Exact multiplicity of positive solutions to superlinear elliptic problems with a sign-changing weight

This talk will be concerned with the number of positive solutions to the boundary value problem

$$\begin{cases} -u'' = \big(h^+(t) - \mu h^-(t)\big) g(u), \\ u(a) = 0 = u(b), \end{cases}$$

where $h^{\pm}(t) := \max\{\pm h(t), 0\}$ and g is a superlinear function. The function $h \in L^1([a,b])$ will be assumed to have m intervals where it is positive separated by intervals where it is negative. Under some assumption on the shape of the positive "bumps", we will establish that this problem possesses *exactly* $2^m - 1$ positive solutions whenever μ is large enough. Moreover, these solutions are non-degenerate.

This is a joint work with Guglielmo Feltrin.