

# Yan Gu

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## Employment

### University of California, Riverside | Jan. 2020 – present

- Assistant Professor, Dept. of Computer Science and Engineering

### Massachusetts Institute of Technology | Jan. 2019 – Dec. 2019

- Postdoctoral associate at CSAIL, supervisor: Julian Shun

## Education

### Ph.D. in Computer Science | Aug. 2012 – Sep. 2018 | Carnegie Mellon University

- Advisor: Professor Guy Blelloch
- Thesis title: *Write-Efficient Algorithms*

### Bachelor's in Computer Science | Aug. 2008 – Jul. 2012 | Tsinghua University

- Outstanding Bachelor Thesis Award / Outstanding Graduates Award

## Selected Publications

For the full publication list including surveys, short papers, and workshop papers, please visit my [\[dblp\]](#) or [\[Google Scholar\]](#) page.

### 18. Algorithmic Building Blocks for Asymmetric Memories

Yan Gu, Yihan Sun and Guy E. Blelloch

European Symposium on Algorithms (ESA), 2018.

Also, arXiv:1806.10370 [cs.DS]

### 17. Parallel Write-efficient Algorithms and Data Structures for Computational Geometry

Guy E. Blelloch, Yan Gu, Julian Shun and Yihan Sun

ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2018.

Also, arXiv:1805.05592 [cs.DS]

### 16. The Parallel Persistent Memory Model

Guy E. Blelloch, Phillip B. Gibbons, Yan Gu, Charles McGuffey and Julian Shun

ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2018.

Also, arXiv:1805.05580 [cs.DS]

### 15. Implicit Decomposition for Write-Efficient Connectivity Algorithms

Guy E. Blelloch, Jeremy T. Fineman, Phillip B. Gibbons, Yan Gu, Charles McGuffey and Julian Shun

IEEE International Parallel & Distributed Processing Symposium (IPDPS), 2018.

Also, arXiv:1710.02637 [cs.DS]

### 14. Efficient Construction of Probabilistic Tree Embeddings

Guy E. Blelloch, Yan Gu and Yihan Sun

International Colloquium on Automata, Languages, and Programming (ICALP), 2017.

Also, arXiv:1605.04651 [cs.DS]

**13. Parallel Algorithms with Asymmetric Read and Write Costs**

Naama Ben-David, Guy E. Blelloch, Jeremy T. Fineman, Phillip B. Gibbons, **Yan Gu**, Charles McGuffey and Julian Shun

ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2016.

**12. Parallel Shortest-paths Using Radius Stepping**

Guy E. Blelloch, **Yan Gu**, Yihan Sun and Kanat Tangwongsan

ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2016.

Also, arXiv:1602.03881 [cs.DS]

**11. Parallelism in Randomized Incremental Algorithms**

Guy E. Blelloch, **Yan Gu**, Julian Shun and Yihan Sun

ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2016.

**10. Efficient Algorithms with Asymmetric Read and Write Costs**

Guy E. Blelloch, Jeremy T. Fineman, Phillip B. Gibbons, **Yan Gu** and Julian Shun

European Symposium on Algorithms (ESA), 2016.

Also, arXiv:1511.01038 [cs.DS]

**9. A Top-Down Parallel Semisort**

**Yan Gu**, Julian Shun, Yihan Sun and Guy E. Blelloch

ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2015.

**8. Sorting with Asymmetric Read and Write Costs**

Guy E. Blelloch, Jeremy T. Fineman, Phillip B. Gibbons, **Yan Gu** and Julian Shun

ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2015.

Also, arXiv:1603.03505 [cs.DS]

**7. Sequential Random Permutation, List Contraction and Tree Contraction are Highly Parallel**

Julian Shun, **Yan Gu**, Guy E. Blelloch, Jeremy T. Fineman, Phillip B. Gibbons

ACM-SIAM Symposium on Discrete Algorithms (SODA), 2015.

**6. Ray Specialized BVH Contraction**

**Yan Gu**, Yong He and Guy E. Blelloch

Pacific Graphics 2015. Computer Graphics Forum 34(7), 309-318.

**5. Extending the Graphics Pipeline with Adaptive, Multi-Rate Shading**

Yong He, **Yan Gu** and Kayvon Fatahalian

SIGGRAPH 2014. ACM Trans. Graph. 33, 4, Article 142 (2014)

**4. Efficient BVH Construction via Approximate Agglomerative Clustering**

**Yan Gu**, Yong He, Kayvon Fatahalian and Guy E. Blelloch

High Performance Graphics 2013.

**3. Mixed-Domain Edge-Aware Image Manipulation**

Xian-Ying Li, **Yan Gu** and Shi-Min Hu

IEEE Trans. on Image Processing (TIP), 2013, 22(5), pp. 1915-1925.

**2. Algorithms on Moving Sensors for Barrier Coverage of a Line Segment and a Simple Circle**

Danny Z. Chen, **Yan Gu**, Jian Li and Haitao Wang

SWAT 2012. Discrete & Computational Geometry, 2013, 50(2), pp. 374-408.

**1. A Geometric Study of V-style Pop-ups: Theories and Algorithms**

Xian-Ying Li, Tao Ju, **Yan Gu**, and Shi-Min Hu

SIGGRAPH 2011. ACM Trans. on Graph. 30, 4, Article 98 (2011).

**Manuscript and Preprint**

**6. In-Place Parallel Algorithms: Theory and Practice**

**Yan Gu**, Omar Obeya, and Julian Shun

**5. Randomized Incremental Convex Hull is Highly Parallel**

Guy E. Blelloch, **Yan Gu**, Julian Shun, and Yihan Sun

**4. Optimal Parallel Algorithms in the Binary-Forking Model**

Guy E. Blelloch, Jeremy T. Fineman, **Yan Gu**, and Yihan Sun

arXiv: 1903.04650 [cs.DS]

**3. Theoretically-Efficient and Practical Parallel DBSCAN**

Yiqiu Wang, **Yan Gu**, Julian Shun

**2. Semi-Asymmetric Parallel Graph Algorithms for NVRAMs**

Laxman Dhulipala, Charles McGuffey, **Yan Gu**, Hongbo Kang, Guy E. Blelloch, Phillip B. Gibbons, and Julian Shun

**1. Improved Parallel Cache-Oblivious Algorithms for Dynamic Programming and Linear Algebra**

Guy E. Blelloch, and **Yan Gu**

arXiv: 1809.09330 [cs.DS]

**Talks**

**“Non-Volatile Main Memories (NVRAMs): Challenges and Opportunities”**

University of California, Riverside, CA (September 2019)

**“Efficient Algorithms for Modern and Future Architecture”**

University of California, Riverside, CA (March 2019)

Lehigh University, PA (March 2019)

University of Connecticut, CT (February 2019)

Missouri University of Science and Technology, MI (February 2019)

**“Write-efficient Algorithms” Series**

**Conference Talks**

“Algorithmic Building Blocks for Asymmetric Memories”, ESA, August 2018 (Helsinki, Finland).

“Parallel Write-efficient Algorithms and Data Structures for Computational Geometry”, SPAA, July 2018 (Vienna, Austria)

“Implicit Decomposition for Write-Efficient Connectivity Algorithms”, IPDPS, May 2018 (Vancouver, Canada)

“Efficient Algorithms with Asymmetric Read and Write Costs”, ESA, August 2016 (Aarhus, Denmark)

“Sorting with Asymmetric Read and Write Costs”, SPAA, June 2015, (Portland, OR)

## **Invited Talks**

Algorithms & Complexity Seminar at MIT, Cambridge, MA (October 2018)  
Annual Parlay Meeting at MIT, Cambridge, MA (October 2017)  
Fudan University, Shanghai, China (June 2017)  
Google Research, Mountain View, CA (July 2016)  
Chinese Academy of Sciences, Beijing, China (June 2016)  
Tsinghua University, Beijing, China (October 2015)

## **Workshop and Seminar Talks**

Workshop on Advances in Parallel and Distributed Computational Models, Vancouver, Canada (May 2018)  
Annual Parlay Meeting at CMU, Pittsburgh, PA (April 2016)  
Samsung, San Jose, CA (March 2016)  
NVM Workshop, San Diego, CA (March 2016)  
CMU SpeakersClub, Pittsburgh, PA (September 2015)

## **“Practical Algorithms Can Benefit from Theoretical Improvements”**

Programming Languages and Software Engineering Seminar at MIT, Cambridge, MA (September 2018)

## **“Efficient Construction of Probabilistic Tree Embeddings”**

International Colloquium on Automata, Languages, and Programming (ICALP), Warsaw, Poland (July 2017)  
CMU Theory lunch, Pittsburgh, PA (May 2017)

## **“Parallel Shortest-Paths Using Radius Stepping”**

Goethe University Frankfurt, Germany (March 2018)  
Symposium on Parallelism in Algorithms and Architectures (SPAA), Pacific Grove, CA (July 2016)  
Annual Parlay Meeting at CMU, Pittsburgh, PA (April 2016)

## **“A Top-Down Parallel Semisort”**

Annual Parlay Meeting at MIT, Cambridge, MA (April 2015)

## **“Ray Specialized BVH Contraction”**

Pacific Graphics, Beijing, China (October 2015)  
CMU Graphics Lab Meeting, Pittsburgh, PA (November 2013)

## **“Efficient BVH Construction” Series**

Tsinghua University, Beijing, China (June 2016, titled “Efficient graphics data structures”)  
High Performance Graphics, Anaheim, CA (July 2013)  
CMU Graphics Lab Meeting, Pittsburgh, PA (June 2013)  
CMU 15-750: Graduate Algorithms, 20-min short lecture (April 2013)

## **“Parallelism in Graphics Applications”**

CMU Graphics Lab Meeting, Pittsburgh, PA (March 2014)  
Annual Parlay Meeting at CMU, Pittsburgh, PA (February 2014)

## **“V-style Pop-ups”**

CMU Graphics Lab Meeting, Pittsburgh, PA (October 2012)

Tsinghua University, Beijing, China (May 2012)

## **“Study Abroad as a Graduate Student in United States (for undergrads)”**

Tsinghua University, Beijing, China (October 2015)

UESTC, Zhongshan, China (June 2014)

## **Professional Services**

### **Program Committee:**

- IEEE International Parallel & Distributed Processing Symposium (IPDPS) 2020
- ACM-SIAM Algorithmic Principles of Computer Systems (APoCS) 2020
- ACM Symposium on Parallelism in Algorithms and Architectures (SPAA) 2019
- IEEE International Parallel & Distributed Processing Symposium (IPDPS) 2019
- Workshop on Advances in Parallel and Distributed Computational Models (APDCM) in IPDPS 2019
- Big Graph Processing (BGP) in ICDCS 2017

### **Conference reviewer:**

SPAA, SODA, ESA, IPDPS, SIGMETRIC, ALENEX, SIGGRAPH, Eurographics, Pacific Graphics, High performance Graphics, Fun with algorithms

### **Journal reviewer:**

- TOPC (ACM Transactions on Parallel Computing)
- Parallel Computing
- IJNC (International Journal of Networking and Computing)
- TVCG (IEEE Transactions on Visualization and Computer Graphics)
- CAG (Computers & Graphics)
- JCGT (Journal of Computer Graphics Techniques)
- The Visual Computer
- JOCO (Journal of Combinatorial Optimization)
- Astronomy and Computing
- Transactions on Computers
- International Journal of Parallel Programming

## **Teaching and Coaching**

Guest lecturer for 6.886 Algorithm Engineering, MIT (Spring 2019)

Guest lecturer for 15-853: Algorithms in the “Real World”, CMU (Spring 2018)

Teaching assistant and guest lecturer for 15-418/618: Parallel Computer Architecture and Programming, Tsinghua University (Summer 17)

Teaching Assistant for 15-853: Algorithms in the “Real World”, CMU (Fall 15)

Teaching Assistant for 15-295 Competition Programming and Problem Solving, CMU (Fall 13, Spring 14, Fall 14, Spring 15)

Co-organizer of the Parallel Reading Group in Spring 2017

**Assistant Coach for CMU programming team (Jul. 2013 – Aug. 2015), and programming team of Beijing Institute of Technology (Jan. 2010 – Aug. 2010)**

### **Highlights of the coached teams:**

- Carnegie Mellon University 2013 – 2015:

- 3 teams in top 5 at 2014 East Central North America (ECNA) regional
- Champion, and 5 teams in top 10 at 2013 East Central North America (ECNA) regional (ECNA regionals are highly-competitive. These are CMU's only presence in top 4 places in ECNA regionals during the last six years.)
- 15<sup>th</sup> at 2015 World Final
- Beijing Institute of Technology 2010:
  - 7<sup>th</sup> place (Gold Medal) at 2010 Asia Regional at Hangzhou, first Gold Medal in school history

### **Problem Setting for various programming contests, from 2009**

Including China National Team Selection Contest (CTSC) 2009, 2010, 2012, Asia-Pacific Informatics Olympiad (APIO) 2010, Tshinghua Olympiad in Informatics (THOI) 2012, and several USA Computing Olympiad (USACO) monthly contests.

## **Awards & Scholarships**

### **ACM International Collegiate Programming Contest (ICPC) 2012 - 2013**

- Member of the CMU team with Jonathan Paulson and Nathaniel Barshay
- Champion of 2012 ACM-ICPC East Central North America regional, Youngstown
- North American Champion and Bronze Medal at 2013 ACM-ICPC World Finals (in St. Petersburg)

### **Awards and Scholarships**

- Outstanding Bachelor Thesis Award, 2012
- Outstanding Graduates Award, 2012
- Morgan Stanley Scholarship, 2011 (4 winners in the CS Department)
- Sohu Academic Scholarship, 2009