

# techdirections

linking education to careers

www.techdirections.com

FEBRUARY 2012

**STEM Program  
Contributes  
to Turnaround  
School Success**

**Teaching STEM  
to Millennial Students**

**NEW!**  
**STEM Resources Guide**



# CAD/CAM, Creativity, and Discipline Lead to Turnaround School Success

By Lynn Gorman  
lynn@gorcomm.com

**M**IAMI Central High School technology teacher Frank Houghtaling loves it when he sees that light of understanding flash in a student's eyes.

"They make the connection with what they are learning in my technology arts and engineering class with what they are learning in geometry

*Lynn Gorman is owner of Lynn Gorman Communications LLC, a business-to-business marketing communications firm serving the manufacturing and technical education industries.*

**“Performance has skyrocketed by more than 60% in math, 40% in writing. Graduation went from 36%—now they are at 63%. And I expect them to be at 100%.”**  
—President Barack Obama

class. It becomes real to them. Suddenly their grades go up in math. They ‘get it’ because they have to in my class. They have to input dimensions and angles. We talk about all the different angles. It’s a language

of numbers and spatial relationships that results in something tangible.”

## Praise for a Turnaround School—and Its STEM Program

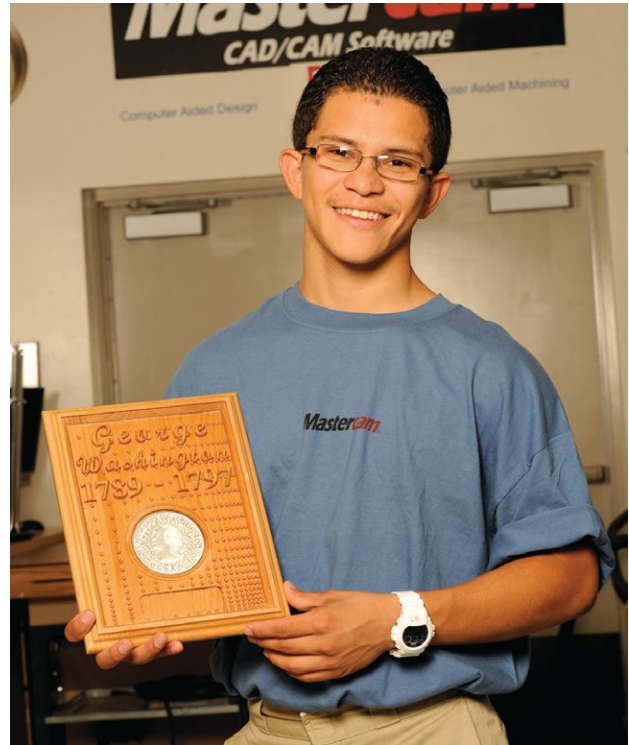
Houghtaling thinks the connection between theory and application is one reason his students perform better on the Florida Comprehensive Assessment Test (FCAT). The impressive turnaround school drew local and national attention last spring when one of Houghtaling’s students, Dagoberto Cruz, won first place in the nationwide “Mastercam Wildest Parts Competition” and when Presi-

dent Barack Obama visited Miami Central to kick off a national education initiative.

“You might not think the two events could be linked in the same sentence,” says Houghtaling. “Having a president visit was a highlight of my career and the ultimate confirmation to this school. However, I give a lot of credit to all my kids and their accomplishments. Dagoberto’s winning the contest has really excited and inspired many kids to work harder and achieve more.”

For nearly a decade, the Central Rockets had one of the worst academic records in the state of Florida. Its sprawling campus was unkempt and dangerous. Only a third of students said they felt safe at school. Florida’s governor at that time, Jeb Bush, imposed an education overhaul that included the nation’s first statewide private school voucher

**Dagoberto holding his winning creation for “Mastercam Wildest Parts Competition”—a plaque and coin featuring George Washington**



**In Houghtaling’s class, students design on the computer, then go to a machine and make something. “It gives them tremendous pride.”**

program for students in failing schools and testing to grade school performance.

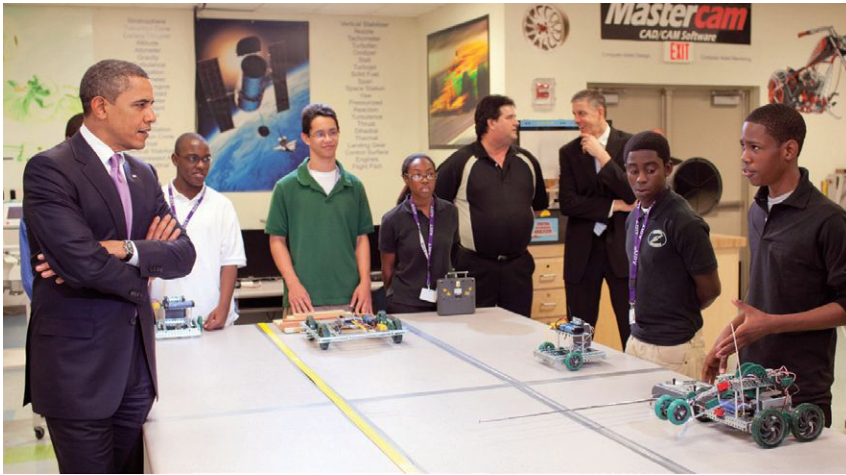
In 2008, the school hired the state’s top principal and replaced more than half of its teachers. Central also developed a partnership with Teach for America, the national program that places top college graduates in struggling schools.

The new administration made discipline a priority. They enforced the dress code and encouraged students to arrive on time. Classroom teachers focused on remedial skills, and a coalition of parents and alumni reached out to the community for additional support. Within two years, student scores rose dramatically. Central achieved a record-high C grade.

Former Governor Bush remains an education advocate. Many states have adopted similar policies and the current administration has applauded Bush’s dedication and results, a refreshingly nonpartisan gesture on both sides. It was Bush who suggested that President Obama—a strong supporter of STEM education—go to Miami Central High School to launch the national initiative. Both visited the school, along with Education Secretary Arne Duncan, last March. ▶

**President Obama and former Florida Governor Jeb Bush toured Houghtaling’s technology class last spring, kicking off the President’s educational initiative.**





**Above, President Obama listens to students describing the CO<sub>2</sub> car project.**

**“Kids are making the connection with machine programming and geometry class,” says Houghtaling.**

Houghtaling said the President spent about 30 minutes touring his class, talking to his students, and reviewing their projects. The President had this to say about Houghtaling’s program during formal remarks at the school: “You’ve got a technology program here that’s preparing kids for the manufacturing jobs of tomorrow. I saw some of the work that they were doing in this lab. It was outstanding stuff. And it matched up with what I see when I go to factories all across America. You can’t work on a factory floor today if you don’t have training in computers and basic math skills and understanding of technology. Those are the jobs of tomorrow.”

To give the students variety and keep their interest level high, Houghtaling intermixes conventional programming and projects, such as CO<sub>2</sub> cars, with Mastercam Art projects. Last year one of the class’s biggest projects was making 3.5"-dia. aluminum coins. The students also

engrave rings and design and fabricate signs using the Art software.

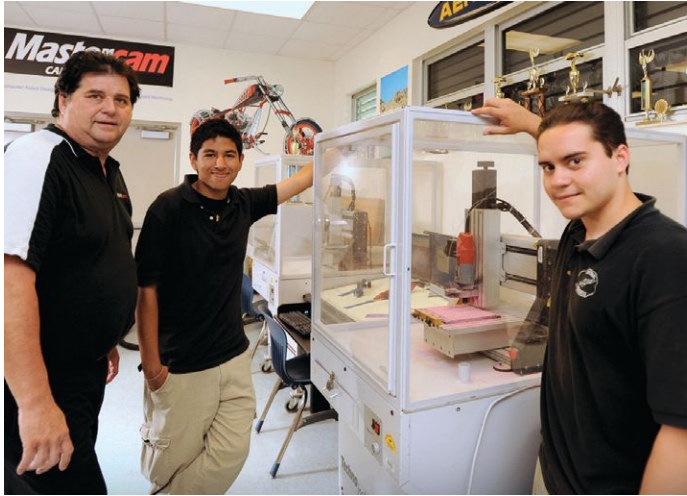
“Art really got the kids excited, motivated, and provided a new tool to express their creativity—‘wild’ enough to enter Mastercam’s annual, national contest,” says Houghtaling. And win. Dagoberto Cruz took first place in the high school category for a plaque and coin he made that features an image of George Washington.

Dagoberto followed his teacher’s standard plan. He was first introduced to the programming software in the beginning of the 2010–2011 school year. He learned the introductory computer-aided design/computer-aided machining (CAD/CAM) program, QuickPart, liked it, and moved on to more advanced machining.

He became enamored with Mastercam Art and designed his now famous coin and entered the contest. He expressed interest in getting Mastercam certification through Mastercam University online. Dagoberto worked hard, took the certification test and passed. “This isn’t an easy test,” says Houghtaling, “and it’s not

**To keep students’ interest level high, Houghtaling offers many activities to choose from. The guitar project was a hit with his classes.**






**Houghtaling says the biggest problem in his class is getting students to leave it.**

ing. "He's been in the newspaper with the President, his name has been on the PA system, and he's famous. Now everybody wants to learn it."

It's important to note that Dagoberito is just one shining example of a Miami Central High School student. Houghtaling said his seniors who graduated in 2011 had been failing school for 12 years.

"There are hundreds of bright lights around here," he said. "It's the whole community coming together to raise these kids up. They realize they can do things." He calls it a domino effect. If two or three students show they can accomplish a task, then the next one wants to do it too.

Houghtaling says his biggest problem in his classroom is getting the kids to leave it. Several try to skip other classes to come to his room. "Here, they can pick up a saw and a drill. They can go to the computer and design something and then they go to a machine and make it. They hold it; they take it home. Their ideas and dreams soar." That is transferring to rising test scores, too. 

scaled back for high schoolers at all. It's the same test everyone takes, whether they are 16 or 60. The test is 4 hours. I am so proud of him."

## Two Big Wins

Then, shortly after Dagoberito received his certification, he found out he had won the Wildest Part Competition and its \$1,000 award. He also was a winner at the County Youth Fair. "Next thing you know,

he's meeting the President of the United States," says Houghtaling, "and driving a car he purchased with his winnings. All in a nine-month time frame. It's been amazing to watch and inspiring to the other students."

The inspiration is not just in the STEM classes, it is school-wide. "The students know that Dagoberito's success and recognition was because he learned Mastercam," says Houghtal-

# POSTERS


for STEM/CTE Classrooms  
[www.techdirections.com/posters.html](http://www.techdirections.com/posters.html)

**PROVEN AND AFFORDABLE TEXTS FOR YOUR STUDENTS!**

**JUST PUBLISHED ... MACHINERY'S HANDBOOK 29TH EDITION!**

2012, 2,800 pgs, illus., Toolbox: 2900-2, \$94.95 ♦ Large Print: 2901-9, \$115.00

The most popular reference for metalworking, design, engineering and manufacturing for nearly 100 years has been updated, revised, and expanded. It includes a new section on **MICROMACHINING** contributed by Professor Wayne Hung of Texas A&M, and the use of metric units has been greatly expanded. Other new coverage includes calculation of hole coordinates, metrology, sheet metal and presses, shaft alignment, taps and tapping, and much more. All standards have been updated as needed and numerous major sections have been reworked.

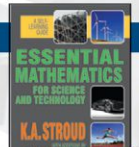


**ESSENTIALS FOR YOUR STUDENTS' SUCCESS!**



**BEGINNING AutoCAD 2013**  
Cheryl R. Shrock

**BEGINNING AutoCAD 2013 EXERCISE WORKBOOK** *COMING SOON!*  
Cheryl R. Shrock, 2012, 450pgs, illus., ISBN 978-0-8311-3456-3, \$39.95



**ESSENTIAL MATHEMATICS FOR SCIENCE AND TECHNOLOGY**  
K.A. Stroud & D.J. Booth

**ESSENTIAL MATHEMATICS FOR SCIENCE AND TECHNOLOGY**  
K.A. Stroud & D.J. Booth, 2009, 752pgs, illus., ISBN 0-8311-3391-7, \$64.95



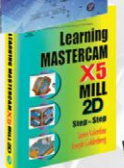
**INTERPRETATION OF GEOMETRIC DIMENSIONING & TOLERANCING**  
Puncochar & Evans

**INTERPRETATION OF GEOMETRIC DIMENSIONING & TOLERANCING, 3RD EDITION**  
Puncochar & Evans, 2010, 336pgs, illus., ISBN 978-0-8311-3421-1, \$34.95



**LEARNING & APPLYING SOLIDWORKS**  
L. Scott Hansen

**LEARNING & APPLYING SOLIDWORKS 2011-2012**  
L. Scott Hansen, 2011, 450pgs, illus., ISBN 978-0-8311-3443-3, \$44.95



**LEARNING MASTERCAM X5 MILL STEP BY STEP**  
Valentino & Goldenberg

**LEARNING MASTERCAM X5 MILL STEP BY STEP**  
2011, 900pgs, CD Included, illus., ISBN 978-0-8311-3423-5, \$74.95



**SOLIDWORKS FOR TECHNOLOGY AND ENGINEERING**  
Valentino & DiZinno

**SOLIDWORKS FOR TECHNOLOGY AND ENGINEERING, 2ND EDITION**  
Valentino & DiZinno 2011, 900pgs, CD Incl., illus., ISBN 978-0-8311-3451-8, \$74.95

PLACE YOUR ORDER BY PHONE, FAX, EMAIL OR ONLINE. EMAIL EXAM COPY REQUESTS TO [INFO@INDUSTRIALPRESS.COM](mailto:INFO@INDUSTRIALPRESS.COM). INCLUDE COURSE NAME, NUMBER, CURRENT TEXT, AND EXPECTED ENROLLMENT.



**INDUSTRIAL PRESS INC.**  
 989 Avenue of the Americas, New York, NY 10018 ♦ Phone 212.889.6330 ♦ Fax 212.545.8327  
 Email: [info@industrialpress.com](mailto:info@industrialpress.com) ♦ Website: [www.industrialpress.com](http://www.industrialpress.com)