NURCAN TUNCBAG, PHD

Middle East Technical University (METU)
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Date of Birth: December 09, 1982

Current Position

2016 – still   Assistant Professor, Middle East Technical University (METU) Graduate School of Informatics Department of Health Informatics

Past Positions

2014 – 2016   Independent Group Leader and FP7 the Marie Curie Action and TUBITAK Co-funded Brain Circulation Scheme Fellow at the Department of Health Informatics **Middle East Technical University (METU)**, Ankara Turkey

2010 – 2014   Postdoctoral Associate in Biological Engineering
Massachusetts Institute of Technology (MIT), Cambridge, MA
Supervisor: Prof. Ernest Fraenkel

January 2012 Visiting Researcher at **Microsoft New England Research and Development**, Cambridge, MA
In collaboration with Jennifer Chayes and Christian Borgs

January 2011 Visiting Researcher at **Politechnico di Torino**, Turin, Italy
In collaboration with Prof Riccardo Zecchina

July 2009 – August 2009 Visiting Researcher at **National Institute of Health (NIH), National Cancer Institute (NCI)**, Frederick, MD

2005 – 2010   Research Assistant at **Koç University**, Istanbul, Turkey

2005 – 2010   Teaching Assistant at **Koç University**, Istanbul, Turkey

July 2004   Intern at Mustafa Nevzat Pharmaceuticals

June 2003   Intern at the Scientific and Technological Research Council of Turkey (TUBITAK)

Education

2007 – 2010   Ph.D., Computational Science and Engineering
Koç University, Istanbul, Turkey
Dissertation Title: Multi-Scale Analysis and Prediction of Protein-Protein Interactions
Supervisors: Prof Ozlem Keskin & Prof Attila Gursoy

2005 – 2007	M.Sc., Computational Science and Engineering **Koç University**, Istanbul, Turkey *Dissertation Title:* Characterization and analysis of protein-protein interfaces *Supervisors:* Prof Ozlem Keskin
2000 – 2005	B.Sc., Chemical Engineering **Istanbul Technical University**, Istanbul, Turkey (with Honors)
2000	Uskudar Anatolian High School (with Honors)

Scientific/Academic honors

2016	ACM Conference on Bioinformatics, Computational Biology and Health Informatics Program Committee Member
2015	Young Scientist Award (BAGEP 2015) of the Science Academy in Turkey
2014 – 2016	FP7 the Marie Curie Action and TUBITAK Co-funded Brain Circulation Scheme Fellow
2014	ACM Conference on Bioinformatics, Computational Biology and Health Informatics Program Committee Member
2012	RECOMB, Barcelona, Spain – Travel Award, sponsored by International Society for Computational Biology
2012	ICBP Mathematical Modeling Meeting 2012, Tampa, USA. (Travel Support by NCI)
2010	Computer Science Student Workshop (CSW'10), Istanbul, Turkey – Best Work in-progress Paper Award
2009	ISMB/ECCB, Stockholm, Sweden – Travel Award, sponsored by BioSapiens
2008	ECCB, Cagliari, Italy – Travel Award, sponsored by EMBRACE
2007	ISMB/ECCB, Vienna, Austria – Student Council Travel Award, sponsored by European Bioinformatics Institute (EBI) assigned only to five people all over the Europe.
2007 – 2010	TUBITAK PhD Fellowship.
2007 – 2008	Director of the Graduate Student Association (GSA) at Koç University
2006 – 2007	TUBITAK, MS Fellowship.

Publications in International Peer-Reviewed Journals

1. **Tuncbag N**, Milani P, Pokorny JL, Johnson H, Sio TT, Dalin S, Iyekegbe DO, White F, Sarkaria JN, Fraenkel E (2016) Network Modeling Identifies Patient-specific Pathways in Glioblastoma, ***Scientific Reports***, 6:28668. doi: 10.1038/srep28668.

2. **Tuncbag N**, Gursoy A, Keskin O, Nussinov R. The potential impact of recent developments in three-dimensional quantitative interaction proteomics on structural biology. ***Expert Rev Proteomics***. 2016 May;13(5):447-9. doi: 10.1080/14789450.2016.

3. **Tuncbag N**, Gosline SJC, Kedaigle A, Soltis AR, Gitter A, Fraenkel E. Network-based interpretation of diverse high-throughput datasets through the Omics Integrator software package, ***PLOS Comp Bio***, 2016, *12(4):e1004879. doi: 10.1371/journal.pcbi.1004879*.

4. Keskin O, **Tuncbag N**, Gursoy A. Predicting Protein-Protein Interactions from the Molecular to the Proteome Level. ***Chemical Reviews***. 2016 Apr 27;116(8):4884-909. doi: 10.1021/acs.chemrev.5b00683.

5. Budak G, Eren-Ozsoy O, Aydin-Son Y, Can T, **Tuncbag N**. Modeling and reconstruction of temporal signaling networks in Salmonella-infected human cells, ***Frontiers in Microbiology***, 2015, 20(6):730.

6. Ersahin T, **Tuncbag N**, Cetin-Atalay R. The PI3K/AKT/mTOR interactive pathway, ***Molecular Biosystems***, 2015, 11(7):1946-54.

7. **Tuncbag N**, Braunstein A, Pagnani A, Huang SSC, Chayes J, Borgs C, Zecchina R, Fraenkel E. Simultaneous reconstruction of multiple signaling pathways via the prize-collecting Steiner forest problem, ***Journal of Computational Biology***, 2013, 20, pp. 1-13.

8. **Tuncbag N**, McCallum S, Huang SSC, Fraenkel E. SteinerNet: A Web Server for Integrating "Omic" data to Discover Hidden Components of Response Pathways, ***Nucleic Acids Research*** *(Web Server Issue)*, 2012, doi: 10.1093/nar/gks445.

9. **Tuncbag N**, Keskin O, Nussinov R, Gursoy A. Fast and Accurate Modeling of Protein-Protein Interactions by Combining Template-Interface-Based Docking with Flexible Refinement, ***Proteins: Structure, Function and Bioinformatics***, 2012, 80(4):1239-49.

10. **Tuncbag N**, Gursoy A, Nussinov R, Keskin O. Predicting Protein-Protein Interactions on a Proteome Scale by Matching Evolutionary and Structural Similarities at Interfaces Using PRISM, ***Nature Protocols***, 2011, 6(9):1341-54.

11. **Tuncbag N**, Gursoy A, Keskin O. Prediction of protein-protein interactions: Unifying evolution and structure at protein interfaces, ***Physical Biology***, 2011, 8(3):035006.

12. **Tuncbag N**, Keskin O, Gursoy A. "HotPoint: Hot Spot Prediction Server for Protein Interfaces" ***Nucleic Acids Research***, 2010, 38(Web Server issue):W402-6.

13. **Tuncbag N**, Salman FS, Keskin O, Gursoy A. "Analysis and network representation of hot spots in protein interfaces using minimum cut trees" ***Proteins: Structure, Function and Bioinformatics***, 2010, 78(10):2283-94.

14. **Tuncbag N**, Kar G, Gursoy A, Keskin O, Nussinov R. "Towards inferring time-dimensionality in protein-protein interaction networks by intergrating structures: the p53 example" ***Molecular Biosystems***, 2009, **5**:1770-1778.
    Amongst the top ten accessed articles in June, July, August 2011 and in February 2012.

15. **Tuncbag N**, Gursoy A, Keskin O. "Identification of computational hot spots in protein interfaces: Combining solvent accessibility and inter-residue potentials improves the accuracy" ***Bioinformatics***, 2009, 25(12):1513-1520.
    "Fast Breaking Paper in Engineering" by Thomson Reuters and Science Watch in December 2010 in the field of Computer Science

    Labelled "Highly cited paper" at Web of Science which received enough citations to place it in the top 1% of the academic field of Computer Science based on a highly cited threshold for the field and publication year.

16. **Tuncbag N**, Kar G, Gursoy A, Keskin O, Nussinov R. "A survey of available tools and web servers for analysis of protein–protein interactions and interfaces" ***Briefings in Bioinformatics***, 2009, 10:217-232.

17. Guney E, **Tuncbag N**, Keskin O, Gursoy A. "HotSprint: database of computational hot spots in protein interfaces" ***Nucleic Acids Research***, 36(Database Issue):D662-666, 2008.

18. Keskin O, **Tuncbag N**, Gursoy A. "Characterization and Prediction of Protein Interfaces to Infer Protein-Protein Interaction Networks" ***Curr. Phar. Biotech***., 9(2):67-76, 2008.

19. **Tuncbag N**, Guney E, Gursoy A, Keskin O, Nussinov R. "Architectures and Functional Coverage of Protein-Protein Interfaces" ***Journal of Molecular Biology***, 381:785-802, 2008.

Talks & Posters

1. X Annual Congress of the European Proteomics Association, 22-25 June 2016 (Invited Talk)
2. Bilkent University, Molecular Biology and Genetics Seminar Series, December 2015 (Invited Talk)
3. Gazi Pharma Symposium Series, Antalya, Turkey, November 2015 (Invited Talk)
4. MolBioCon'15, Ankara Turkey, November 2015 (Invited Talk)
5. METU, Department of Chemistry, November 2015 (Invited Talk)
6. METU, Department of Biology, November 2015 (Invited Talk)
7. University of Zurich, von Mering Lab, October 2015 (Invited Talk)
8. HIBIT 2015, October 2015 (Poster)
9. ISMB/ECCB 2015, July 2015 (Poster)
10. METU, Biomedical Engineering Seminar Series, Ankara, Turkey, October 2014 (Invited Talk)
11. ITU, Istanbul Turkey, March 2013 (Invited Talk)
12. METU, Ankara Turkey, March 2013 (Invited Talk)
13. Bilkent University, Ankara Turkey, March 2013 (Invited Talk)
14. Yeditepe University, Istanbul Turkey, March 2012 (Invited Talk)
15. Turkish Chemical Engineering Society, Istanbul Turkey, November 2012 (Invited Talk)
16. Koc University College of Engineering Seminar Series, Istanbul Turkey, November 2012 (Invited Talk)
17. ICBP Retreat 2012, Danver, MA, USA (Talk)
18. RECOMB 2012, Barcelona, Spain (**Travel Award, sponsored by International Society for Computational Biology)** (Talk)
19. ICBP Mathematical Modeling Meeting 2012, Tampa, USA. (**Travel Support by NCI**) (Poster)
20. MIT-Biological Engineering Retreat 2011, Boston, USA (Poster)
21. Protein Society Symposium 2011, Boston, USA (Poster)
22. 3DSIG-ISMB/ECCB 2011, Vienna, Austria (Talk, **presented by Prof. Ruth Nussinov as the Keynote**)
23. Biophysical Society Meeting 2011, Baltimore, USA (Poster)
24. ISMB 2010, Boston, USA (Poster)
25. 3dSig-ISMB 2010, Boston, USA (Poster)
26. HIBIT'10, Antalya, Turkey (Poster)

27. Computer Science Student Workshop (CSW'10), Istanbul, Turkey (**Best Work in-progress Paper Award**) (Talk)
28. ISMB/ECCB 2009, Stockholm, Sweden (Poster)
29. 3dSig-ISMB/ECCB 2009, Stockholm, Sweden. (**Travel Award, sponsored by BioSapiens**) (Poster)
30. ECCB 2008, Cagliari, Italy. (**Travel Award, sponsored by EMBRACE**) (Poster)
31. ISMB/ECCB 2007, Vienna. (**Student Council Travel Award, sponsored by European Bioinformatics Institute (EBI) assigned only 5 people all over the Europe.**) (Poster)
32. ISMB/ECCB 2007, Vienna (Poster)
33. 51st Biophysical Society Annual Meeting in Baltimore, Maryland, USA, March 3-7, 2007 (Poster)

Students under Supervision

Gungor Budak (MS graduate in Bioinformatics, METU)
Tugba Kaya (MS candidate in Bioinformatics, METU)
Seyma Unsal Beyge (PhD student in Bioinformatics, METU)
Rumeysa Fayetorbay (MS candidate in Bioinformatics, METU)
Cansu Demirel (MS candidate in Bioinformatics, METU)
Cansu Dincer (MS candidate in Bioinformatics, METU)
Gokce Senger (Undergraduate, Izmir Institute of Technology)
Amanda Kedaigle (mentored during the rotation in Comp. and Systems Biology, MIT)
Natasha Patel-Murray (mentored during the rotation in Comp. and Systems Biology, MIT)
Almas Abdulla (Undergraduate Research Opportunities Program (UROP) student, MIT)

Courses Taught

BIN500   Programming for Informatics (Spring 2015, Fall 2015, Fall 2016), METU (**Primary Instructor**)
BIN503   Biological Databases and Data Analysis Tools (Fall 2014, Spring 2015), METU (**Primary Instructor**)
ChBI201   Introduction to Chemical and Biological Engineering, Koç University (Teaching Assistant)
ChBI308   Chemical Reaction Engineering, Koç University (Teaching Assistant)
CMSE520   Biomolecular Structure, Function and Dynamics (Grad Course), Koç University (Teaching Assistant)
ECOE570   Bioinformatics and Algorithms in Computational Biology (Grad Course), Koç University (Teaching Assistant)

Research interests

Systems biology of different types of human cancers.
- Revealing how the networks of interactions among proteins and genome are altered in cells during disease.
- Combination of proteome, interactome and transcriptional data to infer sub-components of signaling and regulatory networks.

- Analysis of next-generation sequencing data and integrating them in a network context
- Simultaneous re-construction of multiple pathways via prize-collecting Steiner forest.
- Identification of common pathways across various xenograft models of human Glioblastoma by integrating proteomic and interactome data.

Structural analysis and characterization of protein interactions using computational methods.
- Construction of the non-redundant dataset of protein interfaces
- Architectures and functional coverage of protein interfaces
- Prediction of hot spots in protein interfaces
- Prediction of protein-protein interactions using structural matching and flexible refinement
- Incorporation of time dimensionality into protein interaction networks
- Binding site cooperativity in multi-partner proteins

Released Softwares, Webservers and Databases Contributed

Omics Integrator (Software, http://fraenkel-nsf.csbi.mit.edu/omicsintegrator/)
STEINERNET (Webserver, http://fraenkel.mit.edu/steinernet/).
PRISM (Software and Webserver, http://prism.ccbb.ku.edu.tr/prism).
HOTPOINT (Webserver, http://prism.ccbb.ku.edu.tr/hotpoint).
PRINT (Database, http://prism.ccbb.ku.edu.tr/print).
HOTSPRINT (Database, http://prism.ccbb.ku.edu.tr/hotsprint).

Technical Skills

Operating Systems: Windows, Unix/Linux
Programming Languages: Fortran, Python, Matlab
Other Tools: Advanced knowledge in high-throughput sequencing analysis tools (Galaxy, Tophat, Cufflinks, Cuffdiff, MACS, MapSplice etc.), protein structure analysis and visualization (Multiprot, Surfnet, Consurf, Pymol, VMD, Rasmol, ClustalW, FoldX, FiberDock), network visualization (Cytoscape)

Referee in International Peer-reviewed Journals and Proceedings

PLOS Computational Biology
Oxford Bioinformatics
PLOS One
Proteins: Structure, Function & Bioinformatics
Transactions on Computational Biology and Bioinformatics
BMC Structural Biology
BMC Bioinformatics
OMICS
Nucleic Acids Research
Oxford Briefings in Bioinformatics

Trends in Biotechnology (Cell Publishing Group)
Molecular Biosytems
Computers in Biology and Medicine
ACM Conference on Bioinformatics, Computational Biology and Health Informatics