

Bibliography

- [Adleman, 1994] Adleman, L. (1994). “Molecular Computation of Solutions to Combinatorial Problems”. *Science*, 266(5187):1021–1024.
- [Adleman et al., 2001] Adleman, L., Cheng, Q., Goel, A., and Huang, M. (2001). “Running Time and Program Size for Self-Assembled Squares”. In *Proceedings of the thirty-third annual ACM Symposium on Theory of Computing*, pages 740–748. ACM.
- [Aldaye et al., 2008] Aldaye, F., Palmer, A., and Sleiman, H. (2008). “Assembling Materials with DNA as the Guide”. *Science*, 321(5897):1795–1799.
- [Alighieri, 2013] Alighieri, D. (2013). *The Divine Comedy: Inferno, Purgatorio, Paradiso (Penguin Classics Deluxe Edition)*. Penguin Classic.
- [Alvarado and Tsonis, 2006] Alvarado, A. and Tsonis, P. (2006). “Bridging the Regeneration Gap: Genetic Insights from Diverse Animal Models”. *Nature Reviews Genetics*, 7(11):873–884.
- [Andersen et al., 2009] Andersen, E., Dong, M., Nielsen, M., Jahn, K., Subramani, R., Mamdouh, W., Golas, M., Sander, B., Stark, H., Oliveira, C., et al. (2009). “Self-Assembly of a Nanoscale DNA Box with a Controllable Lid”. *Nature*, 459(7243):73–76.
- [Antal, 2007] Antal, T. Krapivsky, P. L. (2007). “Molecular Spiders with Memory”. *Phys. Rev. E*, 76:021121–021129.
- [Arbuckle and Requicha, 2004] Arbuckle, D. and Requicha, A. (2004). “Active Self-Assembly”. *IEEE International Conference on Robotics and Automation*, 1:896–901.

- [Bath et al., 2005] Bath, J., Green, S., and Turberfield, A. (2005). “A Free-Running DNA Motor Powered by a Nicking Enzyme”. *Angewandte Chemie*, 117(28):4432–4435.
- [Bath and Turberfield, 2007] Bath, J. and Turberfield, A. (2007). “DNA Nanomachines”. *Nature Nanotechnology*, 2(5):275–284.
- [Baudrillard, 1994] Baudrillard, J. (1994). *Simulacra and Simulation*. Sheila Faria Glaser, trans. Ann Arbor: University of Michigan Press.
- [Beaver, 1996] Beaver, D. (1996). “A Universal Molecular Computer”. In Lipton, R. J. and Baum, E. B., editors, *DNA Based Computers*, pages 29–36. American Mathematical Society.
- [Beck, 2011] Beck, V. (2011). Personal communication.
- [Becker et al., 2006] Becker, F., Rapaport, I., and Rémy, E. (2006). “Self-Assembling Classes of Shapes with a Minimum Number of Tiles, and in Optimal Time”. In *FSTTCS: Foundations of Software Technology and Theoretical Computer Science*, volume 4337, pages 45–56. Springer.
- [Bennett, 1982] Bennett, C. H. (1982). “The Thermodynamics of Computation—A Review”. *International Journal of Theoretical Physics*, 21(12):905–940.
- [Bonabeau et al., 1999] Bonabeau, E., Dorigo, M., and Theraulaz, G. (1999). *Swarm Intelligence: From Natural to Artificial Systems*. Oxford University Press.
- [Braitenberg, 1984] Braitenberg, V. (1984). *Vehicles: Experiments in Synthetic Psychology*. MIT Press.
- [Breitbart et al., 1987] Breitbart, R., Andreadis, A., and Nadal-Ginard, B. (1987). “Alternative Splicing: A Ubiquitous Mechanism for the Generation of Multiple Protein Isoforms from Single Genes”. *Annual Review of Biochemistry*, 56(1):467–495.
- [Brooks, 1991] Brooks, R. (1991). “Intelligence without Representation”. *Artificial intelligence*, 47(1-3):139–159.

- [Buck et al., 2007] Buck, A., Campbell, C., Dickinson, P., Mountford, C., Stoquert, H., Terry, J., Evans, S., Keane, L., Su, T., Mount, A., et al. (2007). “DNA Nanoswitch as a Biosensor”. *Analytical Chemistry*, 79(12):4724–4728.
- [Buranachai et al., 2006] Buranachai, C., McKinney, S., Ha, T., et al. (2006). “Single Molecule Nanometronome”. *Nano Lett*, 6(3):496–500.
- [Butler et al., 2001] Butler, Z., Kotay, K., Rus, D., and Tomita, K. (2001). “Cellular Automata for Decentralized Control of Self-Reconfigurable Robots”. *ICRA 2001 Workshop on Modular Self-Reconfigurable Robots*.
- [Cardelli, 2011] Cardelli, L. (2011). “Strand algebras for DNA computing”. *Natural Computing*, 10(1):407–428.
- [Chen and Doty, 2012] Chen, H. and Doty, D. (2012). “Parallelism and Time in Hierarchical Self-Assembly”. In *Proceedings of the Twenty-Third Annual ACM-SIAM Symposium on Discrete Algorithms*, pages 1163–1182. SIAM.
- [Chen and Seeman, 1991] Chen, J. and Seeman, N. (1991). “Synthesis from DNA of a Molecule with the Connectivity of a Cube”. *Nature*, 350(6319):631–633.
- [Chirikjian, 1993] Chirikjian, G. (1993). “Metamorphic Hyper-Redundant Manipulators”. *Proceedings of the JSME International Conference on Advanced Mechatronics*, pages 467–472.
- [Choi, 2009] Choi, H. (2009). *Programmable In Situ Amplification for Multiplexed Bioimaging*. PhD thesis, California Institute of Technology.
- [Churchman et al., 2005] Churchman, L., Ökten, Z., Rock, R., Dawson, J., and Spudich, J. (2005). “Single Molecule High-Resolution Colocalization of Cy3 and Cy5 Attached to Macromolecules Measures Intramolecular Distances through Time”. *Proceedings of the National Academy of Sciences of the United States of America*, 102(5):1419–1423.
- [Dabby and Chen, 2013a] Dabby, N. and Chen, H.-L. (2013a). “A Synthetic Linear Polymer that Grows Exponentially Fast”. In preparation.

- [Dabby and Chen, 2013b] Dabby, N. and Chen, H.-L. (2013b). “Active Self-Assembly of Simple Units Using an Insertion Primitive”. In *Proceedings of the Twenty-Fourth Annual ACM-SIAM Symposium on Discrete Algorithms*, pages 1526–1536. SIAM.
- [Dabby et al., 2013] Dabby, N., Chen, H.-L., Schaeffer, J., and Winfree, E. (2013). “Control of DNA Four-way Branch Migration Kinetics Using Toeholds”. In submission to *Nucleic Acids Research*.
- [Dabby, 2003] Dabby, N. L. (2003). *Poetry, Postmodernism and Contemporary Scientific Theory*. UC Berkeley English Department Undergraduate Thesis.
- [Ding and Seeman, 2006] Ding, B. and Seeman, N. (2006). “Operation of a DNA Robot Arm Inserted into a 2D DNA Crystalline Substrate”. *Science*, 314(5805):1583–1585.
- [Dirks et al., 2007] Dirks, R., Bois, J., Schaeffer, J., Winfree, E., and Pierce, N. (2007). “Thermodynamic Analysis of Interacting Nucleic Acid Strands”. *SIAM Review*, 49(1):65–88.
- [Dirks and Pierce, 2004] Dirks, R. and Pierce, N. (2004). “Triggered Amplification by Hybridization Chain Reaction”. *Proceedings of the National Academy of Sciences*, 101(43):15275–15278.
- [Dorigo and Stützle, 2004] Dorigo, M. and Stützle, T. (2004). *Ant Colony Optimization*. Cambridge, MA, USA: MIT Press.
- [Douglas et al., 2009] Douglas, S., Dietz, H., Liedl, T., Hogberg, B., Graf, F., and Shih, W. (2009). “Self-Assembly of DNA into Nanoscale Three-Dimensional Shapes”. *Nature*, 459(7245):414–418.
- [Duose et al., 2012] Duose, D., Schweller, R., Zimak, J., Rogers, A., Hittelman, W., and Diehl, M. (2012). “Configuring Robust DNA Strand Displacement Reactions for In Situ Molecular Analyses”. *Nucleic Acids Research*, 40(7):3289–3298.
- [Ehrig, 1979] Ehrig, H. (1979). “Introduction to the Algebraic Theory of Graph Grammars (A Survey)”. *Lecture Notes in Computer Science*, 73:1–69.

- [Eliot, 1995] Eliot, T. (1995). *The Love Song of J. Alfred Prufrock*. Harvard Vocarium Records.
- [Elowitz and Leibler, 2000] Elowitz, M. and Leibler, S. (2000). “A Synthetic Oscillatory Network of Transcriptional Regulators”. *Nature*, 403:335–338.
- [Feller, 1968] Feller, W. (1968). An Introduction to Probability Theory and Its Applications, Vol. 1. New York: Wiley and Sons.
- [Feynman, 1960] Feynman, R. (1960). “There’s Plenty of Room at the Bottom”. *Engineering and Science*, 23(5):22–36.
- [Flamm et al., 2000] Flamm, C., Fontana, W., Hofacker, I., and Schuster, P. (2000). “RNA Folding at Elementary Step Resolution”. *RNA*, 6(3):325–338.
- [Foster et al., 2003] Foster, F., Zhang, M., Duckett, A., Cucevic, V., and Pavlin, C. (2003). “In Vivo Imaging of Embryonic Development in the Mouse Eye by Ultrasound Biomicroscopy”. *Investigative Ophthalmology & Visual Science*, 44(6):2361–2366.
- [Gajardo et al., 2002] Gajardo, A., Moreira, A., and Goles, E. (2002). “Complexity of Langton’s Ant”. *Discrete Applied Mathematics*, 117(1):41–50.
- [Gillespie, 1977] Gillespie, D. (1977). “Exact Stochastic Simulation of Coupled Chemical Reactions”. *The Journal of Physical Chemistry*, 81(25):2340–2361.
- [Goldstein and Mowry, 2004] Goldstein, S. C. and Mowry, T. (2004). “Claytronics: A Scalable Basis for Future Robots”. In *RoboSphere*.
- [Green and Tibbetts, 1981] Green, C. and Tibbetts, C. (1981). “Reassociation Rate Limited Displacement of DNA Strands by Branch Migration”. *Nucleic Acids Research*, 9(8):1905–1918.
- [Green et al., 2008] Green, S., Bath, J., and Turberfield, A. (2008). “Coordinated Chemomechanical Cycles: A Mechanism for Autonomous Molecular Motion”. *Physical Review Letters*, 101(23):238101–238105.
- [Griffith, 2004] Griffith, S. (2004). *Growing Machines*. PhD thesis, MIT.

- [Groß and Dorigo, 2008] Groß, R. and Dorigo, M. (2008). “Self-Assembly at the Macroscopic Scale”. *Proceedings of the IEEE*, 96(9):1490–1508.
- [Grzybowski et al., 2009] Grzybowski, B., Wilmer, C., Kim, J., Browne, K., and Bishop, K. (2009). “Self-Assembly: From Crystals to Cells”. *Soft Matter*, 5(6):1110–1128.
- [Gu et al., 2010] Gu, H., Chao, J., Xiao, S., and Seeman, N. (2010). “A Proximity-Based Programmable DNA Nanoscale Assembly Line”. *Nature*, 465(7295):202–205.
- [Harlow, 1999] Harlow, J. (1999). “Passage of an Iron Rod through the Head”. *Journal of Neuropsychiatry & Clinical Neurosciences*, 11(2):281–283.
- [Hasty et al., 2002] Hasty, J., McMillen, D., and Collins, J. (2002). “Engineered Gene Circuits”. *Nature*, 420(6912):224–230.
- [He et al., 2008] He, Y., Ye, T., Su, M., Zhang, C., Ribbe, A., Jiang, W., and Mao, C. (2008). “Hierarchical Self-Assembly of DNA into Symmetric Supramolecular Polyhedra”. *Nature*, 452(7184):198–201.
- [Hess, 2006a] Hess, H. (2006a). “Self-Assembly Driven by Molecular Motors”. *Soft Matter*, 2(8):669–677.
- [Hess, 2006b] Hess, H. (2006b). “Toward Devices Powered by Biomolecular Motors”. *Science*, 312(5775):860–861.
- [Heuvel and Dekker, 2007] Heuvel, M. G. L. v. d. and Dekker, C. (2007). “Motor Proteins at Work for Nanotechnology”. *Science*, 317(5836):333–336.
- [Holliday, 1964] Holliday, R. (1964). “A Mechanism for Gene Conversion in Fungi”. *Genetical Research*, 5(2):282–304.
- [Jacob et al., 1960] Jacob, F., Perrin, D., Sánchez, C., and Monod, J. (1960). “Operon: A Group of Genes with Expression Coordinated by an Operator”. *CR Academy of Science Paris*, 250:1727–1729.

[Jones and Mataric, 2003] Jones, C. and Mataric, M. J. (2003). “From Local to Global Behavior in Intelligent Self-Assembly”. In *Proceedings of the IEEE International Conference on Robotics and Automation*, volume 1, pages 721–726.

[Joyce, 1989] Joyce, G. (1989). “RNA Evolution and the Origins of Life”. *Nature*, 338(6212):217–224.

[Jungmann et al., 2008] Jungmann, R., Liedl, T., Sobey, T., Shih, W., and Simmel, F. (2008). “Isothermal Assembly of DNA Origami Structures Using Denaturing Agents”. *Journal of the American Chemical Society*, 130(31):10062–10063.

[Karsenti, 2008] Karsenti, E. (2008). “Self-Organization in Cell Biology: A Brief History”. *Nature Reviews Molecular Cell Biology*, 9(3):255–262.

[Karymov et al., 2008] Karymov, M., Chinnaraj, M., Bogdanov, A., Srinivasan, A., Zheng, G., Olson, W., and Lyubchenko, Y. (2008). “Structure, Dynamics, and Branch Migration of a DNA Holliday Junction: A Single-Molecule Fluorescence and Modeling Study”. *Biophysical Journal*, 95(9):4372–4383.

[Kay et al., 2007] Kay, E. R., Leigh, D. A., and Zerbetto, F. (2007). “Synthetic Molecular Motors and Mechanical Machines”. *Angewandte Chemie International Edition*, 46:72–191.

[Ke et al., 2008] Ke, Y., Lindsay, S., Chang, Y., Liu, Y., and Yan, H. (2008). “Self-Assembled Water-Soluble Nucleic Acid Probe Tiles for Label-Free RNA Hybridization Assays”. *Science*, 319(5860):180–183.

[Klavins et al., 2004] Klavins, E., Ghrist, R., and Lipsky, D. (2004). “Graph Grammars for Self-Assembling Robotic Systems”. In *Proceedings of the International Conference on Robotics and Automation*, volume 5, pages 5293–5300.

[Kube and Zhang, 1993] Kube, C. and Zhang, H. (1993). “Collective Robotics: From Social Insects to Robots”. *Adaptive Behavior*, 2(2):189–218.

- [Kuczmarski et al., 2000] Kuczmarski, R., Ogden, C., Grummer-Strawn, L., Flegal, K., Guo, S., Wei, R., Mei, Z., Curtin, L., Roche, A., and Johnson, C. (2000). “CDC Growth Charts: United States”. *Advance Data*, (314):1–27.
- [Lederman et al., 2006] Lederman, H., Macdonald, J., Stefanovic, D., and Stojanovic, M. (2006). “Deoxyribozyme-Based Three-Input Logic Gates and Construction of a Molecular Full Adder”. *Biochemistry*, 45(4):1194–1199.
- [Li et al., 2000] Li, J., Zheng, W., Kwon, A., and Lu, Y. (2000). “In Vitro Selection and Characterization of a Highly Efficient Zn (II)-Dependent RNA-Cleaving Deoxyribozyme”. *Nucleic Acids Research*, 28(2):481–488.
- [Lindenmayer, 1987] Lindenmayer, A. (1987). “Models for Multicellular Development: Characterization, Inference and Complexity of L-Systems”. *Trends, Techniques, and Problems in Theoretical Computer Science*, pages 138–168.
- [Liu and Fletcher, 2009] Liu, A. and Fletcher, D. (2009). “Biology Under Construction: In Vitro Reconstitution of Cellular Function”. *Nature Reviews Molecular Cell Biology*, 10(9):644–650.
- [Liu et al., 1994] Liu, B., Leontis, N., and Seeman, N. (1994). “Bulged 3-Arm DNA Branched Junctions as Components for Nanoconstruction”. *Nanobiology*, 3:177–188.
- [Lu and Lieber, 2007] Lu, W. and Lieber, C. (2007). “Nanoelectronics from the Bottom Up”. *Nature Materials*, 6(11):841–850.
- [Lubrich et al., 2009] Lubrich, D., Green, S., and Turberfield, A. (2009). “Kinetically Controlled Self-Assembly of DNA Oligomers”. *Journal of the American Chemical Society*, 131(7):2422–2423.
- [Lubrich et al., 2008] Lubrich, D., Lin, J., and Yan, J. (2008). “A Contractile DNA Machine”. *Angewandte Chemie International Edition*, 47(37):7026–7028.
- [Luecke et al., 1999] Luecke, R., Wosilait, W., and Young, J. (1999). “Mathematical Modeling of Human Embryonic and Fetal Growth Rates”. *Growth, Development, and Aging*, 63(1-2):49–59.

- [Lund, 2008] Lund, K. (2008). “*Self-Assembling DNA Based Molecular Pegboards as Nanoscale Scaffolds and Prescriptive Molecular Landscapes*”. PhD thesis, Arizona State University.
- [Lund et al., 2010] Lund, K., Manzo, A., Dabby, N., Michelotti, N., Johnson-Buck, A., Nangreave, J., Taylor, S., Pei, R., Stojanovic, M., Walter, N., et al. (2010). “Molecular Robots Guided by Prescriptive Landscapes”. *Nature*, 465(7295):206–210.
- [Mao et al., 2000] Mao, C., LaBean, T., Reif, J., and Seeman, N. (2000). “Logical Computation Using Algorithmic Self-Assembly of DNA Triple-Crossover Molecules”. *Nature*, 407(6803):493–496.
- [Mao et al., 1999] Mao, C., Sun, W., Shen, Z., and Seeman, N. (1999). “A DNA Nanomechanical Device Based on the B–Z Transition”. *Nature*, 397:144–146.
- [Mathews et al., 2004] Mathews, D., Disney, M., Childs, J., Schroeder, S., Zuker, M., and Turner, D. (2004). “Incorporating Chemical Modification Constraints into a Dynamic Programming Algorithm for Prediction of RNA Secondary Structure”. *Proceedings of the National Academy of Sciences of the United States of America*, 101(19):7287–7292.
- [McKinney et al., 2002] McKinney, S., Déclais, A., Lilley, D., and Ha, T. (2002). “Structural Dynamics of Individual Holliday Junctions”. *Nature Structural Biology*, 10(2):93–97.
- [McKinney et al., 2005] McKinney, S., Freeman, A., Lilley, D., and Ha, T. (2005). “Observing Spontaneous Branch Migration of Holliday Junctions One Step at a Time”. *Proceedings of the National Academy of Sciences of the United States of America*, 102(16):5715–5720.
- [Metropolis et al., 1953] Metropolis, N., Rosenbluth, A., Rosenbluth, M., Teller, A., and Teller, E. (1953). “Equation of State Calculations by Fast Computing Machines”. *The Journal of Chemical Physics*, 21(6):1087.
- [Metzger et al., 2008] Metzger, R., Klein, O., Martin, G., and Krasnow, M. (2008). “The Branching Programme of Mouse Lung Development”. *Nature*, 453(7196):745–750.

- [Morris et al., 2001] Morris, D., Grealy, M., Leese, H., and Centre, G. R. (2001). *Cattle embryo growth, development and viability*. Grange Research Centre.
- [Moulton et al., 2000] Moulton, V., Zuker, M., Steel, M., Pointon, R., and Penny, D. (2000). “Metrics on RNA Secondary Structures”. *Journal of Computational Biology*, 7(1-2):277–292.
- [Murata et al., 1994] Murata, S., Kurokawa, H., and Kokaji, S. (1994). “Self-Assembling Machine”. In *Proceedings of the 1994 International Conference on Robotics and Automation*, pages 441–448.
- [Muscat et al., 2011] Muscat, R., Bath, J., and Turberfield, A. (2011). “A Programmable Molecular Robot”. *Nano Letters*, 11(3):982–987.
- [Nagpal, 2008] Nagpal, R. (2008). “Programmable Pattern-Formation and Scale-Independence”. In *Unifying Themes in Complex Systems IV*, pages 275–282. Springer.
- [Omabegho et al., 2009] Omabegho, T., Sha, R., and Seeman, N. (2009). “A Bipedal DNA Brownian Motor with Coordinated Legs”. *Science*, 324(5923):67–71.
- [Panyutin and Hsieh, 1993] Panyutin, I. and Hsieh, P. (1993). “Formation of a Single Base Mismatch Impedes Spontaneous DNA Branch Migration”. *Journal of Molecular Biology*, 230(2):413–424.
- [Panyutin and Hsieh, 1994] Panyutin, I. and Hsieh, P. (1994). “The Kinetics of Spontaneous DNA Branch Migration”. *Proceedings of the National Academy of Sciences*, 91(6):2021–2025.
- [Pei et al., 2006] Pei, R., Taylor, S., Stefanovic, D., Rudchenko, S., Mitchell, T., and Stojanovic, M. (2006). “Behavior of Polycatalytic Assemblies in a Substrate-Displaying Matrix”. *J. Am. Chem. Soc*, 128(39):12693–12699.
- [Prusinkiewicz, 2004] Prusinkiewicz, P. (2004). “Modeling Plant Growth and Development”. *Current Opinion in Plant Biology*, 7(1):79–83.
- [Qian and Winfree, 2011] Qian, L. and Winfree, E. (2011). “Scaling Up Digital Circuit Computation with DNA Strand Displacement Cascades”. *Science*, 332(6034):1196–1201.

- [Qian et al., 2011] Qian, L., Winfree, E., and Bruck, J. (2011). “Neural Network Computation with DNA Strand Displacement Cascades”. *Nature*, 475(7356):368–372.
- [Rosa et al., 2006] Rosa, M. D., Goldstein, S., Lee, P., Campbell, J., and Pillai, P. (2006). “Scalable Shape Sculpting via Hole Motion: Motion Planning in Lattice-Constrained Modular Robots”. In *Proceedings of the 2006 IEEE International Conference on Robotics and Automation*, pages 1462–1468.
- [Rothenmund, 1996] Rothenmund, P. (1996). “A DNA and Restriction Enzyme Implementation of Turing Machines”. In Lipton, R. and Baum, E., editors, *DNA Based Computers*, pages 75–119. American Mathematical Society.
- [Rothenmund, 2006] Rothenmund, P. (2006). “Folding DNA to Create Nanoscale Shapes and Patterns”. *Nature*, 440(7082):297–302.
- [Rothenmund et al., 2004] Rothenmund, P., Papadakis, N., and Winfree, E. (2004). “Algorithmic Self-Assembly of DNA Sierpinski Triangles”. *PLoS Biology*, 2(12):e424.
- [Rus et al., 2002] Rus, D., Butler, Z., Kotay, K., and Vona, M. (2002). “Self-Reconfiguring Robots”. *Communications of the ACM*, 45(3):39–45.
- [Rus and Vona, 2001] Rus, D. and Vona, M. (2001). “Crystalline Robots: Self-Reconfiguration with Compressible Unit Modules”. *Autonomous Robots*, 10(1):107–124.
- [Saffarian et al., 2004] Saffarian, S., Collier, I., Marmer, B., Elson, E., and Goldberg, G. (2004). “Interstitial Collagenase is a Brownian Ratchet Driven by Proteolysis of Collagen”. *Science*, 306(5693):108–111.
- [Saitou, 1999] Saitou, K. (1999). “Conformational Switching in Self-Assembling Mechanical Systems”. *IEEE Transactions on Robotics and Automation*, 15(3):510–520.
- [SantaLucia, 1998] SantaLucia, J. (1998). “A Unified View of Polymer, Dumbbell, and Oligonucleotide DNA Nearest-Neighbor Thermodynamics”. *Proceedings of the National Academy of Sciences*, 95(4):1460–1465.

- [SantaLucia Jr and Hicks, 2004] SantaLucia Jr, J. and Hicks, D. (2004). “The Thermodynamics of DNA Structural Motifs”. *Annual Reviews of Biophysics and Biomolecular Structure*, 33:415–440.
- [Santoro and Joyce, 1997] Santoro, S. and Joyce, G. (1997). “A General Purpose RNA-Cleaving DNA Enzyme”. *Proceedings of the National Academy of Sciences*, 94(9):4262.
- [Schaeffer, 2012] Schaeffer, J. (2012). *The Multistrand Simulator: Stochastic Simulation of the Kinetics of Multiple Interacting DNA Strands*. Master’s thesis, California Institute of Technology.
- [Seelig et al., 2006] Seelig, G., Soloveichik, D., Zhang, D., and Winfree, E. (2006). “Enzyme-Free Nucleic Acid Logic Circuits”. *Science*, 314(5805):1585–1588.
- [Seeman, 2005] Seeman, N. (2005). “DNA Enables Nanoscale Control of the Structure of Matter”. *Quarterly Reviews of Biophysics*, 38(4):363–371.
- [Seeman and Kallenbach, 1994] Seeman, N. and Kallenbach, N. (1994). “DNA Branched Junctions”. *Annual Review of Biophysics and Biomolecular Structure*, 23(1):53–86.
- [Shannon et al., 1956] Shannon, C., McCarthy, J., et al. (1956). *Automata Studies*. Princeton University Press.
- [Sherman and Seeman, 2004] Sherman, W. and Seeman, N. (2004). “A Precisely Controlled DNA Biped Walking Device”. *Nano Letters*, 4(7):1203–1207.
- [Shin and Pierce, 2004] Shin, J. and Pierce, N. (2004). “A Synthetic DNA Walker for Molecular Transport”. *Journal of the American Chemical Society*, 126(35):10834–10835.
- [Siegwart, 2004] Siegwart, R. Nourbakhsh, I. R. (2004). *Introduction to Autonomous Mobile Robots*. MIT Press.
- [Simmel and Yurke, 2002] Simmel, F. and Yurke, B. (2002). “A DNA-Based Molecular Device Switchable between Three Distinct Mechanical States”. *Applied Physics Letters*, 80(5):883–885.

- [Simon, 1996] Simon, H. (1996). *The Sciences of the Artificial*. MIT press.
- [Sipser, 2006] Sipser, M. (2006). *Introduction to the Theory of Computation*. Thomson Course Technology.
- [Siromoney, 1986] Siromoney, R. (1986). “Array languages and Lindenmayer Systems—A Survey”. In *The Book of L*, pages 413–426. Springer.
- [Smith and Schweitzer, 1996] Smith, W. and Schweitzer, A. (1996). “DNA Computers In Vitro and Vivo”. In Lipton, R. and Baum, E., editors, *DNA Based Computers*, pages 121–185. American Mathematical Society.
- [Soloveichik et al., 2010] Soloveichik, D., Seelig, G., and Winfree, E. (2010). “DNA as a Universal Substrate for Chemical Kinetics”. *Proceedings of the National Academy of Sciences*, 107(12):5393–5398.
- [Soloveichik and Winfree, 2005] Soloveichik, D. and Winfree, E. (2005). “Complexity of Self-Assembled Shapes”. *DNA Computing*, pages 344–354.
- [Stojanovic et al., 2002] Stojanovic, M., Mitchell, T., and Stefanovic, D. (2002). “Deoxyribozyme-Based Logic Gates”. *Journal of the American Chemical Society*, 124(14):3555–3561.
- [Stojanovic et al., 2003] Stojanovic, M., Stefanovic, D., et al. (2003). “A Deoxyribozyme-Based Molecular Automaton”. *Nature biotechnology*, 21(9):1069–1074.
- [Stupp, 2010] Stupp, S. (2010). “Self-Assembly and Biomaterials”. *Nano Letters*, 10(12):4783–4786.
- [Tataurov et al., 2008] Tataurov, A., You, Y., and Owczarzy, R. (2008). “Predicting Ultraviolet Spectrum of Single Stranded and Double Stranded Deoxyribonucleic Acids”. *Biophysical Chemistry*, 133(1):66–70.

[Thompson et al., 1976] Thompson, B., Camien, M., and Warner, R. (1976). “Kinetics of Branch Migration in Double-Stranded DNA”. *Proceedings of the National Academy of Sciences*, 73(7):2299–2303.

[Tian et al., 2005] Tian, Y., He, Y., Chen, Y., Yin, P., and Mao, C. (2005). “A DNAzyme that Walks Processively and Autonomously along a One-Dimensional Track”. *Angewandte Chemie International Edition*, 44(28):4355–4358.

[Toffler, 1984] Toffler, A. (1984). *Future shock*. Bantam.

[Turing, 1936] Turing, A. M. (1936). “On Computable Numbers, with an Application to the Entscheidungsproblem”. *Proceedings of the London Mathematical Society*, 42(2):230–265.

[Venkataraman et al., 2007] Venkataraman, S., Dirks, R., Rothemund, P., Winfree, E., and Pierce, N. (2007). “An Autonomous Polymerization Motor Powered by DNA Hybridization”. *Nature Nanotechnology*, 2(8):490–494.

[Venter et al., 2001] Venter, J., Adams, M., Myers, E., Li, P., Mural, R., Sutton, G., Smith, H., Yandell, M., Evans, C., Holt, R., et al. (2001). “The Sequence of the Human Genome”. *Science*, 291(5507):1304–1351.

[Von Neumann and Burks, 1966] Von Neumann, J. and Burks, A. W. (1966). “*Theory of Self-Reproducing Automata*”. University of Illinois Press.

[Walter et al., 2004] Walter, J. E., Welch, J. L., and Amato, N. M. (2004). “Distributed Reconfiguration of Metamorphic Robot Chains”. *Distributed Computing*, 17(2):171–189.

[Walter et al., 2008] Walter, N., Huang, C., Manzo, A., and Sobhy, M. (2008). “Do-It-Yourself Guide: How To Use the Modern Single-Molecule Toolkit”. *Nature Methods*, 5(6):475–489.

[Watson and Crick, 1953] Watson, J. and Crick, F. (1953). “Molecular Structure of Nucleic Acids”. *Nature*, 171(4356):737–738.

[Werfel and Nagpal, 2007] Werfel, J. and Nagpal, R. (2007). “Towards a Common Comparison Framework for Global-to-Local Programming of Self-Assembling Robotic Systems”. *IEEE Conference on Intelligent Robots and Systems*.

[Wetmur, 1976] Wetmur, J. (1976). “Hybridization and Renaturation Kinetics of Nucleic Acids”. *Annual Review of Biophysics and Bioengineering*, 5(1):337–361.

[White et al., 2004] White, P., Kopanski, K., and Lipson, H. (2004). “Stochastic Self-Reconfigurable Cellular Robotics”. *IEEE International Conference on Robotics and Automation*, 3:2888–2893.

[Whitesides and Grzybowski, 2002] Whitesides, G. and Grzybowski, B. (2002). “Self-Assembly at all Scales”. *Science*, 295(5564):2418–2421.

[Win and Smolke, 2008] Win, M. N. and Smolke, C. D. (2008). “Higher-Order Cellular Information Processing with Synthetic RNA Devices”. *Science*, 322(5900):456–460.

[Winfree, 1996] Winfree, E. (1996). “On the Computational Power of DNA Annealing and Ligation”. In Lipton, R. and Baum, E., editors, *DNA Based Computers*, pages 199–221. American Mathematical Society, Providence, RI.

[Winfree, 2000] Winfree, E. (2000). “Algorithmic Self-Assembly of DNA: Theoretical Motivations and 2D Assembly Experiments”. *Journal of Biomolecular Structure and Dynamics*, 17(Supplement 1):263–270.

[Winfree, 2012] Winfree, E. (2012). DNA design toolbox. URL
<http://www.dna.caltech.edu/dnadesign/>.

[Winfree et al., 1998] Winfree, E., Liu, F., Wenzler, L., and Seeman, N. (1998). “Design and Self-Assembly of Two-Dimensional DNA Crystals”. *Nature*, 394(6693):539–544.

[Woods et al., 2013] Woods, D., Chen, H.-L., Goodfriend, S., Dabby, N., Winfree, E., and Yin, P. (2013). “Active Self-Assembly of Algorithmic Shapes and Patterns in Polylogarithmic Time”.

In *ITCS 2013: Innovations in Theoretical Computer Science*, pages 353–354, Berkeley, CA. ACM.

[Woolf, 1957] Woolf, V. (1957). A room of one's own. 1929. *New York: Harvest-Harcourt*.

[Yan et al., 2003] Yan, H., Park, S., Finkelstein, G., Reif, J., and LaBean, T. (2003). “DNA-Templated Self-Assembly of Protein Arrays and Highly Conductive Nanowires”. *Science*, 301(5641):1882–1884.

[Yan et al., 2002] Yan, H., Zhang, X., Shen, Z., and Seeman, N. (2002). “A Robust DNA Mechanical Device Controlled by Hybridization Topology”. *Nature*, 415(6867):62–65.

[Yang et al., 1998] Yang, X., Vologodskii, A., Liu, B., Kemper, B., and Seeman, N. (1998). “Torsional Control of Double-Stranded DNA Branch Migration”. *Peptide Science*, 45(1):69–83.

[Yildiz and Selvin, 2005] Yildiz, A. and Selvin, P. (2005). “Fluorescence Imaging with One Nanometer Accuracy: Application to Molecular Motors”. *Accounts of Chemical Research*, 38(7):574–582.

[Yim et al., 1997] Yim, M., Lamping, J., Mao, E., and Chase, J. G. (1997). “Rhombic Dodecahedron Shape for Self-Assembling Robots”. *SPL TechReport P9710777, Xerox PARC*.

[Yim et al., 2007] Yim, M., Shen, W., Salemi, B., Rus, D., Moll, M., Lipson, H., Klavins, E., and Chirikjian, G. S. (2007). “Modular Self-Reconfigurable Robot Systems”. *IEEE Robotics and Automation Magazine*, 14(1):43.

[Yin et al., 2008] Yin, P., Choi, H., Calvert, C., and Pierce, N. (2008). “Programming Biomolecular Self-Assembly Pathways”. *Nature*, 451(7176):318–322.

[Yin et al., 2004] Yin, P., Yan, H., Daniell, X., Turberfield, A., and Reif, J. (2004). “A Unidirectional DNA Walker that Moves Autonomously along a Track”. *Angewandte Chemie International Edition*, 43(37):4906–4911.

[Yurke and Mills, 2003] Yurke, B. and Mills, A. (2003). “Using DNA to Power Nanostructures”. *Genetic Programming and Evolvable Machines*, 4(2):111–122.

- [Yurke et al., 2000] Yurke, B., Turberfield, A., Mills, A., Simmel, F., and Neumann, J. (2000). “A DNA-Fuelled Molecular Machine Made of DNA”. *Nature*, 406(6796):605–608.
- [Zadeh et al., 2010] Zadeh, J., Steenberg, C., Bois, J., Wolfe, B., Pierce, M., Khan, A., Dirks, R., and Pierce, N. (2010). “NUPACK: Analysis and Design of Nucleic Acid Systems”. *Journal of Computational Chemistry*, 32:170–173.
- [Zadeh et al., 2011] Zadeh, J., Wolfe, B., and Pierce, N. (2011). “Nucleic Acid Sequence Design via Efficient Ensemble Defect Optimization”. *Journal of Computational Chemistry*, 32:439–452.
- [Zhang and Seelig, 2011] Zhang, D. and Seelig, G. (2011). “Dynamic DNA Nanotechnology Using Strand-Displacement Reactions”. *Nature Chemistry*, 3(2):103–113.
- [Zhang et al., 2007] Zhang, D., Turberfield, A., Yurke, B., and Winfree, E. (2007). “Engineering Entropy-Driven Reactions and Networks Catalyzed by DNA”. *Science*, 318(5853):1121.
- [Zhang and Winfree, 2009] Zhang, D. and Winfree, E. (2009). “Control of DNA Strand Displacement Kinetics Using Toehold Exchange”. *Journal of the American Chemical Society*, 131(47):17303–17314.