Laney Bowden* (lbowden1@rams.colostate.edu), Julia Balukonis, Fatme Hourani, Ellie Lochner and John Clifford. The Numerical Range of a Composition Operator on the Hardy Space.

For a bounded operator $T$ on a Hilbert Space $\mathbb{H}$, the numerical range of $T$ is the subset $W(T)$ of $\mathbb{C}$ given by $W(T) = \{ <Tx, x> : ||x|| = 1 \}$. We study the numerical range of the composition operator, $C_A$, on the Hardy space $H^2(\mathbb{B}_n)$ where $A$ is an $n \times n$ matrix that is a self-map of the unit ball. We show the set of homogeneous holomorphic polynomials of degree $k$ is a reducing subspace for $C_A$; it follows that $W(A) \subseteq W(C_A)$. In the special case where $A$ is a weighted shift, $W(C_A) =$ convex hull($W(A) \cup \{1\}$). We completely characterize the numerical range of the operator when $A$ is unitarily similar to a Jordan-normal form that maps the ball to the ball by decomposing our operator into the direct sum of shifts and normal operators. (Received September 24, 2018)