1086-68-2907 **Douglas R Smith*** (smith@kestrel.edu), 3260 Hillview Avenue, Palo Alto, CA 94304. *Formal Coalgebraic Specifications and their Refinement.*

The Specware system developed at Kestrel Institute supports formal specification of software requirements via structured presentation of theories in classical higher-order logic. It also supports the automated refinement of specifications to code in several languages. We have been extending Specware to support a coalgebraic style of specification which is suitable for capturing the requirements on stateful, non-terminating, and concurrent sofware systems. The focus of this talk is on mechanized transformations that refine a coalgebraic specification by incrementally adding implementation detail. One such transformation is called observer maintenance and implements a form of code incrementalization. Other examples include transformations to simplify code expressions, and to refine high-level datatypes to low-level types. The resulting refinement process aims to generate both code and its proof of correctness without the need for post-hoc verification. Applications under current development include high-performance constraint solvers, concurrent garbage collection, and network protocol software. (Received September 26, 2012)