# Statistics Seminar

Department of Mathematical Sciences

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| **DATE:** | Thursday, December 10, 2015 |
| **TIME:** | 1:15pm to 2:15pm |
| **LOCATION:** | WH 100E |
| **SPEAKER:** | Aleksey Polunchenko, Binghamton University |
| **TITLE:** | Exact distribution of the Generalized Shiryaev–Roberts Stopping Time under the Minimax Brownian Motion Setup |


**Abstract**

We consider the quickest change-point detection problem where the aim is to detect the onset of a given drift in “live”-monitored standard Brownian motion; the change-point is assumed unknown (nonrandom). The object of interest is the distribution of the stopping time associated with the Generalized Shryaev–Roberts (GSR) detection procedure set up to “sense” the presence of the drift. Specifically, we seek the GSR stopping time's survival function, i.e., the tail probability that no alarm is triggered by the GSR procedure prior to a given point in time, and distinguish two scenarios: (a) when the drift is never in effect and (b) when the drift is in effect ab initio. Under each of the two scenarios we obtain a closed-form formula for the survival function, with the GSR statistic's (deterministic) nonnegative headstart assumed arbitrarily given. The two formulae are found analytically, through direct solution of the respective Kolmogorov forward equation via the Fourier spectral method to achieve separation of the spacial and temporal variables. We then exploit the obtained formulae numerically and offer a brief study to characterize the pre- and post-drift distributions of the GSR stopping time depending on three factors: (1) drift magnitude, (2) time, and (3) the GSR statistic's headstart.