**NC-170 Research Committee Meeting**

**August 3 – 4, 2017**

**Thursday, August 3**

**USDA National Institute of Food & Agriculture (NIFA), Waterfront Centre, 800 9th Street SW, Washington, DC**

 8:45- 9:00 Introductions

 9:00 - 9:45 Welcome remarks and updates

M. Qureshi, Deputy Director, Institute of Youth, Family, and Community Division

C. Crocoll, Director of Family & Consumer Sciences

B. Samuel, NC-170 NIFA Representative

E. Bye, NC-170 Administrative Advisor

9:45 – 10:00 Election of new officers and next year meeting dates

 Secretary: Linsey Griffin

 Next year’s host: Susan Sokolowski

10:00 – 10:30 Break

10:30 - 12:30 State reports

2:00 – 5:00 Next 5-year project discussion

Notes for the SizeFF Group in Washington DC, 8/3/2017

Members present: S. Ashdown, Lynn B., Ellen M., Juyeon P., Linsey G., Semra P., Shulin H., Susan S., and Sam Stevens from Mirage 3D. Kristen M., and Mary R-S. attended by Zoom.

We reviewed the protocol. The general concept is to define a ‘baseline’ protocol – a protocol that gives us the most useful and robust data with the shortest interaction with each participant, in order to keep to a study that will give us the largest number of participants. Different stations then can add on as they wish and as they have resources (for example, scans using other scanning devices, scanning both left and right hands and feet, scanning in other positions, scanning male bodies as well as female, etc.) We discussed numbers, and said that we would aim for 500 participants. We did not discuss male/female balance within the goal of 500, but acknowledged that we will need to recruit women heavily.

We decided that providing identical scan wear for the study overall, though preferable, is not practical or necessary if we are vigilant about what the participants wear. We decided to ask women coming to be scanned to wear the bra that they would most commonly wear when firefighting. We will also ask them to wear a close fitting t-shirt and tights if possible, but to avoid shapewear or athletic wear with power stretch. (We could also ask them to have their hair in the style they wear under their helmet. We could also ask the male participants to wear or bring shorts, or pants that they can easily roll up above the knee.)

We will need scan wear for anyone that does not wear an appropriate outfit for scanning. Kristen pointed out that we need to be sure that the sizes of scan wear cover the full range; Lynn B. and Juyeon P. confirmed that we may have a full range from very large to very small women. Here are possible sources of scan clothes that Kristen M. has used from Target that come in a large range of sizes, their Ava & Viv house brand: Ava & Viv leggings in plus sizes: <https://www.target.com/p/women-s-plus-size-leisure-leggings-pants-black-ava-viv-153/-/A-16628349#lnk=sametab> Ava & Viv tank tops in plus sizes: <https://www.target.com/p/women-s-plus-size-perfect-tank-ava-viv-153/-/A-17161812#lnk=sametab&preselect=16575583>

Also, here are some cotton/spandex camisoles in standard sizes from Walmart: <https://www.walmart.com/ip/Faded-Glory-Women-s-Essential-Knit-Layering-Cami-With-Retractable-Straps/55380883?variantFieldId=actual_color>

Old Navy was also noted as a possible source with a wide size range of identical garments.

Sam S. confirmed that for the Structure scanner color is not an issue. For anyone who will do additional scans in a Human Solutions scanner, the Target and Walmart garments are available in grey.

We discussed arm position, and the fact that arms abducted on the frontal plane require a wide area in order to walk around the participant at the correct distance, but noted that if the arms are in front of the frontal plane, this will distort the shoulders. Generally it will be important to watch for shoulder tension in participants and get them to relax their shoulders if they are braced. We still need to source the arm stabilizing poles; Susan A. will continue to work on this.

Susan A. and Lynn B. will get together in Buffalo early this fall to pilot the scan methodology. (We can probably set up a camera and use Zoom to connect anyone in who wants to follow along). Sam S. may be able to come and work with us as well.

We discussed scanning the dominant hand and the opposite foot, as Susan S. found in her dissertation research that these were generally the larger. (Susan S. has the reference for this).

The 3D printed firefighter hats were examined, as possible participant giveaways. These examples have fairly rough surfaces, but they can be put in a box with a little liquid acetone, and the fumes will smooth the surface. A sticker with our logo could be placed on the bottom. Inexpensive printing options were discussed. Susan A. will send the digital file to Lynn B. (who may be able to print some for free as Buffalo may have some material that needs to be used before it expires) and to Sam S. (who knows a source for inexpensive 3D printing) We can also put the file in ‘box’ with our other documents so that everyone can access it.

We adjourned to the hotel when NIFA building shut down after a water pipe break in the building.

Sam S. set up Lynn B.’s newly purchased Structure scanner on her iPad, and helped her load the latest version of the Mirage 3D application. He demonstrated the new version by scanning Shu, in a very cramped hotel room, achieving a very respectable scan even with the extremely less than ideal setup. We should all upload this latest version, AND SEND the email address we are using for the scanner to Sam S. so that he can turn off the ‘limited time’ feature.

We discussed the study that Linsey is doing in Minnesota to validate the Structure scanner against the proven Human Solutions scanner, by scanning (20 to30) participants with each scanner, with physical landmarks (dimensional markers), and then measuring for comparison of linear measurements manually from the screen. We will address comparison of the automated measurements at a later date; at this point we need to concentrate on getting valid scans as there are multiple strategies for measuring scans after we take them (using the Mirage 3D process once developed and tested; measuring all scans using Human Solutions or TC2 automated software; measuring all scans (or some proportion of the less reliable measurements) manually on the screen). We discussed the preferred method of landmarking with colored stickers instead of dimensional ones, and Sam S. said they would work on adding color to the Mirage 3D application. This would need to be done before the study initiates.

Susan S. reported that she has undergraduate researchers this semester that can work on the study. Several stations reported that they have compiled the fire stations in their areas.

We reviewed the questionnaire, and changed the format of the questions for more reliable results. Mary R-S. asked that a question be added on what firefighters commonly wear underneath their gear. The university names will be corrected and re-alphabetized. (Sorry about that).

We discussed the angled Plexiglas that optimizes scanning the sole of the foot, and the fact that this will not be a weight bearing scan. Juyeon P. (and possibly Huiju P.) will do a comparative study of weight bearing feet scanned in her foot scanner with feet scanned on the Plexiglas support, possibly with different levels of pressure being applied. There may be a Plexiglas pedestal in MN left over from Susan S’s dissertation study that could provide a pattern for a device that a participant could stand on, but that has enough floor clearance to allow the structure scanner to be brought under the foot to scan. Linsey G. will look for this and test it. We need to resolve this issue soon.

We agreed to submit abstracts for two events; the first is the International Association of Women in Fire and Emergency Services conference in Fairfax, Virginia, May 24-26, 2018. The abstract deadline is August 31st. (Note that this is not an academic presentation, but a classroom session that is 90 minutes in length. We need members to work on a draft for this soon. Lynn B. suggests a talk on the fit of the bunker gear and how to achieve best fit. She has a bunch of images on bad fit – pants worn at the hip, pant legs dragging, women wearing gear far too large, etc. – that could be shown and then a discussion on proper wearing. We could also talk about how some gear is being repaired/taped up out in the field and other modifications to the gear. We could have a discussion on our research findings as they pertain to female firefighters and get their input. Lynn B. is tentatively planning a student trip to China during these dates and therefore cannot attend or lead this effort but she is more than willing to edit and provide images (She specifically took photographs of poor fit.) Please email if you are interested in taking the lead or participating in this effort. We need someone to contact them to see if we can collect data at the conference; this may not be a good fit for us if we cannot organize this). Linsey G. would present and scan at the conference, along with anyone else who can participate.

The other conference is the First International Conference on Functional Textiles and Clothing (FTC 2018) in India on February 9 – 11, 2018. Lynn B. will be in India and would present this abstract. The topic will be development of the methodology (perhaps this could also include validation as well, Linsey G.’s work on bodies, Juyeon P.’s work on weight bearing feet). Lynn B. and at least one other of us will work on this extended abstract (please contact Lynn B. if you want to be part of this); the deadline is September 30, 2017. Lynn B. will be in India and will present this abstract. Neither conference has a proceedings publication. This is good, as we want to develop a paper on validation and development of methodology for a peer reviewed journal.

Lynn B. will start collaborating with overseas researchers to see what we could learn from their bunker gear, sizing research, etc? We are very sure that Jane Ledbury from Manchester in England would be keen to join us and Lynn B. has had overtones from RMIT faculty in Australia who have worked on bunker gear.

There was some discussion on how to recruit women, as the proportion of F to M is so low. It was noted that we can find out online which cities have the most female firefighters.

The timing we will aim for is to have all scanning completed by one year from now. Then we can discuss data analysis at the meeting in Portland on August 2-3, 2018 and hopefully have one or two papers from the data submitted by January 2019.

We discussed publication, and the fact that we want to be as flexible as possible on publication of various topics from the study, and look for various combinations of authors (as well as numbers of authors if some institutions are leery of papers with large numbers of authors for junior faculty) and of author order (getting junior faculty up in the order when possible). If everyone can send an email to Susan A. with an indication of topics from the study they are interested in, (i.e. would like to head the analysis and first draft), we can begin to organize in order to give any faculty working on tenure a chance to get the best publication possible for their purposes from the study. The next most important would be anyone working on further promotion. Of course we may have some conflicts; Susan A will try to broker this.

Next meeting: We will look for a time that Jeffrey Stull of International Personnel Protection, Inc. can attend. I think we will not try to optimize active participants at this meeting given our crazy schedules, but I will record it so that everyone can listen to Jeff’s comments and recommendations.

**Friday, August 4**

**Under Armour Lighthouse Innovation Center, 101 W. Dickman Street Baltimore**

8:15 Depart from the Hotel for Baltimore

10:30 - 1:00 Lighthouse Innovation Center tour: Under Armour

1:00 Meeting adjourns

**Hotel Information:**

[**Residence Inn Arlington Pentagon City**](http://www.marriott.com/hotels/travel/waspt-residence-inn-arlington-pentagon-city/)

550 Army Navy Drive, Arlington, VA 22202 Phone 1-703-413-6630

* Complimentary internet and breakfast is included in the rate.
* Free airport shuttle to and from Regan National airport (DCA).

Metro from hotel to NIFA - Take yellow line metro from Pentagon City to L’Enfant Plaza. Take D and 7th St. exit at L’Enfant Plaza. Turn left on D St. Turn left on 7th St. Turn right on G St., and walk 1 block to 800 9th St., SW. I would suggest leaving the hotel at 8:00 AM. Additional transportation information for NIFA is available at - <https://nifa.usda.gov/visit-nifa>.