Football Physics
Dr. Timothy Gay, Physics Department
University of Nebraska
4:00 PM, January 22, 2009
104 Physics
Physics Colloquium

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This talk discusses a series of one-minute physics lectures given to the ~ 8 x 10^4 fans that attend the University of Nebraska home football games. The lecture topics range from gyroscopic motion to ionizing collisions between linebackers and I-backs. The problem of simultaneous edification and amusement of the fan in the stands is considered.
Tim and football ...

From 1999 until 2004, Tim Gay, a Professor of Physics at the University of Nebraska - Lincoln, taught the largest physics class in the world - the 78,000 fans that attend the University of Nebraska Cornhuskers home football games in Memorial Stadium. During a pause in the action, Gay's lessons were shown on the giant television screens at either end of the field. They ranged in length from forty-five seconds to two minutes, and covered such topics as Newton's Laws of Motion (blocking and tackling), projectile motion (kicking and punting), kinematics (open-field running), and the ideal gas law (why not fill the football with helium to get better hangtime?). Laboratory demonstrations featured Professor Gay being tackled by 370 pound lineman, pummeled with a sledgehammer as he lay on a bed of nails, and learning the finer points of passing from Heisman trophy winner Eric Crouch.

Gay's work has been featured on ABC World News Tonight with Peter Jennings, ESPN's Cold Pizza, and front page stories in the Wall Street Journal and the Tuesday Science section of the New York Times, as well as in People Magazine, ESPN Magazine, the Boston Globe, the Washington Post, and a variety of other television and radio outlets.

In 2001, Gay was hired by NFL Films to write and appear in a series of 5-minute television segments for their show NFL Blast! Blast! is a half-hour program shown in 190 foreign countries to familiarize its audience with the game of American football. The Football Physics segments on the show feature lectures and demonstrations by Gay and interviews with current NFL players. These segments aired starting in 2002, and ran through 2004.

Gay has also written a book, Football Physics, published by Rodale. It recently came out in a second edition retitled The Physics of Football published by Harper-Collins Paperbacks. Its target audience is high school students and football fans of all ages.

The Nebraska segments can be viewed on the Web: http://physics.unl.edu/outreach/football.html
Timothy Gay was born in Ashtabula, Ohio on 23 March, 1953. He was raised in Pleasant Hill, Ohio, a farming community of 1000 people in western Ohio. An only child, his parents are William Gay, a retired pastor in the United Church of Christ, and Annabeth McClelland Gay, a retired church musician. Gay attended Phillips Academy in Andover, Massachusetts, graduating in 1971. At Andover, he was the manager of the varsity football team his senior year. Players on that team included Bill Belichick, who has coached the New England Patriots to three Super Bowl victories, Ernie Adams, an assistant coach with the New England Patriots, and Milt Holt, a former State Senator from Hawaii and the starting quarterback for Harvard for four years.

Gay got a B.S. in physics from the California Institute of Technology, Pasadena, California in 1975. While at Caltech he played tackle for its football team, a squad so notoriously inept that it was profiled by the Wall Street Journal in the fall of 1974. (A typical Caltech season record was 1-7, against such football powerhouses as LaVerne College, Harvey Mudd College, and the University of California - Riverside (freshmen).)

Upon graduating from Caltech, Gay matriculated at the University of Chicago, where he earned his Ph.D. in Experimental Atomic Physics in 1980. He then worked as a Research Physicist and Lecturer at Yale University until 1983, when he joined the faculty at the University of Missouri - Rolla. Since 1993, he has been a Professor of Physics at the University of Nebraska - Lincoln.

Gay's research interests center on the scattering of electrons by atomic and molecular targets and elementary particle physics. His research group is funded by the National Science Foundation. During his career, Gay has been a principle investigator on more than $5 million of grants, and has published more than 70 articles in the refereed scientific literature. He is a Fellow of the American Physical Society, and served as the Chair of its Division of Atomic, Molecular, and Optical Physics in 2007.

Gay married Anna Christine Nothstine of St. Charles, Missouri in 1975. She is currently a math teacher at Lincoln Southeast High School. They have two children, Frederick and Bertram. Besides being a rabid Cornhuskers fan, Gay's hobbies are Civil War history and rock and roll music.