

Curriculum Vitae

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EDUCATION

- Tel-Aviv University**, Tel-Aviv, Israel **2002-2006**
Ph.D., Structural Bioinformatics (Department of Computer Science)
Advisors: Prof. Haim Wolfson and Prof. Ruth Nussinov
Thesis title: Computational modeling and prediction of self assembling beta-sheet rich protein structures
- Tel-Aviv University**, Tel-Aviv, Israel **1999-2002**
M.Sc., Structural Bioinformatics (Department of Human Genetics),
Summa Cum Laude
Advisors: Prof. Ruth Nussinov and Prof. Haim Wolfson
Thesis title: Computational study of protein folding pathways using the building blocks folding model
- Tel-Aviv University**, Tel-Aviv, Israel **1995-1998**
B.Sc., Chemistry and Computer Science, Magna Cum Laude

ACADEMIC EMPLOYMENT

- University of Massachusetts Boston**, Department of Computer Science **2009-present**
Assistant Professor
- Rice University**, Houston, TX, Department of Computer Science **2007-2009**
Postdoctoral research associate, [Physical and Biological Computing Group](#)
Advisor: Prof. Lydia Kavradi
- Tel-Aviv University**, Tel-Aviv, Israel, School of Computer Science **2002-2006**
Research and teaching assistant, [Structural Bioinformatics Group](#).
Advisors: Prof. Haim Wolfson and Prof. Ruth Nussinov
- National Cancer Institute**, Frederick, MD **2001-2005**
Visiting researcher, [Center for Cancer Research Nanobiology Program](#)
Advisor: Prof. Ruth Nussinov

Tel-Aviv University, Tel-Aviv, Israel, Department of Human Genetics

1999-2002

Research assistant, [Structural Bioinformatics Group](#).

Advisors: Prof. Ruth Nussinov and Prof. Haim Wolfson

SELECTED AWARDS AND SCHOLARSHIPS

- **2009:** Postdoctoral Fellow of NIH Nanobiology Training program of the Gulf Coast Consortia (declined).
- **2004, 2006:** Tel Aviv University School of Computer Science PhD fellowship.
- **2005:** Don and Sara Marejn award for PhD students.
- **2005:** Dan David prize for PhD students.
- **2002, 2003:** Tel Aviv University Rector Scholarship for excellent PhD students.
- **1999-2001:** Tel Aviv University School of Medicine MSc Fellowship.
- **1997:** Tel Aviv University commemoration fellowship.
- **1997:** Undergraduate training scholarship, School of Chemistry, Tel Aviv University
- **1996, 1997:** Dean's honor list, School of Chemistry, Tel Aviv University.

PUBLICATIONS

PEER REVIEWED JOURNAL ARTICLES

1. Akbal-Delibas B., Hashmi I., Shehu A. and **Haspel N.**, An Evolutionary Conservation Based Method for Refining and Reranking Protein Complex Structures. *Journal of Bioinformatics and Computational Biology (JBCB)*, in press, 2012.
2. Hashmi I., Akbal-Delibas B., **Haspel N.** and Shehu A., Guiding Protein Docking with Geometric and Evolutionary Information *Journal of Bioinformatics and Computational Biology (JBCB)*, in press, 2012.
3. **Haspel N.**, Zanuy D., Nussinov R., Teesalu T., Ruoslahti E. and Aleman C. Binding of a C-end rule peptide to neuropilin-1 receptor: A molecular modeling approach. *Biochemistry* 50(10):1755-1762, 2011.
4. **Haspel N.**, Moll M., Baker M., Chiu W. and Kavraki L.E. Tracing conformational changes in proteins. *BMC Structural Biology*, 10 Suppl.1 (S1) (2010).
5. **Haspel N.**, Geisbrecht B., Lambris J. and Kavraki L.E. Multi-scale Characterization of the Energy Landscape of Proteins with Application to the C3d/Efb-C Complex. *Proteins: Structure, Function and Bioinformatics*, 78(4):1004-1014 (2010).
6. Zanuy D., Ballano G., Jimenez A., Casanovas J., **Haspel N.**, Cativiela C., Curc6 D., Nussinov R., Aleman C., Protein segments with conformationally restricted amino acids can control supramolecular organization at the nanoscale. *Journal of Chemical Information and Modeling*, 49(7): 1623-1629 (2009). (selected for journal cover).

7. **Haspel N.***, Ricklin D.*, Geisbrecht B., Kaviraki L.E. and Lambris J.D., Electrostatic Contributions Drive the Interaction Between *Staphylococcus aureus* Protein Efb-C and its Complement Target C3d. *Protein Science*, 17(11):1894-1906 (2008).
* These authors contributed equally to the work
8. **Haspel N.**, Zanuy D., Zheng J., Alemàn C., Wolfson H. and Nussinov R. Changing the charge distribution of beta-helical based nanostructures can provide the conditions for charge transfer. *Biophysical Journal*, 93:245-253 (2007).
9. Zheng J., Zanuy D., **Haspel N.**, Tsai C.J., Alemàn C. and Nussinov R. Nanostructure Design using Protein Building Blocks Enhanced by Conformationally Constrained Synthetic Residues. *Biochemistry*, 46(5):1205-1218 (2007).
10. Tsai C.J., Zheng J., Zanuy D., **Haspel N.**, Wolfson H., Alemàn C. and Nussinov R. Principles of nanostructure design with protein building blocks. *Proteins: Structure, Function and Bioinformatics* 68(1):1-12 (2007).
11. Zanuy D., Rodriguez-Ropero F., **Haspel N.**, Zheng J., Nussinov R. and Alemàn C. Stability of tubular structures based on beta-helical proteins: self-assembled versus polymerized nanoconstructs and wild-type versus mutated sequences. *Biomacromolecules*, 8(10):3135-3146 (2007).
12. **Haspel N.**, Zanuy D., Alemàn C., Wolfson H. and Nussinov R. De-novo tubular nanostructure design based on self-assembly of β -helical protein motifs. *Structure*, 14(7):1137-1148 (2006).
13. Wainreb G., **Haspel N.**, Wolfson H. and Nussinov, R., A permissive secondary structure guided superposition tool for clustering of protein fragments toward protein structure prediction via fragment assembly. *Bioinformatics* 22: 1343 – 1352 (2006).
14. Aleman C., Zanuy D., Jimenez A.I., Cativiela C., **Haspel N.**, Zheng J., Casanovas J., Wolfson H. and Nussinov R.: Concepts and schemes for the re-engineering of physical protein modules: generating nanodevices via targeted replacements with constrained amino acids. *Physical biology*, 3(1):S54-S62 (2006).
15. **Haspel N.**, Zanuy D., Ma B., Wolfson H. and Nussinov R., A comparative study of amyloid fibril formation by residues 15-19 of the human calcitonin hormone: A single β -sheet model with a small hydrophobic core. *Journal of Molecular Biology* 345(5):1213-1227 (2005).
16. Zanuy D.*, **Haspel N.***, Ma B., Kannan G., Wolfson H. and Nussinov R. Side chain interactions determine the amyloid organization: a single layer β -sheet molecular structure of the calcitonin peptide segment 15–19. *Physical Biology*, 1:89-99 (2004).
* These authors contributed equally to the work.
17. Tsai H. H., Zanuy D., **Haspel N.**, Ma B., Gunasekaran K., Tsai C.J. and Nussinov R., The Stability and Dynamics of the Human Calcitonin Amyloid Peptide DFNKF. *Biophysical Journal*, 87(1),146-158 (2004).
18. **Haspel N.**, Tsai C.J. Wolfson H. and Nussinov R., Hierarchical protein folding pathways: A computational study of protein fragments. *Proteins: Structure, Function and Bioinformatics*, 51:203-215 (2003).

19. **Haspel N.**, Tsai C.J. Wolfson H. and Nussinov R., Reducing the computational complexity of protein folding via fragment folding and assembly. *Protein Science*, 12:1177-1187 (2003).
20. Schneidman-Duhovny D., Inbar Y., Polak V., Shatsky M., Halperin I., Benyamini H., Barzilai A., Dror O., **Haspel N.**, Nussinov R. and Wolfson H.J. Taking geometry to its edge: fast unbound rigid (and hinge-bent) docking. *Proteins, Structure, Function and Genetics*. 52(1): 107-112 (2003).

BOOK CHAPTERS

1. **Haspel N.**, Wainreb G., Inbar Y., Tsai H.H., Tsai C.J., Wolfson H.J. and Nussinov R., A hierarchical protein folding scheme based on the building block folding model. *Methods Mol. Biol.*, 350:189-204 (2007).
2. **Haspel N.**, Zanuy, D., Tsai H.H., Ma B., Wolfson H. and Nussinov R. Computational approaches and tools for establishing structural models for short amyloid-forming peptides. In *Amyloid Proteins*. Ed. Jean D. Sipe. Wiley-VCH, volume 1, pp 301-318 (2005).
3. **Haspel N.**, Tsai C. J., Wolfson H. and Nussinov R., From the building blocks folding model to protein structure prediction. In *Tsigelny I., (Ed): Protein Structure Prediction: Bioinformatics approach. International University Line*, chapter 8, 201-226 (2002).
4. Kumar S., Barzilai A., **Haspel N.**, Sham Y. Y., Tsai C. J., Wolfson H. and Nussinov R., Critical building blocks in proteins: a common theme in folding and binding. In *Gromiha, M. KH. and Selvarage, S. (Eds): Recent Research Developments in Protein Folding, Stability and Design*. Research Signpost, chapter 15. Trivadrur, India (2002).

PEER-REVIEWED CONFERENCES PROCEEDINGS

1. **N. Haspel** and E. Gonzalez, Topological Properties of the Configuration Spaces of Proteins. Proc. of BICoB (4th international conference on bioinformatics and computational biology), March 12-14 2012.
2. B. Akbal, I. Hashmi, A. Shehu and **N. Haspel**. Refinement of protein complex structures using evolutionary traces. Proc. of the Computational Structural Biology Workshop (CSBW), in conjunction with IEEE BIBM '11, 400-405, 2011.
3. I. Hashmi, B. Akbal, **N. Haspel** and A. Shehu. Protein docking with information on evolutionary conserved interfaces. Proc. of the Computational Structural Biology Workshop (CSBW), in conjunction with IEEE BIBM '11, 358-365, 2011.
4. **N. Haspel** Computing Structural changes in proteins represented at a coarse level. in *Proceedings of Bionetics10*, Dec. 2010, Boston MA.
5. **Haspel N.**, Moll M., Baker, M.L., Chiu W. and Kavraki L.E. Tracing Conformational Changes in Proteins. *Proceedings of CSBW09* (Computational Structural Biology Workshop), 120-127, part of BIBM09 – IEEE international conference on Bioinformatics and Biomedicine, Nov. 2009, Washington DC.

SELECTED PRESENTATIONS

1. Conquering the Complexity of Protein Data, Bio-IT conference, Lehigh University, and Bio-IT 2011 (April 2011).
2. Haspel, N. (Presenter) Oral Presentation, Affordable departmental supercomputing to calculate protein dynamics, Bio-IT 2011, (April 2011).
3. Computing Structural Changes in Proteins, UMass Boston, Biology department seminar, Sep. 2009 (invited talk), George Mason University, CS department seminar, Nov. 2009 (invited talk).
4. **Haspel N.**, Moll M. and Kavraki L.E., HPC for Computational Structural Biology. Rice University annual HPC users workshop, 2008 (invited talk).
5. “Design of Novel Nano-structures using beta-helical protein segments”. University of Illinois at Urbana-Champaign, 2006 (seminar talk).
6. “A comparative study of the amyloid structures formed by the hCT peptide”. Ben-Gurion University, Beer-Sheva, Israel, 2004 (invited seminar talk).
7. “Computational study of protein folding pathways using the building blocks folding model”. National Cancer Institute, Frederick, MD, 2000 (invited seminar talk).

FUNDING AND RESOURCES

- AF: SMALL: Developing Novel Computational Methods for Investigating Protein Dynamics Using a Multi-Scale Approach, **Haspel N.** (PI), \$249,774, (September 1, 2011 - August 31, 2014).
- UMass Boston proposal development grant: Towards Rational Design of Amyloid-based Peptides to Self-assemble into Ordered Nano- or Micro-structures with Distinct Morphology. **Haspel N.** (PI), Zheng J., U. of Akron (Co-PI), April 2010 – December 2011 - \$10000.
- UMass Boston Healey Research grant: Identification and Characterization of Biologically Active Metabolic Fragments of Pituitary Hormones: Has an Entire Area of Cell Signaling Been Missed? Campbell K. (Co-PI), **Haspel N.** (Co-PI). April 2010 – June 2011, \$12000.
- PII award for instruction innovation: WUMP – women undergraduate mentoring program. Ding W. (PI), Haspel N.(Co-PI), O'Neil E. (Co-PI), Jan. 2010 - \$5000.

TEACHING

- **2010:** CS624, Analysis of Algorithms, UMass Boston.
- **2009-2011:** CS310, Advanced data structures and algorithms, UMass Boston.
- **2008:** Teaching assistant, COMP 450, Algorithmic Robotics, Rice University.
- **2006:** Lecturer, Programming for engineering students, Tel Aviv University.
- **2005,2006:** Teaching assistant, Introduction to Computer Science in Scheme, Tel Aviv University.
- **2003,2004:** Teaching assistant, Programming for engineering students, Tel Aviv University.
- **2005:** Lecturer, Programming for Chemistry students, Tel Aviv University.

MENTORED STUDENTS

- Kit Menlove (graduate student rotation project), Rice University. Advisor – Lydia Kavraki.
- Nick Zhu (undergraduate research project), Rice University. Advisor – Lydia Kavraki.
- Bahar Akbal (PhD student), UMass Boston.
- Rohith Kotla (PhD student), UMass Boston.
- Uma Vadhar (Msc Student). co-advisor. Main advisor – Kenneth Campbell, UMass Boston, department of Biology.
- Alex Jurgens – Undergraduate research project.
- Harold Gomez – Undergraduate honors thesis.

PROFESSIONAL DEVELOPMENT

CONFERENCE ORGANIZATION

- Computational Structural Biology Workshop (CSBW) 2011, co-chair.
- Bionetics 2010, special track on bioinformatics, chair.
- Bionetics 2010, special track on visualization, PC member.
- International Conference on Recent Advances in Technology, Engineering, Management and Science (ICRATEMS-2011) – advisory committee.

REVIEWER

- Proceedings of the National Academy of Science (PNAS).
- Computational Systems in Bioinformatics conference (CSB).
- RECOMB conference.
- Biopolymers: Peptide science.
- Journal of Bioinformatics and Computational Biology – special guest editor for the Bioinformatics track in BIONETICS 2010.
- IEEE/ACM transactions on Computational Biology and Bioinformatics.
- Journal of Organic Chemistry.
- PLoS Computational Biology.
- PLoS one.
- International Journal of Data Mining and Bioinformatics (IJDMB).
- Editorial board member of the book "Developing and Applying Biologically-Inspired Vision Systems: Interdisciplinary Concepts" to be published by IGI Global. Editors: Marc Pomplun and Jun Suzuki.
- Guest editor for a special issue in JBCB, June 2011 (associated with Bionetics).

MEMBER

- International Society for Computational Biology (ISCB).
- Association for Computing Machinery (ACM).
- Protein Society.
- Biophysical Society.
- IEEE, IEEE Women in Engineering.