

# ARLETTE BALJON

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## BIOGRAPHY

Dr. Baljon grew up in The Netherlands, where she obtained a master's degree in mathematics and theoretical physics at the University of Utrecht. Her MS thesis, with G. t'Hooft (Nobel Laureate) as supervisor, was on black hole dyons. In 1988 she moved to the United States, to pursue a PhD program at the University of Chicago. There her research interest switched to polymer science. In 1993 she completed a PhD thesis on associating polymers with T. Witten as supervisor. This was followed by a postdoctoral position at Johns Hopkins, where she studied adhesion and friction by means of large-scale computer simulations of polymeric systems under the supervision of M. Robbins. Subsequently, she earned a fellowship to continue her research at the Supercomputer Center at Cornell. In collaboration with chemists, chemical engineers, and material scientists she studied the dynamics of polymers in confined spaces and the formation of polymer/silicate nanocomposites. In the summer of 1999, she joined the physics faculty at San Diego State University, where she studies the dynamics of associating polymers under the influence of a variety of externally imposed strains and stresses. In particular rhythmic patterns of dissociation and association and how memory is retained in them intrigues her. In addition, together with researchers at SDSU's Viral Information Institute she investigates how mucosal surfaces enhance phage infectivity and the importance of mucus to the human immune system. As part of SDSU's Arts Alive, she worked with Physics Prof. Alter on a course which encouraged collaborative learning between Dance and STEM students. They are exploring how art can be used as an alternative form of inquiry into natural phenomena. Finally, she coordinates SDSU's community on contemplative pedagogies and incorporates these pedagogies in some of the classes she teaches. She has been an active member of the Senate for over 20 years, served in five of its eight Standing committees, and is currently the chair of the Constitution and Bylaws committee. She co-coordinated in 2018 the yearlong Common Experience for faculty project, which aimed to install a sense of belonging by organizing interdisciplinary scholarly exchanges. This evolved into an off-campus reading salon, which still meets regularly. She is an Associate Editor for "Frontiers in Soft Matter Physics". She is married and has three children.

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**CURRENT POSITION**

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Associate Professor, Dept. of Physics, San Diego State University, CA, 5/2005-present<sup>1</sup>

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**EDUCATION**

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<i>Institution</i>	<i>Year</i>	<i>Degree</i>	<i>Major Field</i>	<i>Thesis Advisor</i>
U. of Chicago	1993	Ph.D.	Theoretical Physics	Prof. T. Witten
U. of Utrecht	1988	Doctoraal	Theoretical Physics	Prof. G. 't Hooft

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**PREVIOUS POSITIONS**

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<i>Institution</i>	<i>Position</i>		<i>Supervisor/Host</i>
Dept. of Physics, Johns Hopkins University, Baltimore, MD	Postdoctoral Fellow	7/93-8/96	Prof. M.O. Robbins
Supercomputer Center, Cornell University, Ithaca, NY.	Research Associate	9/96-8/98	Dr. A.Z. Panagiotopoulos
Dept. of Chemistry, Cornell University, Ithaca, NY.	Visiting Scientist	9/98-8/99	Host: Prof. R.F. Loring
Dept. of Physics, San Diego State University, San Diego, CA.	Assistant Professor	8/99-5/05	
KITP, Univ. of California Santa Barbara, Santa Barbara, CA	Visiting Scientist	10-11/97 4-5/06 4-5/10 5-6/11	Programs on "Jamming", "Biological Physics", "Glass Transition Phenomena", and "Biopolymers"
Dutch Polymer Institute, TUE, Eindhoven, The Netherlands	Visiting Professor	9-11/07	Prof. M. Michels

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<sup>1</sup> Medical Leave all of 2012

See also Google Scholar

“Non-equilibrium fluctuations in “jammed” associating polymer networks under stress,” A.R.C. Baljon, manuscript in preparation (2024).

“A large-scale simulation of mucus,” J. Parsons\*\* and A.R.C. Baljon, manuscript in preparation (2023).

“Embodied engagement with scientific concepts: An exploration into emergent learning,” A. R. C. Baljon, M. Bresciani Ludvik, J. Alter, *College Teaching* **71**, 1 (2022).

“Multiscale soft tissue biomechanics and cell mechanobiology: Towards coupling extracellular biophysical cues and cellular function,” O.V. Kim, X. Li, and A. R. C. Baljon, *Frontiers in Physics* **10**, 1184 (2022).

“Glass Transition Temperature of Cyclic Polystyrene: A Computational Study,” A.R.C. Baljon, G. Mendoza\*\*, A.V. Lyulin, *Polymer Science Series A* **63**, 356-362 (2021).

“Impact of bacteria motility in the encounter rates with bacteriophage in mucus,” K. Joiner\*\*, A.R.C. Baljon, J. Barr, F. Rohwer, A. Luque, *Scientific Reports* **9**, 16427 (2019).

“Linear Viscoelasticity of Polymers and Polymer Nano-composites: Molecular-Dynamics Large Amplitude Oscillatory Shear and Probe Rheology Simulations,” Theodoros Davris, Alexey V Lyulin, Arlette R. C. Baljon, Victor M Nazarychev, Igor V Volgin, Sergey V Larin, and Sergey V Lyulin in *The Scaling of Relaxation Processes*. Friedrich Kremer and Alois Loidl (Eds.) 375-404 (Springer International, (2018).

“Microstructural Origins of Nonlinear Response in Associating Polymers under Oscillatory Shear,” M. Wilson\*\*, and A. R. C. Baljon, *Polymers* **9**, 556 (2017). (Invited publication for special issue entitled “Complex Fluid Rheology”)

“Interfacial and topological effects on glass transition in free-standing polystyrene films,” Alexey V. Lyulin, Nikolav K. Balabaev, Arlette R. C. Baljon, Gerardo Mendoza\*, Curtis W. Frank, and Do Y Yoon, , *J. Chem. Phys.* **146**, 203314 (2017) (Invited publication for special issue entitled “Dynamics of polymer materials in thin films and related geometries”)

“Bond kinetics of a telechelic polymer network,” M. Wilson\*\*, A. Rabinovitch, and A. Baljon, *Int. J. of Nanotech.* **13**, 935 (2016).

“Computational studies of nonlinear rheology of associating polymers,” Proceedings of the XVII International Congress on Rheology, Kyoto, Japan. (2016).

“Movement of bacteriophages through mucus,” Proceedings of the XVII International Congress on Rheology, Kyoto, Japan. (2016).

“Versatile and Dexterous Soft Robotic Leg System for Untethered Operations.” John Waynelovich\*\*, Terrence Frey, Arlette Baljon, and Peter Salamon, *Soft Robotics* **3**, 46 (2016).

“Subdiffusive motion of bacteriophage in muscosal surfaces increases the frequency of bacterial encounters.” J.J. Barr, R. Auro, N. Sam-Soon, S. Kassegne, G. Peters, N. Bonilla, M. Hatay, S. Mourtada, B. Bailey, M. Youle, B. Felts, A. Baljon, J. Nulton, P. Salamon, and F. Rohwer, *Proc. Natl. Acad. Sci.* **112**, 12675 (2015).

“Computational Study of the Structure and Rheological Properties of Self-Associating Polymer Networks,” M. Wilson\*\*, A. Rabinovitch, and A. Baljon, *Macromolecules* **48**, 6313 (2015).

“Shear banding in simulated telechelic polymers,” J. Billen\*\*, M. Wilson\*\*, A.R.C. Baljon, *Chemical Physics*. **142**, 7 (2015).

“Insight into mitochondrial structure and function from correlated four-dimensional light and electron microscopy,” T.G. Frey, M. Ghochani\*\*, J. Waynelovich\*, S. Taheri, J. Nulton, and A. Baljon, *Biochim Biophys Acta*; **1817**, S115 (2012).

“Aggregation kinetics of a simulated telechelic polymer,” M. Wilson\*\*, A. Rabinovitch, and Arlette R. C. Baljon, *Phys Rev E* **84**, 061801 (2011).

“Effect of strong confinement on the glass transition temperature in simulated atactic polystyrene films,” D. Hudzinsky\*\*, A.V. Lyulin, A. R. C. Baljon, N. K. Balabaev, and M. A. J. Michels, *Macromolecules*, **44**, 2299 (2011).

“Tensile forces and shape entropy explain observed crista structure in mitochondria,” M. Ghochani\*\*, J.D. Nulton, P. Salamon, T.G. Frey, A. Rabinovitch, and A.R.C. Baljon, *Biophys. J.* **99**, 3244 (2010).

“Simulated glass transition in free-standing thin polystyrene films,” A.R.C. Baljon, S. Williams\*, N.K. Balabaev, F. Paans\*, D. Hudzinsky\*\*, and A.V. Lyulin, *Journal of Polymer Science, Part B: Polymer Physics* **48**, 1160 (2010).

“Eigenvalue spectra of spatial dependent networks,” A. Rabinovitch, J. Billen\*\*, J. M. Wilson\*\*, and A.R.C. Baljon, *Phys Rev. E* **80**, 046116 (2009).

“Topological changes at the gel transition of a reversible polymeric network,” J. Billen\*\*, M. Wilson\*\*, A. Rabinovitch, and A.R.C. Baljon., *Europhys. Lett.* **87**, 68003 (2009).

“A stereological unfolding method for the study of a mitochondrial network,” D.C. Flynn\*, J.D. Nulton, P. Salamon, T.G. Frey, A. Rabinovitch and A.R.C. Baljon, *Image Analysis and Stereology* **28**, 11 (2009).

“End-bridging Monte Carlo simulation of bulk and grafted amorphous polyethylene above and below the glass transition”, O. Alexiadis, V. Mavrantzas, R. Khare, J. Beckers\*, and A. Baljon, *Macromolecules*, **41**, 987 (2008).

“Numerical study of the gel transition in reversible associating polymers,” Arlette R.C. Baljon, Danny Flynn\*, David Krawzenek\*\*, *J. Chem. Phys.* **126**, 044907 (2007).

“Membrane Remodeling and Diffusion of Cytochrome C from a Geometrically Idealized Mitochondrial Crista,” J.C. Manor\*, T. Frey, A. Baljon, J. Mahaffy J. Nulton, and P. Salamon in Proceedings of the 2006 International Conference on Bioinformatics & Computational Biology, H.R. Arabnia & H. Valafar editors, (CSREA Press, USA 2006).

“Glass Transition Behavior of Polymer Films of Nanoscopic Dimension,” Arlette R.C. Baljon, Regina Barber DeGraaff\*\*, Maarten H.M. v. Weert\*, and Radjesh Khare, *Macromolecules* **38**, 2391 (2005).

“Modeling tubular shapes of mitochondrial membranes,” A. Ponnuswamy\*\*, J. Nulton, J. M. Mahaffy, P. Salamon, T.G. Frey, and A.R.C. Baljon, *Physical Biology* **2**, 73 (2005).

“Percolation of Immobile Domains in Supercooled Thin Polymeric Films,” Arlette R.C. Baljon, J. Billen\*\*, and R. Khare, *Phys. Rev. Lett.* **93**, 255701 (2004).

“Transitory response of confined polymer films subjected to oscillatory shear,” Arlette R. C. Baljon, *J. Chem. Phys.* **121**, 11402 (2004).

“Computational studies of contact time dependence of adhesive energy due to redistribution of the locations of strong specific interfacial interactions,” Arlette R.C. Baljon, Travis Depuy\*, and Joris Vorselaars\*, *Macromolecules* **37**, 5800 (2004).

“Monte Carlo Simulations of Curved Lipid Membranes,” Arlette R.C. Baljon, and Arun Ponnuswamy\*\*, *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences*, 377 (2003).

“Contact time dependence of adhesive energy,” Arlette R.C. Baljon, Travis Depuy\*, and Joris Vorselaars\*, *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences*, 366 (2003).

“Simulations of crazing in polymer glasses: Effect of chain length and surface tension,” Arlette R.C. Baljon, and Mark O. Robbins, *Macromolecules* **34**, 4200 (2001).

“Molecular Dynamics Study of the Intercalation of Diblock Copolymers into Layered Silicates,” Jae Youn Lee\*\*, Arlette R.C. Baljon, Dotsevi Y. Sogah, and Roger F. Loring, *J. Chem. Phys.*, **112**, 9112 (2000).

“Spontaneous Swelling of Layered Nanostructures by a Polymer Melt,” Jae Youn Lee\*\*, Arlette R.C. Baljon, and Roger F. Loring, *J. Chem. Phys.*, **111**, 9754 (1999).

“Molecular View of Polymer Flow into a Strongly Attractive Slit,” Arlette R. C. Baljon, Jae Youn Lee\*\*, and Roger F. Loring, *J. Chem. Phys.*, **111**, 9068 (1999).

“A Molecular View of Bond Rupture,” Arlette R. C. Baljon and Mark O. Robbins, *Computational and Theoretical Polymer Science*, **9**, 35 (1999).

“Response of Thin Oligomer Films to Steady and Transient Shear,” Arlette R.C. Baljon and Mark O. Robbins, *Microstructure and Microtribology of Polymer Surfaces*, ACS Symposium Series **741**, Edited by V. V. Tsukruk and K. J. Wahl, (American Chemical Society, Washington DC), 91 (1999).

“Modeling Intercalation Kinetics of Polymer Silicate Nanocomposites,” Jae Youn Lee\*\*, Arlette R.C. Baljon and Roger F. Loring, *Mat. Res. Symp. Proc. (Mat. Res. Symp. Proc. 543*, 455 (1999).

“Modeling intercalation Kinetics of Polymer Intercalated Silicate Nanocomposites,” Jae Youn Lee, Arlette R.C. Baljon, Roger F. Loring, and Athanassios Z. Panagiotopoulos, *J. Chem. Phys.*, **109**, 10321 (1998).

“Molecular Mechanism during Rupture of Thin Adhesive Bonds,” Arlette R.C. Baljon and Mark O. Robbins, *Proc. of the Adh. Soc.* (1998).

“Adhesion and Friction of Thin Films,” Arlette R.C. Baljon and Mark O. Robbins, *MRS Bulletin*, Theory and Simulation of Polymers at Interfaces **22**, 22 (1997).

“Individual Entanglements in a Simulated Polymer Melt,” Eli Ben-Naim, Gary S. Grest, Arlette R.C. Baljon, and Thomas A. Witten, *Phys. Rev. E*. **53**, 1816 (1996).

“Energy Dissipation During Rupture of Adhesive Bonds,” Arlette R.C. Baljon and Mark O. Robbins, *Science* **271**, 482 (1996).

“Stick-Slip Motion, Transient Behavior, and Memory in Confined Films,” Arlette R.C. Baljon and Mark O. Robbins, in *Micro/Nanotribology and its Applications*, ed. B. Bhushan (1996).

“Simulations of Induced Orientation in Stretched Polymer Melts,” Arlette R.C. Baljon, Gary S. Grest, and Thomas A. Witten, *Macromolecules* **28**, 1835 (1995).

“Architecture Controlled Solution Properties of Hydrophobically Associating Copolymers,” Arlette R.C. Baljon and Thomas A. Witten, *Hydrophilic Polymers: Performance with Environmental Acceptance*, Advances in Chemistry Series **248**, Chapter 11 (1995).

“Monte-Carlo Simulations of Associating Polymers,” Arlette R.C. Baljon and Thomas A. Witten, *Forefronts, Newsletter of the Cornell Theory Center* **8**, 10 (1993).

“Swollen Conformations of Associating Polymers,” Arlette R.C. Baljon, *Macromolecules* **26**, 4339 (1993).

“Influence of Placements of Hydrophobes on the Solution Properties of Associative Thickeners,” Arlette R.C. Baljon and Thomas A. Witten, *Proceedings of the ACS, Division of Polymeric Materials: Science and Engineering* **69**, 130 (1993).

“Equilibrium Topologies of Associating Polymers,” Arlette R.C. Baljon-Haakman and Thomas A. Witten, *Mat. Res. Symp. Proc.* **248**, 455 (1992).

“Architecture-Controlled Interactions between Associating Polymers,” Arlette R.C. Baljon-Haakman and Thomas A. Witten, *Macromolecules* **25**, 2969 (1992).

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**FUNDED GRANTS\* \$660.000 total**

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- 5/20-8/20 “A Mucus Model” SDSU, Summer Undergraduate Research Program, Graduate Division, SDSU \$2,400
- 5/19-8/19 “Glass transition of cyclic polymers” SDSU, Summer Undergraduate Research Program, Graduate Division, SDSU \$2,400
- 5/18-12/22 “Vertical Assessment of Quantum Physics Across Three Major-Required Courses” SDSU \$1,500
- 5/18-5/19 “Physical and Lived Time,” Common Experience, DEASA, SDSU (shared with Mark Wheeler) \$12,000.
- 12/17-6/19 “A large scale simulation of mucus” University Grant Program, SDSU \$9,900.
- 11/16-6/19 “Collaborative teaching: Physics and Dance,” SDSU Provost Office (shared with Joseph Alter): \$10,296
- 7/16-6/18 “Collaborative Research and Leadership Mechanisms of Success (Viral Information Institute),” SDSU, Graduate Division (PI: Antoni Luque (my share approx. 3k)
- 5/16-8/16 “Structure of ultrathin polystyrene films,” SDSU, Summer Undergraduate Research Program, Graduate Division, SDSU \$1,850.
- 5/16-5/17 “Making the Invisible Visible: Investigating scientific concepts through movement,” Common Experience, Division of Undergraduate Studies, SDSU \$1,750.
- 6/16-5/17 “Promising course redesign with technology: Modern Physics,” CSU Chancellors Office \$15,398
- 9/10-9/15 “Topological Changes in Associative Polymer Networks due to Mechanical Stress,” National Science Foundation, Division of Materials Research, \$264,000.
- 2/10-2/13 “Acquisition of a Computer Cluster for Molecular Sciences,” National Science Foundation, Chemical Research Instrumentation Fund (Co-PI, PI: Carl Carrano), \$146,500. (my share approximately. 30k)

- 2/08-3/08 "Travel grant Biophysical Society Annual Meeting Long Beach," CSUPERB \$1,500
- 8/05-7/10 "Spatio-dynamical Order in Reversible Polymeric Gels," National Science Foundation, Division of Materials Research, \$240,000.
- 2/08-8/09 "Simulations of polymer/clay filler nanocomposites," Grant-in-Aid for research, SDSU \$3,972
- 6/02-8/06 "Structure-composition relationships for curved membranes," Petroleum Research Fund, American Chemical Society, \$35,000.
- 5/00-5/05 "A computational study of how contact time affects the strength of an adhesive bond," Research Corporation, \$25,269.
- 9/96- 9/98 "Associating Polymers and Nanocomposites," National Science Foundation, CISE Postdoctoral Fellowship, \$50,000.

\*In addition my students have received numerous travel grants from the *Society of Rheology, American Physical Society, Gordon Research Conferences, CSUPERB, SDSU Graduate Division, and the College of Sciences.*

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## AWARDS

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**Associate Editor- Frontiers in Physics** 2020-present

**External Committee member PhD Thesis at the Technical University in Eindhoven, The Netherland**

12/2014 Zhara Fahimi "Structure and Mechanics of Physically Cross-Linked Hydrogels"

02/2017 Theodorus Davris "Course-grained molecular-dynamics simulations of segmental motion and mechanical properties in polymeric films and nanocomposites"

### **Teaching Awards**

Outstanding faculty award (student Rita Philavahn) – 2009

Mortar Board outstanding faculty award (student Danny Flynn) - 2008

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## INVITED CONFERENCE TALKS AND COLLOQUIA - 65 total

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- 3/23 "Simulations of Non-equilibrium Processes in Polymer-based Materials, March Meeting of the American Physical Society, Las Vegas.
- 4/18 "Bacteriophages; the natural born killers of bacteria, hunt for their prey in mucosal surfaces. What is the underlying strategy and how can it be optimized? University of San Diego, San Diego.
- 7/17 "Structure and Rheological Properties of Self-Associating Polymer Networks," 8<sup>th</sup> International Discussion Meeting of Relaxations in Complex Systems," Wisla, Poland.



- 3/17 "Making the Invisible Visible" Common Experience Movement Discussion Panel, San Diego State University, San Diego.
- 1/17 "Bacteriophages, the natural born killers of bacteria: hunt for their prey in mucosal surfaces. What is the underlying strategy and how can it be optimized?," Dept. of Physics, Theory of Polymers and Soft Matter Group, TU Eindhoven, The Netherlands.
- 8/16 "A Free Energy Model For Observed Morphologies Of The Crista Membrane Of Mitochondria," MechBio. Symposium: Putting Together the Cell Mechanome." UCSD, La Jolla.
- 5/16 " $E=mc^2$ , Energy, Einstein, and the most famous equation in history, Common Experience Energy Discussion Panel, San Diego State University, San Diego.
- 5/16 "Bacteriophages, "the natural born killers of bacteria", hunt for their prey in mucosal surfaces. What is the underlying strategy and how can it be optimized? CTBP-CSUSM FIS seminar, CSUSM, San Diego.
- 1/16 "Computational Studies of Self-associating Polymer Networks Under Oscillatory Shear," EMN Meeting on Polymers, Hong Kong.
- 11/14 "Computational studies of associating polymers under oscillatory shear," Dept. of Physics, Theory of Polymers and Soft Matter Group, TU Eindhoven, The Netherlands.
- 11/13 "Programmed cell death: the role of stress," Conference on Imagery for Insight into Materials Structure, U. of Chicago, Chicago.
- 6/13 "Studies on mitochondrial morphology: EM-tomography combined with physical modeling suggests a new role for OPA1," Dept. of Physics, Northwestern University, Chicago.
- 11/11 "Rheology of Simulated Telechelic Polymers," Dept. of Materials Science Seminar, Northwestern University, Chicago.
- 11/11 "Studies on mitochondrial morphology: EM-tomography combined with physical modeling suggests a new role for OPA1," CTBP- CSUSM FIS seminar, CSUSM, San Diego
- 6/11 "A free energy model for observed mitochondrial cristae morphology," 7<sup>th</sup> International Conference on Biological Physics, UCSD, La Jolla.
- 4/10 "Dynamical heterogeneity in thin polymeric films: the least mobile clusters and their possible role in the glass transition", Kavli Institute for Theoretical Physics, Santa Barbara.
- 5/09 "Simulations of thin polymer films", Computational Science research center, SDSU, San Diego.

- 5/09 "Structural properties of networks formed in simulations of reversible associating polymers", Dutch Polymer Institute, University of Eindhoven, Eindhoven, The Netherlands.
- 9/06 "Computational study of gel transition and jamming in an ensemble of reversible associating polymers, Dutch Polymer Institute, University of Eindhoven, Eindhoven, The Netherlands.
- 5/06 "Statistical models for observed shapes of the mitochondrial crista membrane", Kavli Institute for Theoretical Physics, Santa Barbara.
- 9/05 "Jamming in super cooled nanoscale polymeric films, " CECAM Workshop, Lyon, France.
- 12/03 "Spatio-temporal patterns in ultra-thin polymeric films," Dutch Polymer Institute, University of Eindhoven, Eindhoven, The Netherlands.
- 9/03 "How pulls a polymeric film away from a surface?," Dept. of Physics, San Diego State University, San Diego.
- 8/03 "Spatio-temporal patterns in ultra-thin polymeric films," Conference on Pattern Formation in Physics and Biology," Kavli Institute for Theoretical Physics, Santa Barbara.
- 6/03 "Computational studies of time dependent adhesion increase due to strong specific interfacial interactions," Polymer Consortium Meeting, Accelerys Inc, San Diego.
- 10/02 "Structure-Property relationships in molecularly thin films," Dept. of Physics, San Diego State University, San Diego.
- 5/02 "Polymers and Clay: hate and love," Colloquium, Dept. of Physics, California State University Los Angeles, Los Angeles
- 3/02 "Computational Studies of Nanocomposites," Dept. of Chemistry, San Diego State University, San Diego.
- 5/00 "Polymers and Clay: Hate and Love," Dept. of Physics, California State University Long Beach, Long Beach.
- 3/00 "Simulations of Polymer/Clay Nanocomposites," Dept. of Physics, San Diego State University, San Diego.
- 8/98 "Simulations of Microstructural Changes during Rupture of Adhesive Bonds," Gordon Research Conference on "Adhesion Science: From Forces at Interfaces to Life Itself," Tilton.
- 5/98 "A Molecular View of Adhesion," Corporate Outreach Workshop on Pressure Sensitive Adhesives, Lehigh University, Bethlehem.

- 4/98 "Memory of Molecularly-thin Oligomer Films," American Chemical Society National Meeting, Dallas.
- 2/98 "Molecular Mechanisms during Rupture of a Thin Adhesive Film," Adhesion Society Meeting, Savannah.
- 12/97 "A Molecular View of Friction and Adhesion," Materials Science, Rensselaer Polytechnic Institution, Troy.
- 10/97 "Simulations of Stick-to-slip Transition and Memory in Confined Fluids," Conference on "Jamming and Rheology," Kavli Institute for Theoretical Physics, Santa Barbara.
- 3/97 "A Molecular View of Friction and Adhesion," Materials Science, State University of New York, Stony Brook.
- 11/96 "A Molecular View of Adhesion," Condensed Matter Seminar, U. of Illinois, Chicago.
- 11/96 "Memory, Transient Behavior, and Stick-Slip in Confined Films," Materials Science, University of Illinois, Urbana.
- 11/96 "Memory, Transient Behavior, and Stick-Slip in Confined Films," Condensed Matter Seminar, U. of Chicago, Chicago.
- 10/96 "A Molecular View of Adhesion," Materials Science Lab, Cornell Univ., Ithaca.
- 6/96 "Dissipation Mechanisms during Rupture and Shear of Thin Oligomeric Films," Center for Composite Materials, Univ. of Delaware, Newark.
- 5/96 "Dissipation Mechanisms during Rupture and Shear of Thin Oligomeric Films," Department of Polymer Technology, Univ. of Twente, Enschede, The Netherlands.
- 4/96 "Dissipation Mechanisms during Rupture and Shear of Thin Oligomeric Films," Workshop, Los Alamos National Laboratory, Los Alamos.
- 3/96 "Molecular Mechanisms during Rupture of Thin Adhesive Bonds," March Meeting of the American Physical Society, St. Louis.
- 3/96 "A Molecular View of Adhesion," Department of Molecular Biology, Scripps Research Institutes, La Jolla.
- 3/96 "A Molecular View of Adhesion," Department of Chemical Engineering, Yale Univ., New Haven.
- 10/95 "A Molecular View of Adhesion," Max-Planck Institute für Kolloid- und Grenzflächenforschung, Teltow, Germany.
- 10/95 "A Molecular View of Adhesion," FOM-Institute for Atomic and Molecular Physics, Amsterdam, The Netherlands.

- 10/95 "A Molecular View of Adhesion," Materials Science Center, Univ. of Groningen, Groningen, The Netherlands.
- 10/95 "A Molecular View of Adhesion," Institute fur Physik, Johannes Gutenberg Universitat, Mainz, Germany.
- 10/95 "A Molecular View of Adhesion," Condensed Matter Seminar, Institut Charles Sadron, Strasbourg, France.
- 6/95 "Dissipation Mechanisms during Rupture and of Thin Adhesive Films," Materials Science, Pittsburgh Univ., Pittsburgh.
- 1/95 "Dissipation Mechanisms during Rupture and of Thin Adhesive Films," Physical Chemistry, Univ. of California, Los Angeles.
- 1/95 "Dissipation Mechanisms during Rupture and of Thin Adhesive Films," Materials Science, Univ. of California, Santa Barbara.
- 1/95 "Dissipation Mechanisms during Rupture and of Thin Adhesive Films," Chemical Engineering, Stanford University.
- 1/95 "Dissipation Mechanisms during Rupture and of Thin Adhesive Films," Chemical Engineering, Univ. of California, Berkeley.
- 10/93 "Orientational Coupling in Simulated Polymer Melts," Solid State Seminar, Johns Hopkins Univ., Baltimore.
- 8/93 "Influence of Placement of Hydrophobes on the Solution Properties of Associative Thickeners," American Chemical Society National Meeting, Chicago.
- 6/93 "Entropic Attraction of Associating Polymers," Institut fur Festkorperforschung, Forschungszentrum Julich, Germany.
- 6/93 "Entropic Attraction of Associating Polymers," Condensed Matter Seminar, Institut Charles Sadron, Strasbourg, France.
- 6/93 "Entropic Attraction of Associating Polymers," Max-Planck-Institut fur Polymerforschung, Mainz, Germany.
- 5/93 "Entropic Attraction of Associating Polymers," FOM-Institute for Atomic and Molecular Physics, Amsterdam, The Netherlands.
- 1/93 "Entropic Attraction of Associating Polymers," Chemical Engineering, California Institute of Technology, Los Angeles.
- 11/91 "Architecture-Controlled Interactions between Associating Polymers," Materials Science, North Western Univ., Evanston.

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## CONTRIBUTED TALKS AND POSTERS

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Approx. 60 total given by me at International Conferences since 1991 (not listed)

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Below I list those given by students. Note that on-campus presentations at *Student Research Symposium* and the *ACCESS* event organized by SDSU's Computational Science Center are not included.

- 3/18 Elena Arroyo\* "Subdiffusive motion of phages through mucus," March Meeting of American Physical Society, Los Angeles.
- 3/18 Gerardo Mendoza\* "Glass Transition Temperature of Nanometer Ultra-thin Polymer Films," March Meeting of American Physical Society, Los Angeles.
- 9/17 Gerardo Mendoza\* "Effect of the  $\pi$ - $\pi$  Interactions on the Glass Transition Temperature of Nanometer Thin Polystyrene," Southern California Soft Matter Symposium, San Diego.
- 5/17 Gerardo Mendoza\* "Effect of the  $\pi$ - $\pi$  Interactions on the Glass Transition Temperature of Nanometer Thin Polystyrene," SoCal TheoChem 2.0 Symposium, Irvine.
- 5/17 Elena Arroyo\* "Movement of Bacteriophages through Mucus," SoCal TheoChem 2.0 Symposium, Irvine.
- 10/16 Gerardo Mendoza\* "Effect of the  $\pi$ - $\pi$  Interactions on the Glass Transition Temperature of Nanometer Thin Polystyrene," Far West section of the American Physical Society, Davis.
- 8/16 Sam Dickey\*\* "Movement of Bacteriophages through Mucus," MechBio Symposium: Putting Together the Cell Mechanome." UCSD, La Jolla.
- 12/15 Mark Wilson\*\* "Modeling Self-Associating Polymer Fluids with Applications in Bulk Rheology," Predictive Performance Measures Group, Sandia National Laboratory, Albuquerque.
- 10/15 Mark Wilson\*\* "Modeling Self-Associating Polymer Fluids with Applications in Bulk Rheology," US Army Research Laboratory, Aberdeen.
- 10/14 Mark Wilson\*\* "Computational Study of Flow-induced Structural Changes in Self-Associating Polymer Networks," Society of Rheology Annual Meeting, Philadelphia.
- 2/14 Mark Wilson\*\* "Structure and Rheological Properties of Self-Associating Polymer Networks," **Gordon Research Seminar on Colloidal, Macromolecular and Polyelectrolyte Solutions,** Ventura. **INVITED TALK.**

- 2/13 Mark Wilson\*\* ``Numerical Study on the Structure and Rheology of Transient Self-Associating Polymer Networks,” Society of Rheology Annual Meeting, Pasadena.
- 10/12 Joris Billen\*\* ``Microscopic differences between shear bands obtained from simulations of associating polymers,” Society of Rheology Annual Meeting, Cleveland.
- 10/12 Mark Wilson\*\* ``Association and dissociation rates in a simulated telechelic polymer gel,” Society of Rheology Annual Meeting, Cleveland.
- 10/10 Joris Billen\*\* ``A computational study of shear banding in reversible associating polymers,” Society of Rheology Annual Meeting, Santa Fe.
- 3/10 Joris Billen\*\* ``The jammed state of a simulated transient polymer network, March Meeting of the American Physical Society, Portland.
- 2/10 Mariam Ghochani\*\* ``Investigation of Mitochondrial Crista Membrane Morphologies in Terms of Minimizing the Free Energy of Configuration,” Annual meeting of the Biophysical Society, San Francisco.
- 2/08 Danny Flynn\* ``Mitochondrial Stereology from the Statistics of Sections,” Annual meeting of the Biophysical Society, Long Beach.
- 5/05 Arun Ponnuswamy\*\* ``Computational Models of Inner Mitochondrial Membranes,” **19<sup>th</sup> annual CSU Student Research Competition (statewide)** Sacramento
- 3/05 Regina Barber DeGraaff Mariam Ghochani\*\* ``A free energy model for the observed morphologies of crista membrane of mitochondria,” Annual meeting of the Biophysical Society, Long Beach.
- 5/05 Mariam Ghochani\*\* ``A free energy model for the observed morphologies of crista membrane of mitochondria,” Annual meeting of the Biophysical Society, Long Beach.
- 6/03 Arun Ponnuswamy\*\* ``Monte Carlo Simulations of Curved Lipid Membranes,” International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences, Las Vegas.
- 6/03 Travis Depuy\* ``Contact time dependence of adhesive energy,” International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences, Las Vegas.

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## TEACHING

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### Students Supervised

- PhD: Mark Wilson (2015), "Structure and Rheological Properties of Self-Associating Polymer Networks"
- PhD: Joris Billen (2012), "Simulated Associating Polymer Networks"
- 16 MS student thesis projects supervised
- 21 UG students mentored in research

### Thesis Committee membership

- 19 total: PhD and MS thesis committee member for Physics, Biology, Chemistry, Mathematics, Mechanical Engineering, and Philosophy.

### Curriculum Development

- Revamp BA for Physics Credential Students ITEP (2022-current)
- Revamp BA in General Physics (2022-23)
- New BA in "Physics, Science, and Society" (2022)
- New course on "Polymer Science" for Physics and Chemistry Majors (2005)
- Revamp Chemical Physics BS degree (2002)

### Course Redesign and Teaching Innovations

- Redesigned the UG course on Modern Physics as part of CSU's "Course redesign with technology" initiative. Flipped the course, introduced inclusive element. (2016)
- Redesigned the graduate level course in Classical Mechanics (2012).
- Redesigned the graduate level course in Statistical Mechanics (2000).
- Supplemental Instruction for Lower Division Calculus-based Physics, wrote proposal to get funding (2019).

### Arts Alive collaborative teaching

- Arts Alive Selection Committee Collaborative Teaching 2022-present
- Arts Alive Collaborative Teaching- Stacked courses in Polymer Physics and Dance Making. Designed new curriculum and executed it twice, partner Joseph Alter (dance) 2016-2019

### Common Experience

- Common Experience "Transformation" - Invited two speakers (2019-20)
- Organized 15 meeting at which faculty, staff, and students from across all units mingled and discussed the theme "Time" (2018-19)
- Common Experience Movement- Physics students and dance students collaborated as part of Common Experience "Movement" (2016-17)

### Teaching Training or Teaching Conferences

- Total of approx. 50 CTL and CIE workshops, 1999-present
- BIE Inclusion Representative training - first cohort 2020-21
- Attended Racelighting and Black Mind Matters Series hosted by Wood and Harris III (2020, 2022)
- SDSU flexible course design (2020, 2021)
- Course Redesign with Technology Institute, CSU, 1 day, Sacramento (2017)
- Course Redesign with Technology Institute, CSU, 3 days, San Diego (2016)
- Certificate Quality Assurance Training CSU; Introduction to teaching online using QLT (2016)

### Talks and book circles given for Center for Teaching and Learning SDSU

- CTL Learning Circle on "Contemplative Practices in Higher Education" by D. Barbezat and M. Bush
- CTL luncheon speaker on "Plickers" (2016)
- CTL luncheon speaker on "Clickers" (2008)

### Assessment

- Vertical Assessment of 3 Quantum Physics Courses (2018-22)
- Collaborative Teaching: Physics and Dance. Both as part of Arts Alive's own assessment and for publication with assessment expert Dr. M. Bresciani (2018-22)
- The impact of supplemental instruction on grades in subsequent classes (2022)
- Learning outcomes of Thermodynamics (2010)

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## SERVICE

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### Service for the Department

- Department of Physics Chair Curriculum 2021-present
- Department of Physics Assessment Committee 2013-present
- Department of Physics Retention Tenure and Promotion Committee 2005- (*Chair 2015-2018*)
- Department of Physics Undergraduate and Curriculum Committee 2009-2017
- Department of Physics Search Committee for Area of Excellence in Viromics search 2013-14 (*Co-Chair*)
- Department of Physics Search Committee 2002-03
- Department of Physics Graduate Committee 2002-03, 2021-present
- Department of Physics Executive Committee 2001-05
- Department of Physics Colloquium Organizer 2000-01

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### Service for the College

- Department of Chemistry, Computational Physical Chemistry Search Committee 2021-22
- College of Sciences Senate Caucus meetings (monthly) 2016-present
- College of Sciences Research Committee 2000-01

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### Service for the University

- Member Dean Search Committee Dean PSFA 2022-present
- Senate Executive Committee 2021-present
- Senate Committee on Constitution and Bylaws 2021- (*Chair 2021-present*)
- Senate Library Committee 2020-2022
- General Education Reform Task Force 2018-2020
- Common Experience Faculty coordinator 2018-2020
- Community for Contemplative Pedagogies (Coordinator 2016-2018)
- Senate General Education Committee 2017-2018
- Senate 2009-2012, 2015-2018, Fall 2019, 2020-present
- Senate Committee on Committees and Elections 2015-16
- Senate Committee on Academic Resources and Planning 2005-12
- Senate Committee on Undergraduate Curriculum 2001-05



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**Service for the Profession**

- Associate Editor, Frontiers in Soft Matter Physics 2020- present
- Program Committee Member of “Science inspired by Mark: Soft Matter Physics” 2022-23
- Program Committee Member IUPAC (International Union of Pure and Applied Chemistry) meeting in St. Petersburg, Russia. 2016-17
- Committee member PhD Thesis at the Technical University in Eindhoven, The Netherland (twice)
- Session chair at conferences (American Physical Society, Society of Rheology)
- Referee for professional journals (Biomacromolecules, European Physical Journal, International Journal of Hydrogen Energy, Entropy, Frontiers, Gels, International Journal of Molecular Sciences, Journal of Chemical Physics, Journal of Physical Chemistry, Journal of Polymer Science part B: Polymer Physics, Journal of Research in Innovative Teaching and Learning, Macromolecular Theory and Simulations, Macromolecules, Modeling and Simulation in Materials Science and Engineering, Physical Review E, Physical Review Letters, Sensors, **Science**)
- Referee for Grant Proposals (National Science Foundation, Petroleum Research Fund of the American Chemical Society, Romanian National Council for Scientific Research, The Research Council of Norway, 3TU Research Center high Tech Materials, The Netherlands, U.S. Civilian Research and Development Foundation)

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**Service for the Community**

- Teaching and Development of Quantum Physics Curriculum for Emory-Tibet Science Initiative 2018-2019
- Science Olympiad Coach (Middle and High School) 2007-2017