Bayesian Inference with Incomplete Likelihood or Prior: Employing Quick-and-Dirty Bayes Theorems and Prior Impact Assessments

BIOSTATISTICS SEMINAR

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The Bayesian paradigm provides a comprehensive and coherent framework to model variations, propagate uncertainties, and assess risks. But its full advantage comes with a heavy price: a mathematically precise description of both the likelihood function and the prior distribution. Neither is possible in most practice without making up unverifiable assumptions. Two principled (corner-cutting) strategies to address such impossibilities are (1) working with incomplete specifications to make imprecise but honest probability assessments, and (2) conducting sensitivity or scenario analyses to assess the impact of the scenarios. This talk demonstrates the power of the first strategy in the context of assessing risks for rare events via several quick-and-dirty Bayes theorems (Meng, 2022), inspired by a weekly puzzler from the popular radio show Car Talk. It then presents a practical approach to the second strategy in the context of quantifying the impact of prior scenarios; using an asymptotic formula or a bootstrap-like approximation (Reimherr, Meng, Nicole, 2021) to answer the question: what percentage of the posterior precision comes from the prior postulation instead of the likelihood? Both the quick-and-dirty Bayes theorems and prior impact assessments are as basic (or as fundamental) as the Bayes theorem itself, and yet their developments revealed several unexpected phenomenon and insights.

Thursday October 13, 2022, 3:30-4:30 PM Eastern

133 Rosenau Hall

Virtual using link and info below.

Link: https://unc.zoom.us/j/92602267820?pwd=YW1wN1pjdUNVd1A4TTl2OStmVHBjQT09

Meeting ID: 926 0226 7820 Passcode: 533114