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Current Trends in Civil & Structural Engineering

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Short Communication

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Current Trends in Civil Engineering

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Short Communication

The intention of this introductory paper is to demonstrate emerging themes and approaches within the civil engineering profession. With this introduction to the first issue of "Current Trends in Civil Engineering", emphasis is placed on the challenges that have arisen, as suggested from the title itself. The journal reveals an ambition to approach the issue of "current trends", as they are precisely faced by this discipline. Currently, the profession is provoked to face the increasing demands of modern societies including multilayered public infrastructure and housing for a constantly rising population, while at the same time targeting financial viability and energy consumption. The aforementioned requirements and conditions are proving to be a great challenge and require further innovation in the construction industry. As such, the demand for new materials and rigorous selection criteria [1,2], the need for complicated structural design, the desire to build in new sites with no previous experience of their performance, the interaction of new buildings and infrastructure with their surrounding built environment, as well as energy and transportation networks and offshore wind energy farms [3] are the main areas demanding optimal planning and design strategies. In order to undertake this task, new methods of analysis capable of simulating complicated structural analysis whilst modelling interactions of structures are needed. In effect, advanced computational methods are being developed in Universities and research centers. There is a shift from Finite Elements towards mesh free methods [4,5], while Non-linear constitutive laws are required to simulate material behaviour and new technologies are needed to monitor the structural integrity throughout the structures' cycle of life [6].

In addition, energy consumption and the protection of the Environment are great challenges requiring innovative solutions. Specifically, in the field of Geotechnics new geomechanical and geotechnical applications have been developed [7]. On a global scale, urbanization and the extended networks change the scene [8-10]. These tremendous changes pose societies at risk against natural hazards. Systemic approaches are being developed to address perturbations like Climate change, natural disasters, economic

destabilization etc. – all posed on systems like societies at large, infrastructures, economies and ecosystems [11,12]. As a result, the main body of knowledge within civil engineering has expanded to include space technologies, like GPS and remote sensing and Information Systems tools like GIS, BIM, Smart Structures and Data Mining. Artificial Intelligence seems to be reshaping our society, with applications from every day life to the most advanced ventures. Accordingly, in our profession AI provides tools for decision making at planning and design processes, knowledge extraction from data, and an additional computational method in combination with more conventional ones. For instance, self-driving vehicles, robotics and 3D printing are reshaping both transportation and industry. Undeniably, the challenges that the profession faces are increasingly demanding and require a multidisciplinary cooperation, or at least a combination and a juxtaposition of skills and knowledge across our own discipline. For a young Engineer to be prepared to encounter the various tasks within the profession, a thorough, fundamental and profound engineering education is necessary. New methods and approaches require demanding mathematics and an inherent ability for self-learning. Above all, an education based on the three "C's", namely Critical thinking, Creativity and Collaboration is required.

Finally, I wish to encourage the readers to watch the video of the last Rankine Lecture, presented in March 2018 by Dr. Nick O' Riordan of Arup Company [8]. It consists a distinct model of presentation giving valuable insights into the Civil Engineering Profession in an Era of what is called by him as "Anthropocene".

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Conflict of Interest

No conflict of interest.

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