

# TANER Z SEN

## RESEARCH INTERESTS

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Analysis, interpretation, and representation of maize sequence as part of MaizeGDB; 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

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**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

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**Computational Biologist**, 2007-present

USDA-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 and Laurence  
H. Baker Center for Bioinformatics and Biological Statistics  
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

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### JOURNAL ARTICLES

#### **Bioinformatics/Computational Biology:**

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

18) **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.

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

16) **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.

15) 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.

14) **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.

13) 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.

12) **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.

11) 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.

10) 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.

9) 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.

### **Synthetic Polymers:**

8) 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.

7) 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.

6) 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.

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

4) **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.

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

2) 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.

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**

#### **Bioinformatics/Computational Biology:**

10) 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.

9) **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.

### **Synthetic Polymers:**

8) Gold, D.G., Miller, W.G., **Sen, T.Z.**, Kloczkowski, A., “Poly(gamma-benzyl-L-glutamate)”, in “Polymer data handbook”, Ed. James E. Mark, 2<sup>nd</sup> edition, Oxford University Press, in press.

7) Gold, D.G., Miller, W.G., **Sen, T.Z.**, Kloczkowski, A., “Poly(glycine)”, in “Polymer data handbook”, Ed. James E. Mark, 2<sup>nd</sup> edition, Oxford University Press, in press.

6) Gold, D.G., Miller, W.G., **Sen, T.Z.**, Kloczkowski, A., “Poly(L-alanine)”, in “Polymer data handbook”, Ed. James E. Mark, 2<sup>nd</sup> edition, Oxford University Press, in press.

5) Andrady, A.L., Kloczkowski, A., **Sen, T.Z.**, Ahunbay, M.G., “Poly(vinyldienechloride)”, in “Polymer data handbook”, Ed. James E. Mark, 2<sup>nd</sup> edition, Oxford University Press, in press.

4) Andrady, A.L., **Sen, T.Z.**, Ahunbay, M.G., “Poly(vinylchloride)”, in “Polymer data handbook”, Ed. James E. Mark, 2<sup>nd</sup> edition, Oxford University Press, in press.

3) Andrady, A.L., **Sen, T.Z.**, Ahunbay, M.G., “Poly(chlorotrifluoroethylene)”, in “Polymer data handbook”, Ed. James E. Mark, 2<sup>nd</sup> edition, Oxford University Press, in press.

2) Andrady, A.L., **Sen, T.Z.**, Ahunbay, M.G., “Poly(acrylonitrile)”, in “Polymer data handbook”, Ed. James E. Mark, 2<sup>nd</sup> edition, Oxford University Press, in press.

1) 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, 2<sup>nd</sup> edition, Springer-Verlag, in press.

### **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.

#### **CONFERENCE ARTICLES (NON-REFEREED)**

1) Toki, S., **Sen, T. Z.**, Valladares, D., Cakmak, M., “True stress, true strain and real time birefringence development of orientation in rubber during uniaxial stretching as detected by spectral birefringence technique. II. Natural rubber and synthetic polyisoprene”, 160th American Chemical Society Rubber Division Meeting, Fall, 614-625, 2001.

#### TEACHING

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**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

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

**Mentor**, *Graduate student*: 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 (2004-2006)

**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)

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#### 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)

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#### TALKS

##### **INVITED**

“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.

“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.

##### **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.

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#### PROFESSIONAL SOCIETIES

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

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#### CITIZENSHIP

US and Turkish Dual Citizen