

## SHAPE ANALYSIS IN THE 3D DIMENSION: ARE CENTRIC DIATOMS FINALLY SHOWING SOME CHARACTER

Intana Chanthirath<sup>1</sup>, Russell Lidberg<sup>2</sup>, & Matthew L. Julius<sup>1</sup>

<sup>1</sup>St. Cloud State University, Department of Biological Sciences

<sup>2</sup>St. Cloud State University, Center for Microscopy and Image Analysis

Quantitative shape analysis is a well established technique that has been utilized on diatom taxa with morphometric data collected via the light and scanning electron microscope. Results of these investigations have identified shape groups potentially reflecting multiple evolutionary lineages for specimens identified by a single species name. Utility of this technique has been restricted to pennate species. This limitation is a result of the minimized shape variations exhibited by centric diatom taxa in the X and Y axes and the inability of light and electron microscopes to capture quantitative Z axis data. Atomic force microscopy (AFM) allows accurate measurement of Z axis topologies at micro and nano scale resolutions. In this investigation, Z axis topographic data captured via the AFM is used to compare species in the *Stephanodiscus niagarae* complex. Data for the longest diameter transect for individual specimens were converted into a complex polynomial equations. Equations were developed for a minimum of 10 specimens per species. Species investigated included *S. niagarae*, *S. remerij*, and *S. superiorenensis*. Intra and inter specific variations in polynomial equations were compared statistically to identify this techniques success in distinguishing between these closely related lineages.