1036-11-138 **Jennifer Beineke*** (jbeineke@wnec.edu), Department of Mathematics, Western New England College, 1215 Wilbraham Road, Springfield, MA 01119, and **Daniel Bump** (bump@math.stanford.edu), Department of Mathematics, Stanford University, Stanford, CA 94305. *Oppenheim Summation and the Atkinson-Jutila Formula for the Square of the Riemann Zeta Function.* Preliminary report.

In a 1927 paper, Oppenheim generalized Voronoï's summation formula to obtain a representation for $D_a(x) = \sum_{n \leq x} \sigma_a(n)$ in terms of Bessel functions. We will first describe a smooth version of Oppenheim summation. We will then discuss how its application can provide asymptotic results for moments of the Riemann zeta function. In particular, we will relate Oppenheim summation to a formula of Jutila, which is a modified version of Atkinson's 1949 formula for the error term in the asymptotic expansion of the second moment of $\zeta(s)$. (Received January 20, 2008)