

Duygu Ucar

CONTACT INFORMATION Jackson Laboratory for Genomic Medicine
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CURRENT POSITION **2013-now, Assistant Professor - Jackson Laboratories for Genomic Medicine**
Epigenomics/Computational biology/Genomics of aging

TRAINING **2010-2013, Stanford University**, Stanford, CA USA
Post-doctoral fellow, Genetics Department
2009-2010, University of Iowa, Iowa City, IA USA
NSF Computing Innovation fellow, Internal Medicine Department
2003-2009, Ohio State University, Columbus, OH USA
Ph.D., Computer Science, August 2009
1998-2003, Bilkent University, Ankara, Turkey
B.S., Computer Science, May, 2003

OTHER RESEARCH EXPERIENCE **January 2008 - July 2008, Technical University of Denmark**, Copenhagen, Denmark
Guest Researcher, Center for Biological Sequence
June 2006 - September 2006, Bristol Myers Squibb, Hopewell, NJ, USA
Research Intern, Applied Genomics Department

PUBLICATIONS

PEER-REVIEWED ARTICLES Nathan Lawlor, Shubham Khetan, **Duygu Ucar**, Michael L. Stitzel. Genomics of Islet (Dys)function and Type 2 Diabetes. *Trends in Genetics*, in press.

Duygu Ucar and Berenice A. Benayoun. Aging epigenetics: changes and challenges, Book chapter in *Epigenetics of Aging and Longevity*, Elsevier, in press.

Esra Kurum, Berenice A. Benayoun, Ankit Malhotra, Joshy George, and **Duygu Ucar**. Computational inference of a genomic pluripotency signature in human and mouse stem cells **Biology Direct**, 2016, 11(1) 47.

Asa Thibodeau, Eladio Marquez, Oscar Luo, Yijun Ruan, Francesca Menghi, Dong-Guk Shin, Michael L. Stitzel, Paola Vera-Licona, **Duygu Ucar**. QuIN: A web server for Querying and visualizing Chromatin Interaction Networks. **PLOS Computational Biology**, 2016. 12(6): p. e1004809.PMCID: 4919057.

Joshy George, Asli Uyar, Kira Young, Lauren Kuffler, Kaiden Waldron-Francis, Eladio Marquez, **Duygu Ucar**, Jennifer Trowbridge. Leukaemia cell of origin identified by chromatin landscape of bulk tumour cells. **Nature Communications**, 2016. 7(Article number: 12166).

Francesca Menghi, Koichiro Inaki, Xing Yi Woob, Pooja Kumara, Krzysztof Grzedaa, Ankit Malhotra, Hyunsoo Kima, **Duygu Ucar**, Phung Trang Shreckengast, Joel P. Wagner, Jeff Chuang, and Edison T. Liu. The tandem duplicator phenotype in cancer genomes. **PNAS**, 2016 Apr 26;113(17):E2373-82.

Julian Zubek, Michael Stitzel, **Duygu Ucar***, and Dariusz Plewczynski*. Computational inference of H3K4me3 and H3K27ac domain length. **PeerJ**, 2016 Mar 14;4:e1750. doi: 10.7717/peerj.1750.
*co-corresponding.

Michael L. Stitzel, Ina Kycia, Romy Kursawe, and **Duygu Ucar** (2015). Transcriptional regulation of the pancreatic islet: implications for islet function. **Current Diabetes Reports** , 2015 Sep;15(9):66.

Duygu Ucar and Douglas Lin (2015). Amplification of the bromodomain-containing protein 4 gene in ovarian high-grade serous carcinoma is associated with worse prognosis and survival. **Molecular and Clinical Oncology** ,2015 Nov;3(6):1291-1294.

Dashzeveg Bayarsaihan and **Duygu Ucar** (2015). Cell-specific gene promoters are marked by broader spans of H3K4me3 and are associated with robust gene expression patterns. **Epigenomics** Editorial article , 2015;7(2):129-31.

Rakhi Gupta, Andrea Wills, **Duygu Ucar**, Julie Baker, (2014) Developmental enhancers are marked independently of zygotic Nodal signals in Xenopus **Developmental Biology**, 395(1):38-49.

Berenice A. Benayoun+, Elizabeth A. Pollina+, **Duygu Ucar**+, Edith D. Wong, Elena Mancini, Salah Mahmoudi, Benjamin C. Hitz, Keerthana Devarajan, Rakhi Gupta, Thomas A. Rando, Julie C. Baker, Michael P. Snyder, J. Michael Cherry, and Anne Brunet (2014) H3K4me3 breadth is linked to cell identity and transcriptional consistency. (+co-first authors) **Cell**, 158(3):673-688.

Ashley E. Webb, Elizabeth A. Pollina, Thomas Vierbuchen, Noelia Urban, **Duygu Ucar**, Dena S. Leeman, Ben Martynoga, Madhavi Sewak, Thomas A. Rando, Francois Guillemot, Marius Wernig and Anne Brunet (2013) FOXO3 shares common targets with ASCL1 genome-wide and inhibits ASCL1-dependent neurogenesis (2013). **Cell Reports**, 4(3):477-491.

Victoria A Rafalski, PP Ho, Jamie O Brett, **Duygu Ucar** , JC Dugas , Elizabeth A. Pollina, LM Chow, A Ibrahim, SJ Baker , BA Barres , L Steinman , and Anne Brunet (2013) Expansion of oligodendrocyte progenitor cells following SIRT1 inactivation in the adult brain. **Nature Cell Biology**, 15(6):614-24.

Dervis A.M. Salih, Asim J. Rashid, Damien Colas, Luis de la Torre-Ubieta, Ruo P. Zhu, Alexander A. Morgan, Evan E. Santo, Duygu Ucar, Keerthana Devarajan, Christina J. Cole, Daniel V. Madison, Mehrdad Shamloo, Atul J. Butte, Azad Bonni, Sheena A. Josselyn, Anne Brunet (2012) FoxO6 regulates memory consolidation and synaptic function **Genes Development**, 26(24): 2780-2801.

Eric L. Greer, Travis J. Maures, **Duygu Ucar**, Anna G. Hauswirth, Elena Mancini, Jana P. Lim, Berenice Benayoun, Yang Shi, and Anne Brunet (2011) Transgenerational Epigenetic Inheritance of Longevity in *C. elegans*. **Nature**, 479(7373): 365-371.

Duygu Ucar, Qingyang Hu, and Kai Tan (2011) Combinatorial chromatin modification patterns in the human genome revealed by subspace clustering. **Nucleic Acids Research**, 39(10):4063-4075.

Hiram Firpi, **Duygu Ucar**, and Kai Tan (2010) Discovering Regulatory DNA Elements Using Chromatin Signatures and Artificial Neural Network **Bioinformatics**, 26(13):1579-1586.

Sitaram Asur, Srinivasan Parthasarathy, and **Duygu Ucar** (2009) An Event-based Framework for Characterizing the Evolutionary Behavior of Interaction Graphs. **ACM Transactions on Knowledge Discovery from Data (TKDD)**, 3(4).

Duygu Ucar, Andreas Beyer, Srinivasan Parthasarathy, and Christopher T. Workman (2009) Predicting functionality of protein-DNA interactions by integrating diverse evidence. **Bioinformatics (ISMB'09 Proceedings)**, 25(12): 137-144.

Duygu Ucar, Isaac Neuhaus, Petra Ross-MacDonald, Charles Tilford, Srinivasan Parthasarathy,

Nathan Siemers, and Rui-Ru Ji (2007) Construction of a Reference Gene Association Network from Multiple Profiling Data: Application to HIV Data Analysis. **Bioinformatics**, 23(20): 2716-2724.

Sitaram Asur, **Duygu Ucar**, and Srinivasan Parthasarathy (2007) An Ensemble Framework for Clustering Protein-Protein Interaction Networks. **Bioinformatics (ISMB'07 Proceedings)**, 23(13): 29-40.

Hui Yang, Srinivasan Parthasarathy, and **Duygu Ucar** (2007) A spatio-temporal mining approach towards summarizing and analyzing protein folding trajectories. **Algorithms for Molecular Biology**, 2:3.

PEER-REVIEWED
CONFERENCE AND
WORKSHOP
ARTICLES

Full papers appeared in conferences/workshops after thorough referee evaluation. Considered equivalent to journal publications within the Computer Science community as well as by NSF guidelines.

ISMB conference publish accepted articles directly in special Bioinformatics journal after thorough peer review. These articles are indicated with a †. Corresponding journal publication information is listed under 'Peer-Reviewed Journal Articles'.

Venu Satuluri, Srinivasan Parthasarathy, and **Duygu Ucar** (2010) Markov Clustering of Protein Interaction Networks with Improved Balance and Scalability. ACM Int'l Conference on Bioinformatics and Computational Biology, **ACM-BCB**. (Acceptance Rate = 28%)

Duygu Ucar, Andreas Beyer, Srinivasan Parthasarathy, and Christopher T. Workman (2009) Predicting Functionality of Protein-DNA Interactions by Integrating Diverse Evidence. The 17th Int'l Conference on Intelligent Systems for Molecular Biology, **ISMB** (Acceptance Rate = 18%) †.

Duygu Ucar, Fatih Altiparmak, Hakan Ferhatosmanoglu, and Srinivasan Parthasarathy (2009) Mutual Information Based Extrinsic Similarity for Microarray Analysis. Int'l Conference on Bioinformatics and Computational Biology, **BiCoB** (Acceptance Rate = 42%).

Duygu Ucar, Fatih Altiparmak, Hakan Ferhatosmanoglu, and Srinivasan Parthasarathy (2007) Investigating the use of Extrinsic Similarity Measures for Microarray Analysis. 6th Int'l Workshop on Data Mining in Bioinformatics **BioKDD** held at 13th ACM Int'l Conference on Knowledge Discovery and Data Mining, **SIGKDD**, (Acceptance Rate = 24%).

Sitaram Asur, **Duygu Ucar**, and Srinivasan Parthasarathy (2007) An Ensemble Framework for Clustering Protein-Protein Interaction Networks. The 15th Int'l Conference on Intelligent Systems for Molecular Biology, **ISMB**, (Acceptance Rate: 15%) †.

Sitaram Asur, Srinivasan Parthasarathy, and **Duygu Ucar** (2007) An Event-based Framework for Characterizing the Evolutionary Behavior of Interaction Graphs. The 13th Int'l Conference on Knowledge Discovery and Data Mining, **SIGKDD**, **Best Applications Paper Award**, (Acceptance Rate = 20%).

Duygu Ucar, Sitaram Asur, Umit Catalyurek, and Srinivasan Parthasarathy (2006) Functional Modularity in Protein-Protein Interactions Graphs Using Hub-induced Subgraphs. The 17th European Conference on Principles and Practice of Knowledge Discovery in Databases, **PKDD**, (Acceptance Rate= 9%).

Sitaram Asur, Srinivasan Parthasarathy, and **Duygu Ucar** (2006) An Ensemble Approach for Clustering Scale-Free Graphs. The **LinkKDD** workshop - 12th ACM Int'l Conference on Knowledge Discovery and Data Mining **SIGKDD**, (Acceptance Rate = 33%).

Hui Yang, Srinivasan Parthasarathy, and **Duygu Ucar** (2006) Protein Folding Trajectories Analysis:

Summarization, Folding Events Detection and Common Partial Folding Pathway Identification. 5th Int'l Workshop on Data Mining in Bioinformatics **BioKDD** held at 12th ACM International Conference on Knowledge Discovery and Data Mining SIGKDD, (Acceptance Rate = 24%).

Duygu Ucar, Srinivasan Parthasarathy, Sitaram Asur and Chao Wang (2005) Effective Pre-processing Strategies for Functional Clustering of a Protein-Protein Interactions Network. The 5th IEEE Symposium on Bioinformatics and Bioengineering, **BIBE**, (Acceptance Rate = 18%).

INVITED BOOK
CHAPTERS

Srinivasan Parthasarathy, Shirish Tatikonda, and **Duygu Ucar** (2009) A Survey of Graph Mining Techniques for Biological Datasets, **Managing and Mining Graph Data** 547:580.

INVITED TALKS

- The chromatin accessibility signature of human immune system aging stems from memory CD8+ T cells. Keystone Epigenetics and Aging meeting. Santa Fe, New Mexico. March, 2016.
- Epigenetic remodeling of human immune system aging. Brown University. Providence, RI. March, 2016.
- Software and Computational Platforms to Integrate Diverse Genomics and Epigenomic Datasets. 23rd International Molecular Medicine Tri-Conference, San Francisco, CA. March, 2016.
- Epigenetic of Aging. University of Connecticut Health Center. Aging Center. Farmington, CT. November, 2015.
- Search for an epigenetic cell identity signature. Seoul National University. Seoul, Korea. November, 2014.
- An epigenetic biomarker for cell identity. Vanderbilt University Medical Center. Center for Human Genetics Research, April, 2014.
- Epigenetic Pattern Mining. Albert Einstein College of Medicine. Department of Systems and Computational Biology, May, 2012.
- Epigenetic Pattern Mining. Jackson Laboratory. March, 2012.
- Supervised and Unsupervised Models to Analyze Human Epigenetic Data. IBM Computational Biology Group, Yorktown Heights, NY. June 2010.
- A Biclustering Algorithm to Explore Combinatorial Epigenetic Code. Harvard Medical School, Boston, MA. June 2010.
- A Computational Model to Explore Combinatorial Epigenetic Code. Stanford Genetics Department, Palo Alto, CA. May 2010.
- A Computational Model to Explore Combinatorial Epigenetic Code. The University of Iowa, Computer Science Department. Iowa City, Iowa. March 2010.
- Constructing condition-dependent regulatory networks from diverse evidence. Technical University of Dresden, BIOTEC, Dresden, Germany. July 2010.
- Constructing and analyzing biological interaction networks for knowledge discovery. Battelle Center for Mathematical Medicine, The Research Institute at Nationwide Children's Hospital, Columbus, OH, June 2009.
- Constructing Biological Networks for Knowledge Discovery. Netherlands Cancer Institute, Amsterdam, Netherlands. May 2009.
- Extraction and Analysis of Biological Networks. Drexel University. School of Biomedical Engineering. February 2009.
- Data Mining Strategies for Information Extraction from Protein Interactions Networks. Workshop on Discrete Models for Systems Biology, Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, NC. December 2008.
- Constructing, Mining, and Integrating Biological Networks for Knowledge Discovery. Delft University of Technology, Information and Communication Theory Group, Delft, Netherlands. March 2008.
- Construction of a Reference Gene Association Network from Multiple Profiling Data: Application to HIV gene expression datasets. Applied Genomics Department Bristol Myers Squibb, Hopewell, NJ. September 2006.

TEACHING AND
MENTORING
EXPERIENCE

2008-present, Student Mentoring

- Gokul Parakulan, UC Davis , JAX summer student program (summer 2016)
- Shubham Khetan, University of Connecticut , Biomedical Sciences, PhD student (2015-current)
- Sumaira Zaman, University of Connecticut , JAX summer student program (summer 2015)
- Asa Thibodeau, University of Connecticut , Computer Science, PhD student (2014-current)
- Haley Strassner, University of Connecticut , JAX summer student program (summer 2014)
- Elizabeth Ann Pollina, Stanford University, Genetics, PhD student (2010-2013)
- LeeAnn Perry, Stanford University, Genetics , Summer student (summer 2011)
- Qingyang Hu, University of Iowa, Computer Science, Master's student(2009-2010)

PROFESSIONAL
SERVICE

National Science Foundation Panel Member

3 panels within the CISE (Computer & Information Science & Engineering) and BIO (Biological Sciences) directorates (2010-2011)

Reviewer for Scientific Journals

Aging Cell, 2016

PLOS (Public Library of Science) Computational Biology, 2010, 2015

Nucleic Acids Research, 2014

Bioinformatics, 2010, 2011

BMC (Biomed Central) Bioinformatics, 2008, 2010

Transactions on Knowledge and Data Engineering, 2010, 2011

BMC (Biomed Central) Genomics, 2010

Reviewer for Scientific Conferences

SIGKDD (Special Interest Group on Knowledge Discovery and Data mining) 2011

SDM (SIAM International Conference on Data Mining) 2010

BioKDD (International Workshop on Data Mining in Bioinformatics) 2011

BiCoB (Int'l Conf. on Bioinformatics and Computational Biology) 2010, 2011

BIBM (Int'l Conf. on Bioinformatics and Medicine) 2010, 2011

ACM-BCB (Int'l Conf. on Bioinformatics and Computational Biology) 2010,2011

Program Committees

2nd and 3rd Int'l Conf. on Bioinformatics and Computational Biology (BiCoB), 2010, 2011,2012

2nd ACM Conf. on Bioinformatics and Computational Biology (ACM-BCB), 2011

IEEE Int'l Conf. on Bioinformatics and Medicine (BIBM), 2010, 2011,2012,2013

17th ACM SigKDD Conf. on Knowledge Discovery and Data Mining (KDD), 2011

10th Int'l Workshop on Data Mining in Bioinformatics (Bio-KDD), 2011