

# DONGEUN LEE

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Computer Science & Information Systems, College of Science and Engineering, Texas A&M University - Commerce, Commerce, TX

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## EDUCATION

- **Seoul National University (SNU)**, Seoul, Korea

Ph. D. in Electrical Engineering and Computer Science February 2014

Advisor: Prof. Heonshik Shin

**Thesis:** *Analysis for Scalable Coding of Quality-Adjustable Sensor Data.*

- **Seoul National University (SNU)**, Seoul, Korea

B.S. in Computer Science and Engineering February 2006

## RESEARCH INTERESTS

- **Big Spatio-Temporal Data Processing/Analytics**

-Data Reduction using Compressive Sensing and Source Coding

-Machine Learning for Analysis

-Nonlinear Dimensionality Reduction

- **Distributed Systems/Security**

-Efficient Algorithms for Resource Limited Devices

-Integration of Source Coding and Cryptography

## APPOINTMENTS

- **Assistant Professor, Texas A&M University - Commerce (TAMUC), Commerce, TX** 2016-Current

- **Faculty Research Affiliate, Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA** 2016-Current  
-Scientific Data Management Group, Computational Research Division

- **Computer Systems Engineer, Postdoctoral Research Affiliate, Lawrence Berkeley National Laboratory (LBNL), Berkeley, CA** 2015-2016  
-Researched big streaming data analysis problems.  
-Participated in two projects: "Open Framework for High-Performance Streaming Analytics" and "Behavior Analysis on Residential Electricity Usage Data."

- **Postdoctoral Research Associate, Ulsan National Institute of Science and Technology (UNIST), Ulsan, Korea** 2014-2016  
-Researched big spatio-temporal data archiving and sensing problems.  
-Studied machine learning algorithms and led the project "Failure Prediction and Diagnosis Algorithm for RMS."  
-Advised students in research.  
-Published three international conference papers (UAI 2016, SDM 2015, IEEE BigData 2014).

- **Research Intern, Hokkaido University, Sapporo, Japan** **Fall 2009, Spring 2010**  
 -Research theme: “Energy-aware and Fault-tolerant Peat Fire Monitoring with Wireless Sensor Network” under guidance of Prof. Toshihisa Honma.  
 -Deployed and operated 20 sensor motes at experimental farms in Hokkaido university.  
 -TinyOS programming for routing of monitored environmental sensor data and sending alarm in case of fire.  
 -Published a domestic conference paper and subsequently an international conference paper (AINA 2012).
- **Instructor, BIT Computer Academy, Seoul, Korea** **2008-2010**  
 -Lectured three one-month courses: “UNIX/LINUX System Programming,” “Client/Server Programming,” and “MS Visual Studio 2008.”
- **Software Engineer, SimsLine Inc., Seoul, Korea** **2003-2004**  
 -Developed/maintained text-to-speech applications using L&H API in MS Windows platform.  
 -Developed/maintained device-sync applications that can synchronize music with MP3 players using WDM (Windows driver model) in MS Windows platform.
- **Software Engineer, Hyun-seung Inc., Seoul, Korea** **2002-2003**  
 -Maintained a graphical desktop sharing system similar to VNC written in MFC/Win32 API.
- **Software Engineer, Betaland Inc., Seoul, Korea** **2001**  
 -Developed an educational purpose application in MS Windows platform that could record Windows desktop and annotate on the recorded desktop.

## TEACHING

- Big Data Computing and Analytics (CSCI 573), TAMUC, Spring 2017.
- Fundamentals of Programming C/C++ (CSCI 515), TAMUC, 2016-2017.
- Programming Fundamentals II (CSCI 152), TAMUC, Fall 2016.

## AWARDS

- **DataCom 2015 Best Paper Award**  
 -Taehoon Kim, **Dongeun Lee**, Jaesik Choi, Anna Spurlock, Alex Sim, Annika Todd, and Kesheng Wu, “Extracting Baseline Electricity Usage Using Gradient Tree Boosting,” *1st Intl. Conf. Big Data Intelligence and Computing (DataCom)*, pp. 734-741, Dec. 2015.
- **IEEE ISCC 2010 Best Paper Award - Student Category**  
 -**Dongeun Lee**, Jonghun Lee, Yonghee Lee, Heejung Lee, and Heonshik Shin, “Low-Complexity Aggregation of Collected Images with Correlated Fields of View in Wireless Video Sensor Networks,” *IEEE 15th Symp. Computers and Communications (ISCC)*, pp. 765-771, Jun. 2010.
- **Efficient and Stable Video Transmission over Wireless Video Sensor Network, Korea Student Aid Foundation (KOSAF) Graduate Research Grant, Korea, Sept. 2008-Aug. 2009.**  
 -Reviewed multiview video coding (MVC) for an application in video sensor network.  
 -The grant served as a basis for research of the ISCC 2010 paper.

## PUBLICATIONS

### • Thesis

1. **Dongeun Lee**, [Analysis for Scalable Coding of Quality-Adjustable Sensor Data](#), Ph. D. Thesis, Department of Electrical Engineering and Computer Science, Seoul National University, 2014.

### • Journals

2. Jaemyoun Lee, Haegeon Jeong, Won-Joo Lee, Hyo-Joong Suh, **Dongeun Lee**, and Kyungtae Kang, "Advanced Primary-Backup Platform with Container-Based Automatic Deployment for Fault-Tolerant Systems," *Wireless Personal Communications*, accepted for publication.
3. Taehoon Kim, Jaesik Choi, **Dongeun Lee**, Alex Sim, Anna Spurlock, Annika Todd, and Kesheng Wu, "Predicting Baseline for Analysis of Electricity Pricing," *International Journal of Big Data Intelligence*, accepted for publication.
4. Junhee Ryu, **Dongeun Lee**, Changhee Han, Heonshik Shin, and Kyungtae Kang, "File-System-Level Storage Tiering for Faster Application Launches with No Mapping Overhead," *IEEE Access*, vol. 4, pp. 3688-3696, 2016 (corresponding author).
5. **Dongeun Lee**, Jaesik Choi, and Heonshik Shin, "[A Scalable and Flexible Repository for Big Sensor Data](#)," *IEEE Sensors Journal*, vol. 15, no. 12, pp. 7284-7294, Dec. 2015.
6. **Dongeun Lee**, Junhee Ryu, and Heonshik Shin, "[Scalable Management of Storage for Massive Quality-Adjustable Sensor Data](#)," *Computing*, vol. 97, no. 8, pp. 769-793, Aug. 2015.
7. **Dongeun Lee**, Jaesik Choi, and Heonshik Shin, "Low-Complexity Compressive Sensing with Down-sampling," *IEICE Electronics Express*, vol. 11, no. 3, pp. 20130947, Feb. 2014.
8. Heejung Lee, Yonghee Lee, Jonghun Lee, **Dongeun Lee**, and Heonshik Shin, "Design of a Mobile Video Streaming System using Adaptive Spatial Resolution Control," *IEEE Transactions on Consumer Electronics*, vol. 55, no. 3, pp. 1682-1689, Aug. 2009.
9. Donggeon Noh, **Dongeun Lee**, and Heonshik Shin, "QoS-Aware Geographic Routing for Solar-Powered Wireless Sensor Networks," *IEICE Transactions on Communications*, vol. 90, no. 12, pp. 3373-3382, Dec. 2007.

### • Refereed Conferences

10. **Dongeun Lee**, Alex Sim, Jaesik Choi, and Kesheng Wu, "Improving Statistical Similarity Based Data Reduction for Non-Stationary Data," *29th Intl. Conf. Scientific and Statistical Database Management (SSDBM)*, to appear, Jun. 2016.
11. **Dongeun Lee**, Alex Sim, Jaesik Choi, and Kesheng Wu, "Novel Data Reduction Based on Statistical Similarity," *28th Intl. Conf. Scientific and Statistical Database Management (SSDBM)*, pp. 21:1-21:12, Jul. 2016.
12. **Dongeun Lee**, Rafael Lima, and Jaesik Choi, "[Improving Imprecise Compressive Sensing Models](#)," *32nd Conf. Uncertainty in Artificial Intelligence (UAI)*, pp. 397-406, Jun. 2016.
13. Taehoon Kim, **Dongeun Lee**, Jaesik Choi, Anna Spurlock, Alex Sim, Annika Todd, and Kesheng Wu, "Extracting Baseline Electricity Usage Using Gradient Tree Boosting," *1st Intl. Conf. Big Data Intelligence and Computing (DataCom)*, pp. 734-741, Dec. 2015.
14. Junhee Ryu, Haksu Jeong, **Dongeun Lee**, Heonshik Shin, and Kyungtae Kang, "ClusterFetch: A Lightweight Prefetcher that Responds to Intensive Disk Read Patterns," *IEEE 12th Intl. Conf. Embedded Software and Systems (ICSS)*, pp. 1051-1056, Aug. 2015 (corresponding author).
15. **Dongeun Lee** and Jaesik Choi, "[Learning Compressive Sensing Models for Big Spatio-Temporal Data](#)," *SIAM 15th Intl. Conf. Data Mining (SDM)*, pp. 667-675, Apr./May 2015.
16. **Dongeun Lee** and Jaesik Choi, "[Low Complexity Sensing for Big Spatio-Temporal Data](#)," *IEEE 2nd Intl. Conf. Big Data (IEEE BigData)*, pp. 323-328, Oct. 2014.
17. Ikjune Yoon, Dong Kun Noh, **Dongeun Lee**, Rony Teguh, Toshihisa Honma, and Heonshik Shin, "Reliable Wildfire Monitoring with Sparsely Deployed Wireless Sensor Networks," *IEEE 26th Intl. Conf. Advanced Information Networking and Applications (AINA)*, pp. 460-466, Mar. 2012.

18. **Dongeun Lee**, Heonshik Shin, and Eunjeong Park, "Modeling Recovery Strategies in Service-Oriented Architecture using a Markov Decision Process," *IEEE 13th Intl. Symp. High-Assurance Systems Engineering (HASE)*, pp. 285-290, Nov. 2011.
19. **Dongeun Lee**, Jonghun Lee, Yonghee Lee, Heejung Lee, and Heonshik Shin, "Low-Complexity Aggregation of Collected Images with Correlated Fields of View in Wireless Video Sensor Networks," *IEEE 15th Symp. Computers and Communications (ISCC)*, pp. 765-771, Jun. 2010.
20. Heejung Lee, Yonghee Lee, **Dongeun Lee**, Jonghun Lee, and Heonshik Shin, "Implementing Rate Allocation and Control for Real-Time H.264/SVC Encoding," *IEEE 28th Intl. Conf. Consumer Electronics (ICCE)*, pp. 269-270, Jan. 2010.
21. **Dongeun Lee**, Yonghee Lee, Heejung Lee, Jonghun Lee, and Heonshik Shin, "Determining Efficient Bit Stream Extraction Paths in H.264/AVC Scalable Video Coding," *42nd Asilomar Conf. Signals, Systems, and Computers (Asilomar)*, pp. 2233-2237, Oct. 2008.
22. Heejung Lee, **Dongeun Lee**, Yonghee Lee, and Heonshik Shin, "Luminance Scalable Coding using H.264/AVC SVC Extensions for Mobile Video Applications," *IEEE Intl. Conf. Multimedia and Expo (ICME)*, pp. 1025-1028, Jun. 2008.
23. Donggeon Noh, **Dongeun Lee**, and Heonshik Shin, "Mission-Oriented Selective Routing for Wireless Sensor Network," *2nd Intl. Conf. Communications and Networking in China (CHINACOM)*, pp. 809-813, Aug. 2007.
24. Hyuntaek Kwon, Donggeon Noh, Junu Kim, Joonho Lee, **Dongeun Lee**, and Heonshik Shin, "Low-Latency Routing for Energy-Harvesting Sensor Networks," *4th Intl. Conf. Ubiquitous Intelligence and Computing (UIC)*, pp. 422-433, Jul. 2007.
25. Donggeon Noh, Junu Kim, Joonho Lee, **Dongeun Lee**, Hyuntaek Kwon, and Heonshik Shin, "Priority-Based Routing for Solar-Powered Wireless Sensor Networks," *2nd Intl. Symp. Wireless Pervasive Computing (ISWPC)*, pp. 53-58, Feb. 2007.

#### • Abstracts and Workshops

26. Kesheng Wu, **Dongeun Lee**, Alex Sim, and Jaesik Choi, "Statistical Data Reduction with Exchangeability," *1st Intl. Workshop Data Reduction for Big Scientific Data (DRBSD) in conjunction with 32nd Intl. Supercomput. Conf. (ISC)*, to appear, Jun. 2017.
27. **Dongeun Lee**, Alex Sim, Jaesik Choi, and Kesheng Wu, "Expanding Statistical Similarity Based Data Reduction to Capture Diverse Patterns," *27th Data Compression Conf. (DCC)*, pp. 445, Apr. 2017.
28. Haksu Jeong, Junhee Ryu, **Dongeun Lee**, Jaemyoun Lee, Heonshik Shin, and Kyungtae Kang, "ClusterFetch: A Lightweight Prefetcher for General Workloads," *ACM/SPEC 6th Intl. Conf. Performance Engineering (ICPE)*, pp. 99-100, Jan./Feb. 2015.
29. Changhee Han, Junhee Ryu, **Dongeun Lee**, Jaemyoun Lee, Kyungtae Kang, and Heonshik Shin, "File-System-Level Flash Caching for Improving Application Launch Time on Logical Hybrid Disks," *IEEE 33rd Intl. Performance Computing and Communications Conf. (IPCCC)*, pp. 1-2, Dec. 2014.

#### • Manuscripts in Preparation

- Junhee Ryu, **Dongeun Lee**, Kyungtae Kang, and Heonshik Shin, "Paralfetch: A Fast Application Launcher for Commodity Disk Drives."

## RESEARCH PROJECTS

- **Open Framework for High-Performance Streaming Analytics, LBNL** 2015-2016
  - Studied an effective streaming data analysis framework for high-velocity data from smart grid.
  - Implemented streaming data compression schemes with the Locally Exchangeable Measures technique developed for data reduction and pattern discovery.
  - Released an open software for streaming data compression (IDEALEM) and published an international conference paper (SSDBM 2016).

- **Behavior Analysis on Residential Electricity Usage Data, LBNL** **2015**  
 - Authored two manuscripts for publication.  
 - Published an international conference paper (DataCom 2015) and prepared a manuscript.
- **Failure Prediction and Diagnosis Algorithm for RMS (Remote Monitoring System), UNIST** **2015**  
 - Led the project with Doosan Heavy Industry.  
 - Applied various machine learning algorithms to power plant sensor data for detecting failure.
- **Breakpoint-Based Prefetching Techniques to Improve the Responsiveness of Mobile Applications, Hanyang University** **2014-2016**  
 - Studied diverse prefetching/caching techniques on memory hierarchy that can improve application launch times.  
 - Published three international conference papers (ICISS 2015, ICPE 2015, IPCCC 2014) and prepared two manuscripts.
- **Development of Next Generation File System for Urban Computing, SNU** **2009-2012**  
 - Devised new data management scheme for huge amount of data generated in urban areas.  
 - Analyzed conventional distributed file system codes for an adaptation to comply with characteristics of urban sensing data.  
 - Focused on data quality adjustment for efficient management of data storage.  
 - Derived the idea for the Ph. D. dissertation.  
 - Published two journal papers (IEEE Sensors Journal, Computing).
- **An Adaptive Service Composition Technique for Reliable Service-Oriented Architecture, SNU** **2009-2011**  
 - Surveyed numerous literature regarding service-oriented computing with emphasis on reliability and fault-tolerance.  
 - Published an international conference paper (HASE 2011).
- **A Study on Scalable Video Server for Heterogeneous Network Environment, SNU** **2007-2008**  
 - Studied H.264/AVC SVC (scalable video coding) extension standard and analyzed its reference software JSVM (joint scalable video model).  
 - Conducted profiling of JSVM and evaluated coding efficiencies on diverse parameter combinations.  
 - Surveyed numerous literature regarding image and video coding issues.  
 - Published an international conference paper (Asilomar 2008).
- **Development of Ubiquitous Storage Dust, SNU** **2006**  
 - Researched data synchronization problems between a central storage server and many storage dusts with lower capacity and bandwidth (Intel's XScale PXA270 - ARMv5TE ISA compliant).  
 - Developed data synchronization and conflict resolution module using cross compiler that could merge modified replicas across storage dusts and also support disconnected operation and asynchronous update.

## PATENT

-Junhee Ryu, **Dongeun Lee**, and Kwangjin Ko, "Prefetching Method for Flash Memory Device and Recording Medium in Which Method is Recorded," Korean Patent No. 1020140061018, Korea, May 2014.

## SOFTWARE PACKAGE RELEASE AND DEMO

-Implementation of Dynamic Extensible Adaptive Locally Exchangeable Measures (IDEALEM), *ACM/IEEE 29th Intl. Conf. High Performance Computing, Networking, Storage, and Analysis (SC)*, [Demo](#), Nov. 2016.

-Implementation of Dynamic Extensible Adaptive Locally Exchangeable Measures (IDEALEM), [LBNL S/W Disclosure No. 2016-045](#), under the modified BSD license, USA, Feb. 2016.

## INVITED TALKS

-*Novel Data Reduction Based on Statistical Similarity*, Computational Research Division, Lawrence Berkeley National Laboratory (LBNL), May 2016.

-*Big Sensor Data Acquisition and Archiving*, Computational Research Division, Lawrence Berkeley National Laboratory (LBNL), Nov. 2015.

-*Efficient Big Data Signal Acquisition by Compressive Sensing and Random Sampling*, Department of Electrical and Computer Engineering, Ulsan National Institute of Science and Technology (UNIST), Mar. 2015.

-*An Introduction to Compressive Sensing and Big Data Applications*, Department of Computer Science and Engineering, Hanyang University, Nov. 2014.

-*An Introduction to Compressive Sensing and Big Data Applications*, Department of Computer Science, Korea Advanced Institute of Science and Technology (KAIST), Aug. 2014.

-*An Introduction to Compressive Sensing*, School of Electronic Engineering, Soongsil University, Jan. 2014.

## TECHNICAL PROGRAM COMMITTEE AND REVIEWS

-TPC, IEEE Global Communications Conference (GLOBECOM) - Big Data Track, Selected Areas in Communications Symposium, 2017.

-AMS Mathematical Reviews, 2016.

-IEEE Systems Journal, 2015-2016.

-Conference on Uncertainty in Artificial Intelligence (UAI), 2016.

-AAAI Conference on Artificial Intelligence (AAAI), 2015.

-Conference on Neural Information Processing Systems (NIPS), 2015.

-IEEE Journal on Selected Areas in Communications, 2014.