1086-05-90 **Megan E. Heenehan*** (mheenehan@wesleyan.edu), Department of Mathematics and CS, Wesleyan University, 265 Church Street, Middletown, CT 06457, and **Karen L. Collins**.
Constructing Graphs with No Immersion of Large Complete Graphs.

In 2003, Abu-Khzam and Langston conjectured that every d-chromatic graph contains an immersion of K_d. Lescure and Meyniel proved the conjecture for $d = 5, 6$ and DeVos, Kawarabyashi, Mohar, and Okamura proved the conjecture for $d = 5, 6, 7$. Both proofs use the fact that a d-critical graph has minimum degree at least $d-1$. Seymour and later DeVos, Dvořák, Fox, McDonald, Mohar, and Scheide showed that the stronger conjecture that a graph with minimum degree $d-1$ has an immersion of K_d fails for $d = 10$ and $d \geq 12$, but it is shown by DeVos et al. that a minimum degree of $200d$ does guarantee an immersion of K_d.

Here we will show that the stronger conjecture is false for $d \geq 8$ and give infinite families of examples with minimum degree $d-1$ and chromatic number $d-2$ or $d-1$ that do not contain an immersion of K_d. We will give examples that can be up to $(d-2)$-edge-connected. We show, using Hajós' Construction, that there is an infinite class of non-$(d-1)$-colorable graphs that contain an immersion of K_d. We also make a conjecture for the minimum number of vertices that must have degree at least md, m a positive integer, to guarantee an immersion of K_d. (Received July 11, 2012)