innsbruck, Austria, 2005.

62. BIO2005 International Conference, Converging Technologies Track, Nanoscale Systems: The New Frontier in High-Throughput Drug Discovery panel, Philadelphia, 2005

63. Microscopy and Microanalysis Society International Conference, Honolulu, 2005

64. University of West Virginia, WVNano Initiative & Physics Department, Morgantown, 2004.

65. BIO2004 International Conference, Emerging Technology panel, San Francisco, 2004

66. 3rd European Light Microscopy Initiative and EMBL International Conf, Barcelona, 2003

67. BIO2003 International Conference, Nanotechnology Initiative, Washington DC, 2003

68. CNRS-CRBM, Montepellier, France, 2003.

69. Melbourne Univ, Neurodegeneration Center, Chemistry, Pathology, Australia, 2003.

70. Wool Research Organization of New Zealand (WRONZ) and Nanotechnology Institute at Canterbury University, Christchurch, New Zealand, 2003.

71. Industrial Research Organization of New Zealand, Auckland, New Zealand, 2003.

72. Australian Biophysical Society Annual meeting, Nov 2002.

73. Flinders Univ, Dept of chemistry, Adelaide, Australia, 2002.

74. CSRIO, Melbourne, Australia, 2002.

75. Australian National University, Dept of Chemistry, Canberra, Australia, 2002.

76. UTS, Institute for Immunology and Biomedicine, Sydney, Australia, 2002.

77. UTS, Institute for Nanoscale Technology, Sydney, Australia 2002.

78. University of New Southwales (UNSW), Institute of Immunology, Sydney, 2002.

79. Sydney University, Sydney, Australia 2003.

80. University of Pittsburgh, McGowan Institute for Regenerative Medicine, Pittsburgh, 2002.

81. University of California at Davis, Department of Physics, Davis, 2002.

82. New York University, School of Medicine, New York, 2002.

83. NEC Research Center, Princeton, 2002.

84. University of Central Florida, Orlando, Florida, 2001.

85. Harvard University, Department of Physics, Cambridge, Mass, 2000.

86. IBM, Nanotechnology Division, Watson Research Center, Yorktown, NY, 2000.

87. NIAMS-NCI joint seminar, National Institute of Health, 2000.

88. University of West Virginia Medical Center, Morgantown, WV, 2000.

89. Univ of Connecticut Medical Center, Center for Biomaterials, Farmington, CT, 2000.

90. University of Alabama Medical Center, Department of Neurobiology, 2000.

91. Nextar (Gilead) Pharmaceuticals, San Dimas, CA, 2000.

92. National Institute of Neurological Disorders and Strokes, National Institute of Health, 2000.

93. Microscopy-Microanalysis Soc meeting, Philadelphia, Biomaterials symp, Chair, 2000.

94. Michigan State University, Dept of Biochemistry, East Lansing, MI, 1999.

95. Park-Davis Pharmaceuticals, Ann Arbor, 1999.

96. Microscopy & Microanalysis Soc meeting, Portland, Bio-SPM symposium, Co-Chair, 1999.

97. Microscopy & Microanalysis Annual meeting, Portland, Biomaterial symposium, 1999.

98. University of California at Berkeley, Department of Bioengineering, Berkeley, CA, 1999.

99. California Institute of Technology, Division of Biology, Pasadena, CA, 1999.

100. NINDS, NIH, Laboratory of Adaptive Systems, 1999.

101. Genetic Therapy Inc, Novartis, Gaithersburg, MD, 1999.

102. Georgetown University, Institute for Cognitive and Computational Sciences, 1999.

103. Microscopy 99, Microscopy Society of New Zealand, Rotorua, Keynote Speaker, 1999.

104. Australasia SPM & AMAS joint Bi-annual meeting, Sydney, Keynote Speaker, 1999.

105. Wool Research Organization of New Zealand, University of Canterbury Medical School, and Lincoln University Joint Seminar, Christchurch, New Zealand, 1999.

106. SPIE Conference on Biological Imaging, San Jose, 1999.

107. University of Pennsylvania, Institute of Medicine and Engineering and the Seminar Series on Imaging and Micromanipulation, Philadelphia, 1998.

108. SmithKline & Beecham Pharmaceuticals, Structural Biology and Biophysics Division, King of Prussia, Pennsylvania, 1998.

109. Uniformed Services University of the Health Sciences, Department of Anatomy & Cell Biology and Physiology and the USUHS Biomedical Instr Center, Bethesda, 1998

110. Monsanto LifeSciences; St. Louis, MO, 1998.

111. Cambridge University, Pharmacology Department, Cambridge, U.K., 1997.

112. Tata Institute of Fundamental Research, Molecular Biology Division, Bombay, 1997.

113. National Center for Structural Biology, Indian Institute of Sciences, Banglore, 1997.

114. University of Alabama at Birmingham, Department of Neurobiology, Birmingham, 1997.

115. 30th Anniversary Scanning Microscopy and Cells and Materials Meeting, Chicago, 1997.

116. University of Virginia, Molecular Physiology & Biological Physics, Charlottesville, 1996

117. State University of New York at Stony Brook, Dept of Physiology & Biophysics, 1996.

118. Santa Barbara Cottage Hospital Annual Research Symposium, Santa Barbara, CA, 1996.

119. University of Auckland, Center for Gene Technology, Biomedical Imaging Center, and Dept of Biology joint seminar, Auckland, New Zealand, 1996.

120. Forest Research Institute, Rotorua, New Zealand, 1996.

121. University of Otago, Department of Chemistry, Dunedin, New Zealand, 1996.

122. Wool Research Organization of New Zealand, University of Canterbury Medical School, and Lincoln University Joint Seminar, Christchurch, New Zealand, 1996.

123. National Institute of Health, NIDDK, Laboratory of Cell Biology, Bethesda, MD, 1996

124. 14th Pfefferkorn Conference on Biological Microscopy, St. Louis, MO, 1995.

125. Case Western Reserve University, Biomedical engineering, Cleveland, 1995.

126. University of California, Department of Cellular and Molecular Biology, Davis, 1994.

127. Biomedical Engineering Society annual meeting, "Biological applications of Scanning Probe Microscopy", Tempe, Arizona, 1994.

128. Northern Illinois University, Department of Biology, Dekalb, IL 1994.

129. NutraSweet Technology, Mt. Prospect, IL, 1994.

130. University of Alabama, Department of Biomedical Engineering, Birmingham, 1994

131. University of Illinois Chicago, Department of Visual Sciences and Ophthalmology, 1994.

132. Illinois Institute of Technology, Department of Electrical Engineering, Chicago, 1994.

133. Procter & Gamble Pharmaceuticals, Cardiovascular Discovery Group, Norwich NY 1994.

134. Northern California Society for Electron Microscopy Symposium on Scanned Probe Microscopy, University of California, Berkeley, 1992.

135. University of Alabama, Neurobiology Research Center Birmingham, 1992

136. University of Indiana Medical Center, Departments of Medical Genetics and Physiology and Biophysics, Indianapolis, 1992.

137. University of Chicago, Department of Medicine, Cardiology seminar series, 1993

138. University of Illinois at Chicago, Department of Physics, 1992.

139. University of Chicago, SCOR in Atherosclerosis seminar series, 1991-92

140. AMOCO Research Center, Naperville, 1991.

141. Postgraduate Seminar on "Cellular Coupling in the Heart: Molecular and Cellular Mechanisms in Health and Disease" at the 63rd Annual Meeting of the American Heart Assoc, 1990.

Collaborators (Recent past):

1. Dr. Sanjoy Banerjee, Dept of Chemical Engineering, Univ California at Santa Barbara.
2. Dr. Wilbert Lick, Department of Mechanical and Environmental Engineering, UCSB.
3. Dr. Mohammed Dahleh, Dept of Mechanical and Environmental Engineering, UCSB.
4. Dr. Carl Meinhart, Department of Mechanical and Environmental Engineering, UCSB.
5. Dr. Banglore Manjunath, Dept of Computer and Electrical Engineering, UCSB.
6. Dr. Dennis Clegg, Dept of MCDB and Neurosci Res Inst, UCSB.
7. Dr. Michael Garavito, Department of Biochemistry, Michigan State University
8. Dr. George Primbs, Santa Barbara Cottage Hospital and Miravant Medical Technology.
9. Dr. Stuart Feinstein, MCDB and Neurosci Res Institute, UCSB
10. Dr. Raj Bhatanagar, Department of Biochemistry and Bioengineering, UCSF
11. Dr. Deron Walter, Department of Physics, University of Central Florida, Orlando.
12. Dr. Don Anderson, Neruscience Research Institute, UCSB.
13. Dr. Linc Johnson, Neuroscience Research institute, UCSB.
14. Dr. Herb Waite, MCDB, BMSI, UCSB.
15. Dr. Helga Lechtenegger, UCSB.
16. Dr. Igor Mezic, Department of Mechanical and Environmental Engineering, UCSB
17. Dr. Ravi Salgia, Department of Medicine, Oncology hematology section, Univ of Chicago
18. Dr. Anthony Kosiokoff, Department of Biochem and Mol Biol, Univ of Chicago
19. Dr. Ursula Strob, Department of Molecular Genetics and Cell Biology, Univ of Chicago
20. Dr. Morton Arnsdorf, Department of Medicine, Univ of Chicago
21. Dr. Craig Prater, Veeco Metrology, Santa Barbara

Postdoctoral Fellows (Past)

1. Dr. Michael Allen, Research Assistant Professor, University of Chicago
2. Dr. Ricardo Capone, Project Scientist, UCSD
3. Dr. Sujatha Peela, Associate Professor, Pondicherry, India
4. Dr. Arjan Quist, Director, NanoResearch, RC Nano Corp, Chicago
5. Dr. Ivo Duodevski, postdoctoral Fellow, NYU
6. Dr. Adam Mechler, Assistant Professor, Chemistry Department, LaTrobe University, Melbourne, Australia
7. Dr. Cristian Ionescu, President, A Nanobiotech company, California
8. Dr. Elizabeth Pavlovic, Postdoctoral Fellow, UCSB
9. Dr. Ami Chand, President, APNano Corp, California
10. Dr. Daniel Cohen, Senior Scientist, UCSB
11. Dr. Brian Oh, Postdoctoral Fellow (shared with Dr. Jin at UCSD)
12. Dr. Fei Liu, Postdoctoral Fellow, Harvard
13. Dr. Shaohua Xu, Assistant Professor, Florida Atlantic Unviersity
14. Dr. Ken Ginsberg, research faculty, University of California, Davis
15. Don Saner, Computing resources, biological Sciences Division, University of Chicago
16. Dr. Judy Zhu,Senior Scientist at Molecular Imaging, an AFM manufacturing company
17. Dr. Seung Rhee, Professor of Biochemistry, Yeungnam Univ, South Korea
18. Dr. Ashok Parbhu, Senior Scientist,MetPerfect, a biotech industrial consultancy company
19. Dr. Rajinder Bhatia, Senior Scientist at Clonetech (a division of Becton-Dickinson)
20. Dr. Nils Almkvist, Senior Lecturer, Lulea University of Technology, Sweden.
21. Dr. Hai-Lin, Assistant Professor, Bioengineering Dept, Univ of Pittsburgh
22. Dr. Bettye Smith, Senior Scientist at Oregon Green Nano initiative

Graduate Advisor/committee member

Current:

1. Alan Gilman, Bioengineering Department, UCSD
2. Nirav Patel, Bioengineering Department, UCSD
3. Alexander Mo, Mechanical Engineering and Material Sciences Department, UCSD
4. Laura Connolly, Mechanical Engineering and Material Sciences Department, UCSD
5. Jeanie Kwok, Materials Science, UCSD
6. Raffaella Fior, Materials and Natural Resources, University of Trieste
7. Casey Sanchez, Materials Science, UCSD
8. Taeyoung (Michael) Hwang, Materials Science, UCSD
9. Joon Lee, Materials Science, UCSD
10. Adam Printz, Nanoengineering, UCSD
11. Mukanth ;4 gs0 g/GS55 gs0 ngng2SD

Working in computer industry

1. Ting Shen, MCDB, Univ of California at Santa Barbara
   Working in a consulting company
2. Raffi Novosel
   he is finishing his undergraduate at UCSB
3. Aaron Hall (Form Stanford University)
   he is preparing for graduate study
4. Sanjoy Cherala, (from Depaul University)
   he is finishing fourth yr of study
5. Kevin Chen, University of Chicago
   He is preparing for graduate studies
6. Gideon Klionsky (from Brandeis University)
   he is finishing his fourth yr of study
7. Sumeet Shroff, Biology and bioengineering, University of Pittsburgh, 2010 Summer
   he is a Junior yr student
8. Anthony Neuberger, Nuclear Engineering, New Mexico State University, 2010 Summer
   he is a Junior yr student
9. Aljandro Soto, Mechanical Engineering, UCSD
10. Davis Carlin, Bioengineering, CalPoly, San Luis Obispo, Claifornia, 2010 REU Student
    he is Junior yr student

<u>High School Students</u>

1. Sarah Pattison, Long Island, New York, UCSB mentorship program, 2006
   Undergraduate student in NY
2. Suryendra Doron Sherman, DP High School, Goleta, California, 2006
   Undergraduate student at UCSD
3. Abbie Klionski, Lincoln High School, Chicago, 2008
   Undergraduate student in Princeton
4. Naomi Klionski, Lincoln High School, Chicago, 2009
   Senior yr High school student