1086-58-2704 **Arthur E Fischer*** (aef@ucsc.edu), Department of Mathematics, University of California, Santa Cruz, CA 95064. *Conformal Ricci Flow on the Teichmüller Space of Conformal Structures on a compact n-dimensional manifold, $n \geq 3$.*

We introduce a variation of the classical Ricci flow equation that modifies the volume constraint of that equation to a scalar curvature constraint. The resulting equations are named the **conformal Ricci flow equations** because of the role that conformal geometry plays in constraining the scalar curvature. These new equations are given by

$$\begin{aligned} \frac{\partial g}{\partial t} + 2\big(\mathrm{Ric}(g) + \tfrac{1}{n} g\big) &= -pg \\ R(g) &= -1 \end{aligned}$$

for a dynamically evolving metric g and a non-dynamical scalar field $p \geq 0$, named the **conformal pressure**. The conformal pressure serves as a Lagrange multiplier to conformally deform the flow so as to maintain the scalar curvature constraint. The conformal Ricci flow equations are analogous to the **Navier-Stokes equations** of fluid mechanics

$$\begin{aligned} \frac{\partial v}{\partial t} + \nabla_v v + \nu \Delta v &= -\mathrm{grad}\ p \\ \mathrm{div}\ v &= 0 \end{aligned}$$

The conformal Ricci flow equations can be thought of as a Navier-Stokes equation for the metric g, just as the classical Ricci flow equation can be thought of as a heat equation for g. Properties of the conformal Ricci flow equations and their interpretation as a flow on the Teichmüller space of conformal structures are discussed. (Received September 26, 2012)