1067-57-1502 **Clayton Shonkwiler*** (cshonkwi@haverford.edu), Department of Mathematics, Haverford College, 370 Lancaster Ave., Haverford, PA 19041, and **Dennis DeTurck**, **Herman Gluck**, **Rafal Komendarczyk**, **Paul Melvin** and **David Shea Vela-Vick**. *The Search for Higher Helicities.*

Helicity was introduced in 1958 by Woltjer, who showed that the helicity of a magnetic field remains constant as the field evolves according to the equations of ideal magnetohydrodynamics and that it provides a lower bound for the field energy during such evolution. In fact, helicity is the only known topological invariant of vector fields. Arnol′d suggested that there should be higher helicities which provide lower bounds on the field energy when the first helicity vanishes. The integral which computes helicity is analogous to Gauss's famous integral formula for the linking number, suggesting that geometric integral formulas for higher-order linking invariants may lead to higher helicities. I will present such an integral formula for Milnor's triple linking number, which was discovered by proving a correspondence between the link-homotopy invariants of three-component links and the homotopy invariants of associated maps to a configuration space. This correspondence is of independent interest, as it establishes the $n = 3$ case of a conjecture of Koschorke. (Received September 21, 2010)