

Department of Computer Science & Engineering
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EDUCATION

Case Western Reserve University, Cleveland, Ohio **Aug. 2003**
Doctor of Philosophy, Computer Science **-Sept. 2008**

Research interests:

Bioinformatics, Data Mining, Data Management, Databases, Big Data, Query Optimization, Information Retrieval, Information Extraction, Digital Libraries

Thesis Title: "Mining Metabolic Networks and Biomedical Literature"

Advisor: Gultekin Ozsoyoglu

Bilkent University, Ankara, Turkey **Sept. 1999**
Bachelor of Science, Computer Engineering **-May 2003**

PROFESSIONAL EXPERIENCE

Istanbul Sehir University, Istanbul, Turkey **Aug. 2013**
Associate Professor of Computer Science **- Present**

Oracle, Inc., Redwood Shores, California **Nov. 2009**
Senior Member of Technical Staff, Query Optimizer Team, Database Technologies **- July 2013**

Case Western Reserve University, Cleveland, Ohio **Oct. 2008**
Postdoctoral Research Associate **- Oct. 2009**

Case Western Reserve University, Cleveland, Ohio **Fall 2003**
Research Assistant, Bioinformatics and Database Research Group **- Fall 2008**

RESEARCH EXPERIENCE

Istanbul, Sehir University, Istanbul, Turkey **Aug. 2013**
Associate Professor **- Present**

- *Bioinformatics:* Developing system biology algorithms for the automated interpretation of metabolomics data, and later link it to possible diagnosis alternatives for personalized medicine.
- *Sport Analytics:* Analyze game data to reveal non-obvious team- and player-level patterns to guide instructors and players for performance improvement, and designing adaptive game tactics.
- *Health Informatics:* Predicting Readmission Risk of Patients
- *Database Research:* Estimating the Selectivity of SQL LIKE Queries

Oracle, Inc., Redwood Shores, California **Nov. 2009**
Senior Member of Technical Staff **- July 2013**

- *Estimating Database Statistics On-the-fly:* Research on learning statistics patterns, and adjusting previously collected stats dynamically during query compile-time according to the trends discovered based on historical data.
- *New histogram types:* Introduced two new histograms (i.e., top-frequency and

hybrid) which provide more accurate predicate selectivity estimates during query optimization.

- *Concurrent statistics gathering*: Developed a framework that allows gathering statistics for multiple objects concurrently. Improved statistics gathering time upto 10x on the Oracle database machine.

Case Western Reserve University, Cleveland, Ohio
Postdoctoral Research Associate

Oct. 2008
- Oct. 2009

- *Systems Biology Research*: Participated in the design and development of database-enabled framework and tools to facilitate effective and efficient model development for multiscale mechanistic models of biological systems. Contribute to the PathCase-SB system's interfaces involving Systems Biology Models-based querying, visualization, simulation, and model building.
- *Metabolomics Research*: Design and query processing of a query language for mammalian metabolic networks, development of graph-based metabolomics data analysis techniques.

Case Western Reserve University, Cleveland, Ohio
Research Assistant, Database and Bioinformatics Research Group

Fall 2003
- Fall 2008

- *Bioinformatics Research*: Functionality annotation analysis of metabolic pathways with applications on pathway inference and categorization, metabolomics data analysis.
- *Data Mining Research*: Mining for frequent graph structures in taxonomy super-imposed graph databases
- *Information Extraction Research*: Extracting gene annotations from biomedical literature using textual annotation patterns and semantic pattern matching techniques. Design of a next generation novel search engine that collects and mines for information about individuals on the WWW (PopulusLog)
- *Information Retrieval Research*: Investigating the context-based search paradigm, evaluation of publication similarity measures, exploring different ranking functions.
- *Databases Research*: Data Integration with particular focus on biological web data sources, data and visualization models for pathways, pathways databases system with advanced querying and visualization tools.
- *Metabolomics Research*: Metabolic-network projected automated interpretation of concentration changes for a large number of metabolites. Developed models for hypothesis generation, consistency checking, and ranking of alternative hypothesis based on observed metabolite changes.

TEACHING EXPERIENCE

Istanbul Sehir University, Istanbul, Turkey

Instructor – ECE 527: Bioinformatics
Graduate Level (EECS 468 – Undergraduate Level)

Instructor – ENGR 101: Introduction to Programming
Freshman Level (Two sections)

Instructor – ENGR 102: Programming Practice
Freshman Level (Two sections)

Instructor – ECE 562: Networks Modeling
Graduate Level

Case Western Reserve University, Cleveland, Ohio

Instructor – EECS 233: Data Structures
Sophomore Level

Teaching Assistant – EECS 338: Introduction to Operating Systems
Graded assignments, held office hours, assisted students with assignments.

Teaching Assistant – EECS 341: Introduction to Database Systems
Graded assignments, supervised course projects, held office hours,
assisted students with assignments. (For two semesters)

DEVELOPMENT EXPERIENCE

Oracle, Inc., Redwood Shores, California Senior Member of Technical Staff

Nov. 2009
- July 2013

- Member of the Query Optimizer Group in the Oracle Database product. Focused on the optimizer statistics management area within the group. Also contributed to the maintenance and enhancement of all aspects of the query optimizer within the RDBMS kernel.

Case Western Reserve University, Cleveland, Ohio Database and Bioinformatics Research Group

Fall 2003
- Fall 2009

- *PathCase Metabolic Pathways Database System*: A bioinformatics tool to store, query, analyze, and visualize biological pathways. Took part in design, implementation, and coordination phases.
 - Project Web Site: <http://nashua.case.edu/pathways>
- *CaseExplorer, The Case Digital Library Project*: An umbrella project housing online tools to effectively query and rank scientific papers. Developed Pubmed Abstract Full Text Search Prototype running on 7,000,000 paper abstracts, and took part in the development of similarity and ranking measures for other tools.
- *PopulusLog People Information Database*: A web data mining research project and the associated knowledgebase to collect publicly available online information about people. Provides tools for crawling web pages, information extraction, querying, and visualization of automatically constructed social networks.

PUBLICATIONS

Patents:

- Pt1.** Delibas, E., Uzun, A., Inan, M. F., Guzey, O., & Cakmak, A. (2019). *U.S. Patent Application No. 16/331,744.*
- Pt2.** Cakmak, A., Celik, M.H. (2018). A System for Diagnosing Diseases. TR Patent App. TP18-795.
- Pt3.** Cakmak, A., Aytimur, M. (2018). LIKE Selectivity Estimation. International Patent App. PCT/TR2018/050366.
- Pt4.** Chakkappen, S. P., Zait, M., Lee, A. W., & Cakmak, A. (2017). *U.S. Patent Application No. 15/295,539.*
- Pt5.** Chakkappen, S. P., Zait, M., Lee, A. W., & Cakmak, A. (2016). *U.S. Patent No. 9,471,631.* Washington, DC: U.S. Patent and Trademark Office.

Refereed/Invited Journal Publications:

- J1.** Emrullah Delibas, Ali Uzun, M. Fatih Inan, Onur Guzey, Ali Cakmak. Interactive Exploratory Soccer Data Analytics. *Journal of Information Systems and Operational*

Research, 57(2), 141-164, 2019 (**SCI-E**).

- J2.** Polat, N., Cakmak, A., Turan, R. N. (2019). Exploring the Power of Supervised Learning Methods for Company Name Disambiguation in Microblog Posts. *Turkish Journal of Electrical Engineering and Computer Sciences*. DOI: 10.3906/elk-1809-167 (**SCI-E**).
- J3.** Ali Cakmak, Ali Uzun, Emrullah Delibas. Computational Modeling of Pass Effectiveness in Soccer. *The Journal of Advances in Complex Systems*, 21: 3-4, pp. 1-28, 2018. DOI: 10.1142/S0219525918500108 (**SCI-E**).
- J4.** Mehmet Aytimur, Ali Cakmak. Estimating the Selectivity of LIKE Queries using Pattern-based Histograms. *Turk J Elec Eng & Comp Sci* 26 (6), 3319 – 3334, 2018. DOI: 10.3906/elk-1806-96 (**SCI-E**).
- J5.** Ali Cakmak: Predicting Student Success in Courses via Collaborative Filtering. *International Journal of Intelligent Systems and Applications in Engineering* 5(1):10-17 (2017).
- J6.** Ercument Cicek, Xinjian Qi, Ali Cakmak, Stephan Johnson, Xu Han, Sami Alshalwi, Gultekin Ozsoyoglu. "An Online System for Metabolic Network Analysis ". Database: *The Journal of Biological Databases and Curation* (Oxford Univ. Press), 2014 (**SCI-E**)
- J7.** Xinjian Qi, Sarp Coskun, Ali Cakmak et al. "PathCase-SB: Database-Enabled Tools for Regulatory Metabolic Networks". *SIGBioinformatics Record*, Volume 2, Issue 3, 2012.
- J8.** Ali Cakmak, Xinjian Qi, A. Ercument Cicek, Ilya Bederman, Leigh Praskac, Mitchell Drumm, Gultekin Ozsoyoglu. "A New Metabolomics Analysis Technique: Steady -State Metabolic Network Dynamics Analysis". *Journal of Bioinformatics and Computational Biology* 10(1): (2012) (**SCI-E**).
- J9.** Sarp A. Coskun, Xinjian Qi, Ali Cakmak, En Cheng, A. Ercument Cicek, Lei Yang, Rishiraj Jadeja, Ranjan K. Dash, Nicola Lai, Gultekin Ozsoyoglu, Z. Meral Ozsoyoglu. PathCase-SB: Integrating Data Sources and Providing Tools for Systems Biology Research . *BMC Systems Biology*, 2012, 6:67 (**SCI**).
- J10.** Ali Cakmak, Xinjian Qi, Sarp Coskun, Mitali Das, En Cheng, Ercument Cicek, Nicola Lai, Gultekin Ozsoyoglu, Meral Ozsoyoglu. "PathCase-SB Architecture and Database Design". *BMC Systems Biology* 5:188, 2011 (**SCI**).
- J11.** Ali Cakmak, Gultekin Ozsoyoglu, Richard W. Hanson. "Querying Metabolism under Different Physiological Constraints". *Journal of Bioinformatics and Computational Biology* 8(2): 247-293 (2010) (**SCI-E**).
- J12.** Nattakarn Ratprasartporn, Jonathan Po, Ali Cakmak, Sulieman Bani-Ahmad, Gultekin Ozsoyoglu. "Context -Based Literature Digital Collection Search". *VLDB Journal* 18(1): 277-301, 2009 (**SCI**).
- J13.** B. Elliott, M. Kirac, A. Cakmak, G. Yavas, S. Mayes, E. Cheng, Y. Wang, C. Gupta, G. Ozsoyoglu, Z. M. Ozsoyoglu. "PathCase Pathways Database System". *Bioinformatics* 24(21):2526-2533, 2008 (**SCI**).
- J14.** Ali Cakmak, Gultekin Ozsoyoglu. "Discovering Gene Annotations in Biomedical Text Databases". *BMC Bioinformatics* 9:143, 2008 (**SCI-E**).
- J15.** Ali Cakmak, Gultekin Ozsoyoglu. "Mining Biological Networks for Unknown Pathways". *Bioinformatics* 23(20): 2775-2783, October 2007 (**SCI**).
- J16.** Sulieman Bani-Ahmad, Ali Cakmak, Gultekin Özsoyoglu, Abdullah Al-Hamdani. "Evaluating Publication Similarity Measures". *IEEE Data Eng. Bull.* 28(4): 21-28, December 2005.

Refereed Conference/Workshop Publications:

- C1.** Ali Cakmak, Muhammed Hasan Celik. Personalized metabolic analysis of diseases. *The*

International Symposium on Health Informatics and Bioinformatics (HIBIT). October 25-27, 2018.

- C2.** Feruz Davletov, Ali Selman Aydin, Ali Cakmak. "High Impact Academic Paper Prediction Using Temporal and Topological Features". ACM International Conference on Information and Knowledge Management (ACM CIKM 2014), November 3-7, Shanghai, China.
- C3.** Ahmet Bulut, Tarik Arıcı, Onur Guzey, Baris, Arslan, Ali Cakmak. "Training the Data Scientists of the Future". Big Data and Analytics EdCon, Las Vegas, Nevada, USA, October 25-26, 2014
- C4.** Ercument Cicek, Xinjian Qi, Ali Cakmak, Stephan Johnson, Xu Han, Sami Alshalwi, Gultekin Ozsoyoglu. "PathCase-MAW: An Online Metabolic Network Analysis Workbench". ACM International Conference on Bioinformatics and Computational Biology (ACM BCB 2013), September 22-25, Washington, DC.
- C5.** Ali Cakmak, Xinjian Qi, Ercument Cicek, Tekin Ozsoyoglu. "Computational Interpretation of Metabolomics Measurements: Steady -State Metabolic Network Dynamics Analysis". ACM Conference on Bioinformatics, Computational Biology and Biomedicine 2011 (ACM BCB 2011), Aug 1 -3, Chicago, IL.
- C6.** Brendan Elliott, Steve Mayes, Ali Cakmak, Gultekin Ozsoyoglu, Z. Meral Ozsoyoglu. "Advanced Querying Interface for Biological Networks". 25th ACM Symposium on Applied Computing (SA C), Sierre, Switzerland, March 22 - 26, 2010.
- C7.** Ali Cakmak, Arun Dsouza, Richard W. Hanson, Z. Meral Özsoyoglu. "Analyzing metabolite measurements for automated prediction of underlying biological mechanisms". ACM Conference on Bioinformatics, Computational Biology and Biomedicine 2010 (ACM BCB 2010), Aug 2-4, Niagara Falls, NY pp. 137-146.
- C8.** En Cheng, Ali Cakmak, Z. Meral Özsoyoglu. "Efficient query evaluation for DAG -shaped hierarchies". ACM Conference on Bioinformatics, Computational Biology and Biomedicine 2010 (ACM BCB 2010), Aug 2-4, Niagara Falls, NY pp. 454-456 (Short paper).
- C9.** Ali Cakmak, Gultekin Ozsoyoglu, Richard W. Hanson. "Managing and Querying Mammalian Metabolic Networks: A Metabolism Query Language and Its Query Processing". 8th International Conference on Computational Systems Bioinformatics (CSB), Stanford, California, USA, August 10-13, 2009.
- C10.** Ali Cakmak, Arun Dsouza, Richard W. Hanson, Z. Meral Ozsoyoglu, Gultekin Ozsoyoglu. "A Web-based Data Source for Metabolomics". 24th International Symposium on Computer and Information Sciences (ISCIS), Guzelyurt, Northern Cyprus, September 14 - 16, 2009.
- C11.** Ali Cakmak, Mustafa Kirac, Gultekin Ozsoyoglu. "PopulusLog: People Information Database". 24th International Symposium on Computer and Information Sciences (ISCIS), Guzelyurt, Northern Cyprus, September 14 -16, 2009.
- C12.** Ali Cakmak, Gultekin Ozsoyoglu. "Taxonomy -Superimposed Graph Mining". 11th International Conference on Extending Database Technology (EDBT), Nantes, France, March 25-30, 2008.
- C13.** Ali Cakmak, Mustafa Kirac, Marc Reynolds, Meral Ozsoyoglu, Gultekin Ozsoyoglu. "Gene Ontology-Based Annotation Analysis and Categorization of Metabolic Pathways". 19th International Conference on Scientific and Statistical Databases (SSDBM). Banff, Calgary, Canada, July 9-11, 2007.
- C14.** Nattakarn Ratprasartporn, Sulieman Bani -Ahmad, Ali Cakmak, Jonathan Po, Gultekin Ozsoyoglu. "Evaluating Different Ranking Functions for Context -Based Literature Search". IEEE ICDE Workshop on Ranking in Databases (DBRANK), pp. 261-

268, Istanbul, Turkey, April 16 2007.

- C15.** Ali Cakmak, Gultekin Ozsoyoglu. “Annotating Genes Using Textual Patterns”. 12th Pacific Symposium on Biocomputing (PSB), pp. 221-232, Maui, Hawaii, USA, January 3-7, 2007.
- C16.** Mustafa Kirac, Ali Cakmak, Gultekin Ozsoyoglu. “Task-Oriented Integrated Use of Biological Web Data Sources”. 18th International Conference on Scientific and Statistical Databases (SSDBM), pp. 81-90, Vienna, Austria, July 3 -5, 2006.
- C17.** Nattakarn Ratprasartporn, Ali Cakmak, Gultekin Ozsoyoglu. “On Data and Visualization Models for Signaling Pathways”. 18th International Conference on Scientific and Statistical Databases (SSDBM), pp. 133-142, Vienna, Austria, July 3 -5, 2006.
- C18.** Sulieman Bani-Ahmad, Ali Cakmak, Abdullah Al-Hamdani, Gultekin Ozsoyoglu. “Evaluating Score and Publication Similarity Functions in Digital Libraries”. 8th International Conference on Asian Digital Libraries (ICADL), pp. 483-485, Bangkok, Thailand, December 12 -15, 2005.

GRANTS

- TUBITAK ARDEB 1001, Research Grant, The Scientific and Technological Research Council of Turkey (Role: PI, Amount: ~121,000 TL, Duration: 21 Months) **2017 -2019**
- TUBITAK ARDEB 3501, CAREER Grant, The Scientific and Technological Research Council of Turkey (Role: PI, Amount: ~223,000 TL, Duration: 27 Months) **2015 -2016**
- Returning Researcher Scholarship, The Scientific and Technological Research Council of Turkey (Role: PI, Amount: ~95,000 TL, Duration: 24 Months) **2014 -2015**

HONORS and AWARDS

- Nominated by the Case School of Engineering and selected for participation in the American Association for the Advancement of Science (AAAS) Program for Excellence in Science. **July 2008**
- Graduate Research Assistantship during doctoral studies (tuition waiver and monthly stipend) **2004-2008**
- Travel Award for attending EDBT 2008 Conference, awarded by the Department of EECS and the Graduate Studies at Case Western Reserve University **February 2008**
- Travel Award for attending PNAS 2007 Conference, awarded by the conference program committee **June 2007**
- Travel Award for attending PSB 2007 Conference, awarded by the US National Institute of Health **Jan. 2007**
- Case Prime Fellowship (tuition waiver and stipend), awarded by Case Western Reserve University **Fall 2003-Spring 2004**
- Scholarship (covering tuition, accommodation, and monthly stipend) during undergraduate study, awarded by Bilkent University **1999-2003**
- Dean’s Honors, Bilkent University **1999-2003**

ACTIVITIES

• Program Committee Member, IoTBDS (IoTBDS 2018)	2018
• Program Committee Member, eKNOW (eKNOW 2018)	2018
• Program Committee Member, eKNOW (eKNOW 2017)	2017
• Program Committee Member, IoTBDS (IoTBDS 2017)	2017
• Program Committee Member, IoTBDS (IoTBDS 2016)	2016
• Program Committee Member, Big Data and Analytics Education Conference (BDA EdCon European Track) (ECE 2015)	2015
• Program Committee Member, Big Data and Analytics Education Conference (BDA EdCon European Track) (ECE 2015)	2015
• Program Committee Member, IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (IEEE AEECT 2013)	2013
• Program Committee Member, International Conference on Electronics, Computer, and Computation (ICECCO 2013)	2013
• Program Committee Member, the ACM International Conference on Bioinformatics and Computational Biology (ACM BCB 2012)	2012
• Program Committee Member, IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (IEEE AEECT 2011)	2011
• Program Committee Member, the ACM International Conference on Bioinformatics and Computational Biology (ACM BCB 2010)	2010
• Program Committee Member, the 24th International Symposium on Computer and Information Sciences (ISCIS 2009)	2009
• Sponsored Member, The American Association for the Advancement of Science (AAAS)	2008 - 2010
• Assistant to the Editor in Chief, ACM TODS Journal	2008
• Reviewer for Bioinformatics Journal, Journal of Recent Patents on Computer Science, SIGMOD, SIAM, VLDB, SSDBM, ADVIS, ICDT, PODS, and ISCIS	2004 - Present
• Member, ACM SIGMOD	2006 - 2008
• Judge, Ohio Science Fair for High and Middle School Students	2008, 2009
• Founding President of Turkish Student Association, UTURK, at Case Western Reserve University	2004 - 2006