

## Assoc. Prof. Hasan Kurban

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### CONTACT INFORMATION

Computer Science Department  
Indiana University  
47408 Bloomington, IN, USA

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### RESEARCH INTERESTS

Data Mining, Machine Learning, Big Data, Data Science, Artificial Intelligence

### EDUCATION

**Indiana University**, Bloomington, IN, USA September 2017

- Ph.D. in [Computer Science](#) and minor in [Statistics](#)
- Advisor: Prof. [Mehmet M. Dalkilic](#)
- Committee: Prof. [Predrag Radivojac](#), Prof. [Michael W. Trosset](#), Prof. [Yuzhen Ye](#)
- Thesis: *A Novel Approach to Optimization of Iterative Machine Learning Algorithms: Over Heap Structure*

**Indiana University**, Bloomington, IN, USA May 2012

- M.Sc. in [Computer Science](#)

**University of Connecticut**, Storrs, CT, USA July 2010

- Intensive Certificate Program

**Marmara University**, Istanbul, Turkey June 2009

- Intensive Certificate Program

**Inonu University**, Malatya, Turkey June 2008

- B.Sc. in [Mathematics](#)

### PUBLICATIONS *Journal Articles* [Refereed]

- J15. Parichit Sharma, **Hasan Kurban** and Mehmet M. Dalkilic. “Data Clustering with EM (DCEM) for Big Data, an R Package”. *SoftwareX*, 2021 (under-review).
- J14. **Hasan Kurban** and Mustafa Kurban. “Building Machine Learning Systems for Multi-Atoms Structures: CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> Perovskite Nanoparticles”. *Computational Materials Science*, 195, 110490(1-9), 2021.
- J13. **Hasan Kurban**, Mustafa Kurban, Parichit Sharma and Mehmet M. Dalkilic . “Predicting Atom Types of Anatase TiO<sub>2</sub> Nanoparticles with Machine Learning”. *Key Engineering Materials*, vol.880, pp.89-94, 2021.
- J12. **Hasan Kurban** and Mustafa Kurban. “Rare-class Learning over Mg-Doped ZnO Nanoparticles”. *Chemical Physics*, vol.546, 11159(1-9), 2021.
- J11. Iskender Muz, **Hasan Kurban** and Mustafa Kurban. “A DFT Study on Stability and Electronic Structure of AlN Nanotubes”. *Materials Today Communications*, 26, 102118(1-7), 2021.
- J10. **Hasan Kurban**, Sholeh Alaei and Mustafa Kurban. “Effect of Mg content on electronic structure, optical and structural properties of amorphous ZnO nanoparticles: A DFTB study”. *Journal of Non-Crystalline Solids*, 560, 120726(1-6), 2021.
- J9. **Hasan Kurban**. “Atom Classification with Machine Learning and Correlations among Physical Properties of ZnO Nanoparticle”. *Chemical Physics*, vol.545, 111143(1-9), 2021.
- J8. **Hasan Kurban**. “Measuring the Proximity of Medical Treatment Areas with Text Mining”. *European Journal of Science and Technology*, no.21, pp. 518-526, 2021.
- J7. **Hasan Kurban**. “Practical Data Science: Examining the Correlations between Structural and Electronic Properties of Different Phases of TiO<sub>2</sub> Nanoparticles”. *Journal of Selcuk-Technic*, 4(19), 1-9, 2020.

- J6. **Hasan Kurban**, Mehmet Dalkilic, Selcuk Temiz and Mustafa Kurban. “Tailoring the structural properties and electronic structure of anatase, brookite and rutile phase TiO<sub>2</sub> nanoparticles: DFTB calculations”. *Computational Materials Science*, 183, 109843 (1-9), 2020.
- J5. **Hasan Kurban** and Mustafa Kurban. “Study of Structural and Optoelectronic Properties of Hexagonal ZnO Nanoparticles”. *Bilecik Seyh Edebali University Journal of Science*, 6(2), 124-131, 2019.
- J4. Mustafa Kurban, **Hasan Kurban** and Mehmet M. Dalkilic. “Controlling structural and electronic properties of ZnO NPs”. *Bilge International Journal of Science and Technology Research*, 3(0), 35-39, 2019.
- J3. **Hasan Kurban**, Mustafa Kurban and Mehmet M. Dalkilic. “Density-functional tight-binding approach for the structural analysis and electronic structure of copper hydride metallic nanoparticles”. *Materials Today Communications*, 21, 100648 (1-7), 2019.
- J2. **Hasan Kurban**, Mark Jenne and Mehmet M. Dalkilic. “Using data to build a better EM: EM\* for big data”. *International Journal of Data Science and Analytics*, vol.4, no.2, pp. 83-97, 2017.
- J1. Mark Jenne, Owen Boberg, **Hasan Kurban** and Mehmet M. Dalkilic. “Studying the Milky Way Galaxy using ParaHeap-k, a parallel heap-based k-means”. *IEEE Computer*, vol.47, no.9, pp.26-33, 2014.

#### **Conference Proceedings** [Refereed]

- C7. Parichit Sharma, **Hasan Kurban** and Mehmet M. Dalkilic. “Data Expressiveness and Its Use in Data-centric AI”. *Neurips Data-centric AI*, 2021 (under-review).
- C6. **Hasan Kurban**, Mustafa Kurban and Mehmet M. Dalkilic. “Size Dependent Electronic Structure and Structural Properties of Cupric Oxide (CuO) Nanoparticles”. *International Natural Science, Engineering and Material Technologies Conference (NEM)*, Istanbul, Turkey, 2019.
- C5. Kurt Zimmer, **Hasan Kurban**, Mark Jenne, Logan Keating, Perry Maull, Mehmet M. Dalkilic. “Using Data Analytics to Optimize Public Transportation on a College Campus”. *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Turin, Italy, 2018.
- C4. **Hasan Kurban**, Mehmet M. Dalkilic. “A novel approach to optimization of iterative machine learning algorithms: over heap structure”. *IEEE International Conference on Big Data (Big Data)*, Boston, MA, USA, 2017.
- C3. **Hasan Kurban**, Mark Jenne and Mehmet M. Dalkilic. “EM\*: An EM algorithm for Big Data”. *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Montreal, Canada (received “Honorable Mention Paper Award”, best paper awards), 2016.
- C2. Hussein Mohsen, **Hasan Kurban**, Kurt Zimmer, Mark Jenne, Mehmet M. Dalkilic. “Red-RF: Reduced Random Forest for big data using priority voting & dynamic data reduction, International Congress on Big Data”. *IEEE BigData Congress*, New York, USA, 2015.
- C1. Hussein Mohsen, **Hasan Kurban**, Mark Jenne, Mehmet M. Dalkilic. “A new set of Random Forests with varying dynamic data reduction and voting techniques”. *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Shanghai, China, 2014.

#### **Workshop Proceedings** [Refereed]

- W2. **Hasan Kurban**, Can Kockan, Mark Jenne and Mehmet M. Dalkilic. “Improving Expectation Maximization Algorithm over Stellar Data”. *Workshop on Management, Search and Mining of Massive Repositories of Solar and Stellar Astronomy Data*, Boston, MA, USA, 2017.
- W1. Mark Jenne, Alex Zimmerman, **Hasan Kurban**, Claudia Johnson and Mehmet M. Dalkilic. “Employing Software Engineering Principles to Enhance Management of Climatological Datasets for Coral Reef Analysis”. *The 6th International Workshop on Climate Informatics (CI)*, Colorado, USA, 2016.

#### **Poster Proceedings** [Refereed]

- P1. **Hasan Kurban**, Can Kockan, Mark Jenne and Mehmet M. Dalkilic. “Case study: clustering big stellar data with EM\*”. *IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT)*, Austin, Texas, USA (received “Best Poster Award”), 2017.

## **Abstract Proceedings** [Refereed]

- A1. **Hasan Kurban**. “Comparison of Machine Learning Algorithms for CuO Nanoparticles”. *4th International Conference on Physical Chemistry and Functional Materials (PCFM21)*, Elazığ, Turkey, 2021.

## **Book Reviews**

- B2. “Mastering Social Media Mining with R”, Sharan Kumar Ravindran, 2015, ISBN 1784396311
- B1. “Learning Data Mining with R”, Biter Makhabel, 2015, ISBN 1783982101

## INVITED TALKS

### **Invited Talks** [Conferences]

- “Comparison of Machine Learning Algorithms for CuO Nanoparticles”. *4th International Conference on Physical Chemistry and Functional Materials (PCFM21)*, Elazığ, Turkey (04/08/2021).
- “Predicting Atom Types of Anatase TiO<sub>2</sub> Nanoparticles with Machine Learning”. *International Conference on Engineering and Innovative Materials (ICEIM)*, Singapore (09/05/2020).
- “Practical Data Science: Examining the Correlations between Structural and Electronic Properties of Different Phases of TiO<sub>2</sub> Nanoparticles”. *International Conference on Advanced Technologies (ICAT)*, Istanbul, Turkey (08/12/2020).
- “Using Data Analytics to Optimize Public Transportation on a College Campus”. *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Turin, Italy (10/4/2018).
- “A novel approach to optimization of iterative machine learning algorithms: over heap structure”. *IEEE International Conference on Big Data (Big Data)*, Boston, MA, USA (12/14/2017).
- “Improving Expectation Maximization Algorithm over Stellar Data, Workshop on Management”. *Search and Mining of Massive Repositories of Solar and Stellar Astronomy Data*, Boston, MA, USA (12/12/2017).
- “Case study: clustering big stellar data with EM\*”. *IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT)*, Austin, Texas, USA (12/07/2017).
- “EM\*: An EM algorithm for Big Data”. *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, Montreal, Canada (10/18/2016).
- “A new set of Random Forests with varying dynamic data reduction and voting techniques”. *IEEE International Conference on Data Science and Advanced Analytics*, Shanghai, China (10/30/2014).

### **Invited Talks** [Teaching/Hiring]

- “Data Science”. *Computer Engineering Department, Izmir Institute of Technology*, Spring 2020.
- “Clustering”. *Computer Engineering Department, Yildirim Beyazit University*, Spring 2019.
- “Data Science”. *Informatics Department, Istanbul Technical University*, Fall 2018
- “Data Science and Big Data”. *Eli Lilly and Company*, Fall 2017.
- “EM for clustering”. *Computer Science Department, Indiana University*, Fall 2016.
- “Principal Component Analysis”. *Computer Science Department, Indiana University*, Fall 2016.
- “Data Structures”. *Computer Science Department, Indiana University*, Spring 2014.
- “Ensemble Models”. *Computer Science Department, Indiana University*, Spring 2013.

TEACHING  
EXPERIENCE

**Visiting Associate Professor, Computer Science Department**, Indiana University, IN, USA

- Applied Machine Learning (Graduate), Elements of Artificial Intelligence (Graduate), Fall 2021.
- Introduction to Data Analysis and Mining (Undergraduate), Spring 2022.

**Dr. Lecturer, Computer Engineering Department**, Siirt University, Turkey

- Data Structures, Artificial Neural Networks, Introduction to Computer Engineering, Fall 2018.
- Data Security, Algorithms and Programming II, Web and Internet Technologies, Spring 2019.
- Algorithms and Programming I, Artificial Neural Networks, Introduction to Computer Engineering, Fall 2019.

**Visiting Assistant Professor, Computer Science Department**, Indiana University, IN, USA

- Applied Machine Learning (Graduate), Online Applied Data Mining (Graduate), Fall 2017.
- Elements of Artificial Intelligence (Graduate), Introduction to Data Analysis and Mining (Undergraduate), Spring 2018.

**Associate Instructor, Computer Science Department**, Indiana University, IN, USA

Worked as an Associate Instructor in the Computer Science Department at Indiana University Bloomington between Aug. 2012 - May 2016. Graded homeworks, exams, weekly quizzes; taught labs; held office hours, weekly help sessions; lectured.

- Data Mining (Graduate), Fall 2012, Fall 2013, Spring 2015, Spring 2016.
- Machine Learning (Graduate), Spring 2013.
- Data Structures (Undergraduate/Graduate), Spring 2014.
- Seminar in Computer Science: Data Mining (Undergraduate), Fall 2014, Fall 2015.
- Topics in Algorithms and Computing Theory (Graduate), Fall 2014.
- Real World Data Science (Graduate), Summer 2016: Online class sponsored by Eli Lilly and Company.

**Senior Associate Instructor, Computer Science Department**, Indiana University, IN, USA

Head Associate Instructor (AI). Managed a group of AIs; lectured; designed homeworks; graded homeworks, exams.

- Data Mining (Graduate), Fall 2016.
- Introduction to Artificial Intelligence (Graduate), Spring 2017.

PROFESSIONAL  
EXPERIENCE

**Indiana University Bloomington**, IN, USA

- Visiting Associate Professor, Computer Science Department (July 2021 - Current).
- Contact: Yuzhen Ye, yye@indiana.edu

**Siirt University**, Siirt, Turkey

- Dr. Lecturer, Computer Engineering Department (Aug. 2018 - July 2021).
- Contact: Musa Atas, hakmesyo@gmail.com

**Indiana University Bloomington**, IN, USA

- Visiting Assistant Professor, Computer Science Department (Aug. 2017 - Aug. 2018).
- Contact: Amr Sabry, sabry@indiana.edu

**Turbo Appeal**, Chicago IL, USA

- Data Scientist (Jan 2015 - Dec. 2015): Predictive analytics on valuation of homes; web scraping; stored, processed, analyzed, modeled big data sets.
- Contact: Scott Beason, scottmbeason@gmail.com

***Indiana University Bloomington***, IN, USA

- Undergraduate Research Mentor (Jan. 2015 - May 2017): Designed data mining research projects for undergraduate students; coached students.
- Contact: Dr. Lamara D. Warren, ldwarren@indiana.edu

HONORS AND  
AWARDS

- ***Best Paper Award:*** Honorable Mention Paper Award, IEEE International Conference on Data Science and Advanced Analytics (DSAA'16), Montreal, Canada, 2016.
- ***Best Poster Award:*** IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (UCC/BDCAT), Austin, TX, USA, 2017.
- ***Turkish National Ministry of Education Scholarship :*** (all tuitions, fees, and a stipend) Scholarship awarded to high-achieving Turkish university graduates enabling them to pursue graduate study and research in top-ranked universities abroad, 2009 - 2017.
- ***Computer Science Graduate Fellowship:*** Indiana University, Bloomington, Aug. 2010 - May 2012.
- ***Nomination for Associate Instructor of the year:*** Being nominated for the Computer Science Program Associate Instructor of the year award, 2014 - 2015, Indiana University Bloomington.
- ***Nomination for Researcher of the year:*** Being nominated for the Computer Science Program Researcher of the year award, 2016 - 2017, Indiana University Bloomington.

COMPUTER  
AND  
LANGUAGE  
SKILLS

- ***Programming Languages:*** Python, C, C++, C#, Java.
- ***Technical Softwares:*** R, Matlab, OpenCV, Octave, OpenBUGS, WinBUGS, Weka, Rattle, Tableau, Knime.
- ***Databases:*** MySQL, NoSQL, PostgreSQL, SQL Server.
- ***Languages:*** English (fluent), Turkish (native).

REFERENCES

***Available upon request.***