



Guest Editorial

Special Section: Annual Education Issue: Let the Wild Rumpus of Education Start!

Welcome to the inaugural Annual Education Issue of the *Journal of Biomechanical Engineering*. As part of our efforts to foster excellence in biomechanics education, the editors of the journal have created this special section to highlight innovative teaching practices in bioengineering. The field of bioengineering is still young and, to a large part, lacks established textbooks and pedagogy. Yet, the field is growing rapidly, and some of the most exciting teaching methods and texts are being created to teach biomechanics to a broad, interdisciplinary audience. Our goal is to facilitate the dissemination of best teaching practices and to encourage use of recent research findings published in this journal to educate our students about cutting-edge research results and methods.

In this issue, we have four invited articles based on presentations and workshops at the 2015 Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C2015), which describe a journal club format which invigorates learning with primary literature, a tutorial for senior design courses, a process aimed at turning student projects into marketable devices, and integration of problem-based learning (PBL) in biomechanics courses. All the articles selected for publication are rigorously peer reviewed.

In the first article entitled “Classroom Journal Club: Collaborative Study of Contemporary Primary Literature in the Biomechanics Classroom,” Laurel Kuxhaus and Nicole C. Corbiere present a straightforward method to introduce students to primary literature in a self-guided way. This technique could be used by both new and experienced educators to supplement their existing courses and equips students for lifelong learning from primary literature. This type of reflective learning encourages students to make connections between the articles they analyze and class topics. The fact that students self-select their articles for Journal Club can spark their curiosity, connects engineering principles to real-world applications, and encourages them to consider the implications of creating value based on what they read.

In the article “Structure and Management of an Engineering Senior Design Course,” Tanaka and Fischer provide suggestions on how to develop and execute a senior design course. They have over 15 years of combined industrial experience working for various companies (Boeing, Texas Instrument, ABB, Siemens VDO, etc.) and they share this knowledge to better prepare students for careers in industry. Faculty developing a new course will find it a useful guide to avoid common pitfalls and those with more experience may discover new ways to improve their approach.

The third manuscript highlights the development of a capstone design course in biomedical engineering at UAB wherein Eberhardt and colleagues describe their recent quest to turn prototypes into marketable devices, including a new Master of Engineering. In “Team-Based Development of Medical Devices: An Engineering—Business Collaborative,” a number of personal “best practices” are described that are sure to be useful for educators looking to develop similar activities at their institutions.

In the final paper of this initial series entitled “Problem-Based Learning in Biomechanics: Advantages, Challenges, and Implementation Strategies,” Clyne and Billiar review the literature regarding the advantages and challenges of problem-based (and project-based) learning (PBL) and present their experiences of integrating PBL in biomechanics courses at two different institutions. They also provide practical guidelines for implementing PBL with examples and rubrics.

To facilitate teaching using primary biomechanics literature, we request the authors of technical articles to include methods and data that would aid instructors, e.g., including raw data as supplementary data or a link to an open access data source, detailed derivations of equations, analysis code/files, and links to videos of data visualization. We also invite members of industry to contribute editorials describing what they need in terms of biomechanics education for students positioning themselves to work in their companies.

We hope that the coming articles will aid the instructors who are teaching biomechanics course for the first time and do not want to “reinvent the wheel.” Creative examples to demonstrate biomechanics theory can be difficult to develop and, unlike core engineering topics, such as statics and stress analysis, there are few resources for such problems. We also encourage inclusion of rubrics and example problems as supplementary information for these manuscripts. We also trust that seasoned instructors will find the articles useful for updating existing delivery methods with innovative active-learning methods incorporation of cutting-edge research.

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