1073-92-259 **Xiaoming Zheng*** (zheng1x@cmich.edu), PE 214, Mathematics, Central Michigan University, Mount Pleasant, MI 48858, and **Yeonhyang Kim**, **Leela Rakesh** and **En-Bing Lin**. *A multiscale model of reaction and diffusion in angiogenesis and a conservative multiresolution finite volume method.*

We propose a multiscale model to combine reactions on thin blood vessel capillaries and diffusion in bulk tissue domain in angiogenesis, and a conservative multiresolution finite volume scheme. In angiogenesis, we study chemicals such as growth factors that have two processes occurring at different spatial scales simultaneously: ligand/receptor binding kinetics on thin capillaries, and the tissue-level diffusion in the three-dimensional tissue domain. We first derive a new multiscale model where a line Dirac delta function is introduced to integrate these two processes, and we compare this new model with existing models. Then we develop a conservative finite volume method to solve the reaction and diffusion processes where we use a finer mesh on capillary centerlines than the mesh in the tissue domain to accurately capture faster and larger data changes along capillaries. In addition to the multiresolution meshes, another challenge is the constantly-changing capillary shape and length. To overcome these difficulties, we construct a data transferring algorithm between reaction and diffusion meshes, which is proved to conserve the mass between two meshes and retain the variation in the reaction domain. (Received August 03, 2011)