

# Jiaqi Zheng

✉ orzzzjq (at) gmail.com

🔗 <https://github.com/orzzzjq>

🏠 <https://orzzzjq.github.io/aboutme>

## EDUCATION

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**National University of Singapore**, Singapore

Aug. 2020 – Present

Ph.D. in Computer Science

- **Current GPA:** 4.79/5.0
- **Selected Scholarships & Awards:** Research Scholarship, Research Incentive Award

**Harbin Engineering University**, China

Aug. 2016 – June 2020

B.Eng. in Computer Science and Technology

- **Core Course GPA:** 3.84/4.0
- **Selected Scholarships & Awards:** Excellent Graduation Thesis - *Awarded to top 2% of the cohort*  
National Incentive Scholarship - *Awarded to top 2% of the cohort*  
Gold Medal of ACM-ICPC Chinese Collegiate Programming Contest - *Nationwide competition with 420 participants*  
Silver Medal of ACM-ICPC Asia Regional Contest  $\times 2$  - *Asian-wide competition with 373 & 298 teams participating, resp.*  
Bronze Medal of ACM-ICPC Asia-East Continent Final - *Asian-wide competition with 374 teams participating*

## EXPERIENCE

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**Institute of Science and Technology**, Austria

Oct. 2024 – Present

Visiting Scientist (Algorithm, Geometry & Topology Group), hosted by Herbert Edelsbrunner

- **Topics:** Geometric Optimization and Topological Data Analysis
- **Achievements:** Developed and contributed to two open-sourced libraries, and finished two academic papers

**National University of Singapore**, Singapore

July 2019 – July 2020

Research Intern (Geometry & Graphics Lab), hosted by Tiow-Seng Tan

- **Topics:** Digital Geometry and GPU Computing
- **Achievements:** Developed three open-sourced libraries, and published one academic paper

## SKILLS

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**Programming:** C/C++, CUDA, Python, Java, C#

**Libraries & Tools:** CGAL, Unity Engine, PyTorch, MPI/OpenMP, LaTeX

**Languages:** English (professional), Chinese (native)

## RESEARCH & PUBLICATIONS

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**Research Focus:** Convex Optimization, Computational Geometry, Topological Data Analysis, GPGPU

- **Symmetric Cone Eigenvalue Optimization: Expressivity and Algorithms through Equilibrium Computation**  
[Jiaqi Zheng](#) and Antonios Varvitsiotis
- **Approximation Algorithms for Smallest Intersecting Balls**  
[Jiaqi Zheng](#) and Tiow-Seng Tan
- **A Primal-Dual Algorithmic Framework for Symmetric Cone Programming**  
[Jiaqi Zheng](#), Antonios Varvitsiotis, Tiow-Seng Tan, Wayne Lin
- **Multiplicative Updates for Online Convex Optimization over Symmetric Cones**  
Ilayda Canyakmaz, Wayne Lin, Georgios Piliouras, Antonios Varvitsiotis, [Jiaqi Zheng](#) ( $\alpha$ - $\beta$  order)
- **Computing Centroidal Voronoi Tessellation Using the GPU**  
[Jiaqi Zheng](#) and Tiow-Seng Tan  
*ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D), 2020*

## SELECTED PROJECTS

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**LIBSIB:** The first library for computing *Smallest Intersecting Balls* in arbitrary dimensions

- Capable of solving the problem for various types of input objects such as convex polytopes, balls, and ellipsoids
- The problem is related to many important problems such as SVM and SVDD in machine learning

**Periodica:** The most efficient library for analyzing *Periodic Point Sets* in 2D and 3D spaces

- Computes zero-dimensional homology fingerprints for periodically repeating point sets
- Capable of analyzing large-scale data sets from molecular biology and crystalline material science

**PDSCP:** A novel algorithmic framework for *Symmetric Cone Programming* (which generalizes LP, SDP, and SOCP)

- Has been applied to develop efficient parallel algorithms for *Smallest Enclosing Ball* and *Support Vector Machine*
- Outperforms the best commercial conic programming solvers – IBM Cplex and Gurobi – in these two tasks

**PosLP:** A library for computing *Positive Linear Programs* using GPU

- Implements and improves the massively parallel algorithms for PosLP

**PBA+ (★ 74):** The most efficient open-sourced library for computing 2D and 3D *Digital Voronoi Diagrams* on GPU

- Processes very large-scaled input images (up to  $32K \times 32K$  pixels) in the order of hundreds of milliseconds
- The source code has been integrated into game engines and motion-planning projects

**gCVT (★ 39):** An open-sourced library for computing 2D and 3D *Centroidal Voronoi Tessellations* (CVT) on GPU

- Adopts the over-relaxed Lloyd's method for minimizing the objective function and outperforms existing optimizers

**Surface Remesher (★ 40):** An open-sourced project for optimizing *Surface Meshes* using 2D Centroidal Voronoi Tessellations

- Refining and simplifying triangulated surface meshes using parameterization and CVTs

## TEACHING & MENTORING

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**National University of Singapore**, Singapore

Jan. 2021 – Present

Teaching Assistant in Department of Computer Science

- **Teaching Courses:** Programming Methodology, Introduction to 2D Game Development
- **Roles:** Conducting tutorials and consultations - *Received positive feedback every year*