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CHARACTERISING UNCERTAINTY IN BIOMEDICAL MODELS: BAYESIAN METHODS, INFERENCE, AND UNCERTAINTY QUANTIFICATION

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MINI-SYMPOSIUM PROPOSAL

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The aim of computational modelling in biomedical engineering has typically been to make predictions about patient physiology, disease progression, diagnostic quantities, and/or device/drug performance. Since the computational models are simplified abstractions of reality, *i.e.* they do not account for all the biophysical processes, and the model parameters are not precisely known, the predictions made by such models are necessarily uncertain. Furthermore, the construction of such models and their customization to individual patients relies on experimental or clinical measurements, which themselves are uncertain. This mini-symposium invites the scientific community to present methods for the characterisation of both model and measurement uncertainty, and associated applications to biomedical engineering. Particular emphasis is on Bayesian frameworks, which have recently gained wide attention, but other frameworks enabling researchers to work with uncertainty are also welcome.

Invited topics include, but are not limited to, methods, advances, and applications for:

- Methods for parameter estimation and uncertainty quantification.
- Forward and backward propagation of uncertainty.
- Bayesian inference in computational biomedical engineering.
- Model selection and comparison.
- Methods to account for model errors.
- Multi-fidelity information fusion or assimilation.
- Metrics for quantification of uncertainty.
- Probabilistic models in biomedical engineering.
- Representation and communication of uncertainty to clinical end-users.