CURRICULUM VITAE

Pablo Fernando Martín Terán Arce
Research Associate Professor
Division of Translational and Regenerative Medicine, Department of Medicine
Department of Biomedical Engineering
University of Arizona
Steele Children's Research Center, Room 7342
1501 Campbell Avenue
Tucson, AZ 86719
E-mail: ftarce@email.arizona.edu
Telephone: 520-626-7228 (office)

Chronology of Education

1986-1993	B.Sc. and M.Sc. (Diplom Physiker)	Physics Technical University of Munich, Munich, Germany
1992-1993	(Diplomarbeit)	Master's Thesis Department of Structural Molecular Biology Max Planck Institute for Biochemistry Martinsried, Germany Title: Scanning Tunneling Microscopy and Electrochemical Methods for Prospective in situ Imaging of Biological Samples Co-directors: Dr. R. Guckenberger and Dr. W. Baumeister
1995-1997	Ph. D.	Physics, Research Institute of Theoretical and Applied Physical Chemistry (INIFTA) National University of La Plata, Argentina Title: Scanning Probe Microscopy Applied to the Study of the Molecular Structure and Surface Dynamics of Organic Monolayers Co-directors: Dr. R. Salvarezza and Dr. A. J. Arvia

Chronology of Employment

March-April 1988	Student Laboratory Assistant Research Department for Photovoltaic Cells, Siemens (Neuperlach Süd), Munich, Germany
Aug.-Oct. 1990	Research Summer Student Biophysics Section (supervisor Dr. Erich Sackmann), Physics Department, Technical University of Munich, Garching, Germany
1994-1995	Lecturer Physics Department, Universidad Mayor Tomás Frías/Mayor de San Simón (Bolivia)
March 1998-April 2000	Postdoctoral Fellow Department of Physical Chemistry (supervisor Dr. Fausto Sanz), University of Barcelona, Barcelona, Spain

Aug. 1999-Feb. 2000	Visiting Research Scholar Materials Sciences Division (supervisor Dr. Miquel Salmeron), Lawrence Berkeley National Laboratory, Berkeley, CA
May 2000-March 2001	Postdoctoral Fellow Department of Physics & Astronomy (supervisor Dr. Pulak Dutta), Northwestern University, Evanston, IL
April 2001-May 2002	Research Associate Laboratory for Molecular Robotics (supervisor Dr. Aristides Requicha), Department of Computer Science, University of Southern California, Los Angeles, CA
June 2002-Feb. 2006	Research Scientist and Postdoctoral Researcher Imaging and Chemical Analysis laboratory (supervisor Dr. Recep Avci), Department of Physics, Montana State University, Bozeman, MT
Feb.-Sept. 2006	Postdoctoral Researcher Neuroscience Research Institute (supervisor Dr. Ratnesh Lal), University of California at Santa Barbara (UCSB), Santa Barbara, CA
Oct. 2006-Dec. 2009	Research Associate (Assistant Professor) Center for Nanomedicine (supervisor Dr. Ratnesh Lal), Department of Medicine (Pulmonary/Critical Care Section), University of Chicago, Chicago, IL
Jan. 2010-	Assistant Project Scientist, Bioengineering, and Mechanical & Aerospace Engineering (supervisor Dr. Ratnesh Lal), University of California at San Diego (UCSD), La Jolla, CA

Professional Memberships

- 2003-2004 American Chemical Society (ACS)
- 2004-2005 American Physical Society (APS)
- 2008-2013 Biophysical Society

Honors and Awards

- Australian Research Council (ARC). International Fellowship; ARC Linkage International grant (2009).
- Argentine Research Council (CONICET). Fellowship for foreign graduates (1995-1997).

Service/Outreach

National/international outreach

Reviewer for:

- *Soft Matter*
- *Physical Chemistry Chemical Physics*

- *Nanomedicine: Nanotechnology, Biology, and Medicine*
- *Biochimica et Biophysica Acta (BBA) - Biomembranes*
- *Chemical Physics Letters*
- *Microscopy and Microanalysis*

Publications/Creative Activity

Book chapters

Presenting original research

1. ***F. Teran Arce**, J. L. Zubimendi, M.E. Vela, R.C. Salvarezza, and A.J. Arvia. "Self-assembled monolayers on C(0001)", in "Adsorption by Carbons", Eduardo Bottani and Juan Tascón (editors), chapter 20 (Elsevier 2008).

Based on prior research

1. **F. Teran Arce**, H. Jang, L. Connelly, , S. Ramachandran, B. L. Kagan, R. Nussinov, and R. Lal. "Structure–Function Studies of Amyloid Pores in Alzheimer's Disease as a Case Example of Neurodegenerative Diseases", in "Bionanoimaging: Protein Misfolding & Aggregation", Vladimir Uversky and Yuri Lyubchenko (editors), chapter 36 (Elsevier 2013).

2. Hyunbum Jang, **F. Teran Arce**, Joon Lee, Alan L. Gillman, Srinivasan Ramachandran, Bruce L. Kagan, Ratnesh Lal, and Ruth Nussinov. "Computational Methods for Structural and Functional Studies of Alzheimer's Amyloid Ion Channels", in "Methods in Molecular Biology: Protein Amyloid Aggregation", David Eliezer (editor), chapter 16 (Springer 2015).

Refereed journal articles

1. *R. Guckenberger, **F. Terán Arce**, A. Hillebrandt, T. Hartmann. "Imaging of uncoated tobacco mosaic virus by scanning tunneling microscopy". *J. Vac. Sci. Technol. B* 12, 1508-1511 (1994).

2. ***F. Terán Arce**, M. E. Vela, R. C.Salvarezza, A. J. Arvia. "Scanning probe microscopy comparative study of thiol films on C(0001) and Au(111) surfaces". *Surf. Rev. Lett.* 4, 637-649 (1997).

3. ***F. Terán Arce**. "The scanning tunneling microscope (STM)". *Bolivian Journal of Physics* 4(4), 37-57(1998).

4. ***F. Terán Arce**, M. E. Vela, R. C. Salvarezza, A. J. Arvia. "Evolution of a monolayer of dodecanethiol on gold followed in situ by scanning tunneling microscopy". *Electrochim. Acta* 44, 1053-1067 (1998).

5. ***F. Terán Arce**, M. E. Vela, R. C. Salvarezza, A. J. Arvia. "The dynamic behavior of butanethiol and dodecanethiol adsorbates on Au(111) terraces". *J. Chem. Phys.* 109, 5703-5706 (1998).

6. ***F. Terán Arce**, M. E. Vela, R. C. Salvarezza, A. J. Arvia. "A complex structural dynamics at adsorbed alkanethiol layers at Au(111) single crystal domains". *Langmuir* 14, 7203-7212 (1998).

7. **P. F. M. Terán Arce**, G. Andreu Riera, P. Gorostiza, F. Sanz. "Atomic-Layer Expulsion in Nanoindentations on an Ionic Single Crystal". *Appl. Phys. Lett.* 77, 839-841 (2000).

8. **F. Terán Arce**, R. Avci, I. B. Beech, K. E. Cooksey, B. Wigglesworth-Cooksey. "Microelastic properties of minimally adhesive surfaces: A comparative study of RTV11 and Intersleek elastomers". *J. Chem. Phys.*, 119, 1671-1682 (2003).

9. I. Diez-Perez, M. Luna, **F. Teheran**, D.F. Ogletree, F. Sanz, M. Salmeron. "Interaction of water with self-assembled monolayers of alkylsilanes on mica". *Langmuir*, 20, 1284-1290 (2004).

10. R. Avci, M. Schweitzer, R. Boyd, J. Wittmeyer, A. Steele, J. Toporski, I. Beech, **F. Terán Arce**, B. Spangler, K. Cole, D. S. McKay. "A comparison of antibody-antigen interactions on collagen measured by conventional immunological techniques and atomic force microscopy". *Langmuir* 20, 11053-11063 (2004).

11. **F. Terán Arce**, R. Avci, I. B. Beech, K. E. Cooksey, B. Wigglesworth-Cooksey. "A live bioprobe for studying diatom-surface interactions". *Biophys. J.* 87, 4284-4297 (2004).

12. R. Avci, M. H. Schweitzer, R. D. Boyd, J. L. Wittmeyer, **F. Terán Arce**, J. O. Calvo. "Preservation of bone collagen from the late Cretaceous period, studied by immunological and atomic force microscopy". *Langmuir* 21, 3584-3590, (2005).

13. Z. Suo, **F. Terán Arce**, R. Avci, K. Thieltges, B. Spangler. "Dendritic structures of poly(ethylene glycol) on silicon nitride and gold surfaces". *Langmuir* 22, 3844-3850 (2006).

14. P. A. Suci, M. T. Klem, **F. T. Arce**, T. Douglas, M. Young. "Assembly of multilayer films incorporating a viral protein cage architecture". *Langmuir* 22, 8891-8896 (2006).

15. **F. Terán Arce**, R. Avci, I. B. Beech, K. E. Cooksey, B. Wigglesworth-Cooksey. "Modification of surface properties of a polydimethylsiloxane based elastomer, RTV11, under the influence of seawater". *Langmuir* 22, 7217-7225 (2006).

16. F. Liu*, **F. Terán Arce***, S. Ramachandran*, R. Lal. "Nanomechanics of hemichannel conformations: connexin flexibility underlying channel opening and closing". *J Biol. Chem.* 281, 23207-23217 (2006). ***Equal first author.**

17. M. Higby Schweitzer, Z. Suo, R. Avci, J. M. Asara, M. A. Allen, **F. Teran Arce**, J. R. Horner. "Analyses of soft tissue from tyrannosaurus rex Suggest the presence of protein". ***Science*** 316, 277-280 (2007).

18. **F. Terán Arce**, J. L. Whitlock, A. A. Birukova, K. G. Birukov, M. F. Arnsdorf, J.G.N. García, R. Lal and S. Dudek. "Micromechanical properties of pulmonary endothelial barrier enhancement induced by sphingosine-1 phosphate: regulation by cortactin". *Biophys. J* 95, 886-894 (2008).

19. A. A. Birukova*, **F. Terán Arce***, N. Moldobaeva, S. Dudek, J.G.N. García, R. Lal, K. G. Birukov. "Endothelial permeability is controlled by spatially defined cytoskeletal force distribution: application of atomic force microscopy". *Nanomed.-Nanotechnol.* 5, 30-41 (2009). ***Equal first author.**

20. **F. Terán Arce**, R. Carlson, J. Monds, R. Veeh, F. Z. Hu, P. S. Stewart, R. Lal, G. D. Ehrlich, R. Avci. "Nanoscale structural and mechanical properties that influence pathogenicity of *Haemophilus influenzae* biofilms". *J. Bacteriol.* 191, 2512-2520 (2009).

21. H. Jang, **F. Teran Arce**, R. Capone, S. Ramachandran, R. Lal, R. Nussinov. "Misfolded amyloid ion channels present mobile β-sheet subunits in contrast to conventional ion channels". *Biophys. J.* 97, 3029-3037 (2009).

22. M. Mustata, R. Capone, H. Jang, **F. Teran Arce**, S. Ramachandran, R. Lal, R. Nussinov. "The K3 Fragment of amyloidogenic β2-microglobulin forms ion channels: implication for dialysis related amyloidosis". *J. Am. Chem. Soc.* 131 (41), 14938–14945 (2009).

23. R. Capone, M. Mustata, H. Jang, **F. Teran Arce**, R. Nussinov, R. Lal. Antimicrobial protegrin-1 forms ion channels: molecular dynamic simulation, atomic force microscopy, and electrical conductance studies, *Biophys. J.* 98, 2644-2652 (2010).

24. H. Jang, **F. Teran Arce**, S. Ramachandran, R. Capone, R. Lal, R. Nussinov. "Structural convergence among diverse, toxic β-Sheet ion channels". *J. Phys. Chem. B* 114, 9445-9451 (2010).

25. H. Jang*, **F. Teran Arce***, S. Ramachandran*, R. Capone, R. Azimova, B. L. Kagan, R. Nussinov, R. Lal. "Truncated β-amyloid peptide channels provide an alternative mechanism for Alzheimer's Disease and Down syndrome". ***Proc. Natl. Acad. Sci. U.S.A.*** 107, 6538-6543 (2010). ***Equal first author.**

26. S. M. Dudek, E. T. Chiang, S. M. Camp, Y. Guo, J. Zhao, M. E. Brown, P. A. Singleton, L. Wang, A. Desai, **F. Teran Arce**, R. Lal, J. E. Van Eyk, S. Z. Imam, J. G. N. Garcia. "Abl tyrosine kinase phosphorylates non-muscle myosin light chain kinase to regulate endothelial barrier function". *Mol. Biol. Cell* 21, 4042–4056 (2010).

27. H. Jang, **F. Teran Arce**, S. Ramachandran, R. Capone, R. Lal, R. Nussinov. "β-Barrel topology of Alzheimer's β-Amyloid ion channels". *J. Mol. Biol.* 404, 917-934 (2010).

28. R. Ayala, C. Zhang, D. Yang, A. Aung, S. Shroff, **Fernando T. Arce**, Y.S. Hwang, R. Lal, G. Arya, S. Varghese. Engineering cell-material interface for controlling stem cell adhesion, migration, and differentiation. *Biomaterials* 32, 3700-3711 (2011).

29. S. Ramachandran, **F. Teran Arce**, R. Lal. " Potential role of atomic force microscopy in systems biology". *Wiley Interdisciplinary Reviews: Systems Biology and Medicine* 3, 702-716 (2011).

30. H. Jang*, **F. Teran Arce***, M. Mustata*, S. Ramachandran, R. Capone, R. Nussinov, R. Lal. "Antimicrobial Protegrin-1 forms amyloid-like fibrils with rapid kinetics suggesting a functional link". *Biophys. J.* 100, 1775-1783 (2011). **(featured as new and notable) *Equal first author.**

31. **F. Teran Arce**, Hyunbum Jang, Srinivasan Ramachandran, Preston B. Landon, Ruth Nussinov and Ratnesh Lal. "Polymorphism of amyloid β peptide in different environments: implications for membrane insertion and pore formation". *Soft Matter* 7, 5267-5273 (2011).

32. B. L. Kagan, H. Jang, R. Capone, **F. Teran Arce**, S. Ramachandran, R. Lal and R. Nussinov "Antimicrobial properties of amyloid peptides". *Mol. Pharmaceutics* 9(4), 708–717 (2012).

33. R. Capone, H. Jang, S. Kotler, L Connelly, **F. Teran Arce**, S. Ramachandran, B. L. Kagan, R. Nussinov, R. Lal. "All-D-enantiomer of β-amyloid peptide forms ion channels in lipid bilayers". *J. Chem. Theory Comput.* 8(3), 1143–1152 (2012).

34. L. Connelly, H. Jang, **F. Teran Arce**, R Capone, S. A. Kotler, S Ramachandran, B. L. Kagan, R. Nussinov and R. Lal. "Atomic force microscopy and MD simulations reveal pore-like structures of all-D-enantiomer of Alzheimer's β-amyloid peptide: relevance to the ion channel mechanism of AD pathology" *J. Phys. Chem. B* 116, 1728–1735 (2012).

35. L. Connelly, H. Jang, **F. Teran Arce**, S. Ramachandran, B. L. Kagan, R. Nussinov and R. Lal. "Effects of point substitutions on the structure of toxic Alzheimer's β-amyloid channels: atomic force microscopy and molecular dynamics simulations" *Biochemistry* 51(14), 3031–3038 (2012).

36. H. Jang, L. Connelly, **F. Teran Arce**, S. Ramachandran, B. L. Kagan, R. Lal, and R. Nussinov. "Mechanisms for the insertion of toxic, fibril-like beta-amyloid oligomers into the membrane" *J. Chem. Theory Comput.* 9(1), 822–833 (2013).

37. H. Jang, L. Connelly, **F. Terán Arce**, S. Ramachandran, B. L. Kagan, R. Lal, and R. Nussinov. "Alzheimer's disease: which type of amyloid-preventing drug agents to employ?" *Phys. Chem. Chem. Phys.* 15(23), 8868-8877 (2013).

38. H. Jang, **F. Terán Arce**, S. Ramachandran, B. L. Kagan, R. Lal, and R. Nussinov. "Familial Alzheimer's disease Osaka mutant (ΔE22) β-barrels suggest an explanation for the different $A\beta_{1\text{-}40/42}$ preferred conformational states observed by experiment" *J. Phys. Chem. B* 117 (39), 11518–11529 (2013).

39. **F. Terán Arce**, B. Meckes, S. M. Camp, J. G. Garcia, S. M. Dudek, R. Lal. "Heterogeneous elastic response of human lung microvascular endothelial cells to barrier modulating stimuli" *Nanomed.-Nanotechnol.* 9 (7), 875-884 (2013).

40. H. Jang, **F. Teran Arce**, S. Ramachandran, B. L. Kagan, R. Lal, and R. Nussinov. "Disordered amyloidogenic peptides may insert into the membrane and assemble into common cyclic structural motifs". *Chem. Soc. Rev.,* 43(19):6750-64 (2014).

41. B. Meckes, **F. Terán Arce**, L. Connelly and R. Lal**. "**Insulated conducting cantilevered nanotips and two-chamber recording system for high resolution ion sensing AFM". *Sci. Rep*., 4, 4454 (2014).

42. S. Ramachandran*, **F. Terán Arce***, Patel, N., Quist, A. P., Cohen, D. A., and R. Lal. "Structure and permeability of ion-channels by integrated AFM and waveguide TIRF microscopy" *Sci. Rep*., 4, 4424 (2014). ***Equal first author.**

43. J. Kwok, S. Grogan, B. Meckes, **F. Arce**, R. Lal, and D. D'Lima "Atomic force microscopy reveals age-dependent changes in nanomechanical properties of the extracellular matrix of native human menisci: implications for joint degeneration and osteoarthritis." *Nanomed.-Nanotechnol.*, 10(8), 1777–1785 (2014).

44. B. Meckes, C. Ambrosi, H. Barnard, **F. Terán Arce**, G. Sosinsky and R. Lal. "Atomic force microscopy shows connexin26 hemichannel clustering in purified membrane fragments". *Biochemistry* 53(47),7407-14 (2014).

45. A.L. Gillman, H. Jang, J. Lee, S. Ramachandran, B. L. Kagan, R. Nussinov and **F. Terán Arce**. "Activity and architecture of pyroglutamate modified amyloid-β ($A\beta_{pE3\text{-}42}$) pores". *J. Phys. Chem. B.* 118 (26), 7335–7344 (2014).

46. J. Lee, A.L. Gillman, H. Jang, S. Ramachandran, B. L. Kagan, R. Nussinov and **F. Terán Arce**. "Role of fast kinetics of pyroglutamate modified amyloid-β oligomers in membrane binding and membrane permeability". *Biochemistry* 53 (28), 4704–4714 (2014).

47. K. Santacruz-Gomez, E. Silva-Campa, R. Melendrez-Amavizca, **F. Teran Arce**, V. Mata-Haro, P. B. Landon, C. Zhang, M. Pedroza-Montero and R. Lal. "Carboxylated nanodiamonds inhibit γ-irradiation damage of human red blood cells". *Nanoscale* DOI: 10.1039/c5nr06789h (2016).

Peer reviewed electronic publications

1. P. Landon, J. J. Gutierrez, S. A. Alvarado, S. Peela, S. Ramachandran, **F. Teran Arce**, R. Lal. "Hollow disc and sphere shaped particles from red Blood cell templates". *Research Letters in Physical Chemistry*, volume 2008, Article ID 726285 (2008). http://dx.doi.org/10.1155/2008/726285.

Work in progress

Under review

1. Q. Huang, **F. Teran Arce**, J. Lee, I. Yoon, R. Lal, D. J. Sirbuly. "Single nanoparticle terminated AFM tips to study the optical interaction between plasmonic nanoparticles with dielectric waveguide". *Nanoscale* 2016 (under review).

To be submitted (tentative titles and authorship)

1. Q. Huang, J. Lee, **F. Teran Arce**, I. Yoon, J. Liu, P. Angsantikul, J. Villanueva, X. Ma, S. Thamphiwatana, S. Chen, L. Zhang, R. Lal, D. J. Sirbuly. "Ultrasensitive nanofiber optic force transducers for local probing of nanomechanical behavior". (In preparation).

2. J. Lee, Y. H. Kim, **F. Teran Arce**, H. Jang, A. Gillman, B. L. Kagan, R. Nussinov, J. Yang, and R. Lal. "Structures and electrical activity of toxic Amyloid β oligomers in a brain lipid membrane". (In preparation).

3. A. Hernandez Martinez, A. Gillman, **F. Teran Arce**, J. Lee, S. Ryazanov, H. Y. Agbemenyah, Q. Li, N. Rezaei-Ghaleh, P. Wilken, C. Bartels, A. Leonov, R. Benz, M. Zweckstetter, A. Giese, A. Schneider, M. Korte, R. Lal, C. Griesinger, G. Eichele, Andre Fischer "The oligomer modulating anle138b compound blocks Aβ channels and rescues the phenotype in the APPPS1Δ9 mouse Alzheimer's model". (In preparation).

Conferences/Scholarly Presentations

Symposia/Conferences

1. September 24-26, 1993. Scanning-Near Field Microscopies and Organic Materials II. Mainz, Germany. **F. Terán Arce**, A. Hillebrandt, T. Hartmann, W. Baumeister, R. Guckenberger."Scanning tunneling microscopy and elektrochemical methods for imaging biological objects *in situ*". (Poster presentation).

2. October 25-29, 1999. Seattle, WA. American Vacuum Society 46th International Symposium, Nanomechanics Session. **P. F. M. Terán Arce**, G. Andreu Riera, P. Gorostiza, F. Sanz. "Nanoindentation Mechanism and Surface Recovery in an Ionic Crystal Surface". (Oral presentation).

3. March 23-27, 2003. American Chemical Society 225th National Meeting, New Orleans, LA. **F. Terán Arce**, R. Avci, I. B. Beech, K. E. Cooksey and B. Wigglesworth-Cooksey. "Microelasticity domains in minimally adhesive polymer surfaces studied with atomic force microscopy". (Oral presentation).

4. March 22-26, 2004. American Physical Society 2004 March Meeting, Montreal, Canada. **F. Terán Arce**; R. Avci; I. B. Beech; K. E. Cooksey and B. Wigglesworth-Cooksey. "Changes in mechanical properties and morphology of elastomer coatings after immersion in salt solutions". (Oral presentation).

5. March 28-April 1, 2004. American Chemical Society 227th National Meeting, Anaheim, CA. **F. Terán Arce**; R. Avci; I. B. Beech; K. E. Cooksey and B. Wigglesworth-Cooksey. "Adhesion forces between

marine diatoms and a fouling release surface determined with atomic force microscopy". (Oral presentation).

6. November 14-19 2004. American Vacuum Society 51st Symposium, Anaheim CA. **F. Terán Arce**; R. Avci; I. B. Beech; K. E. Cooksey and B. Wigglesworth-Cooksey. "Cell-surface interactions between marine diatoms and fouling-release coatings studied with atomic force microscopy". (Poster presentation).

7. February 13-16, 2005. 28th Annual Meeting of the Adhesion Society, Mobile AL. **F. Terán Arce**; Zhiyong Suo; I. B. Beech; K. E. Cooksey; B. Wigglesworth-Cooksey and R. Avci. "Adhesion, deterioration and microelastic properties of fouling release surfaces in seawater". (Poster presentation).

8. February 02-08, 2008. 52nd Annual Meeting of the Biophysical Society and 16th IUPAB International Biophysics Congress, Long Beach, CA. **F. Teran Arce**, Clark H. Hyde, Michael J. Allen, Srinivasan Ramachandran, Francisco Bezanilla, Ratnesh Lal. "AFM Study Of KcsA potassium channels reconstituted in model supported lipid bilayers". (Poster presentation).

9. February 28-March 04, 2009. 53th Annual Meeting of the Biophysical Society, Boston, MA. **F. M. Teran Arce**, Ratnesh Lal, Joe G.N. Garcia and Steven M. Dudek. "Micromechanical properties of fixed and living vascular pulmonary endothelial cells following exposure to barrier enhancing and barrier disrupting agents". (Poster presentation).

10. February 20-24, 2010. 54th Annual Meeting of the Biophysical Society, San Francisco, CA. H. Jang, **F. Teran Arce**, R. Capone, S. Ramachandran, R. Lal, R. Nussinov. "Modeling Ion-Permeable β-Amyloid (Aβ) Barrels in the Lipid Bilayer". (Poster presentation).

11. February 20-24, 2010. 54th Annual Meeting of the Biophysical Society, San Francisco, CA. **F. Teran Arce**, H. Jang, R. Nussinov, R. Lal. "Real-time AFM imaging of surface-induced oligomerization of the non-amyloidogenic p3 peptide: implications for membrane insertion and ion channel formation". (Poster presentation).

12. February 25-29, 2012. 56th Annual Meeting of the Biophysical Society, San Diego, CA. H. Jang, R. Capone, S. A. Kotler, **F. T. Arce**, L. Connelly, S. Ramachandran, B. L. Kagan, R. Lal and R. Nussinov. Modeling Alzheimer's ion channel structures in lipid bilayers formed by D- and L-enantiomers of beta-amyloid (1-42) peptide. (Poster presentation).

13. February 25-29, 2012. 56th Annual Meeting of the Biophysical Society, San Diego, CA. L. Connelly, **F. T. Arce**, H. Jang, R Capone, S. A. Kotler, B. L. Kagan, R. Nussinov and R. Lal. "Alzheimer's β-amyloid all-D enantiomers and native all-L enantiomers exhibit similar pore structures in lipid bilayers: atomic force microscopy". (Poster presentation).

14. February 25-29, 2012. 56th Annual Meeting of the Biophysical Society, San Diego, CA. B. Meckes, **F. T. Arce**, A. Gillman, A. Mo, R. Lal. "Conducting atomic force microscopy for simultaneous imaging of structure and ionic current though nanopores". (Poster presentation).

15. February 02-06, 2013. 57th Annual Meeting of the Biophysical Society, Philadelphia, PA. H. Jang, L. Connelly, **F. Teran Arce**, S. Ramachandran, B. L. Kagan, R. Lal, and R. Nussinov. "Modeling variants of Alzheimer's ion channels in the lipid bilayer formed by an aggregation-intermediate beta-Hairpin and E22 Delta mutant". (Poster presentation).

16. February 02-06, 2013. 57th Annual Meeting of the Biophysical Society, Philadelphia, PA. N. Patel, C. P. H. Seo, H. Jang, B. Meckes, L. Connelly, A. Gillman, S. Ramachandran, B. L. Kagan, R. Nussinov, R. Lal and **F. Teran Arce**. "Effect of A beta Insertion in DPPC LB Films". (Poster presentation).

17. December 13-17, 2014. AFM BioMed Conference San Diego, CA. “AFM-based approaches to high resolution imaging and electrical recording of amyloid proteins”. (Oral presentation).

Seminars

1. November 1996. La Plata, Argentina. “Scanning probe microscopy characterization of thin organic films”. First Latin American Course of Scanning Probe Microscopy. (Oral presentation).

2. July 14-25, 1997. Modification, Characterization and Modeling of Surfaces, Edes, Buenos Aires, Argentina. "Scanning Probe Microscopy Observations of Alkanethiol Adsorbate Domains on Au(111)". (Poster presentation).

3. November 30-December 02, 1998. 1st Spanish Congress of Scanning Probe Microscopy. Barcelona. Spain. “Lateral phase separation and domain growth in Langmuir-Blodgett films of a natural biomembrane studied by AFM”. (Oral presentation).

4. January 31-February 03, 2003. V. Annual Linz Winter Workshop, Austria. “Microelastic properties of two minimally adhesive polymer paint surfaces”. (Poster presentation).

5. November 05-07, 2003. Prevention of pollution from ships, shipyards, drydocks, ports and harbors international symposium. New Orleans, LA. “Mechanical, adhesion and deterioration properties of Intersleek and RTV11 studied using atomic force microscopy and surface analysis techniques”. (Oral presentation).

6. August 08-13, 2004. Science of Adhesion Gordon Conference, Tilton NH. “Studying diatom-surface interactions with a live bioprobe”. (Poster presentation).

Colloquia

1. October 15, 1998. University of Barcelona, Department of Physical Chemistry. Barcelona, Spain. “Dynamical processes in self-assembled monolayers of alkanethiols studied by STM/AFM”. (Invited).

2. February 15, 2001. University of Southern California, Department of Computer Science. Los Angeles, CA. “Mechanical properties of surfaces studied by AFM nanoindentation". (Invited).

3. October 5, 2001. Center for Condensed Matter. Ensenada, México. “Mechanical properties of surfaces studied by AFM nanoindentations”. (Invited).

4. May 20, 2002. Imaging and Chemical Analysis Laboratory at the Physics Department, State University of Montana, Bozeman, MT. "Nanoindentations, adhesion and wetting studied with the atomic force microscope". (Invited).

5. March 16, 2010. School of Chemical and Physical Sciences of Flinders University. Adelaide, Australia. "From proteins to cells. Structural and mechanical properties of biophysical systems studied using atomic force microscopy". (Invited).

6. April 29, 2015. Department of Biomedical Engineering, University of Arizona. Tucson, AZ. "AFM-based approaches to study nanoscale structural and mechanical properties of biomacromolecules and cells". (Invited).

Peer-reviewed abstracts

1. September 02-04, 1999. Proceedings of the 5th conference on intermolecular interactions in matter. Lublin, Poland. **F. Terán Arce**; G. Andreu Riera; P. Gorostiza; F. Sanz. "Humidity Mediated Surface Recovery after Nanoindentations on MgO(100). Role of Atomic Steps".

2. March 12-16, 2001. Abstracts of the American Physical Society March 2001 Meeting, Seattle, WA. **F. Teran Arce**; P. Dutta. " Nanomechanical properties of heneicosanoic acid LB films measured with an Atomic Force Microscope (AFM)".

3. March 12-16, 2001. Abstracts of the American Physical Society March 2001 Meeting, Seattle, WA. J. Kmetko; G. Evmenenko; A. Datta; **F. Teran Arce**; P. Dutta. "Structural Relationships Between Organic (Langmuir) monolayers and initial stages of inorganic nucleation".

4. October 28-30, 2001. IEEE International Conference on Nanotechnology, Maui, HI. A. A. G. Requicha, S. Meltzer, **F. P. Terán Arce**, J. H. Makaliwe, H. Siken, S. Hsieh, D. Lewis, B. E. Koel and M. Thompson. "Manipulation of nanoscale components with the AFM: principles and applications".

5. March 28-April 1, 2004. Abstracts of papers of the American Chemical Society, 227, PMSE 90, 76-77, (2004). R. D. Boyd, R. Avci, M. H. Schweitzer, J. L. Wittmeyer, **F. Terán Arce**, J. O. Calvo. "Measuring collagen properties in biomineralized vertebrate tissues by liquid atomic force microscopy".

6. May 21-25, 2005. The 15th Annual Goldschmidt Conference. Abstract published in Geochimica et Cosmochimica acta 69 (10): A34-A34 Suppl. S. Z. Suo, **F. T. Arce**, R. Avci, B. Spangler, M.H. Schweitzer, K. Thieltges, J. Wittmeyer, R. Boyd. "Fishing at the nanoscale".

7. August 03-07, 2008. Microscopy and Microanalysis 2008, Albuquerque, NM. Microsc. Microanal. vol. 14, suppl 2, ps. 950-951, (2008). R. Lal; S Ramachandran; **F. Teran Arce**; M. Allen; A. Quist. "Multimodal atomic force microscopy for nanomedicine: biological nanoimaging, nanomechanics and nanodevices".

8. July 9-14, 2010. Aegean Conferences: 8th International Conference on Pathways, Networks, and Systems Medicine, Ixia, Rhodes, Greece. **F. Teran Arce**, H Jang, S Ramachandran, R Capone, B Kagan, R Nussinov, and Ratnesh Lal. "Alzheimer's disease and Down Syndrome: Amyloid beta structural polymorphism and ion channel toxicity".

9. March 05-09, 2011. 55th Annual Meeting of the Biophysical-Society, Baltimore, MD. Biophys. J. 100:3 Suppl.: 1, 201. H. Jang, **F. T. Arce**, S. Ramachandran, R. Capone, R. Lal, R. Nussinov. "Transmembrane β-Barrel Topology Model for Alzheimer's β-Amyloid (Aβ) Ion Channels".

10. March 27-31, 2011. Abstracts of papers of the American Chemical Society, 241, 308-BIOT, 76-77. R. Nussinov, H. Jang, **F. T. Arce**, S. Ramachandran, R. Capone, R. Lal. "Misfolded polymorphic amyloid ion channels present mobile beta-sheet subunits in contrast to conventional ion channels".

11. September 28-October 1, 2011. European Biotechnology Thematic Network Association. Istambul, Turkey. Curr. Opin. Biotechnol. Vol: 22, Suppl: 1, S19-S20. R. Lal, **F. T. Arce**, S Ramachandran, L. Connelly and R Capone. "Nanobiotechnology for neurodegenerative and protein-misfolding diseases".

12. April 09-13, 2011. Experimental Biology Meeting 2011, Washington, DC. FASEB J. 25:708.7. H. Jang, **F. T. Arce**, S. Ramachandran, R. Capone, R. Lal, R. Nussinov. "Modeling Transmembrane β-Amyloid (Aβ) Barrels of Alzheimer's Ion Channels".

13. February 15-19, 2014. 58th Annual meeting of the biophysical society, San Francisco, CA. Biophys. J. 106:2, Suppl.1, 96A. Y. C. Ma, S. K. Ghosh, D. DiLena, L. Connelly, N. Patel, **F. T. Arce**, R. Lal, S. K. Sinha. "Logarithmic domain growth in ternary mixture lipid multilayer systems". (Poster presentation).

14. August 10-14, 2014. Abstracts of papers of the American Chemical Society, 248, COMP 61 (2014). H. Jang, **F. Teran Arce**, S. Ramachandran, R. Lal, B. L. Kagan, and R. Nussinov. "Membrane insertion of Alzheimer's amyloid-β (Aβ) peptides and their assembly into common cyclic structural motifs".

Grants and Contracts

Past
Federal
1. Period: 04/01/08-03/31/13 5R01DA024871-15 (PI: Ratnesh Lal)
Role: Co-investigator, 50% effort
Title: Structure, Activity & Physiological Role of Hemichannels
Source and amount: NIH $210,000

2. Period: 07/15/08-04/30/14 3R01DA025296-05S1 (PI: Ratnesh Lal)
Role: Co-investigator, 50% effort
Title: Designing an integrated nanoscale system for ion channel structure-function study
Source and amount: NIH/NIDA $314,616

3. Period: 02/01/08-12/31/09 P01 HL058064 (PI: Joe Garcia, Program Director)
Role: Co-investigator, 50% effort
Title: Cytoskeletal Regulation of Lung Endothelial Pathobiology. Core D: Biophysical Imaging Core
Source and amount: NIH/NHLBI $162,114

4. Period: 09/01/09-12/31/09 9 1R01NS067247-0110 (PI: Michael J. Allen)
Role: Co-investigator, 50% effort
Title: The Role of Toxic Ion Channels in ALS Pathogenesis.
Source and amount: NIH $336,350

5. Period: 09/01/09-12/31/09 1R01HL095723-01A109 (PI: Patrick A. Singleton)
Role: Co-investigator, 25% effort
Title: Hyaluronan and CD44 are Novel Targets for Acute Lung injury.
Source and amount: NIH $390,000

Industry
1. Period: 07/18/05 – 12/30/05 PI: Recep Avci
Role: Co-investigator, 25% effort
Title: Mechanical Characterization of Nanocomposite Coatings
Source and amount: Arcomac Surface Engineering, LLC (Missoula, MT), $50,232.50

Current
Federal
1. Period: 09/15/06-02/28/18 2R01AG028709-07A1 (PI: Ratnesh Lal)
Title: Amyloid ion channels to design therapeutics for neurodegenerative diseases.
Role: Co-Investigator, 100% effort
Source and amount: NIH $292,738

Not funded (role: PI or co-PI)
Period: 04/01/2013-03/31/2018
Title: Role of interfaces in amyloid self-assembly and implications for functional nanomaterials
Source and amount: NIH-RO1 $1,250,000
Not discussed

Period: 06/01/2013-05/31/2015
Title: Membrane mediated amyloid aggregation and toxicity in Alzheimer's disease.
Source and amount: NSF-BMAT $447,000
Not discussed

Period: 04/01/16-03/31/21
Title: Membrane mediated toxicity of pyroglutamate Aβ peptides in Alzheimer's disease.
Source and amount: NIH-RO1 $1,250,000
Impact Score: 59. Percentile: 54

Period: 04/01/2016- 03/31/2018
Title: A force sensor to detect Aβ-induced changes in cellular mechanical properties.
Source and amount: NIH-R21 $275,000
Impact Score: 55. Percentile: 57

Period: 04/01/2016- 03/31/2018
Title: Mapping the density of A pores in cell membranes
Source and amount: NIH-R21 $275,000
Not discussed

Mentoring

University of California San Diego (UCSD):
- **Undergraduate Research Students:**
- Sumeet Schroff / REU student from Univ. of Pittsburgh, summer 2011. Research co-advisor.
- Nirav Patel / Undergraduate student in the lab 2011-2012 (now graduate student in Lal's lab). Mentor and research co-advisor.
- Karl Hujsak / Undergraduate student in the lab 2011-2012. Advisor during his introduction to AFM techniques.
- Chris Seo / Physics undergraduate student from New Zealand between December 2011 to February 2012. Co-advisor.
- Surya Sherman / Undergraduate student in the lab in October 2011. Advisor.

Doctoral Students:
- Brian Meckes (Bioengineering) / From 01/2011 to 09/2015. Co-advisor during his introduction to AFM techniques and current measurements using AFM. Graduated September 2015.
- Joon Lee (Materials Science and Engineering) / From 08/2011 to 06/2012. Research co-advisor for adhesion force measurements using AFM. From 07/2012-current date. Research co-advisor on biophysical studies (in particular using AFM) of amyloid peptides.
- Aereas Aung (Bioengineering, Varghese lab). From 07/2012-current date. Co-advisor on use of AFM and data processing for his studies on hydrogels and cell mechanics as part of a collaboration between the Lal and Varghese labs. Currently, he uses the AFM only occasionally and has considerable independence.
- Robert Schwartz (from Physics department, new student at Mali lab in Bioengineering). From 11/15/2014-04/30/2015. Co-advisor in application of combined AFM force spectroscopy and fluorescence to detect multiple cell receptors.

- Karla Santacruz (Postdoctoral researcher from the University of Sonora, Mexico). From 01/2015 to 11/2015. Co-advisor on AFM characterization of cellular mechanical properties and nanodiamond morphology.
- Laura Connelly (Materials Science and Engineering) / From 01/2010 to 08/2013. Co-advisor on AFM studies of amyloid peptides. Graduated 08/2013.
- Jeanie Kwok (Materials Science and Engineering) / From 01/2012 to current date. Co-advisor in her introduction to cell mechanics studies using AFM techniques.
- Yicong Ma (Physics, Sinha lab). 07/2012-current date. Advised her on mechanical and morphological characterization of lipid multilayers using AFM as part of collaboration between the Lal and Sinha labs. Currently almost finished with her project.
- Qian Huang (Nanoengineering, Sirbuly lab). From 01/2013-current date. Co-advised her on noise reduction techniques of AFM and bioscope use to setup and develop optical force sensing techniques as part of a collaboration with the Sirbuly lab.

University of Chicago:
- Trained a medical fellow in the fundamentals and use of AFM
- Trained a postdoc in preparation of liposomes reconstituted with peptides and high-resolution imaging of reconstituted supported lipid bilayers using AFM

Montana State University:
- Trained, supervised and assisted laboratory assistants and 1 visiting scholar from Portsmouth University (UK) in the use of the atomic force microscope (AFM) and data analysis of force vs. distance curves
- Assisted 1 postdoc in experiments and data analysis related to AFM
- Assisted 1 REU student in the development of a MatLab-based program for the analysis of data involving electrical double layer interactions and Van der Waals forces

Contribution to diversity
- 2011-2013: Mentored six high-school students during the Upward Bound summer Program for low-income students in the Southern California area