



**Davidson Fellow
Charles Zhang**

(\$25,000 Scholarship Recipient)



Personal Info

Charles Zhang
Age: 17
Oakland Township, Michigan

School, College and Career Plans

A rising senior at Adams High School, Charles plans to major in an engineering and/or science field. He is interested in a scientific research career because he wants to help improve society.

Davidson Fellows Submission (Science)

In his project, "Development of a Vibration Energy Harvesting Device Based on an Asymmetric Air-spaced Cantilever," Charles researched and developed a prototype for renewable battery power that harvests energy from mechanical vibrations. Charles found that by using asymmetric air-spaced cantilevers, mechanical energy present in the environment could generate AC voltage. The magnitude of the AC voltage generated is substantial and helps to increase the efficiency when converting the AC voltage into DC voltage. His prototype can be used as a primary power source in wireless structural monitoring sensors for bridges, implantable medical devices, tire pressure monitoring systems and portable devices.

Biography

Charles finished his elementary and middle school education at Baldwin Elementary School and Van Hoosen Middle School, both in Rochester, Michigan, and currently attends Adams High School. His experiences while learning electricity in Advanced Placement Physics helped to foster an interest that motivated him to pursue his Davidson Fellows project.

Outside the standard school curriculum, Charles accessed specialized math classes at the Indus Center for Academic Excellence and at a summer program called Oakland University Summer Mathematics Institute, where he took math classes in Linear Algebra and Number Theory. In addition, Charles graduated from the American Chinese School of Greater Detroit, which he attended for 11 years and is fluent in Chinese. Charles also played the piano for about nine years.

One sport Charles loves to play is tennis. He was on the Varsity Tennis team last year and the team was state runner-ups in Division 2. Piano is his favorite musical instrument.

Please see next page.



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(Cont.)

Honors/Awards

- 2008 Davidson Fellow
- 2008 High School Honors Science Program participant.
- 2008 Michigan Science and Engineering Fair, fourth place
- 2008 Herbert Hoover Young Engineer Award
- 2008 Innovative Engineering Award
- 2008 Most Outstanding 11th grade student exhibiting in the areas of Computer Science, Engineering, Physics or Chemistry
- 2008 Science and Engineering Fair of Metro Detroit, third place
- 2008 United States Air Force, certificate of achievement for an outstanding Science or Engineering Fair Project
- 2007 Advanced Placement (AP) Scholar with Distinction
- 2007 Honorable Mention in the USA Mathematical Talent Search
- 2007 Michigan Math Prize Competition Bronze Award
- 2005 American Guild of Music Test List, second place

Community Activities

Charles volunteers through activities for Key Club and National Honors Society. He was elected as junior representative for National Honors Society this past year, and because of his devotion to Key Club, he has been elected as Key Club president his senior year.

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