**Kayna Hobbs-Murphy Dissertation: Updated Specific Aims and Objectives**

**Specific Aim 1:** Assess 3D facial measurement variables via gender, race/ethnicity, and age groups.

*SA1 Objective 1:* Define the proportion of missing values for each measurement and demographic variable in the dataset.

(Specifically: find the count of NA values for each measurement and demographic variable, find the proportion by dividing NA count by total count, and provide plots.)

*SA1 Objective 2:* Summarize the demographic (gender, race/ethnicity, age) makeup of the sample.

(Specifically: use summary statistics, frequencies, and plots to show the demographic makeup of the dataset.)

*SA1 Objective 3:* Summarize measurement properties (27 measurement locations) of the sample via demographic factors (gender, race/ethnicity, age).

(Specifically: provide mean, median, min, max, standard error, standard deviation, and 5th, 25th, 50th, 75th, and 95th percentiles for each measurement within each demographic group.)

**Specific Aim 2:** Define specific 3D facial measurement values that influence variability in the overall sample.

*SA2 Objective 1:* Compare current sample measurement data to measurement data found in the literature.

(Specifically: map our data over Zhaung (2007) bivariate panel, which uses face width and face length measurements.)

Table

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*SA2 Objective 2:* Define measurement variables that best capture facial anthropometry of the sample as related to respirator fit.

(Specifically: Determine the correlations between measurements (27 measurement locations) in the sample, use Isabel’s intraRR and interRR data to determine which measurements should not be used, use literature to determine which measurements best predict respirator fit. In general, this step will help finalize reducing the number of measurement locations used in PCA and MANOVA from 27 to maybe around 10-15. Findings from SA1 will also be used to reduce the number of measurements.)

*SA2 Objective 3:* Visualize trends and patterns of variability in selected measurement variables.

(Specifically: Use PCA to create plots that are color-coordinated by gender, race/ethnicity, and age group. This will just show general trends and patterns, and if demographic groups are separated visually when all measurement data are compared using PCA.)

AS A NOTE: I will not explain PCA in depth in my writing, as it is a common statistical method.

**Specific Aim 3:** Examine significant differences in selected 3D facial measurements between selected demographic groups.

*SA2 Objective 1:* Determine which demographic groups and/or interactions between demographic groups are integral in determining differences in face measurements.

(Specifically: run MANOVA and drop demographic categories that are not statistically significant, aka backward model selection. Findings from SA1 and PCA will also inform which demographic/y variables are selected for use in MANOVA.)

*SA2 Objective 2:* Determine selected measurements that are significantly different between selected demographic groups and/or interactions between demographic groups.

(Specifically: run the MANOVA with selected X’s and selected Y’s.)

*SA3 Objective 3:* As necessary based on statistical significance, further examine differences in selected measurements between selected demographic groups.

(Specifically: run one-way and two-way ANOVAs on statistically significant variables to determine which measurements are significantly different between demographic groups. MANOVA alone will not be able to tell this.)