



**Davidson Fellow  
Yi Sun**

(\$25,000 Scholarship Recipient)



**Personal Info**

Yi Sun  
Age: 17  
San Jose, California

**School, College and Career Plans**

Yi recently graduated from The Harker School and will be attending Harvard in the fall. Yi plans to major in mathematics and physics and hopes to pursue careers in both fields.

**Davidson Fellows Submission** (*Mathematics*)

In his project, "On the Expected Winding Number of a Random Walk on the Unit Lattice," Yi applied combinatorial mathematics to derive a formula for the expected winding number of a random walk on a unit lattice. Yi's work characterizes this tendency associated with random walks, or taking successive steps in random directions. When this research is applied to the growth of polymers, scientists can predict how many times the polymer will coil around an obstacle, or rod, thus, indicating the strength of the polymer. This research can be used in physics, computer science and material science.

**Biography**

Yi was born in Shanghai, China and then moved to Canada and finally to the United States at the age of 5. Yi has always been fascinated by the elegance of math and science, and has been in an accelerated math curriculum since seventh grade. He has also done extensive study outside the classroom in the math and science olympiads.

Yi became interested in his current research by way of another mathematical problem regarding random walks on a spiral staircase-like structure. Yi began his research for his Davidson Fellows project at the Research Summer Institute (RSI) in the summer of 2005 and finished the following October. During his time at RSI, Yi learned many valuable methods and ideas towards the mathematical process. Yi hopes his project will provide the theoretical basis for the development of new and better materials.

When Yi isn't studying math, he is the captain of his school's Quiz Bowl and Science Bowl teams, leading them to the national championship tournaments. Yi is also captain of the Harker Junior Engineering Technical Society Varsity Team; in 2005, they won the national competition. He also enjoys reading, swimming and listening to music. Yi is a big fan of the Duke basketball team.

*Please see next page.*



## Davidson Fellow

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*(Cont.)*

### **Honors/Awards**

- 2006 Davidson Fellow
- 2006 Intel Science Talent Search, 2<sup>nd</sup> Place
- 2006 Silver Medal International Mathematical Olympiad
- 2006 Siemens Awards in Advanced Placement National Winner
- 2006 National Merit Scholarship Finalist
- 2006 USA Math Olympiad Winner
- 2005 USA Math Olympiad Winner
- 2005 National Advanced Placement Scholar
- 2005 Research Science Institute Scholar
- 2005 Gold Medal Asian Pacific Mathematics Olympiad
- 2005 USA Computing Olympiad Finalist
- 2004 Gold Medal International Physics Olympiad
- 2004 Silver Medal Asian Pacific Mathematics Olympiad
- 2004 USA Math Olympiad Honorable Mention

### **Community Activities**

Yi coaches the MathCOUNTS team at his alma mater middle school and volunteers at local food banks.

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