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**JUDITH PACKER**, University of Colorado, Boulder

*Cocycles on groupoids associated to  $\mathbb{N}^k$ -actions, and dynamics on the associated  $C^*$ -algebra*

We construct a locally compact Hausdorff étale groupoid  $\mathcal{G}$  from  $k$  commuting surjective local homeomorphisms acting on a compact metric space  $X$ . We characterize the continuous 1-cocycles in the groupoid  $\mathcal{G}$  taking on values in  $\mathbb{R}$ , in terms of  $k$ -tuples of continuous real-valued functions on the unit space of  $\mathcal{G}$  satisfying certain canonical identities. Under appropriate conditions, we construct a one-parameter automorphism group acting on the groupoid  $C^*$ -algebra  $C^*(\mathcal{G})$  corresponding to the continuous 1-cocycle on  $\mathcal{G}$ . The question of the existence of KMS states on  $C^*(\mathcal{G})$  associated to these one-parameter automorphism groups is addressed. The work discussed is joint with C. Farsi, L. Huang, and A. Kumjian.