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SEMINAR

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March 8, 2007
304 Whitehead Hall
Refreshments: 3:30 p.m.
Seminar: 4:00 p.m.

**THE GENUS OF A DIGITAL IMAGE IS DETERMINED BY
ITS FOREGROUND, BACKGROUND, AND REEB GRAPHS**

ABSTRACT

Our main result is that the genus of the boundary of a digital image is precisely half of the sum of the cycle ranks of three particular graphs: the “foreground graph” and “background graph”, which capture topological information about the digital image and its complement, respectively, and the Reeb graph, relative to the natural height function, associated with the digital image’s boundary. Additional results include a characterization of when the cycle rank of the Reeb graph fails to equal the genus of the digital image’s boundary (which can happen by virtue of the failure of the natural height function on the boundary of the digital image to be a Morse function).

(This is joint work with Lowell Abrams and Carey Priebe.)