



**Davidson Fellow
Billy Dorminy**

(\$10,000 Scholarship Recipient)



Personal Info

Billy Dorminy

Age: 15

McDonough, Georgia

School, College and Career Plans

Billy is homeschooled and takes advanced mathematics classes through the Art of Problem Solving online school. Billy hopes to continue with his mathematics and computer science studies and work towards a doctorate degree.

Davidson Fellows Submission (*Technology*)

In his project, "Improper Fractional Base Encryption," Billy invented a secure method of encrypting messages using reduced redundancy representations of improper fractional bases (IFBs), a number base using improper fractions. Billy created a new method of encryption using these representations, which takes up less computer memory and uses both confusion and diffusion to hide a message. As the first secure method of encryption using IFBs, this system allows a second encrypted message to be undetectable within the body of the main message and opens a new area for encryption exploration.

Biography

Billy started exploring the topic of improper fractional bases for a project in his online independent study class. After a lot of background work, Billy found a method of encryption as a possible application for IFBs. Billy had complete autonomy for his project, from conception of the idea to its implementation. He hopes his secure program will alleviate some of the stress of possessing sensitive and significant secrets and messages.

Billy has always been homeschooled, and began his math studies at age 3 and reading at 4. By the time he was 6, Billy was a specialist on woody landscape shrubs and became a farmer at 8.

Billy won the Scientific Depth and Rigor scholarship from Alcatel-Lucent and the first place prize from the Association for Computing Machinery. Billy received a perfect score on the 2007 American Mathematics Competition 10. He was also a finalist Reader's Digest Word Power Challenge.

In his spare time, Billy enjoys fitness running and competing in 5K races and quail hunting in South Georgia. He also enjoys vegetable gardening.

Please see next page.



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(Cont.)

Honors/Awards

- 2007 Davidson Fellow
- 2007 Alcatel-Lucent Scientific Depth and Rigor Scholarship
- 2007 Association of Computing Machinery First Place Award
- 2007 Internship at Sandia National Laboratories
- 2007 International Science and Engineering Fair Second Place Computer Science
- 2007 Cyworld Leadership Summit Soli Deo Gloria Home Educators' High School Math Tournament Organizer and Test Writer
- 2007 Georgia Council on Social Studies State Fair Finalist
- 2007 National High School Vocabulary Championship Finalist
- 2007 USA Math Olympiad Participant
- 2007 American Mathematics Competition 10 Perfect Score
- 2006-2007 USA Computing Olympiad Gold Level
- 2006-2007 International Debate Society
- 2005 Biz for Kid\$ Summer Business Contest Grand Prize Winner
- 2005 National MathCounts Finalist
- 2004, 2005 Reader's Digest National Word Power Challenge Finalist and First Runner-up
- 1997, 1998, 2005 National Junior Horticulture Association National Award

Community Activities

Billy is a volunteer forum moderator for the Art of Problem Solving website. He also wrote *How To Win Word Power* to help middle school students learn vocabulary and compete effectively in the Reader's Digest Word Power Challenge.

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