

# Jongmin Choi

☎ (+82) 10-2770-8619 | ✉ icothos@gmail.com / icothos@cryptolab.co.kr | 📅 Feb 17th, 1995 | 🏠 Jongmin choi

## Summary

I am Ph.D. in POSTECH (Pohang University and Technology), majoring in computational geometry (algorithms). In particular, I focus on reducing time complexity of algorithms by slightly modifying data structure to fit the constraints of the given problem. For example, I gave an  $O(n \log n)$ -time algorithm for computing Euclidean planar point 2-center in 2021. This matches the lower bound of the problem (closed) given in 1997.

## Research Interests

**Geometry Algorithms**    Nearest neighbor search / Clustering  
**Packing and Covering**    Packing / Covering /  $k$ -center  
**Optimization Techniques**    matrix search / parametric search / parallel algorithm

## Education

### POSTECH(Pohang University of Science and Technology)

M.S. AND PH.D IN COMPUTER SCIENCE AND ENGINEERING

- Dissertation : Optimal Planar Covering with Congruent Disks.
- Advisor: Hee-Kap Ahn

Pohang, S.Korea

Sep. 2016 - Feb. 2023

### POSTECH(Pohang University of Science and Technology)

B.S. IN COMPUTER SCIENCE AND ENGINEERING

- Cum Laude.

Pohang, S.Korea

Mar. 2012 - Aug. 2016

## Skills

**Programming**    C++, Python, etc.  
**Algorithms**    Algorithm Design / Complexity Analysis / Numerical Analysis  
**Languages**    Korean (Native) / English (Available for work)

## Industrial Experience

### CryptoLab Inc.

RESEARCHER, HOMOMORPHIC ENCRYPTION TEAM

- Optimize algorithms in HEaAN (homomorphic encryption software library that supports CKKS scheme). Related on mathematical function approximation, data structures and memory usage etc.
- Implement and Optimize Privacy Preserved Machine Learning program. Implment matrix multiplication over the HEaAN. Implement homomorphic encrypted machine learning program which is converting python-torch base ML model to HEaAN base homomorphic encrypted ML model. Implement and Optimize LLamMA model over the HEaAN.

Seoul, S.Korea

Oct. 2022 - Feb. 2024

### SK hynix

INTERN, SSD FIRMWARE TEAM

- Read Ubuntu NVMe protocol code and explain to others.

Seongnam, S.Korea

Jun. 2015 - Aug. 2015

## Publications

### INTERNATIONAL JOURNALS

1. Byeonguk Kang, Jongmin Choi, Hee-Kap Ahn. Intersecting Disks using Two Congruent Disks. *Computational Geometry*, 110, 101966, Mar.2023.
2. Jongmin Choi, Dahye Jeong, Hee-Kap Ahn. Covering Convex Polygons by Two Congruent Disks. *Computational Geometry*, 109, 101936, Feb.2022.
3. Taehoon Ahn, Jongmin Choi, Chaeyoon Chung, Hee-Kap Ahn, Sang Won Bae, Sang Duk Yoon. Rearranging a Sequence of Points onto a Line. *Computational Geometry*, 107, 101887, 2022.
4. Jongmin Choi, Sergio Cabello, Hee-Kap Ahn. Maximizing Dominance in the Plane and its Applications. *Algorithmica*, 83, pages 3491–3513, 2021.

5. Jongmin Choi, Hee-Kap Ahn. Efficient Planar Two-Center Algorithms. *Computational Geometry*, 97, 101768, 2021.
6. Hee-Kap Ahn, Sang Won Bae, Jongmin Choi, Matias Korman, Wolfgang Mulzer, Eunjin Oh, Ji-Won Park, André van Renssen, Antoine Vigneron. Faster Algorithms for Growing Prioritized Disks and Rectangles. *Computational Geometry: Theory and Applications*, 80, pages 23–39, 2019.
7. Hee-Kap Ahn, Taehoon Ahn, Sang Won Bae, Jongmin Choi, Mincheol Kim, Eunjin Oh, Chan-Su Shin, Sang Duk Yoon. Minimum-Width Annulus with Outliers: Circular, Square, and Rectangular Cases. *Information Processing Letters*, 145, pages 16–23, 2019.

## INTERNATIONAL CONFERENCES

1. Jongmin Choi, Jaegun Lee, Hee-Kap Ahn. Efficient k-Center Algorithms for Planar Points in Convex Position. *In Proc. 18th International Workshop on Algorithms and Data Structures (WADS 2023)*, pages 262–274, 2023.
2. Taehoon Ahn, Jongmin Choi, Chaeyoon Chung, Hee-Kap Ahn, Sang Won Bae, Sang Duk Yoon. Rearranging a Sequence of Points onto a Line. *33rd Canadian Conference on Computational Geometry (CCCG 2021)*, pages 36–46, 2021.
3. Jongmin Choi, Dahye Jeong, Hee-Kap Ahn. Covering Convex Polygons by Two Congruent Disks. *In Proc. 32nd International Workshop on Combinatorial Algorithms (IWOCA 2021)*, pages 165–178, 2021.
4. Byeonguk Kang, Jongmin Choi, Hee-Kap Ahn. Intersecting Disks using Two Congruent Disks. *In Proc. 32nd International Workshop on Combinatorial Algorithms (IWOCA 2021)*, pages 400–413, 2021.
5. Jongmin Choi, Sergio Cabello, Hee-Kap Ahn. Maximizing Dominance in the Plane and its Applications. *In Proc. 16th International Workshop on Algorithms and Data Structures (WADS 2019)*, pages 325–338, 2019.
6. Hee-Kap Ahn, Taehoon Ahn, Jongmin Choi, Mincheol Kim, Eunjin Oh. Minimum-Width Square Annulus Intersecting Polygons. *12th International Conference and Workshops on Algorithms and Computation (WALCOM 2018)*, pages 56–67, 2018.
7. Hee-Kap Ahn, Taehoon Ahn, Sang Won Bae, Jongmin Choi, Mincheol Kim, Eunjin Oh, Chan-Su Shin, Sang Duk Yoon. Minimum-Width Annulus with Outliers: Circular, Square, and Rectangular Cases. *12th International Conference and Workshops on Algorithms and Computation (WALCOM 2018)*, pages 44–55, 2018.
8. Hee-Kap Ahn, Sang Won Bae, Jongmin Choi, Matias Korman, Wolfgang Mulzer, Eunjin Oh, Ji-won Park, André van Renssen, Antoine Vigneron. Faster Algorithms for Growing Prioritized Disks and Rectangles. *In Proc. 28th International Symposium on Algorithms and Computation (ISAAC 2017)*, pages 3:1–3:13, 2017.
9. Jongmin Choi, Dongwoo Park, Hee-Kap Ahn. Bundling Two Simple Polygons to Minimize Their Convex Hull. *In Proc. 11th International Conference and Workshops on Algorithms and Computation (WALCOM 2017)*, pages 66–77, 2017.

## Academic activities

---

### WORKSHOP

**Korean Workshop on Computational Geometry**

Obertrubach, Germany

2019

### REVIEWER ROLE

<b>reviewer</b> , Computational Geometry: Theory and Applications(CGTA)	2022	2020	2019
<b>reviewer</b> , Symposium on Computational Geometry(SOCG)	2022	2020	
<b>reviewer</b> , Workshops on Algorithms and Data Structure(WADS)			2021
<b>reviewer</b> , International Symposium on Algorithms and Computation(ISAAC)			2021

## Educational Activities

---

TEACHING ASSISTANTS OF AI EDUCATION PROGRAM FOR BUSINESS.

### POSCO AI Expert.

PYTHON AND ALGORITHMS

- Create algorithm materials for the course.

Pohang, S.Korea

2017 - 2022

### POSCO Youth AI · Big data Academy.

PYTHON AND ALGORITHMS

- Support by South Korea's Ministry of Employment and Labor.

Pohang, S.Korea

2022

### SK Hynix ML Champion.

ALGORITHMS

Pohang, S.Korea

2019

### Samsung Electronics DS part ML Expert.

ALGORITHMS

Pohang, S.Korea

2017

### TEACHING ASSISTANT.

CSED331 **Algorithms**,  
CSED312 **Operating System**,

Spring 2017 & 2018

Fall 2016

## Extracurricular Activity

---

### PLUS (POSTECH Laboratory for UNIX Security)

MEMBER & PRESIDENT AT 2014

Pohang, S.Korea

May. 2012 - Feb. 2016

### POSCAT (POSTECH Computing Algorithm Team)

MEMBER

Pohang, S.Korea

Mar. 2012 - Feb. 2015

## Awards

---

2014 **6th place**, ACM ICPC Asia Daejeon Regional.

Daejeon, S.Korea

2014 **Finalist**, Codegate CTF Finals

Seoul, S.Korea

2012 **10th place**, ACM ICPC Asia Daejeon Regional.

Daejeon, S.Korea