1060-17-42 **Murray R. Bremner*** (bremner@math.usask.ca), Mathematics and Statistics, University of Saskatchewan, Saskatoon, SK S7N 5E6, Canada, and **Hader A. Elgendy**. *Universal enveloping algebras of n-Lie algebras.* Preliminary report.

An n-Lie algebra is a vector space L with a multilinear product $L^n \to L$ satisfying n-ary anticommutativity and the n-ary Jacobi identity. These structures were introduced by Filippov in 1985; in the case $n = 2$ we obtain the definition of a Lie algebra. Ling proved in 1993 that for $n \geq 3$, there is only one simple finite-dimensional n-Lie algebra; it has dimension $n+1$ and generalizes the cross product on $\mathbb{R}^3$ to an n-ary product on $\mathbb{R}^{n+1}$. We study representations of n-Lie algebras in associative algebras by means of the n-ary alternating sum. This leads to the problem of determining the universal enveloping algebra $U(L)$ of an n-Lie algebra L. Using the theory of Gröbner bases, we determine a basis for $U(L)$ when n is even and L is the simple n-Lie algebra. As a corollary, we find that the natural map from L to $U(L)$ is injective; this is a partial generalization of the PBW theorem to n-Lie algebras. (For odd n the situation is much more complicated.) We obtain a new proof of some results of Pozhidaev from 2003 for $n \leq 6$, but our results seem to be new for $n \geq 8$. This is joint work with my Ph.D. student Hader Elgendy. (Received March 08, 2010)