

# Charmaine J. Sia

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## Education

2006– **Massachusetts Institute of Technology**, Cambridge, MA  
B.Sc. Candidate in Mathematics and Physics with minor in Economics (degree expected Jun 2010)  
GPA: 5.0/5.0  
Selected Coursework: Commutative Algebra, Algebraic Geometry, Algebraic Topology, Algebraic Number Theory, Combinatorial Theory, Advanced Algorithms, Randomized Algorithms, Combinatorial Optimization, Quantum Mechanics, Statistical Physics, Relativity

## Academic Interests

Algebraic topology, combinatorics, number theory, algorithms

## Research Experience

Jun–Aug 2009 **Williams College SMALL REU**, Williamstown, MA  
Conducted research in knot theory under the supervision of Prof. Colin Adams. Two papers in preparation.

Jun–Aug 2008 **University of Minnesota Duluth REU**, Duluth, MN  
Conducted independent research on the game chromatic number of graphs, and on Hurwitz equivalence in tuples of dihedral, dicyclic, and semidihedral groups under the supervision of Prof. Joseph Gallian. Published two papers.

Jun–Aug 2007 **MIT Summer Program in Undergraduate Research**, Cambridge, MA  
Conducted independent research on zero-sum problems in finite groups under the supervision of Hoda Bidkhori.

## Teaching Experience

Jan–Aug 2006 **Raffles Girls' School (Secondary) Mathematics Department**, Singapore  
Taught 3 middle school classes of 25 students GCE O-level Mathematics for 2 terms. Planned lessons and graded homework. Established effective classroom management and communication skills.

Jan–Jul 2006 **Singapore IMO Team**, Singapore  
Assisted with the training of the Singapore team for the International Mathematical Olympiad. Designed instructional material, gave lectures, and graded tests.

Jan–May 2006 **High School Mathematics Olympiad Training**, Singapore  
Gave mathematics olympiad training to students of the Mathematics Club in two high schools. Designed instructional material and gave lectures.

## Publications

- [1] Charmaine Sia, The game chromatic number of some families of Cartesian product graphs, *AKCE Int. J. Graphs Comb.* **6** (2009) 315–327.
- [2] Charmaine Sia, Hurwitz equivalence in tuples of dihedral groups, dicyclic group, and semidihedral groups, *Electron. J. Combin.* **16** (2009) #R95, 17pp.

## Papers in Preparation

- [3] Colin Adams, Dan Collins, Katherine Hawkins, Charmaine Sia, Rob Silversmith, and Bena Tshishiku, Planar and spherical stick indices of knots.
- [4] Colin Adams, Dan Collins, Katherine Hawkins, Charmaine Sia, Rob Silversmith, and Bena Tshishiku, Duality properties of indicatrices of knots.

## **Awards**

- 2010 Alice T. Schafer Prize for Undergraduate Women in Mathematics  
2006 William Lowell Putnam Mathematical Competition Honorable Mention  
2003–2005 International Mathematical Olympiad Bronze Medal  
2005 Asian Physics Olympiad Bronze Medal  
2004 Asian Pacific Mathematics Olympiad Silver Award

## **Other Activities**

- 2009– **Girls' Angle**  
**Mentor.** Mentored middle- and high-school female students in high-level mathematics at weekly club meetings.
- 2008–2009 **MIT Singapore Students' Society**  
**Treasurer.** Kept and disbursed funds and organized events.
- 2007–2009 **Harvard-MIT Mathematics Tournament**  
**Problem contributor.** Wrote, test-solved, and proofread problems for a mathematics competition for high school students.
- 2004–2005 **Raffles Junior College Mathematics Society**  
**President.** Organized and initiated club activities such as Mathematics Olympiad trainings and lectures.