

## BETHECHANGE



## Can independence be engineered?

*Engineering students build a bike to help local teen's mobility needs* BY AUSTIN FARINHOLT ('11)

**B**orn with cerebral palsy, 16-year-old Ricky Forgey needs a cane for standing and walking. He must also think about the steps he takes for his muscles to respond properly.

Riding a bicycle may sound like an impossible task, but with the help of some JMU engineering students, Forgey will be more active and independent while pedaling around his hometown of Bridgewater, Va., later this year.

The engineering students recently presented Forgey with six prototypes of bicycles they designed for someone with limited mobility. Forgey, a high-school junior, has the spastic diplegic form of cerebral palsy, which mostly affects his legs. He recently tested each bicycle and provided feedback that will be used to create a final design.

While the engineering students help a member of the local community, they are getting a good dose of real-world engineering experience, says engineering professor Robert Nagel. "We want the students to learn about interfacing and working with a customer and using the needs to inform the design process."


Students learned about Forgey by observing him work out with physical therapy students in Godwin Hall. Forgey works with graduate students in the kinesiology department twice a week to try and gain more control of his muscles. Greg Tidd ('11M), one of the graduate students working with Forgey, says he has noticed an improvement in Forgey's strength and hopes the bike will increase Forgey's fitness levels. "When we started, Ricky seemed very uncomfortable lift-

ing weights, but now is able to keep a good pace while lifting and really gets a good workout," says Tidd.

Engineering junior Richard Arena ('13) says he saw Forgey's knees bump into each other during the workouts, so his team designed a recumbent-style bike with plenty of open space for his legs. Several of the designs allow for adjustments as Forgey grows.

This is the second time students in Engineering 231 (fall semester) and Engineering 232 (spring semester) have designed and built a bicycle for someone with cerebral palsy. The 2010 client was JMU kinesiology professor Tom Moran, who received the final version of his bike this semester. Moran introduced Forgey to the engineering students. Forgey has been a participant in Moran's Overcoming Barriers Program.

Nagel and his engineering students will continue to work with Moran to identify new clients. While the projects will be similar, there will be differences based on client needs. The National Science Foundation has awarded grants to engineering design professors Eric Pappas and Olga Pierrakos for future projects.

Forgey will receive his finished bicycle after the modifications are made to the prototypes and he chooses a favorite design. 

\* Watch a video about this project at [www.jmu.edu/news/madison\\_scholar/2011EngineeringBicycle.shtml](http://www.jmu.edu/news/madison_scholar/2011EngineeringBicycle.shtml).