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**Jacek Szmigielski\*** ([szmigielski@math.usask.ca](mailto:szmigielski@math.usask.ca)), Department of Mathematics and Statistics, University of Saskatchewan, Saskatoon, SK , Canada. *Peakons and Cauchy biorthogonal polynomials.*

Peakons are non-smooth (peaked) solutions to certain class of nonlinear partial differential equations, most notably the Camassa-Holm, and Degasperis-Procesi equations. In the process of describing these solutions one is led to certain approximation problems, which naturally link the problem of describing peakons to the theory of orthogonal polynomials and, in the case of the Degasperis-Procesi equation, to certain biorthogonal polynomials associated to two measures and the Cauchy kernel  $1/(x+y)$ . These polynomials share many properties with orthogonal polynomials but also exhibit some novel features like four-term recurrence relations, generalized Christoffel-Darboux identity, a  $3 \times 3$  Riemann-Hilbert factorization formulation. This talk is based on joint work with M. Bertola and M. Gekhtman. (Received July 29, 2008)