

Prediction of soft tissue changes in bimaxillary surgery for obstructive sleep apnea**Salisbury K / Girod S****Stanford University, Palo Alto (USA)****Project #: C-10-30S**

The research goal of this proposal is the development and evaluation of a computational environment for the planning of bimaxillary or genioglossus advancement for Obstructive Sleep Apnea (OSA). The proposed tool will allow interactive visualization and manipulation of images derived from computed tomography (CT) scans. We anticipate that a computational tool will allow modeling of the anticipated soft tissue airway changes that are relevant to the successful surgical treatment of OSA. Specifically, our research plan consists of the following elements:

- 1) Develop a visuohaptic virtual environment for interactively exploring CT data, specifying surgical cuts, and manipulating bone fragments
- 2) Develop an interface modeling of 3-D airway soft tissue changes based on maxillo-mandibular movements and for taking and recording physical measurements from 3-D models
- 3) Perform a validation study in which the surgical plans and postoperative outcomes are compared to the surgical prediction generated using our interactive tool

The significance of the proposed surgical planning environment stems from its ability to allow surgeons to simulate, plan, and iterate on individual patient data in 3-D from a CT scan. The software will allow surgeons to predict results of their interventions – specifically the changes of the soft tissue airway based on maxillo-mandibular or genioglossus advancement – before the actual surgery, leading to better planning, fewer errors, shortened surgery time and improved outcomes for the patient.