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Academic Positions

2017 – present	Associate Professor	METU Department of Health Informatics
2016 – 2017	Assistant Professor	METU Department of Health Informatics
2014 – 2016	Independent Group Leader	METU Department of Health Informatics
2010 – 2014	Postdoctoral Associate	MIT Biological Engineering
		Supervisor: Prof. Ernest Fraenkel
Jan 2012	Visiting Researcher	Microsoft New England Research and Development
		In collaboration with Jennifer Chayes and Christian Borgs
Jan 2011	Visiting Researcher,	Politechnico di Torino
		In collaboration with Prof Riccardo Zecchina
July 2009	Visiting Researcher	National Institute of Health (NIH), National Cancer Institute (NCI)
2005 – 2010	Research and Teaching Assistant,	Koç University

Education

2007 – 2010	Koç University, Ph.D, Computational Science and Engineering, (Supervisors: Prof Ozlem Keskin & Prof Attila Gursoy, Thesis Title: Multi-Scale Analysis and Prediction of Protein-Protein Interactions)
2005 – 2007	Koç University, M.S., Computational Science and Engineering (Supervisor: Prof Ozlem Keskin, Thesis Title: Characterization and analysis of protein-protein interfaces
2000 – 2005	Istanbul Technical University, B.S., Chemical Engineering (with Honors)

GRANTS

2017 – 2020   TUBITAK 3501 Career Development Program Grant
Project Title: "Reconstruction of the Tumor-Specific Protein Interaction Networks in Human Cancers via Alternative Splicing Events"
2016 – 2017   METU – BAP Grant
Project Title: "Structural Modeling of the Patient Specific Networks in Glioblastoma"

2014 – 2016   FP7 the Marie Curie Action and TUBITAK Co-funded Brain Circulation Scheme
                Fellowship
Project Title: "Multi-dimensional modelling of the disease networks in atomic detail by data
                integration across several cancer types"

Scientific/Academic honors and Fellowships

- National L'Oréal-UNESCO For Women in Science Award in Life Sciences, 2018
- Parlar Foundation, Young Scientist Award (Parlar Vakfı Araştırma Teşvik Ödülü), 2017
- The Dissertation of the Year Award at ODTU (given to my advisee Gungor Budak) by ODTU Parlar Foundation, 2016
- Young Scientist Award (BAGEP 2015) of the Science Academy in Turkey, 2015
- FP7 the Marie Curie Action and TUBITAK Co-funded Brain Circulation Scheme Fellowship, 2014-2016
- RECOMB, Barcelona, Spain – Travel Award, sponsored by International Society for Computational Biology, 2012
- ICBP Mathematical Modeling Meeting 2012, Tampa, USA. (Travel Support by NCI)
- Computer Science Student Workshop (CSW'10), Istanbul, Turkey – Best Work in-progress Paper Award, 2010
- ISMB/ECCB, Stockholm, Sweden – Travel Award, sponsored by BioSapiens, 2009
- ECCB, Cagliari, Italy – Travel Award, sponsored by EMBRACE, 2008
- ISMB/ECCB, Vienna, Austria – Student Council Travel Award, sponsored by European Bioinformatics Institute (EBI) assigned only to five people all over the Europe, 2007
- TUBITAK PhD Fellowship, 2007-2010
- TUBITAK, MS Fellowship, 2006-2007

Professional Activities

- Reviewer for Scientific Reports, 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 Biosystems, Computers in Biology and Medicine, ACM Conference on Bioinformatics, Computational Biology and Health Informatics
- Co-Chair and the Organization Committee member of the 10th International Symposium on Health Informatics and Bioinformatics (HIBIT), June 28-30, 2017
- Program Committee Member at ACM Conference on Bioinformatics, Computational Biology and Health Informatics, 2016
- Program Committee Member at ACM Conference on Bioinformatics, Computational Biology and Health Informatics Program Committee Member, 2014
- Director of the Graduate Student Association (GSA) at Koç University, 2007 – 2008

Publications

1. Demirel HC, Dogan T, **Tuncbag N**. (2018) A Structural Perspective on the Modulation of Protein-Protein Interactions with Small Molecules, ***Curr Top Med Chem.*** doi: 10.2174/1568026618666180601080824. [Epub ahead of print]

2.   Atas H, **Tuncbag N**, Doğan T. (2018) Phylogenetic and Other Conservation-Based Approaches to Predict Protein Functional Sites, ***Methods Mol Biol***.,1762:51-69. doi: 10.1007/978-1-4939-7756-7_4.

3.   Karayel O, Sanal E, Giese SH, Uretmen Kagıalı ZC, Polat AN, Hu CK, Renard BY, **Tuncbag N**, Ozlu N (2017) Comparative phosphoproteomic analysis reveals signaling networks that regulate cytokinesis, ***Scientific Reports***, 8(1):2269. doi: 10.1038/s41598-018-20231-5

4.   Kacar B, Garmendia E, **Tuncbag** N, Andersson DI, Hughes D. (2017) Functional Constraints on Replacing an Essential Gene with Its Ancient and Modern Homologs, ***mBio***, doi: 10.1128/mBio.01276-17

5.   Khurana V, Peng J, Chung CY, Auluck PK, Fanning S, Tardiff DF, Bartels T, Koeva M, Eichhorn SW, Benyamini H, Lou Y, Nutter-Upham A, Baru V, Freyzon Y, **Tuncbag N**, Costanzo M, San Luis B, Schöndorf DC, Barrasa MI, Ehsani S, Sanjana N, Zhong Q, Gasser T, Bartel DP, Vidal M, Deleidi M, Boone C, Fraenkel E, Berger B, Lindquist S (2017) Genome-scale networks link neurodegenerative disease genes to alpha-synuclein through specific molecular pathways, ***Cell Systems***, doi:10.1016/j.cels.2016.12.011.

6.   **Tuncbag N**, Keskin O, Nussinov R, Gursoy A (2017) Prediction of Protein Interactions by Structural Matching: Prediction of PPI Networks and the Effects of Mutations on PPIs that Combines Sequence and Structural Information, ***Methods in Molecular Biology***, 1558:255-270. (book chapter).

7.   **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.

8.   **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.

9.   **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.*

     Out of all 2016 articles, it was in the top 50 most downloaded.

10. 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.

11. 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.

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

13. **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.

14. **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.

15. **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.

16. **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.

    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.

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

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

19. **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.

20. **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.

21. **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.

22. **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.

23. 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.

24. 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.

25. **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.

Current Graduate Students at METU

- Gungor Budak (PhD student in Computer Engineering, METU)
- Poorya Parvizi (PhD student in Medical Informatics, METU)
- Seyma Unsal Beyge (PhD student in Medical Informatics, METU)
- Kaan Arici (PhD student in Medical Informatics, METU)
- Melike Caglayan (PhD student in Medical Informatics, METU)
- Mecit Sari (PhD student in Medical Informatics, METU)
- Tugba Kaya (MS candidate in Bioinformatics, METU)
- Cansu Demirel (MS candidate in Bioinformatics, METU)
- Cansu Dincer (MS candidate in Bioinformatics, METU)
- Gokce Senger (MS candidate in Bioinformatics, METU)

Courses Taught

BIN500   Programming for Informatics (effective in Spring 2015), METU (**Primary Instructor**)

BIN503   Biological Databases and Data Analysis Tools (Fall 2014, Spring 2015), METU (**Primary Instructor**)

BIN515   Structural Bioinformatics (effective in Spring 2017) (**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 and Contributed Software, Webservers and Databases

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).

Talks and Posters

1. Hacettepe University, Department of Computer Engineering, April 2018 (Invited Talk)
2. Ankara University, Biotechnology Institute, April 2018 (Invited Talk)
3. Great Lakes Bioinformatics Conference, May 15 - 17, 2017 (Selected Talk)
4. HIBIT 2017, June 2017 (Poster)
5. X Annual Congress of the European Proteomics Association, June 22-25, 2016 (Invited Talk)
6. Bilkent University, Molecular Biology and Genetics Seminar Series, December 2015 (Invited Talk)
7. Gazi Pharma Symposium Series, Antalya, Turkey, November 2015 (Invited Talk)
8. MolBioCon'15, Ankara Turkey, November 2015 (Invited Talk)
9. METU, Department of Chemistry, November 2015 (Invited Talk)
10. METU, Department of Biology, November 2015 (Invited Talk)
11. University of Zurich, von Mering Lab, October 2015 (Invited Talk)
12. HIBIT 2015, October 2015 (Poster)
13. ISMB/ECCB 2015, July 2015 (Poster)
14. METU, Biomedical Engineering Seminar Series, Ankara, Turkey, October 2014 (Invited Talk)
15. ITU, Istanbul Turkey, March 2013 (Invited Talk)
16. METU, Ankara Turkey, March 2013 (Invited Talk)
17. Bilkent University, Ankara Turkey, March 2013 (Invited Talk)
18. Yeditepe University, Istanbul Turkey, March 2012 (Invited Talk)
19. Turkish Chemical Engineering Society, Istanbul Turkey, November 2012 (Invited Talk)
20. Koc University College of Engineering Seminar Series, Istanbul Turkey, November 2012 (Invited Talk)
21. ICBP Retreat 2012, Danver, MA, USA (Talk)
22. RECOMB 2012, Barcelona, Spain (Travel Award, sponsored by International Society for Computational Biology) (Talk)
23. ICBP Mathematical Modeling Meeting 2012, Tampa, USA. (Travel Support by NCI) (Poster)
24. MIT-Biological Engineering Retreat 2011, Boston, USA (Poster)
25. Protein Society Symposium 2011, Boston, USA (Poster)
26. 3DSIG-ISMB/ECCB 2011, Vienna, Austria (Talk, presented by Prof. Ruth Nussinov as the Keynote)
27. Biophysical Society Meeting 2011, Baltimore, USA (Poster)
28. ISMB 2010, Boston, USA (Poster)
29. 3dSig-ISMB 2010, Boston, USA (Poster)
30. HIBIT'10, Antalya, Turkey (Poster)
31. Computer Science Student Workshop (CSW'10), Istanbul, Turkey (Best Work in-progress Paper Award) (Talk)
32. ISMB/ECCB 2009, Stockholm, Sweden (Poster)
33. 3dSig-ISMB/ECCB 2009, Stockholm, Sweden. (Travel Award, sponsored by BioSapiens) (Poster)

34. ECCB 2008, Cagliari, Italy. (Travel Award, sponsored by EMBRACE) (Poster)
35. ISMB/ECCB 2007, Vienna. (Student Council Travel Award, sponsored by European Bioinformatics Institute (EBI) assigned only 5 people all over the Europe.) (Poster)
36. ISMB/ECCB 2007, Vienna (Poster)
37. 51st Biophysical Society Annual Meeting in Baltimore, Maryland, USA, March 3-7, 2007 (Poster)

References

1. Prof. Ernest Fraenkel, Biological Engineering, Massachusetts Institute of Technology, Cambridge, MA USA, Tel: +1 617 258 8702 E-mail: fraenkel@mit.edu

2. Prof. Ozlem Keskin, Chemical and Biological Engineering, Koç University, İstanbul, Tel:+90 212 338 1538, E-mail: okeskin@ku.edu.tr

3. Prof. Attila Gursoy, Computer Engineering, Koç University, İstanbul Turkey, Tel:+90 212 338 1720, E-mail: agursoy@ku.edu.tr

4. Prof. Ruth Nussinov, Center for Cancer Research, National Cancer Institute Frederick, MD USA, Tel: +1 301 846 5579 E-mail: nussinor@helix.nih.gov