

Cemal Çağatay Bilgin

Contact Information

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Interests

Computer Aided Tissue Modeling, Graph Theory, Image Analysis, Machine Learning and Computational Biology.

Education

Rensselaer Polytechnic Institute, Troy, New York, USA
Ph.D. Computer Science, 2005 - 2011 May(Expected)
M.S. Computer Science, 2005 - 2007
Bilkent University, Ankara, Turkey
B.S. Computer Engineering, 2001 - 2005

Research

Rensselaer Polytechnic Institute, Troy, NY, USA *Graduate Student August, 2005 - present*

- Characterized and classified histopathological brain, breast, bone and prostate tissues and salivary gland and various stem-cell specimens using global and local topological and morphological features.
- Analyzed, designed and developed methods to describe, track and quantify the spatio-temporal organizational changes that occur over time in 3D biological events.
- Designed and developed graph theoretical models for cell to cell, cell to ECM, cell to actin and ECM interactions during cell-mediated compaction and remodeling to quantify and decide if a tissue is progressing toward a desired state.
- Developed techniques, worked on FE models, and simulations required for salivary gland branching morphogenesis modeling.
- Developed registration, segmentation, enhancement and classification tools for histopathological images, salivary glands, and confocal stem-cell images.
- Funded by NIH R01 EB008016, DE019244, and partly by AR053231, NIDCR RO1 DE0192.

Professional Experience

GE Global Research, Niskayuna, NY, USA *Intern* **June - August, 2008**

- Group: Visualization and Computer Vision Laboratory.
- Designed and developed methods and systems for digitally enhancing images of a stained material.
- An invention disclosure based on this technique is filed with GE Global Research.

AT&T Labs, Middletown, NJ, USA *Intern* **June - August, 2007**

- Group: Homeland Security Center for Dynamic Data Analysis.
- Worked on generation, visualization and detection of anomalies of time varying multigraphs.

Bilkent University, Ankara, Turkey *Intern/Researcher* **May - August, 2004**

- Group: Center for Bioinformatics.
- Developed visualization and manipulation tools for network of cellular events.

ASELSAN: Military Electronics Industry, Ankara, Turkey *Intern* **May - July, 2003**

- Group: Microwave & System Technologies Division
- Implemented network traffic querying and visualization tools.

Journal Publications

1. Cemal Cagatay Bilgin, Amanda Lund, Ali Can, George Plopper, Bulent Yener. Quantification of Three-Dimensional Cell-Mediated Collagen Remodeling Using Graph Theory. PLoS ONE, 2010.
2. Amanda Lund, Cemal Cagatay Bilgin, Mohammad Al Hasan, Lindsey McKeen, Jan Stegemann, Bulent Yener, Mohammad Zaki, George Plopper. Quantification of Spatial Parameters in 3D Cellular Constructs Using Graph Theory. Biomedicine and Biotechnology, 2010.
3. Cemal Cagatay Bilgin, Peter Bullough, George Plopper, Bulent Yener. ECM-Aware Cell-Graph Mining for Bone Tissue Modeling and Classification. Data Mining and Knowledge Discovery, 2009.
4. Mert Akdere, Cemal Cagatay Bilgin, Ozan Gerdaneri, Ibrahim Korpeoglu, Ozgur Ulusoy, Ugur Cetintemel. A Comparison of Epidemic Algorithms in Wireless Sensor Networks, Elsevier Computer Communications, 2006.

Conference Publications

1. Cemal Cagatay Bilgin, Shayoni Ray, William Daley, Banu Baydil, Sharon Sequeira, Bulent Yener, Melinda Larsen. Cell-Graph Modeling of Salivary Gland Morphology. IEEE Int. Symp. on Biomed. Imaging, Rotterdam, 2010.
2. Cemal Cagatay Bilgin, Shayoni Ray, William Daley, Banu Baydil, Sharon Sequeira, Bulent Yener, Melinda Larsen. Quantification of Changes in Salivary Gland Morphology Using Cell Graphs. 39th Annual Meeting of the American Association for Dental Research, 2010.
3. Kira Henderson, Cemal Cagatay Bilgin, Bulent Yener, George Plopper. Signal Transduction Mediates the Remodeling of the Stem Cell Microenvironment. 49th American Society for Cell Biology Annual Meeting, 2009.
4. Lindsey McKeen, Cemal Cagatay Bilgin, George Plopper, Bulent Yener. Investigation of Structure-Function Relationships of Breast Cancer's Metastatic Potential. 49th American Society for Cell Biology Annual Meeting, 2009.
5. Cemal Cagatay Bilgin, Cigdem Gunduz, Chandandeep Nagi, Bulent Yener. Cell-Graph Mining for Breast Tissue Modelling and Classification. Engineering in Medicine and Biology Society. 29th Annual International Conference of the IEEE, 2007.
6. Cagri Aksay, Asli Ayaz, Ozgun Babur, Cemal Cagatay Bilgin, Ahmet Cetintas, Ali Civril, Recep Colak, et al. PATIKA: An Informatics Infrastructure for Cellular Networks, Intelligent Systems for Molecular Biology, 2004.

In Submission

1. Cemal Cagatay Bilgin, Jens Rittscher, Bob Filkins, Ali Can. Digitally Adjusting Chromogenic Dye Proportions in Pathology Images. Submitted for review to IEEE Trans. on Medical Imaging, 2010.
2. Cemal Cagatay Bilgin, Shayoni Ray, William Daley, Banu Baydil, Bulent Yener, Melinda Larsen. Multiscale Feature Analysis of Branching Morphogenesis. Submitted for review to PLoS One, 2010.
3. Basak Oztan, Cemal Cagatay Bilgin, Lindsey McKeen, Kira Henderson, Bulent Yener, George Plopper. Characterization of Stages of Cancer in Artificial Breast Tissues Using Ductal Structure Morphology. Submitted for review to IEEE Int. Conf. on Acoustics, Speech, and Sig. Proc., 2010.
4. Lindsey McKeen, Kira Henderson, Basak Oztan, Cemal Cagatay Bilgin, Bulent Yener, George Plopper. Tensor Analysis Identifies Quantitative Features for Three Dimensional Tissue-Specific Classification. Submitted for review to BMC Systems Biology, 2010.
5. Cemal Cagatay Bilgin, Bulent Yener. Dynamic Network Evolution: Models, Clustering, Anomaly Detection: A systematic Survey. In submission, 2010.

Patents

1. Ali Can, Cemal Cagatay Bilgin, Jens Rittscher, Bob Filkins. Methods and Systems for Digitally Enhancing an Image of a Stained Material. Patent Pending, 2009.

Honors & Awards

- GE Patent application bonus award, 2009.
- Awarded full-tuitions and stipend for graduate studies by Rensselaer Polytechnic, 2005 to 2011.
- Graduated with high honors from Bilkent, listed 7 times in high honors and once in honors list.
- Awarded full-tuitions and stipend for undergraduate studies by Bilkent University, 2001 to 2005.
- Ranked in the top 300 (0.01%) in the nationwide university entrance, high school and science high school entrance examinations in Turkey in 2001, 1998, 1995.

Computer Skills

Languages: C/C++, Java, Python, R(Basic).

Operating Systems GNU/Linux, Mac, UNIX, Windows XP.

Application Programs, APIs: Matlab, MySQL, CVS, L^AT_EX, STL, BGL, ITK, VTK, Abaqus.

Languages

Native Turkish, Fluent English, Basic German (*Completed basic German courses*)

Activities

Member IEEE, ACM **Reviewer** KAIS, TBME, EMBC, CMIG, ICC, JCST

Extracurricular Skiing and snowboarding, classical guitar, long distance running, president of RPI TurkSA.

References

- Prof. Bülent Yener, Rensselaer Polytechnic Institute,
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- Additional references available upon request.