# EUIWOONG LEE

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**RESEARCH INTEREST** Theoretical computer science, especially approximation algorithms, hardness of approximation, sum-of-squares (SoS) hierarchy.

**EMPLOYMENT**

**Postdoctoral Associate**
New York University, 2018.1 -

**Research Fellow**
Simons Institute for the Theory of Computing at Berkeley, 2017.8 - 2017.12

**Research Assistant**
Carnegie Mellon University, 2017.6 - 2017.8

**EDUCATION**

**Ph.D., Computer Science**
Carnegie Mellon University, 2017
Advisor: Venkatesan Guruswami

**M.S., Computer Science**
California Institute of Technology, 2012
Thesis advisor: Leonard J. Schulman

**B.S., Computer Science and Mathematics**
California Institute of Technology, 2009

**HONORS**

ICALP Best Student Paper Award, 2017
Simons Award for Graduate Students in Theoretical Computer Science, 2015
Samsung Scholarship for graduate study (PhD), 2012 - 2017
Samsung Scholarsihp for graduate study (MS), 2009 - 2012
Upperclass Merit Award at Caltech, 2008
ACM - ICPC World Final, 31th place (out of 100 teams), 2008
ACM - ICPC Southern California Regional, First place (out of 63 teams), 2007

**JOURNAL PUBLICATIONS**

Nearly Optimal NP-hardness of Unique Coverage
with Venkatesan Guruswami.
*SIAM Journal on Computing (SICOMP).*

APX-Hardness of Maximizing Nash Social Welfare with Indivisible Items
*To appear in Information Processing Letters (IPL).*

LP/SDP Hierarchy Lower Bounds for Decoding Random LDPC Codes
with Badih Ghazi.
*To appear in IEEE Transactions on Information Theory.*

Improved and Simplified Inapproximability for k-means
with Melanie Schmidt and John Wright.
*Information Processing Letters (IPL).*

Towards a Characterization of Approximation Resistance for Symmetric CSPs
with Venkatesan Guruswami.
*Theory of Computing (TOC).*

Strong Inapproximability Results on Balanced Rainbow-Colorable Hypergraphs
with Venkatesan Guruswami
*To appear in Combinatorica.*

Simple Proof of Hardness of Feedback Vertex Set
with Venkatesan Guruswami.
*Theory of Computing (TOC) 2016.*

Complexity of Approximating CSP with Balance/Hard Constraints.
with Venkatesan Guruswami.
*Theory of Computing Systems (TOCS) 2016.*

**CONFERENCE PUBLICATIONS**

Weak Decoupling, Polynomial Folds, and Approximate Optimization over the Sphere
with Vijay V. S. P. Bhattiprolu, Mrinalkanti Ghosh, Venkatesan Guruswami, and Madhur Tulsiani.
*Annual Symposium on Foundations of Computer Science (FOCS) 2017.*

Improved Hardness for Cut, Interdiction, and Firefighter Problems
*International Colloquium on Automata, Languages, and Programming (ICALP) 2017.*

Why You Should Charge Your Friends for Borrowing Your Stuff
with Kijung Shin, Dhivya Eswaran, Ariel Procaccia.
*International Joint Conference on Artificial Intelligence (IJCAI) 2017.*

Sum-of-Squares Certificates for Maxima of Random Tensors on the Sphere
with Vijay V. S. P. Bhattiprolu and Venkatesan Guruswami.
*International Workshop on Randomization and Computation (RANDOM) 2017.*

Global and Fixed-terminal Cuts in Digraphs
with Kristóf Bérczi, Karthekeyan Chandrasekaran, Tamás Király, and Chao Xu.
*International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2017.*

Minimum Birkhoff-von Neumann Decomposition
with Janardhan Kulkarni and Mohit Singh.
*Conference on Integer Programming and Combinatorial Optimization (IPCO) 2017.*

Maximum Matching in the Online Batch-Arrival Model
with Sahil Singla.
*Conference on Integer Programming and Combinatorial Optimization (IPCO) 2017.*

Partitioning a Graph into Small Pieces with Applications to Path Transversal

*ACM-SIAM Symposium on Discrete Algorithms (SODA) 2017.*

Nearly Optimal NP-hardness of Unique Coverage
with Venkatesan Guruswami.
*ACM-SIAM Symposium on Discrete Algorithms (SODA) 2016.*

Approximate Hypergraph Coloring under Low-discrepancy and Related Promises
with Vijay V. S. P. Bhattiprolu and Venkatesan Guruswami.
*International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2015.*

Towards a Characterization of Approximation Resistance for Symmetric CSPs
with Venkatesan Guruswami.
*International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2015.*

Inapproximability of $H$-Transversal/Packing
with Venkatesan Guruswami.
*International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2015.*

Hardness of Graph Pricing Through Generalized Max-Dicut
*ACM Symposium on Theory of Computing (STOC) 2015.*

LP/SDP Hierarchy Lower Bounds for Decoding Random LDPC Codes
with Badih Ghazi.
*ACM-SIAM Symposium on Discrete Algorithms (SODA) 2015.*

Strong Inapproximability Results on Balanced Rainbow-Colorable Hypergraphs
with Venkatesan Guruswami.
*ACM-SIAM Symposium on Discrete Algorithms (SODA) 2015.*

Complexity of Approximating CSP with Balance/Hard Constraints.
with Venkatesan Guruswami.
*Innovations in Theoretical Computer Science (ITCS) 2014.*

Improved Bounds on the Price of Stability in Network Cost Sharing Games
with Katrina Ligett.
*ACM Conference on Electronic Commerce (EC) 2013.*

Clustering Affine Spaces: Hardness and Algorithms
with Leonard J. Schulman.
*ACM-SIAM Symposium on Discrete Algorithms (SODA) 2013.*

Progress on Pricing with Peering
with David Buchfuhrer, Lachlan L.H. Andrew, Ao Tang, and Steven H. Low.
*Conference on Information Sciences and Systems (CISS) 2008.*

Pricing in the Presence of Peering
with David Buchfuhrer, Lachlan L.H. Andrew, Ao Tang, and Steven H. Low.
*Allerton Conference on Communication, Control and Computing 2007.*

**TALKS**

Hardness of Cut Problems
- Simons Workshop on Discrete Optimization via Continuous Relaxation
- ICALP 17

Sum-of-Squares Certificates for Maxima of Random Tensors on the Sphere
- RANDOM 17

FPT Approximation Algorithms for Graph Problems
- KAIST Discrete Math Seminar

Minimum Birkhoff-von Neumann Decomposition
- IPCO 17

Partitioning a Graph into Small Pieces with Applications to Path Transversal
- UC Berkeley Theory Lunch
- Pohang University of Science and Technology (Postech)
- Seoul National University
- SODA 2017
- CMU Theory Lunch

Nearly Optimal NP-hardness of Unique Coverage
- SODA 2016
- CMU Theory Lunch

Inapproximability of $H$-Transversal/Packing
- APPROX 2015
- CMU Theory Lunch

Towards a Characterization of Approximation Resistance for Symmetric CSPs
- Dagstuhl Seminar on CSP 2015
- APPROX 2015

Hardness of Graph Pricing
- CMU CSD Open House 2015
- KAIST Theory Day 2015
- STOC 2015

Strong Inapproximability Results on Balanced Rainbow-Colorable Hypergraphs
- SODA 2015

Complexity of Approximating CSP with Balance/Hard Constraints.
- ITCS 2014
- China Theory Week 2014

Improved Bounds on the Price of Stability in Network Cost Sharing Games
- EC 2013

Clustering Affine Subspaces: Hardness and Algorithms
- SODA 2013
- CMU Theory Lunch 2013

Pricing in the Presence of Peering
- Caltech Theory Seminar 2007

**SERVICE**

Ph.D. Admissions Committee for CMU Computer Science Department, 2016, 2017

Organizer of CMU Theory Lunch, Jan.2015 - Mar. 2015

External reviewer for STOC, FOCS, SODA, ICALP, APPROX, RANDOM, IPEC, TARK, JACM, SICOMP, SIDMA, Algorithmica, TOC, TOCT, TEAC.

**TEACHING**

TA for CS138 (Computer Algorithms) at Caltech, Mar.2009 - Jun.2009

TA for 15-859N (Spectral Graph Theory) at CMU, Aug.2013 - Dec.2013

TA for 15-457A/859E (Advanced Algorithms) at CMU, Jan.2015 - May.2015