

List of Publications
Professor Klaus Schulten
Departments of Physics, Chemistry, and Biophysics
University of Illinois at Urbana-Champaign
Printed November 1, 2002

- [1] Klaus Schulten and Martin Karplus. On the origin of a low-lying forbidden transition in polyenes and related molecules. *Chem. Phys. Lett.*, 14:305–309, 1972.
- [2] Robert R. Birge, Klaus Schulten, and Martin Karplus. Possible influence of a low-lying “covalent” excited state on the absorption spectrum and photoisomerization of 11-cis retinal. *Chem. Phys. Lett.*, 31:451–454, 1975.
- [3] Klaus Schulten and Roy G. Gordon. Exact recursive evaluation of $3j$ - and $6j$ -coefficients for quantum-mechanical coupling of angular momenta. *J. Math. Phys.*, 16:1961–1970, 1975.
- [4] Klaus Schulten and Roy G. Gordon. Semiclassical approximation to $3j$ - and $6j$ -coefficients for quantum-mechanical coupling of angular momenta. *J. Math. Phys.*, 16:1971–1988, 1975.
- [5] Klaus Schulten, I. Ohmine, and Martin Karplus. Correlation effects in the spectra of polyenes. *J. Chem. Phys.*, 64:4422–4441, 1976.
- [6] Klaus Schulten and Roy G. Gordon. Quantum theory of angular momentum coupling in reactive collisions. *J. Chem. Phys.*, 64:2918–2938, 1976.
- [7] Klaus Schulten and Roy G. Gordon. Recursive evaluation of $3j$ - and $6j$ -coefficients. *Comput. Phys. Commun.*, 11:269–278, 1976.
- [8] Klaus Schulten, H. Staerk, Albert Weller, Hans-Joachim Werner, and B. Nickel. Magnetic field dependence of the geminate recombination of radical ion pairs in polar solvents. *Z. Phys. Chem.*, NF101:371–390, 1976.
- [9] Klaus Schulten. Quantum mechanical propensity rules for the transfer of angular momentum in three-atom reactions. *Ber. Bunsenges. Phys. Chem.*, 81:166–168, 1977.
- [10] Zan Schulten and Klaus Schulten. The generation, diffusion, spin motion, and recombination of radical pairs in solution in the nanosecond time domain. *J. Chem. Phys.*, 66:4616–4634, 1977.
- [11] Hans-Joachim Werner, Zan Schulten, and Klaus Schulten. Theory of the magnetic field modulated geminate recombination of radical ion pairs in polar solvents: Application to the pyrene-N,N-dimethylaniline system. *J. Chem. Phys.*, 67:646–663, 1977.
- [12] I. Ohmine, Martin Karplus, and Klaus Schulten. Renormalized configuration interaction method for electron correlation in the excited states of polyenes. *J. Chem. Phys.*, 68:2298–2318, 1978.
- [13] Klaus Schulten and Paul Tavan. A mechanism for the light-driven proton pump of *Halobacterium halobium*. *Nature*, 272:85–86, 1978.
- [14] Hans-Joachim Werner, Klaus Schulten, and Albert Weller. Electron transfer and spin exchange contributing to the magnetic field dependence of the primary photochemical reaction of bacterial photosynthesis. *Biochim. Biophys. Acta*, 502:255–268, 1978.
- [15] Paul Tavan and Klaus Schulten. The ‘phantom’ photochemical singlet state of stilbene and its diphenylpolyene relative. *Chem. Phys. Lett.*, 56:200–204, 1978.
- [16] Klaus Schulten and Peter G. Wolynes. Semiclassical description of electron spin motion in radicals including the effect of electron hopping. *J. Chem. Phys.*, 68:3292–3297, 1978.

- [17] Klaus Schulten and Albert Weller. Exploring fast electron transfer processes by magnetic fields. *Biophys. J.*, 24:295–305, 1978.
- [18] Klaus Schulten. An isomerization model for the photocycle of bacteriorhodopsin. In S. R. Caplan and M. Ginzburg, editors, *Energetics and Structure of Halophilic Organisms*, pp. 331–334. Elsevier, 1978.
- [19] Klaus Schulten, Charles E. Swenberg, and Albert Weller. A biomagnetic sensory mechanism based on magnetic field modulated coherent electron spin motion. *Z. Phys. Chem.*, NF111:1–5, 1978.
- [20] G. Orlandi and Klaus Schulten. Coupling of stereochemistry and proton donor–acceptor properties of a Schiff base: A model of a light-driven proton pump. *Chem. Phys. Lett.*, 64:370–374, 1979.
- [21] Paul Tavan and Klaus Schulten. The $2^1A_g - 1^1B_u$ energy gap in the polyenes: An extended configuration interaction study. *J. Chem. Phys.*, 70:5407–5413, 1979.
- [22] Paul Tavan and Klaus Schulten. Correlation effects in the spectra of polyacenes. *J. Chem. Phys.*, 70:5414–5421, 1979.
- [23] Klaus Schulten and Irving R. Epstein. Recombination of radical pairs in high magnetic fields: A path integral–Monte Carlo treatment. *J. Chem. Phys.*, 71:309–316, 1979.
- [24] Ernst-Walter Knapp and Klaus Schulten. Magnetic field effect on the hyperfine-induced electron spin motion in radicals undergoing diamagnetic–paramagnetic exchange. *J. Chem. Phys.*, 71:1878–1883, 1979.
- [25] Ernst-Walter Knapp, Klaus Schulten, and Zan Schulten. Proton conduction in linear hydrogen-bonded systems. *Chem. Phys.*, 46:215–229, 1980.
- [26] Klaus Schulten, Zan Schulten, and Attila Szabo. Reactions governed by a binomial redistribution process. The Ehrenfest urn problem. *Physica*, 100A:599–614, 1980.
- [27] Paul Tavan and Klaus Schulten. An efficient approach to CI: General matrix element formulas for spin-coupled particle-hole excitations. *J. Chem. Phys.*, 72:3547–3576, 1980.
- [28] Attila Szabo, Klaus Schulten, and Zan Schulten. First passage time approach to diffusion controlled reactions. *J. Chem. Phys.*, 72:4350–4357, 1980.
- [29] Uri Dinur, Barry Honig, and Klaus Schulten. On the nature of excited electronic states in cyanine dyes: Implications for visual pigment spectra. *Chem. Phys. Lett.*, 72:493–497, 1980.
- [30] Klaus Schulten, Uri Dinur, and Barry Honig. The spectra of carbonium ions, cyanine dyes, and protonated Schiff base polyenes. *J. Chem. Phys.*, 73:3927–3935, 1980.
- [31] Klaus Schulten, Zan Schulten, and Attila Szabo. Dynamics of reactions involving diffusive barrier crossing. *J. Chem. Phys.*, 74:4426–4432, 1981.
- [32] Reiner Peters, Axel Brünger, and Klaus Schulten. Continuous fluorescence microphotolysis: A sensitive method for study of diffusion processes in single cells. *Proc. Natl. Acad. Sci. USA*, 78:962–966, 1981.
- [33] Gene Lamm and Klaus Schulten. Extended Brownian dynamics approach to diffusion-controlled processes. *J. Chem. Phys.*, 75:365–371, 1981.
- [34] Klaus Schulten. Magnetic field effects in chemistry and biology. In J. Treusch, editor, *Festkörperprobleme*, volume 22, pp. 61–83. Vieweg, Braunschweig, 1982.
- [35] Bruce S. Hudson, Bryan E. Kohler, and Klaus Schulten. Linear polyene electronic structure and potential surfaces. In Edward C. Lim, editor, *Excited States*, volume 6, pp. 1–95. Academic Press, New York, 1982.

- [36] Gene Lamm and Klaus Schulten. Extended Brownian dynamics: II. Reactive, nonlinear diffusion. *J. Chem. Phys.*, 78:2713–2734, 1983.
- [37] Walter Nadler and Klaus Schulten. Generalized moment expansion for the Mössbauer spectrum of Brownian particles. *Phys. Rev. Lett.*, 51:1712–1715, 1983.
- [38] Klaus Schulten. Ensemble averaged spin pair dynamics of doublet and triplet molecules. In P. Reineker, H. Haken, and H. C. Wolf, editors, *Organic Molecular Aggregates*, pp. 76–87. Springer, 1983.
- [39] Axel Brünger, Zan Schulten, and Klaus Schulten. A network thermodynamic investigation of stationary and non-stationary proton transport through proteins. *Z. Phys. Chem.*, NF136:1–63, 1983.
- [40] Klaus Schulten. Ensemble averaged spin pair dynamics of doublet and triplet molecules. *J. Chem. Phys.*, 80:3668–3679, 1984.
- [41] Klaus Schulten, Axel Brünger, Walter Nadler, and Zan Schulten. Generalized moment description of Brownian dynamics in biological systems. In E. Frehland, editor, *Synergetics — From Microscopic to Macroscopic Order*, pp. 80–89. Springer, 1984.
- [42] Klaus Schulten, Zan Schulten, and Paul Tavan. An isomerization model for the pump cycle of bacteriorhodopsin. In L. Bolis, E. J. M. Helmreich, and H. Passow, editors, *Information and Energy Transduction in Biological Membranes*, pp. 113–131. Allan R. Liss, Inc., New York, 1984.
- [43] Walter Nadler and Klaus Schulten. Theory of Mössbauer spectra of proteins fluctuating between conformational substates. *Proc. Natl. Acad. Sci. USA*, 81:5719–5723, 1984.
- [44] Paul Tavan and Klaus Schulten. The effect of protonation on the thermal isomerization of stilbazolium betaines. *Chem. Phys. Lett.*, 110:191–195, 1984.
- [45] Klaus Schulten and Albert Weller. Magnetfeldeffekte in Chemie und Biologie. *Die Umschau*, 25/26:779–783, 1984.
- [46] Paul Tavan, Klaus Schulten, and Dieter Oesterhelt. The effect of protonation and electrical interactions on the stereochemistry of retinal Schiff bases. *Biophys. J.*, 47:415–430, 1985.
- [47] Zan Schulten and Klaus Schulten. Model for the resistance of the proton channel formed by the proteolipid of ATPase. *Eur. Biophys. J.*, 11:149–155, 1985.
- [48] Paul Tavan, Klaus Schulten, Wolfgang Gärtner, and Dieter Oesterhelt. Substituents at the C₁₃ position of retinal and their influence on the function of bacteriorhodopsin. *Biophys. J.*, 47:349–356, 1985.
- [49] Axel Brünger, Reiner Peters, and Klaus Schulten. Continuous fluorescence microphotolysis to observe lateral diffusion in membranes: Theoretical methods and applications. *J. Chem. Phys.*, 82:2147–2160, 1985.
- [50] Klaus Schulten. The effect of intramolecular paramagnetic–diamagnetic exchange on the magnetic field effect of radical pair recombination. *J. Chem. Phys.*, 82:1312–1316, 1985.
- [51] Walter Nadler and Klaus Schulten. Generalized moment expansion for Brownian relaxation processes. *J. Chem. Phys.*, 82:151–160, 1985.
- [52] Walter Nadler, Paul Tavan, and Klaus Schulten. A model for the lateral diffusion of ‘stiff’ chains in a lipid bilayer. *Eur. Biophys. J.*, 12:25–31, 1985.
- [53] Herbert Treutlein and Klaus Schulten. Noise induced limit cycles of the Bonhoeffer–van der Pol model of neural pulses. *Ber. Bunsenges. Phys. Chem.*, 89:710–718, 1985.
- [54] Walter Nadler and Klaus Schulten. Mean relaxation time approximation for dynamical correlation functions in stochastic systems near instabilities. *Z. Physik B*, 59:53–61, 1985.

- [55] M. Scholz, Klaus Schulten, and Reiner Peters. Single-cell flux measurement by continuous fluorescence microphotolysis. *Eur. Biophys. J.*, 13:37–44, 1985.
- [56] Robert Bittl, Herbert Treutlein, and Klaus Schulten. Electron conduction along aliphatic chains. In M. Michel-Beyerle, editor, *Antennas and Reaction Centers of Photosynthetic Bacteria — Structure, Interaction and Dynamics*, pp. 264–276. Springer, 1985.
- [57] Joachim Buhmann, Helge Ritter, and Klaus Schulten. Neuro-kybernetik und künstliche Intelligenz. *Computerwoche*, 25, 1985.
- [58] Zan Schulten and Klaus Schulten. Proton conduction through proteins: An overview of theoretical principles and applications. *Meth. Enzym.*, 127:419–438, 1986.
- [59] Herbert Treutlein and Klaus Schulten. Noise-induced neural impulses. *Eur. Biophys. J.*, 13:355–365, 1986.
- [60] Walter Nadler and Klaus Schulten. Generalized moment expansion for observables of stochastic processes in dimensions $d > 1$: Application to Mössbauer spectra of proteins. *J. Chem. Phys.*, 84:4015–4025, 1986.
- [61] Klaus Schulten and Robert Bittl. Probing the dynamics of a polymer with paramagnetic end groups by magnetic fields. *J. Chem. Phys.*, 84:5155–5161, 1986.
- [62] Helge Ritter and Klaus Schulten. On the stationary state of Kohonen’s self-organizing sensory mapping. *Biol. Cyber.*, 54:99–106, 1986.
- [63] Klaus Schulten. Continuous fluorescence microphotolysis by a $\sin^2 kx$ grating. *Chem. Phys. Lett.*, 124:230–236, 1986.
- [64] Paul Tavan and Klaus Schulten. Evidence for a 13,14-cis cycle in bacteriorhodopsin. *Biophys. J.*, 50:81–89, 1986.
- [65] Joachim Buhmann and Klaus Schulten. Associative recognition and storage in a model network of physiological neurons. *Biol. Cyber.*, 54:319–335, 1986.
- [66] Joachim Buhmann and Klaus Schulten. A physiological neural network as an autoassociative memory. In E. Bienenstock, F. Fogelman, and G. Weisbuch, editors, *Disordered Systems and Biological Organization*, pp. 273–279. Springer, 1986.
- [67] Dieter Oesterhelt, P. Hegemann, Paul Tavan, and Klaus Schulten. Trans-cis isomerization of retinal and a mechanism for ion translocation in halorhodopsin. *Eur. Biophys. J.*, 14:123–129, 1986.
- [68] Robert Bittl and Klaus Schulten. Study of polymer dynamics by magnetic field dependent biradical reactions. In G. Maret, N. Boccarda, and J. Kiepenheuer, editors, *Biophysical Effects of Steady Magnetic Fields*, volume 11 of *Proceedings in Physics*, pp. 90–98. Springer, Berlin, 1986.
- [69] Klaus Schulten. Magnetic field effects on radical pair processes in chemistry and biology. In J. H. Bernhard, editor, *Biological Effects of Static and Extremely Low Frequency Magnetic Fields*, pp. 133–140. MMV Medizin Verlag, Munich, 1986.
- [70] Klaus Schulten and Andreas Windemuth. Model for a physiological magnetic compass. In G. Maret, N. Boccarda, and J. Kiepenheuer, editors, *Biophysical Effects of Steady Magnetic Fields*, volume 11 of *Proceedings in Physics*, pp. 99–106. Springer, Berlin, 1986.
- [71] Joachim Buhmann and Klaus Schulten. Influence of noise on the behaviour of an autoassociative neural network. In J. S. Denker, editor, *Neural Networks for Computing*, pp. 71–76. American Institute of Physics Publication, Conference Proceedings 151, 1986.

- [72] Helge Ritter and Klaus Schulten. Topology conserving mappings for learning motor tasks. In J. S. Denker, editor, *Neural Networks for Computing*, pp. 376–380. American Institute of Physics Publication, Conference Proceedings 151, 1986.
- [73] Robert Divko and Klaus Schulten. Stochastic spin models for pattern recognition. In J. S. Denker, editor, *Neural Networks for Computing*, pp. 129–134. American Institute of Physics Publication, Conference Proceedings 151, 1986.
- [74] Paul Tavan and Klaus Schulten. The low-lying electronic excitations in long polyenes: A PPP–MRD–CI study. *J. Chem. Phys.*, 85:6602–6609, 1986.
- [75] Helge Ritter and Klaus Schulten. Planning a dynamic trajectory via path finding in discretized phase space. In *Parallel Processing: Logic, Organization, and Technology*, volume 253 of *Lecture Notes in Computer Science*, pp. 29–39. Springer, 1987.
- [76] Joachim Buhmann, Robert Divko, Helge Ritter, and Klaus Schulten. Physicists explore human and artificial intelligence. In *Structure and Dynamics of Nucleic Acids, Proteins and Membranes*, pp. 301–328. Plenum Press, 1986.
- [77] Joachim Buhmann and Klaus Schulten. Influence of noise on the function of a “physiological” neural network. *Biol. Cyber.*, 56:313–327, 1987.
- [78] Joachim Buhmann and Klaus Schulten. Noise-driven temporal association in neural networks. *Europhys. Lett.*, 4:1205–1209, 1987.
- [79] Paul Tavan and Klaus Schulten. Electronic excitations in finite and infinite polyenes. *Phys. Rev. B*, 36:4337–4358, 1987.
- [80] Kim Sharp, Richard Fine, Klaus Schulten, and Barry Honig. Brownian dynamics simulation of diffusion to irregular bodies. *Phys. Chem.*, 91:3624–3631, 1987.
- [81] Klaus Schulten. Ordnung aus Chaos, Vernunft aus Zufall — Physik biologischer und digitaler Informationsverarbeitung. In B.-O. Küppers, editor, *Ordnung aus dem Chaos*, pp. 243–268. Piper Verlag, Munich, 1987.
- [82] Walter Nadler, Axel Brünger, Klaus Schulten, and Martin Karplus. Molecular and stochastic dynamics of proteins. *Proc. Natl. Acad. Sci. USA*, 84:7933–7937, 1987.
- [83] Joachim Buhmann, Robert Divko, Helge Ritter, and Klaus Schulten. Physik und Gehirn — Wie dynamische Modelle von Nervennetzen natürliche Intelligenz erklären. *MC-Computermagazin*, 9:108–120, 1987.
- [84] Joseph Eccles, Barry Honig, and Klaus Schulten. Spectroscopic determinants in the reaction center of *Rhodospseudomonas viridis*. *Biophys. J.*, 53:137–144, 1988.
- [85] Helge Ritter and Klaus Schulten. Extending Kohonen’s self-organizing mapping algorithm to learn ballistic movements. In R. Eckmiller and Ch. von der Malsburg, editors, *Neural Computers*, volume 41 of *NATO Sci. Ser. F*, pp. 393–406. Springer–Verlag, 1988.
- [86] Joachim Buhmann and Klaus Schulten. Storing sequences of biased patterns in neural networks with stochastic dynamics. In R. Eckmiller and Ch. von der Malsburg, editors, *Neural Computers*, Computer and Systems Sciences, pp. 231–242. Springer, 1988.
- [87] Herbert Treutlein, Andreas Windemuth, and Klaus Schulten. “Molecular Design” — Simulation und Graphik von Biomolekülen. *MC-Computermagazin*, 1:46–57, 1988.
- [88] Paul Tavan and Klaus Schulten. Quasiparticle excitations in polyenes and polyacetylene. In A. J. Heeger, J. Orenstein, and D. Ulrich, editors, *Nonlinear Optical Properties of Polymers*, volume 109 of *Symposium Proceedings*, pp. 163–170. Materials Research Society, Pittsburgh, 1988.

- [89] Hans-Ulrich Bauer, Klaus Schulten, and Walter Nadler. Generalized moment expansion of dynamic correlation functions in finite Ising systems. *Phys. Rev. B*, 38:445–458, 1988.
- [90] Herbert Treutlein, Klaus Schulten, J. Deisenhofer, H. Michel, Axel Brünger, and Martin Karplus. Molecular dynamics simulation of the primary processes in the photosynthetic reaction center of *Rhodopseudomonas viridis*. In J. Breton and A. Verméglio, editors, *The Photosynthetic Bacterial Reaction Center: Structure and Dynamics*, volume 149 of *NATO Sci. Ser. A*, pp. 139–150. Plenum, New York, 1988.
- [91] Herbert Treutlein, Klaus Schulten, Christoph Niedermeier, J. Deisenhofer, H. Michel, and D. Devault. Electrostatic control of electron transfer in the photosynthetic reaction center of *Rhodopseudomonas viridis*. In J. Breton and A. Verméglio, editors, *The Photosynthetic Bacterial Reaction Center: Structure and Dynamics*, volume 149 of *NATO Sci. Ser. A*, pp. 369–377. Plenum, New York, 1988.
- [92] Robert Bittl and Klaus Schulten. Length dependence of the magnetic field modulated triplet yield of photogenerated biradicals. *Chem. Phys. Lett.*, 146:58–62, 1988.
- [93] Klaus Boehncke, Christoph Köhler, Georg Meyer-Berg, and Klaus Schulten. Eine Computersimulation künstlicher Wesen — Experimente in einer Welt synthetischer Psychologie. *MC-Computermagazin*, 7:34–48, 1988.
- [94] Robert Bittl and Klaus Schulten. A static ensemble approximation for stochastically modulated quantum systems. *J. Chem. Phys.*, 90:1794–1803, 1989.
- [95] Helge Ritter and Klaus Schulten. Convergence properties of Kohonen’s topology conserving maps: Fluctuations, stability and dimension selection. *Biol. Cyber.*, 60:59–71, 1988.
- [96] Walter Nadler and Klaus Schulten. Mean relaxation time approximation for dynamical correlation functions in stochastic systems near instabilities: II. The single mode laser. *Z. Physik*, 72:535–543, 1988.
- [97] Joachim Buhmann, Robert Divko, and Klaus Schulten. Associative memory with high information content. *Phys. Rev. A*, 39:2689–2692, 1989.
- [98] Helge Ritter and Klaus Schulten. Kohonen’s self-organizing maps: Exploring their computational capabilities. In *IEEE International Conference on Neural Networks, San Diego, California, July 24–27, 1988*, volume 1, pp. 109–116, New York, 1988. The Institute of Electrical and Electronics Engineers.
- [99] Joachim Buhmann and Klaus Schulten. Invariant pattern recognition by means of fast synaptic plasticity. In *IEEE International Conference on Neural Networks, San Diego, California, July 24–27, 1988*, volume 1, pp. 125–132, New York, 1988. The Institute of Electrical and Electronics Engineers.
- [100] Helmut Grubmüller, Helmut Heller, and Klaus Schulten. Eine Cray für 100.000 DM. *MC-Computermagazin*, 11:48–64, 1988.
- [101] Herbert Treutlein, Christoph Niedermeier, Klaus Schulten, J. Deisenhofer, H. Michel, Axel Brünger, and Martin Karplus. Molecular dynamics simulation of the primary processes in the Photosynthetic reaction center of *Rhodopseudomonas viridis*. In A. Pullman et al., editors, *Transport Through Membranes: Carriers, Channels and Pumps*, pp. 513–525. Kluwer Academic Publishers, Dordrecht, 1988.
- [102] Michael F. Grossjean, Paul Tavan, and Klaus Schulten. Can normal mode analysis reveal the geometry of the L₅₅₀ chromophore of bacteriorhodopsin? *Eur. Biophys. J.*, 16:341–349, 1989.
- [103] Helge Ritter, Thomas Martinetz, and Klaus Schulten. Wie neuronale Netzwerke Roboter steuern können. *MC-Computermagazin*, 2:48–61, 1989.
- [104] Helge Ritter, Thomas Martinetz, and Klaus Schulten. Topology-conserving maps for learning visuo-motor-coordination. *Neur. Netw.*, 2:159–168, 1989.

- [105] Jeanne Rubner and Klaus Schulten. A regularized approach to color constancy. *Biol. Cyber.*, 61:29–36, 1989.
- [106] Helge Ritter, Thomas Martinetz, and Klaus Schulten. Topology-conserving maps for motor control. In L. Personnaz and G. Dreyfus, editors, *Neural Networks: From Models to Applications, N'EURO '88*, pp. 579–591. EZIDET, Paris, 1989.
- [107] Joachim Buhmann, Robert Divko, and Klaus Schulten. On sparsely coded associative memories. In L. Personnaz and G. Dreyfus, editors, *Neural Networks: From Models to Applications, N'EURO '88*, pp. 360–371. EZIDET, Paris, 1989.
- [108] Thomas Martinetz, Helge Ritter, and Klaus Schulten. 3D-neural-net for learning visuomotor-coordination of a robot arm. In *Proceedings of the International Joint Conference on Neural Networks, Washington*, volume 2, pp. 351–356, San Diego, 1989. The Institute of Electrical and Electronics Engineers.
- [109] Thomas Martinetz, Helge Ritter, and Klaus Schulten. Kohonen's self-organizing map for modeling the formation of the auditory cortex of a bat. In R. Pfeifer, Z. Schreter, F. Fogelman-Soulié, and L. Steels, editors, *Connectionism in Perspective*, pp. 403–412. North-Holland, Amsterdam, 1989.
- [110] Helge Ritter, Thomas Martinetz, and Klaus Schulten. *Textbook: Neuronale Netze: Eine Einführung in die Neuroinformatik selbstorganisierender Abbildungen*. Addison-Wesley, Bonn, first edition, 1990.
- [111] Helmut Heller, Helmut Grubmüller, and Klaus Schulten. Molecular dynamics simulation on a parallel computer. *Mol. Sim.*, 5:133–165, 1990.
- [112] Markus van Almsick and Klaus Schulten. Mathematica: Mathematik auf Mikrocomputern. *MC-Computermagazin*, 11:42–59, 1989.
- [113] Robert Bittl and Klaus Schulten. Biradical spin dynamics with distance-dependent exchange interaction and electron transfer efficiency. *Chem. Phys. Lett.*, 173:387–392, 1990.
- [114] Thomas Martinetz, Helge Ritter, and Klaus Schulten. Three-dimensional neural net for learning visuomotor coordination of a robot arm. *IEEE Trans. Neur. Netw.*, 1:131–136, 1990.
- [115] Jeanne Rubner and Klaus Schulten. Development of feature detectors by self-organization: A network model. *Biol. Cyber.*, 62:193–199, 1990.
- [116] Klaus Obermayer, Helge Ritter, and Klaus Schulten. Large-scale simulation of a self-organizing neural network: Formation of a somatotopic map. In R. Eckmiller, G. Hartmann, and G. Hauske, editors, *Parallel Processing in Neural Systems and Computers*, pp. 71–74. Elsevier, Amsterdam, 1990.
- [117] Thomas Martinetz, Helge Ritter, and Klaus Schulten. Learning of visuo motor-coordination of a robot arm with redundant degrees of freedom. In R. Eckmiller, G. Hartmann, and G. Hauske, editors, *Parallel Processing in Neural Systems and Computers*, pp. 431–434. Elsevier, Amsterdam, 1990.
- [118] Robert Divko and Klaus Schulten. Hierarchical spin model for stereo interpretation using phase sensitive detectors. In R. Eckmiller, G. Hartmann, and G. Hauske, editors, *Parallel Processing in Neural Systems and Computers*, pp. 335–338. Elsevier, Amsterdam, 1990.
- [119] Jeanne Rubner, Klaus Schulten, and Paul Tavan. A self-organizing network for complete feature extraction. In R. Eckmiller, G. Hartmann, and G. Hauske, editors, *Parallel Processing in Neural Systems and Computers*, pp. 365–368. Elsevier, Amsterdam, 1990.
- [120] Christian Kurrer and Klaus Schulten. Propagation of chemical waves in discrete excitable media: Anisotropic and isotropic wave fronts. In A. V. Holden, M. Markus, and H. G. Othmer, editors, *Nonlinear Wave Processes in Excitable Media*, volume 244 of *NATO Sci. Ser. B*, pp. 489–500. Plenum Press, New York, 1991.

- [121] Robert Bittl, Klaus Schulten, and Nick Turro. Micellar radical pair decay. *J. Chem. Phys.*, 93:8260–8269, 1990.
- [122] Helge Ritter, Thomas Martinetz, and Klaus Schulten. *Textbook: Neuronale Netze: Eine Einführung in die Neuroinformatik selbstorganisierender Abbildungen*. Addison-Wesley, Bonn, second enlarged edition, 1990.
- [123] Herbert Treutlein, Klaus Schulten, Axel Brünger, Martin Karplus, J. Deisenhofer, and H. Michel. Chromophore-protein interactions and the function of the photosynthetic reaction center: A molecular dynamics study. *Proc. Natl. Acad. Sci. USA*, 89:75–79, 1992.
- [124] Michael F. Grossjean, Paul Tavan, and Klaus Schulten. Quantum chemical vibrational analysis of the chromophore of bacteriorhodopsin. *J. Phys. Chem.*, 94:8059–8069, 1990.
- [125] Wolfgang R. Bauer and Klaus Schulten. Theory of contrast agents in magnetic resonance imaging: Coupling of spin relaxation and transport. *Magn. Res. Med.*, 26:16–39, 1992.
- [126] M. K. Grossjean, Michael F. Grossjean, Klaus Schulten, and Paul Tavan. Semistochastic approach to many electron systems. *J. Chem. Phys.*, 97:1865–1875, 1992.
- [127] Andreas Windemuth and Klaus Schulten. Molecular dynamics simulation on the Connection Machine. *Mol. Sim.*, 5:353–361, 1991.
- [128] Markus Tesch and Klaus Schulten. A simulated cooling process for proteins. *Chem. Phys. Lett.*, 169:97–102, 1990.
- [129] Daniel Barsky, Benno Pütz, Klaus Schulten, and Richard L. Magin. Theory of paramagnetic contrast agents in liposome systems. *Magn. Res. Med.*, 24:1–13, 1992.
- [130] Jörg A. Walter, Helge Ritter, and Klaus Schulten. Non-linear prediction with self-organizing maps. In *International Joint Conference on Neural Networks, San Diego, California*, volume 1, pp. 589–594. The Institute of Electrical and Electronics Engineers, New York, 1990.
- [131] Klaus Obermayer, Helge Ritter, and Klaus Schulten. A neural network model for the formation of topographic maps in the CNS: Development of receptive fields. In *International Joint Conference on Neural Networks, San Diego, California*, volume 2, pp. 423–429. The Institute of Electrical and Electronics Engineers, New York, 1990.
- [132] Thomas Martinetz and Klaus Schulten. Hierarchical neural net for learning control of a robot’s arm and gripper. In *International Joint Conference on Neural Networks, San Diego, California*, volume 2, pp. 747–752. The Institute of Electrical and Electronics Engineers, New York, 1990.
- [133] Klaus Obermayer, Helge Ritter, and Klaus Schulten. Large-scale simulations of self-organizing neural networks on parallel computers: Application to biological modelling. *Parall. Comp.*, 14:381–404, 1990.
- [134] Marco Nonella and Klaus Schulten. Molecular dynamics simulation of electron transfer in proteins: Theory and application to $Q_A \rightarrow Q_B$ transfer in the photosynthetic reaction center. *J. Phys. Chem.*, 95:2059–2067, 1991.
- [135] Andreas Windemuth and Klaus Schulten. Stochastic dynamics simulation for macromolecules. Beckman Institute Technical Report TB-91-19, University of Illinois, 1991.
- [136] Helge Ritter, Klaus Obermayer, Klaus Schulten, and Jeanne Rubner. Self-organizing maps and adaptive filters. In J. Leo van Hemmen, Eytan Domany, and Klaus Schulten, editors, *Models of Neural Networks, Physics of Neural Networks*, pp. 281–306. Springer-Verlag, New York, 1991.
- [137] Christian Kurrer and Klaus Schulten. Effect of noise and perturbations on limit cycle systems. *Physica D*, 50:311–320, 1991.

- [138] Klaus Obermayer, Helge Ritter, and Klaus Schulten. A principle for the formation of the spatial structure of cortical feature maps. *Proc. Natl. Acad. Sci. USA*, 87:8345–8349, 1990.
- [139] Klaus Boehncke, Helmut Heller, Helmut Grubmüller, and Klaus Schulten. Molecular dynamics simulations on a systolic ring of transputers. In Alan S. Wagner, editor, *NATUG 3: Transputer Research and Applications 3*, pp. 83–94, Amsterdam, 1990. North American Transputer Users Group, IOS Press.
- [140] Klaus Obermayer, Helmut Heller, Helge Ritter, and Klaus Schulten. Simulation of self-organizing neural nets: A comparison between a transputer ring and a Connection Machine CM-2. In Alan S. Wagner, editor, *NATUG 3: Transputer Research and Applications 3*, pp. 95–106, Amsterdam, 1990. North American Transputer Users Group, IOS Press.
- [141] Helmut Grubmüller, Helmut Heller, Andreas Windemuth, and Klaus Schulten. Generalized Verlet algorithm for efficient molecular dynamics simulations with long-range interactions. *Mol. Sim.*, 6:121–142, 1991.
- [142] Christoph Niedermeier and Klaus Schulten. Molecular dynamics simulations in heterogenous dielectrics and Debye-Hückel media: Application to the protein bovine pancreatic trypsin inhibitor. *Mol. Sim.*, 8:361–387, 1992.
- [143] Klaus Boehncke, Marco Nonella, Klaus Schulten, and Andrew H.-J. Wang. Molecular dynamics investigation of the interaction between DNA and dactinomycin. *Biochemistry*, 30:5465–5475, 1991.
- [144] Christian Kurrer, Benno Nieswand, and Klaus Schulten. A model for synchronous activity in the visual cortex. In A. Babloyantz, editor, *Self-Organization, Emergent Properties, and Learning*, volume 260 of *NATO Sci. Ser. B*, pp. 81–95. Plenum Press, New York, 1991.
- [145] Klaus Obermayer, Helge Ritter, and Klaus Schulten. A model for the development of the spatial structure of retinotopic maps and orientation columns. *IEICE Trans. Fund. Electr. Comm. Comp. Sci.*, E75-A:537–545, 1992. Reprinted in *The Principles of Organization in Organisms — Santa Fe Institute Studies in the Sciences of Complexity, Vol. XII*. A. Baskin and J. Mittleenthal, Eds. (Addison Wesley, 1991).
- [146] Klaus Schulten and Markus Tesch. Coupling of protein motion to electron transfer: Molecular dynamics and stochastic quantum mechanics study of photosynthetic reaction centers. *Chem. Phys.*, 158:421–446, 1991.
- [147] Benno Pütz, Daniel Barsky, and Klaus Schulten. Edge enhancement by diffusion in microscopic magnetic resonance imaging. *J. Magn. Reson.*, 97:27–53, 1992.
- [148] Thomas Martinetz and Klaus Schulten. A neural network for robot control: Cooperation between neural units as a requirement for learning. *Comp. & Elect. Engr.*, 19:315–332, 1993.
- [149] Thomas M. Martinetz, Stanislav G. Berkovich, and Klaus Schulten. “Neural gas” for vector quantization and its application to time-series prediction. *IEEE Trans. Neur. Netw.*, 4:558–569, 1993.
- [150] Thomas Martinetz and Klaus Schulten. A “neural gas” network learns topologies. In Teuvo Kohonen, Kai Mäkisara, Olli Simula, and Jari Kangas, editors, *Artificial Neural Networks*, pp. 397–402. Elsevier, Amsterdam, 1991.
- [151] Klaus Obermayer, Gary G. Blasdel, and Klaus Schulten. A neural network model for the formation and for the spatial structure of retinotopic maps, orientation- and ocular dominance columns. In Teuvo Kohonen, Kai Mäkisara, Olli Simula, and Jari Kangas, editors, *Artificial Neural Networks*, pp. 505–511. Elsevier, Amsterdam, 1991.
- [152] Edgar Erwin, Klaus Obermayer, and Klaus Schulten. Convergence properties of self-organizing maps. In Teuvo Kohonen, Kai Mäkisara, Olli Simula, and Jari Kangas, editors, *Artificial Neural Networks*, pp. 409–414. Elsevier, Amsterdam, 1991.

- [153] Jörg A. Walter, Thomas Martinetz, and Klaus Schulten. Industrial robot learns visuo-motor coordination by means of “neural gas” network. In Teuvo Kohonen, Kai Mäkisara, Olli Simula, and Jari Kangas, editors, *Artificial Neural Networks*, pp. 357–364. Elsevier, Amsterdam, 1991.
- [154] Christian Kurrer, Benno Nieswand, and Klaus Schulten. Dynamics of synchronous neural activity in the visual cortex. In Teuvo Kohonen, Kai Mäkisara, Olli Simula, and Jari Kangas, editors, *Artificial Neural Networks*, pp. 133–138. Elsevier, Amsterdam, 1991.
- [155] Klaus Obermayer, Helge Ritter, and Klaus Schulten. Development and spatial structure of cortical feature maps: A model study. In D. Touretzky and R. Lippman, editors, *Advances in Neural Information Processing Systems 3*, pp. 11–17. Morgan Kaufmann, San Mateo CA, 1991.
- [156] Marco Nonella, Andreas Windemuth, and Klaus Schulten. Structure of bacteriorhodopsin and *in situ* isomerization of retinal: A molecular dynamics study. *J. Photochem. Photobiol.*, 54:937–948, 1991.
- [157] Mark A. Shifman, Andreas Windemuth, Klaus Schulten, and Perry L. Miller. Molecular dynamics simulation on a network of workstations using a machine-independent parallel programming language. *Comp. Biomed. Res.*, 25:168–180, 1992.
- [158] Edgar Erwin, Klaus Obermayer, and Klaus Schulten. Formation of dimension-reducing somatotopic maps. In Samir I. Sayegh, editor, *Proceedings of the Fourth Conference on Neural Networks and Parallel Distributed Processing*, pp. 115–126. Indiana University at Fort Wayne, 1992.
- [159] Helge Ritter, Thomas Martinetz, and Klaus Schulten. *Textbook: Neural Computation and Self-Organizing Maps: An Introduction*. Addison-Wesley, New York, revised English edition, 1992.
- [160] Stanislav G. Berkovitch, Philippe Dalger, Ted Hesselroth, Thomas Martinetz, Benoît Noël, Jörg A. Walter, and Klaus Schulten. Vector quantization algorithm for time series prediction and visuo-motor control of robots. In W. Brauer and D. Hernandez, editors, *Verteilte Künstliche Intelligenz und kooperatives Arbeiten*, volume 291 of *Informatikfachberichte*, pp. 443–447. Springer, Berlin, 1991.
- [161] Benno Pütz, Daniel Barsky, and Klaus Schulten. Edge enhancement by diffusion: Microscopic magnetic resonance imaging of an ultra-thin glass capillary. *Chem. Phys. Lett.*, 183:391–396, 1991.
- [162] Wolfgang R. Bauer and Klaus Schulten. Nuclear spin dynamics ($I=1/2$) under the influence of random perturbation fields in the “strong collision” approximation. *Ber. Bunsenges. Phys. Chem.*, 96:721–727, 1992.
- [163] Edgar Erwin, Klaus Obermayer, and Klaus Schulten. Self-organizing maps: Ordering, convergence properties and energy functions. *Biol. Cyber.*, 67:47–55, 1992.
- [164] Edgar Erwin, Klaus Obermayer, and Klaus Schulten. Self-organizing maps: Stationary states, metastability and convergence rate. *Biol. Cyber.*, 67:35–45, 1992.
- [165] Klaus Schulten. Computational biology on massively parallel machines. In *Parallel Computation — Proceedings of the First International ACPC Conference, Salzburg, Austria*, pp. 391–400, New York, 1992. Springer.
- [166] Dong Xu and Klaus Schulten. Coupling of protein motion to electron transfer in a photosynthetic reaction center: Investigating the low temperature behaviour in the framework of the spin-boson model. *Chem. Phys.*, 182:91–117, 1994.
- [167] Klaus Obermayer, Gary G. Blasdel, and Klaus Schulten. Statistical-mechanical analysis of self-organization and pattern formation during the development of visual maps. *Phys. Rev. A*, 45:7568–7589, 1992.
- [168] Jörg A. Walter and Klaus Schulten. Implementation of self-organizing neural networks for visuo-motor control of an industrial robot. *IEEE Trans. Neur. Netw.*, 4:86–95, 1993.

- [169] Feng Zhou, Andreas Windemuth, and Klaus Schulten. Molecular dynamics study of the proton pump cycle of bacteriorhodopsin. *Biochemistry*, 32:2291–2306, 1993.
- [170] Klaus Obermayer, Klaus Schulten, and Gary G. Blasdel. A comparison between a neural network model for the formation of brain maps and experimental data. In D. S. Touretzky and R. Lippman, editors, *Advances in Neural Information Processing Systems 4*, pp. 83–90. Morgan Kaufmann Publishers, 1992.
- [171] Helmut Heller and Klaus Schulten. Parallel distributed computing for molecular dynamics: Simulation of large heterogeneous systems on a systolic ring of transputers. *Chem. Des. Autom. News*, 7:11–22, 1992.
- [172] Daniel Barsky, Benno Pütz, Klaus Schulten, J. Schoeniger, E. W. Hsu, and S. Blackband. Diffusional edge enhancement observed by NMR in thin glass capillaries. *Chem. Phys. Lett.*, 200:88–96, 1992.
- [173] John A. Board, Jr., J. W. Causey, James F. Leathrum, Jr., Andreas Windemuth, and Klaus Schulten. Accelerated molecular dynamics simulation with the parallel fast multipole algorithm. *Chem. Phys. Lett.*, 198:89–94, 1992.
- [174] Amitabh B. Sinha, Klaus Schulten, and Helmut Heller. Performance analysis of a parallel molecular dynamics program. *Comput. Phys. Commun.*, 78:265–278, 1994.
- [175] Ted Hesselroth, Kakali Sarkar, P. Patrick van der Smagt, and Klaus Schulten. Neural network control of a pneumatic robot arm. *IEEE Trans. Sys., Man, Cybern.*, 24:28–37, 1994.
- [176] Dong Xu and Klaus Schulten. Multi-mode coupling of protein motion to electron transfer in the photosynthetic reaction center: Spin-boson theory based on a classical molecular dynamics simulation. In J. Breton and A. Vermeglio, editors, *The Photosynthetic Bacterial Reaction Center: II. Structure, Spectroscopy and Dynamics*, NATO Sci. Ser. A, pp. 301–312. Plenum Press, New York, 1992.
- [177] Christian Kurrer and Klaus Schulten. Dependence of percolation thresholds on lattice connectivity. *Phys. Rev. E*, 48:614–617, 1993.
- [178] Thomas Martinetz and Klaus Schulten. Topology representing networks. *Neur. Netw.*, 7:507–522, 1994.
- [179] Helmut Heller, Michael Schaefer, and Klaus Schulten. Molecular dynamics simulation of a bilayer of 200 lipids in the gel and in the liquid crystal-phases. *J. Phys. Chem.*, 97:8343–8360, 1993.
- [180] Edgar Erwin, Klaus Obermayer, and Klaus Schulten. A comparison of models of visual cortical map formation. In Frank H. Eeckman and James M. Bower, editors, *Computation and Neural Systems*, chapter 60, pp. 395–402. Kluwer Academic Publishers, 1993.
- [181] Patrick van der Smagt and Klaus Schulten. Control of pneumatic robot arm dynamics by a neural network. In *Proceedings of the World Congress on Neural Networks, Portland, OR, July 11-15*, volume 3, pp. 180–183, 1993.
- [182] Thomas Martinetz and Klaus Schulten. A neural network with Hebbian-like adaptation rules learning visuomotor coordination of a PUMA robot. In *Proceedings of the IEEE International Conference on Neural Networks (ICNN-93), San Francisco*, pp. 820–825, 1993.
- [183] Kakali Sarkar and Klaus Schulten. Topology representing network in robotics. In J. Leo van Hemmen, Eytan Domany, and Klaus Schulten, editors, *Models of Neural Networks*, volume 3 of *Physics of Neural Networks*, pp. 281–302. Springer-Verlag, New York, 1996.
- [184] Benno Pütz, Daniel Barsky, and Klaus Schulten. Mechanisms of liposomal contrast agents in magnetic resonance imaging. *J. Liposome Res.*, 4:771–808, 1994.
- [185] William Humphrey, Ilya Logunov, Klaus Schulten, and Mordechai Sheves. Molecular dynamics study of bacteriorhodopsin and artificial pigments. *Biochemistry*, 33:3668–3678, 1994.

- [186] Thomas C. Bishop and Klaus Schulten. Molecular dynamics study of a sequence specific protein–DNA interaction. In G. Wipff, editor, *Computational Approaches in Supramolecular Chemistry*, pp. 419–439. Kluwer Academic Publishers, Boston, 1994.
- [187] Jeff M. Canfield, R. Linn Belford, Peter G. Debrunner, and Klaus Schulten. A perturbation theory treatment of oscillating magnetic fields in the radical pair mechanism. *Chem. Phys.*, 182:1–18, 1994.
- [188] Thomas C. Bishop, Helmut Heller, and Klaus Schulten. Molecular dynamics on parallel computers: Applications for theoretical biophysics. In Rajiv K. Kalia and Priya Vashishta, editors, *Toward Teraflop Computing and New Grand Challenge Applications*, pp. 129–138. Nova Science Publishers, Inc., New York, 1995.
- [189] Edgar Erwin, Klaus Obermayer, and Klaus Schulten. A critical comparison of models for orientation and ocular dominance columns in the striate cortex. In G. Tesauero, D. Touretzky, and T. Leen, editors, *Advances in Neural Information Processing Systems 7*, pp. 93–100. MIT Press, Cambridge, Mass and London, England, 1995.
- [190] Svilen Tzonev, Joseph Malpeli, and Klaus Schulten. Morphogenesis of the lateral geniculate nucleus: How singularities affect global structure. In G. Tesauero, D. Touretzky, and T. Leen, editors, *Advances in Neural Information Processing Systems 7*, pp. 133–140, Cambridge, Mass and London, England, 1995. MIT Press.
- [191] Edgar Erwin, Klaus Obermayer, and Klaus Schulten. Models of orientation and ocular dominance columns in the visual cortex: A critical comparison. *Neur. Comp.*, 7:425–468, 1995.
- [192] Ilya Logunov, William Humphrey, Klaus Schulten, and Mordechai Sheves. Molecular dynamics study of the 13-*cis* form (bR₅₄₈) of bacteriorhodopsin and its photocycle. *Biophys. J.*, 68:1270–1282, 1995.
- [193] Feng Zhou and Klaus Schulten. Molecular dynamics study of a membrane–water interface. *J. Phys. Chem.*, 99:2194–2208, 1995.
- [194] Christian Kurrer and Klaus Schulten. Noise-induced neuronal oscillations. *Phys. Rev. E*, 51:6213–6218, 1995.
- [195] Mark Nelson, William Humphrey, Attila Gursoy, Andrew Dalke, Laxmikant Kalé, Robert Skeel, Klaus Schulten, and Richard Kufrin. MDSCOPE – A visual computing environment for structural biology. *Comput. Phys. Commun.*, 91:111–134, 1995.
- [196] John A. Board, Jr., Laxmikant V. Kalé, Klaus Schulten, Robert D. Skeel, and Tamar Schlick. Modeling biomolecules: Larger scales, longer durations. *IEEE Comp. Sci. Eng.*, Winter:19–30, 1994.
- [197] James Phillips and Klaus Schulten. Modeling AFM tip dynamics through diffusion in time-periodic potentials. In J. Rabe, editor, *NATO Advanced Research Workshop on Atomic Force Microscopy*, NASD. Kluwer Academic Publishers, New York, 1995. In press. [Beckman Institute Technical Report TB-95-03].
- [198] Qing Sheng, Klaus Schulten, and Charles Pidgeon. A molecular dynamics simulation of immobilized artificial membranes. *J. Phys. Chem.*, 99:11018–11027, 1995.
- [199] Dong Xu, Klaus Schulten, Oren M. Becker, and Martin Karplus. Temperature quench echoes in proteins. *J. Chem. Phys.*, 103:3112–3123, 1995.
- [200] Dong Xu and Klaus Schulten. Velocity reassignment echoes in proteins. *J. Chem. Phys.*, 103:3124–3139, 1995.
- [201] Ioan Kosztin, Byron Faber, and Klaus Schulten. Introduction to the diffusion Monte Carlo method. *Am. J. Phys.*, 64:633–644, 1996.

- [202] Xiche Hu, Dong Xu, Kenneth Hamer, Klaus Schulten, Jürgen Koepke, and Hartmut Michel. Knowledge-based structure prediction of the light-harvesting complex II of *Rhodospirillum rubrum*. In P. M. Pardalos, D. Shalloway, and G. Xue, editors, *Global Minimization of Nonconvex Energy Functions: Molecular Conformation and Protein Folding*, pp. 97–122. American Mathematical Society, Providence, R.I., 1996.
- [203] Xiche Hu, Dong Xu, Kenneth Hamer, Klaus Schulten, Jürgen Koepke, and Hartmut Michel. Prediction of the structure of an integral membrane protein—the light-harvesting complex II of *Rhodospirillum rubrum*. In K.M. Merz and B. Roux, editors, *Biological Membranes: A Molecular Perspective from Computation and Experiment*, pp. 503–533. Birkhäuser, Cambridge, MA, 1996.
- [204] K.-R. Müller, M. Finke, N. Murata, K. Schulten, and S. Amari. Large scale simulations for learning curves. In Jong-Hoon Oh, Chulan Kwon, and Sungzoon Cho, editors, *Progress in neural Processing Vol. 1 / Neural Networks: The Statistical Mechanics Perspective*, pp. 73–84. World Scientific, Singapore, 1995.
- [205] Jeff M. Canfield, R. Linn Belford, Peter G. Debrunner, and Klaus Schulten. A perturbation theory treatment of oscillating magnetic fields in the radical pair mechanism. *Chem. Phys.*, 191:347–347, 1995.
- [206] James Phillips and Klaus Schulten. Diffusive hysteresis at high and low driving frequencies. *Phys. Rev. E*, 52:2473–2477, 1995.
- [207] Mark Nelson, William Humphrey, Attila Gursoy, Andrew Dalke, Laxmikant Kalé, Robert Skeel, Klaus Schulten, and Richard Kufrin. MDSCOPE – A visual computing environment for structural biology. In S.N. Atluri, G. Yagawa, and T.A. Cruse, editors, *Computational Mechanics 95*, volume 1, pp. 476–481, 1995.
- [208] Xiche Hu, Dong Xu, Kenneth Hamer, Klaus Schulten, Jürgen Koepke, and Hartmut Michel. Predicting the structure of the light-harvesting complex II of *Rhodospirillum rubrum*. *Prot. Sci.*, 4:1670–1682, 1995.
- [209] Thomas C. Bishop and Klaus Schulten. Molecular dynamics study of glucocorticoid receptor–DNA binding. *Proteins: Struct., Func., Gen.*, 24:115–133, 1996.
- [210] Klaus Schulten, William Humphrey, Ilya Logunov, Mordechai Sheves, and Dong Xu. Molecular dynamics studies of bacteriorhodopsin’s photocycles. *Israel J. Chem.*, 35:447–464, 1995.
- [211] William Humphrey, Dong Xu, Mordechai Sheves, and Klaus Schulten. Molecular dynamics study of the early intermediates in the bacteriorhodopsin photocycle. *J. Phys. Chem.*, 99:14549–14560, 1995.
- [212] Michael Zeller, K. R. Wallace, and Klaus Schulten. Biological visuo-motor control of a pneumatic robot arm. In Dagli et al., editors, *Intelligent Engineering Systems Through Artificial Neural Networks*, volume 5, pp. 645–650, New York, 1995. American Society of Mechanical Engineers.
- [213] Ilya Logunov and Klaus Schulten. Quantum chemistry of *in situ* retinal: Study of the spectral properties and dark adaptation of bacteriorhodopsin. In D. Bickel and M. J. Field, editors, *Proceedings of the Ecole de Physique des Houches*, pp. 235–256, Paris, 1995. Les Editions de Physique, Springer.
- [214] Klaus Schulten. Curve crossing in a protein: Coupling of the elementary quantum process to motions of the protein. In D. Bickel and M. J. Field, editors, *Proceedings of the Ecole de Physique des Houches*, pp. 85–118, Paris, 1995. Les Editions de Physique, Springer.
- [215] J. M. Canfield, R. L. Belford, P. G. Debrunner, and K. Schulten. A perturbation treatment of oscillating magnetic fields in the radical pair mechanism using the Liouville equation. *Chem. Phys.*, 195:59–69, 1995.

- [216] Dong Xu, Mordechai Sheves, and Klaus Schulten. Molecular dynamics study of the M₄₁₂ intermediate of bacteriorhodopsin. *Biophys. J.*, 69:2745–2760, 1995.
- [217] Klaus Schulten and Michael Zeller. Topology representing maps and brain function. In *Nova Acta Leopoldina NF*, volume 72, pp. 133–157. Jahresversamlungsband, 1996.
- [218] Dong Xu, Charles Martin, and Klaus Schulten. Molecular dynamics study of early picosecond events in the bacteriorhodopsin photocycle: Dielectric response, vibrational cooling and the J, K intermediates. *Biophys. J.*, 70:453–460, 1996.
- [219] K.-R. Müller, N. Murata, M. Finke, K. Schulten, and S. Amari. A numerical study of learning curves in stochastic multi-layer feed-forward networks. *Neur. Comp.*, 8:1085–1106, 1995.
- [220] Manel A. Balsera, Willy Wriggers, Yoshitsugu Oono, and Klaus Schulten. Principal component analysis and long time protein dynamics. *J. Phys. Chem.*, 100:2567–2572, 1996.
- [221] Klaus Schulten, Hui Lu, and Linsen Bai. Probing protein motion through temperature echoes. In Henrik Flyvbjerg, John Hertz, Mogens H. Jensen, Ole G. Mouritsen, and Kim Sneppen, editors, *Physics of Biological Systems: From Molecules to Species*, Lecture Notes in Physics, pp. 117–152. Springer, 1997.
- [222] William Humphrey, Andrew Dalke, and Klaus Schulten. VMD – Visual Molecular Dynamics. *J. Mol. Graphics*, 14:33–38, 1996.
- [223] Feng Zhou and Klaus Schulten. Molecular dynamics study of the activation of phospholipase A₂ on a membrane surface. *Proteins: Struct., Func., Gen.*, 25:12–27, 1996.
- [224] Dong Xu, James Christopher Phillips, and Klaus Schulten. Protein response to external electric fields: Relaxation, hysteresis, and echo. *J. Phys. Chem.*, 100:12108–12121, 1996.
- [225] Jürgen Koepke, Xiche Hu, Cornelia Münke, Klaus Schulten, and Hartmut Michel. The crystal structure of the light harvesting complex II (B800-850) from *Rhodospirillum rubrum*. *Structure*, 4:581–597, 1996.
- [226] Mark Nelson, William Humphrey, Attila Gursoy, Andrew Dalke, Laxmikant Kalé, Robert D. Skeel, and Klaus Schulten. NAMD – A parallel, object-oriented molecular dynamics program. *Int. J. Supercomp. Appl. High Perform. Comp.*, 10:251–268, 1996.
- [227] R. Sharma, T. S. Huang, V. I. Pavlovic, K. Schulten, A. Dalke, J. Phillips, M. Zeller, W. Humphrey, Y. Zhao, Z. Lo, and S. Chu. Speech/gesture interface to a visual computing environment for molecular biologists. In *Proceedings of 13th ICPR 96*, volume 3, pp. 964–968, 1996.
- [228] Ilya Logunov and Klaus Schulten. Quantum chemistry – molecular dynamics study of the dark adaptation process in bacteriorhodopsin. *J. Am. Chem. Soc.*, 118:9727–9735, 1996.
- [229] Michael Zeller, Rajeev Sharma, and Klaus Schulten. Topology representing network for sensor-based robot motion planning. In *Proceedings of the 1996 World Congress on Neural Networks*, pp. 100–103. INNS Press, 1996.
- [230] Michael Zeller, Rajeev Sharma, and Klaus Schulten. Vision-based motion planning of a pneumatic robot using a topology representing neural network. In *Proceedings of 1996 IEEE Int. Symposium on Intelligent Control*, pp. 7–12, 1996.
- [231] P. van der Smagt, F. Grön, and K. Schulten. Analysis and control of a rubbertuator arm. *Biol. Cyber.*, 75:433–440, 1996.
- [232] Andrew Dalke and Klaus Schulten. Using TCL for molecular visualization and analysis. In *Proceedings of the Pacific Symposium on Biocomputing '97*, volume 2, pp. 85–96, 1997.

- [233] Daniel Barsky, Benno Pütz, and Klaus Schulten. Theory of heterogeneous relaxation in compartmentalized tissues. *Magn. Res. Med.*, 37:666–675, 1997.
- [234] William Humphrey, Ernst Bamberg, and Klaus Schulten. Photoproducts of bacteriorhodopsin mutants: A molecular dynamics study. *Biophys. J.*, 72:1347–1356, 1997.
- [235] Michael Zeller, Rajeev Sharma, and Klaus Schulten. Motion planning of a pneumatic robot using a neural network. *IEEE Control Systems Magazine*, 17:89–98, 1997.
- [236] Sergei Izrailev, Sergey Stepaniants, Manel Balsera, Yoshi Oono, and Klaus Schulten. Molecular dynamics study of unbinding of the avidin-biotin complex. *Biophys. J.*, 72:1568–1581, 1997.
- [237] Tom Connor Bishop, Dorina Kosztin, and Klaus Schulten. How hormone receptor–DNA binding affects nucleosomal DNA: The role of symmetry. *Biophys. J.*, 72:2056–2067, 1997.
- [238] Michael Zeller, Rajeev Sharma, and Klaus Schulten. Vision-based robot motion planning using a topology representing neural network. In Jens Kalkkuhl, Ken Hunt, Rafal Zbikowski, and Andrzej Dzieliński, editors, *Applications of Neural Adaptive Control Technology*, volume 17 of *World Scientific Series in Robotics and Intelligent Systems*, pp. 181–204. World Scientific Publishing, 1997.
- [239] Ioan Kosztin and Klaus Schulten. Boundary integral method for stationary states of two-dimensional quantum systems. *Int. J. of Modern Phys. C*, 8:293–325, 1997.
- [240] Xiche Hu, Thorsten Ritz, Ana Damjanović, and Klaus Schulten. Pigment organization and transfer of electronic excitation in the purple bacteria. *J. Phys. Chem. B*, 101:3854–3871, 1997.
- [241] Willy Wriggers and Klaus Schulten. Protein domain movements: Detection of rigid domains and visualization of hinges in comparisons of atomic coordinates. *Proteins: Struct., Func., Gen.*, 29:1–14, 1997.
- [242] Thomas C. Bishop, Robert D. Skeel, and Klaus Schulten. Difficulties with multiple time stepping and the fast multipole algorithm in molecular dynamics. *J. Comp. Chem.*, 18:1785–1791, 1997.
- [243] Dorina Kosztin, Thomas C. Bishop, and Klaus Schulten. Binding of the estrogen receptor to DNA: The role of waters. *Biophys. J.*, 73:557–570, 1997.
- [244] Manel Balsera, Sergey Stepaniants, Sergei Izrailev, Yoshitsugu Oono, and Klaus Schulten. Reconstructing potential energy functions from simulated force-induced unbinding processes. *Biophys. J.*, 73:1281–1287, 1997.
- [245] Willy Wriggers and Klaus Schulten. Stability and dynamics of G-actin: Back door water diffusion and behavior of a subdomain 3/4 loop. *Biophys. J.*, 73:624–639, 1997.
- [246] Michael Zeller, Rajeev Sharma, and Klaus Schulten. Learning the perceptual control manifold for sensor-based robot path planning. In *Proceedings of the 1997 IEEE International Symposium on Computational Intelligence in Robotics and Automation (CIRA '97)*, pp. 48–53. IEEE Computer Society Press, 1997.
- [247] Michael Zeller, James C. Phillips, Andrew Dalke, William Humphrey, Klaus Schulten, Rajeev Sharma, T. S. Huang, V. I. Pavlovic, Y. Zhao, Z. Lo, and S. Chu. A visual computing environment for very large scale biomolecular modeling. In *Proceedings of the 1997 IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP)*, pp. 3–12. IEEE Computer Society Press, 1997.
- [248] Xiche Hu and Klaus Schulten. How nature harvests sunlight. *Physics Today*, 50:28–34, 1997.
- [249] James C. Phillips, Willy Wriggers, Zhigang Li, Ana Jonas, and Klaus Schulten. Predicting the structure of apolipoprotein A-I in reconstituted high density lipoprotein disks. *Biophys. J.*, 73:2337–2346, 1997.

- [250] Barry Isralewitz, Sergei Izrailev, and Klaus Schulten. Binding pathway of retinal to bacterio-opsin: A prediction by molecular dynamics simulations. *Biophys. J.*, 73:2972–2979, 1997.
- [251] Sergey Stepaniants, Sergei Izrailev, and Klaus Schulten. Extraction of lipids from phospholipid membranes by steered molecular dynamics. *J. Mol. Mod.*, 3:473–475, 1997.
- [252] Ivo Hofacker and Klaus Schulten. Oxygen and proton pathways in cytochrome *c* oxidase. *Proteins: Struct., Func., Gen.*, 30:100–107, 1998.
- [253] Alexander Balaeff, Mair E. A. Churchill, and Klaus Schulten. Structure prediction of a complex between the chromosomal protein HMG-D and DNA. *Proteins: Struct., Func., Gen.*, 30:113–135, 1998.
- [254] Thorsten Ritz, Xiche Hu, Ana Damjanović, and Klaus Schulten. Excitons and excitation transfer in the photosynthetic unit of purple bacteria. *J. Luminesc.*, 76-77:310–321, 1998.
- [255] Sergei Izrailev, Sergey Stepaniants, Barry Isralewitz, Dorina Kosztin, Hui Lu, Ferenc Molnar, Willy Wriggers, and Klaus Schulten. Steered molecular dynamics. In P. Deuffhard, J. Hermans, B. Leimkuhler, A. E. Mark, S. Reich, and R. D. Skeel, editors, *Computational Molecular Dynamics: Challenges, Methods, Ideas*, volume 4 of *Lecture Notes in Computational Science and Engineering*, pp. 39–65. Springer-Verlag, Berlin, 1998.
- [256] James C. Phillips, Robert Brunner, Aritomo Shinozaki, Milind Bhandarkar, Neal Krawetz, Laxmikant Kalé, Robert D. Skeel, and Klaus Schulten. Avoiding algorithmic obfuscation in a message-driven parallel MD code. In P. Deuffhard, J. Hermans, B. Leimkuhler, A. Mark, S. Reich, and R. D. Skeel, editors, *Computational Molecular Dynamics: Challenges, Methods, Ideas*, volume 4 of *Lecture Notes in Computational Science and Engineering*, pp. 472–482. Springer-Verlag, 1998.
- [257] Svilen Tzonev, Joseph Malpeli, and Klaus Schulten. A three-dimensional model of the morphogenesis of the rhesus lateral geniculate nucleus. Beckman Institute Technical Report, University of Illinois, 1998.
- [258] Willy Wriggers and Klaus Schulten. Nucleotide-dependent movements of the kinesin motor domain predicted by simulated annealing. *Biophys. J.*, 75:646–661, 1998.
- [259] Xiche Hu, Ana Damjanović, Thorsten Ritz, and Klaus Schulten. Architecture and function of the light harvesting apparatus of purple bacteria. *Proc. Natl. Acad. Sci. USA*, 95:5935–5941, 1998.
- [260] Michael Bailey, Klaus Schulten, and John E. Johnson. The use of solid physical models for the study of macromolecular assembly. *Curr. Op. Struct. Biol.*, 8:202–208, 1998.
- [261] Willy Wriggers, Ernest Mehler, Felicia Pitici, Harel Weinstein, and Klaus Schulten. Structure and dynamics of calmodulin in solution. *Biophys. J.*, 74:1622–1639, 1998.
- [262] Michal Ben-Nun, Ferenc Molnar, Hui Lu, James C. Phillips, Todd J. Martínez, and Klaus Schulten. Quantum dynamics of retinal’s femtosecond photoisomerization in bacteriorhodopsin. In *Faraday Discussions*, No. 110, pp. 447–462. Faraday Publications, 1998.
- [263] Xiche Hu and Klaus Schulten. A model for the light-harvesting complex I (B875) of *Rhodobacter sphaeroides*. *Biophys. J.*, 75:683–694, 1998.
- [264] Ana Damjanović, Thorsten Ritz, and Klaus Schulten. Energy transfer between carotenoids and bacteriochlorophylls in a light harvesting protein. *Phys. Rev. E*, 59:3293–3311, 1999.
- [265] Hui Lu, Barry Isralewitz, André Krammer, Viola Vogel, and Klaus Schulten. Unfolding of titin immunoglobulin domains by steered molecular dynamics simulation. *Biophys. J.*, 75:662–671, 1998.
- [266] W. Humphrey, H. Lu, I. Logunov, H. J. Werner, and K. Schulten. Three electronic state model of the primary phototransformation of bacteriorhodopsin. *Biophys. J.*, 75:1689–1699, 1998.

- [267] David Kaufman, Ioan Kosztin, and Klaus Schulten. Expansion method for stationary states of quantum billiards. *Am. J. Phys.*, 67:133–141, 1999.
- [268] Klaus Schulten. From simplicity to complexity and back: Function, architecture and mechanism of light harvesting systems in photosynthetic bacteria. In H. Frauenfelder, J. Deisenhofer, and P. G. Wolynes, editors, *Simplicity and Complexity in Proteins and Nucleic Acids*, pp. 227–253, Berlin, 1999. Dahlem University Press.
- [269] Marshall G. Cory, Michael C. Zerner, Xiche Hu, and Klaus Schulten. Electronic excitations in aggregates of bacteriochlorophylls. *J. Phys. Chem. B*, 102:7640–7650, 1998.
- [270] Dorina Kosztin, Sergei Izrailev, and Klaus Schulten. Unbinding of retinoic acid from its receptor studied by steered molecular dynamics. *Biophys. J.*, 76:188–197, 1999.
- [271] Thorsten Ritz, Ana Damjanović, and Klaus Schulten. Light-harvesting and photoprotection by carotenoids: Structure-based calculations for photosynthetic antenna systems. In G. Garab, editor, *Photosynthesis: Mechanisms and Effects (Proceedings of the XIth International Congress on Photosynthesis)*, volume 1, pp. 487–490, Dordrecht, 1998. Kluwer Academic Publications.
- [272] Milind Bhandarkar, Gila Budescu, William Humphrey, Jesus A. Izaguirre, Sergei Izrailev, Laxmikant V. Kalé, Dorina Kosztin, Ferenc Molnar, James C. Phillips, and Klaus Schulten. BioCoRE: A laboratory for structural biology. In Agostino G. Bruzzone, Adelinde Uchrmacher, and Ernest H. Page, editors, *Proceedings of the SCS International Conference on Web-Based Modeling and Simulation*, pp. 242–251, San Francisco, California, 1999.
- [273] Willy Wriggers, Ronald A. Milligan, Klaus Schulten, and J. Andrew McCammon. Self-organizing neural networks bridge the biomolecular resolution gap. *J. Mol. Biol.*, 284:1247–1254, 1998.
- [274] Willy Wriggers and Klaus Schulten. Investigating a back door mechanism of actin phosphate release by steered molecular dynamics. *Proteins: Struct., Func., Gen.*, 35:262–273, 1999.
- [275] Justin Gullingsrud, Rosemary Braun, and Klaus Schulten. Reconstructing potentials of mean force through time series analysis of steered molecular dynamics simulations. *J. Comp. Phys.*, 151:190–211, 1999.
- [276] Laxmikant Kalé, Robert Skeel, Milind Bhandarkar, Robert Brunner, Attila Gursoy, Neal Krawetz, James Phillips, Aritomo Shinozaki, Krishnan Varadarajan, and Klaus Schulten. NAMD2: Greater scalability for parallel molecular dynamics. *J. Comp. Phys.*, 151:283–312, 1999.
- [277] André Krammer, Hui Lu, Barry Isralewitz, Klaus Schulten, and Viola Vogel. Forced unfolding of the fibronectin type III module reveals a tensile molecular recognition switch. *Proc. Natl. Acad. Sci. USA*, 96:1351–1356, 1999.
- [278] Tamar Schlick, Robert Skeel, Axel Brünger, Laxmikant Kalé, John A. Board Jr., Jan Hermans, and Klaus Schulten. Algorithmic challenges in computational molecular biophysics. *J. Comp. Phys.*, 151:9–48, 1999.
- [279] Hui Lu and Klaus Schulten. Steered molecular dynamics simulations of force-induced protein domain unfolding. *Proteins: Struct., Func., Gen.*, 35:453–463, 1999.
- [280] Christian V. Forst and Klaus Schulten. Evolution of metabolisms: A new method for the comparison of metabolic pathways. In Sorin Istrail, Pavel Pevzner, and Michael Waterman, editors, *Proceedings of the Third Annual International Conference on Computational Molecular Biology*, pp. 174–180, Lyon, France, 1999. ACM Press, New York.
- [281] Hui Lu and Klaus Schulten. Steered molecular dynamics simulation of conformational changes of immunoglobulin domain I27 interpret atomic force microscopy observations. *Chem. Phys.*, 247:141–153, 1999.

- [282] Dorina Kosztin, Richard Gumport, and Klaus Schulten. Probing the role of structural water in a duplex oligodeoxyribonucleotide containing a water-mimicking base analogue. *Nucl. Acids Res.*, 27:3550–3556, 1999.
- [283] Sergei Izrailev, Antony R. Crofts, Edward A. Berry, and Klaus Schulten. Steered molecular dynamics simulation of the Rieske subunit motion in the cytochrome bc_1 complex. *Biophys. J.*, 77:1753–1768, 1999.
- [284] Hui Lu, André Krammer, Barry Isralewitz, Viola Vogel, and Klaus Schulten. Computer modeling of force-induced titin domain unfolding. In Jerry Pollack and Henk Granzier, editors, *Elastic Filaments of the Cell*, chapter 1, pp. 143–162. Kluwer Academic/Plenum Publishers, New York, NY, 2000.
- [285] Emad Tajkhorshid, Jerome Baudry, Klaus Schulten, and Sandor Suhai. Molecular dynamics study of the nature and origin of retinal’s twisted structure in bacteriorhodopsin. *Biophys. J.*, 78:683–693, 2000.
- [286] Piotr E. Marszalek, Hui Lu, Hongbin Li, Mariano Carrion-Vazquez, Andres F. Oberhauser, Klaus Schulten, and Julio M. Fernandez. Mechanical unfolding intermediates in titin modules. *Nature*, 402:100–103, 1999.
- [287] Thorsten Ritz, Salih Adem, and Klaus Schulten. A model for photoreceptor-based magnetoreception in birds. *Biophys. J.*, 78:707–718, 2000.
- [288] Ana Damjanović, Thorsten Ritz, and Klaus Schulten. Excitation energy trapping by the reaction center of *Rhodobacter sphaeroides*. *Int. J. Quantum Chem.*, 77:139–151, 2000.
- [289] Christian Forst and Klaus Schulten. Evolution of metabolisms: A new method for the comparison of metabolic pathways using genomics information. *Journal of Computational Biology*, 6:343–360, 1999.
- [290] Alexander Balaeff, L. Mahadevan, and Klaus Schulten. Elastic rod model of a DNA loop in the *lac* operon. *Phys. Rev. Lett.*, 83:4900–4903, 1999.
- [291] K. Moffat, J.-P. Changeux, D. M. Crothers, H. Grubmueller, G. U. Nienhaus, M. U. Palma, F. G. Parak, K. Schulten, and A. Warshel. Group report: How does complexity lead to an apparently simple function? In H. Frauenfelder, J. Deisenhofer, and P. G. Wolynes, editors, *Simplicity and Complexity in Proteins and Nucleic Acids*, pp. 255–280, Berlin, 1999. Dahlem University Press.
- [292] John Board and Klaus Schulten. The fast multipole algorithm. *IEEE Comp. Sci. Eng.*, 2:56–59, 2000.
- [293] Ferenc Molnar, Michal Ben-Nun, Todd J. Martínez, and Klaus Schulten. Characterization of a conical intersection between the ground and first excited state for a retinal analog. *J. Mol. Struct. (THEOCHEM)*, WATOC special issue, 506:169–178, 2000.
- [294] Rajeev Sharma, Michael Zeller, Vladimir I. Pavlovic, Thomas S. Huang, Zion Lo, Stephen Chu, Yunxin Zhao, James C. Phillips, and Klaus Schulten. Speech/gesture interface to a visual-computing environment. *IEEE Comp. Graph. App.*, 20:29–37, 2000.
- [295] Ferenc Molnar, Lawrence S. Norris, and Klaus Schulten. Simulated unbinding and binding of fatty acid substrates in the cyclooxygenase site of prostaglandin H_2 synthase-1. *Progr. Reac. Kin. Mech.*, 25:263–298, 2000.
- [296] Ana Damjanović, Thorsten Ritz, and Klaus Schulten. Excitation transfer in the peridinin-chlorophyll-protein of *Amphidinium carterae*. *Biophys. J.*, 79:1695–1705, 2000.
- [297] Klaus Schulten. Electron transfer: Exploiting thermal motion. *Science*, 290:61–62, 2000.
- [298] Amit Kessel, Klaus Schulten, and Nir Ben-Tal. Calculations suggest a pathway for the transverse diffusion of a hydrophobic peptide across a lipid bilayer. *Biophys. J.*, 79:2322–2330, 2000.

- [299] Klaus Schulten. To students contemplating research in biomolecular modelling. *Journal of Molecular Graphics and Modeling*, 18:218–220, 2000.
- [300] Hui Lu and Klaus Schulten. The key event in force-induced unfolding of titin’s immunoglobulin domains. *Biophys. J.*, 79:51–65, 2000.
- [301] Thorsten Ritz, Ana Damjanović, Klaus Schulten, Jian-Ping Zhang, and Yasushi Koyama. Efficient light harvesting through carotenoids. *Photosyn. Res.*, 66:125–144, 2000.
- [302] Jerome Baudry, Emad Tajkhorshid, Ferenc Molnar, James Phillips, and Klaus Schulten. Molecular dynamics study of bacteriorhodopsin and the purple membrane. *J. Phys. Chem. B*, 105:905–918, 2001.
- [303] Barry Isralewitz, Jerome Baudry, Justin Gullingsrud, Dorina Kosztin, and Klaus Schulten. Steered molecular dynamics investigations of protein function. *Journal of Molecular Graphics and Modeling*, 19:13–25, 2001. Also in *Protein Flexibility and Folding*, L. A. Kuhn and M. F. Thorpe, editors, *Biological Modeling Series* (Elsevier).
- [304] John Stone, Justin Gullingsrud, Paul Grayson, and Klaus Schulten. A system for interactive molecular dynamics simulation. In John F. Hughes and Carlo H. Séquin, editors, *2001 ACM Symposium on Interactive 3D Graphics*, pp. 191–194, New York, 2001. ACM SIGGRAPH.
- [305] Christian Forst and Klaus Schulten. Phylogenetic analysis of metabolic pathways. *Journal of Molecular Evolution*, 52:471–489, 2001.
- [306] Thorsten Ritz and Klaus Schulten. Physik der Photosynthese. *Physikalische Blätter*, 57:49–53, 2001.
- [307] Barry Isralewitz, Mu Gao, and Klaus Schulten. Steered molecular dynamics and mechanical functions of proteins. *Curr. Op. Struct. Biol.*, 11:224–230, 2001.
- [308] Justin Gullingsrud, Dorina Kosztin, and Klaus Schulten. Structural determinants of MscL gating studied by molecular dynamics simulations. *Biophys. J.*, 80:2074–2081, 2001.
- [309] David Craig, André Krammer, Klaus Schulten, and Viola Vogel. Comparison of the early stages of forced unfolding of fibronectin type III modules. *Proc. Natl. Acad. Sci. USA*, 98:5590–5595, 2001.
- [310] Mu Gao, Hui Lu, and Klaus Schulten. Simulated refolding of stretched titin immunoglobulin domains. *Biophys. J.*, 81:2268–2277, 2001.
- [311] Thorsten Ritz, Sanghyun Park, and Klaus Schulten. Kinetics of excitation migration and trapping in the photosynthetic unit of purple bacteria. *J. Phys. Chem. B*, 105:8259–8267, 2001.
- [312] Shigehiko Hayashi, Emad Tajkhorshid, Eva Pebay-Peyroula, Antoine Royant, Ehud M. Landau, Javier Navarro, and Klaus Schulten. Structural determinants of spectral tuning in retinal proteins – bacteriorhodopsin vs sensory rhodopsin II. *J. Phys. Chem. B*, 105:10124–10131, 2001.
- [313] Fangqiang Zhu, Emad Tajkhorshid, and Klaus Schulten. Molecular dynamics study of aquaporin-1 water channel in a lipid bilayer. *FEBS Lett.*, 504:212–218, 2001.
- [314] Thomas W. Lynch, Dorina Kosztin, Mark A. McLean, Klaus Schulten, and Stephen G. Sligar. Dissecting the molecular origins of protein-nucleic acid recognition: Hydrostatic pressure and molecular dynamics. *Biophys. J.*, 82:93–98, 2002.
- [315] Melih Şener and Klaus Schulten. A general random matrix approach to account for the effect of static disorder on the spectral properties of light harvesting systems. *Phys. Rev. E*, 65:031916, 2002. (12 pages).
- [316] Thorsten Ritz, Ana Damjanović, and Klaus Schulten. The quantum physics of photosynthesis. *ChemPhysChem*, 3:243–248, 2002.

- [317] Xiche Hu, Thorsten Ritz, Ana Damjanović, Felix Autenrieth, and Klaus Schulten. Photosynthetic apparatus of purple bacteria. *Quart. Rev. Biophys.*, 35:1–62, 2002.
- [318] Morten Ø. Jensen, Emad Tajkhorshid, and Klaus Schulten. The mechanism of glycerol conduction in aquaglyceroporins. *Structure*, 9:1083–1093, 2001.
- [319] André Krammer, David Craig, Wendy E. Thomas, Klaus Schulten, and Viola Vogel. A structural model for force regulated integrin binding to fibronectin’s RGD-synergy site. *Matrix Biology*, 21:139–147, 2002.
- [320] Ana Damjanović, Ioan Kosztin, Ulrich Kleinekathoefer, and Klaus Schulten. Excitons in a photosynthetic light-harvesting system: A combined molecular dynamics, quantum chemistry and polaron model study. *Phys. Rev. E*, 65:031919, 2002. (24 pages).
- [321] Michal Ben-Nun, Ferenc Molnar, Klaus Schulten, and Todd J. Martinez. The role of intersection topography in bond selectivity of *cis-trans* photoisomerization. *Proc. Natl. Acad. Sci. USA*, 99:1769–1773, 2002.
- [322] Rob Phillips, Markus Dittrich, and Klaus Schulten. Quasicontinuum representations of atomic-scale mechanics: From proteins to dislocations. *Annu. Rev. Mater. Res.*, 32:219–233, 2002.
- [323] Ioan Kosztin, Robijn Bruinsma, Paul O’Lague, and Klaus Schulten. Mechanical force generation by G-proteins. *Proc. Natl. Acad. Sci. USA*, 99:3575–3580, 2002.
- [324] Thomas W. Lynch, Mark A. McLean, Dorina Kosztin, Klaus Schulten, and Stephen G. Sligar. High pressure gel mobility shift analysis and molecular dynamics: Investigating specific protein-nucleic acid recognition. In R. Hayashi, editor, *Trends in High Pressure Bioscience and Biotechnology*, pp. 87–94. Elsevier, 2002.
- [325] Shigehiko Hayashi, Emad Tajkhorshid, and Klaus Schulten. Structural changes during the formation of early intermediates in the bacteriorhodopsin photocycle. *Biophys. J.*, 83:1281–1297, 2002.
- [326] John Ervin, Edgar Larios, Szabolcs Osvath, Klaus Schulten, and Martin Gruebele. What causes hyperfluorescence: folding intermediates or conformationally flexible native states? *Biophys. J.*, 83:473–483, 2002.
- [327] Fangqiang Zhu, Emad Tajkhorshid, and Klaus Schulten. Pressure-induced water transport in membrane channels studied by molecular dynamics. *Biophys. J.*, 83:154–160, 2002.
- [328] Morten Ø. Jensen, Sanghyun Park, Emad Tajkhorshid, and Klaus Schulten. Energetics of glycerol conduction through aquaglyceroporin GlpF. *Proc. Natl. Acad. Sci. USA*, 99:6731–6736, 2002.
- [329] Emad Tajkhorshid, Peter Nollert, Morten Ø. Jensen, Larry J. W. Miercke, Joseph O’Connell, Robert M. Stroud, and Klaus Schulten. Control of the selectivity of the aquaporin water channel family by global orientational tuning. *Science*, 296:525–530, 2002.
- [330] Rosemary Braun, Mehmet Sarikaya, and Klaus Schulten. Genetically engineered gold-binding polypeptides: Structure prediction and molecular dynamics. *J. Biomat. Sci.*, 13:747–758, 2002.
- [331] Melih K. Şener, Deyu Lu, Thorsten Ritz, Sanghyun Park, Petra Fromme, and Klaus Schulten. Robustness and optimality of light harvesting in cyanobacterial photosystem I. *J. Phys. Chem. B*, 106:7948–7960, 2002.
- [332] Mu Gao, Matthias Wilmanns, and Klaus Schulten. Steered molecular dynamics studies of titin I1 domain unfolding. *Biophys. J.*, 2002. In press.
- [333] Jan Saam, Emad Tajkhorshid, Shigehiko Hayashi, and Klaus Schulten. Molecular dynamics investigation of primary photoinduced events in the activation of rhodopsin. *Biophys. J.*, 2002. In press.

- [334] Mu Gao, Hui Lu, and Klaus Schulten. Unfolding of titin domains studied by molecular dynamics simulations. *J. Muscle Res. Cell Mot.*, 2002. In press.
- [335] Mu Gao, David Craig, Viola Vogel, and Klaus Schulten. Identifying unfolding intermediates of FN-III₁₀ by steered molecular dynamics. *J. Mol. Biol.*, 323:939–950, 2002.