Mach’s Principle is making a comeback: after decades of obscurity, new lab-results by Paul March & Dr. James Woodward are changing the way that we view inertial propulsion, and bringing with them some new ideas about gravity & inertia...

The Woodward Effect is named after James F. Woodward. However, Woodward prefers to give credit of this effect to Mach, Sciama, and Nordtvedt, and uses phrases such as transient mass fluctuations, Machian mass fluctuations, and Mach-Lorentz thrusts. The Woodward Effect’s core foundation is based upon Mach’s principle. According to Woodward, Mach’s principle is “that the physical origin of all inertial reaction forces is an interaction of the object with chiefly the most distant matter in the universe.”

What is inertia? According to NASA, inertia is a “property of matter that causes it to resist changes in speed or direction (velocity).” For the most part Mach’s principle has been swept aside by the general scientific community. However, recent STAIF published experimental and theoretical results from Paul March and Jim Woodward seem to indicate that the Woodward Effect is real, and hence Mach’s principle is indeed correct.

How does an object interact with the universe? According to Sciama:

“Inertial forces have a dynamical rather than a kinematical origin, and so must be derived from a field theory [or possibly an action at a distance theory in the sense of J.A. Wheeler and R.P. Feynman]”

My preference is to take the later radiation reaction and Wheeler-Feynman view of the Woodward Effect. According to Woodward radiation reaction occurs when,

“accelerating electric charges launch electromagnetic waves that move away from the source charges at the speed of light carrying energy and momentum with them...the charges must experience a recoil force, that is, a force of “radiation reaction.”

In other words an accelerating charge, such as an electron, will radiate electromagnetic waves that will interact with itself, and the electron will experience a recoil force. Despite the apparent absurdity of a point charge, such as an electron, being able to interact with itself and create a recoil force on itself, this effect is indeed real and is well accepted by the general physics community.
According to Woodward, Wheeler-Feynman absorber theory was:

“developed as an "action-at-a-distance" explanation for electromagnetic radiation reaction forces (based on earlier work by Dirac). In action-at-a-distance theories "fields" have no real existence apart from the interacting sources. And radiation reaction, instead of being assumed a force produced by a charge acting on itself in the process of launching radiation, is explained as a seemingly instantaneous interaction between a local accelerated charge and the distant matter in the universe (the "absorber") mediated by retarded and advanced disturbances. Fields are just book-keeping devices for the (delayed) interaction of sources. Wheeler-Feynman theory works very neatly.”

The Woodward Effect is radiation reaction and Wheeler-Feynman like in that it makes the supposition that when an object with mass accelerates, it radiates gravitational waves that interact with the rest of the universe. In particular, these gravitational waves travel from the present accelerating object to the future universe. The future universe absorbs these gravitational waves and also accelerates. Since the future universe accelerates, it emits gravitational waves that travel from the future to the present accelerating object, thereby giving the object inertia.

Woodward has shown that if you accelerate an object with mass in a particular manner that it is possible for the mass of that object to fluctuate. Therefore, if you push on the object when it is less massive and pull on the object when it is more massive, the object will experience a net thrust. This is effect is called the Woodward Effect. Ultimately, these mass fluctuations are caused by the gravitational radiation reaction between the object and the rest of the universe.

Peter Vandeventer has a Masters in physics and is currently working on a second Masters in applied life sciences. He has recently published a STAIF paper on the Woodward Effect with Dr. Woodward for the 2006 STAIF conference. You can learn more about him online at http://chaos.fullerton.edu/Woodward.html