Log-location-scale-log-concave distributions for survival and reliability data

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This talk will concern the sub-class of log-location-scale models for survival and reliability data formed by restricting the density of the underlying location-scale distribution to be log-concave. These, LLSLC, models display a number of attractive properties. I shall spend most time on the hazard functions of members of this class of distributions. Perhaps the most useful LLSLC models are contained in a class of three-parameter distributions which allow constant, increasing, decreasing, bathtub and upside-down bathtub shapes for their hazard functions. The generalized gamma and exponentiated Weibull distributions are particular examples thereof. I hope to be able to say something about the relative merits of these and heavier-tailed (Pareto/F) distributions for survival and reliability data. As yet, this work is more about understanding why existing − but perhaps not yet sufficiently popular − models work as they do (inter alia, providing further theoretical insight into practical comparisons in the work of C. Cox and colleagues), rather than providing a great deal in the way of new models. This work is joint with Angela Noufaily.

Keywords: distribution theory; exponentiated Weibull; generalized gamma; hazard shapes.