ABSTRACT FACE PAGE

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11. **Is this the research presented in this abstract supported by IMAG MSM-related U01 funding? No**
12. **If the Presenting Author is a trainee, who is the trainee's primary research advisor? Dr. Steven Abramowitch**

TRAINEE POSTER AND ORAL PRESENTATION COMPETITONS:

New to the meeting this year, we are holding *both* a trainee poster competition and a trainee oral presentation competition! If the presenting author is a trainee (i.e., a student at any level or a post doctoral trainee), he/she may enter his/her abstract in the trainee poster competition, the trainee oral presentation competition, or both competitions. Trainees may also submit more than one abstract to the meeting and enter more than one abstract in these competitions. Prizes will be given to the presenters of the top-ranked trainee oral presentation and the top-ranked trainee poster (judged during the meeting by the Program Committee).

13. **If the Presenting author is a trainee, would the Presenting Author like to enter his/her abstract in the Trainee Poster Competition*? Yes**

*Note: Trainees who enter the poster competition are expected to stand by their poster during the scheduled poster sessions and present them to the judges.

14. **If the Presenting author is a trainee, would the Presenting Author like to enter his/her abstract in the Trainee Oral Presentation Competition**? Yes**

**Note: The Program Committee will select the top four abstracts from trainees who elect to enter their abstract into the trainee oral presentation competition, these four trainees will be notified by Feb. 17th, and they will deliver their oral presentations (which will be judged) on the second day of the meeting after lunch.

QUANTIFICAITON OF PELVIC FLOOR MUSCLE FASCICLE ORIENTATIONS FROM A CADAVERIC SPECIMEN USING PHOTOGRAMMETRY

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BACKGROUND: Little is known about female pelvic floor muscle (PFM) fascicle arrangement. Technical restrictions of magnetic resonance imaging and limitations of diffusion tensor imaging (DTI) make identifying borders and fascicles of these complex muscles difficult [1,2]. Fascicle orientations are needed to study and model functional disorders and physiologic functions. Therefore, we developed a novel approach utilizing close-range photogrammetry to quantify PFM surface fascicle orientations as angles in axial and sagittal planes and a 3D vector field to promote clinical and computational applications.

METHODS: Dissections of 6 fixed female cadaveric pelvises were performed. The PFM complex was removed *en bloc* and close-range photogrammetry was utilized to create 3D textured surfaces of the PFMs *in situ* using Photoscan Pro™. The photogrammetric reconstructions were imported into Blender™, where PFM fascicles were traced manually. PFM attachment sites were identified *in silico* to serve as landmarks defining axial and sagittal planes. Each fascicle trace was imported into Mathematica™ where tangent vectors from each trace were projected onto those planes to calculate angles with respect to the pubococcygeal line and input into Mathematica's interpolation function to generate a continuous vector field. Polar histograms were generated in Matlab™. Currently, these traces have been completed for one PFM specimen.

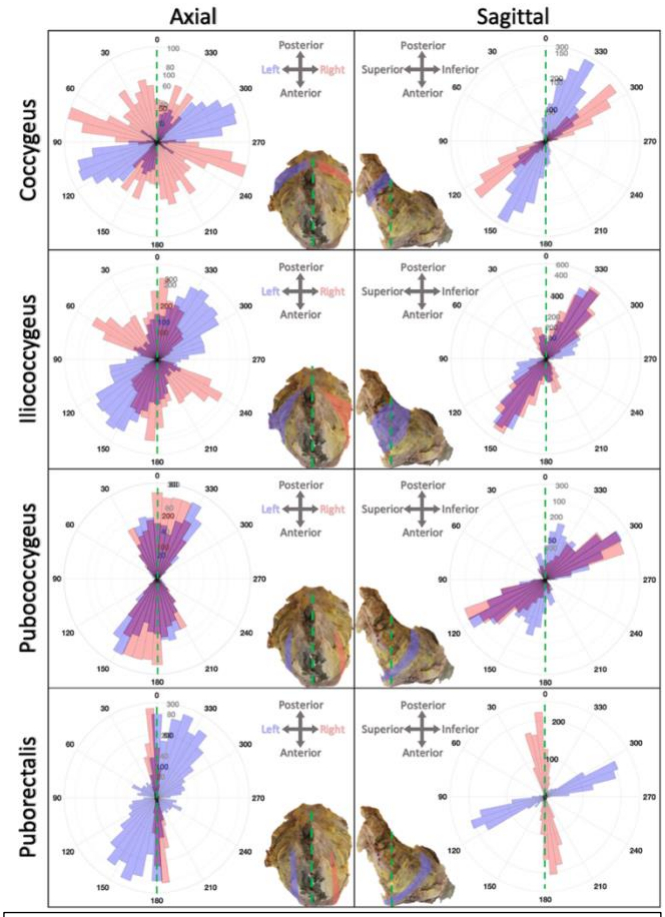

Figure 1: Angle polar histograms and figures indicating corresponding PFM cone orientations and specific muscles.

RESULTS: Muscle fascicles of more proximal components of the PFM complex (i.e. coccygeus) were more laterally oriented (Fig. 1). The average orientation of the muscle fascicles progressively became more anterior-posterior when moving distally (from iliococcygeus to puborectalis).

CONCLUSIONS: We used photogrammetry to robustly quantify female PFM surface fascicle orientations in a way that allows for intuitive clinical interpretation and utilization by computational models. This method could be used to validate DTI and provide more exhaustive orientation data. Despite its limitations, this method provides data that is currently lacking in the field of female pelvic medicine and essential for a more accurate and complete understanding of pelvic floor biomechanics. Future studies will validate these results using less detailed, but volumetric, data from *in vivo* imaging.

REFERENCES:

1. Betschart et al. *International Urogynecology Journal.* **25**(9):1263–1268, 2014
2. Brandão et al. *Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine*. **227**(12):1324–1332, 2013

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