2019 ABME Paper Awards

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Each year, the top papers in Annals of Biomedical Engineering (ABME) are selected for editorial awards that are presented at the annual Biomedical Engineering Society (BMES) meeting. At the 2019 BMES Annual Meeting, a total of five awards were presented: one award for the most citations,¹ one award for the most downloads,⁹ and three editor's choice awards.^{5,6,8} These papers were selected from a total of 182 papers published in 2018. Three of the five awarded authors were able to attend BMES to receive their award in person (Fig. 1). While the citation and download awards were selected purely quantitatively, the editor's choice awards were selected by the journal's editorial board. Each deputy editor-in-chief selected finalists based on the impact and quality of the papers, while also considering the number and rate of citations and downloads the papers received. The editor-in-chief selected the papers to be awarded from those finalists. The awards covered a wide range of topics, including biomechanics, medical robotics, and tissue engineering.

Ahola *et al.* developed a new method to simultaneously measure contractile motion and calcium transients in stem cell derived cardiomyocytes.¹ They used a combination of video-based measurement of contraction with fluorescent dye to measure calcium flux. This combined measurement can be used to better understand the electromechanical coupling of cardiomyocytes, and to study disease mechanisms and therapeutic effects.

Thesleff *et al.* reviewed all currently available bone-anchored limb prostheses along with their biomechanical characteristics.⁹ The percutaneous implant systems directly attach to the bone of an external limb, and therefore must be mechanically stable and withstand constant stresses from the limb over a long

period of time, along with providing an infection barrier to the environment.

Lin *et al.* implemented a computational method called direct collocation on a full-body neuromusculoskeletal model to perform predictive simulations of walking at different speeds.⁶ The simulations were able to accurately predict joint motion, ground reaction forces, and knee contact loads for total knee arthroplasty patients.

Horvath *et al.* compared different strategies for coupling a soft robotic cardiac assist device to the external surface of the heart.⁵ They specifically looked at direct cardiac compression sleeves, and found that a mesh-based sleeve that is allowed to biologically integrate with the epicardium may provide more efficient coupling. The results can be used to inform therapeutic approaches for end-stage heart failure patients.

Philips *et al.* compared a novel decellularization protocol for peripheral nerve allografts to two previously developed methods.⁸ They found that the new protocol was able to successfully remove cellular material, while still maintaining the nerve ultrastructure and extracellular matrix (ECM) components. The previously developed protocols either did not fully remove cellular material, or resulted in a loss of essential ECM molecules. This new protocol could lead to an alternative to the current gold standard of autografts for nerve substitutes.

These papers follow the six ABME paper awards presented at the 2018 BMES Annual meeting.^{2–4,7,10,11} All papers published in ABME during 2019 will be considered for awards to be presented at the 2020 BMES Annual Meeting. Awardees will be notified in July, and invited to receive their awards in person during a plenary session at the meeting. We look for-

FIGURE 1. ABME awards presented by Editor-in-Chief Stefan Duma at the 2019 BMES Annual Meeting. Pictured left to right: Antti Ahola (most citations), Claudia Varela (for Ellen Roche, editor's choice), and Yi-Chung Lin (editor's choice).

ward to recognizing the authors of our most impactful papers at BMES in San Diego next year.

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