

1070-05-218

**Stefan Forcey\*** (sf34@uakron.edu), **Aaron Lauve** and **Frank Sottile**. *Indelible grafting: species and graded Hopf operads.*

Composition of species is a familiar monoidal product. Monoids with respect to composition are discrete or combinatorial operads. We find that when the structures of such an operad can be split then it immediately spans a Hopf algebra.

On top of that, the algebraic features are inherited by any species composition of such an operad with another that projects to it. Examples include the results of grafting and splitting binary trees, sometimes combed and with or without levels. It is just such species whose structures we draw by refusing to erase grafts. Those pictures are the vertices of new polytopes, extending families of spaces familiar from the axioms of homotopy maps of  $A_\infty$  spaces. Several examples give rise to well known algebras, others are new, and there is a bounty of possibilities for future investigation. (Received February 12, 2011)