

TANER Z SEN

RESEARCH INTERESTS

Analysis, interpretation, and representation of maize genome; protein sequence and structure-based methods to understand function as part of the elaborate networks of cellular interactions; protein modeling and dynamics to elucidate structure-function relationships; development and improvement of secondary and tertiary structure prediction methods; protein-protein binding site predictions; structural and functional interpretations of protein-protein interaction networks.

EDUCATION

Ph.D. in Polymer Engineering, University of Akron, Akron, OH, 2003

M.S. in Chemical Engineering, Bogazici University, Turkey, 1998

B.S. in Chemical Engineering, Bogazici University, Turkey, 1996

EMPLOYMENT

Computational Biologist, 2007-present

U.S. Department of Agriculture-Agricultural Research Service,
Corn Insects and Crop Genetics Research Unit, Ames, Iowa

Collaborator Assistant Professor, 2007-present

Department of Genetics, Development and Cell Biology,
Iowa State University, Ames, Iowa

Collaborator Assistant Professor, 2007-present

Bioinformatics and Computational Biology Program,
Iowa State University, Ames, Iowa

Postdoctoral Research Associate, 2003-2007

Department of Biochemistry, Biophysics, and Molecular Biology;
Laurence H. Baker Center for Bioinformatics and Biological
Statistics, Iowa State University, Ames, Iowa

PUBLICATIONS

JOURNAL ARTICLES

27) Andorf, C.M., Harper L.C., Schaeffer M.L., Seigfried, T.E., Andorf, C.M., Lawrence C.J., **Sen, T.Z.** "The Locus Lookup Tool at MaizeGDB: Identification of Genomic Regions in Maize by Integrating Sequence Information with Physical and Genetic Maps", *Bioinformatics*, in press.

26) **Sen T.Z.**, Andorf C.M., Schaeffer M.L., Harper L.C., Sparks M.E., Duvick J., Brendel V.P., Cannon, E., Campbell D.A., Lawrence C.J., "MaizeGDB becomes 'sequence-centric'", *Database*, in press.

25) Kurkcuoglu O, Doruker P., **Sen T.Z.**, Kloczkowski, A., Jernigan R.L.,

“The ribosome shape directs mRNA translocation through entrance and exit dynamics”, *Physical Biology*, 5(4), 40005, 2008.

24) Lawrence, C. J., Harper, L.C., Schaeffer, M.L., **Sen, T.Z.**, Seigfried, T.E., Campell, D.A., “MaizeGDB: the Maize Model Organism Database for Basic, Translational, and Applied Research”, *International Journal of Plant Genomics*, 2008: 496957, 2008.

23) **Sen, T.Z.**, Kloster, M., Kloczkowski, A., Kolinski, A., Bujnicki, J.M., Jernigan, R.L., “Structure prediction and normal mode analysis of the outer membrane transporter FecA”, *Biophysical Journal*, 94(7), 2482–2491, 2008.

22) Sulkowska, J.I., Kloczkowski, A., **Sen, T.Z.**, Cieplak, M., Jernigan, R.L. “Predicting the order in which contacts are broken during single molecule protein stretching experiments”, *Proteins*, 71, 45-60, 2008.

21) Cheng, H., **Sen, T.Z.**, Jernigan, R.L., Kloczkowski, A., “Consensus Data Mining (CDM) Protein Secondary Structure Prediction Server: Combining GOR V and Fragment Database Mining (FDM)”, *Bioinformatics*, 23(19), 2628-2630, 2007.

20) Peto, M., **Sen, T.Z.**, Jernigan, R.L., Kloczkowski, A., “Generation and enumeration of compact conformations on the 2D triangular and 3D fcc lattices”, *Journal of Chemical Physics*, 127(4):044101, 2007.

19) Mark, J.E, Abou-Hussein, R., **Sen, T.Z.**, Kloczkowski, A., “Monte Carlo Simulations on Nanoparticles in Elastomers. Effects of the Particles on the Dimensions of the Polymer Chains and the Mechanical Properties of the Networks”, *Macromolecular Symposia*, 256, 40-47, 2007.

18) **Sen, T.Z.**, Kloczkowski, A., Jernigan, R.L., “A DNA-centric look at protein-DNA complexes”, *Structure*, 14(9), 1341-1342, 2006.

17) **Sen, T.Z.**, Cheng, H., Kloczkowski, A., Jernigan, R.L., “The Consensus Data Mining (CMD) secondary structure prediction method by combining GOR V and Fragments Database Mining”, *Protein Science*, 15, 2499-2506, 2006.

16) **Sen, T.Z.**, Kloczkowski, A., Jernigan, R.L., “Functional clustering of yeast proteins from the protein-protein interaction network”, *BMC Bioinformatics*, 7:355, 2006.

15) **Sen, T.Z.**, Feng, Y., Garcia, J.V., Kloczkowski, A., Jernigan, R.L., “The extent of cooperativity of protein motions observed with elastic network models is similar for atomic and coarser-grained models”, *Journal of Chemical Theory and Computation*, 2, 696-704, 2006.

14) Sharaf, M.A., Kloczkowski, A., **Sen, T.Z.**, Jacob, K.I., Mark, J.E., “Molecular Modeling of Matrix Chain Deformation in Nanofiber Filled Composites”, *Colloid & Polymer Science*, 284(7), 700-709, 2006.

13) Sharaf, M.A., Kloczkowski, A., **Sen, T.Z.**, Jacob, K.I., Mark, J.E., “Filler-induced deformations of amorphous polyethylene chains. The

effects of the deformations on elastomeric properties, and some comparisons with experiments”, *European Polymer Journal*, 42, 796-806, 2006.

12) Fernandez, A., Tawfik, D.S., Berkhout, B., Sanders, R., Kloczkowski, A., **Sen, T.Z.**, Jernigan, R.L., “Protein Promiscuity: Drug Resistance and Native Functions -- HIV-1 Case”, *J. Biomol. Struct. Dyn.*, 22(6), 615-624, 2005.

11) **Sen, T.Z.**, Jernigan, R.L., Garnier, J., Kloczkowski, A., “The GOR V server for protein secondary structure assignment”, *Bioinformatics*, 21(11), 2787-2788, 2005.

10) Cheng, H., **Sen, T.Z.**, Kloczkowski, A., Margaritis, D., Jernigan, R.L., “Prediction of protein secondary structure by mining fragments database”, *Polymer*, 46, 4314-4321, 2005.

9) Mark, J.E., Abou-Hussein, R., **Sen, T.Z.**, Kloczkowski, A., “Some simulations on filler reinforcement in elastomers”, *Polymer*, 46(21), 8894-8904, 2005.

8) **Sen, T.Z.**, Sharaf, M.A., Mark, J.E., Kloczkowski, A., “Modeling the elastomeric properties of stereoregular polypropylenes in nanocomposites with spherical fillers”, *Polymer*, 46(18), 7301-7308, 2005.

7) Kloczkowski, A., **Sen, T.Z.**, Sharaf, M.A., “The largest eigenvalue method for stereo-regular vinyl chains”, *Polymer*, 46, 4373-4383, 2005.

6) **Sen, T.Z.**, Kloczkowski, A., Jernigan, R.L., Yan, C., Honavar, V., Ho, K.-M., Wang, C.-Z., Ihm, Y., Cao, H., Gu, X, Dobbs, D., “Predicting binding sites of hydrolase-inhibitor complexes by combining several methods”, *BMC Bioinformatics*, 5:205, 2004.

5) Varshney, V., Dirama, T.E., **Sen, T.Z.**, Carri, G.A., “A Minimal Model for the Helix-Coil Transition of Worm-like Polymers. Insights from Monte Carlo Simulations and Theoretical Implications”, *Macromolecules*, 37, 8794-8804, 2004.

4) Kloczkowski, A., **Sen, T.Z.**, Jernigan, R.L., “The transfer matrix method for lattice proteins-an application with cooperative interactions”, *Polymer*, 45, 707-716, 2004.

3) Valladares, D., Toki, S., **Sen, T.Z.**, Yalcin, B., Cakmak, M., “Real time birefringence, true stress and true strain behavior of natural rubber: Effect of crosslink density”, *Macromolecular Symposia*, 185, 149-166, 2002.

2) Konuklar, F. A. S., Aviyente, V., **Sen, T.Z.**, Bahar, I., "Modeling the deamidation of asparagine residues via succinimide intermediates", *Journal of Molecular Modeling*, 7(5), 147-160, 2001.

1) **Sen, T. Z.**, Bahar, I., Erman, B., Lauprêtre, F., Monnerie, L., "Local chain dynamics of cis-1,4-polybutadiene and cis-1,4-polyisoprene. A comparative study based on Cooperative Kinematics theory and NMR

experiments", *Macromolecules*, 32, 3017-3024, 1999.

BOOK CHAPTERS

12) Cheng, H. **Sen, T.Z.**, Jernigan, R.L., Kloczkowski, A., "Data Mining for Protein Secondary Structure Prediction", Ed. D.W.M. Hofmann, in "Structure and Bonding", in press.

11) Harper, L.C., **Sen, T.Z.**, Lawrence, C.J., "Plant Cytogenetics in Genome Databases", in "Plant Cytogenetics", Ed. H.W. Bass and J. Birchler, in press.

10) Mark, J.E., Sen, T.Z., Kloczkowski, A., "Some Monte Carlo Simulations on Nanoparticle reinforcement of Elastomers", Eds. Jozsef Karger-Kocsis and Stoyko Fakirov, Carl Hanser Verlag, Ch. 14, 519-544, 2009

9) Gold, D.G., Miller, W.G., **Sen, T.Z.**, Kloczkowski, A., "Poly(gamma-benzyl-L-glutamate)", in "Polymer data handbook", Ed. James E. Mark, 2nd edition, Oxford University Press, 405-408, 2009.

8) Gold, D.G., Miller, W.G., **Sen, T.Z.**, Kloczkowski, A., "Poly(glycine)", in "Polymer data handbook", Ed. James E. Mark, 2nd edition, Oxford University Press, 713-715, 2009.

7) Gold, D.G., Miller, W.G., **Sen, T.Z.**, Kloczkowski, A., "Poly(L-alanine)", in "Polymer data handbook", Ed. James E. Mark, 2nd edition, Oxford University Press, 344-346, 2009.

6) Andrady, A.L., Kloczkowski, A., **Sen, T.Z.**, Ahunbay, M.G., "Poly(vinyldienechloride)", in "Polymer data handbook", Ed. James E. Mark, 2nd edition, Oxford University Press, 1164-1167, 2009.

5) Andrady, A.L., **Sen, T.Z.**, Ahunbay, M.G., "Poly(vinylchloride)", in "Polymer data handbook", Ed. James E. Mark, 2nd edition, Oxford University Press, 1145-1152, 2009.

4) Andrady, A.L., **Sen, T.Z.**, Ahunbay, M.G., "Poly(chlorotrifluoroethylene)", in "Polymer data handbook", Ed. James E. Mark, 2nd edition, Oxford University Press, 512-515, 2009.

3) Andrady, A.L., **Sen, T.Z.**, Ahunbay, M.G., "Poly(acrylonitrile)", in "Polymer data handbook", Ed. James E. Mark, 2nd edition, Oxford University Press, 339-343, 2009.

2) Kloczkowski, A., **Sen, T.Z.** "Magnetic, piezoelectric, pyroelectric, and ferroelectric properties of synthetic and biological polymers", in "Physical properties of polymers handbook", Ed. James E. Mark, 2nd edition, Springer-Verlag, Ch. 48, 787-794, 2007.

1) **Sen, T.Z.**, Jernigan, R.L. "Optimizing cutoff distances and spring constants for the Gaussian network model of ATP-binding proteins", in "Normal mode analysis: theory and applications to biological and chemical

systems”, Eds. Q. Cui and . I. Bahar, CRC press, Chapter 9, pp. 171-186, 2005.

CONFERENCE ARTICLES (REFEREED)

4) Mulligan, J., Cakmak, M., **Sen, T.Z.**, “Basic mechanisms of structural ordering in uniaxial stretching of PLA using fully automated on-line birefringence coupled with true stress-true strain measurement”, Annual Technical Conference - Society of Plastics Engineers (ANTEC), 60(2), 1646-1650, 2002.

3) Koike, Y., **Sen, T.Z.**, Cakmak, M., “Real time development of orientation in PP during stretching as detected by spectral birefringence technique”, Annual Technical Conference – Society of Plastics Engineers (ANTEC), 60(2), 1550-1555, 2002.

2) Toki, S., Valladares, D., **Sen, T.Z.**, Cakmak, M., “Real time birefringence development of orientation in polymers during uniaxial stretching as detected by robust spectral birefringence technique.”, Annual Technical Conference – Society of Plastics Engineers (ANTEC), 59(2), 1830-1834, 2001.

1) **Sen, T. Z.**, Toki, S., Cakmak, M., “Real time development of stress and birefringence in PET during uniaxial stretching as detected by spectral birefringence technique”, Annual Technical Conference- Society of Plastics Engineers (ANTEC), 59(2), 1510-1514, 2001.

TEACHING

Lecturer, “Structure Prediction and Dynamics for Functional Assignment”, NIH-NSF BBSI Summer Institute in Bioinformatics and Computational Biology, Iowa State University, 2005-2006.

Guest Lecturer, “Tertiary structure prediction methods”, BBMB 551: Molecular Biophysics, Iowa State University, 2004-2006.

Lecturer, “Comparative modeling”, NIH-NSF BBSI Summer Institute in Bioinformatics and Computational Biology, Iowa State University, 2004.

Teaching Assistant, CE 243: Principles of Mechanics, Bogazici University, 1998.

SERVICE

Reviewer, Accounts of Chemical Research; Biophysical Chemistry; Computer and Mathematics with Applications; BMC Genomics; Drug Discovery Today; Journal of Evolutionary Biology, Journal of Polymer Science Part B: Polymer Physics; Polymer; Journal of Intelligent & Fuzzy Systems; Libertas Academica, and Pacific Symposium on Biocomputing.

Grant Reviewer, U.S. Army Research Office, National Science Foundation, American Chemical Society-Petroleum Research Fund, and Health Research Board of Ireland.

Committee Member, Biophysical Society-Public Affairs Committee, 2008-present.

Committee Member, Human Relations and Diversity Committee, Department of Genetics, Development and Cell Biology, Iowa State University, 2008-present.

Committee Member, Safety, Health, and Environmental Management Committee, U.S. Department of Agriculture–Agricultural Research Service, Iowa State University Campus, 2008-present.

Committee Member, Ames Area Civil Rights Committee, U.S. Department of Agriculture–Agricultural Research Service, Iowa State University Campus, 2009-present.

Mentor, *Graduate students*: Huong Tran, Donna Esbjornson; *undergraduate students*: Margaret Kloster, John V. Garcia, Scott E. Boyken, Ashley Andersen, Deepti Reddy, during NIH-NSF BBSI Summer Institute in Bioinformatics and Computational Biology, Iowa State University, 2004-2008.

Judge, High School projects, Science and Technology Fair of Iowa , 2008-present.

Committee Member and Organizer, “Polymer Engineering New Building’s Dedication Ceremony”, University of Akron, 2001.

Organizer and Moderator, Panel Discussion on “Career Opportunities for Polymer Engineering Students”, University of Akron, 2001.

President, Society of Plastics Engineers, Akron Section, Student Chapter, 2000-2001.

President, University of Akron Polymer Eng. Student Organization, 2000-2001.

HONORS AND AWARDS

Ticona Excellence Award - given by Polymer Engineering Department at the University of Akron based on academic excellence and service to the department (2001)

TALKS

INVITED

“The MaizeGDB Genome Browser”, 51st Maize Meeting, Maize Genetics Meeting, St. Charles, IA, March, 2009.

“How to use the MaizeGDB Genome Browser”, Plant and Animal Genome XVII Conference, San Diego, CA, January, 2009.

“MaizeGDB Community Curation Tools”, Plant and Animal Genome

XVI Conference, San Diego, CA, January, 2008.

“Modeling biological complexity at multiple structural levels”, University of Southern Mississippi, MS, February 2007.

“Modeling proteins: from sequence to structure, dynamics, and interaction networks”, USDA, IA, April, 2007.

“Modeling biological complexity at multiple structural levels”, Center for Nonlinear Studies, Los Alamos National Lab, NM, August 2006.

“Modeling biological complexity at multiple structural levels”, IBM T.J. Watson, NY, September 2006.

OTHERS

“Real time development of stress and birefringence in PET during uniaxial stretching as detected by spectral birefringence technique”, Annual Technical Conference- Society of Plastics Engineers (ANTEC), Dallas, TX, 2001.

PROFESSIONAL SOCIETIES

American Association for the Advancement of Science (2003-present); American Chemical Society (1999-2008); Biophysical Society (2003-present); Protein Society (2005-2007); Society of Plastics Engineers (1998-2003)

CITIZENSHIP

US and Turkish Dual Citizen