

IGNORING LIMITS

Utah State University undergraduate biochemist Bradley Hintze is not only excelling in his studies, he's a 2007 finisher of the nation's longest one-day bicycle race sanctioned by the United States Cycling Federation.



Undergrad Brad Hintze (left) and USU mathematics lecturer, Bryan Bornholdt, competed in the 206-mile, 2007 LOTOJA bike race.

"I'd be a disaster at the lab bench," says Hintze, revealing his characteristically subtle sense of humor.

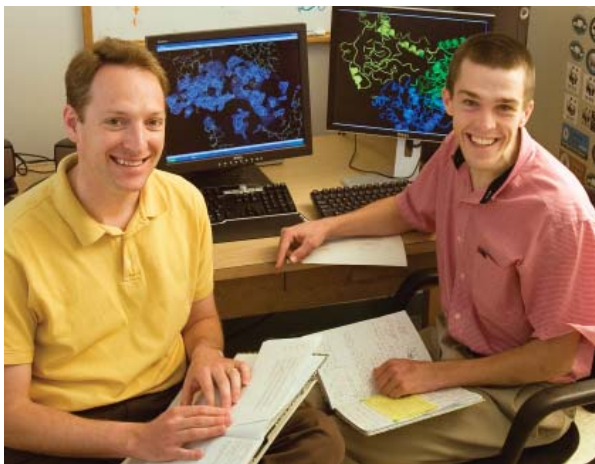
Born with mild cerebral palsy, Hintze's physical disabilities initially seemed minor. But at puberty, he developed cervical dystonia that became progressively worse. The neurological movement disorder of the neck, for which there is no known cure, causes Hintze's head to involuntarily twist and turn to one side.

"Brad has a great enthusiasm for science and I love having him in our lab," says Sean Johnson, Hintze's faculty mentor and R. Gaurth Hansen Assistant Professor of Biochemistry. "I am constantly amazed at his abilities and drive. I have never heard a word of complaint or frustration regarding his physical challenges. He doesn't seem to let anything prevent him from succeeding in whatever it is he wants to do."

In spring 2008, USU honored the Aggie senior with the university's Legacy of Utah State Award. The honor was created in memory of the agricultural students and instructor involved in the 2005 USU van accident. It is given annually to a student who embodies the true spirit, heart and soul of Utah State and demonstrates love and support for the university family, while leading with a vision of hope for the future.

Impressive, yes. But even more remarkable is Hintze's perseverance in the face of significant physical obstacles. He has difficulty holding his head upright and walks with a limp. Lack of fine motor skills makes writing difficult and precision lab techniques impossible.

"Brad's dedication to science is clear," says Johnson. "He is one of the most inquisitive students I have ever met, and his influence is felt throughout our department. One of the top performing students in our departmental courses, Brad is constantly sought out by other students who are struggling to understand the coursework."



Biochemistry student Brad Hintze, right, and faculty mentor Sean Johnson are deciphering the structure and mechanism of proteins.

Hintze, a Willard L. Eccles Undergraduate Research Fellow, has carved his niche in computer-based biochemistry research in Johnson's x-ray crystallography lab. Along the way he's proven to himself and others that, with determination and persistence, individual strengths and talents can emerge in spite of physical limits.

Despite a busy academic schedule Hintze found time to squeeze in nearly 4,000 training miles with USU mathematics lecturer and tandem bike partner Bryan Bornholdt in preparation for the grueling LOTOJA. The 206-mile bike race starts in Logan, Utah and finishes in Jackson Hole, Wyoming. Participants climb and descend three mountain passes in the race's first 110 miles in unpredictable September weather that can range from scorching heat to sudden snow squalls.

"Our Logan to Jackson ride was remarkable," Bornholdt says. "Yes, we prepared for it but it still demanded a great deal of heart and determination. Bradley has these traits in spades."

Bornholdt recounts that, at the LOTOJA awards ceremony, a race participant walked up to Hintze and thanked the Aggie student for his inspiration.

"The man told Bradley that, when we passed him, he was about ready to give up," Bornholdt says. "But he decided if Bradley was still riding, he would keep riding. He moved in behind us and rode with our group the last 11 miles. He was in tears as he spoke to Bradley."

In Johnson's lab, Hintze uses x-ray crystallography techniques in combination with biochemical analysis to understand the structure and mechanism of proteins.

"Our goal is to get a picture of the protein based on x-ray diffraction," he says.

During USU's 2008 Research Week, Hintze presented his lab's efforts in determining the crystal structure of a protein complex called TRAMP, found in brewer's yeast.

"TRAMP is a protein complex that's involved in RNA degradation in the nucleus," he says. "It identifies RNA substrates that need to be degraded and labels them – much like a lumberjack identifies and tags trees in a forest that need to be cut down."

The project gives scientists a structural view of cell components that play a central role in nuclear RNA surveillance, Hintze says. "RNA surveillance is a widespread cellular process that is critical for cell function and viability."

A 2001 graduate of Utah's Alta High School, Hintze was initially timid about pursuing university studies. "I thought college wasn't an option for me; that it would be way too difficult."

With encouragement from a Salt Lake vocational rehabilitation center, he entered USU in Fall 2003. Testing the waters with ten credits, he earned a 4.0 GPA during his first semester. A general biology course his second year, taught by professors Keith Mott and Greg Podgorski, captured his interest but, at first, shook his confidence.

"I was nervous but my advisor, Cathy Myers-Roche, encouraged me to keep trying," Hintze says.

After his first big test, he emerged with a nearly perfect score. "That, right there, gave me more confidence in my collegiate career than anything else," he says.

The course, along with subsequent science courses, steered him to biochemistry.

"I thought, 'this is so cool' and I wanted to do research," Hintze says. "The research we're doing now, determining the structure of TRAMP, has never been done before. We're getting information that's never been known. That fascinates me."

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October 2008*